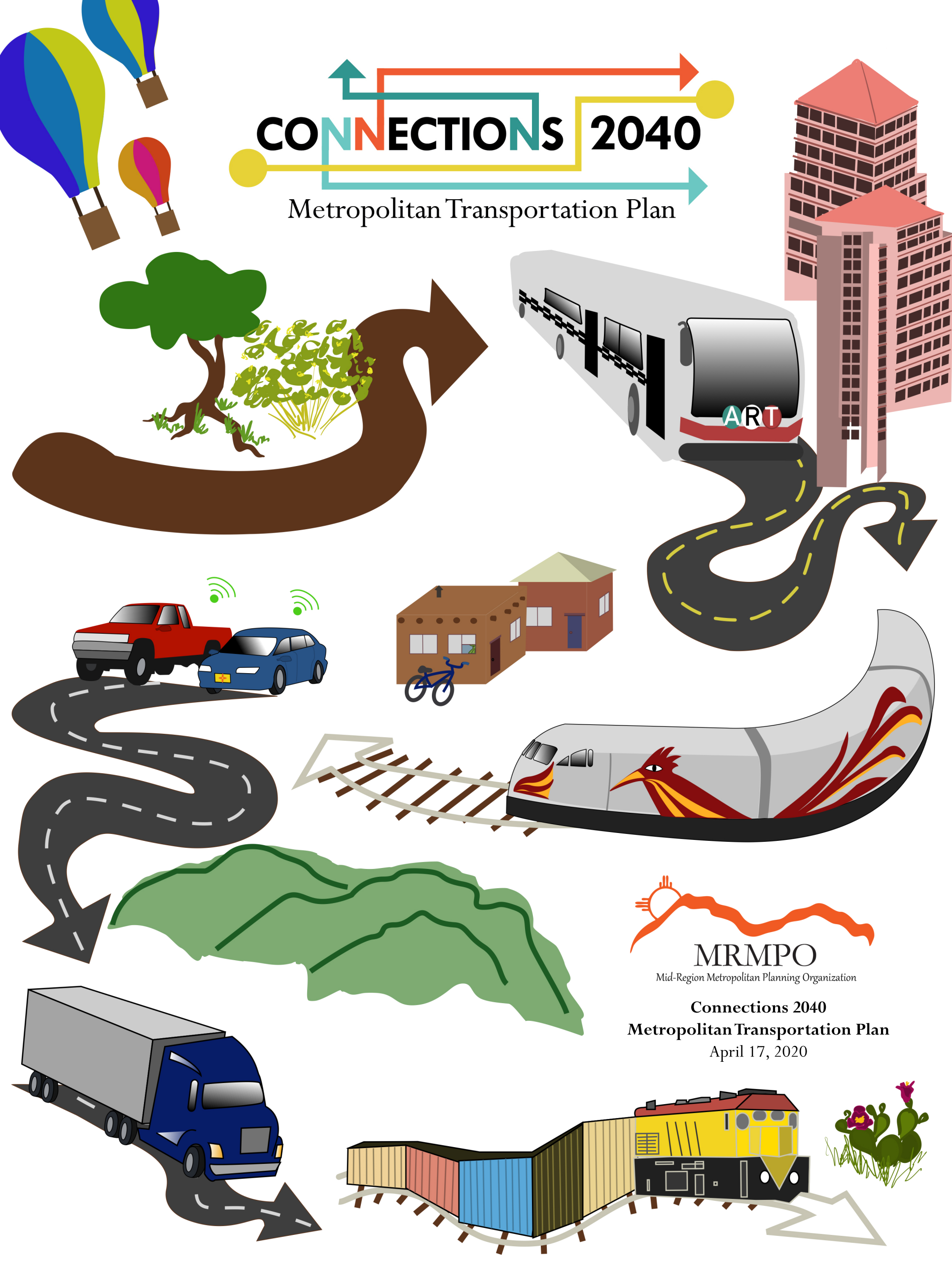


CONNECTIONS 2040

Metropolitan Transportation Plan



MRMPO

Mid-Region Metropolitan Planning Organization

Connections 2040
Metropolitan Transportation Plan
April 17, 2020



Metropolitan Transportation Board
Mid-Region Metropolitan Planning Organization
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Intelligent Transportation Systems (ITS) Committee
Land-Use Transportation Integration (LUTI) Committee

Active Transportation Committee
Freight Logistics Committee
Community Engagement Committee
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Table of Contents

Executive Summary

CHAPTER 1: INTRODUCTION TO THE CONNECTIONS 2040 MTP	1-1
1.1 The Role of MRMPO	1-2
1.2 MTP Goals	1-6
1.3 Federal Requirements for the MTP	1-7
1.4 MRMPO Structure	1-11
1.5 MTP Public Engagement	1-14
1.6 Contents of the MTP	1-18
CHAPTER 2: CURRENT AND FUTURE STATE OF THE REGION	2-1
2.1 Socioeconomic Trends	2-3
2.2 Transportation Trends	2-19
2.3 Regional Opportunities	2-25
2.4 Regional Challenges	2-31
CHAPTER 3: THE TARGET SCENARIO	3-1
3.1 What is the Target Scenario?	3-1
3.2 Target Scenario Forecast	3-7
3.3 Benefits of the Target Scenario	3-11
3.4 Foundation of the Target Scenario	3-12
CHAPTER 4: OPTIMIZED MOBILITY	4-1
4.1 Roadway System Performance	4-1
4.2 Transit System Performance	4-54
4.3 Roadway, Rail, and Air Freight Assets	4-79

CHAPTER 5: ACTIVE TRANSPORTATION	5-1
5.1 Pedestrian and Bicycle Travel Conditions	5-1
5.2 The Future of Active Transportation	5-15
5.3 Roadway Safety Priorities	5-21
5.4 Public Health Connections	5-27
5.5 Local Enhancements to Active Transportation	5-32
CHAPTER 6: ECONOMIC LINKAGES	6-1
6.1 Economic Impact of Transportation Spending	6-1
6.2 Economic Impact of Network Efficiency	6-3
6.3 Economic Well-Being	6-5
6.4 Place-Making as an Economic Driver	6-14
6.5 Fiscal Stewardship	6-18
6.6 Goods Movement	6-28
CHAPTER 7: ENVIRONMENTAL RESILIENCY	7-1
7.1 Crucial Habitat	7-4
7.2 Temperature and Precipitation Changes	7-11
7.3 Water Resources	7-21
7.4 Transportation Security and Critical Infrastructure	7-25
7.5 Air Quality Concerns	7-31
CHAPTER 8: FINANCIAL ANALYSIS	8-1
8.1 Financial Legislation and Requirements	8-1
CHAPTER 9: PLAN IMPLEMENTATION AND EVALUATION	9-1
9.1 Implementation Tools	9-2
9.2 Environmental Justice	9-13
9.3 Transportation Gaps in the Region	9-27

9.4	Recommended Pathways for Achieving the MTP Goals	9-31
9.5	Next Steps	9-33

APPENDICES

Appendix A: MTP Project List

Appendix B: Illustrative Projects List

Appendix C: Projects of Regional Interest

Appendix D: Financial Plan Detail

Appendix E: Long Range Transportation Systems (LRTS) Guide

Appendix F: Public Outreach

Appendix G: Recommended Pathways

Appendix H: Model Methodologies

Appendix I: Federal Performance Measures and FAST Act Report

Appendix J: Map Citations

Appendix K: Acronyms

LIST of FIGURES, TABLES, and MAPS

CHAPTER 1: Introductions to the Connections 2040 MTP

FIGURE	TITLE	PAGE
1-1	Aerial View of the AMPA	1-1
1-2	Illustration of the Transportation Planning Process	1-3
1-3	Connections 2040 Goals	1-6
1-4	FAST Act Performance Goals	1-7
1-5	New Mexico 2040 Plan	1-10
1-6	MRMPO Core Documents	1-10
1-7	MRMPO Committees and Structure	1-12
1-8	A Profile in Congestion, 2016 and the RTSAP, 2018	1-13
1-9	Public Engagement Goals	1-14
1-10	Mind the Gap Postcard	1-15
1-11	Bean Jar Voting	1-16

1-12	Bean Votes for Transportation Spending	1-16
1-13	Online Interactive Map for Public Comments	1-17

TABLE	TITLE	PAGE
1-1	List of Members, Advisory Agencies, and Stakeholders	1-5
1-2	Connection between FAST Act Goal Areas and MTP Goals	1-9
1-3	Document Organization and Chapter Summaries	1-18

MAP	TITLE	PAGE
1-1	Albuquerque Metropolitan Planning Area (AMPA) Boundaries	1-4
1-2	AMPA Urbanized Areas as defined by the US Census Bureau	1-8

CHAPTER 2: Current and Future State of the Region

FIGURE	TITLE	PAGE
2-1	Sunset over the Sandia Mountain Range	2-1
2-2	AMPA Population and Pace of Growth over Time, 1940-2018	2-3
2-3	Net Migration in the Region, 2000-2018	2-4
2-4	Employment Growth by Industry in the Albuquerque MSA, 2008-2018	2-5
2-5	Birth Count and Birth Rate in the Albuquerque MSA, 1990-2017	2-6
2-6	Housing Construction by Housing Type, 1990-2018	2-11
2-7	Housing Market Activity, 2004-2018	2-12
2-8	Population and Employment Forecast, 2016-2040	2-13
2-9	New Housing Construction in the AMPA	2-15
2-10	Transit Ridership vs. Vehicle Miles, 2004-2016	2-19
2-11	Current vs. Desired Housing Location, 2018	2-22
2-12	Satisfaction with the Transportation System, 2018	2-23
2-13	Bicycle, Transit, and Pedestrian Mode Share by Age, AMPA	2-24
2-14	City of Albuquerque Rapid Transit Bus (ART)	2-25
2-15	Los Lunas Route 66 Efforts	2-26
2-16	CEDS Plan	2-27
2-17	Pace Bike Share Station near the University of New Mexico	2-29
2-18	Pew Research Center Adult Ride-Hailing Services Use, 2019	2-30
2-19	Fatal Crashes in the AMPA by Mode, 2013-2017	2-35
2-20	FHWA Focus Cities and States	2-36

TABLE	TITLE	PAGE
2-1	Age Distribution in the Albuquerque MSA, 1990-2040	2-7
2-2	New Residential Units Constructed, Pre and Post Recession	2-8
2-3	Forecast Pace of Growth by County	2-14
2-4	Forecast Distribution of Growth by County	2-15
2-5	Summary Transportation Statistics, 2012-2016	2-20

2-6	Commute Mode Share over Time, 2012 and 2017	2-20
2-7	ABQ Metro Area Top Five Growth Industries	2-21
2-8	Jobs-to-Housing Balance East and West of the Rio Grande	2-34

MAP	TITLE	PAGE
2-1	Household and Job Densities, 2016	2-2
2-2	Housing Unit Construction, 2000-2008	2-9
2-3	Housing Unit Construction, 2008-2016	2-10
2-4	Household Growth, 2016 - 2040	2-16
2-5	Job Growth, 2016 - 2040	2-17

CHAPTER 3: The Target Scenario

FIGURE	TITLE	PAGE
3-1	The 3 Products of the Target Scenario	3-1
3-2	Connections 2040 Target Scenario Guiding Principles	3-3
3-3	Translating Regional Challenges into Scenarios	3-15

TABLE	TITLE	PAGE
3-1	Jobs-to-Housing Balance, 2016, Trend and Target Scenarios	3-7
3-2	Total Activity in Key Locations, 2016, 2040 Trend and Target Scenarios	3-8
3-3	Growth in Rural Areas and Existing Service Areas, 2040 Trend and Target Scenarios	3-8
3-4	Summary Statistics, 2016 Base Year, Trend and Target Scenarios	3-11

MAP	TITLE	PAGE
3-1	Key Locations of the Target Scenario, Key Centers and Transit	3-5
3-2	Household Growth, Trend vs. Target Scenario, 2040	3-9
3-3	Employment Growth, Trend vs. Target Scenarios, 2040	3-10

CHAPTER 4: Optimized Mobility

FIGURE	TITLE	PAGE
4-1	Non-Farm Jobs by County, 2018 in the Albuquerque MSA	4-3
4-2	Per Capita VMT in the AMPA, 1970-2018	4-5
4-3	Average Weekday Daily Traffic at the Big-I, 1980-2018	4-6
4-4	River Crossing Traffic in the AMPA, 1984-2018	4-8
4-5	Impact of Speed on Pedestrian Fatalities	4-10
4-6	TCFs for Fatal and Injury Crashes in the AMPA, 2013-2017	4-11
4-7	TCFs for Fatal Crashes Only in the AMPA, 2013-2017	4-11
4-8	Unmarked Crosswalks	4-12
4-9	River Crossing in the AMPA	4-22

4-10	Alameda Blvd River Crossing Peak Period	4-31
4-11	Where's My Bus?	4-32
4-12	NMROADS.COM Interface	4-33
4-13	Key Facts about NM's Infrastructure	4-34
4-14	Types of Capital Investments in the Most Recent MTPs	4-35
4-15	Typical Pavement Preservation Curve	4-36
4-16	Local Conditions based on NMDOT Bridge and Pavement Management System	4-36
4-17	How a Self-Driving Car Works	4-48
4-18	Connected Vehicle Communication	4-49
4-19	DOT's Connected Vehicle Path to Development	4-50
4-20	NHTSA Established Automation Levels	4-51
4-21	Distribution by age of Vehicle Replacement	4-53
4-22	Annual Transit Ridership in the Region	4-54
4-23	Transit Ridership in the United States, 2000-2017	4-55
4-24	Moving People Per Hour (HR)	4-56
4-25	Auto Loan by Credit Score	4-57
4-26	Pace Bike Share in Albuquerque	4-58
4-27	Comparison of Change in Transit Ridership	4-58
4-28	Average Historical Gas Prices (Federal Reserve Economic Data)	4-59
4-29	Albuquerque Ride Transit Trips by Mode, FY 2018	4-60
4-30	ABQ RIDE Service Locations and Operations	4-61
4-31	Rio Metro Service Area	4-62
4-32	Rio Metro Systemwide Passenger Trips, FY 2018	4-63
4-33	Rio Metro and ABQ RIDE Passenger Miles Traveled, 2008-2016	4-64
4-34	Operation Expenditures for Demand Response Services	4-65
4-35	Impacts of Poor Connectivity	4-66
4-36	Previous and Revised Network Comparison	4-70
4-37	Screenshot of Remix LRTN	4-74
4-38	Commute Seattle Drive Alone Percentages	4-78
4-39	Percentage of Commercial Vehicles out of Total Traffic Volume	4-79
4-40	2035 Truck Average Annual Daily Traffic on Freight Corridors	4-80
4-41	Commercial Vehicle Network Operating Under Congested Conditions	4-82
TABLE	TITLE	PAGE
4-1	2016 County-to-County Workflows	4-4
4-2	Crash Statistics in the AMPA, 2013-2017	4-9
4-3	Base Year and Trend No-Build Roadway Performance Summaries, PM Peak Hour	4-20
4-4	Trend and Target Scenarios Roadway Performance Summaries, 2040 PM Peak Hour	4-21
4-5	Impact of Additional Westside Jobs on River Crossings	4-22

4-6	CMP Corridor Rankings, 2016	4-28
4-7	Roadway Network Lane Miles	4-37
4-8	Primary ITS Services	4-42
4-9	VMT and Centerline Miles on ITS Corridors with Real-Time Operations	4-45
4-10	Mode Share for Selected Corridors	4-68
4-11	Long Range Transit Network Demographics from Remix	4-76
4-12	Performance Measures on Primary Freight Corridors, 2016 and 2040 Scenarios	4-81

MAP	TITLE	PAGE
4-1	Current Highway Functional Classification in the AMPA	4-2
4-2	PM Peak Hour Volume-to-Capacity Ratios, 2016 Observed Data	4-7
4-3	High Fatal and Injury Network	4-15
4-4	2016 Roadway Conditions	4-18
4-5	2040 Trend No Build Roadway Conditions	4-19
4-6	2040 Trend Roadway Conditions	4-23
4-7	2040 Target Scenario Roadway Conditions	4-24
4-8	Differences in River Crossing Delay and Westside Employment	4-25
4-9	CMP Network and Corridor Rankings	4-29
4-10	Roadway Vehicle Capacity Projects included in the Connections 2040 MTP	4-38
4-11	Long Range Roadway System (LRRS)	4-39
4-12	ITS Corridors in the AMPA	4-43
4-13	Network Coverage of “Real Time” ITS Travelers Information Services	4-44
4-14	Average Weekday Transit Users, 2018	4-69
4-15	ABQ RIDE Park and Ride Locations	4-72
4-16	Long Range Transit Network	4-77
4-17	Primary Freight Network	4-84
4-18	Freight and Truck Restrictions	4-85
4-19	Freight Speeds	4-86

CHAPTER 5: Active Transportation

FIGURE	TITLE	PAGE
5-1	Percentage of Trips by Mode	5-1
5-2	Strava Metro Online Dashboard Demonstration	5-4
5-3	Bike to Work Day Stop in Albuquerque	5-7
5-4	Share of US Vehicle Trips by Distance, 2017	5-8
5-5	What is your Primary Mode of Transportation? What other Modes do you Use?	5-9
5-6	Four Types of Bicyclists from City of Fresno Active Transportation Plan	5-10
5-7	ABQ CiQlovia, 2018	5-12

5-8	NMDOT “Look For Me” Campaign	5-13
5-9	How Complete do you Consider the Transportation Networks?	5-13
5-10	Bicycle Accessible Areas with the Sunport Extension	5-14
5-11	Top Reported Issues for All Transportation Modes, 2040 MTP Questionnaire	5-21
5-12	Bicyclist in AMPA	5-22
5-13	Traditional Safety Approach versus Vision Zero	5-24
5-14	City of Albuquerque’s Vision Zero Goals	5-25
5-15	Children Scooting to School in Albuquerque	5-26
5-16	Percentage of People Diagnosed with Diabetes and Workers who Bicycle or Walk to Work	5-28
5-17	Different Roadway Networks and their Effects on Connectivity	5-29
5-18	Heart Disease Deaths per 100,000 Population by County, New Mexico, 2015-2017	5-30
5-19	Village of Los Lunas Bicycle Master Plan	5-33
5-20	City of Albuquerque 50 Mile Loop	5-35
5-21	Pedestrian Hybrid Beacon in Bernalillo County	5-37

TABLE	TITLE	PAGE
5-1	Improved Bicycle Accessibility with Sunport Blvd Crossing Over I-25	5-14
5-2	MRMPO Recommended Bicycle Guidelines based on Roadway Attributes	5-17
5-3	Inputs to Pedestrian Composite Index	5-19
5-4	AMPA Pedestrian and Bicycle Crash Severity, 2013-2017	5-22

MAP	TITLE	PAGE
5-1	Permanent Counter Locations	5-3
5-2	Strava Metro Pedestrian Counts, 2017	5-5
5-3	Strava Metro Bicycle Counts, 2017	5-6
5-4	Bike Share Stations and Distance Contours	5-16
5-5	Long Range Bikeway System (LRBS)	5-18
5-6	Pedestrian Composite Index (PCI)	5-20
5-7	Crashes Involving Pedestrians or Cyclists	5-23

CHAPTER 6: Economic Linkages

FIGURE	TITLE	PAGE
6-1	Multi-Unit Housing in Albuquerque	6-7
6-2	Household Costs by Category	6-8
6-3	Shifting Age Composition in the Region	6-14
6-4	Wealth by Age	6-16
6-5	Deep Dive Coding Workshop	6-17

6-6	Industrial Zones and Vacant Land in the Region	6-30
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TABLE	TITLE	PAGE
6-1	Economic Impacts of New Transportation Dollars (MTP 2016-2040), 2020 Dollars	6-1
6-2	Economic Indicators	6-2
6-3	Economic Impact of Network Efficiency Improvements	6-3
6-4	Housing by Units in Structure in 2017, Albuquerque MSA & United States	6-6
6-5	Select Equity Data, 2017	6-13
6-6	Means of Transportation to Work by Poverty Level, 2017	6-13
6-7	Estimate of Capital Costs Incurred by New Growth, 2016-2040	6-20
6-8	Annual Maintenance and Operations Cost Estimates (New growth only)	6-21

MAP	TITLE	PAGE
6-1	Housing Affordability in the AMPA, 2017	6-9
6-2	Combined Housing and Transportation Affordability in the AMPA, 2017	6-10
6-3	Combined Housing and Transportation Affordability and Residential Building Permits	6-12
6-4	Infill Areas for the FIT Model	6-24
6-5	School Subdistrict Boundaries for the FIT Model	6-26

CHAPTER 7: Environmental Resiliency

FIGURE	TITLE	PAGE
7-1	Core Reserve, Buffer Zones, and Linkages	7-4
7-2	Tijeras Canyon Safe Passage Project	7-6
7-3	Bernalillo County Greenprint Close Up	7-10
7-4	Observed U.S. Temperature Change, 1901-2012; Observed Temperature Change Decadal Bar Graph, 1900s-2000s, U.S. Southwest	7-11
7-5	Observed U.S. Precipitation Change, 1901-2012; Observed Precipitation Change Decadal Bar Graph, 1900s-2000s, U.S. Southwest	7-12
7-6	Change in Annual Temperature and Precipitation Levels, Summary of Global Circulation	7-12
7-7	Total Regional Water Use by Sector, 2010	7-22
7-8	Available Water Supply and Projected Demand	7-23
7-9	Residential Water Consumption Rates by Lot Size, Bernalillo County	7-23
7-10	Stormwater Median	7-24

7-11	Carbon Monoxide in Bernalillo County, 1980-2018	7-32
7-12	US Greenhouse Gas Emissions by Sector, 2017	7-34
7-13	Energy Roadmap for the Southwest	7-37
7-14	City of Albuquerque Electric Vehicle Charging Stations	7-37
7-15	New Mexico Clean Energy Map	7-38
7-16		

MAP	TITLE	PAGE
7-1	National Land Cover Data Classifications with Trails	7-2
7-2	Wildlife-Vehicle Collisions, 2012-2016	7-7
7-3	Crucial Habitat Assessment Tool (CHAT)	7-9
7-4	Federal Emergency Management Agency (FEMA) 100-year Floodplains in the Region	7-15
7-5	Wildland Urban Interface (WUI) Areas of the Region	7-17
7-6	Urban Heat Island (UHI) and Tree Canopy in the Albuquerque Metro Area	7-20
7-7	Alternate Routes along the Local Network	7-30

CHAPTER 8: Financial Analysis

FIGURE	TITLE	PAGE
8-1	Projected Funding Available from Public and Private Sources, 2016-2040	8-5
8-2	2040 MTP Publicly Funded Projects by Type	8-12
8-3	2040 MTP Comparison of Publicly & Privately Funded Projects by Type	8-12

TABLE	TITLE	PAGE
8-1	Summary of Fiscal Constraints	8-3
8-2	Projected Funding Available from Public Sources	8-4
8-3	Projected Funding Available from Public and Private Sources	8-4
8-4	Private Capital Revenue and Expenditures	8-8
8-5	Projected State and Local Maintenance & Operations Expenditures	8-11
8-6	Funds Available for Capital Transportation Projects	8-11
8-7	Project Expenditures by Type of Project, Comparison of Futures 2040 MTP and Connections 2040 MTP Update	8-13

CHAPTER 9: Implementation and Evaluation

FIGURE	TITLE	PAGE
9-1	Project Prioritization (PPP) Guidebook	9-4
9-2	Public School in the AMPA	9-5
9-3	LRTS Guide Document	9-6
9-4	Enhanced Bicycle Facility in the AMPA	9-6
9-5	Inadequate Sidewalk	9-7
9-6	Regional Transportation Safety Action Plan (RTSAP) Cover	9-8
9-7	Dynamic Message Sign in the AMPA	9-10
9-8	Activity Center, AMPA	9-11
9-9	ABQ RIDE Bus Stop, AMPA	9-16
9-10	ABQ RIDE Bus in Downtown	9-17
9-11	Bosque Trees in the AMPA	9-19
9-12	People Enjoying Open Space Along the Bosque	9-23
9-13	MTP Promotional Postcard in Spanish	9-29
9-14	Invitation to the Public to Identify Gaps	9-30
9-15	Spot Gaps Distribution by Topic Area in the AMPA	9-31
9-16	Top System Gaps in the AMPA as Reported by the Public	9-33
9-17	Transportation Gap in the AMPA	9-34
9-18	Key Pathways for Meeting the MTP Goals (Optimized Mobility, Economic Linkages)	9-35
9-19	Key Pathways for Meeting the MTP Goals (Active Transportation/Environmental Resiliency)	9-36
TABLE	TITLE	PAGE
9-1	Top 10 Congested Corridors in the AMPA, 2016	9-9
9-2	Accessibility of EJ and Non-EJ Population to Transit in the AMPA, 2018	9-17
9-3	Accessibility of Transit for Low-Income and Persons of Color	9-17
9-4	Tree Canopy Coverage in the AMPA	9-19
9-5	Urban Heat Islands in the AMPA	9-21
9-6	Accessibility of Outdoor Recreation for Populations in the AMPA, 2017	9-23
9-7	Transit Access to Grocery Stores for Various Demographic Groups	9-25
9-8	Transit Access to Healthcare Facilities for Various Demographic Groups	9-27
MAP	TITLE	PAGE
9-1	Environmental Justice Index	9-15
9-2	Walking Access to Transit and EJ Populations	9-18
9-3	Tree Canopy Coverage and EJ in the Albuquerque Metro Area	9-20
9-4	Urban Heat and EJ in the Albuquerque Metro Area	9-22

9-5	Walking Access to Open Space and EJ Populations	9-24
9-6	Access to Grocery Stores by Transit	9-26
9-7	Accessibility of Major Healthcare Facilities by Transit	9-28
9-8	Public Responses on Existing Gaps (or Problem Areas) in the AMPA	9-32



CONNECTIONS 2040

Metropolitan Transportation Plan



EXECUTIVE SUMMARY

The Albuquerque metropolitan area is a dynamic place. With close to a million residents, and the state's largest concentration of jobs, it is the state's economic center. The safe and efficient movement of people and goods is important for the region to thrive and the economy to flourish. This involves keeping our transportation infrastructure in good working order, improving or adding roads, bike facilities, and sidewalks, providing quality transit service, and fine-tuning traffic operations through signal timing, real-time traveler information, and other technology-based solutions.

The Mid-Region Metropolitan Planning Organization (MRMPO) plays an important role in keeping the region moving. It covers the greater Albuquerque metro from Belen to the south to Pueblo de Cochiti to the north. Working together with various entities and the public in central New Mexico, MRMPO facilitates the development of the Metropolitan Transportation Plan (MTP), a long-range transportation plan which helps guide transportation investment in the region.

While our region's infrastructure needs continue to mount, our sources of transportation funding have become more limited and unpredictable. Because of this, it is imperative that projects listed in the **Connections 2040 MTP** fill a critical gap in the regional transportation system to ensure the greatest return on investment of public dollars.

Metropolitan Transportation Board

The **Connections 2040 MTP** is adopted by the Metropolitan Transportation Board (MTB). The MTB is the transportation policy making body for the region and is comprised of elected officials from local, county, and Tribal governments in Bernalillo, Sandoval, and Valencia Counties as well as other advisory agencies such as the New Mexico Department of Transportation and public school districts.



CONNECTIONS 2040

Metropolitan Transportation Plan

What's New in this MTP?

- Although the *Connections 2040 MTP* has the same horizon year of 2040 as the previous MTP, the updated plan includes the use of a new base year, which is 2016.
- The MTP is now on a five-year cycle rather than a four year one because our region is now in conformity with federal air quality requirements.
- This plan includes new socioeconomic forecasts and new travel demand forecasts based on the updated roadway network. The Target Scenario was also updated, and the benefits are summarized in Chapter 3.
- New analysis was undertaken on mode share along the Priority Investment Transit Network, connectivity impacts, and the estimated costs and number of residents that could be served by the Long Range Transit Network.
- There is an expanded description of Transportation Systems Management and Operations strategies with discussions about Intelligent Transportation Systems and Autonomous and Connected Vehicle Technology.
- The Environmental Resiliency chapter includes newly mapped data on wildlife/vehicle collisions as well as areas of the region that are experiencing urban heat island effects.
- Greater emphasis is given to the Active Transportation goal, with an entire chapter devoted to bicycle and pedestrian travel and improving safety for these modes.
- Consideration of the relationship between transportation and economic conditions is looked at more robustly in the Economic Linkages chapter, with new analyses on the economic impact of the Plan and an analysis of the fiscal implications of different growth scenarios.

We invite you to read and reflect on this updated long-range transportation plan, the *Connections 2040 MTP*, our regional blueprint for how we can make the needed improvements and connections for moving forward as we step—bike, scooter, ride, or drive—into the future!

Regional Projections

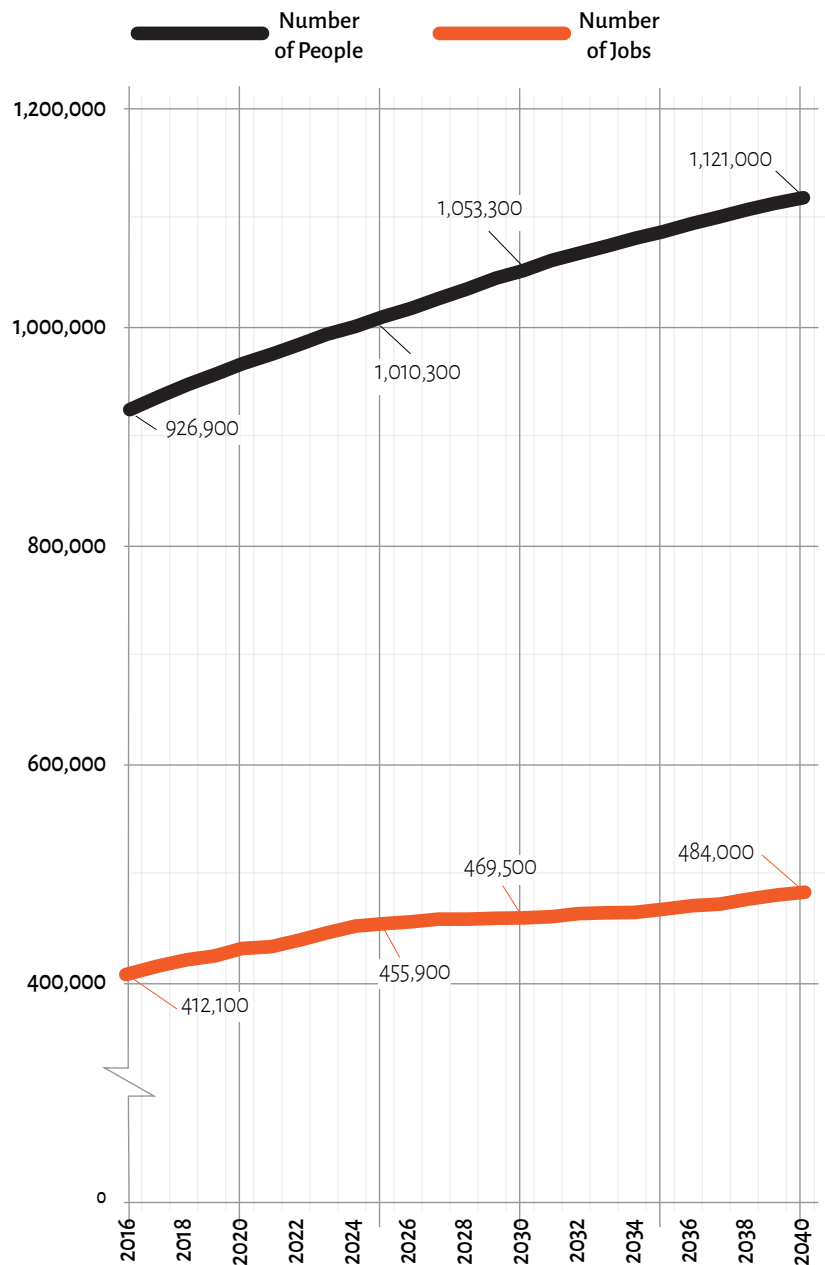
The **Connections 2040 MTP** provides a framework for looking at projected population and employment growth as well as the impact of that growth on our transportation system.

Looking 20 years ahead helps us proactively prepare for the future; a future that includes nearly 200,000 more residents and an additional 72,000 jobs. In terms of transportation needs, people in this region currently travel about 1.6 million miles on average in a given year. This is expected to increase to 1.9 million miles by 2040.

If we do not invest in future upgrades to our transportation system, there will be an approximate 42 percent increase in hours spent sitting in traffic during peak commuting times by 2040, resulting in an 18 percent reduction in average system-wide speeds.

By pursuing the projects listed in the MTP we will improve our future. Targeted investments over the next 20 years will result in a 20 percent decrease in congested lane-miles during peak commutes when compared with a “do-nothing” scenario. The economic benefits of a more efficient transportation network are substantial, with **an estimated savings in travel time worth approximately \$2 billion dollars over the life of the plan.**

Population and Employment Forecast MRCOG Region, 2016-2040



Identifying Gaps in the Current Transportation System

The central focus of the *Connections 2040 MTP* is on addressing existing gaps in the transportation system so that greater connections across our region can be achieved in the long term. As part of the MTP outreach efforts to the general public, as well as public agencies, certain system-wide gaps and other transportation-related concerns were identified.

Public Outreach

The public participated in the development of the plan through public meetings, an online questionnaire (also available in hard copy and in Spanish), an online interactive “gaps” map, as well as at community events, meetings, and presentations around the region. In addition, comments and questions were accepted by (e)mail throughout the process. Over 30 feedback opportunities were provided by MRMPO and approximately 1,826 data inputs were received (comments, questionnaires submitted, and funding votes) from the public and agency stakeholders. Efforts were made to meet people where they were and to reach groups that don't typically participate, such as young adults and low-income populations.

Other Concerns Raised

LAND USE

Lack of jobs and daily destinations on the Westside
Lack of integrated land use and transportation planning
Neighborhoods not connected to schools

FREIGHT

Lack of a complete freight network
Gaps in Westside freight corridors
Air, rail, and truck freight not integrated

ITS

Poor signal timing and coordination at intersections
Need to use technology to manage traffic operations
Travelers need improved access to information

POLICY

Need better coordination between agencies
Not enough consideration of issues of equity
Better implementation of the MTP

System-wide Gaps by Mode

PEDESTRIAN & BICYCLE

Crosswalks are unsafe - too many speeding vehicles
Poor facility design—e.g. lack of buffered bike lanes, pedestrian crossing (hawk) signals, well-maintained sidewalks
Bicycle and pedestrian networks are incomplete

TRANSIT

Transit service not frequent enough and hours too limited
Transit needs to expand to underserved areas
Lack of support and funding for transit

ROADWAYS

Poor maintenance of our existing roadway infrastructure
Lack of roadway connections and river crossings
Too much congestion and bottlenecks

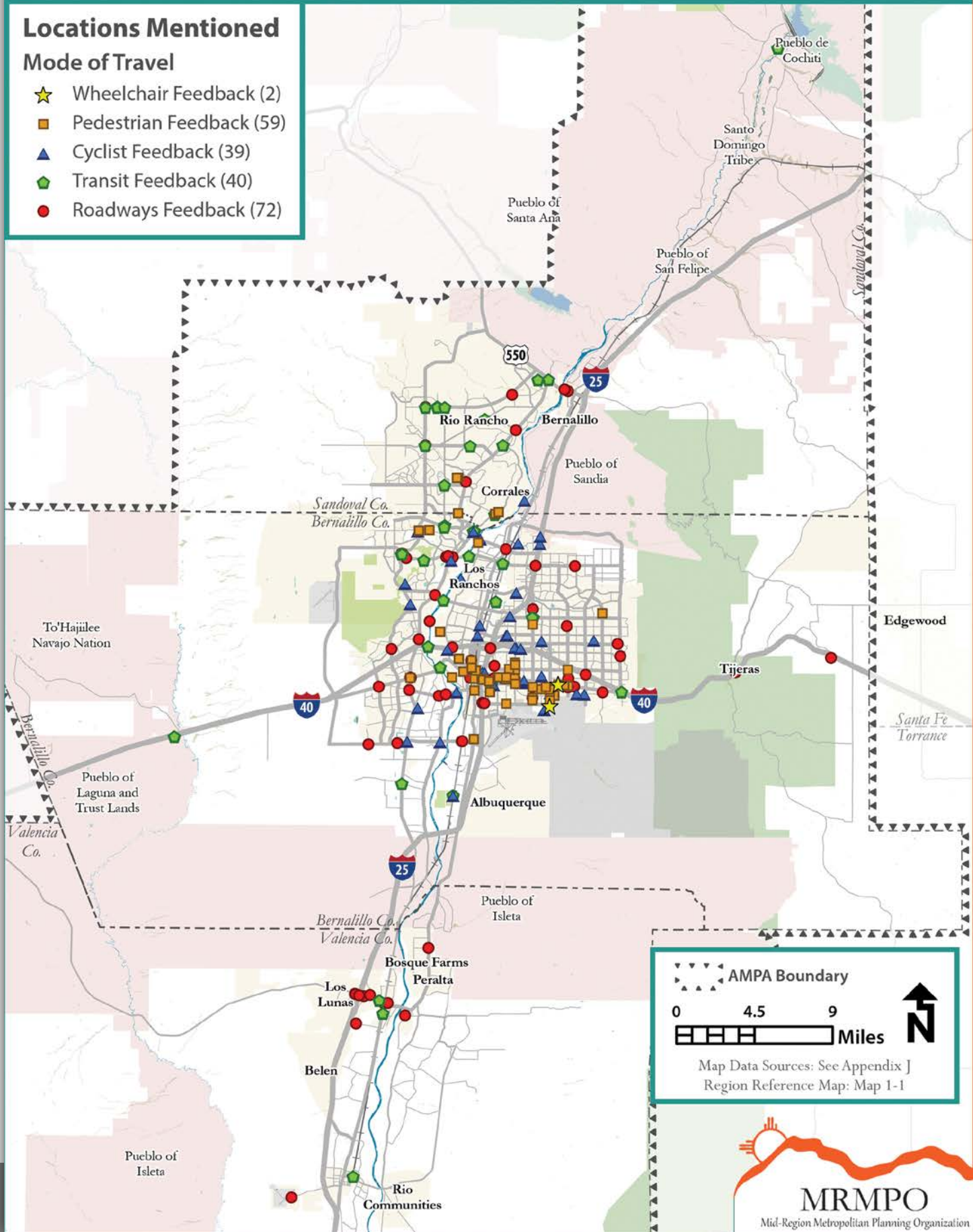


Public Feedback on Transportation Gaps

Locations Mentioned

Mode of Travel

- ★ Wheelchair Feedback (2)
- Pedestrian Feedback (59)
- ▲ Cyclist Feedback (39)
- ◆ Transit Feedback (40)
- Roadways Feedback (72)



AMPA Boundary

0 4.5 9 Miles



Map Data Sources: See Appendix J
Region Reference Map: Map 1-1



MRMPO

Mid-Region Metropolitan Planning Organization

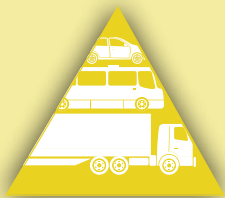
MTB Goals and Pathways*

Transportation projects included in the MTP must align with the long-range plan's vision and goals. There are four overarching goals that guide the **Connections 2040 MTP** which incorporate the federal performance goals set forth by the FAST Act.**

Each goal is accompanied by a list of pathways, or strategies. They will help guide regional planning and policy decisions and make sure transportation-related

plans align with the regional vision expressed in the **Connections 2040 MTP**.

The pathways associated with each goal focus on closing existing gaps in the transportation system by improving connections. Greater connectivity helps improve the efficiency and safety for all modes of travel and helps increase the viability of walking, bicycling, and taking transit.



OPTIMIZED MOBILITY

- Develop a long-range regional transit plan in coordination with public service agencies, municipalities, and developers that contains prioritized transit investments
- Enhance the safety, frequency, availability, and reliability of transit
- Adopt mixed-use and higher-density zoning along transit corridors to support ridership
- Develop and implement roadway connectivity standards
- Improve multi-modal options and last mile connections
- Adopt policies and standards that support Complete Streets and context sensitive design standards



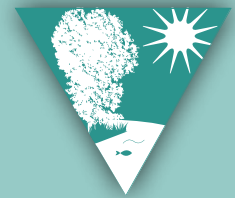
ECONOMIC LINKAGES

- Encourage place-making and the proliferation of community identity and innovation
- Incentivize redevelopment, transit-oriented development, and infill in order to maximize the utility of existing infrastructure
- Ensure project readiness in transportation funding decisions
- Support projects utilizing innovative technologies
- Support and coordinate freight operations and movement, and industrial development
- Promote fiscally responsible growth patterns



ACTIVE TRANSPORTATION

- Implement the recommendations in the Long Range Transportation System Guide (LRTS) and Regional Transportation Safety Action Plan (RTSAP)
- Ensure the health and safety of the traveling public
- Improve the user experience for cyclists, pedestrians, and transit riders with thoughtful connections and design
- Prioritize a well-connected and safe transportation network
- Improve access to and within activity centers and transit corridors
- Consider the needs of people of all ages and abilities in the design and operation of active transportation infrastructure



ENVIRONMENTAL RESILIENCY

- Integrate ecological principles in transportation and land use planning
- Prepare Emergency Management Plans with a focus on multi-agency coordination
- Encourage low-impact and sustainable development strategies in natural or culturally sensitive areas
- Promote natural resource and greenspace conservation
- Provide non-motorized access and safe routes to recreational areas and open space
- Consider transfer of development rights and land purchases to conserve and create new open spaces
- Require coordination of drainage and landscape plans to maximize efficient use of stormwater

*See full document Chapter 9 for a detailed discussion of pathways and Appendix G for a full list of pathways.

** National performance goals are discussed in Chapter 1.

Performance-Driven

The **Connections 2040 MTP** is the first MTP that includes quantitative federal performance measures to help measure the region's performance. These include metrics that measure safety, pavement and bridge condition, and freight movement. Additional federal performance measures will be included as part of the MTP as they are finalized and approved at the federal level. *

Fiscally Constrained

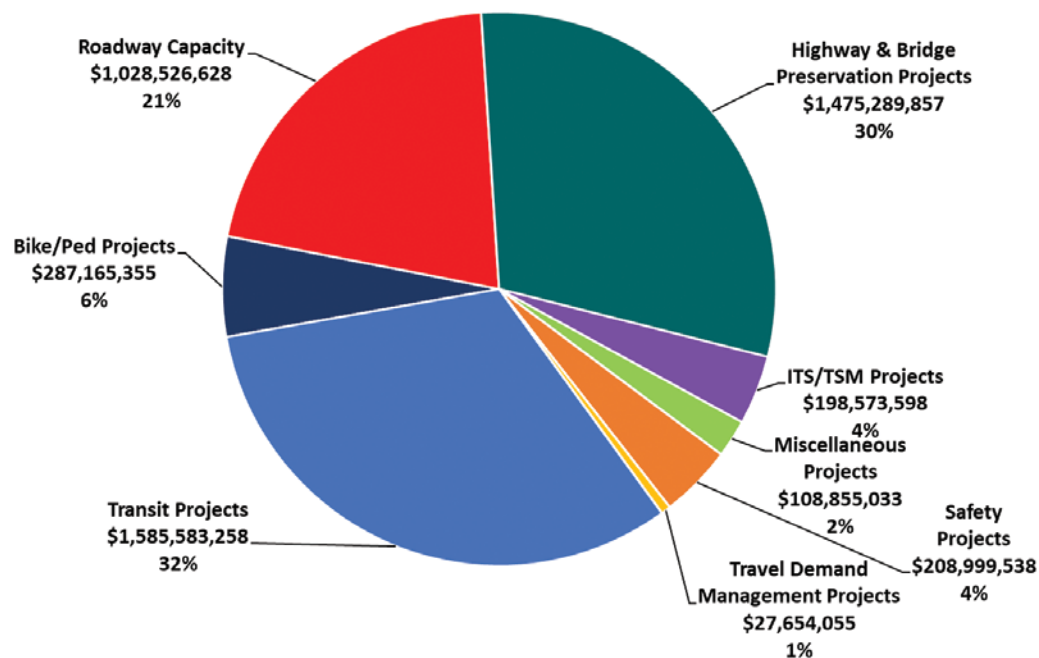
Metropolitan transportation plans are required to be fiscally constrained. This means that these long-range transportation plans must demonstrate that projects can be implemented using committed, available, or reasonably expected future revenue sources. In other words, the total cost of all transportation projects and expenditures in the MTP cannot exceed the projected financial resources available.

Financial Plan

In all, this MTP includes an estimated \$11.45 billion in public and private funds that are available in the AMPA for maintenance, operations, and capital projects.** The chart below shows how the \$4.9 billion in public funds available for capital projects will be spent across the different project types over the next 20 years. Projects include new interchanges, additional and expanded roadways, various pedestrian improvements, and expanded transit services.

This MTP continues to emphasize preserving existing infrastructure, and funding reflects a prudent continuation of a shift from investment in building new roadways to first making sure that what we already have built is maintained. The plan includes approximately \$1.5 billion dollars of available public funds to preserve roads and bridges nearing the end of their lifespan while considering additional investments that improve the efficiency of our existing transportation infrastructure.

2040 MTP Publicly Funded Projects by Type



*More information on the federal performance measures is found in Appendix I.

**See Appendix D for a detailed fiscal constraint analysis.



The Target Scenario

This MTP updates the region's preferred growth scenario, the Target Scenario. The Target Scenario envisions a future with bustling activity centers and transit nodes, where rural character is preserved, where there is a well-connected multi-modal transportation network, and where street design that considers all users is commonplace. The **Connections 2040 MTP** helps forward that vision with eight guiding principles. These guiding principles help inform planning and decision making toward this shared vision.

Heavily guided by input from member governments and stakeholders, **Connections 2040 MTP** updated the listing of key locations identified for targeted investment. They all are regionally significant *and* support local planning efforts.

The guiding principles are the heart of the Target Scenario, and the key locations form its backbone.

An analysis of the Target Scenario* demonstrates that when implemented, the Target Scenario can help to:

- shift 13,000 jobs to locations west of the Rio Grande
- increase pedestrian access of 3,000 households to transit
- reduce land consumption by 1,500 acres
- take nearly 40,000 vehicle trips off river crossings per day
- decrease PM peak hour delay across the river by 43 percent
- improve safety for all modes of travel

Eight Guiding Principles

COORDINATE land use and transportation planning

Reduces congestion and encourages shorter trips

PRIORITIZE existing infrastructure

Necessary for fiscally responsible growth

FOCUS on active place-making

Encourages economic development and a sense of community

INVEST in activity centers and transit-oriented development

Supports economic viability and access to services

BALANCE housing and jobs particularly on the Westside

Decreases trips across the river

BUILD connected multi-modal travel networks

Provides shorter and safer routes for everyone

SUPPORT premium regional transit

Improves equity and frequency of transit services

ENCOURAGE diverse housing options

Responds to changing consumer preferences

*See full document Chapter 3 for complete analysis of the Target Scenario

Key Locations of the Target Scenario

Key Transit

- Target Scenario Transit Network
- Rail Runner
- Rail Runner Stops

Key Centers

- Regional Center
- Opportunity Center
- Reinvestment Center
- Employment Center

Key Center Names

- NM 550
- Rio Rancho City Center
- Northern and 528
- Southern and 528
- Unser Gateway
- Intel
- Cottonwood Mall
- North Jefferson
- Volcano Heights
- La Cueva Center
- South Jefferson
- Double Eagle II
- Uptown
- Sawmill
- UNM
- Atrisco Business Park
- Petroglyphs Town Center
- Downtown Albuquerque
- Fairgrounds
- Upper Petroglyphs
- East Gateway
- CNM/ Stadiums
- Five Points
- Sandia Science & Technology Park
- KAFB
- Sunport Airport
- Sunport Commerce Center
- Santolina
- Las Estancias
- Sunport South
- Mesa del Sol
- West Los Lunas
- Los Lunas RR Station
- Manzano Center
- Belen Intermodal Center
- Downtown Belen
- Belen Airport
- Rio Grande Industrial



MTP Projects

Below is a listing by travel mode of some of the major projects that are planned for the lifetime of the

Connections 2040 MTP.*

Five Major Roadway Projects

- Completing Unser Blvd. corridor improvements
- Widening of I-25 Northbound between Rio Bravo Blvd. and Sunport Blvd.
- Reconstructing the I-25/Cesar Chavez Blvd. interchange
- Reconstructing the I-25/Gibson Blvd. interchange
- Reconstructing the I-25/Montgomery Blvd. interchange

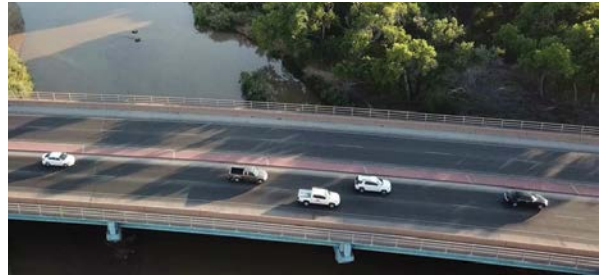
RIVER CROSSING | The MTP includes resources for constructing a new river crossing in Los Lunas. This project will increase response times for emergency services and improve congestion and commute times for the growing number of residents in Valencia County. The project enjoys broad community support.

Five Major Transit Projects

- Implementing Albuquerque Rapid Transit (ART) along Central Avenue.
- Planning for rapid bus service in the UNM/CNM/ Sunport area to complement the ART.
- Improvements to NM Rail Runner Express service and infrastructure.
- Implementing Positive Train Control (PTC), a federally mandated rail safety system.
- Developing additional Park and Ride facilities in the metropolitan area.

Five Major Bicycle/Pedestrian Projects

- Provide a continuous bike/pedestrian trail along Paseo del Norte. (To be constructed in phases.)
- North Diversion Channel Trail Rehabilitation.
- Construct a safe, multi-use trail from the softball fields to the Santo Domingo Trading Post.
- Construct missing bike lanes along University Blvd.
- Construct a multi-use trail along 2nd Street with a connection to the new Valle de Oro National Wildlife Refuge and other existing trails.



*The full list can be found in Appendix A. A list of "major projects" is featured in Chapter 8. In addition, an Illustrative List of projects is included in Appendix B. This list is separate from the MTP fiscally constrained list and is comprised of projects that have been identified as potential projects, but lack either a local agency sponsor and/or identified funding sources. Appendix C provides the status of projects that have been of regional interest over the course of several long range plans.

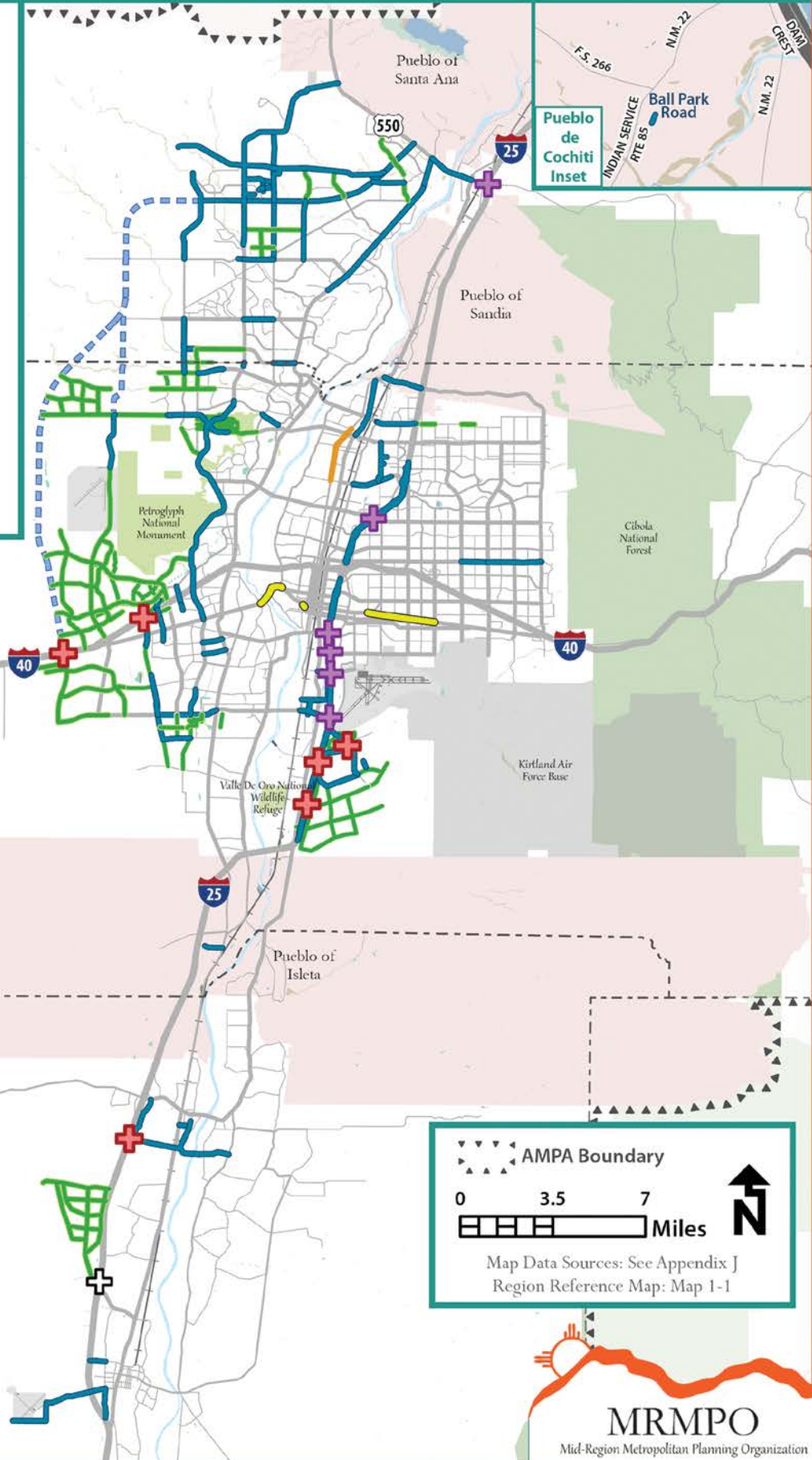
Roadway Vehicle Capacity Projects (2016 - 2040)

Capacity Change and Funding Type

- Expansion (Public)
- Expansion (Private)
- - - Right of Way Acquisition (Public)
- Vehicle Capacity Reduction (ART; Public)
- Reduction (Public)

Interchanges

- + Proposed Interchange (Public)
- + Reconfiguration (Public)
- + Reconfiguration (Private)



AMPA Boundary

0 3.5 7 Miles

Map Data Sources: See Appendix J
Region Reference Map: Map 1-1

MRMPO

Mid-Region Metropolitan Planning Organization

10 KEY TAKEAWAYS



Community Engagement

- 1 → In developing this Plan, MRMPO focused on getting out into communities instead of asking people to come to us. In addition, a conscious shift was made from presenting research to gathering perspectives.
- 2 → Many public comments emphasized that ADA compliant, complete street infrastructure and efficient transit service are not simply amenities, but a necessity for safe daily travel. Not all residents own vehicles, and our region ranks among the most dangerous places nationwide for pedestrians.

Safety

- 3 → Over a third of our region's traffic fatalities involve pedestrians or bicyclists. It is imperative that we take into account the safety of the most vulnerable of our roadway users when designing new roadways or retrofiting old ones.
- 4 → Excessive speed and dangerous driving are responsible for 25 percent of the region's fatal crashes. The Plan recommends implementing traffic calming treatments on dangerous roadways and to step up enforcement that confronts the most dangerous driving behaviors where appropriate.

Regional Growth

- 5 → Annual census estimates show modest population growth, reversing out-migration patterns following the Great Recession. The region is expected to reach one million residents by 2025.
- 6 → More than 72,000 new jobs are expected to be added by 2040. However, working-age people will likely make up a smaller percentage of the total population.

Regional Trends and Target Scenario

- 7 → Current trends point toward more mixed-use and multifamily housing, and – with continued investment in multi-modal transportation – additional growth in activity centers. This may help alleviate the amount of time people will spend in their vehicles over the next twenty years.
- 8 → The Target Scenario represents our Board-adopted vision for more resilient land-use development patterns. Achieving a healthier balance of jobs and housing on the west side of the Rio Grande will reduce anticipated river crossing delays by 43 percent.

Implementation Strategies

- 9 → The MTP recommends local communities follow the region's complete streets guide, *the Long Range Transportation Systems Guide* which contains proven strategies for improving safety for all roadway users.
- 10 → Smart technologies, such as Intelligent Transportation Systems (ITS), allow us to get the most capacity out of our existing roadways. The MTP details how emerging technologies and autonomous vehicles may influence travel behaviors over the coming decades.



CHAPTER 1:

INTRODUCTION TO THE *CONNECTIONS 2040* MTP

The *Connections 2040 Metropolitan Transportation Plan* (MTP) is the region's long-range transportation plan. The MTP identifies transportation challenges that the Albuquerque Metropolitan Planning Area (AMPA) will face over the next 20 years and presents strategies for addressing them.

As our region grows it is crucial to analyze both the location and density of growth and the types of transportation options available to people to reach certain destinations. Our ability to access employment centers, local services and entertainment, and recreational activities all impact the quality of our lives. Having opportunities to walk or ride a bike safely or get to our jobs if we don't have access to a vehicle, are important factors to consider for everybody. When residential or commercial growth develops in a fragmented way, or the streets are not well-connected, congestion can worsen, and safety concerns become more amplified.

Integrating our land use and transportation decisions in a way that creates complete street networks, and therefore redundancy in an emergency situation such as a vehicular crash or roadway flooding, is beneficial for both overall safety and smooth traffic flow, as well as more direct facilities for people biking and walking.

When there are limited choices of different housing types, and when residential land uses are separated from other land uses, people end up having to travel long distances to their jobs, for socializing, or to obtain services. These long trips on a limited number of wide thoroughfares can encourage high speeds on major roadways and increase congestion.

Figure 1-1: Aerial View of the AMPA



The Mid-Region Metropolitan Planning Organization

(MRMPO) considers all these issues and helps the region make better land use and transportation decisions for the future based upon the areas that will see the most severe congestion or existing data that point to the most unsafe intersections. Long-range multimodal transportation systems and proposed transportation investments are evaluated within the 20-year planning horizon and within fiscal constraints (federal regulations that require the plan be fiscally responsible). Recognizing that transportation issues and opportunities are highly inter-related with other regional aspects, this plan examines land use, economic development, environmental resiliency, public health, and environmental justice as well.

The purpose of the *Connections 2040 MTP* is to provide a framework for establishing equitable regional priorities in cooperation with member agencies, and to invest in multi-modal transportation infrastructure and programs that optimize mobility, enhance economic linkages, improve environmental resiliency, and support active transportation.

Why Connections 2040?

The *Connections 2040 MTP* is an update to the *Futures 2040 MTP* and both share a core concept: that transportation and land use decisions are integrally linked. The previous 2040 MTP was named “Futures” due to its emphasis on scenario planning, which brought together regional stakeholders with the goal of

improving transportation conditions through envisioning different land use and transportation scenarios. Participants identified major regional challenges and potential solutions that relate to where and how we grow and how we get around. For example, a challenge was river crossing congestion and a potential solution was increasing job opportunities west of the Rio Grande. With the assistance of MRMPO’s analytical tools, stakeholders were able to compare the performance of different scenarios and come to consensus around a shared direction for future growth that focuses growth in key centers, supports premium regional transit, and balances jobs and housing on both sides of the river, among other objectives. The result was the Target Scenario, which was approved by MRMPO’s governing body, the Metropolitan Transportation Board (MTB), as an aspirational scenario.

The *Connections 2040 MTP* honors the regional commitment towards the Target Scenario and continues to refine this vision. It also improves one of its guiding principles, prioritizing existing infrastructure, through a new emphasis on transportation system management and operations. This MTP is named “Connections” because it emphasizes identifying gaps, or problem areas, in our existing multimodal networks and because it identifies an assortment of pathways to address these gaps. By focusing on filling in the gaps in existing multimodal networks, such as extending a bike lane, or making a high crash intersection safer, we can make the most efficient use of limited infrastructure funds. Through making important connections we effectively reduce the costs of congestion and improve traveler experiences and safety, thus enhancing how we live and travel, oftentimes at a much lower price tag than constructing entirely new transportation facilities.



1.1 The Role of MRMPO

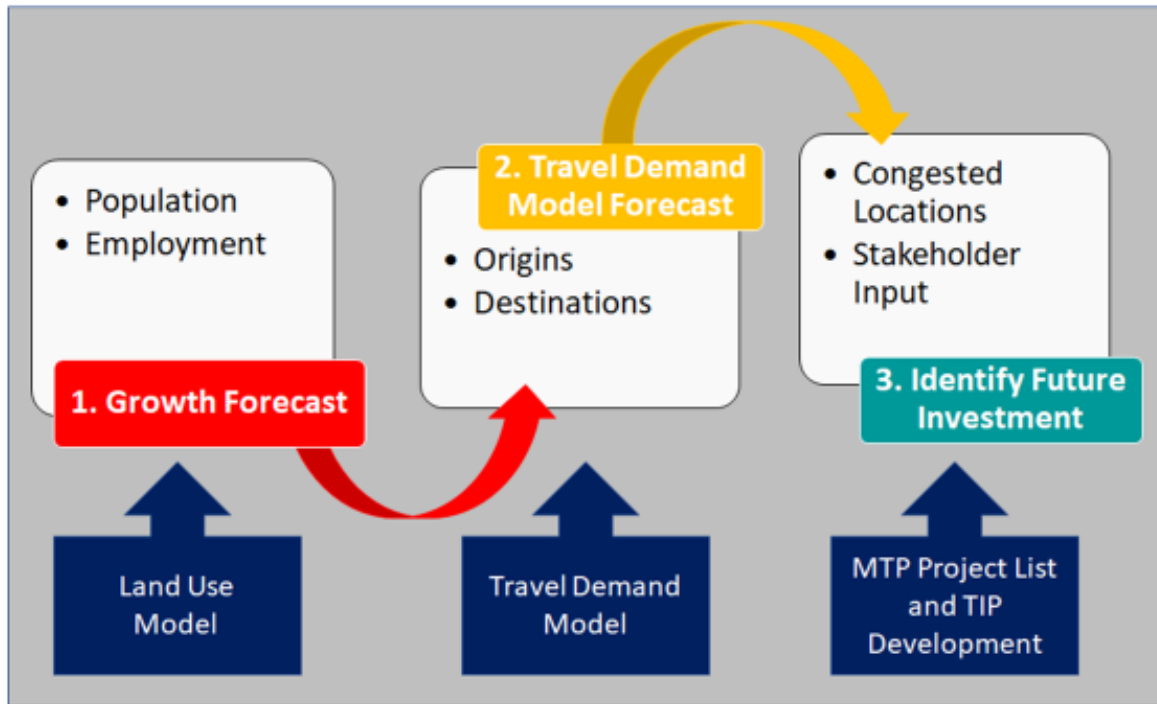
The *Connections 2040 MTP* is a product of the Mid-Region Metropolitan Planning Organization, or MRMPO, a regional government planning agency responsible for the long-range transportation planning and programming of near-term federal transportation dollars in the AMPA. MRMPO is housed within the Mid-Region Council of Governments (MRCOG) and works closely with local governments, member agencies, and the public. The MRMPO is governed by the Metropolitan Transportation Board (MTB), a board of elected officials appointed by local jurisdictions and member agencies. The board is supported by numerous technical and advisory committees comprised of a variety of planners, engineers, geographers, demographers, and other technical professionals. MRMPO is not an implementation agency, meaning it does not build or maintain infrastructure projects. Rather, **the role of MRMPO is to facilitate regional discussion, identify long-term regional transportation needs, and develop strategies for addressing those needs.** MRMPO staff members have collaboratively developed this Metropolitan Transportation Plan, guided by the following mission statement:

Through a commitment to robust and quality data, the MPO will ensure an objective and balanced analytical approach that emphasizes multi-modal considerations and unique geographic characteristics, in order to support well-informed regional decision-making and public discourse.

a. Long-Term Planning Horizon

MTPs must have a planning horizon of at least 20 years and must be updated every four or five years.¹ The MTP is a living document that is intended to be continually revisited as urban areas grow and change, funding situations evolve, new data and analytical methods become available, and different transportation needs and priorities are identified. *Connections 2040* is an update to the previous MTP, the *Futures 2040* MTP. Both plans have the same horizon year of 2040, but the *Connections 2040* plan has a new base year of 2016. *Connections 2040* builds off the previous plan but with updated data, analysis, research, and public and stakeholder inputs.

Figure 1-2: Illustration of the Transportation Planning Process



b. MTP Planning Area or the AMPA

The Albuquerque Metropolitan Planning Area (AMPA) is geographically situated in central New Mexico. The AMPA encompasses the central Rio Grande valley and a rich diversity of natural and human-made landscapes and cultural treasures. It includes all of Valencia County, Bernalillo County, and the most developed part of southern Sandoval County. Approximately one-sixth of the land within the AMPA is protected open space including city or county open spaces, state parks, and lands owned and managed by federal agencies such as the U.S. Fish and Wildlife Service, National Park Service, and U.S. Forest Service. The Rio Grande runs through the middle of the region and supports the Bosque ecosystem, irrigates farmland, and carries water for household consumption. The AMPA also includes all, or portions of, several tribal reservations and land grants. Within the AMPA's 3,095 square miles there are 11 incorporated communities, seven Pueblos, and the To'hajiilee chapter of the Navajo Nation.

¹ MPOs without air quality maintenance violations can update their plans every five years. MRMPPO's plan must now be updated every five years because it is currently in carbon monoxide (CO) attainment status.

Map 1-1: Albuquerque Metropolitan Planning Area (AMPA) Boundaries

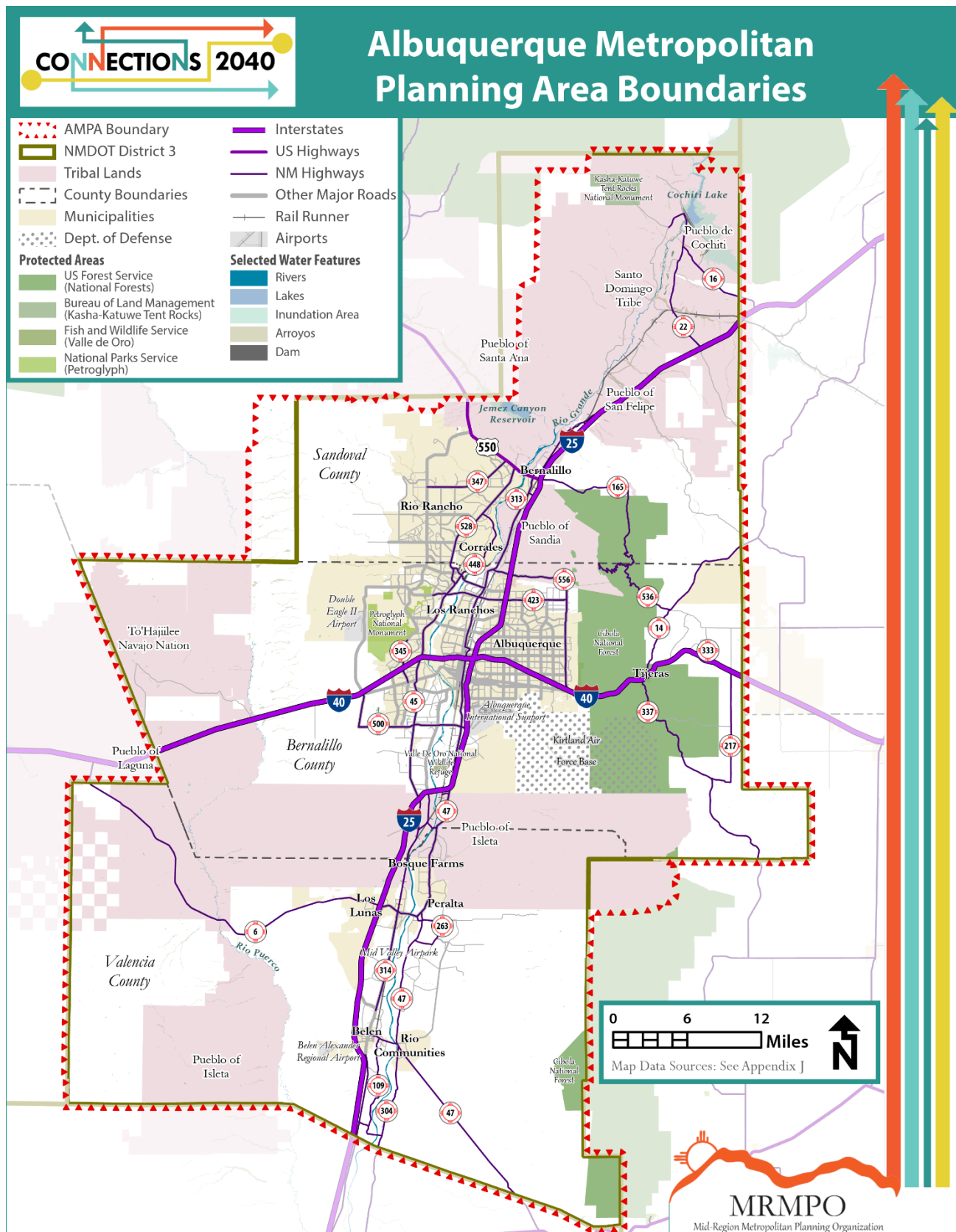


Table 1-1: List of Members, Advisory Agencies, and Stakeholders

Jurisdictions and Agencies with Transportation Rights-of-Way	Agencies with Little or No Transportation Rights-of-Way
Bernalillo County	Albuquerque Public Schools
City of Albuquerque (includes ABQ RIDE)	Belen Consolidated Schools
City of Belen	Bernalillo Public Schools
City of Rio Rancho	Los Lunas Public Schools
City of Rio Communities	Rio Rancho Public Schools
Navajo Nation – To'Hajiilee	Albuquerque Metropolitan Arroyo & Flood Control Authority
New Mexico Department of Transportation	East Sandoval County Arroyo & Flood Control Authority
Pueblo de Cochiti	Southern Sandoval County Arroyo & Flood Control Authority
Pueblo of Isleta	Middle Rio Grande Conservancy District
Pueblo of Laguna	Other Stakeholders/Advisory Agencies
Pueblo of San Felipe	City of Albuquerque Aviation
Pueblo of Sandia	Albuquerque/Bernalillo County Air Quality Control Board
Pueblo of Santa Ana	Federal Highway Administration
Pueblo of Santo Domingo	Federal Transit Administration
Rio Metro Regional Transit District	Kirtland Air Force Base
Sandoval County	NM State Transportation Commission
Town of Bernalillo	US Bureau of Indian Affairs
Village of Bosque Farms	US Forest Service
Town of Edgewood	US Fish and Wildlife Service
Town of Peralta	US National Park Service
Village of Corrales	US Bureau of Land Management
Village of Los Lunas	Various Economic Development Agencies
Village of Los Ranchos de Albuquerque	
Village of Tijeras	
Valencia County	

1.2 MTP Goals

There are four overarching goals that guide *Connections 2040*. The goals of the MTP are: Optimized Mobility, Economic Linkages, Active Transportation, and Environmental Resiliency. These four goals establish a direction and general priorities for the MTP and provide a framework to help assess the transportation system's performance in the region.

What is Different in this MTP

The MTP goals are evolving in notable ways. Optimized Mobility focuses on the overall management of our roadways, including the introduction of more advanced technologies, such as smart signals and vehicle to vehicle communication. In addition, a greater emphasis is placed on prioritizing cost effective maintenance and operations to preserve existing infrastructure.

The Active Transportation goal is enhanced in response to a disproportionately high rate of pedestrian fatalities in our region and helps target funding towards the most unsafe locations for all modes of travel as well as toward the critical role of transportation investments in activity centers for people biking and walking. For this MTP, Active Transportation focuses on non-motorized modes of travel such as walking and biking and includes other types of new ways to travel in the region like using bike share or scooters.

Economic Linkages is expanded in this update to explore the economic impacts of place-making and capture a better sense of fiscal implications of expanded growth, such as roadways and transit, as well as costs of public services like schools or fire stations.

Finally, Environmental Resiliency continues to recognize the impact of climate change and the urban heat island effect as well as the transportation sector's impacts on air quality. The chapter discusses the benefits of low impact development and tree coverage. This chapter also expands on emergency evacuation and critical transportation infrastructure.

***Connections 2040* identifies pathways to achieve these goals and discusses these in Chapter 9, Plan Implementation. Pathways are defined as strategies or action items for achieving the goals.**

Figure 1-3: Connections 2040 Goals



1.3 Federal Requirements for the MTP

All urbanized areas in the United States with a population of more than 50,000 must have a designated metropolitan planning organization (MPO) to facilitate the federally required multimodal transportation planning process. The AMPA includes two urbanized areas as defined by US Census Bureau: the Albuquerque Urbanized Area and the Los Lunas Urbanized Area as well as the Santo Domingo Urban Cluster. The following map shows these boundaries. The transportation plan, or MTP, is at the center of this process and uses long-term growth projections and anticipated travel patterns to consider long-term regional needs. **Development of the MTP is a comprehensive and cooperative planning process that involves iterative feedback from member agencies within the metropolitan area and includes all modes of transportation.** The plan must be fiscally constrained, meaning all projects proposed for inclusion in the MTP must have an identified funding source.

a. Fiscally Constrained Project Listings in the MTP and TIP

In coordination with the state department of transportation, all MPOs must develop an MTP and a Transportation Improvement Program (TIP). The TIP is the short-range implementing mechanism for the MTP that allows for transportation projects to be funded and eventually built. Simply put, the TIP lists regionally significant transportation projects that will receive federal funding over a six-year timeframe and is updated every two years. **The MTP provides the framework for proper consideration of whether projects meet regional transportation needs and are effective investments for the AMPA.** For a project to be in the TIP, it must first be included in the MTP. Indeed, the two go hand in hand: if you had an MTP without a TIP, projects would never get off the ground. On the other hand, if you had a TIP without an MTP, projects would be built in an ad hoc manner and may not necessarily support the goals of the region. The MTP and TIP must be consistent with the latest federal transportation law, the Fixing America's Surface Transportation (FAST) Act, signed into law by President Obama in 2015. Administrative regulations for the FAST Act are found in Title 23 of the Code of Federal Regulations, Part 450.

a. FAST Act and State Requirements and Goals

Title 23 of the Code of Federal Regulations includes planning factors that must be considered as part of the metropolitan transportation planning process (23 CFR 450.306(b)), as well as specific elements that must be included in a metropolitan transportation plan (23 CFR 450.324).

MRMPO's planning process is consistent with the planning process requirements and *Connections 2040* includes all federally required elements for transportation plans. The detailed planning factors and plan requirements that must be addressed in a long-range transportation plan are included in the Appendix. In addition, the FAST Act includes seven national goals that MPOs must measure progress toward as part of their planning programs and transportation decisions (23 USC 150(b)).

Figure 1-4: FAST Act Performance Goals



Map 1-2: AMPA Urbanized Areas as defined by the US Census Bureau

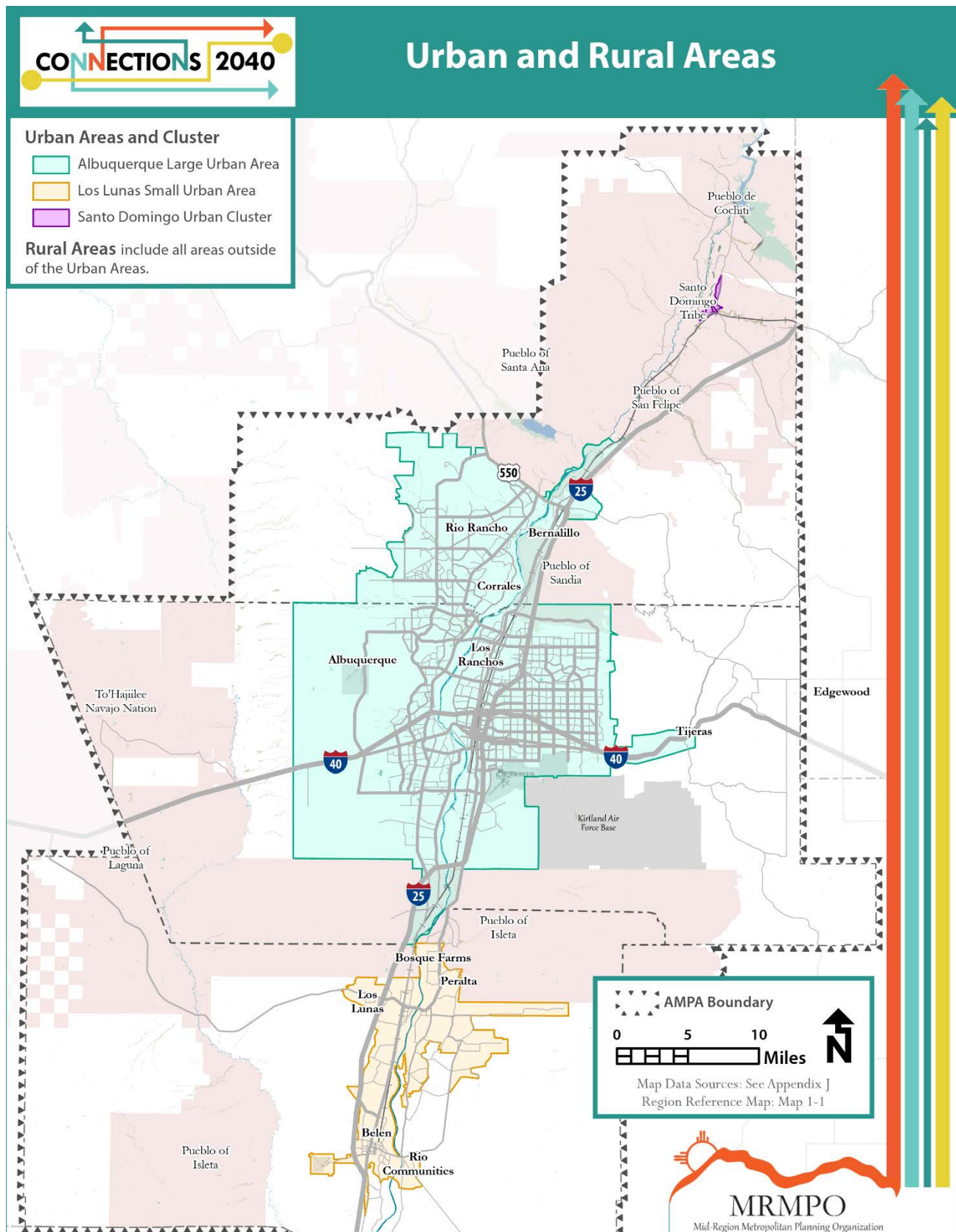


Table 1-2: Connection between FAST Act Goal Areas and MTP Goals

FAST Act National Goals	2040 MTP Goal(s)
Safety: To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.	Active Transportation, Optimized Mobility
Infrastructure Condition: To maintain the highway infrastructure asset system in a state of good repair.	Optimized Mobility
Congestion Reduction: To achieve a significant reduction in congestion on the National Highway System.	Optimized Mobility, Economic Linkages
System Reliability: To improve the efficiency of the surface transportation system.	Optimized Mobility, Active Transportation, Economic Linkages
Freight Movement and Economic Vitality: To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.	Economic Linkages, Optimized Mobility
Environmental Sustainability: To enhance the performance of the transportation system while protecting and enhancing the natural environment.	Environmental Resiliency
Reduced Project Delivery Delays: To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.	Economic Linkages, Project Prioritization Process*

*The Project Prioritization Process is described in Chapter 9.

Air Quality

MRMPO must make a conformity determination on its MTP in accordance with the Clean Air Act and EPA conformity regulations. Currently, the region is in conformity with federal air quality regulations, however there are potential future concerns around ozone levels, and whether the region will meet these standards which are expected to be determined one to two years after the adoption of this plan. The Federal Highway Administration and Federal Transit Administration must also make a conformity determination. Finally, the MTP must conform to the Albuquerque/Bernalillo County Air Quality Control Board transportation conformity regulations (New Mexico Administrative Code [NMAC] Title 20, Chapter 11, Part 3).

Title VI and Environmental Justice

The planning and public input processes conducted by MRMPO are required by federal law to comply with Title VI of the Civil Rights Act of 1964 and the Environmental Justice Orders. Title VI prohibits discrimination on the basis of race, color, or national origin and specifies that recipients of federal funds must certify nondiscrimination. Environmental Justice requirements direct every federal agency to make environmental justice part of its mission by identifying and addressing all effects of programs, policies, and activities on minority and low-income populations. Evaluation of environmental justice as it applies to the regional transportation system is addressed in Chapter 9, Plan Implementation.

ITS Regional Architecture

For any project that includes ITS elements such as communications, traffic and operational management, or travel messaging associated with informing traveler about congestion, incidents, detours, or weather conditions that affect travel decisions, MRMPO must ensure that projects comply with the Regional ITS Architecture. This requirement, referred to in 23 CFR as Rule 940, is in place so that all of these communications and data collection systems are integrated in a planned and coordinated manner that guarantees the delivery of these critical transportation information services.

Statewide Long-Range Transportation Plan

Federal transportation law requires New Mexico's Department of Transportation (NMDOT), MPOs, and regional transportation planning organizations (RTPOs) to coordinate their long-range plan development processes. Coordination means that plans produced by those organizations must be mutually consistent with respect to demographic assumptions, travel demand forecasts, and revenue forecasts. To help ensure this consistency NMDOT, MPOs, and the RTPOs update their plans on roughly the same timetable and participate in exchanges of data, information, and ideas at critical stages. The previous MTP, the *Futures 2040 MTP*, was developed concurrently with the update to the statewide long-range transportation plan, the *New Mexico 2040 Plan*, and *Connections 2040* is consistent with current statewide planning.

Figure 1-5: New Mexico 2040 Plan

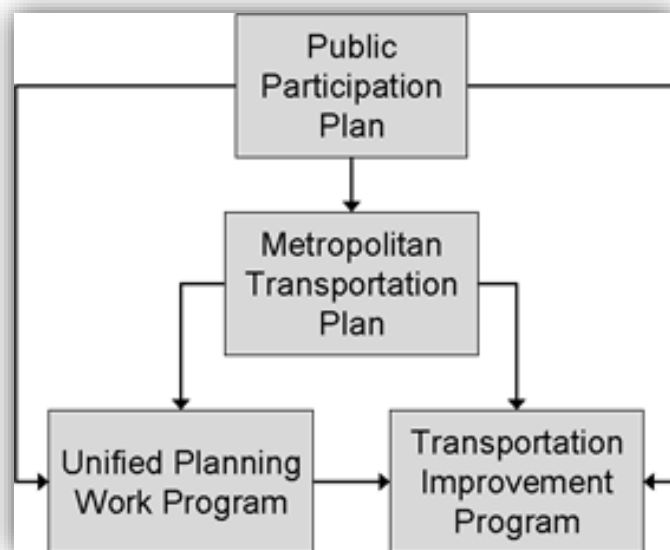


b. MRMPO Core Documents

Certain core documents are required by federal transportation regulations. MPOs must create a *Public Participation Plan* that defines the process for providing citizens and all interested parties reasonable opportunities to be involved in the metropolitan transportation planning process including development of the Metropolitan Transportation Plan (MTP) and the Transportation Improvement Program (TIP). Once the MTP has been adopted, a Unified Planning Work Program (UPWP) outlines transportation planning activities that will be conducted by the MPO. The MTP then guides the TIP process, where project selections must be consistent with the goals of the MTP.

MRMPO has also developed a *Project Prioritization Process (PPP)* document that essentially translates the MTP goals into both qualitative and quantitative ways to more objectively evaluate TIP projects and ensure that projects that are programmed to receive federal funds and meet the goals of the MTP.

Figure 1-6: MRMPO Core Documents



1.4 MRMPO Structure

The Mid-Region Metropolitan Planning Organization or MRMPO is the designated MPO for the Albuquerque urbanized area and the Los Lunas urbanized area in central New Mexico. MRMPO has an established policy board, the Metropolitan Transportation Board (MTB), and technical committees that work alongside the organization on the region's continuing, comprehensive, and cooperative planning process. MPO staff are committed to creating an effective regional forum for transportation planning decisions.

a. MRMPO Committees

Metropolitan Transportation Board (MTB)

The MTB sets regional transportation policy for the AMPA and is comprised of elected officials from the jurisdictions within the AMPA. These jurisdictions are often referred to as member agencies of the MPO. Reporting to the MTB is the Transportation Coordinating Committee (TCC), which includes staff-level representatives from each of the local member agencies and other planning partners, such as the New Mexico Department of Transportation and Albuquerque Public Schools.

Technical Coordinating Committee (TCC)

The TCC provides technical advice to the MTB and reviews items that are scheduled to come before the MTB. Both the MTB and TCC meetings are open to the public and all of their meetings allot time for public input. Reporting to the TCC are several specialized committees. An organization chart showing this board and committee hierarchy is shown. Descriptions of the committees reporting to the TCC follow.

Land Use and Transportation Integration Committee (LUTI)

To promote a more robust planning process in a growing area and support the better integration of land use and transportation planning in the region, LUTI was formed in 2012. Committee members include transportation and land use planners, transit professionals, and transportation engineers from local jurisdictions, including Rio Rancho, Albuquerque, Los Lunas, Belen, Valencia County, Bernalillo County, the Town of Bernalillo, the New Mexico Department of Transportation, Rio Metro, and ABQ Ride. This group meets regularly and has become the steering committee for integrating scenario planning into the MTP.

Active Transportation Committee (AT)

The Active Transportation Committee (AT) provides a forum for discussing primarily walking and biking in the larger scope of the region's community health and safety. This committee also addresses mobility, access to transit, recreation, and other services. The committee reviews MPO products and projects including, but not limited to; safety planning and analysis, the Long Range Bicycle System (LRBS), the MTP, PPP, TIP, bike share, transit, complete streets, and more. This committee is comprised of staff from local agencies and local stakeholders, public health professionals, and active transportation advocates.

Intelligent Transportation Systems Subcommittee (ITS)

The Intelligent Transportation System (ITS) Subcommittee is responsible for the promotion and coordination of ITS applications and services within the AMPA. Intelligent Transportation Systems (ITS) Subcommittee meetings are inter-agency meetings between federal, state, and local stakeholders. The Subcommittee coordinates ITS stakeholder activity and ensures the ITS data is up to date and conforms to the ITS Architecture (regional guidance document) for the region.

Congestion Management Process Committee (CMP)

The Congestion Management Process (CMP) is a federally mandated process that helps planners identify congested travel corridors and recommends strategies to increase transportation efficiency and improve transportation options for the traveling public. The CMP Committee is comprised of technical staff from member

agencies who meet monthly to discuss congestion management, transit, safety, and the Project Prioritization Process (PPP) that guides the TIP projects selection process.

Roadway Access Committee (RAC)

The RAC hears requests to modify roadway access conditions of current and future Limited Access Roadways in the AMPA and the roadway access policy. The Committee is comprised of traffic engineers representing the NMDOT, City of Albuquerque, City of Rio Rancho, Bernalillo and Valencia Counties and staff traffic engineers from any other MPO member agency wishing to participate. This Committee meets on an as-needed basis.

Transportation Program Task Group (TPTG)

The TPTG is a working group that provides advice to the Transportation Coordinating Committee (TCC) regarding the Transportation Improvement Program (TIP) and the long-range system maps for the urban area. The TPTG uses a set of evaluation criteria to develop the draft TIP prior to its release for public review and comment. TPTG membership is drawn from technical staff from the various local agencies and the New Mexico Department of Transportation.

Freight Logistics Committee (FLC)

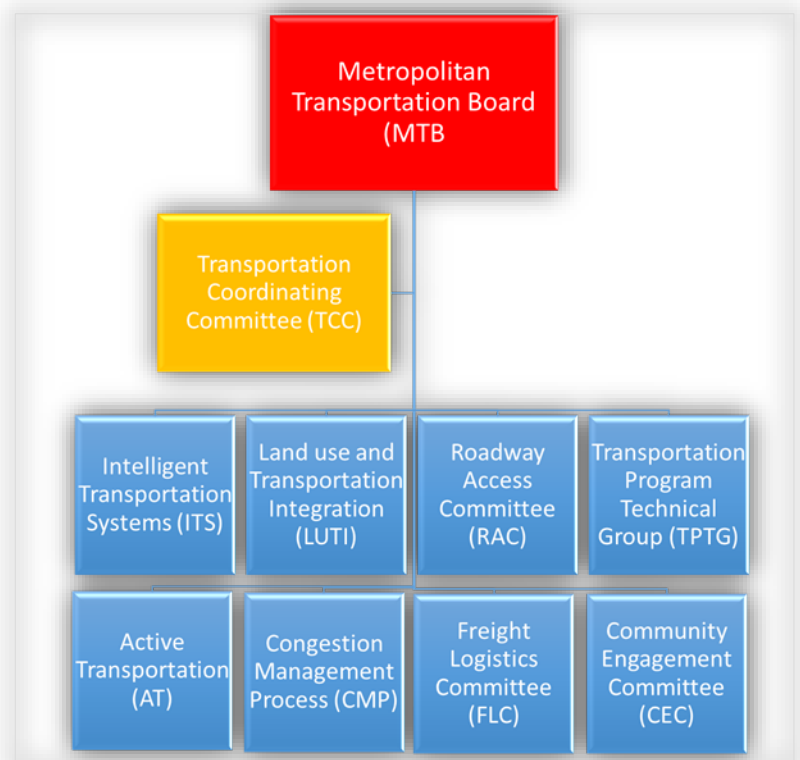
This committee serves as the regional forum for intermodal movement of goods into, out of, and within the MRCOG region.

Members of the committee include staff members and representatives in the region involved in economic development and transportation planning as well as representatives from private associations involved in freight movement.

Community Engagement Committee (CEC)

The Community Engagement Committee is a committee comprised of local professionals and advocates who outreach with the public. The Committee provides feedback and helps assess MRMPO's public outreach methods.

Figure 1-7: MRMPO Committees and Structure



b. MRMPO Technical Assistance and Reports

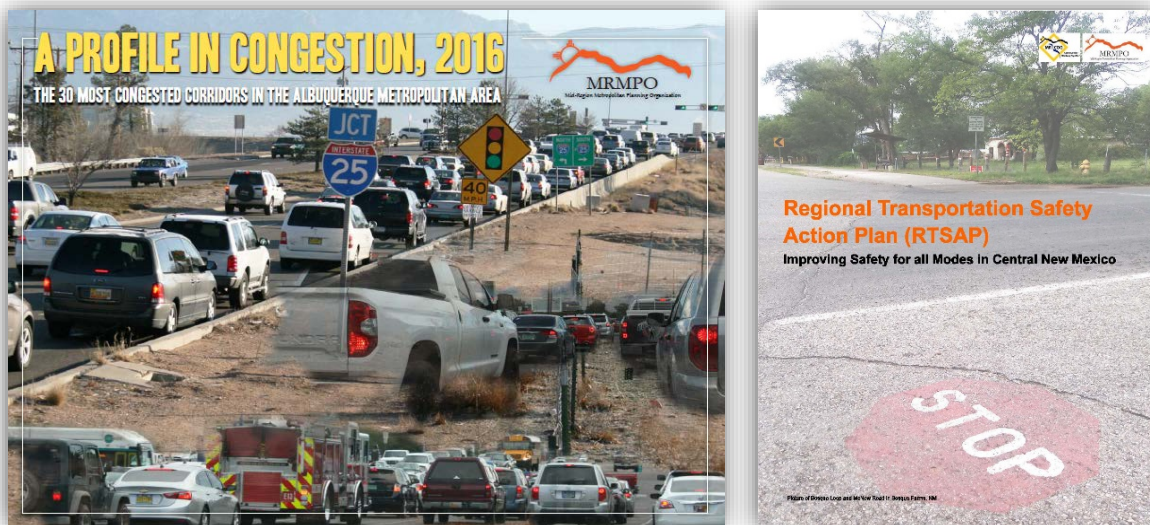
In addition to the policy board and committees that support the work of the transportation planning process, MRMPO has a variety of technical tools and services that support the function of the MPO in the following areas:

- Socioeconomic and land use modeling and analyses
- Regional safety and crash analyses
- Traffic Counts data collection (motorized and non-motorized)
- Travel demand modeling and analyses
- Transportation accessibility modeling and analyses
- Regional economic modeling and analyses
- Geographic Information Systems (GIS) mapping and spatial analyses

MPO-developed documents, maps and data sets are often produced and maintained as a result of these services, including the following examples:

- *The Regional Transportation Safety Action Plan (RTSAP)*
- *The AMPA ITS Regional Architecture*
- *Taking the Wheel – Getting ABQ from Here to There*
- *A Profile in Congestion*

Figure 1-8: A Profile in Congestion, 2016 and the RTSAP, 2018



1.5 MTP Public Engagement

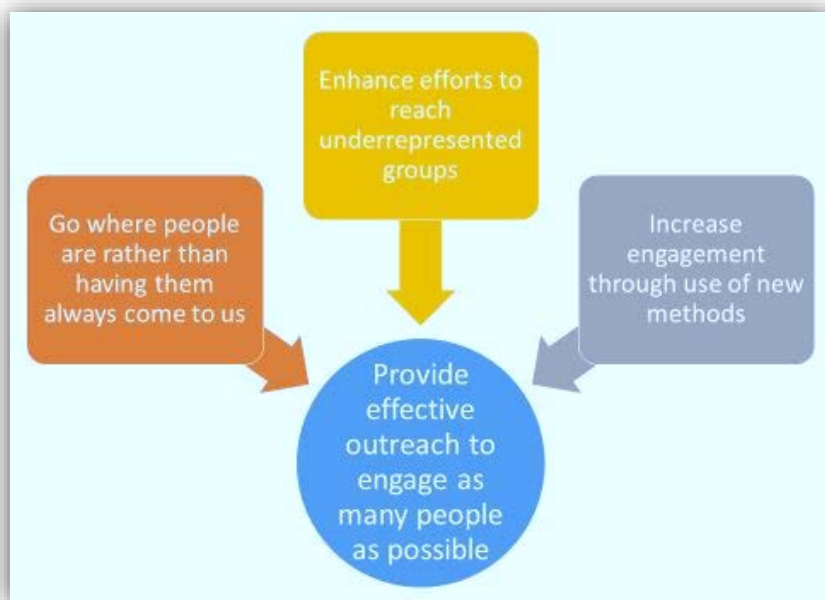
Public engagement efforts and activities for *Connections 2040* were undertaken in accordance with MRMPO's *Public Participation Procedures* adopted by the Metropolitan Transportation Board in 2018 and were guided by MRMPO's *Connections 2040 Public Participation Plan*. MRMPO's overarching goal for public participation is to provide effective outreach to engage as many members of the public and stakeholders as possible, with particular focus on reaching out to populations underrepresented in the planning process such as low-income, minority populations, and young adults.

a. Public Engagement Goals and Objectives

The objectives of MRMPO's public participation goals are to increase engagement through new methods, to increase efforts to reach underrepresented groups, and to put more effort on going to *where people are* as opposed to having them come to where we are. A list of public presentations given and forums where public input was gathered, as well as MTP materials provided, is available in the Appendix F. In its outreach efforts, **MRMPO's focus shifted from *presenting* information to *gathering* information and *ideas*** from the public, agency members, and stakeholders through a variety of methods. As this information is gathered, staff integrates feedback into the applicable plans where possible. Outreach strategies used for the *Connections 2040 MTP* include the following:

- Paper and online questionnaires (available in English and Spanish)
- Public meetings and open houses, including new methods and techniques used at meetings to better engage participants
- Attending community events and meetings to hand out information and gather feedback in geographically varied locations
- Social media, electronic newsletters, and email blasts
- Interactive maps to gather public feedback
- Presentations to existing advocacy groups and non-profit organizations
- Use of videos that explain the MTP planning process and products

Figure 1-9: Public Engagement Goals



b. Methods for Collecting Public Input and Feedback

To collect public input and feedback for the *Connections 2040 MTP*, staff used a variety of methods including: an online MTP questionnaire; a voting poll on transportation spending; an online interactive map; and documenting comments and questions from meetings and community events. In all, MRMPPO recorded over 167 individual comments, 630 respondents to the online questionnaire (with 695 write-in responses), 140 participants in the online gaps map tool, and 368 participants in a “bean jar” voting

activity that assessed how people would like to see their transportation funds spent. In addition, MRMPPO attended or hosted over 30 community events and meetings where participants had the opportunity to provide feedback. Official public meetings were held for this MTP, and MRMPPO made a concerted effort to supplement these meetings with other opportunities for the public to weigh in on the Plan.

Figure 1-10: Mind the Gap Postcard



MTP Questionnaire

The *Connections 2040 MTP* questionnaire was made available online and also in hard copy format in both English and Spanish. The survey was open from August 2018

until December 2018. There were 23 questions that were designed to gauge respondents’ satisfaction with the transportation system and their opinions about different transportation modes. About 630 people participated and filled out the questionnaire². Key takeaways from the questionnaire included: the vehicle network is the only network most respondents felt is ‘very complete’ at 64 percent compared to, for instance, only three and two percent of respondents agreeing that the train and bus networks are very complete, respectively. Also, the top barriers reported for each mode were revealing:

- Vehicle – no significant barriers
- Train – lack of good routes
- Bus – lack of good routes
- Walking – distance is too great
- Bicycle – safety

People’s views varied in interesting ways depending on what they reported as their primary mode of transportation. For example, the overall pool of respondents viewed bus travel as not very conducive to getting where you want, but people who reported taking the bus as their primary mode of transportation reported higher satisfaction with that mode. This indicated that perhaps efforts and campaigns that encourage people to try other modes (such as bike to work day events and Safe Routes to School programs), may be an effective means to achieving greater satisfaction for active modes of transportation.

² A summary of the questionnaire results is found on MRCOG’s website at this location: <https://www.mrcog-nm.gov/DocumentCenter/View/3951/Connections-2040-Questionnaire-Report-PDF>

Bean Jar Voting

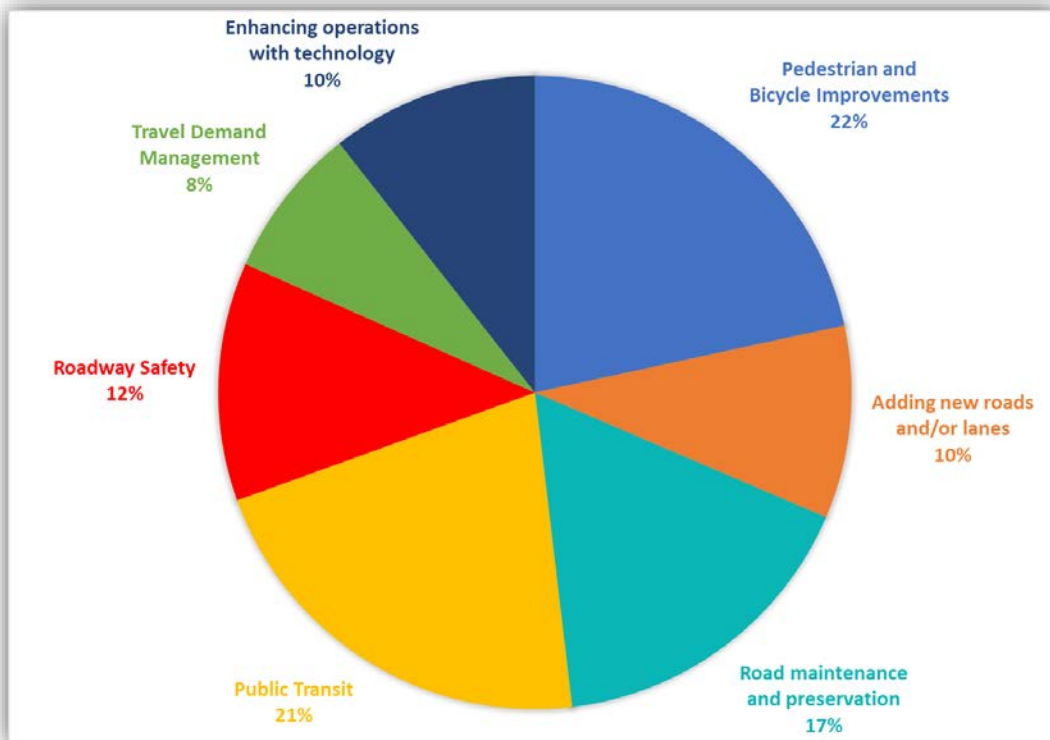
The *Connections 2040 MTP* represents a more concerted effort to provide interactive opportunities for involving the public. Bean jar voting—where the public was given the opportunity to tell us how they would like to see transportation funds spent—was one such interactive opportunity. Seven project categories used in the Transportation Improvement Program were used for this voting exercise that spanned approximately 15 months.

Figure 1-11: Bean Jar Voting



Results for each voting event were tallied and shared with participants to let them know how their group voted and how their “spending” compared to the entire universe of participants. This exercise proved to be an approachable, intuitive, hands-on way to get feedback about a very important responsibility of MRMPPO’s—programming federal funds for transportation projects. The results of the public’s voting are shown below.

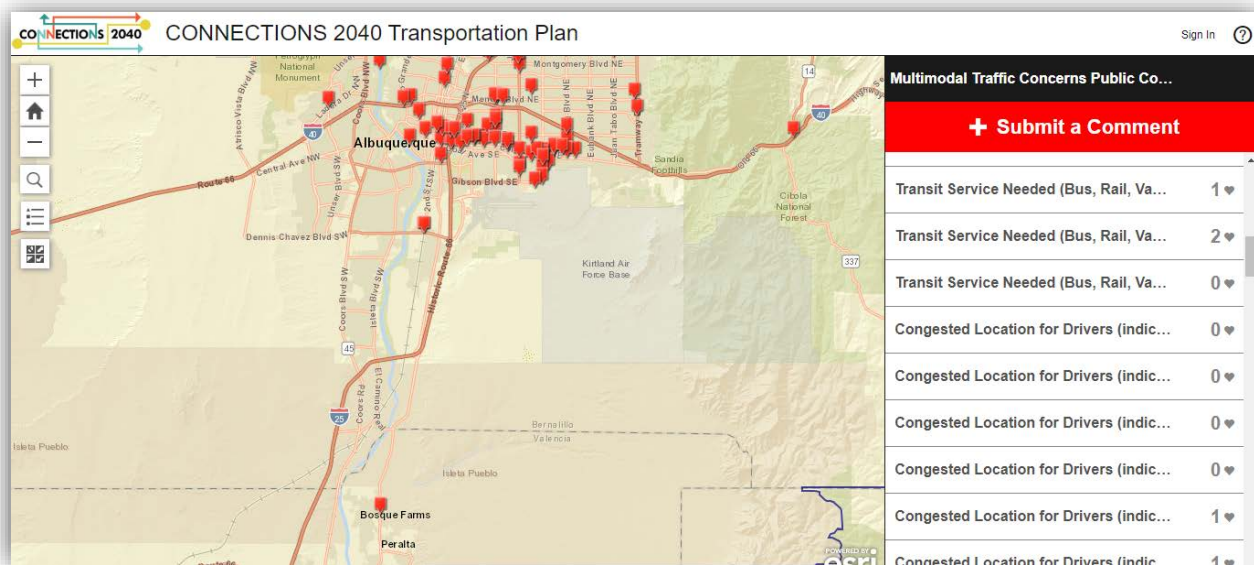
Figure 1-12: Bean Votes for Transportation Spending



Online Interactive Map

Another new tool used to gather public feedback was the development of an online interactive map that allowed people to record problem areas, or gaps, from traveling around the region by vehicle, bus, train, walking, or biking. The intent of the tool was to give MRMPO a sense of where the public identifies problem areas or gaps are around the region in order to inform transportation priorities. Approximately 140 comments were received. Results were shared online and are included in Chapter 9.

Figure 1-13: Online Interactive Map for Public Comments



c. Public Engagement Groups

Public Outreach Group

An informal Public Outreach Group was created by staff from local governments and civic agencies to discuss best practices and lessons learned regarding public outreach practices. This group began meeting in March 2018 and continues to meet once a month. The intent of the group is to improve the effectiveness of public outreach in the region. Staff from the MRMPO regularly attend these meetings and any government agency staff person working on public outreach in the region is welcome.

Community Engagement Committee (CEC)

A formal Community Engagement Committee (CEC) was formed with a charter adopted by the MTB in 2019. The Committee will meet once or twice per year to provide feedback to MRMPO on its public outreach activities and methods starting in 2020.

1.6 Contents of the MTP

a. Improved Outlook for the Region

Besides the fact that an MTP is federally required, it is a wise investment in time and energy to produce a long-range transportation plan for the region. By working toward the goals of optimized mobility, active transportation, environmental resiliency, and economic linkages and implementing the pathways described in Appendix G, the region's future outlook improves. This is true not only in terms of transportation conditions, but also livability, traveling safety, regional competitiveness, and sense of place, to name a few.

The *Connections 2040 MTP* represents a continuing, cooperative, and comprehensive transportation planning process to identify existing conditions, anticipate future needs, and prioritize projects that support the goals and pathways of the plan.

The MTP development process not only results in a long-range multimodal transportation plan, but also provides the opportunity to reconsider how the region is growing and how those growth patterns affect the way people live and travel throughout the region.

As a result, the *Connections 2040 MTP* is not just a product and a means of disseminating information, but it is also *a process* that brings together regional stakeholders to develop a vision for the future and continually work toward achieving that vision.

b. Document Organization and Chapter Summaries

The *Connections 2040 MTP* document highlights the state of our existing transportation system and how we expect conditions to change in the future before delving into more focused chapters that include content grouped around the four goals of the MTP and the financial aspects of the plan, and then finishes with a look at plan implementation.

Table 1-3: Document Organization and Chapter Summaries

Chapter 1: Introduction to the long-range transportation plan and the role of the MRMPO.	Chapter 6: Overview of how transportation investments ripple throughout the economy including infrastructure spending, issues of affordability, and fiscal impacts to municipalities.
Chapter 2: Socioeconomic and transportation trends and the rate of growth expected in our region over the next 20 years, including key opportunities and challenges in the region.	Chapter 7: Brings together environmental resiliency concerns including climate change and air quality concerns, and protecting natural landscapes.
Chapter 3: Target Scenario explanation and its integration into the long-range process, including the scenario's guiding principles and benefits.	Chapter 8: Describes financial aspects of the plan including federal funding, fiscal constraint, revenue projections, and maintenance and operations costs.
Chapter 4: Focuses on optimized mobility including how the roadway and transit systems are performing, congestion management and maintenance of our transportation infrastructure.	Chapter 9: Explores the multiple avenues for plan implementation including a toolbox of strategies for achieving the MTP goals.
Chapter 5: Highlights active transportation, including pedestrian and bicycle conditions, roadway safety, access to transit, and public health concerns.	Supplemental materials are in the Appendices , including a list projects proposed by member agencies for implementation by the year 2040.

CHAPTER 2:

CURRENT AND FUTURE STATE OF THE REGION

The Albuquerque Metropolitan Planning Area (AMPA) encompasses the State of New Mexico's highest concentration of population and jobs. As of 2016, there were approximately 890,600 people and 403,100 jobs¹, which represents 43 percent of the state's population and about 45 percent of its jobs. It also contains New Mexico's largest city, the City of Albuquerque, and its fastest growing, the City of Rio Rancho. In 2013, Rio Communities became the newest incorporated place. The AMPA is home to several major educational institutions, including the University of New Mexico (UNM), Central New Mexico Community College (CNM), and Albuquerque Public Schools (APS), numerous major hospitals including University of New Mexico Hospital and Presbyterian Hospitals, and other large employers such as Sandia National Laboratories, Intel Corporation, and Kirtland Air Force Base. With a unique mix of urban and natural amenities and vast agricultural and rural rangelands, the AMPA offers a range of settings and lifestyle opportunities for its diverse population.

This chapter provides the regional backdrop for this plan in terms of the population characteristics and the current economic situation. It also highlights some challenges and opportunities facing the region today. Note that much of the data presented herein pertains to the Albuquerque Metropolitan Statistical Area (MSA), which represents the four counties of Bernalillo, Sandoval, Torrance, and Valencia. **The MSA is a reliable proxy for the AMPA given that 98 percent of its population and jobs are within the AMPA boundary.**

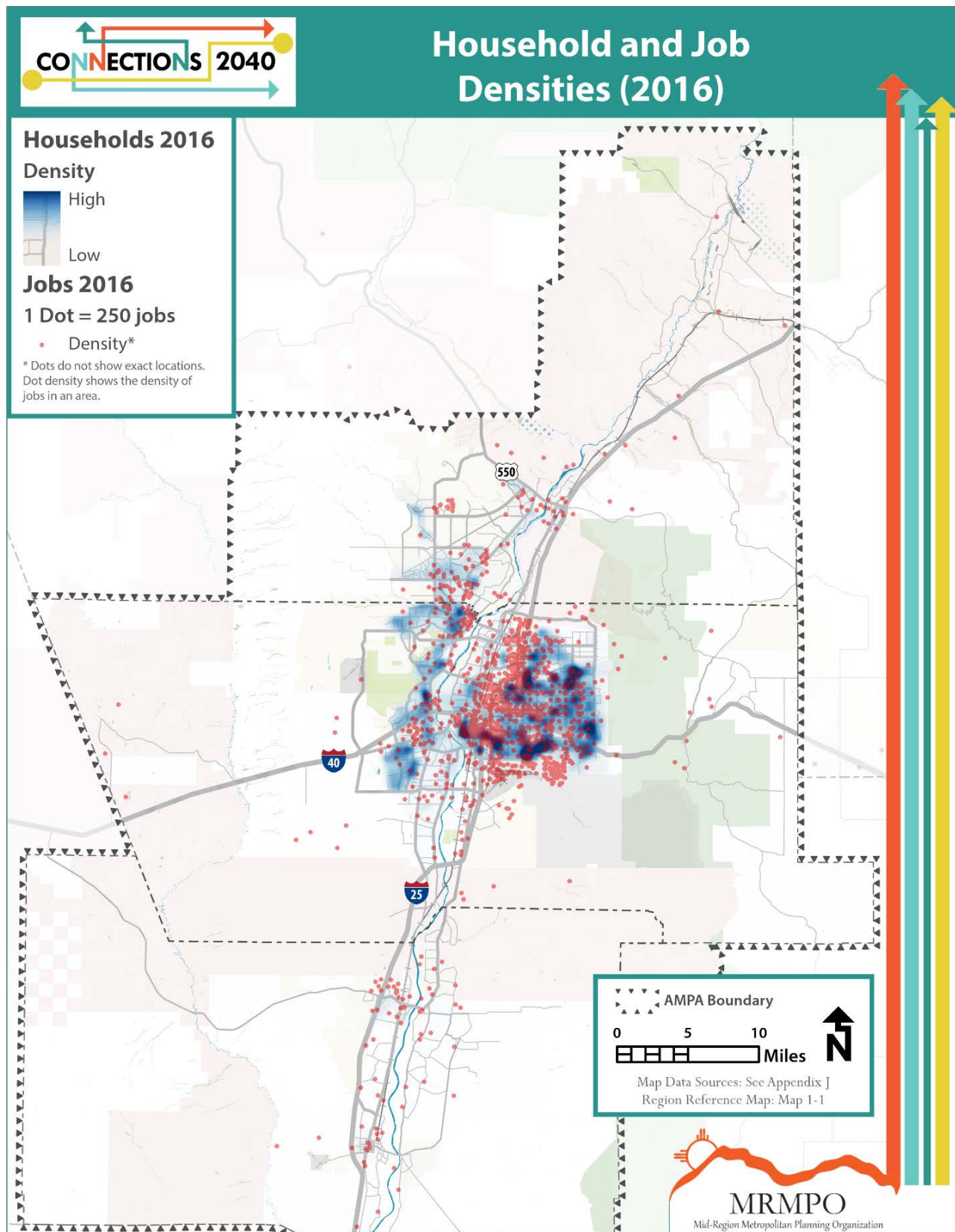
Figure 2-1: Sunset over the Sandia Mountain Range



Source: FreeABQimages.com

¹ MRMPO's definition of employment includes all jobs covered by unemployment insurance as well as an estimate of agricultural workers, military, and self-employment.

Map 2-1: Household and Job Densities, 2016



2.1 Socioeconomic Trends

a. Regional Shifts

The Great Recession had a deep and long-lasting impact on our region. While the Albuquerque MSA was a bit of a latecomer to the recession, the recovery lagged behind the rest of the country. The MSA began to lose jobs in 2008, and according to the US Bureau of Labor Statistics, by the end of 2012 the region had lost almost 30,000 jobs, or seven percent of its total employment. While the number of jobs in the MSA has rebounded to pre-recessionary levels, there have been some key shifts that have changed the structure of our economy in some fundamental ways.

Slow Population Growth

Population growth in the United States is at an all-time low due to fewer births, more deaths, and reduced migration between states. In fact, a fifth of all states experienced population loss between 2016 and 2018. Our region is not an exception to these trends. After three decades of over 20 percent increases in population, the Albuquerque MSA has experienced a dramatic slowdown with the average annual growth rate, hovering just above zero since 2010. New Mexico is the slowest growing state in the Southwestern United States.

Figure 2-2: AMPA Population and Pace of Growth over Time, 1940 – 2018

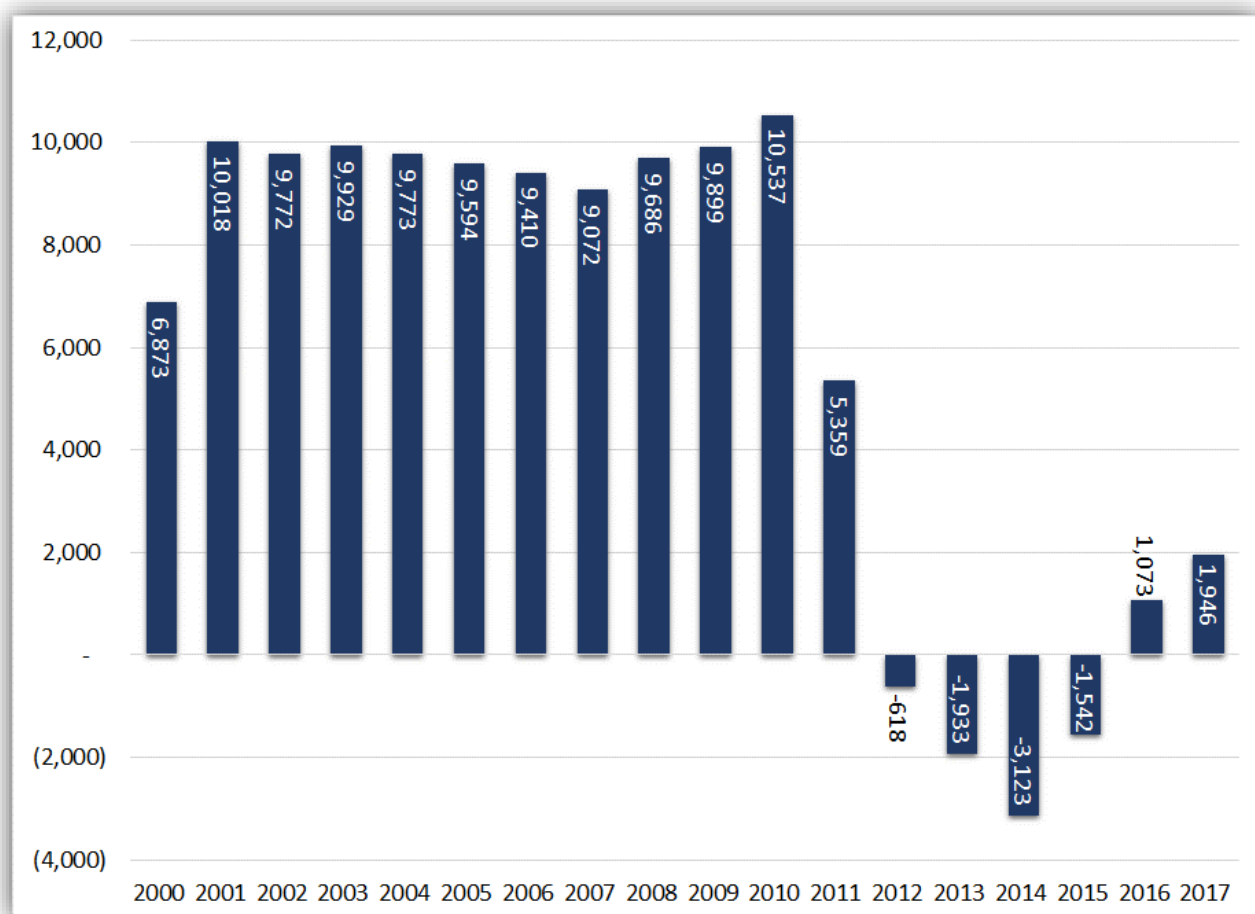


Source: US Census Bureau, Decennial Census and American Community Survey

Negative Net Migration

A large reason behind population stagnation in the Albuquerque MSA has been increased out-migration and decreased in-migration on the heels of the recession. Once attractive to people from neighboring states and other parts of New Mexico, this region has typically relied on migration for a large share of its growth for decades. However, beginning in 2012 more people left the area than moved in, many to bordering states such as Colorado, Arizona, and Texas.² The most recent data from the US Census Bureau's Population Estimates Program show that the region is back in positive territory in terms of net migration. While this is a good sign, an analysis of state migration data by University of New Mexico's Bureau of Business and Economic Research (UNM-BBER) shows that **the majority of people who left New Mexico were educated adults and their families**. While educated adults moved into the region as well, the data show 40 percent of the *net* population lost to migration held Bachelor's degrees. This represents a leakage of human capital that is likely to have a fundamental impact on our workforce going forward.

Figure 2-3: Net Migration in the Region, 2000 – 2018



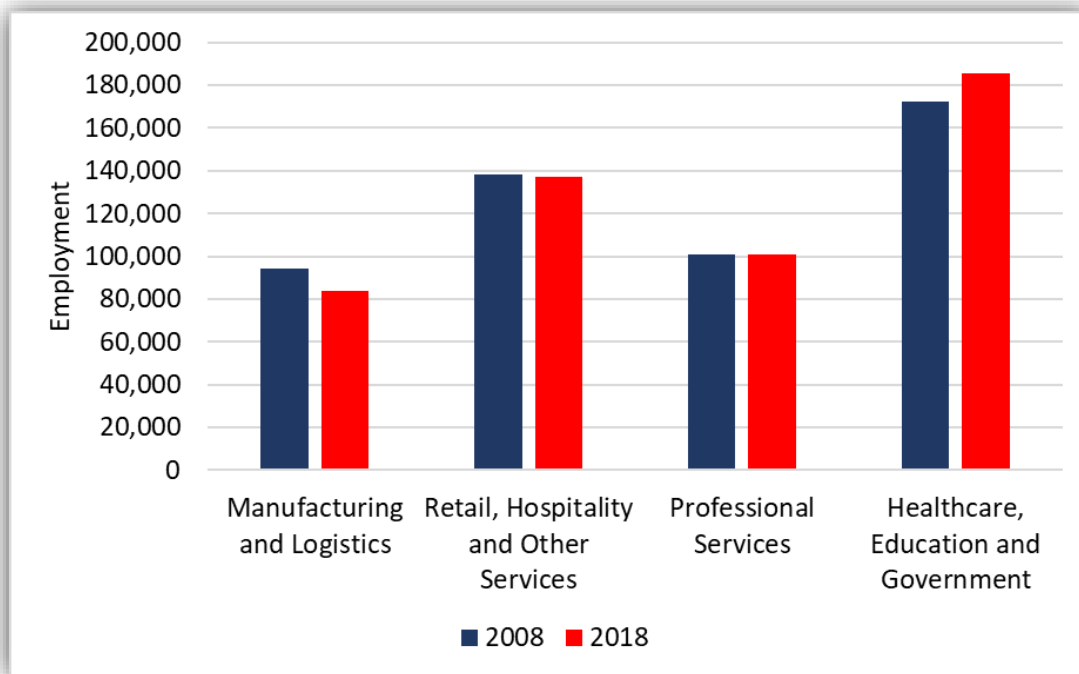
Source: US Census Bureau Population Estimates Program, NM Department of Health, MRCOG

² US Census Bureau's Population Estimates Program, US Census Bureau's Job-Job Flows, Local Employment and Household Dynamics (LEHD).

b. Employment Sectors Performance

The vast majority of the region's jobs are in service industries. The largest sector is healthcare and social assistance (68,800 jobs), followed by retail trade (41,600 jobs), and accommodation and food services (39,200 jobs). Government jobs span multiple employment sectors (including healthcare and education) and are estimated by UNM-BBER at approximately 76,300 jobs in 2018. The manufacturing sector (16,000 jobs) represents 4 percent of the region's jobs. The chart below groups multiple sectors into broad categories in order to demonstrate how they have changed over the past 10 years.

Figure 2-4: Employment Growth by Industry in the Albuquerque MSA, 2008-2018



Source: New Mexico Department of Workforce Solutions

Led by growth in the healthcare industry, which grew by 28 percent over the past decade, service jobs are growing as a share of overall employment. Conversely, there has been a 17 percent decline in manufacturing and logistics jobs over the past ten years. This is a concern because these industries tend to generate wealth and increase regional competitiveness. As the region has rebounded from overall job losses due to the recession, many subsectors of the manufacturing industry have not recovered.

Economic Diversity

The reduction in manufacturing related employment has spurred action by policy leaders and the private sector. Many opportunities have been identified in niche industries. For example, food manufacturing has flourished in the MSA and serves as an example of how we might build upon specialized areas in the future. Another challenge is a historical reliance on a dominant government sector. Due in part to major regional employers such as Kirtland Air Force Base, Sandia National Laboratories, and the University of New Mexico, government jobs currently represent one in every five jobs. Once seen as a source of stability for the region, systematic reductions in government programs and spending at the federal level over the past several years has rippled throughout the economy.

The devastating impact of federal cutbacks spurred broad recognition of the need to build on the private sector. Positive momentum and a growing list of success stories has mounted behind entrepreneurship, high-technology clusters, film and media, and tourism, to name a few.

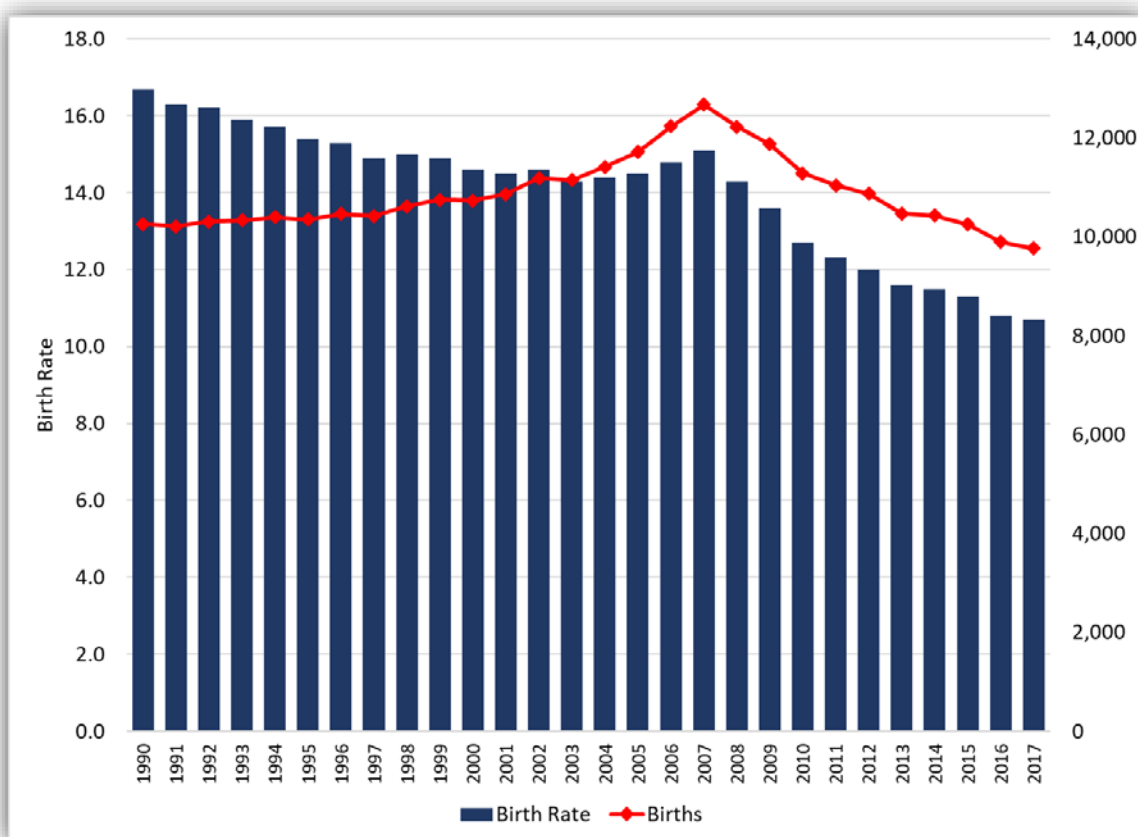
c. Changing Demographics and Lifestyles

There have been some key structural shifts over the past several years that are attributable to changes in demographics and consumer preferences. Evolving household composition, shifting age dynamics, and changing housing and transportation demands are among them. **These trends are important to understanding travel behavior and anticipating what may lie ahead in the future.**

Declining Household Size

Both nationally and locally households have been declining in size for decades. While the average household in the region consisted of approximately 3.64 people in 1960, this has dramatically fallen over time, and today the average household size is 2.58.³ A large contributing factor is an overall reduction in number of children per family, which has decreased as women have taken a prominent place in the workforce and young adults have chosen to pursue higher education prior to starting families. Longitudinal data from the US Census Bureau's American Community Survey (ACS) confirm recent shifts towards delaying marriage and having children later in life than previous generations.

Figure 2-5: Birth Count and Birth Rate in the Albuquerque MSA, 1990 - 2017



Source: NM Department of Health

³ US Census Bureau Decennial Census

While birth rates have fallen steadily for decades, there was a precipitous drop after 2008, indicating that the struggling economy has further fueled the decision to delay starting a family. Another contributor to declining household sizes is that people are living longer, particularly women, thereby increasing the number of individuals who are living alone. In fact, according to the ACS, in 2017 nearly a third of all households (107,000) in Albuquerque's MSA were one-person households. As we continue to age as a society, this number is expected to grow considerably.

Aging Population

Following World War II, the nation experienced a baby boom that lasted approximately 18 years between 1946 and 1964. Today, the children of that generation are between the ages of 54 and 72 and are crossing over between being active members of the workforce to active retirees. Due to that surge in population growth, we are now seeing the share of seniors dramatically rising as a percentage of the overall population. By 2040 the percentage of the population over 65 is expected to be the same as the percentage under 18 (approximately 21 percent).

Table 2-1: Age Distribution in the Albuquerque MSA, 1990-2040

Age Group	1990		2017		2040	
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
Youth (<18)	166,020	27.6%	207,605	22.9%	240,694	21.7%
Working Age (18-64)	373,548	62.0%	561,437	62.0%	633,887	57.2%
Seniors (65+)	63,020	10.5%	136,007	15.0%	234,151	21.1%
Total Population	602,588	100.0%	905,049	100.0%	1,108,733	100.0%

Source: US Census Bureau Decennial Census, American Community Survey, University of NM Geospatial Population Studies

This has implications for senior services, such as healthcare, as already evidenced by our growing healthcare industry, and our labor force. A strong workforce will be required to support the needs of a growing number of retirees. However, as the senior population rises in share the working aged population will decline, potentially resulting in a labor shortage in the region.

Impacts on Transportation Patterns

An aging population will have an impact on travel patterns and transportation needs. In particular, commuting trips in the peak period will form a smaller percentage of daily trips compared to today. There will also likely be changes in traffic patterns as trips are dispersed across the day. Similarly, an aging population may result in a greater reliance on some form of public transit or private services such as Uber or Lyft as some aging residents may no longer be able to drive.

Housing Shifts

Recent housing data shows that amid a backdrop of declining household sizes and a growing senior population, there are some key shifts occurring in the housing market. One recent shift has been the location of residential development. While the majority of new homes have historically been built west of the Rio Grande, there is a growing share of new dwelling units east of the Rio Grande. The following table and maps compare clusters of new residential units constructed between 2000-2008 and 2008-2016 based on building permits.

Centralized Development

While considerably fewer residential units were permitted overall following 2008, a larger share of those building permits were issued occurred closer to existing development.

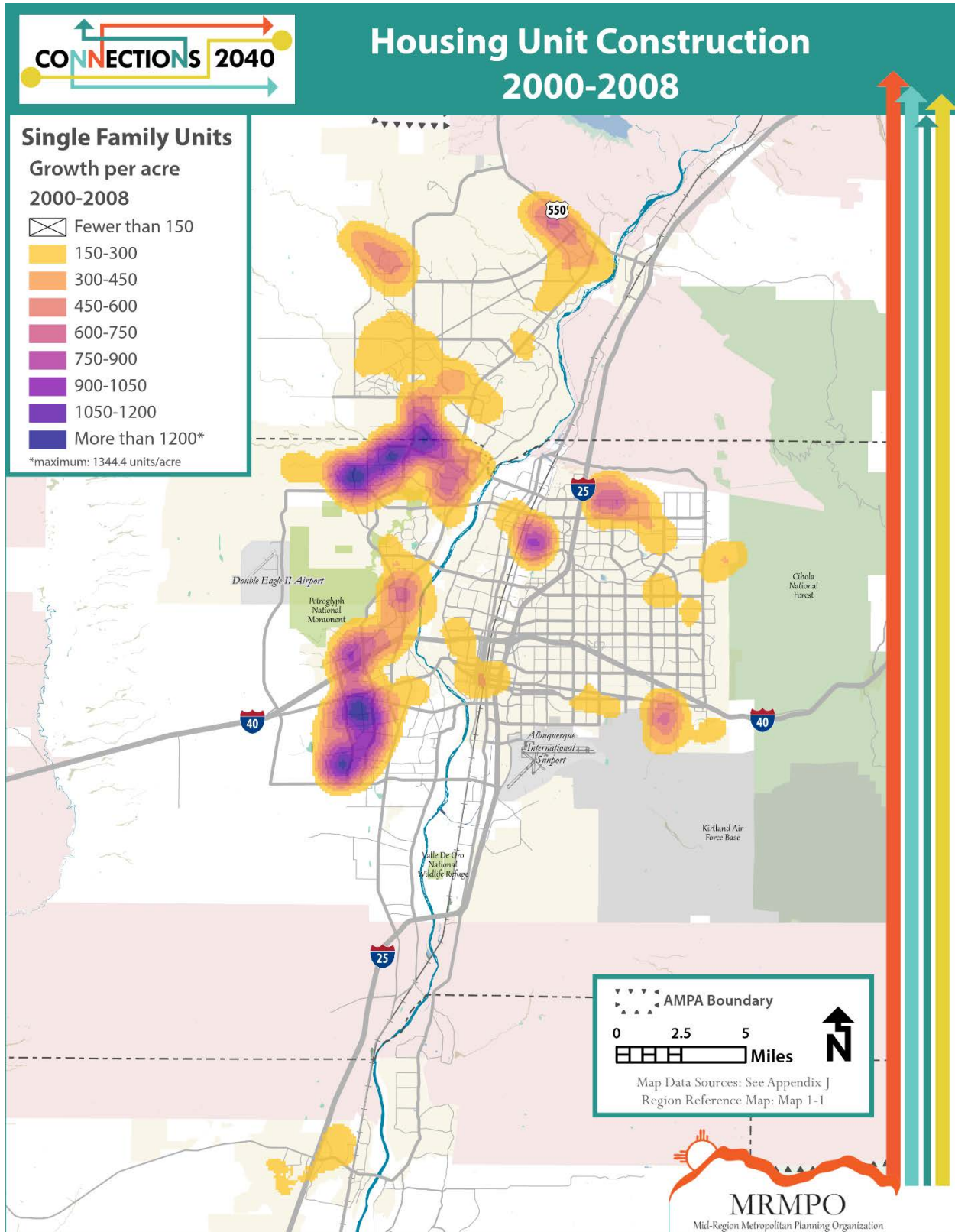
Table 2-2: New Residential Units Constructed, Pre and Post Recession

	2000 - 2008		2009 - 2018	
	Number	Share	Number	Share
New Units West of the Rio Grande	41,755	73%	12,387	64%
New Units East of the Rio Grande	15,131	27%	6,969	36%
New Units Total	56,886	73%	19,356	64%

Source: Building Permits issued in Bernalillo and Sandoval Counties by individual jurisdictions

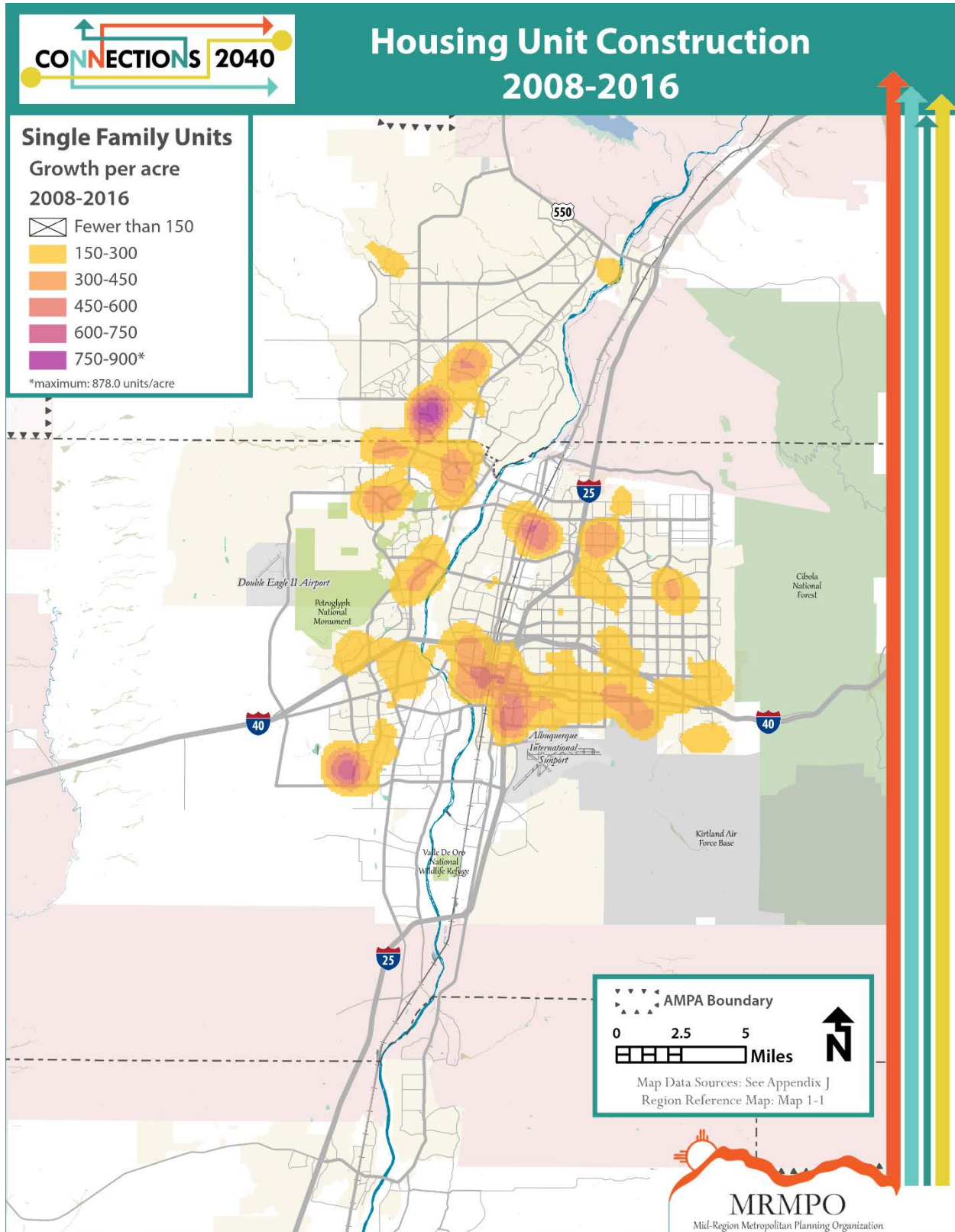
Map 2-2: Housing Unit Construction, 2000-2008

Source: Building Permits issued by individual jurisdictions, MRCOG



Map 2-3: Housing Unit Construction, 2008-2016

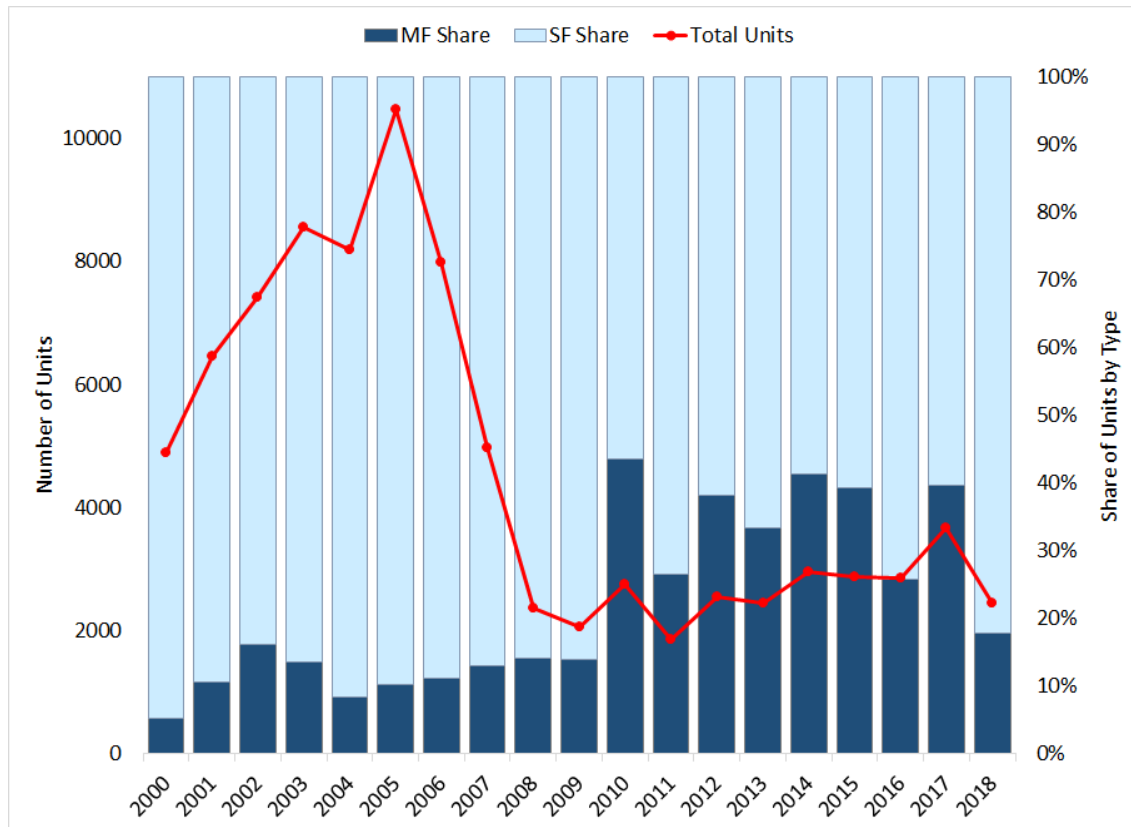
Source: Building Permits issued by individual jurisdictions, MRCOG



Multi-Family Development

One of the key drivers behind the shift towards more centralized development patterns was an increase in the share of multi-family development. An analysis of building permits collected by jurisdictions within the region shows between 2000 and 2008 multi-family units represented an average of 11 percent of all units. After 2009 multi-family units have averaged approximately 37 percent of all units. This rise in multi-family construction as a share of overall new housing has been sustained over several years suggesting a steady demand for this type of housing.

Figure 2-6: Housing Construction by Housing Type, 1990-2018

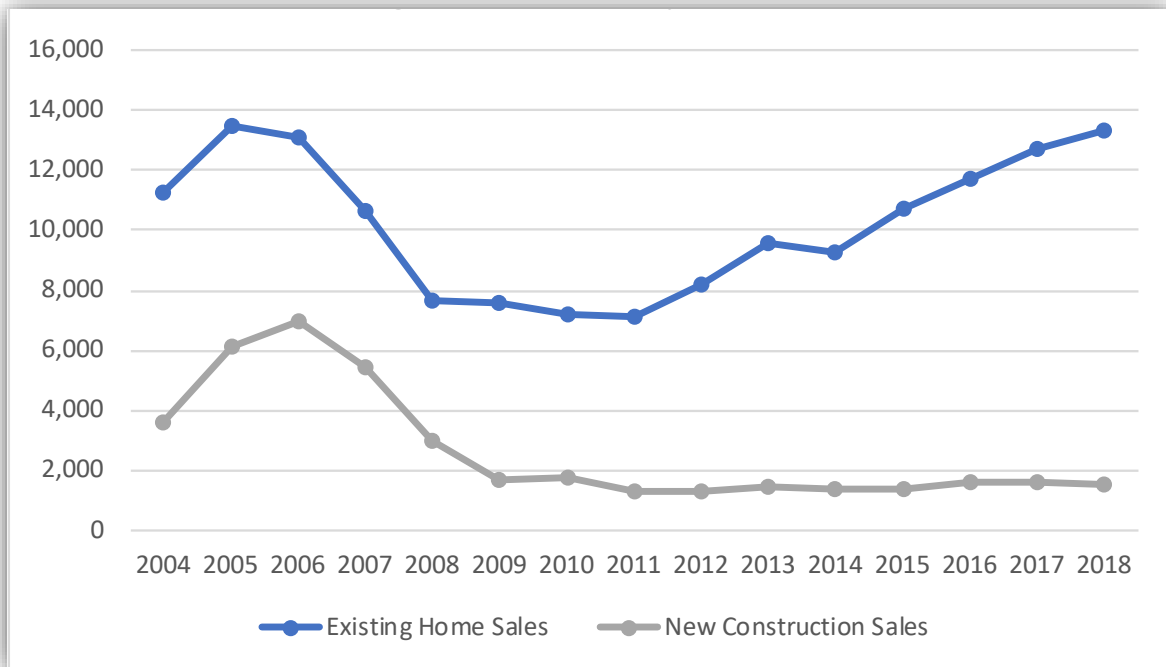


Source: Building permits issued by individual jurisdictions, MRCOG

Single Family Activity

Single-family construction has essentially plateaued since its drop following the housing boom in the mid-2000s, meanwhile existing home sales have rebounded to pre-recessionary levels. While these two components of the housing industry generally track closely, this has not been the case in recent years.

Figure 2-7: Housing Market Activity, 2004 - 2018



Source: Metrostudy, Greater Albuquerque Area Realtors

Housing experts point to several reasons for suppressed new homebuilding:

- low lot supply due to lack of access to capital
- a shortage of labor due to a competition for skilled workers
- increased costs due to increased building efficiency regulations
- rising costs of building materials due to increased tariffs at the national scale

Homebuilders predict that residential construction activity will experience an uptick in 2020 citing consumer demand and several thousand new housing units poised for delivery as master planned communities come online. Near term plans for new housing developments are part of the assumptions that are incorporated into the 2040 Socioeconomic Forecast.

d. Socioeconomic Forecast

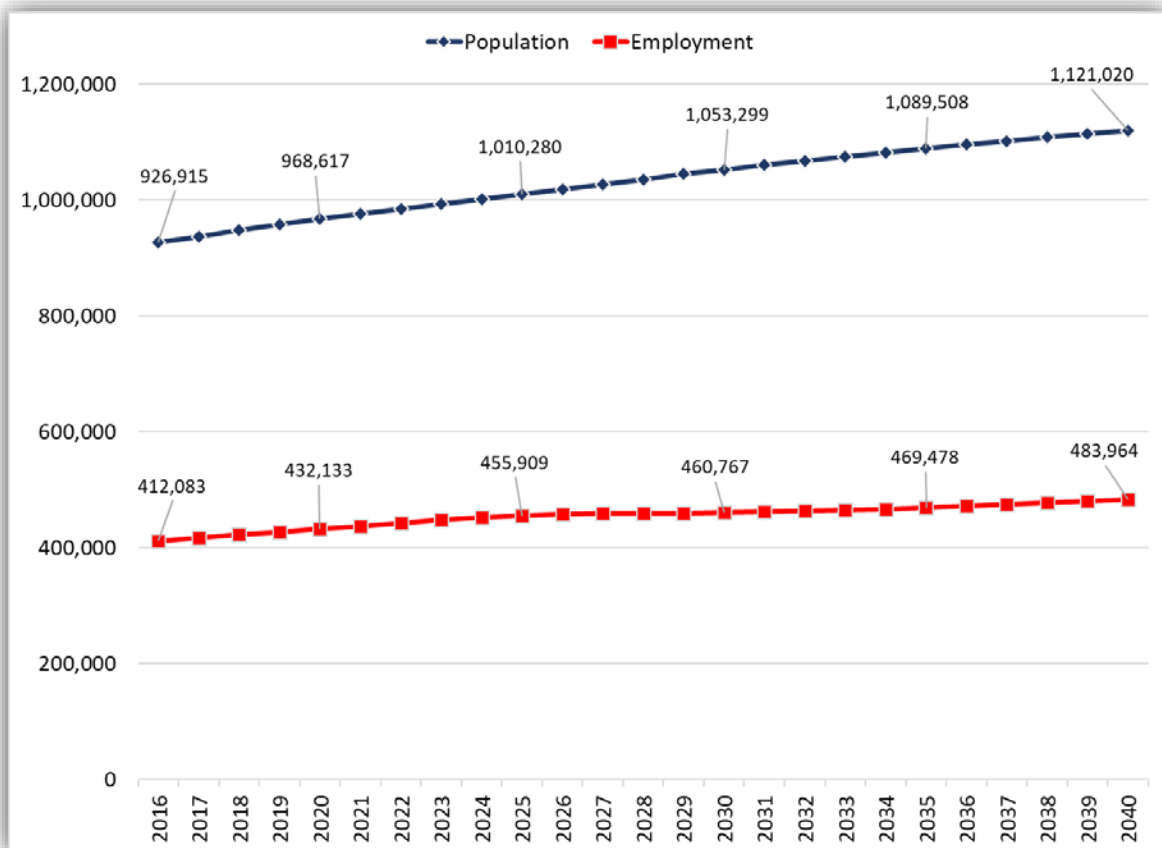
Socioeconomic forecasts are developed for MTPs in order to determine the likely amount and location of future households. With this information, regional leaders can prepare for future travel demand and prioritize transportation infrastructure needs accordingly.

Forecast Methods

Federal guidelines require forecasts that inform long-range metropolitan transportation plans to be built upon the most current information available regarding both demographic and economic trends. The population forecast always begins with the most recent US Census Data. A new Decennial Census, which reflects a best effort towards a 100 percent count, will be taken in April 2020. The next MTP will be based on that count.

The population forecast for this MTP is based on the 2010 Decennial Census Count, which is then brought up to date by estimating births, deaths and migration, the primary components of population growth. Then, current estimates are extended into a long-range population projection for 2040 by the University of New Mexico's Geospatial Population Studies Group (UNM-GPS) using a demographic cohort-component method. The state demographer provides projections at a state and county level for use by state agencies, including the New Mexico Department of Health. The employment forecast for this MTP began with a short-range employment forecast by sector developed by UNM-BBER. MRMPO extended this forecast out to 2040 using a Regional Economic Model (REM).

Figure 2-8: Population and Employment Forecast, 2016-2040



Source: UNM-GPS, UNM-BBER, MRCOG

Regional Forecast

According to projections by UNM-GPS, **the MRCOG region is projected to grow by 194,000 people over the next 24 years resulting in a 2040 population of 1.1 million.** This represents an average annual growth rate of 0.8 percent. By contrast, the average annual historical growth rate in the 1990s was approximately 1.6 percent. The reduction in the pace of growth is attributed to slowed migration and a declining birth rate. In addition, the region is projected to gain 72,000 jobs for a total of 484,000 jobs by 2040.

Sub-Regional Forecast

The sub-regional forecast begins with the overall population and employment totals as described in the section above, which are then distributed throughout the region using a model that forecasts land use. This process is described in detail in Appendix H. The following tables and map depict the expected distribution of future growth by county and throughout the region.⁴ They represent MRMPO's Trend forecast, which is a most likely growth scenario based on current development plans, land use policies, and historical growth trends.

The region is expected to grow by approximately 67,000 households and 72,000 jobs over the next 24 years. Led by the City of Rio Rancho, Sandoval County is expected to hold onto its position as the fastest growing county in the region (and the state) by 31 percent. Bernalillo County will see the second fastest household growth at 17 percent. Sandoval will also see the fastest employment growth at 19.8 percent, followed closely behind by Valencia County.

In terms of sheer numbers, Bernalillo County will capture the largest amount of growth, adding 46,600 households and 60,000 jobs. While Bernalillo County holds 75.6 percent of the region's households, it will capture 69.9 percent of the growth.

Table 2-3: Forecast Pace of Growth by County

County	2016 Base		2040 Trend		% Growth	
	Households	Jobs	Households	Jobs	Households	Jobs
Bernalillo	272,540	352,003	319,180	412,176	17.1%	17.1%
Sandoval	50,564	35,852	66,319	42,955	31.2%	19.8%
*Southern Santa Fe	3,959	1,784	4,517	2,109	14.1%	18.2%
Torrance	6,092	4,321	7,053	5,118	15.8%	18.4%
Valencia	27,461	18,123	30,288	21,606	10.3%	19.2%
Total	360,616	412,083	427,357	483,964	18.5%	17.4%

Source: MRCOG, UNM-GPS

*Only a small part of Santa Fe County is included in the MRCOG region.

⁴ Data Analysis Subzones (DASZs) are a unit of geography often used by transportation planners. DASZs are the equivalent of small subareas that are relatively homogeneous in nature, are usually bounded by transportation corridors, and provide a standardized geography for displaying information

As the economic center of the region, Bernalillo County currently contains 85.4 percent of all jobs and will capture about 83.7 percent of new jobs. Meanwhile, surrounding counties are expected to capture a slightly higher percentage of job growth when compared with their existing shares.

Table 2-4: Forecast Distribution of Growth by County

County	Existing Distribution		2016 - 2040 Growth		Growth Distribution	
	Households	Jobs	Households	Jobs	Households	Jobs
Bernalillo	75.6%	85.4%	46,640	60,173	69.9%	83.7%
Sandoval	14.0%	8.7%	15,755	7,103	23.6%	9.9%
Southern Santa Fe	1.1%	0.4%	558	325	0.8%	0.5%
Torrance	1.7%	1.0%	961	797	1.4%	1.1%
Valencia	7.6%	4.4%	2,827	3,483	4.2%	4.8%
Total	100.0%	100.0%	66,741	71,881	100.0%	100.0%

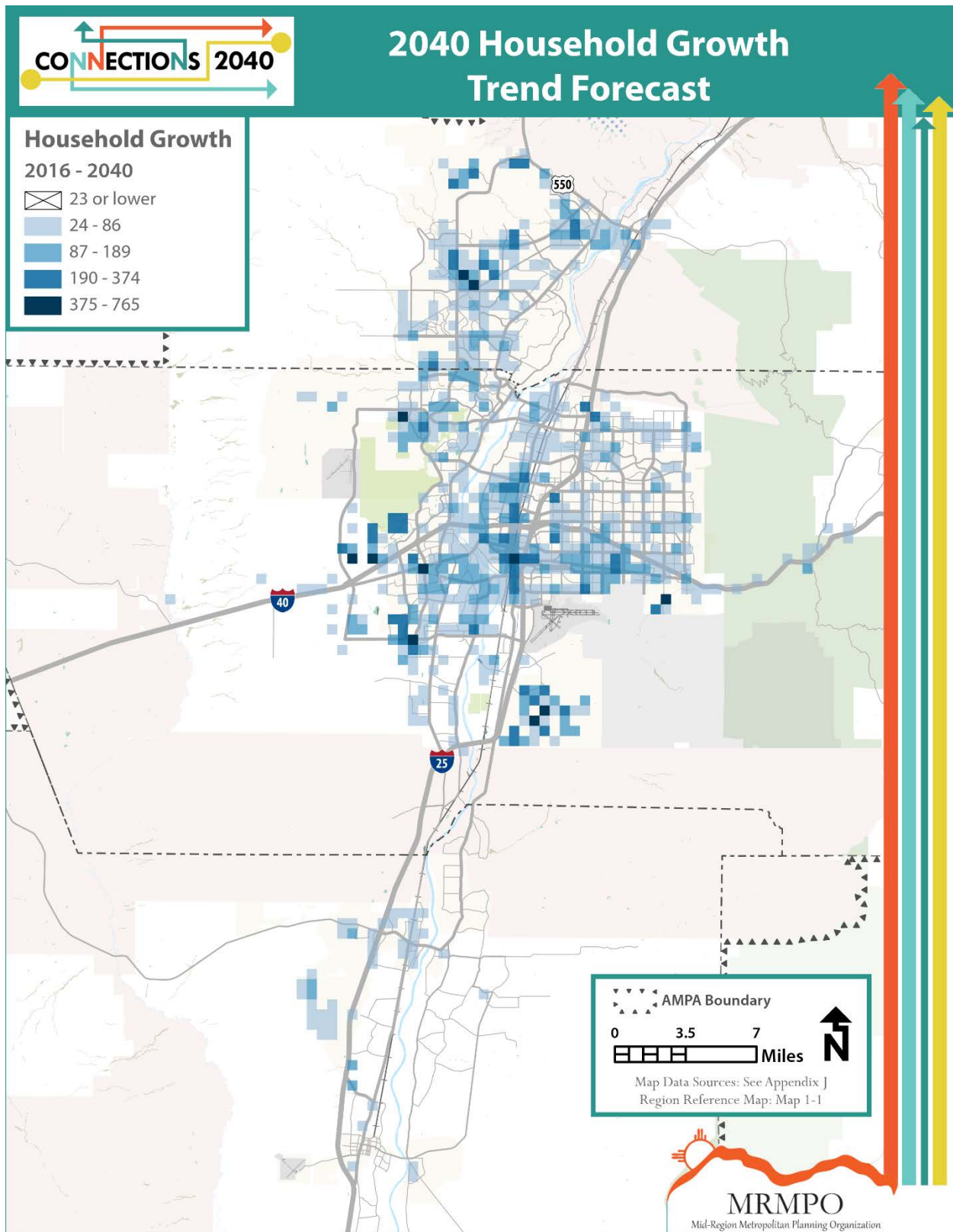
Source: MRCOG, UNM-GPS

The following map shows the forecasted distribution of household and job growth throughout the region. Large master planned communities are expected to capture a great deal of housing growth and attract jobs to new or growing job centers. There will also be a considerable amount of redevelopment in older parts of the region as buildings near the end of their lifecycle, with some increased density in urban areas and conversions from underutilized commercial to a mix of uses. In addition, it is expected that vacant homes in established neighborhoods will begin to fill up and that there will be increased household turnover with the aging of the population, contributing to population growth in areas that may be considered to be built out.

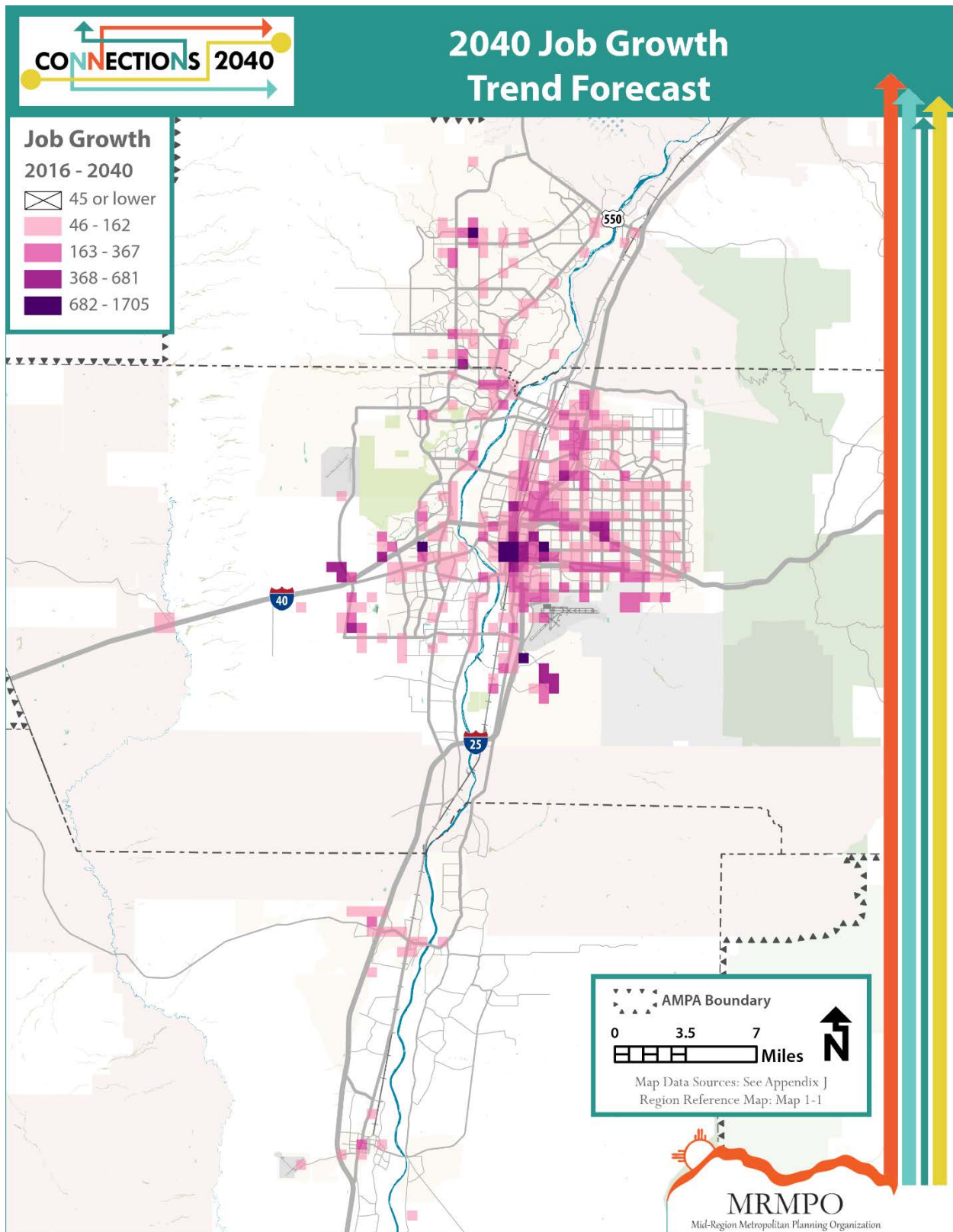
Figure 2-9: New Housing Construction in the AMPA



Map 2-4: Household Growth, 2016 - 2040



Map 2-5: Job Growth, 2016 - 2040



e. How to use the Forecast

The *Connections 2040* socioeconomic forecast is referred to as a Trend Scenario, which is essentially a depiction of how the region will likely grow if it continues to develop in a similar manner as it has in the past under today's regulatory framework. The Trend Scenario is available to the planning and transportation community so that plans may be developed with consideration of how the future may look.

Uncertain Future

The Trend Scenario does not represent a certain future. Rather, it represents a most likely growth scenario based on adopted plans and policies. This is an important distinction, and it is one of the key reasons the MTP is updated every five years.

There are many uncertainties in the region's future, be they related to planning regulation, the economy, the housing market, demographic trends, availability of natural resources, fiscal constraints, or a change in regional priorities. These changing conditions should be part of any discussion that references the Trend Scenario. **When establishing infrastructure priorities and project design, policy leaders and transportation professionals should balance these forecasts with qualitative elements such as community context and planning goals.** Simply put, forecasts should be considered as one factor in the broader picture of how a community wants to establish itself in the future, rather than an inevitability.

A Current Base Year

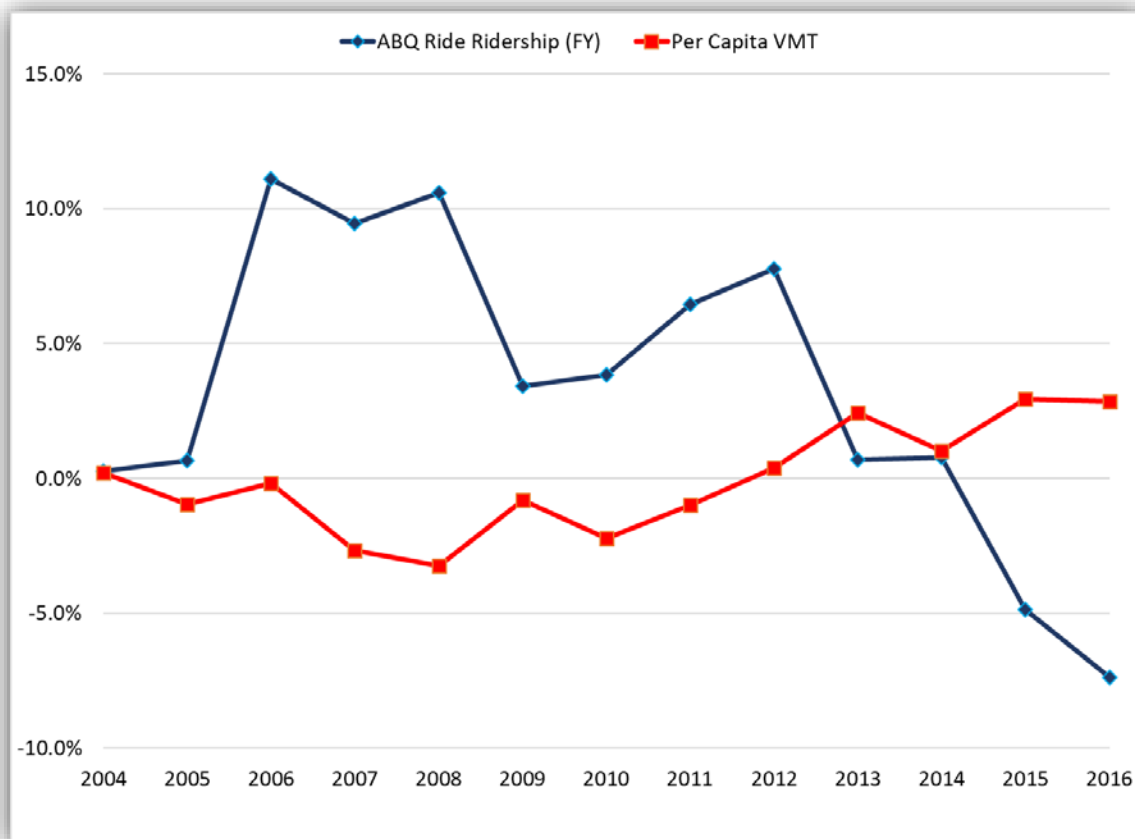
Because the forecasting process is a time-consuming part of MTP development, it begins very early in the process of putting together an MTP. Early data collection for this MTP began in 2017 when the most complete data year was 2016, and as such, 2016 serves as the "base year" for the *Connections 2040*. As the forecast is refined over time it is brought up to date by inserting more recent development activity that has occurred since the base year, in this case between 2016 and 2019. This is achieved by tracking local development review cases and building permits and entering them into the early years of the forecast. This important step ensures that the forecast truly begins with the most current information available and reflects reality when it comes to existing land use and growth patterns.

2.2 Transportation Trends

a. Regional Travel Patterns

Toward the end of the last decade vehicle miles traveled (VMT) both nationally and locally were experiencing a ten-year decline, leading national analysts, and regional planners alike, to consider that it may be a trend that was here to stay. In addition to declining vehicle miles, transit ridership had been growing exponentially. However, since 2012 these trends have reversed direction with VMT on the rise once more and transit usage on the decline across most metropolitan areas. **Between 2012 and 2016, VMT in the AMPA increased nearly 12 percent**, which is particularly notable given the fact that both population and jobs grew at a considerably slower pace.

Figure 2-10: Transit Ridership vs. Vehicle Miles, 2004-2016



Source: ABQ RIDE, MRCOG Traffic Monitoring Program

Note: While New Mexico Rail Runner Express ridership has declined over the same time, the transit ridership represents only ABQ RIDE for the purpose of year-over-year comparability since rail service was not fully implemented until 2011.

The following table demonstrates that the increase in VMT far outpaced both population and employment growth between 2012 and 2016, while the decline in transit ridership is also out of line with the pace of growth. Chapter 4 provides greater detail regarding the major influences behind these trends.

Table 2-5: Summary Transportation Statistics, 2012-2016

Measure	2012	2016	% Growth
Population - AMPA	879,401	890,600	1.3%
Employment - AMPA	388,981	403,133	3.6%
Vehicle Miles Traveled - Total	18,966,203	21,199,359	11.8%
Vehicle Miles Traveled - Per Capita	21.7	23.8	9.7%
Transit Ridership	14,277,115	12,721,269	-10.9%
Passenger Miles Traveled	100,245,174	81,607,901	-18.6%

Source: MRMPO 2016 Socioeconomic Estimates by DASZ, MRMPO Travel Demand Model, RMRTD

Ride-Hailing Services

It is important to note that the rise in VMT coincides with the rise in the use of ride-hailing services such as Uber and Lyft, which likely contributed to the increase. A survey of ride-hailing users across California found that 24 percent of these trips would have been taken by transit, walking, or biking, or not taken at all.⁵ In addition, according to a recent study at Arizona State University based on data from the 2017 National Household Travel Survey, it is estimated that ride-hailing trips doubled between 2009 and 2017.⁶ While it's impossible to say the extent that ride-hailing has impacted VMT, the likelihood is that it is significant. Local information from a recent MRMPO preference survey showed that 56 percent had used Uber or Lyft within the past year, 1.3 percent of whom used it daily.⁷

More Commuters Drive Alone

An examination of commute to work patterns using Census Journey-to-Work data provides further evidence of increased dependence on the personal vehicle. Between 2012 and 2017, there was a 1.5 percent increase in commuters who drove alone to work (9,200 workers). This increase was primarily at the expense of the carpooling segment, which decreased over the same time period.

Table 2-6: MSA Commute Mode Share over Time, 2012 and 2017

Commute Mode	2012		2017	
Type	Workers	Percent	Workers	Percent
Drove Alone	315,272	79.2%	324,496	80.4%
Carpool	42,068	10.6%	36,551	9.1%
Public Transportation	6,614	1.7%	6,651	1.6%
Bicycle	3,744	0.9%	4,048	1.0%
Walked	7,397	1.9%	7,193	1.8%
Other Means	5,002	1.3%	5,267	1.3%
Worked at Home	18,090	4.5%	19,295	4.8%
Total	398,187	100.0%	403,501	100.0%

Source: US Census Bureau Journey to Work

⁵ Source: Ride-Hailing's Climate Risks, Steering a Growing Industry toward a Clean Transportation Future. Union of Concerned Scientists. www.ucsusa.org/resources/ride-hailing-climate-risks. February 2020.

⁶ Source: How ride-hailing is changing urban mobility. Jesse Berst, Smart Cities Council. July 2019.

⁷ The MRMPO 2040 MTP Questionnaire does not represent a statistically significant sample.

One possible explanation can be found in the kinds of jobs that have been created during this time. When we consider that the fastest growing sector in the economy is healthcare, followed by construction, food services and accommodations – industries that don't conform to a typical 8:00 am to 5:00 pm weekday schedule or have changing job site locations – it is likely that the ability to carpool or use other forms of alternative modes has decreased.

Table 2-7: MSA Top Five Growth Industries

Employment Industries	2012	2017	Growth
Health Care and Social Assistance	60,371	68,025	7,654
Construction	19,334	23,500	4,166
Accommodation and Food Services	37,669	41,609	3,940
Professional and Technical Services	28,708	30,849	2,141
Finance and Insurance	10,703	12,372	1,669
<i>All Industries</i>	<i>355,089</i>	<i>373,873</i>	<i>18,784</i>

Source: US Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Transit Riders

While transit ridership has declined in recent years, there are some interesting exceptions. **There are two age groups where the commute share by transit has increased over time: the 20-24 and 60-64 age groups.** In addition, the Census commuting data show that both the number and share of workers commuting by transit held relatively constant between 2012 and 2017. This suggests that the decline in transit ridership may not be due to the commuting segment of riders, but by those using transit for other trip purposes.

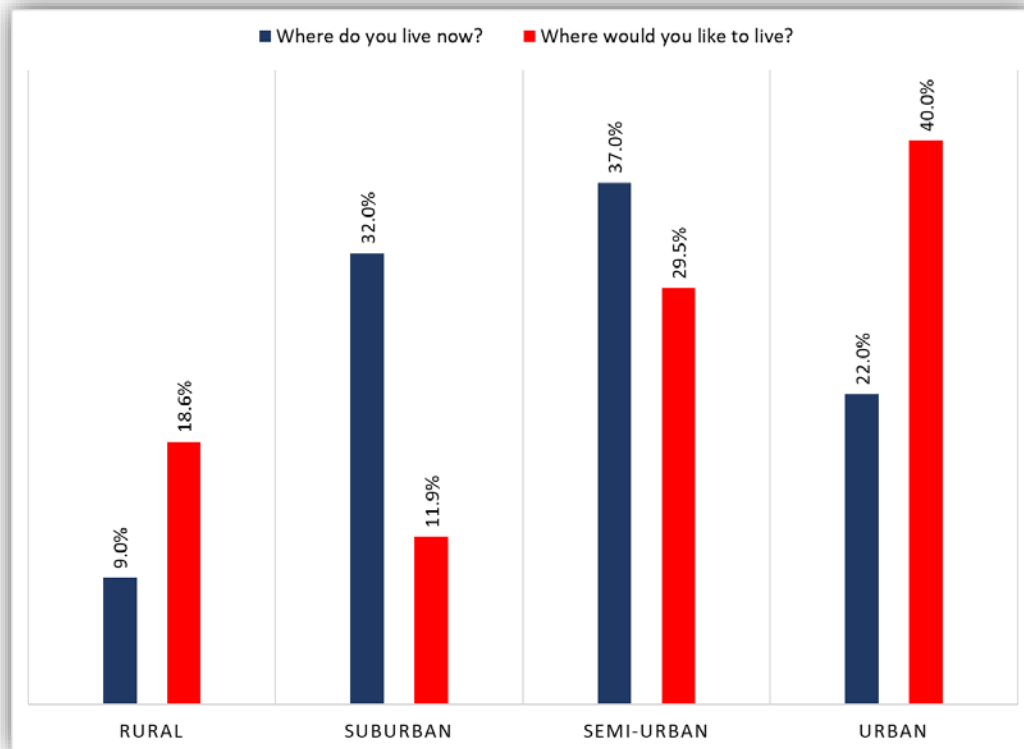
b. Consumer Preferences and Concerns

Between 2018 and 2019, MRMPO distributed a public questionnaire about transportation needs and challenges across the region as part of its general public outreach efforts. Responses were collected through public meetings, broad outreach efforts, and online. There were approximately 700 respondents. The questionnaire responses do not represent a statistically significant survey; rather, it is a summary of information gathered from members of the public who are interested in transportation issues. This public perception questionnaire provides us a means of gaining insight into some of the qualitative motivations of the general public. Several of the questions were identical to those posed in a 2013-2014 survey distributed during the development of the *Futures 2040 MTP* to approximately 1,300 people, allowing a comparison of how opinions have changed over time.

Desired Housing Options

Both questionnaires asked the public the type of area they live in and the type of area they wish to live in, and the findings were strikingly similar both times. **Twice as many people desire to live in an urban environment than already do. The same is true for a smaller share of respondents who desire a rural lifestyle.** Far fewer people desire to live in a suburban area than currently do.

Figure 2-11: Current vs. Desired Housing Location, 2018



Source: MRMPO 2040 Connections Questionnaire, 2018

Access to Goods and Services

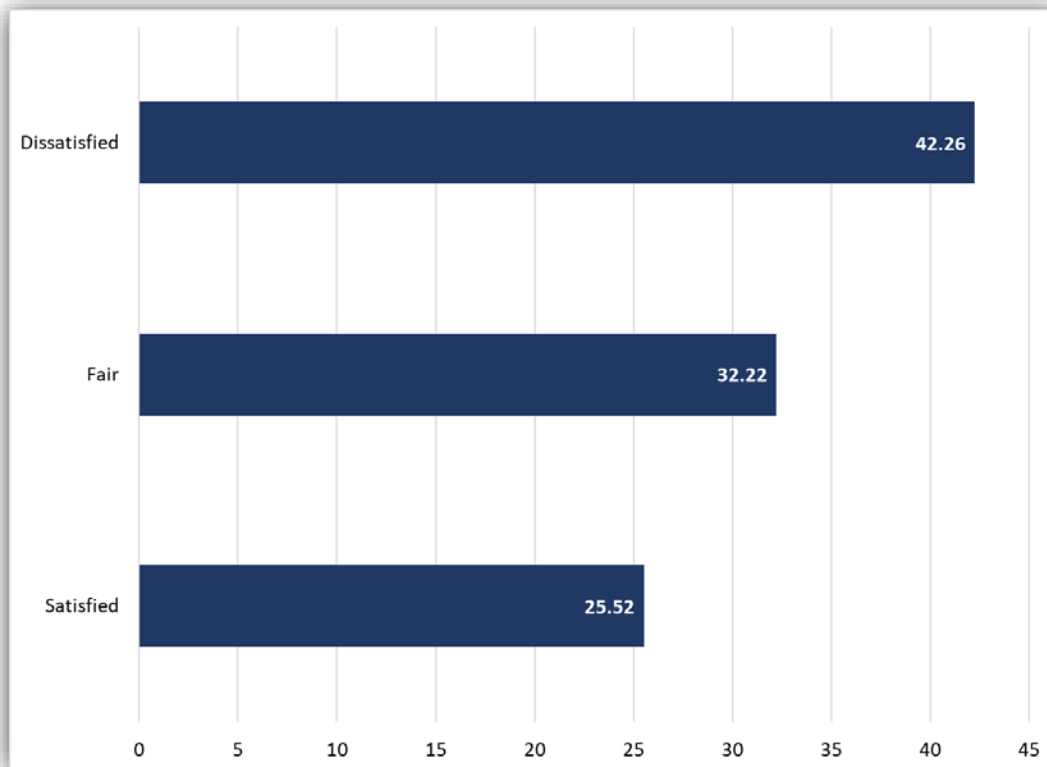
When questionnaire results were analyzed further the data showed that the majority of respondents, across all age groups, showed a preference for urban environments. The write-in comments revealed the desire for easier access to goods and services. National surveys from the Urban Land Institute and the National Association of Realtors have similar findings, that residents and homebuyers across different age groups desire walkable, mixed-use neighborhoods with access to jobs and entertainment, even in rural and suburban areas where people enjoy small town centers.⁸ The takeaway is not that people are expected to flock to downtown apartments and city centers, but that having access to transit, services, and jobs closer to home is important to people. This is also critical to low-income populations and people who lack dependable travel options. **The costs associated with long work commutes, both in vehicle costs and in travel time, can be substantial particularly for the most vulnerable in our workforce.** The growing distance between where people live and where they buy goods or seek medical care is particularly challenging for seniors and youth.

⁸ <https://uli.org/wp-content/uploads/ULI-Documents/America-in-2015.pdf>, <https://www.nar.realtor/newsroom/millennials-and-silent-generation-drive-desire-for-walkable-communities-say-realtors>

Lack of Travel Options

Respondents to the MRMPO questionnaire tended to be dissatisfied with the current transportation system. Only one in four people felt that the transportation options met their needs, with a full 42 percent saying that it did not meet their needs. When compared with the previous questionnaire, responses indicate a growing level of dissatisfaction that is strongest among young adults. The questionnaire also provides insight into why people are dissatisfied. Lack of good routes by alternative modes, concern for safety, and excessive travel times are all important factors. Interestingly, respondents reported that there were few significant barriers to vehicle travel, and just one out of four respondents felt congestion was a serious problem.

Figure 2-12: Satisfaction with the Transportation System, 2018



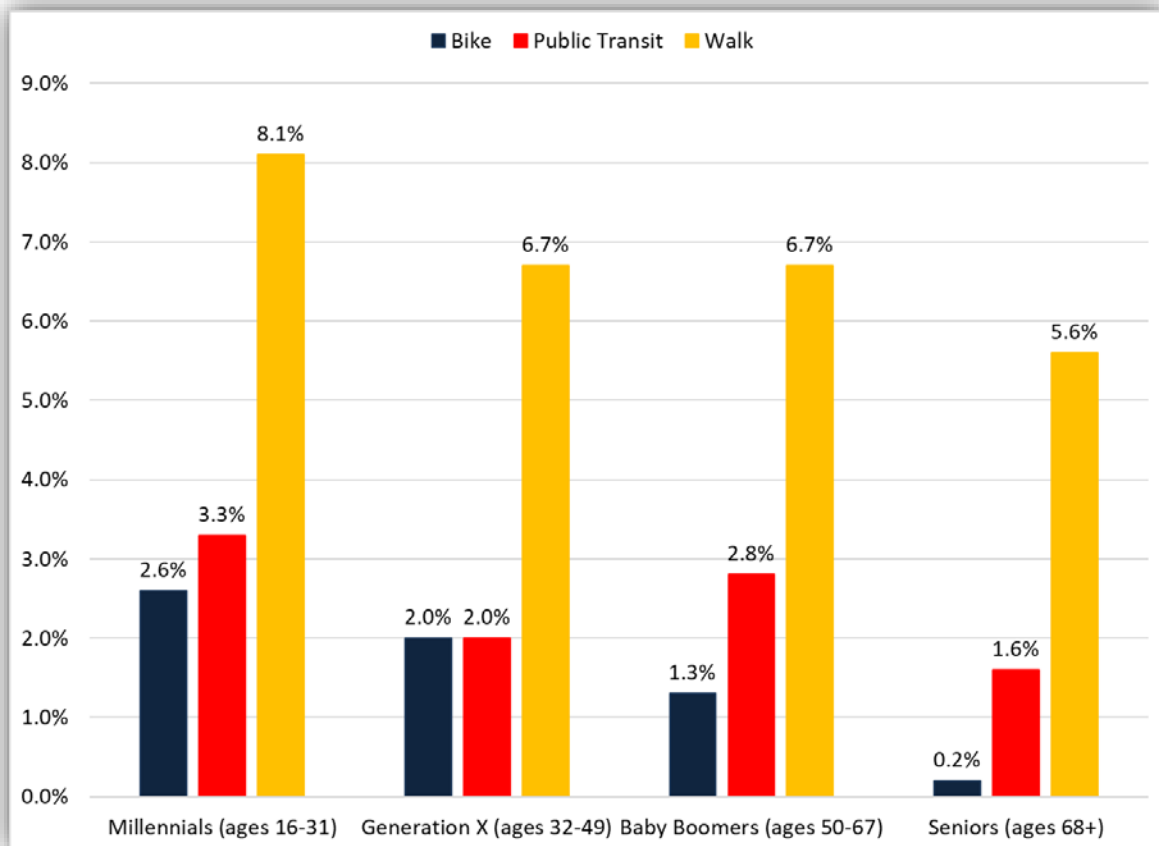
Source: MRMPO 2040 Connections Questionnaire, 2018

Multimodal Access

MRMPO conducted a Mid-Region Travel Survey from November 2013 to January 2014. Nearly 2,500 households (and more than 5,000 individuals) from across Bernalillo, Sandoval, and Valencia Counties participated in this statistically significant survey. The survey revealed that Bernalillo County residents were most apt to travel using multimodal options due to the increased opportunities to do so. Additionally, young adults were more likely to bike, walk, and take public transit than other age groups. Given that young adults are more likely to use active modes of transportation and are least likely to be satisfied with their transportation choices, investments in pedestrian, bicycle, and transit facilities are well received among this population.

If we provide more convenient, connected, and safe transportation options, we may find that we have an advantage in attracting and retaining young professionals to the region.

Figure 2-13: Bicycle, Transit, and Pedestrian Mode Share by Age, AMPA



Source: Mid-Region Household Travel Survey, 2014

2.3 Regional Opportunities

a. Local Planning Advances

An important function of a long-range transportation plan is to guide and support local jurisdictions with their land use and transportation policies and plans. While the MTP can be considered a general roadmap, the policies and plans of local jurisdictions are the actual avenues that take us to where we want to go. There have been several local efforts that embody many of the concepts that were put forth in the previous long-range plan, the *Futures 2040 MTP*, which continue to be supported with this update, the *Connections 2040 MTP*.

High Frequency Transit

The City of Albuquerque has pioneered the region's first BRT system along the Central Avenue corridor, paid primarily with funds from the Federal Transit Administration (FTA). While the start date suffered several delays due to a series of challenges, service began November 30, 2019. There is evidence of significant private investment along the corridor with developers citing ART service as a key factor. A second premium service line along the University Avenue corridor, connecting the Albuquerque Sunport with sports stadiums and educational and health facilities, is

in the planning stages. These efforts are supported by the MTP through the recommendation for high frequency transit, such as Bus Rapid Transit, in order to increase transit mode share, promote efficient and equitable people movement, reduce congestion, and support active place-making.

Mixed-Use Zoning

The City of Albuquerque has recently passed a new Integrated Development Ordinance (IDO), which represents a massive overhaul of its previously complex system of land use regulations and zoning. The IDO integrates numerous plans and ordinances into one document. As part of this effort, the City created a new category of zoning called Mixed-Use Zones, which were formerly commercial zones. These zones will also allow housing in new development and in redevelopment along key transportation corridors and will increase the proximity of housing to transit, jobs, and services. It is an important step towards changing the Euclidian zoning strategy of separating jobs and commerce from residences. These efforts are supported by the MTP through recommending and encouraging a compact mix of uses in key locations, and the adoption of mixed-use zoning in appropriate areas.

Figure 2-14: City of Albuquerque Rapid Transit Bus (ART)



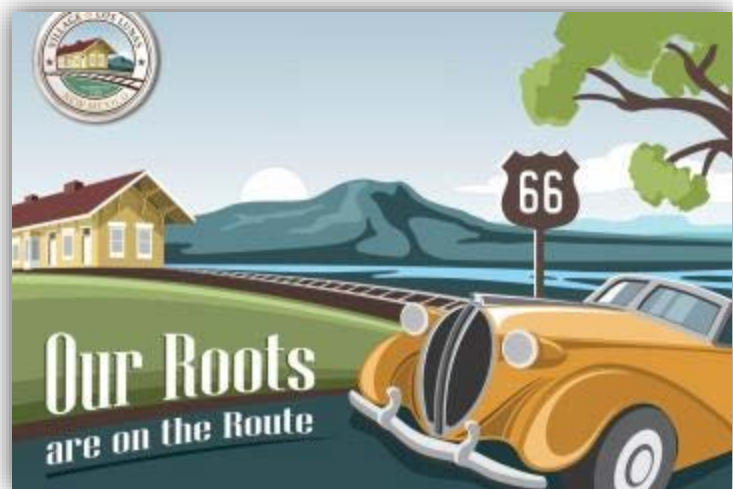
Diverse Activity Centers

The City of Rio Rancho adopted the Unit 10 Specific Area Plan in 2016, which highlights the need for diverse housing types, jobs, and shopping and a well-designed transportation system that encourages complete street design, walkable neighborhoods, and a high level of connectivity. The plan also emphasizes the desire to improve the balance of housing and jobs in order to lessen traffic congestion and the need for workers to commute out of the City to their jobs. In addition, the Los Diamantes master plan, located within Unit 10, is zoned to accommodate higher density housing and a business park, providing an opportunity to create a new mixed-use activity center. These efforts are supported through MTP recommendations that growth in large undeveloped areas should be master planned to include well-connected streets, a range of densities, and a balance of housing and jobs.

Place-making and Historic Preservation

Through funding received from a National Endowment for the Arts Our Town Grant, the Village of Los Lunas has worked in collaboration with the UNM School of Architecture and Planning to develop plans for an upcoming Los Lunas Route 66 Museum and Visitor Center. In spring of 2019, students and professors in the UNM Community and Regional Planning Capstone Studio worked directly with staff from the Village of Los Lunas to develop a site plan and programming structure for the upcoming museum, including recommendations for highlighting the historic pre-1937 Route 66 corridor. Historic preservation students documented the condition of buildings on the site to determine the remediation needed to use them for the museum. An architecture studio in fall of 2019 further developed the design of the buildings and the museum programming. The Village has been in the early planning stages for the Route 66 Museum since early 2015 and envisions an active museum and event center on our historic Route 66 corridor. These efforts are supported through the MTP recommendation of the use of creative partnerships to encourage development in key locations.

Figure 2-15: Los Lunas Route 66 Efforts



Connected Transportation Investments

In 2019, Bernalillo County adopted the Sunport Commerce Center Design Overlay Zone and the Sunport Commerce Center Transportation Plan. The Design Overlay helps to encourage new economic activity that is attractive and will enhance the overall identity of the area. The Transportation Plan identifies a multi-modal network that connects the Commerce Center to the region and enhances access within the plan area. Together, these two plans are strategically integrated with new major transportation investments, existing rail connections, and access to the airport, in order to promote a variety of transportation options for commuting and goods and freight movement. These efforts are supported through MTP recommendations that key economic development projects be linked with transportation investments.

Targeting Economic Investments

MRCOG's 2020 Comprehensive Economic Development Strategy (CEDS) presents a five-year plan for economic growth and highlights strategies that will move the region towards a more resilient economy. The CEDS development convened regional economic development leaders to identify focus areas that will elevate our region and maximize our return on investment. There are several key job clusters identified for growth, including Film / Arts & Entertainment, Agriculture and Value-Added Foods, Tourism / Outdoor Recreation, and Science and Technology, to name a few.

The Film / Arts & Entertainment sector has catapulted the region onto the radar of national industry leaders with the announcement of Albuquerque as a Netflix production hub, promising 1,000 new jobs and \$1 billion in production over 10 years. Several additional production announcements include Sony Pictures, Warner Brothers, and NBC Universal. Agricultural and Value-Added Foods (foods that have had a change in the physical state or form of the product) is another growth area in the region with average annual growth of six percent over the past five years. The region's Science and Technology Sector, which has a concentration of jobs as a proportion of the total economy that is 10 times that of the nation, is expected to grow even more with expansion announcements at both Intel and Sandia National Laboratories amounting to over 2,000 new jobs in the region.

Figure 2-16: CEDS Plan



Transportation and Logistics Assets

MRCOG's *Transportation and Logistics Hub Study* (the Hub Study) presents opportunities for the region to leverage its transportation infrastructure and workforce development to build a robust manufacturing and technology economy. The Hub Study identifies several regional assets that can be further leveraged to support economic growth. Importantly, the region benefits from ample access to cross-country infrastructure (air, highway, and rail) that facilitates connections to major markets. In addition, the metropolitan area has a competitive advantage in the area of industrial land availability. Between Bernalillo and Valencia Counties, there are dozens of vacant or under-utilized industrially zoned near rail, highway, and air transportation. One such site is the location of a new Burlington Northern Santa Fe (BNSF) Railway intermodal facility under construction in the Village of Los Lunas. This project is an example of how local partnerships can work to facilitate freight movement and economic opportunities in the region. The study recommends that local governments catalyze development through creating a "certified ready" industrial site program that would expedite development in desired locations while simultaneously achieving public goals such as balancing jobs and housing and supporting employment centers.

b. Transportation Enhancements

Leaders in the transportation profession agree that when it comes to mobility, the future is all about choice. Whether it is general auto, ride-hailing, automated vehicles, public transit, bus rapid transit, commuter rail, bike-sharing, electric scooters, or walking, transportation options are continuing to expand and fill in the gaps to connect people with their destinations. Evolving transportation technology and the supportive infrastructure that it requires is challenging cities and regions to plan ahead and adapt quickly during this time of rapid change.

Autonomous Vehicles

Perhaps most revolutionary of these options is autonomous or ‘driverless’ vehicles. While there is no clear agreement as to exactly when, it is certain that in the coming years fully automated cars and trucks that drive us, instead of us driving them, will become a reality. The potential benefits from automation include improved mobility, faster movement of goods, fewer crashes, and better accessibility for those who can’t drive. But equally possible are job losses due to automation, more congestion, increased emissions, sprawl, and economic inequity. There are some important steps we can take in order to avoid some of the potential negative consequences of autonomous vehicles:

- 1) Create an economic development strategy that supports the development and testing of smart auto systems including electric vehicle components, connected infrastructure, and other emerging transportation technologies.
- 2) Encourage the use of shared or pooled rides to reduce the number of trips and increase affordability.
- 3) Maximize regulatory and economic incentives that encourage compact mixed-use development and creative reuse of space including parking areas to reduce trip length and auto dependency.
- 4) Adopt policy surrounding autonomous transportation systems that includes provisions to ensure equitable access to economically and physically disadvantaged populations.
- 5) Establish proactive roadway maintenance and right-of-way acquisition procedures that conform to emerging technology needs.

As of 2018, twenty-nine states have enacted legislation related to autonomous vehicles. While the New Mexico state legislature has not yet acted on legislation, it has committed to addressing the emerging need for transportation policy in this area by establishing a committee of key stakeholders to investigate autonomous vehicle regulation.

Connected Vehicle Technology

Connected Vehicle (CV) technology is another advancement in transportation that is already being used in vehicles today. CV technology enables vehicles to communicate with other vehicles and infrastructure and detect pedestrians to improve transportation safety and efficiency. This technology has the benefit of responding instantaneously to changes in roadway conditions. Some examples of CV technology include signals that convey the posted speed limit, sensors that alert vehicles to potential incidents, and vehicle platooning where vehicles sync their travel together like train cars.

Connected technology exists today and has already shown great results in improved safety and driver-experience, however; realizing the full benefits of this technology will depend on how widely integrated it is into the overall transportation fleet. Additionally, it is essential that we adapt and maintain our current transportation infrastructure for this type of technology in order for it to be successful in the future.

Bike Share and Scooters

Bike share and electric scooters represent two mobility options that are relatively new to the transportation market and are available in key locations such as Albuquerque's downtown and Nob Hill. Through an app on a smartphone, users are able to find and rent bikes or scooters instead of needing a car to travel between destinations. These options can be particularly efficient for short distances and within downtown and activity centers. Publicly available bikes and scooters reduce the need for parking, do not compromise our air quality, and supplement transit trips by providing that last-mile connection to a passenger's destination. In addition to their practical use, bike share and scooters also promote physical activity and provide a fun way to get around. While scooters are relatively new (compared to the bike share program in Albuquerque), the bike share program has been a great success and continues to expand to accommodate increased demand.

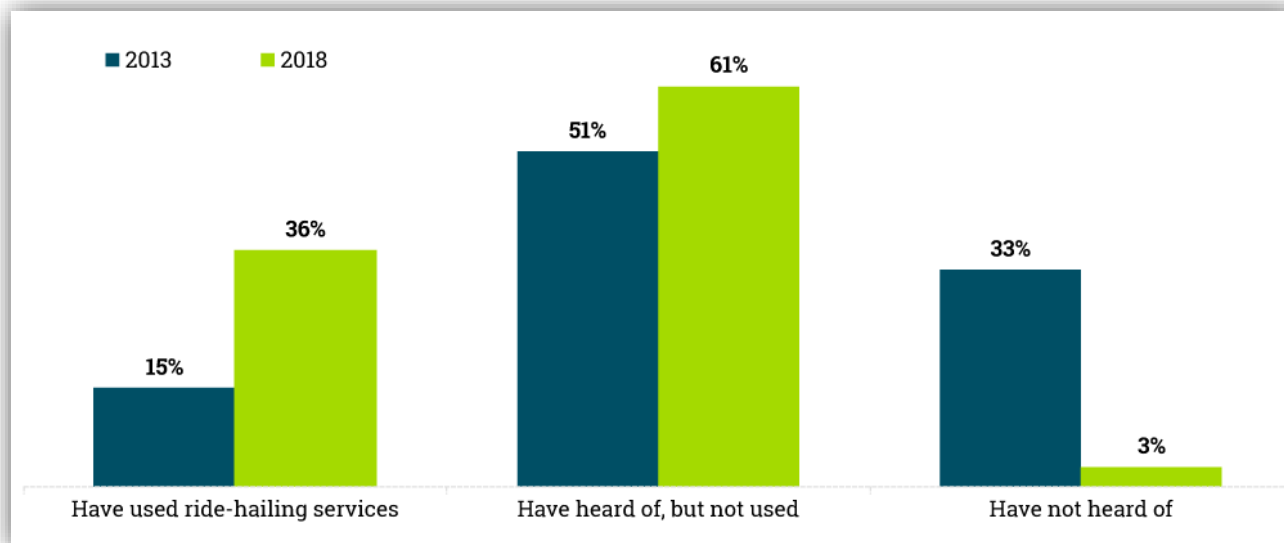
Figure 2-17: Pace Bike Share Station near the University of New Mexico



Ride-Hailing Services

Ride-hailing refers to the on-demand transportation services that link drivers with passengers that need a ride. Using a smart phone app, passengers needing a ride can hail nearby drivers who are compensated for their services by Transportation Network Companies (TNCs).

Figure 2-18: Pew Research Center Adult Ride-Hailing Services Use, 2019



The transaction is quick and easy for the technically equipped, yet out of reach to others. This disparity raises equity issues, and a study in the San Francisco area of riders showed that the lowest income households were underrepresented among users of ride-hailing services.⁹

In addition, TNCs such as Uber and Lyft tend to operate in major cities, while more remote suburban and rural residents continue to rely on their personal vehicle to get around. Another concern related to ride-hailing is the potential to add vehicle miles to our roadways, particularly when the passenger may have otherwise chosen to take public transit, walk, or ride their bike, modes that serve to remove vehicles from the transportation network. In addition, drivers of ride hailing services often operate without passengers as they circulate areas awaiting passengers to be hailed, or are in-between trips after drop off and before the next pickup. Nonetheless, ride-hailing services have disrupted traditional transportation providers with a relatively (and at least for now) cost-effective and easy alternative to other means of travel. When combined with ridesharing (passengers share their ride with other passengers for a lower fare), there is the potential to increase affordability and combine multiple vehicle trips into one. Some transit agencies are starting to partner with TNCs with agreements that provide last mile connections in support of a larger regional transit system. Policymakers in many cities have used various tools to prioritize high-occupancy vehicles and encourage ridesharing. This could be a beneficial future direction for New Mexico.

⁹ Shared Mobility Current Practices and Guiding Principles, FHWA, US Department of Transportation, 2016

2.4 Regional Challenges

a. Limited Funding

While our region's infrastructure needs continue to mount, our sources of transportation funding have become more limited and increasingly unpredictable. There is pressure at the federal level for states to financially shoulder a higher share of their transportation needs. This very much highlights the fiscally constrained nature of the Metropolitan Transportation Plan as there is simply not enough money to fund all the transportation projects being proposed. Because of this situation it becomes more and more important for Connections 2040 to emphasize that:

Transportation projects listed in the MTP should fill a critical gap in the regional transportation system to ensure the greatest return on investment of public dollars.

National and State Level

At the national level, Congress has not passed an increase in the gas tax since 1993; meanwhile, inflation has risen by approximately 70 percent during this time. **The gas tax is the most immediate way to fund infrastructure improvements.** The current transportation bill, the FAST Act (Fixing America's Surface Transportation) was passed in 2015. The FAST Act authorizes modest annual increases in transportation spending that are further diminished by a growing population, a growing inventory of needs, and rising construction costs. The FAST Act expires in 2020, and members of Congress are currently working on drafting a new surface transportation bill.

As with the national situation, at the state level, New Mexico policy leaders have not raised the tax on gasoline since 1993. **At 18.88 cents per gallon, the New Mexico gas tax remains one of the lowest in the nation.** As the fifth largest state in the nation, New Mexico has a considerable inventory of roadways that require maintenance, including many facilities in the Albuquerque metropolitan area in both urban and rural areas. The lack of a major increase in infrastructure funding by the federal government, and the lack of a reliable and sufficient transportation revenue stream from state and local governments, does not abate our public responsibility for ensuring reliable and safe infrastructure for all residents. It does mean, however, that we must be more strategic about how these limited funds are spent.

Raising gas taxes could help local governments fund transportation projects but is certainly not a silver bullet. Increasing fuel efficiency, and improvements in vehicle technology have created less dependence on gasoline as a fuel source. A larger share of vehicles and buses on our roadways are powered by electricity, natural gas, and other alternative fuel sources, and this is expected to continue in the future. There are options for creating new funding streams such as mileage-based user-fees, but these ideas are still very much in their infancy phases and raise concerns about privacy and equity among other things.

Lifecycle Costs

It has become increasingly apparent that we must be more financially prudent when considering new infrastructure projects. **With every roadway expansion project, miles are added to our regional inventory; miles that need to be maintained over time.** The financial responsibility for new roadway maintenance generally defers to the local jurisdiction. Continuously adding to the roadway inventory places a strain on municipal budgets. Therefore, when new transportation infrastructure projects are proposed, the "lifecycle costs" must be taken into consideration; that is, the one-time capital costs of the project plus all recurring costs that are expected throughout a project's life. This complete picture of project costs is a more accurate and informative figure when weighing project costs against a growing list of transportation needs.

The Metropolitan Transportation Board recognizes the need to maintain existing infrastructure first. This is a key objective of the mobility goal from the *Futures 2040 MTP* and has been carried forward to *Connections 2040*. One example of the Board's commitment to this objective is the addition of critical bridge maintenance to the MTP project list.

b. Building a River Crossing

Anyone who commutes over the Rio Grande during peak hour traffic has probably asked the question, "When will we get a new bridge?" The answer is, beyond what is already programmed¹⁰, not within the lifetime of the MTP. There are significant challenges that are posed with the prospect of building a new river crossing. These challenges are highlighted below along with some alternatives to address the congestion problem on existing river crossings.

Location and Right-of-Way Acquisition

Much of the land alongside the river has been developed, making right-of-way acquisition expensive and likely to require the demolition of both commercial and residential buildings. Any location that would require traversing tribal lands would require approval from tribal governments that have sovereign rights regarding the control and use of their land. Any other location would require significant right-of-way and private property acquisition.

Environmental Reviews and Air Quality

Construction of a new bridge and roadway connections require an environmental review of a project. When a project impacts parkland or open space, special effort must be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites. While building a crossing through open space or an environmentally sensitive area is not insurmountable, several mitigation measures and conditions would likely be required and add to a project's cost.

Besides direct impacts due to the construction of a project, an air quality impact analysis would also be required. Any project building general traffic lanes would increase vehicle emissions along the route. The Albuquerque metro area was in nonattainment/limited maintenance for carbon monoxide (CO) from 1996 to 2016. Currently, the region is borderline for ozone (O₃) conformity with levels at the limit of the National Ambient Air Quality Standards (NAAQS) levels.

Fiscal Constraints

While a project cost estimate has not been developed for a new river crossing (and associated ancillary projects), based on the costs of related elements of other major projects, a very rough figure of at least \$100 million is reasonable for design, right-of-way acquisition, and construction. Per federal law the MTP must be fiscally constrained, meaning the cumulative total of all project costs proposed in the plan cannot exceed the total of all estimated revenues. Funding any large-scale project with core federal program funds would require removing an equal amount of other project proposals.

Considering the total federal highway funding currently provided to the AMPA in any given year is approximately \$65 million (which is also needed for rehabilitation, resurfacing, and repair of the existing infrastructure), relying on the core federal funding program to fund a bridge project is not practical.

¹⁰ The Village of Los Lunas will build a new river crossing parallel with Morris Road to alleviate high volumes on its only east/west thoroughfare, New Mexico State Road 6. This project has been planned for well over two decades and is finally nearing construction. US 550 is programmed for a widening project that includes new lanes across the river.

Even relying on state or local funding would require a significant commitment of financial resources to fund a project of this scale. In addition, given the need to provide future rehabilitation projects for our current roadways and bridges, safety improvements and other needs, the impact of doing so would jeopardize the integrity of our existing infrastructure.

Local Funding Match

All projects programmed in the MTP must be sponsored by a member agency. Currently, no agency can easily sponsor such a project, given the fiscal responsibilities, including having to provide the required federal matching funds (usually 20 percent of the project), at a time when funding for transportation is only minimally increasing. At the time of development of this MTP, there are no agencies that can financially take on such a project during the timeframe of the plan.

Ancillary Projects

Ancillary projects needed to mitigate future choke points associated with the new crossing would add significant costs. A new bridge would require upgrades to roads leading to the bridge, and intersection improvements on connections both "upstream" and "downstream" of the bridge roadway's access points. In addition, existing roadways leading to the bridge would experience significant increase in traffic, especially any east-west street the bridge ties into, changing the character of affected neighborhoods and possibly generating neighborhood opposition.

Considering Alternatives

The growing congestion on our river crossings and the major roads that lead to them, particularly during peak commute times, is a source of frustration particularly for residents who live and work on separate sides of the Rio Grande. Given the impracticality of another river crossing within the planning horizon, planners and policymakers are pursuing alternative ways to mitigate congestion and improve access to jobs and services. Alternative strategies must be viable and effective in addressing this critical issue.

Peak Hour Spreading

An option that does not require any additional infrastructure involves a simple shift in travel start-time made by travelers. Nearly every roadway has a "peak hour" of travel where demand is highest and roadway capacity is approached or met; however, if travelers (with support from their employers) can shift their start times earlier or later (sometimes by as little as 15 minutes), they can avoid the congested times associated with the busy peak hour. When used in combination with technological advances that provide real-time travel conditions, as well as other ride sharing strategies, these strategies could achieve similar impacts (and cost much less) than building an additional bridge crossing.

Jobs and Housing Balance

Achieving a balance between jobs and housing both east and west of the river could be an effective strategy towards alleviating the river crossing dilemma. A healthy balance is considered to be 1.2 jobs for every home.¹¹

The metro area's jobs-to-housing ratio (calculated as the number of jobs divided by homes) stands at 1.07 today, meaning that there is just over one job for every household. This ratio has been declining since 2000 as housing growth has outpaced job growth.

While the AMPA has a relatively healthy jobs-to-housing ratio, when we zoom in on the ratio west of the Rio Grande it stands at 0.56. In other words, there is approximately one job for every two homes on the AMPA's westside. In contrast, major employment centers such as Kirtland Air Force Base, UNM, downtown Albuquerque and the Journal Center produces a jobs-to-housing ratio east of the Rio Grande of 1.42, or almost three jobs for every two homes on the eastside.

Table 2-8: Jobs-to-Housing Balance East and West of the Rio Grande

	2000	2004	2008	2012	2016
AMPA					
Jobs-Housing Ratio	1.30	1.22	1.17	1.06	1.07
Housing	294,050	321,979	352,732	366,231	377,348
Jobs	382,746	393,880	412,803	388,981	403,133
Eastside					
Jobs-Housing Ratio	1.60	1.51	1.50	1.39	1.42
Housing	199,242	209,484	215,080	219,694	223,422
Jobs	319,099	317,060	323,496	306,296	317,489
Westside					
Jobs-Housing Ratio	0.67	0.68	0.65	0.56	0.56
Housing	94,808	112,495	137,652	146,537	153,926
Jobs	63,647	76,820	89,307	82,685	85,644

Source: MRMPO Socioeconomic Estimates by DASZ, US Census Bureau, Metrostudy, Building Permits, InfoUSA Employment database, and NM Department of Workforce Solutions.

Behind efforts to improve the westside's jobs-to-housing ratio is the idea that more jobs west of the river will fuel new opportunities for Westside residents to work and shop close to home. While job creation west of the Rio Grande doesn't mean that everyone is going to change their jobs to work closer to home, it does increase the likelihood that residents can get to their destinations without having to sit in traffic. Unfortunately, while the Westside has seen considerable job growth since 2000, these gains have been offset by new housing construction which has had the consequence of reducing the overall jobs-to-housing ratio.

¹¹ There are approximately 1.2 workers per household in the entire Albuquerque MSA. As such, 1.2 is a reasonable target when gauging a healthy job-to-housing ratio (the number of jobs per housing unit) with the rational that there should be at least one job for every person in a household.

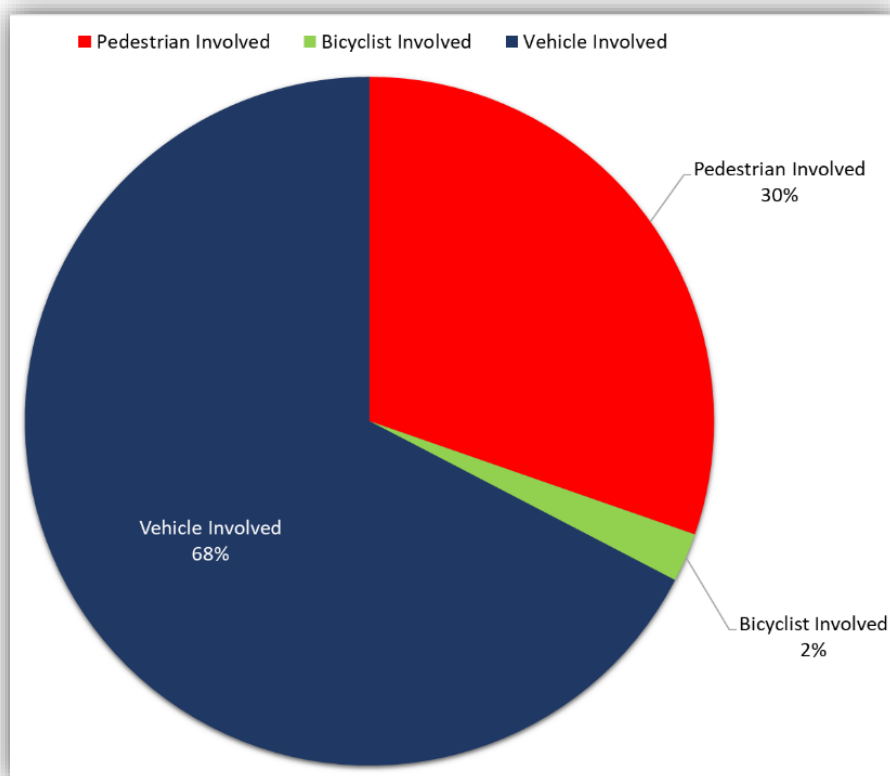
Transit Mode Share

The MTB has adopted a mode share goal to shift a portion of trips away from single-occupancy-vehicle (SOV) travel to transit to reduce the number of vehicles crossing the river. A full, regular-size bus serves the equivalent of approximately 34 vehicles;¹² therefore, a shift to transit has the positive effect of carrying more travelers within the same roadway space as a single lane of automobile traffic. The construction of the Albuquerque Rapid Transit (ART) project, which involves using dedicated bus lanes is a major step toward this goal. An ART bus is a double length bus, providing even more capacity, and ART services is more competitive since it includes a dedicated lane to bypass general traffic. The ART service, along with future scheduled improvements to the existing Rapid Ride Blue Line and existing ABQ RIDE bus routes have the potential to help alleviate congestion.

c. Roadway Safety

Our region struggles with the issue of roadway safety. New Mexico ranks number one in the nation for pedestrian fatalities per 100,000 population. A large portion of these fatalities happen in our region. Between 2013 and 2017, 450 people were killed in traffic crashes in the AMPA and 45,810 people were injured. **A particularly alarming statistic is that 30 percent of the fatal crashes in our region involve pedestrians.**

Figure 2-19: Fatal Crashes in the AMPA by Mode, 2013 - 2017



Source: New Mexico Department of Transportation, Traffic Safety Bureau

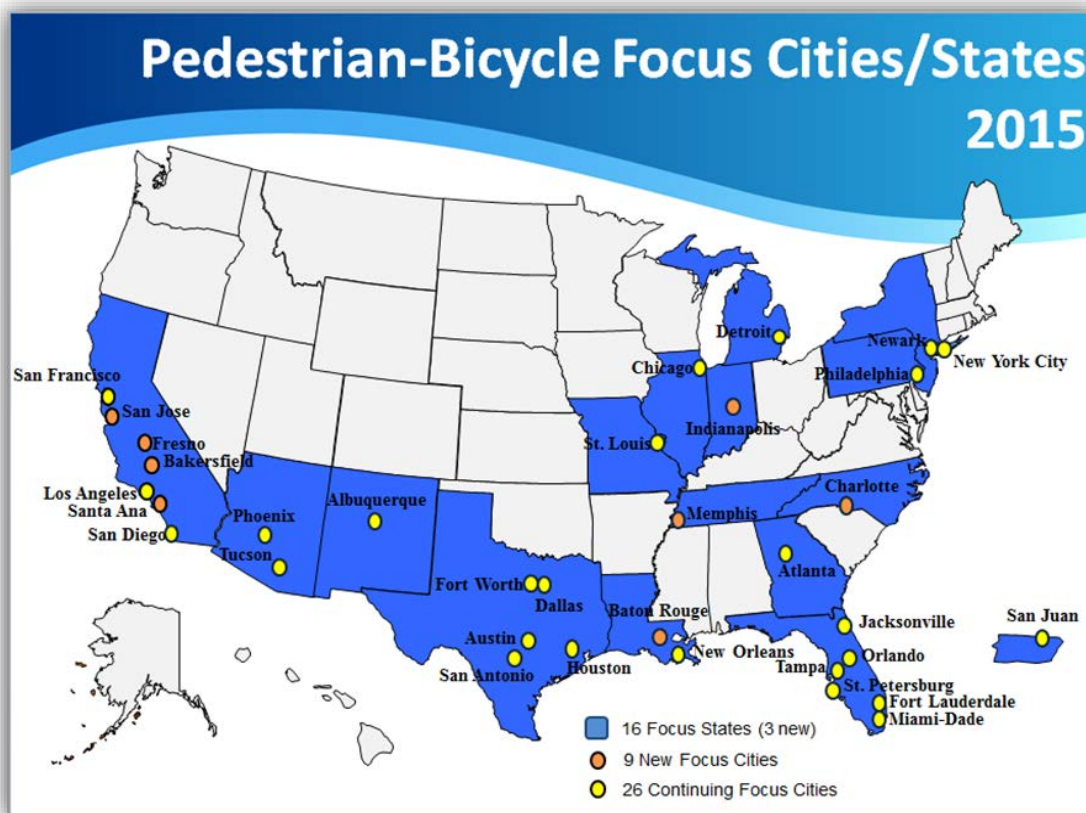
¹² https://www.codot.gov/programs/commuterchoices/documents/trandir_transit.pdf A 40-foot coach bus usually holds about 42 ambulatory passengers when two wheelchair tiedowns are provided. Using an average occupancy of 1.2 people per vehicle, that equates to the equivalent of 33.6 vehicles.

Pedestrians and bicyclists are our most vulnerable roadway users and by making our roadways safer for them, we can reduce crash related fatalities and injuries for every mode of travel and increase mobility options for all roadway users. The reality is that we all walk for some part of our trip and improving safety for people walking benefits us all. Safety issues are beginning to attract more attention from policy makers both nationally and locally. Congress established safety as the first performance goal listed out of seven in the Federal-aid Highway Program established in the passing of the FAST Act. Federal legislation requires that the planning process include consideration of the safety of the transportation system for motorized and non-motorized users. The FHWA stresses the importance of developing data-driven systemic approaches and technologies to analyze safety issues and consider safety needs early, and throughout, the project development process.

Roadway Crashes are a Public Health Crisis

Safety must be elevated to a higher priority in our transportation planning and engineering processes. According to the Centers for Disease Control and Prevention (CDC), **traffic crashes are the leading cause of unintentional death in the United States for the age group four through 34**. Traffic crashes also result in economic losses due to medical costs and police resources, and through the death or serious injury of productive workers. In 2014, the CDC estimated the annual cost of medical care and productivity losses at over \$99 billion dollars for motor vehicle-related injuries and \$41 billion for crash-related deaths.

Figure 2-20: FHWA Focus Cities and States



Source: https://safety.fhwa.dot.gov/ped_bike/ped_focus/focus_cities_states2015.cfm. Updated July 2019.

Both the Albuquerque metropolitan area and the state of New Mexico stand out when it comes to certain types of fatalities and high crash rates (currently considered a public health crisis). Because of this, the Federal Highway Administration (FHWA) identified New Mexico and Albuquerque as a *Focus State and City*, respectively, and provides technical assistance in our region to address high pedestrian and bicycle fatalities. This program has several categories of concern including pedestrian, intersection, and roadway departure crashes. The FHWA provided assistance in the form of Road Safety Audits along West Central (including the intersection of Central and Coors Boulevard), the intersection of San Mateo and Central, and plans to conduct another on a stretch of Louisiana Boulevard in 2020. These Road Safety Audits help bring attention to traffic safety and identify potential interventions to improve safety in these areas.

What is MRMPO Doing to Address Safety in Our Region?

MRMPO recognizes the seriousness of this problem in our region and is devoting resources toward understanding and addressing the issue. MRMPO developed and adopted the *Regional Safety Action Plan (RTSAP)* as a follow up to the last MTP. The RTSAP identifies dangerous roadways in the region and offers proven safety countermeasures that could be used to improve safety at those locations. One tool that was created as a part of the RTSAP, is the High Fatality and Injury Network (HFIN). The HFIN analyzes the last five years of available crash data and identifies the most dangerous segments of roadway and intersections in the region. Once locations with high fatal and injury crashes are identified, they are prioritized to receive federal funding for projects that will implement proven safety countermeasures.

What are MRMPO Member Agencies Doing to Address Safety in Our Region?

In 2019 the City of Albuquerque committed to develop a Vision Zero Action Plan. The plan will set out a course towards eliminating traffic deaths in the city of Albuquerque. These concepts are discussed further in Chapter 5.

Furthermore, the New Mexico Department of Transportation is participating in the Everyday Counts (EDC), Safe Transportation for Every Pedestrian (STEP) program because the pedestrian fatality rate in New Mexico as a whole continues to trend upward. The New Mexico Department of Transportation recognizes the problem and is working on a statewide pedestrian safety plan to identify and implement strategies to address the problem. The plan will come up with specific goals and a timeline for achieving those goals.

Additionally, the Bernalillo County Pedestrian and Bicyclist Safety Action Plan was written in response to an increasing number of pedestrian crashes in New Mexico. This plan explicitly states that pedestrian and bicyclist facilities are an integral and vital part of our transportation system, and that when planning for these facilities the primary goal is to ensure safety for all travelers of all ages and abilities. The goals identified in the plan, in addition to safety as the primary goal, include:

- Provide a choice in transportation to work, school, and shopping for all ages and abilities.
- Promote healthy lifestyles and recreational opportunities for all ages and abilities by encouraging residents to exercise daily.
- Reduce energy use and improvement air quality.

CHAPTER 3: THE TARGET SCENARIO

There is an important connection between land use and transportation. That is, how we invest in our transportation systems has an influence on where growth and development occur. Similarly, where we experience new growth impacts how well the transportation system functions and where we need additional investment. This connection makes it imperative that we integrate transportation and land use planning. This is the purpose of the Target Scenario.

3.1 What is the Target Scenario?

The Target Scenario provides an alternative vision for the region that aspires to align local plans, policies, and development patterns to improve future transportation and land use conditions. Simply put, the Target Scenario represents a “what if” scenario that strives to achieve a higher quality of life through better mobility and an efficient use of land. While the Target Scenario embodies a variety of components, there are three that capture its essence:

- 1) Target investments to strengthen regional activity centers, support a core transit network, and enable safe bicycle and pedestrian connections,
- 2) Achieve a healthy balance of jobs and housing east and west of the Rio Grande, and
- 3) Preserve and protect open space, agricultural land, and rural communities.

At the root of the Target Scenario lies eight Guiding Principles that were developed and refined over the course of several years with extensive input from thousands of regional stakeholders through a collaborative scenario planning process. In addition to the **Guiding Principles**, the Target Scenario identifies **Key Locations** for investment and an alternative **Socioeconomic Forecast**.

Figure 3-1: The 3 Products of the Target Scenario.



Land Use and Transportation Integration Committee (LUTI)

The Land Use and Transportation Integration Committee (LUTI) is the guiding body for development of the Target Scenario. LUTI is comprised of local experts and their active participation ensures that the policies and preferences of their local communities are integrated into the Target Scenario. Participants include land use planners, school planners, transit professionals, and transportation engineers from different entities within the region. LUTI was formed in 2012 for the purpose of better integrating land use and transportation decisions and has become the steering committee for integrating scenario planning into the MTP.

While the Target Scenario process was facilitated by MRMPO, it is a scenario that is developed by and for its member governments.

Beginning in 2012, LUTI led a two-year long scenario planning process that resulted in the development of the Preferred Scenario as documented in the *Futures 2040 MTP*. LUTI is also responsible for refining it to produce its successor, the Target Scenario.

In the development of the *Connections 2040 MTP*, LUTI was integral to updating the Target Scenario in the following ways:

1. Members provided information regarding how the entities they represent have adopted policies consistent with the Target Scenario since the previous MTP was adopted.
2. Members updated activity centers to reflect local priorities and desirable areas for future investment.
3. Members updated the Target transit network to reflect core transit service and desirable areas for improved service and transit supportive land use.
4. Members provided feedback on both the Trend and Target Socioeconomic Forecasts.
5. Members provided recommendations regarding strategies to implement the Target Scenario.

LUTI members ensured the Target Scenario incorporates new or expanded planning efforts that have occurred since the last MTP was approved, such as local comprehensive plan updates, the identification of new activity centers, multimodal corridors and core transit service. The Target Scenario accounts for areas that are not identified to grow or change in character, for example, the City of Albuquerque's newly established 'areas of consistency' as defined in the City of Albuquerque and Bernalillo Comprehensive Plan. Additionally, it incorporates elements that support Rio Rancho's desire to provide opportunities for its residents to shop, work, and access services all without having to leave the City. The Target Scenario supports Bernalillo County's efforts to create attractive multimodal communities and enhance the mix of uses in key centers like the Bernalillo/Sunport Rail Runner station. It supports creative partnerships and the development of vital community destinations such as the planned Route 66 museum in the Village of Los Lunas. The Target Scenario also embodies concurrence with regards to planning between various jurisdictions, agencies and school districts to ensure efficient provision of infrastructure.

The following sections outline the foundational elements of the Target Scenario and the ways that the *Connections 2040 MTP* builds upon the scenario planning work that was central to the *Futures 2040 MTP*.

a. Guiding Principles

The Guiding Principles of the Target Scenario inform many aspects of the work performed at MRMPO. Many of the concepts in the guiding principles can also be found within local comprehensive and master plans providing for a stronger connection among regional visions and implementation. The Guiding Principles were enhanced from *Futures 2040 MTP* based on feedback from the LUTI committee and refined to add clarity and simplicity.

Figure 3-2: *Connections 2040* Target Scenario Guiding Principles

COORDINATE	COORDINATE LAND USE AND TRANSPORTATION PLANNING • REDUCES CONGESTION AND ENCOURAGES SHORTER TRIPS
PRIORITIZE	PRIORITIZE EXISTING INFRASTRUCTURE • NECESSARY FOR FISCALLY RESPONSIBLE GROWTH
FOCUS	FOCUS ON ACTIVE PLACE-MAKING • ENCOURAGES ECONOMIC DEVELOPMENT AND A SENSE OF COMMUNITY
INVEST	INVEST IN ACTIVITY CENTERS AND TRANSIT-ORIENTED DEVELOPMENT • SUPPORTS ECONOMIC VIABILITY AND ACCESS TO SERVICES
BALANCE	BALANCE HOUSING AND JOBS PARTICULARLY ON THE WEST SIDE • DECREASES TRIPS ACROSS THE RIVER
BUILD	BUILD CONNECTED MULTI-MODAL TRAVEL NETWORKS • PROVIDES SHORTER AND SAFER ROUTES FOR EVERYONE
SUPPORT	SUPPORT PREMIUM REGIONAL TRANSIT • IMPROVES EQUITY AND FREQUENCY OF TRANSIT SERVICES
ENCOURAGE	ENCOURAGE DIVERSE HOUSING OPTIONS • RESPONDS TO CHANGING CONSUMER PREFERENCES

The 2040 MTP Questionnaire contained a question for the public about which of the guiding principles they felt would be most effective in bringing about positive change to the region. The two principles that came out on top were ‘Coordinate land use and transportation decision-making’ and ‘Prioritize maintenance of existing transportation infrastructure.’

b. Key Locations

The Target Scenario highlights key locations that are of regional importance and have been identified as appropriate for additional investment. These locations focus on activity centers and transit nodes. *Connections 2040 MTP* updates these locations from those identified in *Futures 2040 MTP* based on recent growth, updates to local plans and priorities, and input from policy leaders and regional stakeholders. Updates include refining activity centers and center type designations, removing key commercial corridors, and modifying key transit nodes based on the Target Scenario Transit Network.

Target Scenario Activity Centers

Key activity centers are areas of concentrated employment and development activity. Centers serve different purposes. Some centers are intended for high-intensity commercial and industrial use, which may indicate the need for enhanced goods movement or neighborhood buffers. Others are intended to include a mix of activity, such as high-density housing in close proximity to shops and entertainment. In these mixed-use centers, landscaping, design, and safe and attractive paths for people walking and biking are important features. The Target Scenario identifies four specific types of centers to differentiate the kind of activity that is occurring there and what kind of investment may be needed to help them thrive.

Activity Center Types:

- **Regional Center** – Large regional market with existing employers and mix of uses. Currently served by public transit, or close to a regional transit station.
- **Opportunity Center** – Growing center or one that is currently underutilized. Opportunity to become a regional mixed-use destination.
- **Reinvestment Center** – Existing long-time hub of activity but targeted for relatively new redevelopment or additional activity.
- **Employment Center** – Business center or large single employer. No major plans for housing or major change in uses.

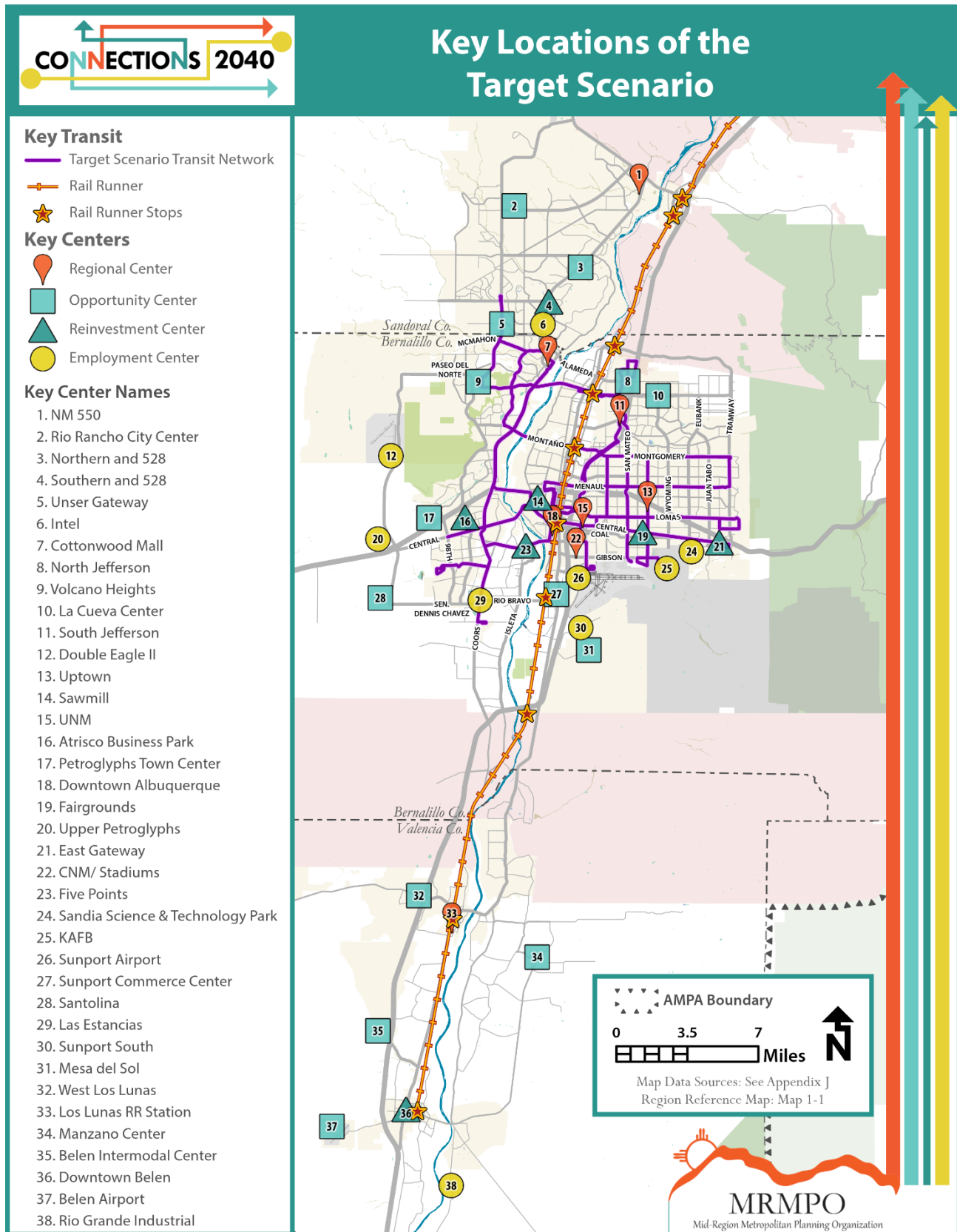
The LUTI Committee discussed the location and type of activity centers, including new centers emerging in the region. Representatives of member agencies considered whether an activity center has regional attraction, whether it would benefit from additional investment, and whether it is a local priority. Centers were updated as local jurisdictions updated their plans and new developments occurred. Some examples include new activity centers identified at Sunport South, Sunport Commerce Center, the Belen Airport, and emerging centers along 528 in Rio Rancho. To maintain a regional focus, the Target Scenario does not include all locally identified activity centers such as neighborhood centers.

Target Scenario Transit Network

A core network of transit routes that are frequent, accessible, and reliable is integral to the function of a healthy region. The availability and quality of transit service is an asset for business attraction and economic vitality, and at the same time provides an important means of transportation for people who cannot drive or may not have access to a reliable vehicle. Connecting people and places with transit can have a significant impact on encouraging active transportation and alleviating congestion on key corridors - including the river crossings. Consequently, the Target Scenario emphasizes the importance of investing in a well-connected core transit network, as shown in the Key Locations of the Target Scenario Map.

The Target Scenario Transit Network is supported by the Metropolitan Transportation Boards' resolution to allocate 25 percent of specific categories of transportation funds toward transit ridership along a network of priority transit corridors. Additionally, the Target Scenario Transit Network reflects regional plans for Bus Rapid Transit, Rapid Ride, Primary, and Secondary routes that are part of the Long Range Transit Network that have frequencies of 15 minutes or less. This Target Scenario Transit Network was vetted through the LUTI committee, the CMP committee, and local transit agencies ABQ Ride and Rio Metro Regional Transit District. This transit network should be considered part of a system that includes supplemental connections such as park and ride locations that serve lower low density areas, and bike share stations, trails, and sidewalks that provide last mile connections to place of work or residence. The Target Scenario Transit Network is considered a core network of transit routes that warrant further attention whether through transit funds, increased service and reliability, or as land use changes occur and transit-oriented places develop.

Map 3-1: Key Locations of the Target Scenario, Key Centers and Transit



c. Target Scenario Socioeconomic Forecast

The final component of the Target Scenario is a land use forecast that represents a picture of possible future household and job growth based on its guiding principles and key locations. This is an alternative land use forecast that portrays what the region might look like and how mobility and other quality of life measures could be affected if we were to modify plans and policies to better align with the concepts behind the Target Scenario. This forecast is not meant to be evaluated at parcel level detail; nor is it intended to serve as a single best land use future for the region. Rather, the land use forecast that accompanies the Target Scenario should be used as a regional direction for member agencies and governments as they update policies and prioritize investments.

The Target Scenario Socioeconomic Forecast is generated with the same land use modeling framework that created the Trend Scenario with some key distinctions. That is, in order to simulate an alternative forecast, certain policy levers in the model were adjusted to reflect the principles of the Target Scenario. These levers simulate alternative policies as they relate to zoning, building costs, and development constraints.

Zoning

The land use model uses local zoning regulations to establish the allowable building types and densities on each parcel. Every zoning code is translated into a database of potential land uses, maximum dwelling units, and maximum floor-to-area ratios.

In the development of the Target Scenario, zoning was adjusted to allow 20 percent higher densities in key activity centers or along the Target Scenario transit network.

Zoning densities were raised in Key Locations to support guiding principle four, additional investment in activity centers and transit-oriented development. The model simulates what might happen if local jurisdictions take measures to increase development in targeted areas through zoning tools such as density bonuses or reduced parking requirements. Zoning allowances were not elevated in the City of Albuquerque's key centers because the Integrated Development Ordinance, adopted in 2017, has already raised residential density allowances in these centers through mixed-use zoning, thereby aligning them with the goals of the Target Scenario. Land uses in the Target Scenario were not altered from the existing zoning classifications.

Revenue Incentives

The land use model contains a pro forma model, which computes the costs of potential development projects using construction costs, demolition costs (if a parcel is not vacant), financing costs, and parking costs. It also calculates potential revenues given the location of the parcel, building age, access to workers and jobs, and other factors. By estimating the costs and revenues of a site, the model selects projects that are likely to be most profitable among an array of potential projects.

The Target Scenario raises commercial revenues on the westside of the Rio Grande and particularly in Key Locations. It also raises residential revenues on the eastside of the Rio Grande and particularly in Key Locations that allow housing.

These adjustments to the pro forma model support guiding principle four, invest in centers and transit nodes, as well as guiding principle 5, balance housing and jobs. The purpose of this adjustment is to simulate what may occur if additional policies are implemented to incentivize development in targeted areas such as land donations, infrastructure upgrades, or an expedited approvals process.

Land Constraints

Using the same approach as the revenue incentives, the model is adjusted to disincentivize development in rural communities or greenfield areas that are not currently being planned for growth.

In the Target Scenario, revenues are decreased for development in areas that are not currently being master planned and are not served by sewer, water, or roadway infrastructure.

This adjustment is made to support guiding principle two, prioritize existing infrastructure. It also serves to protect the rural character of outlying areas, a natural complement to increasing the intensity of uses in activity centers and along transit corridors. This step simulates what could result from additional policies to protect rural areas through conservation and preservation measures.

3.2 Target Scenario Forecast

A summary of the Target Scenario socioeconomic forecast demonstrates the effectiveness of modifying the land use model to achieve its guiding principles. As described in the preceding section, the Target Scenario was adjusted in order to attract jobs west of the river and housing east of the river to improve the jobs to housing balance, densify existing centers and transit nodes with a mix of uses, and preserve low density development in rural areas that are not master planned or currently served by infrastructure. The following tables evaluate the performance of the Target Scenario in achieving its intended goals.

Results Summary

The following table illustrates the extent to which the Target Scenario improves the jobs to housing balance west of the Rio Grande. There are approximately 13,000 more jobs west of the river and 6,700 fewer homes in the Target Scenario over the Trend, resulting in an improved jobs-to-housing ratio of 0.65. While the jobs-to-housing ratio decreases slightly east of the river between scenarios, it is still higher than the AMPA average and higher than the general target of 1.2 (which is the average number of workers per household in the AMPA). Note that the ratio remains the same in the Trend over the baseline conditions in 2016, exhibiting that existing plans and policies do not indicate an improvement over time without additional investment or intervention.

Table 3-1: Jobs-to-Housing Balance in 2016, Trend and Target Scenarios

Jobs-to-Housing Ratio	2016	Trend	Target
<i>East of the Rio Grande</i>	1.42	1.42	1.34
Housing	223,422	255,804	262,286
Jobs	317,489	364,483	351,067
<i>West of the Rio Grande</i>	0.56	0.55	0.65
Housing	153,926	196,898	190,163
Jobs	85,644	109,227	122,656
AMPA Average	1.07	1.05	1.05

The next table illustrates the impact of the Target Scenario in attracting additional households and jobs to regional activity centers and surrounding transit nodes. By incentivizing residential development in Key Locations east of the Rio Grande, the Target Scenario successfully increases accessibility of households to jobs and achieves a better mix of uses within eastside centers and transit nodes. In addition, by making westside Key Locations more attractive to employment uses, the Target Scenario increases jobs in these centers and nodes by 30 percent.

Table 3-2: Total Activity in Key Locations for 2016, and 2040 Trend and Target Scenarios

	2016	Trend	Target	Difference in Target
Eastside				
Households	20,675	25,348	31,033	22.4%
Jobs	156,926	180,318	170,039	-5.7%
Westside				
Households	6,465	9,244	8,023	-13.2%
Jobs	31,091	40,472	52,627	30.0%

Finally, the Target Scenario demonstrates better use of existing infrastructure while simultaneously preserving rural communities and low impact development in outlying areas. The following table shows that the Target Scenario achieves a decrease in households and jobs in rural areas when compared with the Trend in favor of areas that are served by water, sewer, and roadway infrastructure.

Table 3-3: Growth in Rural Areas and Existing Service Areas, 2040 Trend and Target Scenarios

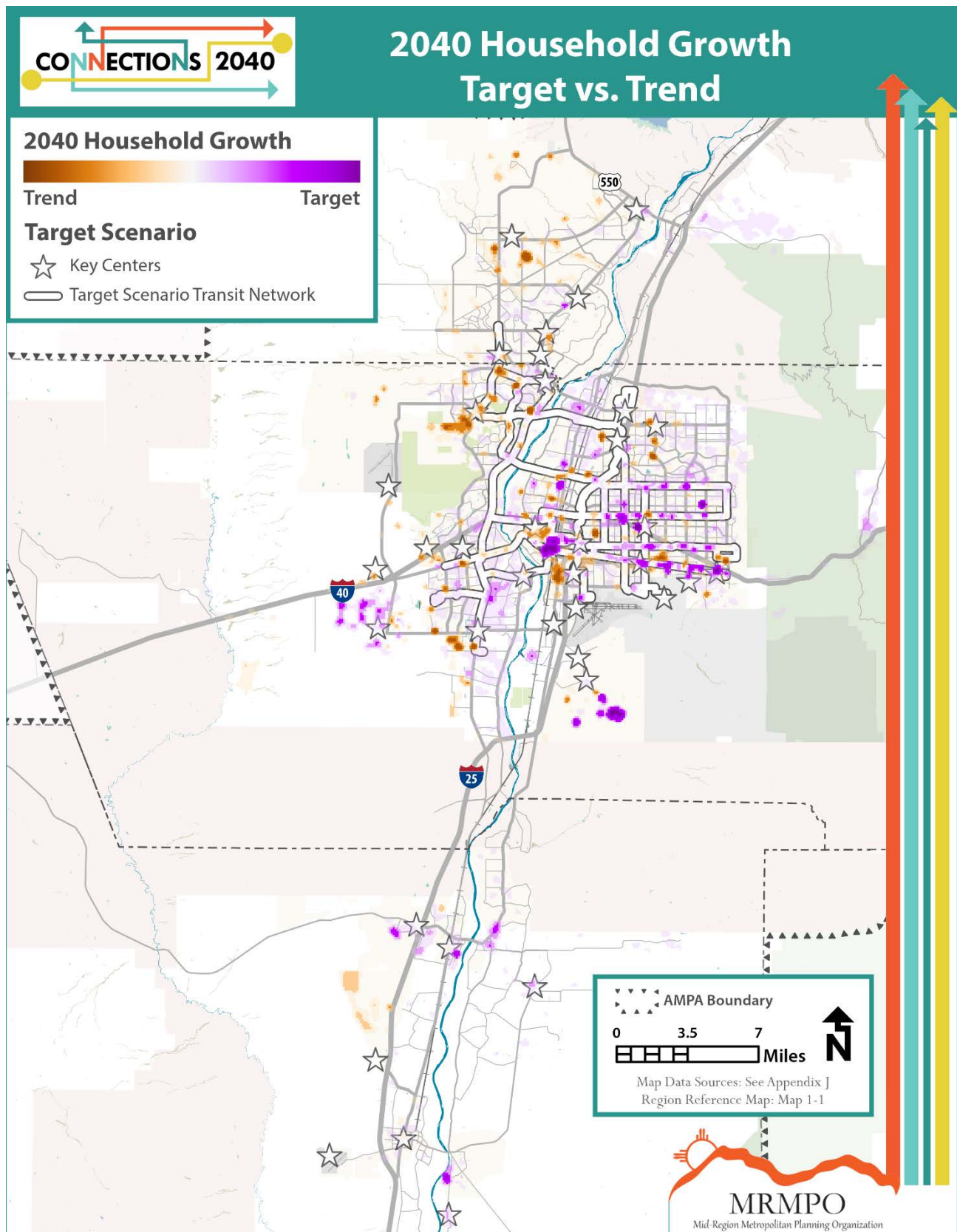
	Trend Growth		Target Growth		Growth Difference	
	Households	Jobs	Households	Jobs	Households	Jobs
Rural Area	31,813	16,180	27,708	13,807	-12.9%	-14.7%
Existing Service Area	34,924	55,701	39,029	58,074	11.8%	4.3%

The following maps show the spatial differences between the Trend and the Target Scenario in households and jobs. These maps are for illustrative purposes only and do not necessarily depict exact locations for desired growth. For example, a principle of the Target Scenario was to increase density in activity centers. This concept was translated into a land use model input by making eastside centers and transit nodes more attractive for residential development, and westside centers and transit nodes more attractive to commercial growth. The land use model determines the placement of future households and jobs based on variables that have been proven to be statistically significant in predicting the location of growth. The fact that one center may develop more than another is a result of a modeled prediction of site suitability and not a decision by stakeholders or MRMPO staff.

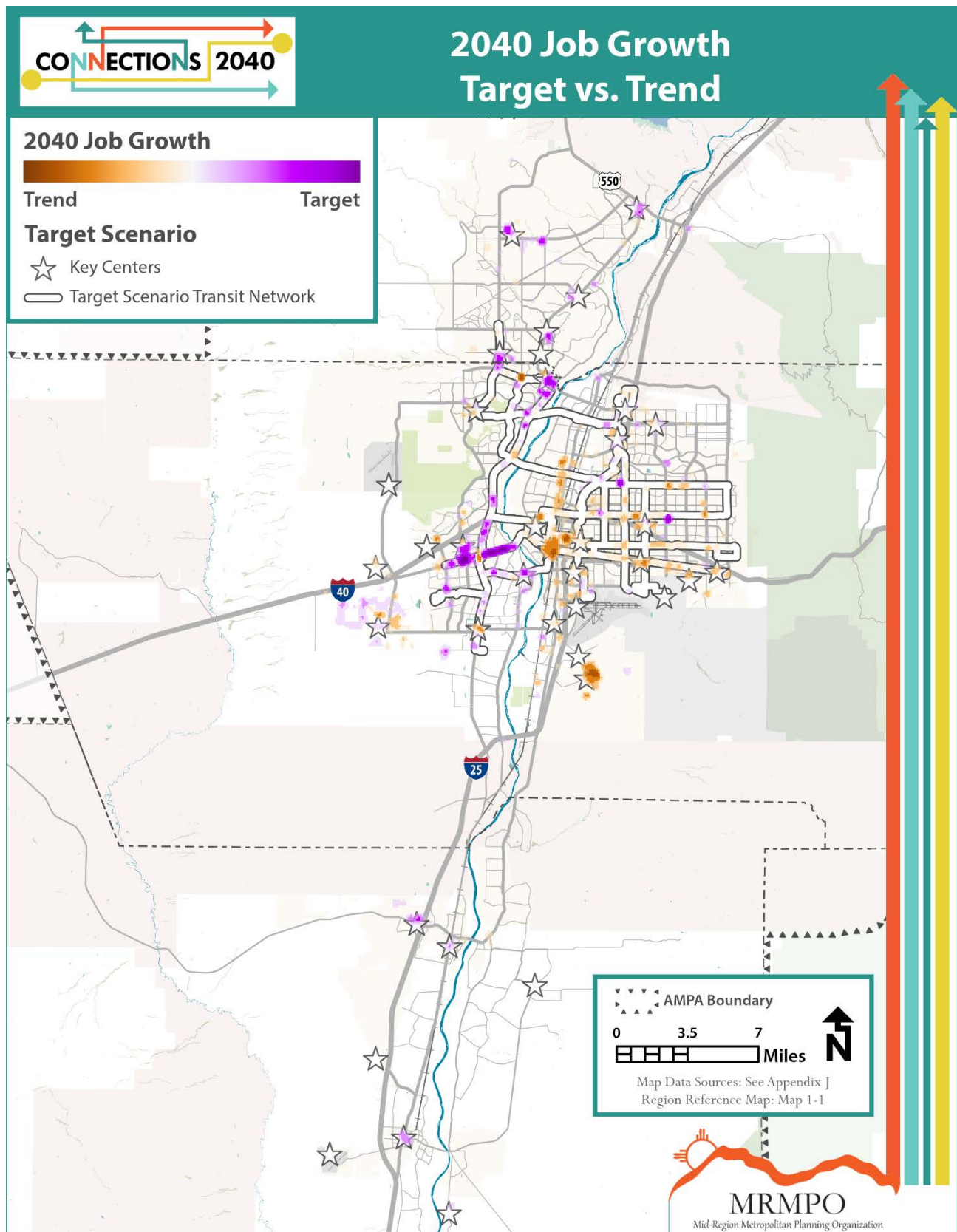
The Target Scenario is best described by its guiding principles and its key locations, and the land use forecast is one example of what the Target Scenario could look like if those guiding principles are translated into local land use policies.

The Target Scenario generally shows increased household and job development in activity centers and transit corridors. Although the Target Scenario exhibits a greater concentration of household growth on the eastside and job growth on the westside, some interesting exceptions stand out. For example, the Santolina Master Plan area attracts more household growth in the Target Scenario. This is likely the effect of having more jobs on the westside. Access to jobs is an important factor in where households choose to locate in the land use model.

Map 3-2: Household Growth, Trend vs. Target Scenario, 2040



Map 3-3: Employment Growth, Trend vs. Target Scenarios, 2040



3.3 Benefits of the Target Scenario

A thorough scenario planning process is accompanied by an evaluation of scenario performance in order to better understand the impacts of various future development patterns on the transportation network, environment, and economy. Assessing the effect of land use changes on key measures such as access to jobs, overall mobility, and land consumption (to name a few) better equips planners to understand how the region may fare given different policy decisions. The true value of scenario planning, in addition to the collaborative visioning process, is in the performance evaluation of the scenarios. **Simply put, scenario planning provides planners with a tool to evaluate the trade-offs between different growth patterns.** The summary statistics below reveal the extent to which the land use development patterns differ between the base year, the Trend Scenario, and the Target Scenario and the impact of those differences.

Table 3-4: Summary Statistics, 2016 Base Year, 2040 Trend and Target Scenarios

Cluster	Metric	Unit of Analysis	2016 Base Year	2040 Scenarios		Scenario Comparison		
				Trend	Target	Trend vs 2016	Target vs 2016	Target vs Trend
Optimized Mobility	Systemwide Speed	PM peak hour average speeds (miles per hour)	26.8	25.91	26.1	-3.2%	-2.5%	0.8%
	VHD - Vehicle Hours of Delay	PM peak hour delay (model speed vs. posted speed)	23,131	33,999	30,244	47.0%	30.8%	-11.0%
	VHT - Vehicle Hours Traveled	PM peak hour total driving time for all roadway users	58,700	75,503	71,224	28.6%	21.3%	-5.7%
	VMT - Vehicle Miles Traveled	Daily value for all roadway vehicle travel	1,673,908	1,937,337	1,913,356	15.7%	14.3%	-1.2%
	VMT per Capita	Average vehicle miles traveled per person	17.5	20.2	20.0	15.2%	13.8%	-1.2%
	Roadway Network Congestion	Percentage of VMT with V/C > 1.0, PM peak hour	4%	6.4%	5.8%	60.0%	45.0%	-9.4%
	Freight Corridor Congestion	Percentage of freight network VMT with V/C > 1.0, PM peak hour	5.4%	7.3%	6.4%	35.2%	18.5%	-12.3%
	River Crossing Congestion (Delay)	PM peak hour vehicle hours of delay (VHD)	923.9	2,766.9	1,570.8	199.5%	70.0%	-43.2%
	River Crossing Trips	Daily roadway vehicle travel across the Rio Grande	576,302	695,831	657,285	20.7%	14.1%	-5.5%
Active Transportation	Number of Crashes	REMI multiplier based on VMT	14,544	16,793	16,615	15%	14%	-1.1%
	Proximity to Activity Centers	Households within 1 mile	98,535	118,672	118,471	20%	20%	-0.2%
	Proximity to Transit	Households within 1/4-mile	100,701	115,615	118,462	15%	18%	2.5%
	Proximity to Existing Schools	Households within 1/4-mile	62,643	72,242	73,231	15%	17%	1.4%
	Jobs/Housing Mix in Activity Centers	Employment divided by households in Activity Centers	6.41	5.92	5.28	-8%	-18%	-10.8%
	Jobs/Housing Ratio Westside	Employment divided by households in Activity Centers	0.56	0.55	0.65	-2%	16%	18.2%
Economic Linkages	Infill Development	Households in areas with existing infrastructure	308,623	343,552	347,657	11%	13%	1.2%
	Proximity to Employment Sites	Jobs within 20 minutes to Households	140,604	142,788	145,114	2%	3%	1.6%
	Proximity to Employment Sites - EJ	Average # of jobs EJ households can reach within 20 mins (AM pk)	160,121	158,336	162,592	-1%	2%	2.7%
	Industrial Jobs in EJ Areas	Total number of industrial sector jobs within EJ areas	21,017	24,850	24,277	18%	16%	-2.3%
	Average Commute Time	Travel time for work trips from home to work (minutes)	34.85	36.71	35.64	5.1%	2.2%	-3.0%
Sustainability & Resiliency	New Land Developed	Total acres of new development	--	24,030	22,590	--	--	-6.0%
	Emissions Levels	REMI: metric tons of VOC, NOX, CO, SOX, and PM per year	108,703	125,375	124,052	15%	14%	-1.1%
	Development in High Flood Risk Areas	Number of Households in undeveloped* FEMA 100-Year Floodplains	13,499	18,231	17,521	35%	30%	-3.9%
	Development in Forest Fire Risk Areas	Number of Households in undeveloped* wildland-urban intermix areas	13,943	16,600	16,449	19%	18%	-0.9%

The Target Scenario brings us closer to all four of our MTP goals. Summary statistics demonstrate that time spent driving decreases considerably when compared with the Trend, especially on our river crossings. In addition, we have better access to jobs and other frequent destinations, improve the balance of land uses, consume fewer acres, and decrease development in areas that are considered high-risk for flooding and forest fires.

3.4 Foundation of the Target Scenario

The 2035 MTP, approved in 2011, included MRMPO's initial effort towards scenario development as presented in its Appendix A, "The Compact Land Use Scenario". This scenario was developed in response to high projections for population growth and congestion, including an anticipated quadrupling of vehicle hours of delay and single digit speeds across the river during PM peak commutes.

Understanding the potential for severe degradation of mobility throughout the region under intense growth pressure, the MTB recognized that it simply was not feasible to build our way out through the construction of new roads. Member governments requested that MRMPO investigate alternative solutions to help mitigate future congestion. The Compact Land Use Scenario showed that by shifting development patterns to areas with excess roadway capacity in the urban core, we could reduce future vehicle miles of travel by 17 percent and increase average speeds by 16 percent.

The *Futures 2040 MTP*, approved in 2015, built upon the Compact Scenario and brought scenario planning from an appendix into a full-blown multi-year participatory process that resulted in the development of a shared vision called the Preferred Scenario, which was officially adopted as a future target for growth by the MTB. The Preferred Scenario was the product of an intensive two-year scenario planning process that involved two grant awards from the FHWA and the Volpe Resource Center. With expert federal assistance both in scenario development and analysis, MRMPO designed and carried out a rigorous process in terms of participation, modeling tools, and analytical capabilities. In the end, regional stakeholders voted and approved the adoption of an alternative scenario, which represents an aspirational transportation and land use future for our region. This section summarizes the major regional effort between 2013 and 2015 that culminated in the development of the Preferred Scenario. After the adoption of the Preferred Scenario as the regional target, this scenario was aptly renamed "The Target Scenario" which has since been updated for this MTP.

a. Rethinking the Future

There are many uncertain conditions in the region's future, including population growth, the economy, housing and development trends, availability of natural resources, and changing regional priorities. Given that the future is not set in stone, scenario planning provides tools to understand a range of potential future outcomes and measure the benefits of different growth patterns. The scenario planning process that led up to the development of *Futures 2040 MTP* occurred with the backdrop of several key themes, described below.

Limited Financial Resources

Policy leaders are faced with the reality of decreasing financial resources during a time of growing need. Tighter budgets have led to an increased emphasis on targeted investments that maximize return and minimize costs. Limited resources require new avenues for collaboration, creative financing strategies, and public/private partnerships in order to accomplish more with less. Understanding that there is not enough money to develop every desired project, public officials are emphasizing catalytic projects that are likely to leverage existing infrastructure and help connect the dots between major activity centers. **The scenario planning process highlights the potential benefits of these key investments.**

River Crossing Congestion

River crossing congestion is certain to worsen over time. While roadway expansion can still be beneficial to a certain degree, given the expected levels of future congestion and reduced amount of funding available for transportation it will be impossible to “build our way out” of these conditions. Therefore, a combination of strategies will be required to tackle this issue. One key strategy is achieving a better balance between jobs and housing west of the river and shifting residential density to key centers east of the river.

More jobs on the Westside would serve residents by creating more nearby destinations and foster a “reverse commute”. Greater residential density east of the river in key centers would improve access to jobs and multimodal transportation options. **The scenario planning process allows us to see the impacts of a better balance between housing and jobs throughout the AMPA.**

Changing Consumer Preferences

As millennials (born early 1980s - 2000) become the largest generation in the labor force and baby boomers (born 1946 – 1964) increasingly enter their retirement years, we are experiencing an increased demand for a broader range of housing and transportation options. Public officials, business leaders, and housing experts alike recognize a growing preference towards walkable, mixed-use communities and housing options that are closer to jobs and services. There is also a growing demand for more transportation options, particularly among young adults. On the heels of the Great Recession and the subsequent increase in out-migration from the region, it is important that we respond to changing preferences in order to increase attraction to business and workers while improving quality of life among existing residents. **The scenario planning process incorporates emerging lifestyles into future growth assumptions so that we can assess their impacts.**

b. Scenario Planning Process

Federal Guidance

Federal guidance mandates that MTPs contain a likely forecast for growth given existing plans and policies. This growth forecast is called a Trend Scenario because it assumes a future that is predicated on similar conditions that created today’s transportation and land use patterns. However, MPOs across the nation are choosing to generate alternative future scenarios that investigate what might happen if there is a departure from existing trends that causes the region to develop differently. This is called “scenario planning” and is considered a best practice by the FHWA. Scenario planning allows for comparisons between the costs and benefits of different growth scenarios and has the power to inform decision-making related to transportation priorities, land use strategies, and infrastructure investment. Scenario planning provides a proactive framework for planning and can be integral in developing collaboration among member agencies.

“There are several approaches for inviting stakeholders to participate in scenario planning. Scenario planning helps inform projects and activities based on values and visions while considering the reality of other inputs (e.g., population, land use, transportation). The purpose of scenario planning is not to create an ideal world but rather a series of potential visions that consider the reality of competing interests.”

-- Excerpt from MRMPO Scenario Planning Peer Exchange Workshop Summary, FHWA 2013

Scenario Planning Workshops

The 2-year scenario planning process that led to the *Futures 2040 MTP* was highly participatory. Representatives from a variety of professions and agencies were active in the process, including public health and bicycle advocates, housing specialists, elected officials, natural resources experts, rural area representatives, neighborhood associations, economic development managers, land developers and business groups. In some cases, interactive workshops were held to discuss a range of topics, and in other cases small focus groups met to discuss pressing issues.

The Preferred Scenario

The development of the Preferred Scenario occurred over the course of two years and involved multiple avenues for stakeholder input, including several large workshops, small focus groups, online surveys, and public outreach at community events. The first step in the scenario planning process was to collect information related to what people saw as the key challenges in the region. Interestingly, despite the number of people interested in transportation planning, water resource availability was identified as the most pressing challenge facing the region, followed by economic development. Other challenges identified were a lack of diverse housing and transportation options, an imbalance between jobs and housing, and a need for shared and active places.

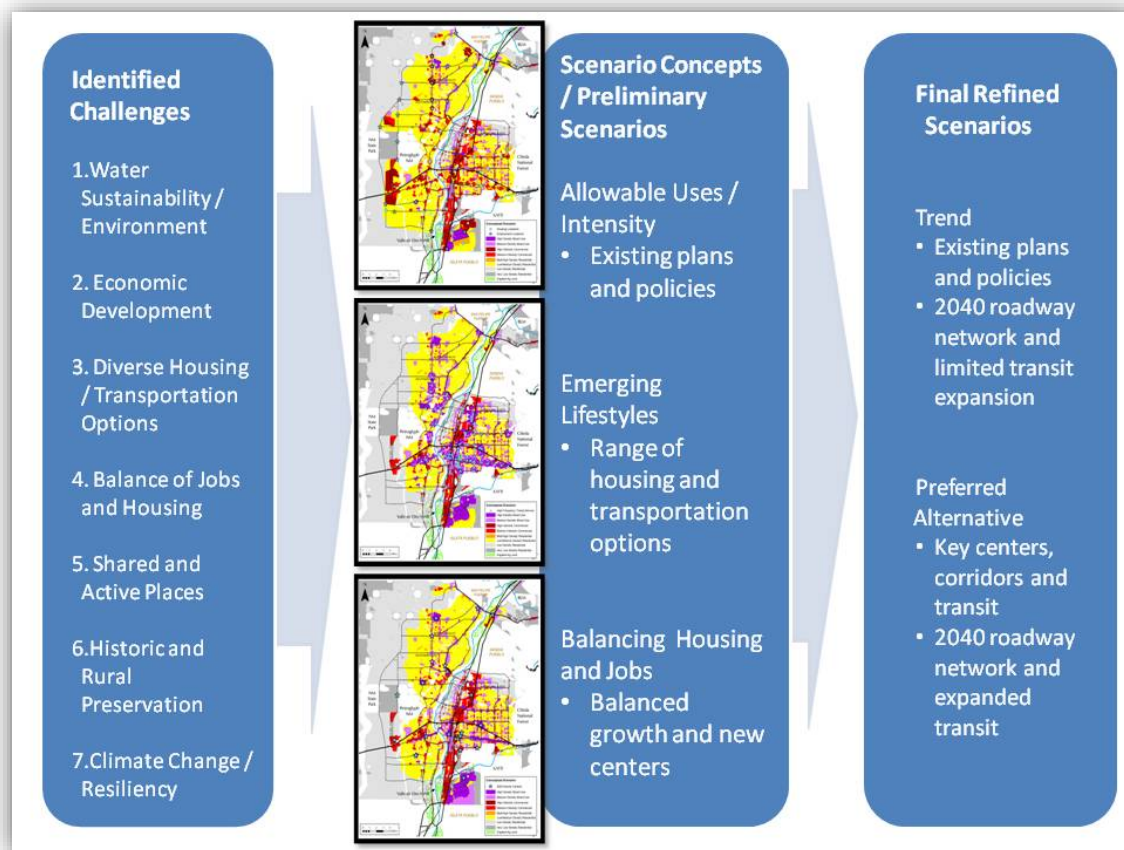
The goal of this process was to develop an agreed upon scenario that best addresses regional challenges and identifies key locations for future development and transportation infrastructure investments over the next 20 years.

Following the identification of the top regional challenges, stakeholders developed initial “scenario concepts,” which entailed creating a narrative regarding the different ways the region might grow that could mitigate these challenges. These conversations revealed a broad set of future interests, including: more transit service, a mix of land uses in key activity centers and transit stops, a better balance of housing and jobs, emphasis on existing water service areas, enhanced preservation of open space and sensitive areas like floodplains and crucial wildlife habitat areas, and the preservation of historic and cultural assets. Some of these interests could not be specifically addressed through land use scenarios. However, all are within the purview of local jurisdictions and addressed through locally implemented programs and policies.

Some of the objectives voiced by stakeholders appeared to conflict on the surface, for example; the desire for dense, unique activity centers, as well as the preservation of the rural character of specific areas. **It became clear through scenario planning efforts that these two interests can in fact support each other by targeting growth in key centers and minimizing impacts on agricultural and other sensitive lands.** In the early stages of the scenario development process three scenarios emerged; 1) Allowable Uses (the Trend), 2) Emerging Lifestyles, and 3) Balancing Housing and Jobs.

After reaching agreement with member agencies on the scenario concepts, MRMPO staff adjusted land use and transportation model inputs in a manner that translated the key concepts behind each scenario into policy changes. The models were run iteratively (i.e. the land use forecast influenced travel demand which in turn influenced future growth allocation) and generated performance measures that were used to evaluate each scenario. These measures were brought back to the stakeholders in another round of collaborative workshops designed to initiate additional discussion and solicit feedback on how well each scenario addressed regional challenges and how they might be further refined to improve their performance and their impact on the region. The process of identifying regional challenges, scenario concepts, and scenario refinement is depicted in the following graphic.

Figure 3-3: Translating Regional Challenges into Scenarios



Based on stakeholder feedback and with the guidance of the LUTI committee, MRMPO finalized a Preferred Scenario based on a hybrid between the *Emerging Lifestyles* and the *Balancing Housing and Jobs* scenarios. Regional stakeholders agreed this scenario best addressed the concerns that arose throughout the process and voted to forward it as a regional target for growth.

In the final workshop, stakeholders participated in breakout groups to brainstorm strategies and actions that they could take based on their role in the planning process to achieve the Preferred Scenario. Ideas ranged from presenting project costs in terms of their full lifecycle costs, incorporating Preferred Scenario principles into local development review processes, estimating fiscal impacts of different growth scenarios, establishing a future network of high frequency transit corridors, decreasing parking requirements and increasing allowable densities in activity centers. The strategies varied in level of effort required, timeline, and implementation agency. Participants agreed that strategies that may work for one jurisdiction may not be appropriate for another. What resulted was a toolbox of potential strategies in order to help move the region in the right direction. A complete list is provided in Chapter 5 of *Futures 2040 MTP*.

Making the Connection

Connections 2040 MTP efforts did not attempt to replicate the same rigorous scenario planning process; rather, the intent for this MTP is to rely on the integrity of the process that was undertaken in the *Futures 2040 MTP*, and strive to strengthen and build upon it. This MTP includes updates to the toolbox of strategies with input from public outreach workshops, agency meetings, MRMPO committees, and public officials. An updated list of pathways to implement the MTP and move the region closer to the Target Scenario is provided in Chapter 9.

CHAPTER 4: OPTIMIZED MOBILITY

Finding ways to move people and goods smoothly, safely, and efficiently throughout a region is the primary focus of a Metropolitan Planning Organization. By identifying current problem areas and anticipating future conditions, planners are able to work together with local stakeholders and member agencies to suggest specific strategies, recognizing that what might work in one instance may not be appropriate in another. Through the collection and monitoring of travel data, MRMPO is able to shed light on discussions pertaining to mobility and provide information that assists decision-makers in their efforts to prioritize projects that will make the biggest difference in the region.

This chapter breaks out three specific modes of travel: single occupancy vehicle travel, transit, and freight. It describes existing conditions, future demand, and highlights challenges as well as programs and practices to support the movement of people and ensure a transportation system that is in good repair. While this section emphasizes vehicular traffic, non-motorized travel and safety are an integral component of regional mobility and are brought to the forefront in Chapter 5, Active Transportation.

4.1 Roadway System Performance

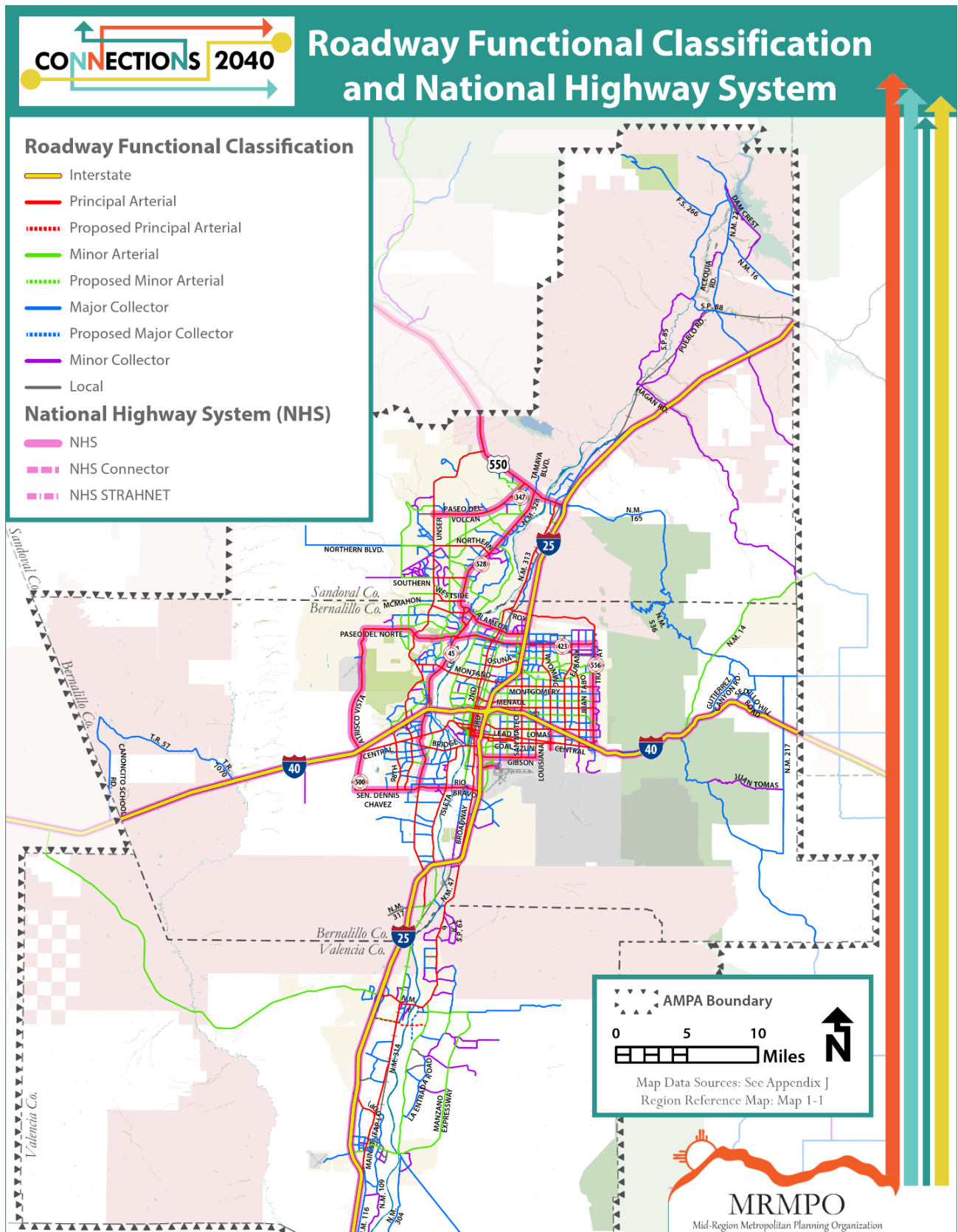
The vast majority of travel in the AMPA takes place by private vehicle. Some motorists find traversing the region fairly easy, and rarely encounter significant delays. Others, particularly during peak commute times, experience recurring and sometimes severe congestion. Whatever one's experience may be, it is certain that as we continue to grow, problem areas on our roadways are likely to worsen and conditions will degrade over time. MRMPO employs several tools to monitor current roadway conditions, anticipate future conditions, and employ strategies that help to improve mobility in the AMPA.

One important way MRMPO monitors existing roadway conditions is through its traffic counts and monitoring program. Federal aid eligible roadways that are counted on a regular basis range from collectors to higher order arterials and are shown on the current highway functional classification system map.

MRCOG Traffic Counts and Monitoring Program

Traffic counts are conducted on all federal-aid eligible roadways in the counties of Bernalillo, Tarrant, Sandoval, Valencia, and Southern Santa Fe and are coordinated through the MRCOG Traffic Counts and Monitoring Program. Within the AMPA, there are over 1,600 miles of roadway network with over 2,800 individual roadway segments. Traffic segments are counted on a periodic three-year cycle, resulting in approximately 1,000 counts being conducted each year. Roadways that are counted range from collectors to higher order arterials and are shown on the current highway functional classification system. The MRCOG Traffic Counts Program allows us to monitor current travel conditions, past trends, and identify consistent patterns and congestion hotspots.

Map 4-1: Current Highway Functional Classification in the AMPA

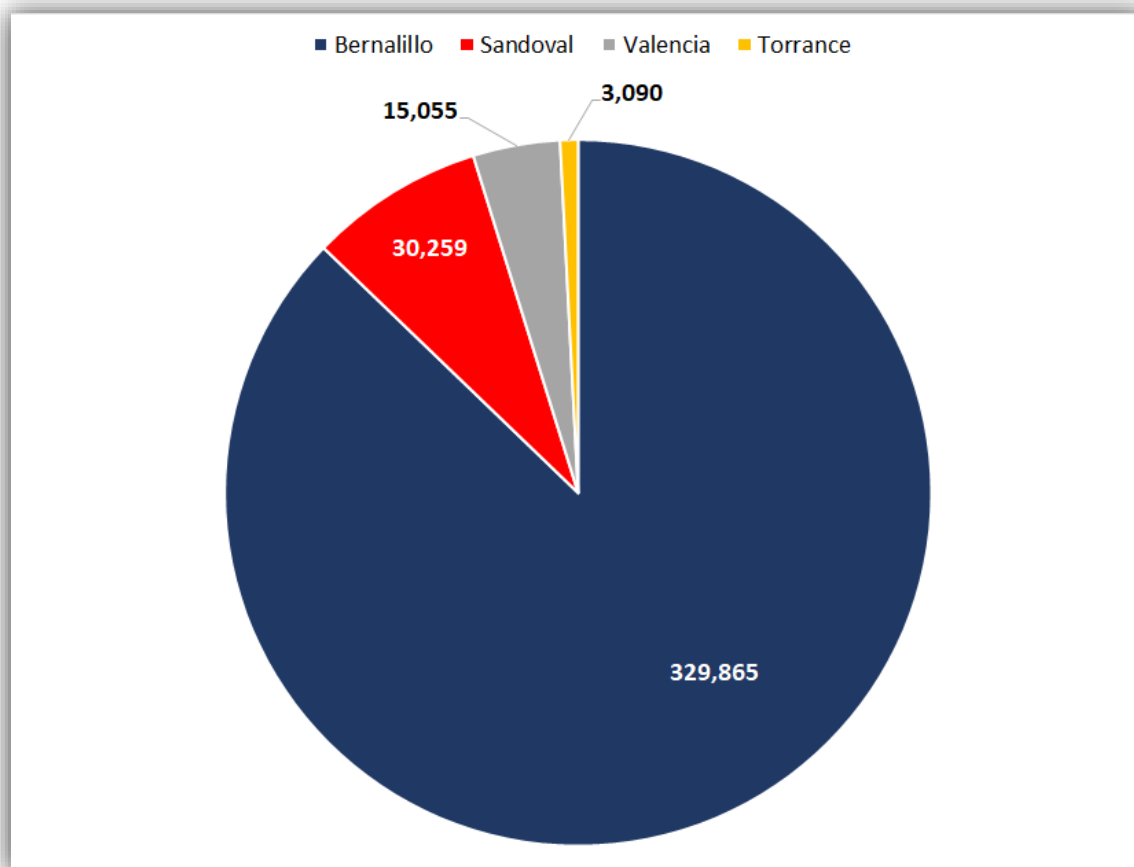


a. Current Travel Conditions

Commuter Flows

The distribution of housing and jobs shapes how we travel throughout the region and directly impacts commuting patterns. **Given that nine out of ten commuting trips are taken by vehicle, these trips have a significant impact on our roadways.** Planners look to travel data from the Census Transportation Planning Package (CTPP) to shed light on regional travel patterns. Travel within Albuquerque's Metropolitan Statistical Area (MSA) has a high level of interdependence between counties and places, especially when it comes to commuting. This is because the majority of jobs (87 percent) within the four counties of the Albuquerque MSA are located within Bernalillo County.

Figure 4-1: Non-Farm Jobs by County, 2018 in the Albuquerque MSA



Source: Census Transportation Planning Package, US Census Bureau

As the regional hub for economic activity, there are approximately 45,000 commute trips into Bernalillo County from surrounding counties each day. Bernalillo County has the highest share of workers who remain in their county of residence when they head off to work (94 percent). Whereas less than half of Sandoval County's workers (44 percent) stay within their county, with the majority heading south into Bernalillo County. Approximately 43 percent of Valencia County's workforce commutes north into Bernalillo County each day while 55 percent live and work in Valencia County.

Table 4-1: 2016 County-to-County Workflows

		County of Work						
		Bernalillo County	Sandoval County	Santa Fe County	Torrance County	Valencia County	In State	Out of State
County of Residence	Bernalillo County	94%	3%	1%	0.2%	0.6%%	1%	1%
	Sandoval County	50%	44%	5%	0%	0.3%	2%	1%
	Santa Fe County	7%	0%	91%	0.5%	0.1%	1%	1%
	Torrance County	34%	0.2%	8%	57%	0.8%	1%	0.4%
	Valencia County	43%	1%	1%	0.1%	55%	1%	1%

Roadway Travel Demand

Work commutes, along with all other trip purposes such as shopping, recreation, and school trips, make up about 23 million traveled miles on our roadway each day. It is generally desirable for local transportation policy to encourage reductions in miles on our roadways as infrastructure impacts grow and conditions worsen over time.

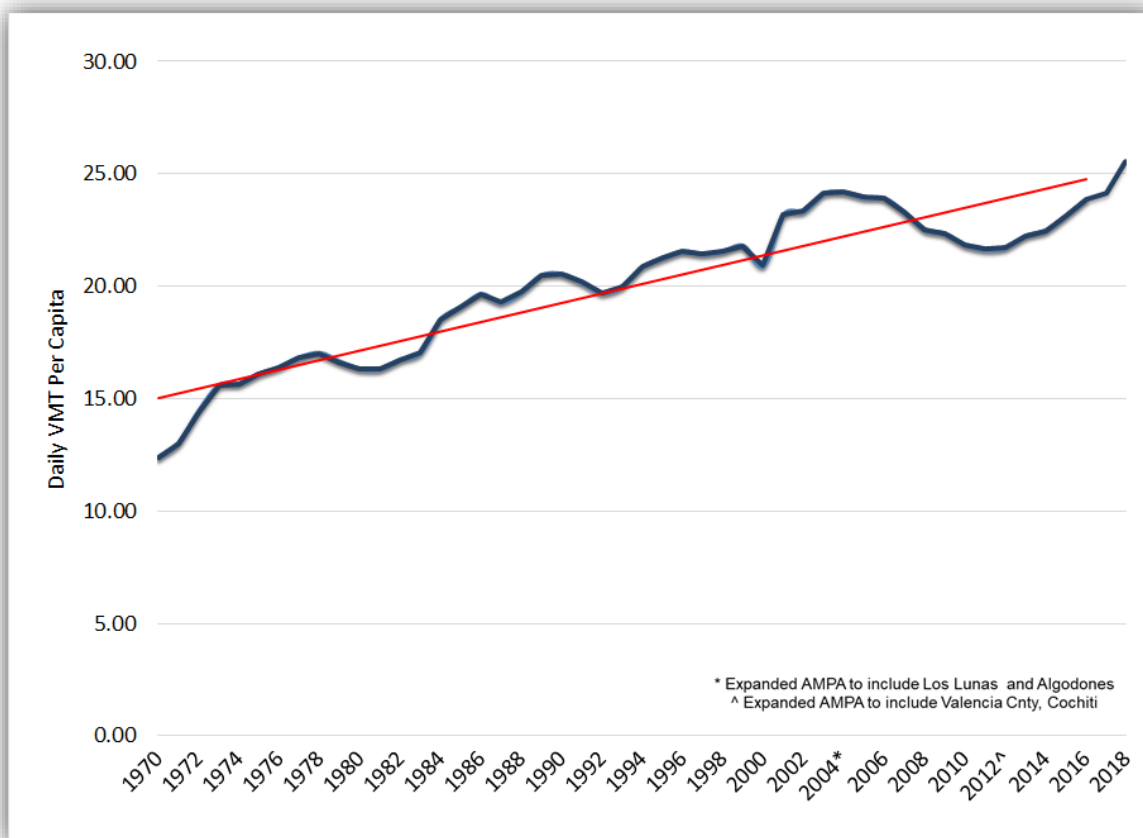
Vehicle Miles Traveled

Historical data beginning in 1970 continuing through today shows there is a steady long-term increase in the amount of overall travel. A dip following the Great Recession was observed beginning 2008, however more recent data show that VMT is beginning to return to the longer-term increasing trend. The following charts capture observed peaks and valleys in VMT reflecting shorter-term phenomena such as national fuel price fluctuations, national and local economic forces, or major local construction projects, as well as longer-term trends that result from fundamental changes in travel behavior and greater availability of multi-modal options.

Vehicle Miles Traveled (VMT)

VMT reflects the total miles of vehicle travel on the roadway network and is based on locally acquired real traffic counts and network mileage data. It is a frequently used measure of roadway demand. Total VMT for the region provides a measure of the total amount of travel taking place on the network. Per-capita VMT is an estimate of the number of miles that an average individual travels each day. Lower per capita VMT is generally a good indicator of a well-balanced and accessible multi-modal transportation system for all users.

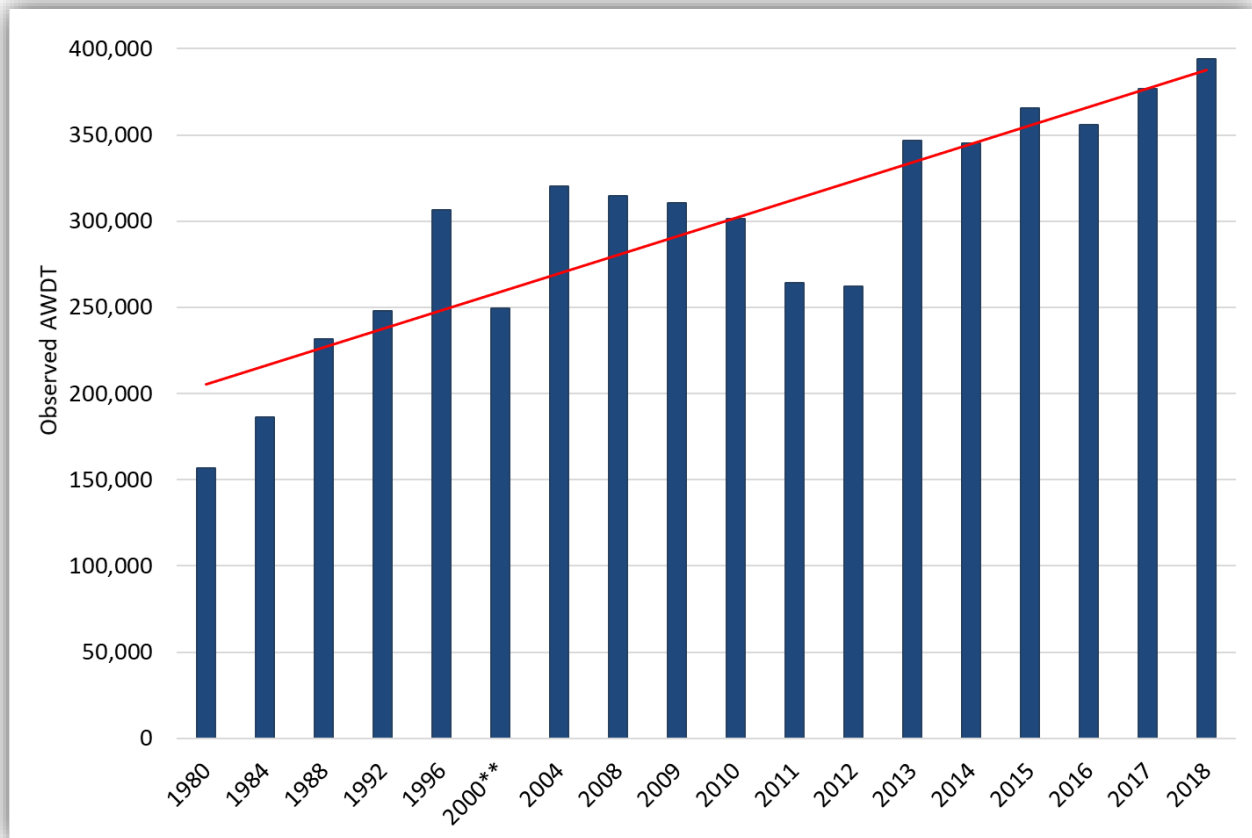
Figure 4-2: Per Capita VMT in the AMPA, 1970-2018



The Big I as a Barometer

A key location to monitor roadway demand is the intersection of the interstates I-40 and I-25, also known as the “Big I.” This interchange encompasses a system of fly-over ramps, mainline through lanes, and frontage roads that carry nearly 400,000 daily vehicles. The confluence of these two major interstates not only support regional travel, but due to their exclusivity as the only major freeways in the area, they play a critical part of the transportation system for local traffic. Hence, the volumes at this location provide a great “barometer” for the levels of travel demand in the region. Note that from the trend line shows that from 1980 through 2008, volumes were at a steady growth, however, after 2008 the growth in volumes began to slow as the region entered the Great Recession. Volumes plateaued and even dropped slightly in the ensuing years, however, they jumped in 2013 and have remained on a steady climb into 2018 (the latest year of data available).

Figure 4-3: Average Weekday Daily Traffic at the Big-I, 1980-2018



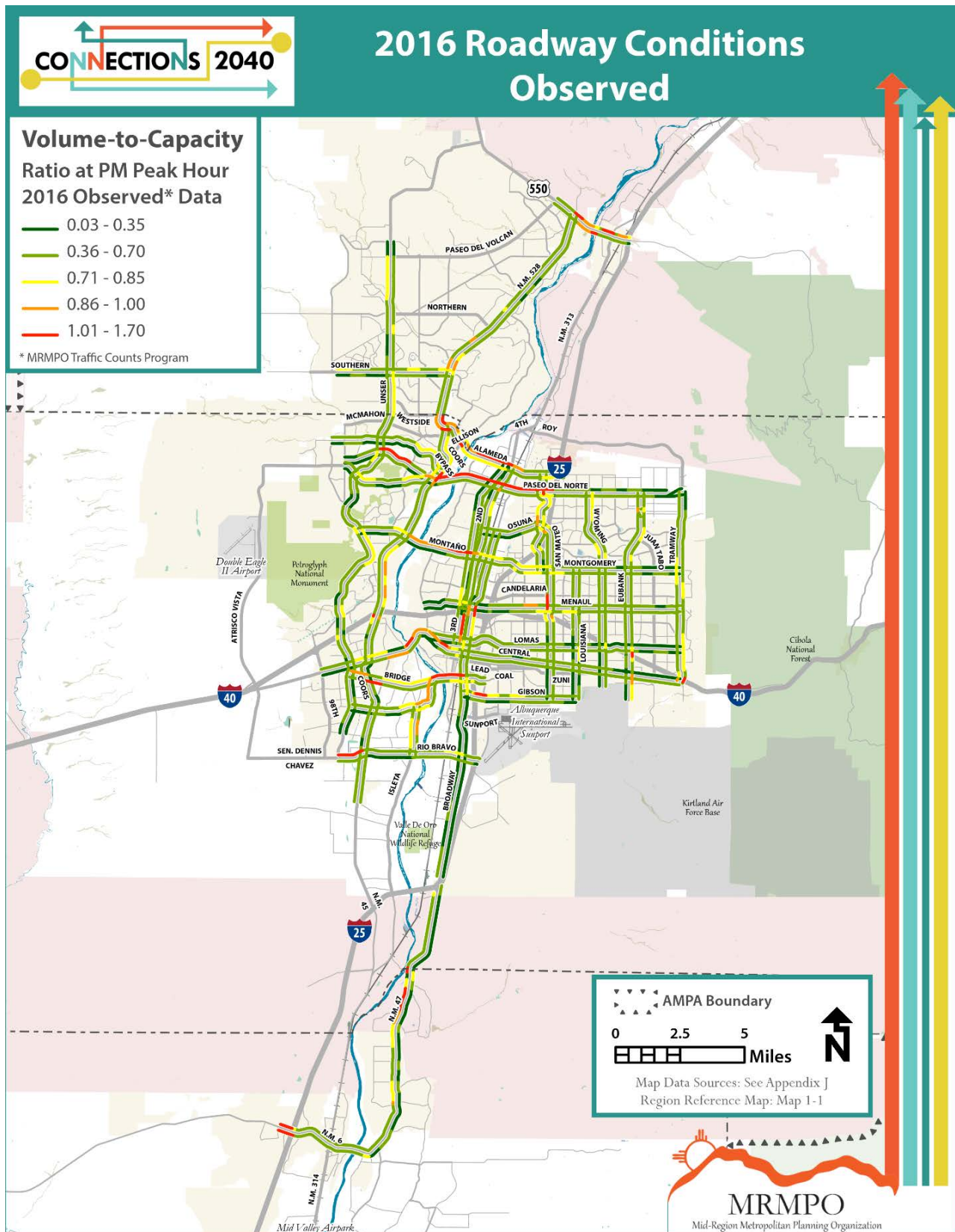
Roadway Capacity

Another key indicator of travel demand is the number of vehicles on a roadway segment relative to the capacity it was designed to hold, particularly during times when commuting is at its highest. This helps us identify areas on our transportation system that are over-burdened, as well as areas where there may be additional capacity. **The majority of our transportation network is operating within its capacity during the PM peak commuting hour.** There are of course some notable exceptions. The 2016 base year volume-to-capacity map shows that travelers experience “severe congestion” particularly on major north/south arterials on the westside including Coors Boulevard and Unser Boulevard, as well as major east/west facilities, and in particular our river crossings that carry excessive amounts of commuter travel.

Volume to Capacity Ratio (V/C Ratio)

One method for measuring the amount of traffic on our roadways is a roadway’s volume relative to the roadway’s ability to carry that volume, a measurement known as the volume-to-capacity (V/C) ratio. Roadway capacity is based on the number of lanes, posted speed, and the functional classification or type of roadway. As traffic volume increases it affects the ability of the roadway to operate efficiently because speed is reduced. When the volume approaches or exceeds the intended capacity, the reduced speeds result in delay and congestion.

Map 4-2: PM Peak Hour Volume-to-Capacity Ratios, 2016 Observed Data

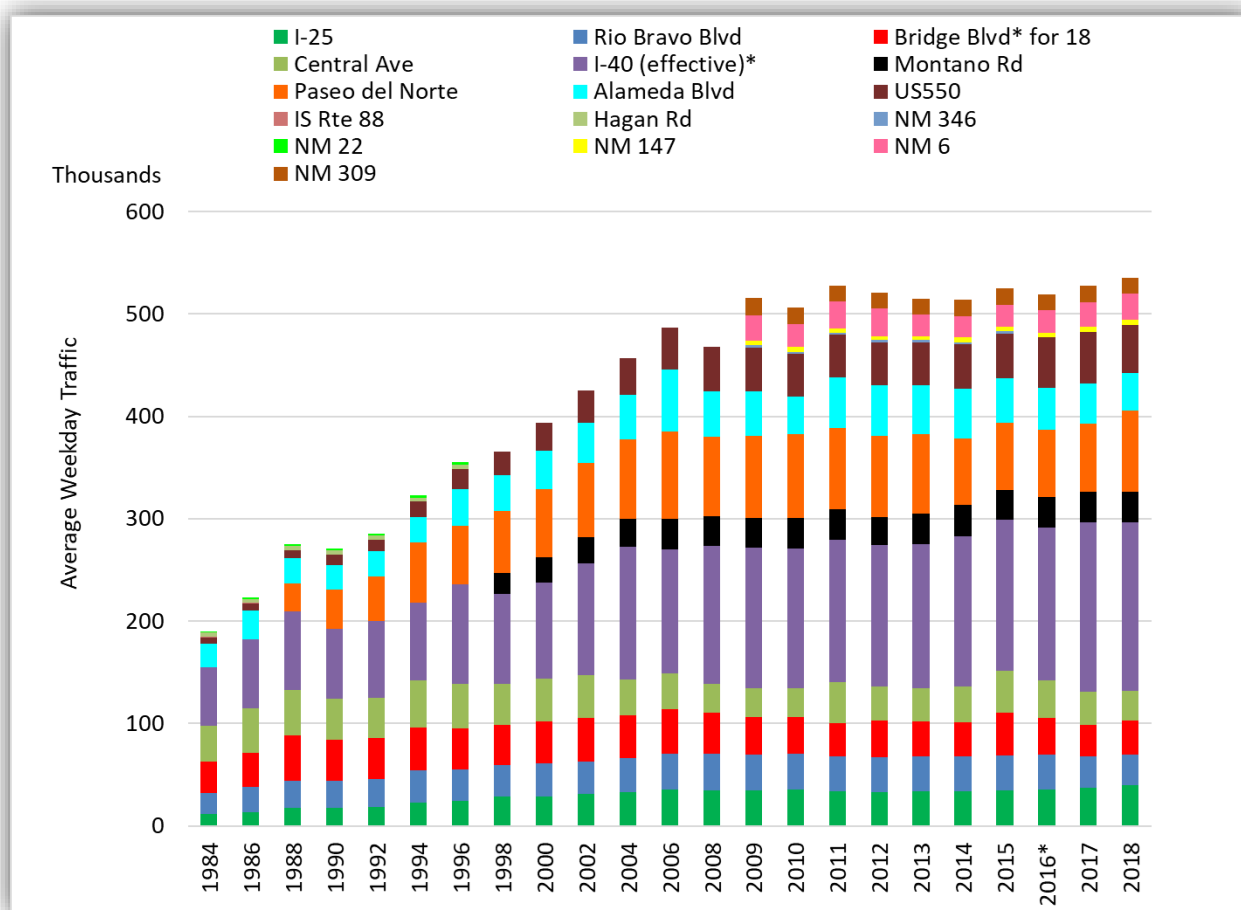


River Crossings

There are 16 river crossings within the region operating at various levels of service during the morning and evening peak times of travel. Combined they support more than 500,000 daily trips across the Rio Grande. The river crossings that connect the northwest neighborhoods to employment and activity centers east of the river experience the greatest congestion and highest numbers of daily trips. These include Montano, Paseo del Norte, Alameda, and US 550. Southwest river crossings such as Rio Bravo, Bridge, and Central also experience significant delays daily. A review of historical average weekday traffic data shows an interesting pattern for growth in demand on river crossings over the years.

Tremendous growth occurred from 1984 to 2006, coinciding with the abundant residential growth west of the Rio Grande. This was followed by relatively flat growth as the region followed the nation into economic recession. During this time new housing construction slowed considerably. However, since 2012 the region began to regain jobs returning to nearly pre-recessionary levels by 2018. Nevertheless, trips across the river during the economic recovery have remained essentially flat. This could be in part because new housing construction has remained relatively low when compared to historical figures. It may also be in part due to roadway capacity issues on the river crossings themselves, which may discourage travelers from making these trips and instead find other ways to commute or move closer to their jobs.

Figure 4-4: River Crossing Traffic in the AMPA, 1984-2018



b. Challenging Safety Statistics

MRMPO staff acquires crash data from the New Mexico Department of Transportation - Traffic Safety Bureau yearly and analyzes this data to help determine locations that are the most dangerous for people driving, walking, and biking. The latest available crash data is usually two years behind, but this process is becoming faster every year. Each crash point has to be reviewed for location and information accuracy. MRMPO staff calculates general statistics and does more in-depth analysis to help identify areas in the region that should be priorities for improving safety.

This plan contains a review of the recent crash data and a variety of action items or strategies to support changes in our education, planning, policies, and design efforts. Perhaps most disturbing, is that based on preliminary data from the Governors Highway Safety Association, New Mexico ranks number one for pedestrian fatalities per 100,000 population¹. These challenging statistics have led the FHWA to identify Albuquerque as a “focus city” and New Mexico a “focus state” for pedestrian safety interventions. The FHWA’s focus city effort has provided support for a better examination of crash data related to pedestrians and bicyclists. The table here shows the general upward trend of crashes in the AMPA.

Crash Database

This plan uses the most recent crash data available: 2013 through 2017. The crash data is provided by University of New Mexico Geospatial Population Studies department, which geocodes crash data compiled by the New Mexico Department of Transportation’s (NMDOT) Traffic Safety Bureau from police records across the state. In order to be included in this database, a crash must involve at least one motor vehicle, occur on a public roadway, and result in at least \$500 of property damage or personal injury. This crash data, along with MRMPO’s street network and traffic counts, allow for the region’s crash rates to be calculated.

Table 4-2: Crash Statistics in the AMPA, 2013 to 2017

Year	Persons Killed	Fatal Crashes	Persons Injured	Injury Crashes	Property Damage Crashes	Total Crashes
2013	66	60	7503	5063	12838	17961
2014	88	82	8167	5497	14076	19655
2015	72	67	9633	6582	15469	22118
2016	114	108	10695	7126	15178	22412
2017	110	102	9812	6715	16248	23065

¹ https://www.ghsa.org/sites/default/files/2019-02/FINAL_Pedestrians19.pdf

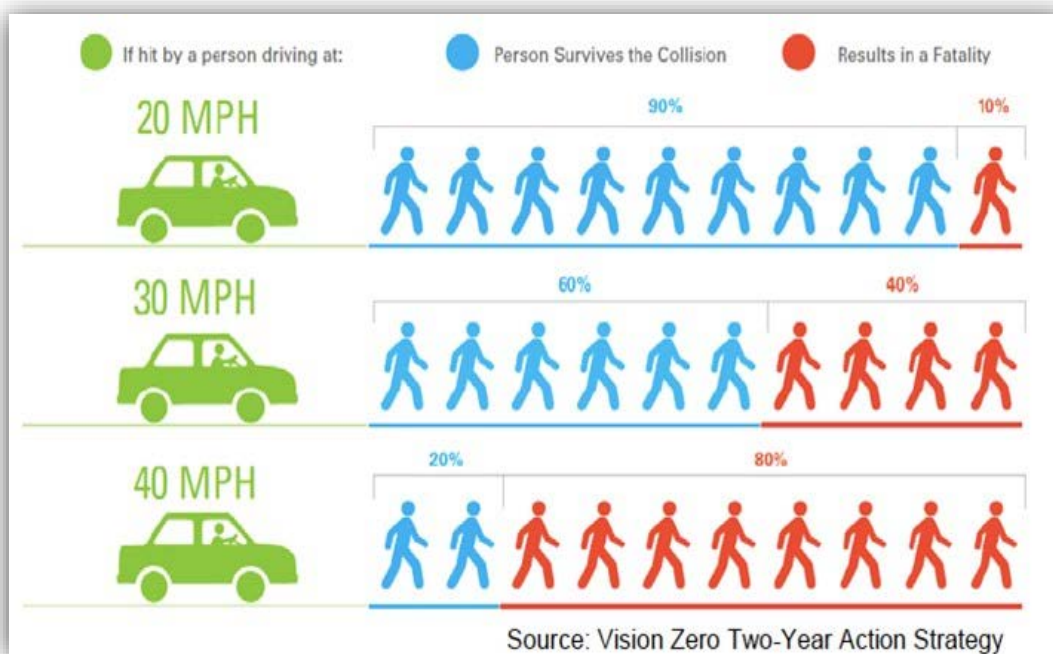
Top Contributing Factors (TCF)

To get a better idea of the cause of crashes, it is important to dig into the crash data to identify top contributing factors (TCF) in the region that result in the most injuries and deaths (see figures 4-6 and 4-7). For fatal *and* injury crashes combined, distracted driving is the top contributing factor followed by failure to yield, following too closely, and then excessive speed. Of the fatal crashes, alcohol/drug involved is the top contributing factor followed by excessive speed. Alcohol/drug Involved crashes are a serious issue for all modes of travel. “Drove left of center” also stands out as a unique factor with fatal crashes. Six of these types of crashes are along interstate type highways, and only two are not in rural areas.

Excessive Speed and Dangerous Driving

Excessive speed is the TCF in 14 percent of fatal crashes in the region. Other dangerous driving factors include following too close, disregarding traffic signals, and running red lights. Combined, excessive speed and dangerous driving make up 25 percent of fatalities. Speed is a factor in nearly one-third of all traffic deaths in the United States (NHTSA). Speed increases the likelihood of being involved in a crash and increases the severity of injuries for those involved in a crash—especially vulnerable roadway users such as pedestrians or bicyclists.² This region needs to focus on curbing dangerous driving and specifically speeding drivers, which can in turn significantly reduce the number of crashes overall and increase the survivability if a pedestrian-involved crash does occur.

Figure 4-5: Impact of Speed on Pedestrian Fatalities



² National Transportation Safety Board, 2017.

Figure 4-6: TCFs for Fatal and Injury Crashes in the AMPA, 2013-2017

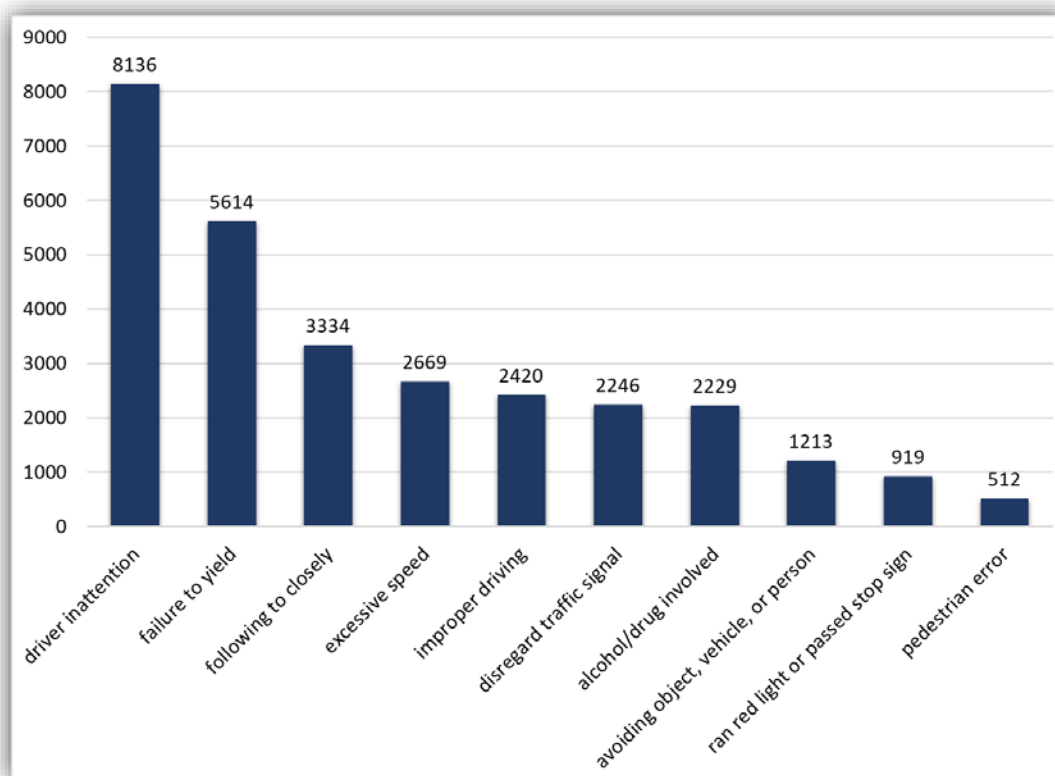
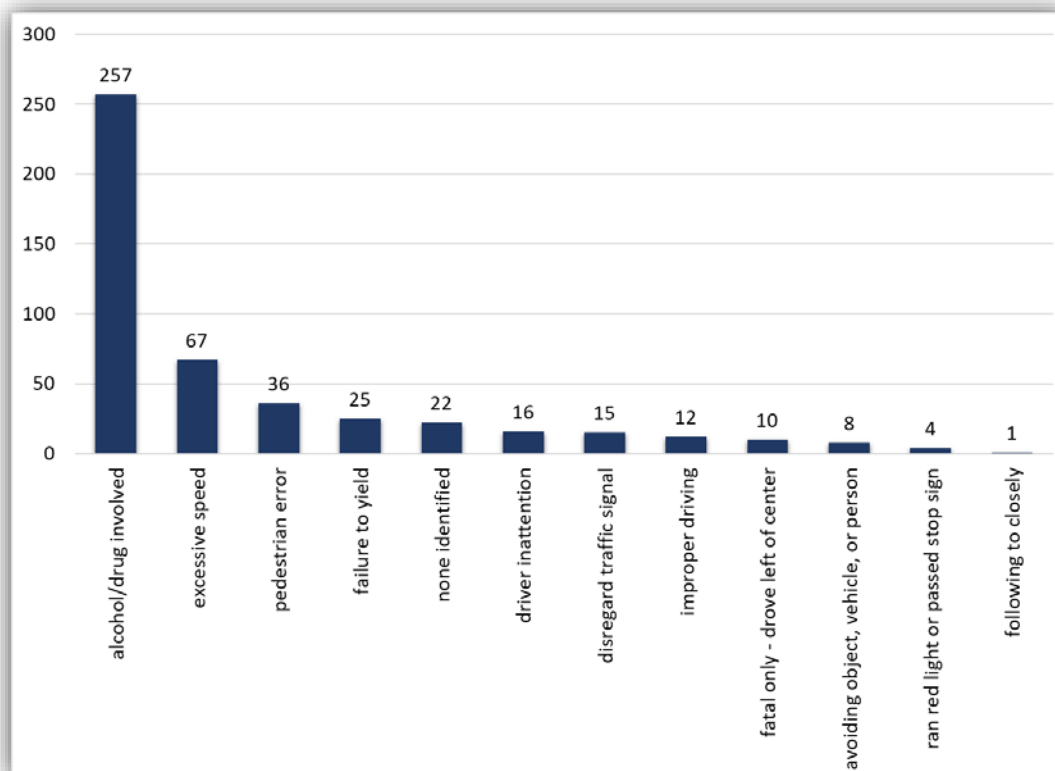


Figure 4-7: TCFs for Fatal Crashes Only in the AMPA, 2013-2017



Reporting Pedestrian Error as a TCF

Pedestrian error is reported as the third highest TCF for fatal crashes. According to analysis in the RTSAP, pedestrian error is disproportionately represented in fatal crashes, which may indicate issues with the way crash data is reported. In addition, the identification of pedestrian error in the first place can be difficult and may not always be applied correctly. The reason for this, unfortunately, is that there seems to be a misunderstanding of what an unmarked crosswalk is (they are locations where, in addition to marked crosswalks, pedestrians have the right of way and drivers must yield to them). In addition, usually a police officer can only take the driver or pedestrian's word on whether the pedestrian left the curb with adequate time for a driver to stop or if the driver was speeding when they hit the pedestrian; and importantly, when a pedestrian is killed or seriously injured, they cannot tell their side of the story. In other states the laws are different. In some places the driver must stop regardless of where the pedestrian is crossing.

Bicycle and Pedestrian Crash Reporting

A recent Transportation Research Board (TRB) paper investigated local media coverage of vehicle crashes involving pedestrians and bicyclists and how these crashes were covered. The research results found that local news coverage tended to shift the blame toward pedestrians and/or bicyclists and away from drivers.³ The research also found that “news coverage misconstrues the problem [of traffic crashes]. Rather than addressing commonalities between crashes, coverage almost always treats crashes as isolated incidents, obscuring systematic solutions.”⁴ These patterns can make it difficult to make effective changes to our built environment and also to initiate a paradigm shift in which people walking or biking are not villainized for doing so.

New Mexico Law for Pedestrians and Drivers

In the state of New Mexico, vehicles must yield the right-of-way to pedestrians crossing a roadway within a marked crosswalk or unmarked crosswalk (NCSL, 2016). However, pedestrians may not suddenly leave the curb and enter a crosswalk (marked or unmarked) into the path of a moving vehicle that is so close that the vehicle is unable to yield. An unmarked crosswalk is a portion of a roadway “ordinarily included with the prolongation or connection of the lateral lines of sidewalks at intersections.” Outside of marked or unmarked crosswalks, pedestrians must yield the right-of-way to vehicles.

Figure 4-8: Unmarked Crosswalks



³ <http://www.eden.rutgers.edu/~ei60/crashespaper.pdf>

⁴ <http://www.eden.rutgers.edu/~ei60/crashespaper.pdf>

Regional Transportation Safety Action Plan (RTSAP)

The *Futures 2040 MTP* called for the creation of a regional safety plan. The Regional Transportation Safety Action Plan (RTSAP) was developed in response. The *RTSAP* was created in 2018 through data driven analysis in collaboration with local agency stakeholders and public input. It puts forth well-researched best practices for combating unsafe streets by identifying short and long-term implementable action items. The plan also identifies Vision Zero as a key approach to improving safety in the AMPA. The *RTSAP* was unanimously adopted by the Metropolitan Transportation Board (MTB) in August 2018 and incorporated into the project prioritization process to encourage member agencies to target challenging areas with safety interventions. Additionally, the plan identifies specific emphasis areas and goals to evaluate and track progress.

RTAP Goals and Emphasis Areas

RTSAP Goals

1. A year over year reduction in fatal and injury crashes:
 - a. at high priority corridors and intersections
 - b. related to excessive speed and dangerous driving
 - c. involving pedestrian and bicyclists
 - d. involving alcohol and drugs
2. An overall 5 to 10 percent reduction of the above categories of fatal and injury crashes over the next 5 years.
3. A year over year increase in the levels of comfort and safety experienced by bicyclists and pedestrians out in traffic.
4. Complete streets approach incorporated by all future construction projects from inception to construction.

RTSAP Emphasis Areas

(Action Items provided under each of these sections in the RTSAP)

1. Reduce excessive speed and dangerous driving
2. Design streets for all modes of travel
3. Implement meaningful behavior change campaigns
4. Expand data collection and traffic management
5. Ensure strong policy and funding mechanisms
6. Provide targeted traffic enforcement

RTSAP Action Items

The RTSAP also includes a comprehensive list of potential action items grouped under each emphasis area. These action items are adapted to our region and provide an excellent starting point for the public and local agencies to consider for implementation. An example action item is a road diet.⁵ Action items vary from relatively cheap interventions, like installing more Speed Feedback (radar) Signs (SFS), which provide approaching drivers with feedback about their speed compared to the posted speed. Action items can also be very complicated and expensive, like re-engineering major streets and intersections to reduce

⁵ According to the FHWA, a road diet is generally described as “removing travel lanes from a roadway and utilizing the space for other uses and travel modes.” (https://safety.fhwa.dot.gov/road_diets/guidance/info_guide/ch1.cfm#s11)

conflict points by consolidating driveways and providing better infrastructure for pedestrians and bicyclists.

Rural Areas

According to 2011-2015 crash data looked at as part of the *RTSAP*, rural areas experience a larger proportion of fatal crashes than other areas. Only 1.7 percent of all crashes occurred in the rural areas, yet 12.5 percent of all fatal crashes occurred in those areas. The top contributing factor for these fatalities is excessive speed, contributing to 20 percent of deadly incidents. Other primary issues in rural areas are driving left of the center of roadways and rollovers. Although “rollover” is listed as the top contributing factor in many crashes, speed is an element of that factor. Thirty-six percent of rollover crashes are due to excessive speed (which outweighs alcohol/drug-related; responsible for 21 percent of rollovers). Enforcement, educational campaigns, and design interventions like narrowing lane widths are all useful in addressing excessive speeding.

Traveling by Motorcycle

The *RTSAP* data revealed high rates of motorcycle crashes, with three percent of crashes involving a motorcycle and 24 percent of fatal and serious injury crashes involving a motorcycle, despite the fact that relatively few trips are made by motorcycle (for instance, only 0.4 percent of commuters use motorcycles to travel to work). New Mexico does not have a universal motorcycle helmet law, which would require that all motorcycle riders and their passengers wear a helmet when riding.

High Fatal and Injury Network (HFIN)

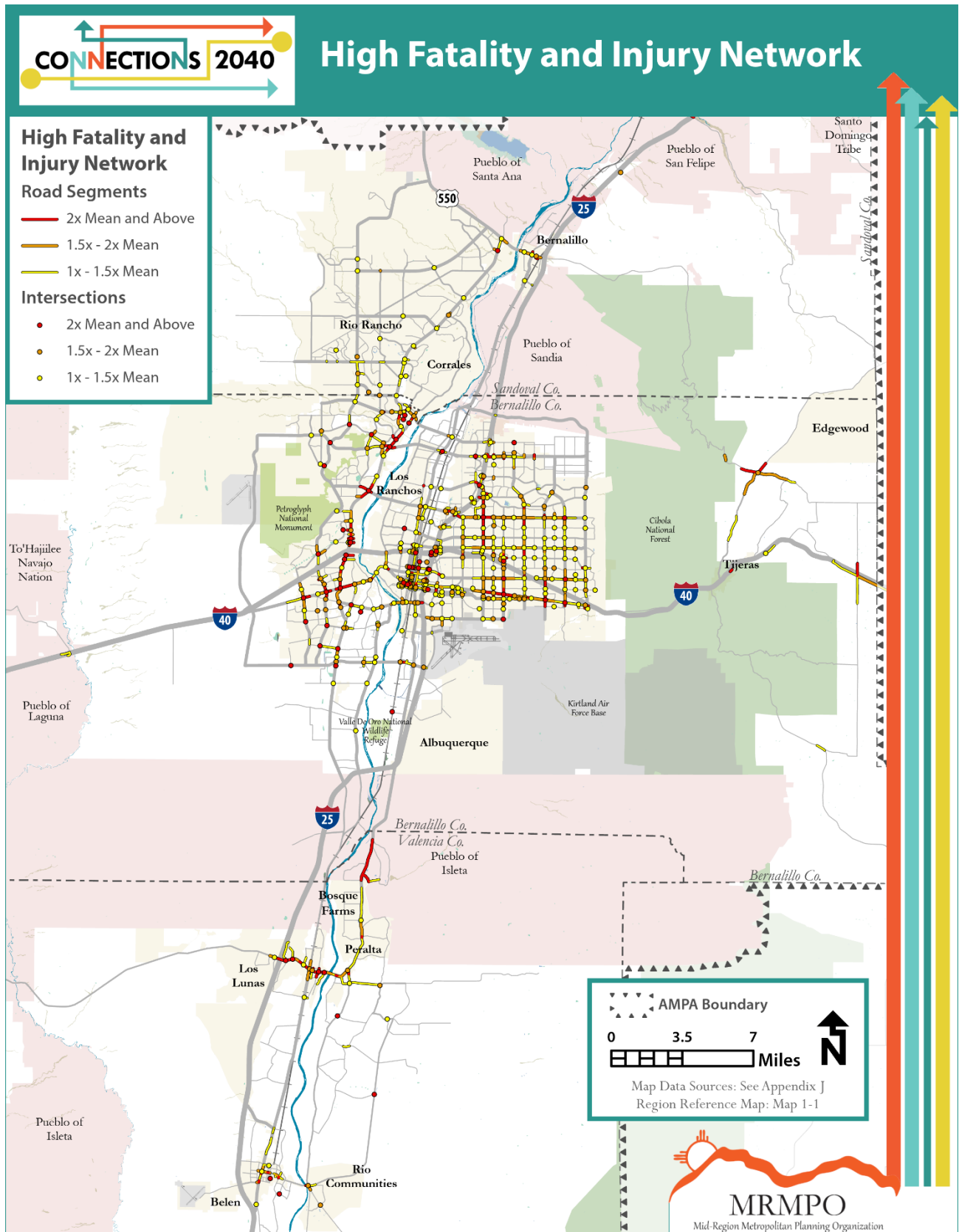
The High Fatal and Injury Network (HFIN), is a new planning tool that allows the region to target those locations that not only have the most crashes, but also the greatest impact on human lives. Using this tool, agencies can work with private institutions and organizations to implement preventative measures.

The High Fatal and Injury Network (HFIN) is critical because it identifies recurring crash areas and is a critical element of any Vision Zero plan. The HFIN (developed as part of the *RTSAP*), shows above average fatal and injury crashes per mile, and above average fatal and injury crash rates at intersections, for every major road in the AMPA. Interstates were not included because they are maintained and operated by the NMDOT and are accounted for in the State Highway Safety Plan. Pedestrian and bicycle crashes per mile, and number of crashes per intersection, were also identified as a part of the HFIN.

Over half (64 percent) of total fatalities and injuries occur on just two percent of all roads in the AMPA.

The HFIN was developed by reviewing each geographic area (Large Urban, Small Urban, and Rural, which includes Tribal areas) individually, and then calculating the mean of either the intersection rate by volume or the crashes per mile. **Intersections and roadways included in the HFIN experience 1.5 times the mean crash rate.** Pedestrian crashes at intersections were analyzed using a total number of crashes as opposed to a rate.

Map 4-3: High Fatal and Injury Network



Intersection Crash Rates

Crash rates provide a more accurate picture than total crash numbers of the most dangerous intersections in the AMPA area. High crash rates may occur for a variety of reasons, including driver inattentiveness and speed. However, other factors also include lack of adequate facilities for the more vulnerable non-motorized modes, roadway design that encourages speed, and line of sight distance issues.

Crash rates were calculated on thoroughfare intersections in the AMPA for the period of 2013 to 2017 by dividing the number of crashes at an intersection by the number of vehicles entering the intersection. These rates are expressed as crashes per million vehicles. Crash rates were also calculated for fatal and injury related crashes, and bicycle and pedestrian involved crashes.

Wisely Targeted Funding

There is clearly a high need for safety improvements in our transportation system, yet funding to accomplish improvements is limited. This makes it imperative to be selective about where safety funds are spent. Identifying the most dangerous streets and intersections allows the region to focus efforts where they are needed most to get the biggest bang for our “safety buck.”

Some of the intersections that stand out consistently as being high in fatal and injury crashes over the years are Central Avenue and San Mateo Boulevard, Montgomery Boulevard and San Mateo Boulevard, and Coors Boulevard and Paseo del Norte Boulevard. Often the intersections with high crashes are surrounded by commercial development and have many lanes of traffic, as well as major transit lines. Each seven to eight lane leg of Central and San Mateo, for example, carries between 22,000 to 33,000 vehicles on an average weekday. As the region looks to increase transit and mixed-use development to address congestion, mobility, and a variety of other regional issues, it will be important to avoid conflicts that occur when land uses and services that promote walking and bicycling are located along high-speed, high-volume arterials. Intersection design that prioritizes safety must also become the norm. The *RTSAP* and *LRTS Guide* provide some design ideas in this respect.

c. Future Travel Demand

MRMPO collects data on current travel conditions, and forecasts that information out 20 years to help plan roadways and other travel management and operations applications needed in the future. To do this, MRMPO maintains and operates a regional travel demand model to anticipate the impacts of growth on the transportation system. This evaluation tool differs from actual count and recorded speed data in that it *models* future roadway travel conditions. Key inputs to the travel demand model include a regional socioeconomic forecast, which is essentially a picture of trip origins (homes) and destinations (jobs, shopping, medical, recreation, etc.), and proposed roadway and transit networks. This information combines with data regarding travel behavior to predict future congestion levels and identify specific problem areas or gaps in the system.

Transportation Scenarios

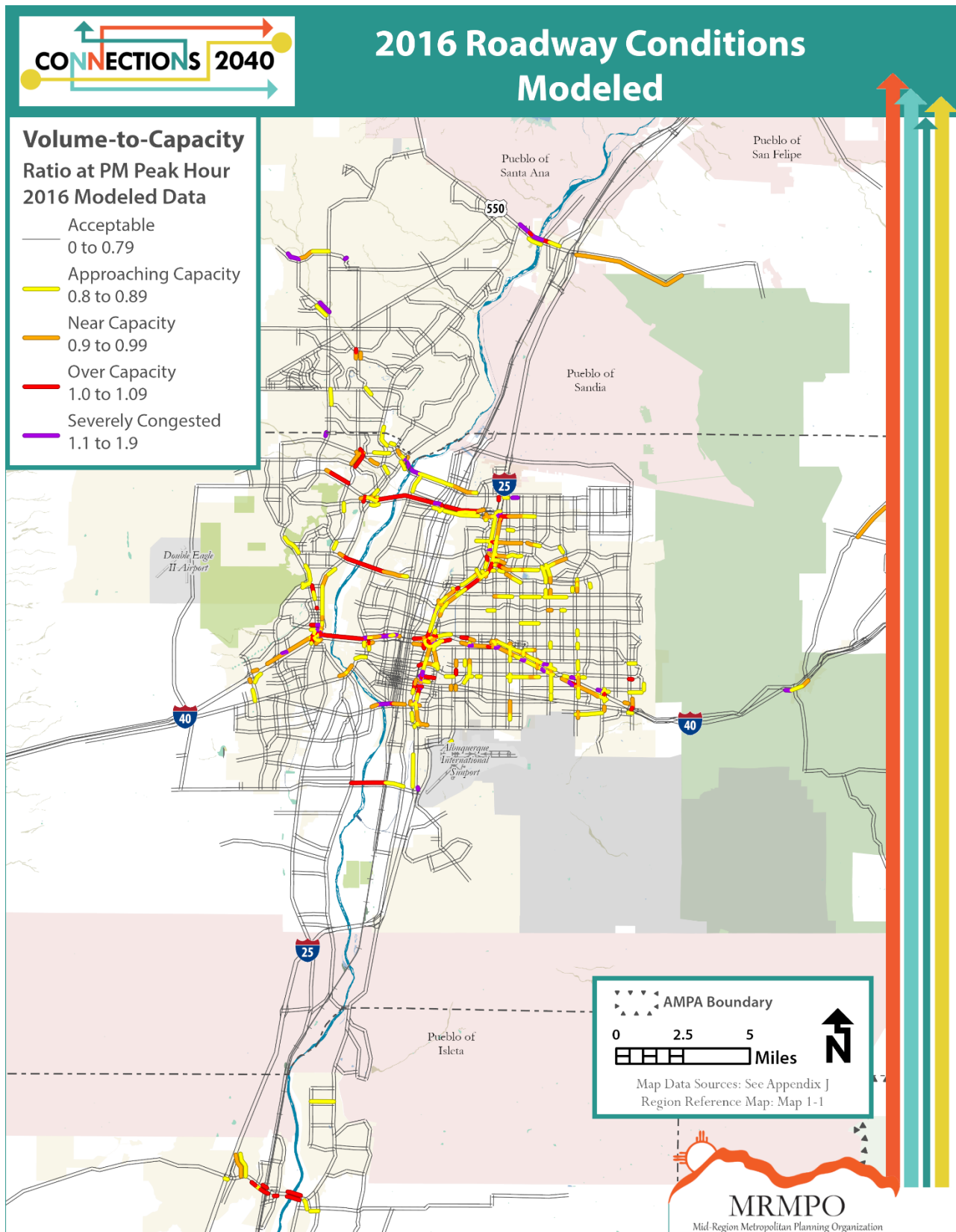
The land use-transportation relationship can be evaluated through future geographic distribution of forecasted socioeconomic data and roadway infrastructure scenarios. Future year roadway scenarios inform the transportation planning process by allowing agencies to identify infrastructure improvements needed to support the region's mobility needs. In particular, the modeled scenarios allow for an assessment of anticipated roadway capacity deficiencies in the year 2040. The analysis sheds light on whether roadway infrastructure improvements do in fact mitigate congestion. The Trend Scenario represents the forecast according to existing policies and plans, while the Target Scenario reflects the desire of MRMPO member governments to address regional needs through changes in land use policy and potential transit investments.

Modeled roadway network and growth scenarios contained in the *2040 MTP* include:

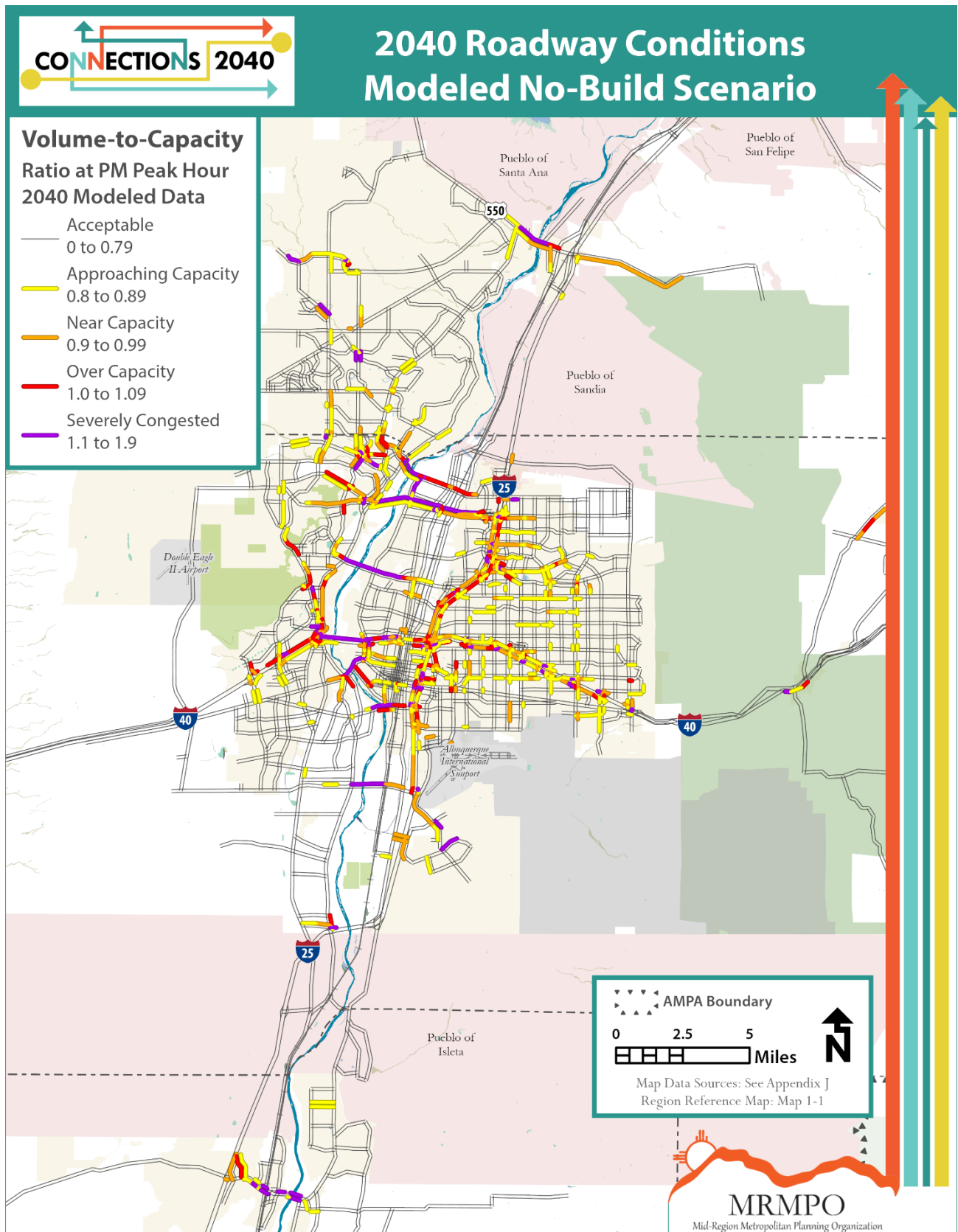
1. **2016 Baseline**
Reflects the modeled or simulated conditions found in the region today. This scenario forms a standard upon which future year scenarios can be projected, compared, and analyzed.
2. **2040 Trend No-Build**
Shows the impacts of anticipated socioeconomic growth on the “no build” roadway network, which represents what might happen were there to be no improvements to the infrastructure beyond the projects included in the 2016 Baseline.⁶
3. **2040 Trend Build**
Represents the same level and distribution of growth but with the additional roadway infrastructure identified using funds available from 2016 to 2040.
4. **2040 Target Build**
Represents the alternative growth scenario, or Target Scenario, with programmed roadway investments.

⁶ A “committed” transportation network includes projects currently programmed in the TIP and Capital Improvement Programs of local agencies. These projects are considered imminent as they are already in the project development and implementation phases, and as such, are likely not subject to change.

Map 4-4: 2016 Roadway Conditions



Map 4-5: 2040 Trend No Build Roadway Conditions



Future Conditions without Transportation Infrastructure Investment

The patterns of congestion identified in the 2016 baseline conditions, unsurprisingly, become more severe under the Trend No-Build Scenario. In effect, by 2040, nearly every river crossing will experience severe congestion, exacerbating what is observed in the 2016 baseline scenario. Other areas that experience over-capacity roadway conditions include much of the Westside adjacent to major river crossings, the downtown/UNM areas, and areas with non-grid type roadway infrastructure design. These emergent patterns are anticipated as many of these areas are expected to absorb future planned growth, meaning congestion issues in these areas would be compounded *without* the infrastructure investments identified in the MTP.

Performance data for the 2016 Baseline and 2040 Trend No-Build Scenario are summarized in the table below, including vehicle miles traveled (VMT) measuring the quantity of travel; vehicle hours of travel (VHT), which indicates the time spent traveling; and vehicle hours of delay (VHD), which measures the time spent traveling below the posted speed. Also included are summaries of the magnitude of VMT under congested conditions (i.e., over-capacity). As can be expected, all performance measures show decreases in the absence of roadway infrastructure improvements. Under the 2040 No-Build Scenario, the amount VHD increases by 73 percent, VMT on roadways that are over capacity, as well as congested lane miles of roadway, both increase around 100 percent, while average speeds decrease by 16 percent.

Table 4-3: Base Year and Trend No-Build Roadway Performance Summaries, PM Peak Hour

PM Peak Hour	2016 Baseline	2040 Trend No-Build	Percent Difference, 2040 No-Build vs. 2016
VMT	1,673,908	1,937,532	16%
VHT	58,700	81,869	39%
VHD	23,131	40,079	73%
VMT Over Capacity	81,245	160,839	98%
Congested Lane-Miles	56.8	115.0	102%
Average Speed	29.8	25.1	-16%
Daily VMT/Capita	20.4	20.3	16%

Future Conditions with Transportation Investment

To address the congested travel demand conditions, roadway improvements such as additional lane expansions and roadway extensions (beyond those already committed) were developed and modeled for the 2040 planning horizon. Conditions in the 2040 Build Scenario are much improved over the No-Build Scenario, demonstrating the benefits of the projects proposed by member agencies over the lifespan of the plan. In particular, areas west of the Rio Grande leading up to the river crossings see significant relief. Nevertheless, travel conditions are expected to worsen over time compared to the 2016 baseline.

Comparing the Trend and Target Growth Scenarios

Areas of congestion remain in both the Trend and Target Scenarios for certain corridors on the Westside, in particular bottlenecks on Unser Boulevard at Montano Road, along Paseo del Norte Boulevard, along Paradise Boulevard, and the network surrounding the Cottonwood Mall Regional Center. Additional corridors in the Westside and South Valley such as I-40, north/south corridors west of the river, and the area surrounding the Rio Bravo Interchange also become congested by 2040. The areas with extensive roadway expansion such as the City of Rio Rancho, private and public-funded improvements in master-planned areas, and the network in the Southwest Mesa appear to be operating well.

Another important consideration is the differences in the systemwide distribution of travel between the Trend and the Target Scenarios for the entire region. Noteworthy are the differences in regional vehicle hours of delay (VHD), where there is a 11 percent reduction in the Target Scenario compared to the Trend Scenario, and there is a 12 percent reduction in the Target Scenario of the amount of travel taking place under congested conditions (VMT over capacity). The areas of bottleneck congestion noted above are, for the most part, improved in the Target Scenario. In the Target Scenario, more vehicle travel occurs in places that have excess capacity; in other words, roadways that have the ability to absorb additional traffic are the roadways that gains traffic. The Target Scenario generates greater traffic volume in the core urban area of Albuquerque and near activity centers, while lower traffic volumes and reduced congestion can be observed across Rio Rancho.

Table 4-4: Trend and Target Scenarios Roadway Performance Summaries, 2040 PM Peak Hour

PM Peak Hour	2016 Base Year	2040 Trend Build	2040 Target Build	Percent Difference, Target vs. Trend
VMT	1,673,908	1,937,337	1,913,356	-1%
VHT	58,700	75,503	71,224	-6%
VHD	23,131	33,999	30,244	-11%
VMT Over Capacity	81,245	125,376	110,058	-12%
Congested Lane-Miles	56.8	91.8	81.9	-11%
River Crossing Delay, PM Vehicle Hours of Delay (VHD)	923.9	2,766.9	1,570.8	-43%

River Crossing Delays: Reductions in Target over Trend

While the differences in travel conditions between the Trend and Target Scenarios may at first appear modest, there is a tremendous difference in travel delay on the river crossings. When observed on river crossings supporting major commutes, the Target Scenario provides a remarkable improvement (43 percent) in travel delay on the river crossings over the Trend Scenario. To further explore this phenomenon, additional analysis was done on river crossings that directly support commuter flows from the residences west of the river to jobs east of the river. Map 4-8 illustrates the impact of increased job concentrations on the westside in the Target Scenario over the Trend Scenario. Also shown are the river crossings that are directly affected by this shift and the consequential reductions in associated river-crossing delay.

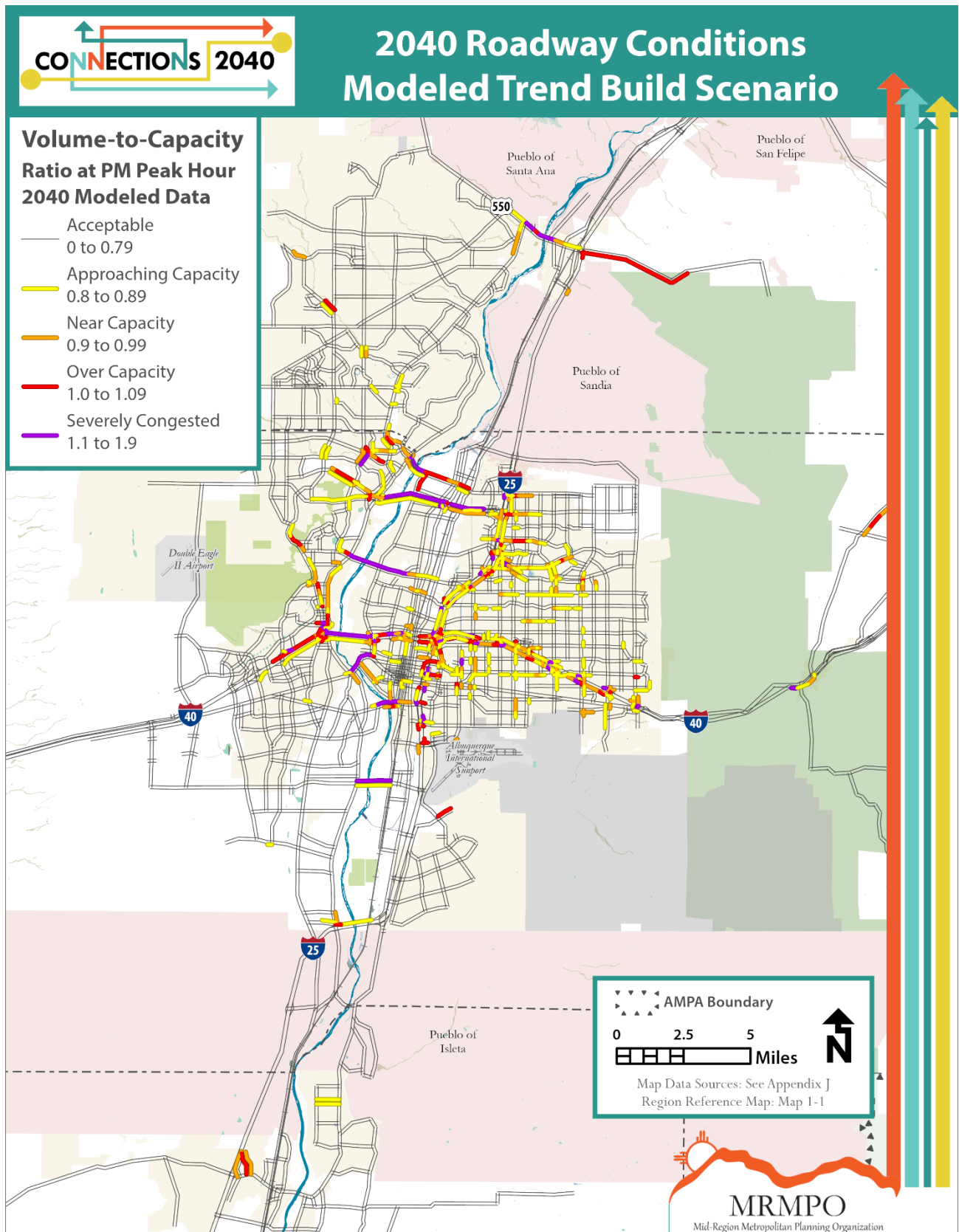
Table 4-5: Impact of Additional Westside Jobs on River Crossings

2040 Trend Westside Jobs	2040 Target Westside Jobs	Additional Westside Jobs in Target Scenario	Reductions in PM Peak Hour River Crossing Delay
109,227	122,656	13,429	1,196 Travel Hours Saved Each Day

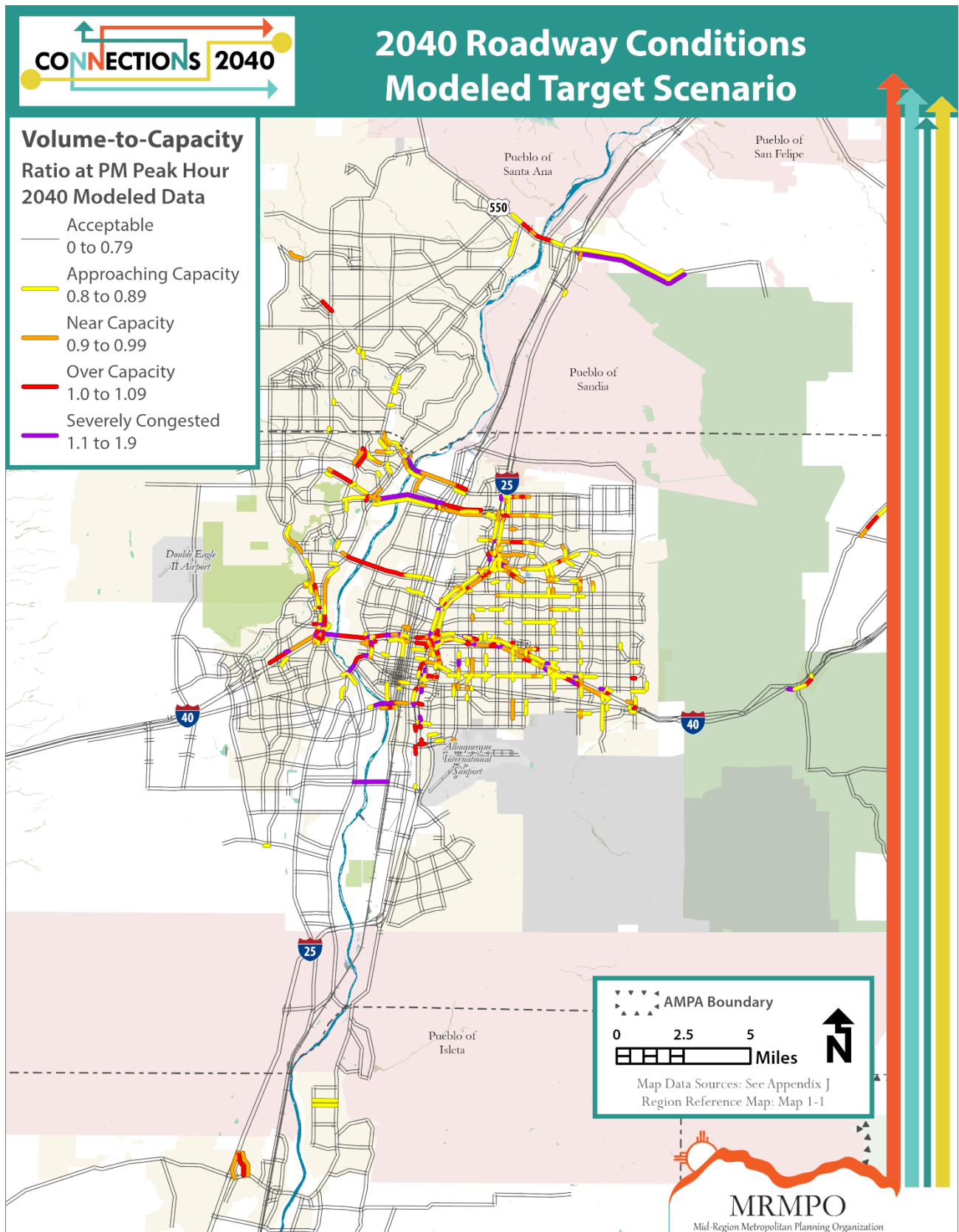
Figure 4-9: River Crossing in the AMPA



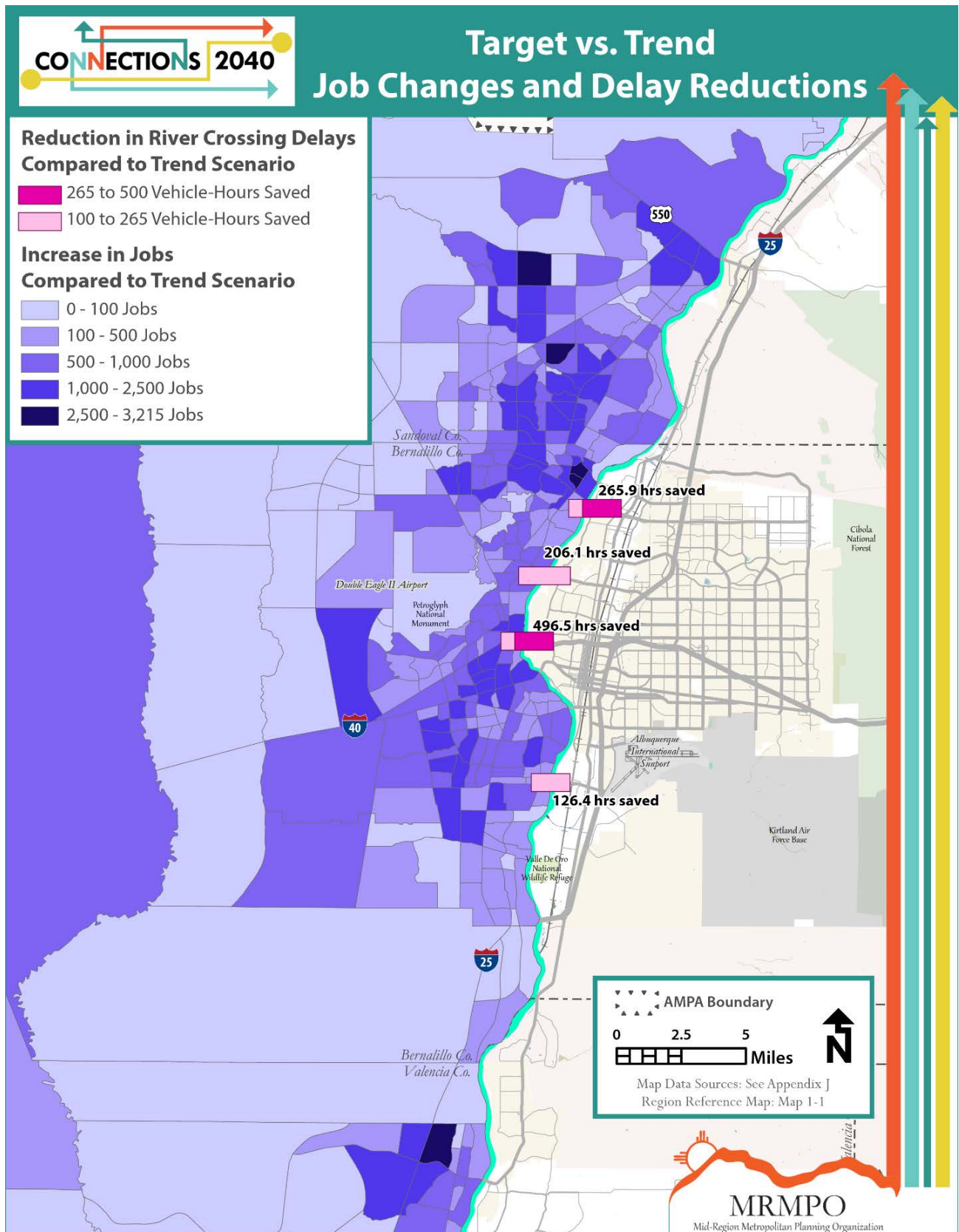
Map 4-6: 2040 Trend Roadway Conditions



Map 4-7: 2040 Target Scenario Roadway Conditions



Map 4-8: Differences in River Crossing Delay and Westside Employment



d. Roadway Management and Mobility

Future growth in the region will increase demand on the roadway network over the next 20 years, requiring a thoughtful approach by MRMPO and all member agencies involved in the transportation planning process. Changes in the distribution of land use as demonstrated by the Target Scenario has the potential for beneficial impacts on traffic in the region. However, a wide range of supplemental roadway management strategies will be necessary to address the travel and mobility needs of the region. The Congestion Management Process (CMP) Committee is the primary body convened by MRMPO that serves to identify transportation needs in the region and develop appropriate strategies to address them.

Congestion Management Process (CMP)

Federal regulations require that MRMPO incorporate an “objectives-driven performance-based” Congestion Management Process (CMP) into regional transportation planning efforts. A CMP is intended to assess the performance of the regional multimodal transportation system and recommend appropriate projects, programs, and strategies. Therefore, this process identifies: the sources and extent of congestion; recommends appropriate strategies to manage congestion and improve mobility; and considers proposed transportation projects and other programs, such as travel demand management. The CMP convenes technical experts from member agencies across the region to ensure better decision-making and prioritize the projects that will have the greatest regional benefits.

Understanding the Congestion Problem

How congestion is understood is evolving. Specifically, there is a growing body of research that points to the relationship between economic activity and congestion, showing that the cities with the highest gross domestic product (GDP) per capita also tend to have high levels of vehicle delay.⁷ Research has found that a region’s economy is not necessarily negatively impacted by traffic congestion, and that economic productivity and jobs are both positively associated with high levels of traffic congestion.⁸

In fact, localized congestion may even be beneficial for businesses, or at least is a by-product of activity and an indication of the desirability of a place.⁹ Congestion metrics are also rightly criticized for comparing travel times to a set of abstract conditions that only exist in pre-dawn hours when few cars are on the roads.¹⁰

For these reasons, the CMP approaches congestion as an issue to be managed rather than eliminated. Historical trends show a plateau in per capita VMT between 2003 and 2006, which was a time of economic growth in the region. This challenges the notion that economic expansion and increasing VMT per capita are linked. Factors such as high gas prices and worsening congestion may have encouraged mode shift in the mid-2000s. ABQ RIDE introduced its Rapid Ride service in 2004 and Rio Metro introduced its Rail Runner service in 2006; both may have contributed to reductions in regional VMT per capita by providing alternatives to the private vehicle.

⁷ Findings of Eric Dumbaugh, professor of urban studies, Florida Atlantic University, <http://www.citylab.com/commute/2012/06/defense-congestion/2118/>

⁸ <https://www.cnu.org/publicsquare/2018/06/06/congestion-can-be-good-study-reports>

⁹ Matthias Sweet, “Do Firms Flee Traffic Congestions?” *Journal of Transport Geography*, February 2014

¹⁰ Todd Litman, VTPI, “Congestion Costing Critique: Critical Evaluation of the ‘Urban Mobility Report,’” June 13, 2014

Data Collection and Performance-Based Planning

The foundations of CMP are data collection, and MRMPO collects and analyzes a series of data that are designed to measure congestion. The three principal data elements for the CMP include:

1. **Volume-to-Capacity (V/C)** ratios – used to compare the observed traffic volume on a roadway segment to the intended roadway capacity.
2. **Speed Differential** – used to understand travel time and delays associated with roadway segments and corridors based on the difference between observed speeds and posted speed limits, or free flow speeds.
3. **Crash Rates** – frequency of crashes at individual intersections compared to the regional average.

Travel time and traffic counts data are available by time of day and can be used to determine whether the congestion is confined to certain times of the day and whether it is the result of a bottleneck or a prolonged stretch of congested traffic conditions. The congestion data serves as a baseline for understanding conditions by location and highlighting the corridors that merit attention. Crashes contribute to what is called non reoccurring congestion and often end up in closing down major roadways and diverting traffic. This data element is also used to determine the most unsafe intersections to help target funding for improving safety.

Multimodal Performance Measures

Federal regulations mandate that MPOs collect multimodal system performance measures as part of the CMP. The CMP collects data on transit and non-motorized travel modes through permanent eco-counters on trails and spot counts using a video camera. Such data is critical when determining how meaningful a role these modes play in the regional transportation system. Similarly, questions of whether the region should focus on efficiency improvements or expand multi-modal opportunities can only be better answered with an understanding of how all residents of the Albuquerque metro area travel around the region. An expansion of the multimodal traffic counts program continues to be a priority.

CMP Products¹¹

Another important part of the CMP is to disseminate data and analyses to local government agencies. Various reports completed by staff through the Congestion Management Process are shared and posted on the MRCOG website. These actions take place through meetings and coordination with the CMP Committee, presentations to local government agencies, and a range of CMP products, including the following:

- **CMP Corridor Rankings** – a table and map of the top congested corridors.
- **“A Profile in Congestion”** – a companion document to the rankings table that provides key data and roadway characteristics for each of the corridors on the CMP congested network.
- **Strategies Toolkit** – a document describing key congestion management strategies and the locations and situations in which implementation is appropriate.
- **Strategies Matrix** – a tool for member agencies to identify the most appropriate and highest priority congestion management strategies for each of the corridors in the CMP congested network (although this tool was developed for use with the Project Prioritization Process, it can be used as a reference by local governments in the development of all transportation projects).

¹¹ All CMP products are available on the Congestion Management Process page of the MRCOG website.

CMP Corridor Rankings

Congestion data is collected across the metropolitan area on a recurring basis, but additional analysis is performed on 30 corridors and two Interstate facilities that comprise the CMP congested network. The data is used to develop a CMP corridor rankings table shown here. The CMP corridor rankings are compiled into a biannual document entitled “A Profile in Congestion” and are an important aspect of regional project selection.

Once collected and analyzed, the data sheds light on the nature of congestion for the segments of each corridor. For instance, if congestion is the result of high traffic volumes and large numbers of long-distance trips, then appropriate strategies may include reduced roadway demand through transit service expansion, enhancing alternate modes, implementing other travel demand management techniques such as ridesharing or telecommuting, as well as capacity expansion under the right circumstances. By contrast, if congestion is the result of delay and slow speeds, then roadway inefficiencies may be addressed through operations improvements such as ITS deployment, the introduction of

acceleration/deceleration lanes, or access management to reduce the number of vehicles or turning movements on a roadway.

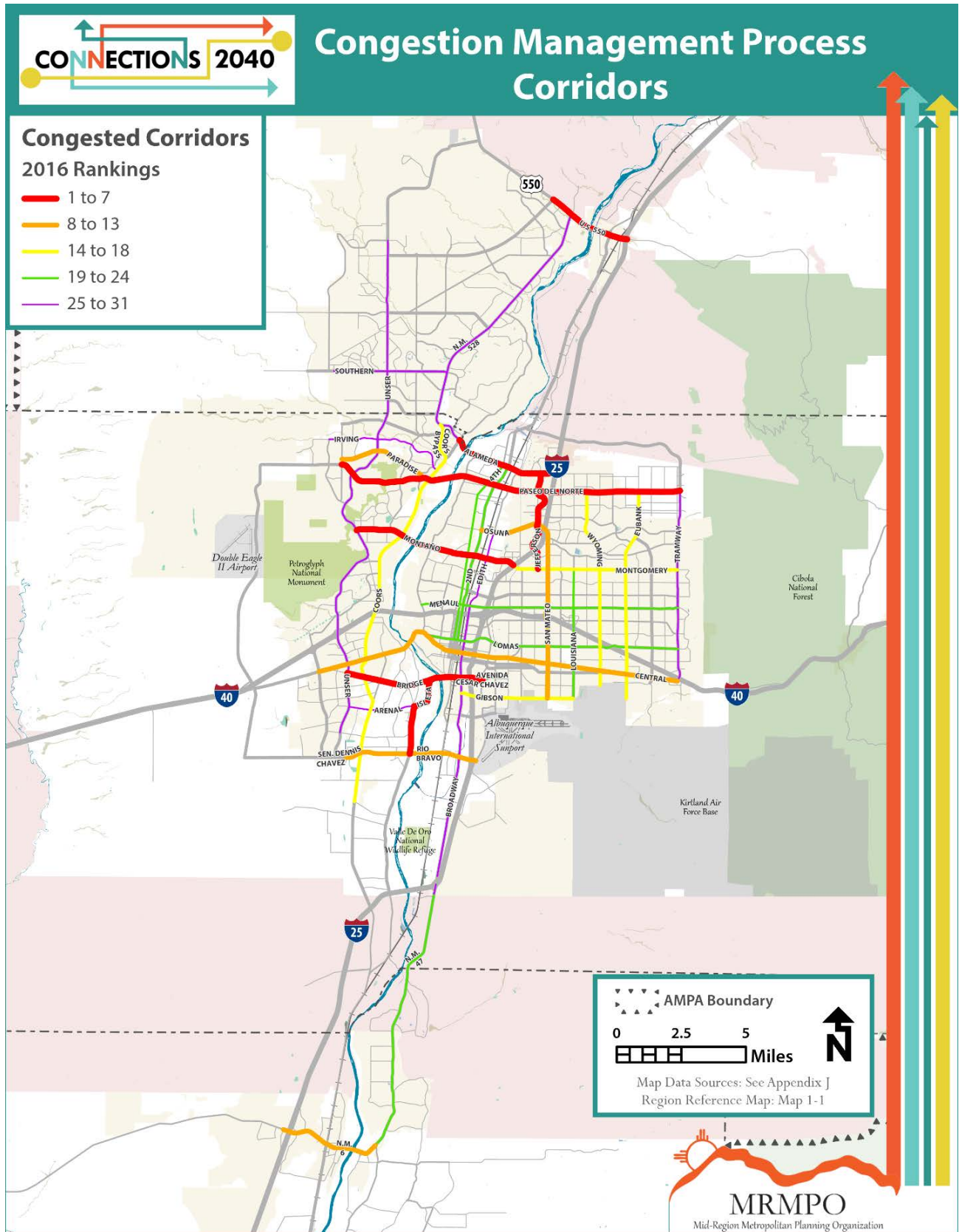
Operations and maintenance strategies such as traffic signal optimization or installation of adaptive traffic signals can be effective for both types of congestion by improving the flow of traffic and increasing speeds, effectively adding capacity by moving more vehicles in the same amount of roadway space.¹²

Table 4-6: CMP Corridor Rankings, 2016

RANK	RTE	V/C Points	Speed Points	Crash Points	Total
1	ALAMEDA BLVD.	67.84	21.33	1.76	90.93
2	ISLETA BLVD.	58.37	22.07	9.40	89.83
3	BRIDGE/CESAR CHAVEZ	57.46	20.26	11.75	89.47
4	U.S. 550	53.21	20.23	6.71	80.16
5	MONTANO	40.22	23.48	11.57	75.28
6	PASEO DEL NORTE	39.02	14.07	12.86	65.95
7	JEFFERSON	24.23	29.71	10.25	64.19
8	RIO BRAVO/DENNIS CHAVEZ	21.21	22.77	14.10	58.08
9	PARADISE BLVD.	31.57	10.88	14.77	57.22
10	SAN MATEO	7.50	32.30	14.30	54.10
11	N.M. 6	9.73	35.01	6.71	51.46
12	CENTRAL	12.86	25.28	11.99	50.13
13	OSUNA	4.21	35.45	8.55	48.21
14	MONTGOMERY	8.64	20.74	16.04	45.42
15	COORS	11.42	18.42	15.21	45.04
16	WYOMING	3.92	25.42	12.09	41.42
17	GIBSON	13.52	17.51	9.40	40.44
18	EUBANK	10.34	18.52	11.11	39.97
19	2ND STREET	5.16	23.43	9.99	38.58
20	MENAU	4.07	21.70	9.76	35.53
21	LOMAS	0.22	26.11	7.88	34.21
22	4TH STREET	11.39	16.16	6.27	33.82
23	N.M. 47	25.86	5.35	2.35	33.56
24	LOUISIANA	1.58	17.74	13.43	32.75
25	UNSER BLVD.	13.26	5.81	10.82	29.89
26	BROADWAY/EDITH	5.63	15.43	7.83	28.89
27	N.M. 528	15.84	8.80	2.86	27.51
28	ARENAL	3.80	12.31	11.28	27.39
29	SOUTHERN BLVD.	10.53	13.27	2.69	26.49
30	TRAMWAY	10.86	8.26	5.44	24.56
31	IRVING	8.22	3.20	6.27	17.69
Sum of points by data input		591.70	591.03	295.44	1478.18
Portion of points by data input		40.0%	40.0%	20.0%	100.0%

¹² Much of the analysis regarding appropriate strategies and means of quantifying congestion occur with the direct input of the CMP Committee. The CMP Committee is comprised of technical experts from member agencies in the region who meet on a monthly basis to discuss regional approaches and strategies and coordinate efforts between agencies.

Map 4-9: CMP Network and Corridor Rankings



Congestion Management Approaches

Congestion management means identifying the most effective transportation improvements given the existing conditions and available options. A wide range of congestion management approaches may be called upon to address congestion. **The ongoing challenge for the CMP is to determine the effectiveness of different approaches and encourage local governments to implement congestion management techniques in appropriate locations.** Approaches to address roadway congestion and mobility in the region can be corridor specific or area/system-wide and can be summarized in the following broad categories:

- Peak Hour Spreading takes advantage of underutilized capacity through changes in work schedule or flexible schedules. This approach can have a great impact on our roadway congestion, yet it is sorely underutilized as a strategy.
- Travel Demand Management programs promote information and encouragement for use of alternatives to single occupancy vehicle travel.
- Incident Management includes handling traffic and incidents resulting from adverse weather conditions, special events, or high-speed crashes and improving both their reduction and management by way of detours and emergency response times.
- Roadway Maintenance includes asset management systems to monitor the condition of roads and bridges.
- Roadway Expansion includes adding capacity through lane restriping, widening projects to create additional lanes, roadway extensions, and the construction of new roadway facilities. These are captured in MRMPO's list of roadway expansion projects developed through the Transportation Improvement Program (TIP) with local agencies.
- Transportation Systems Management and Operations (TSM&O) offers relatively low-cost improvements to enhance the functionality of the existing roadway system. Examples of TSM&O include access management, signal timing optimization, and Intelligent Transportation Systems.

The approaches described in this chapter pertain to roadways and efficient roadway operations, however these should be considered just one part of a comprehensive and multi-modal approach to reduce roadway congestion and improve system reliability. Applications that pertain to non-motorized modes of travel are emphasized in Chapter 5.

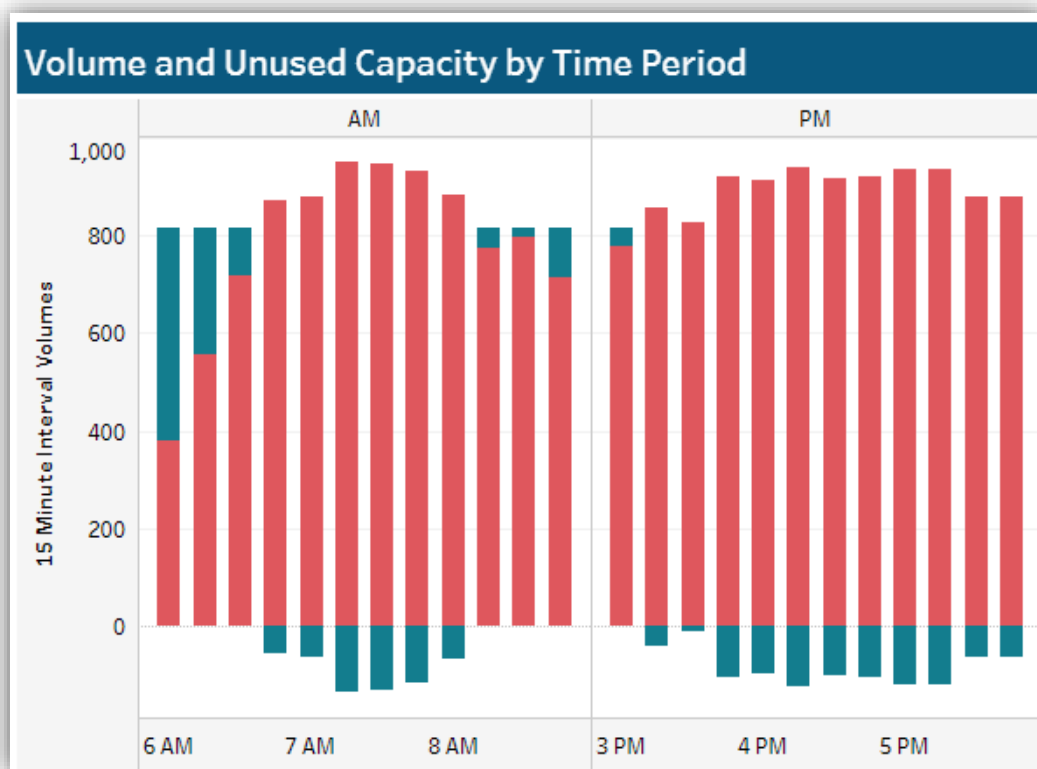
Maximizing Underutilized Capacity

Much of MRMPO's analysis of travel patterns traditionally focuses on the peak "one hour" of travel, the standard for traffic analysis. However, peak hour analysis causes us to miss the opportunity to identify additional roadway capacity over a broader timeframe such as the three-hour peak period. Peak period analysis allows for a more precise evaluation of when the roadway is above, below, or approaching capacity within this interval of time. One method that is a no cost approach to optimizing existing roadways is flexible work schedules that serve to alleviate peak hour congestion.

Peak Hour Spreading and Flexible Schedules

This type of analysis reflects the phenomenon called "peak hour spreading." **There is clearly an opportunity to take advantage of additional roadway capacity without having to physically expand the roadway by encouraging flexibility among employers related to work hours.** Often, and on certain corridors where it is advantageous, these "tails" of the three-hour peak period contain a significant degree of additional capacity. If travel patterns can be shifted or offset sometimes by as little as 15 minutes to ½ hour, additional capacity – without having to expand the roadway – can be easily achieved.

Figure 4-10: Alameda Blvd River Crossing Peak Period



Note: Volume (demand) is shown in red and the available capacity is shown in blue for each 15' increment.

Travel Demand Management (TDM)

Travel demand management (TDM) provides a complementary approach to addressing the functionality of the region's roadways by reducing the demand for vehicle travel in the first place. More specifically, TDM focuses on modifications in travel behavior through a range of strategies and incentive programs designed to take trips off the roads, reduce the length of trips, and shift trips to other times of day and alternative modes. **The more viable transportation choices that are offered, the more likely people will choose alternatives to driving alone, particularly for shorter trips.** The challenge lies in creating and ensuring such options exist, in part through investments in transit, bicycle, and pedestrian infrastructure. Physical infrastructure strategies that support TDM efforts include the provision of High Occupancy Vehicle (HOV) lanes, High Occupancy Toll (HOT) lanes, and parking management strategies that reduce excess parking in some cases and maximize parking efficiency in others. Regions across the country are creating innovative public and private sector partnerships, introducing incentives, and taking advantage of changing travel preferences. While there are some modest efforts already in place in the region, there is much more that can be done.

TDM Partnerships

While TDM programs can be applied at a regional or district level (such as a downtown), many take place in individual businesses or among groups of employers located in places where congestion is particularly problematic.¹³ Often, private sector participation is accomplished through partnership with a government agency. Program formats vary and can include providing employees with incentives to carpool or commute via transit or bicycle, reduced (subsidized) transit fares, or offering flexible schedules that avoid congested times and reduce the number of peak-hour commuters.

Two agencies, the City of Albuquerque's ABQ RIDE and the Rio Metro Regional Transit District, are primarily engaged in TDM efforts in the region. These TDM efforts have evolved in ways that lend themselves to greater cooperation. *Smart Business Partners* receive recognition on transit vehicle displays, agency websites, and promotional materials. They are also eligible for discounted passes and advertising. **Rio Metro has engaged over 90 businesses and agencies representing 84,000 employees and 30,000 students through this program.** One of the most important aspects of the *Smart Business Partnership* is that it allows partners to consider both transit *and* non-transit related TDM strategies. Similarly, ABQ RIDE also offers the *Guaranteed Ride Home* program—a form of insurance to non-single-occupancy-vehicle commuters (regardless of mode) if an unscheduled meeting or emergency leaves them unable to use their regular means of alternative transportation to get to their destination.

The Smart Business Partnership

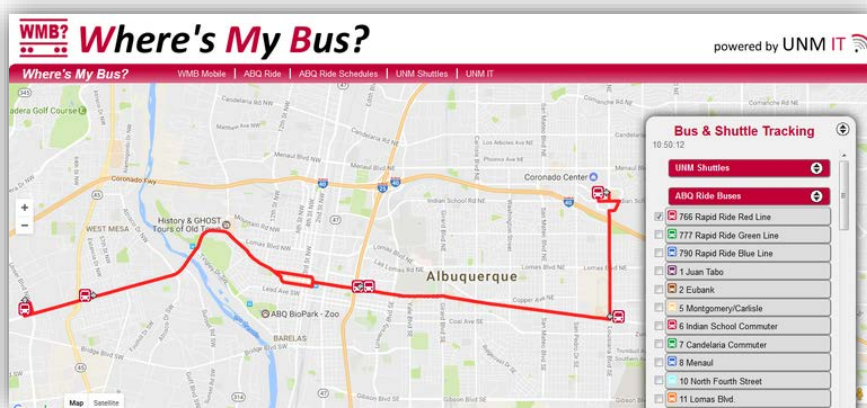
The Smart Business Partnership is one of the primary TDM programs that both ABQ RIDE and Rio Metro employ. Partners are encouraged to provide alternatives to single-occupancy vehicle travel by:

- Allowing alternative work schedules (such as telecommuting and flexible schedules)
- Subsidizing bus and rail passes
- Promoting the federal commuter tax benefits
- Installing/constructing improvements such as carpool spaces and bike racks and lockers
- Operating shuttles or vanpools or providing fleet vehicles
- Advertising and promoting transit and other alternative modes to access work

New Technology

Technology initiatives are also an important aspect of TDM. In 2016, Rio Metro introduced a mobile app for the Rail Runner that includes ticketing, scheduling, and rider alerts. ABQ RIDE's *Where's My Bus* website and corresponding iPhone and Android app are also examples of TDM funded technology solutions that make trip planning more predictable and the transit system more understandable.

Figure 4-11: Where's My Bus?



¹³ Washington state law requires urban areas with traffic congestion to reduce single-occupancy vehicle travel and regional VMT by developing travel demand management programs.

Incident Management Plan (IMP)

Transportation agencies within the Albuquerque Metropolitan Planning Area (AMPA) have long recognized the need for a coordinated Incident Management Plan (IMP) that includes strategies, both single and multi-agency to address disruptions in traffic flow resulting from crashes, adverse weather conditions, special events, secondary crashes, and reduce the incident response and clearance times.

Local statistics from NMDOT have shown that for every one minute a lane is closed there is a resulting six minutes of delay. Further, the likelihood of secondary crashes (crashes resulting from the initial crash) increases by 2.8 percent for each minute the primary incident continues to be a hazard.¹⁴

Significant events often result in lane closures and backups. The resulting detoured traffic relies on adjacent arterials that are not necessarily prepared to handle the additional traffic, thus causing tremendous disruptions in flow. With numbers like these it is easy to see that closures of any duration can have huge consequences with added congestion and traveler delay, reduced safety with impeded first responders, loss of productivity, and increased risk of secondary crashes.

Collaboration Among Stakeholders

The optimal IMP involves collaboration among all stakeholders of the roadway system including transportation agencies, first responders, the towing industry, and those involved in managing roadway operations. Though agency management and operators are often quite responsive to each other's needs, no formalized system or protocol has ever existed in the region. Further exacerbating the disruptive impacts of incidents is the fact that there are no redundant freeway systems, and, in most cases, the arterials serve as *de facto* alternative routing. The current communications platform for traffic management, NMRoads.com, is not enough. In addition, and not helping matters, is that the region has relied on plans from each agency which are not coordinated with each other.

New Regional Incident Management Plan

Fortunately, the current TIP includes a multi-agency incident management project that is managed by the MRMPO staff involving key transportation infrastructure owners and operators. The plan, due to be completed at the time of approval of this document, will establish a fully integrated IMP comprised of the critical transportation entities and incident responders, and will include well-vetted event driven response protocol.

Figure 4-12: NMROADS.COM Interface



¹⁴ USDOT FHWA Traffic Incident Management Performance Measures Final Report, FHWA-HOP-10-009

The IMP will also include the identification of critical gaps in both infrastructure and coordination, with different scenarios for recurring and non-recurring events having “significant impact” defined in terms of duration, queue-length, severity, or a combination thereof. Goals and functional needs will be established, and roles and responsibilities will be identified for each of the responsible operators and managers of the system. State-of-the-art strategies for transportation management that rely on existing and emerging data collection and shared communications practices will be developed. This will provide a template to guide a roadway operator’s coordinated, timely, and efficient response to roadway events, as well as provide travelers with adequate situational information that will assist in their travel decisions.

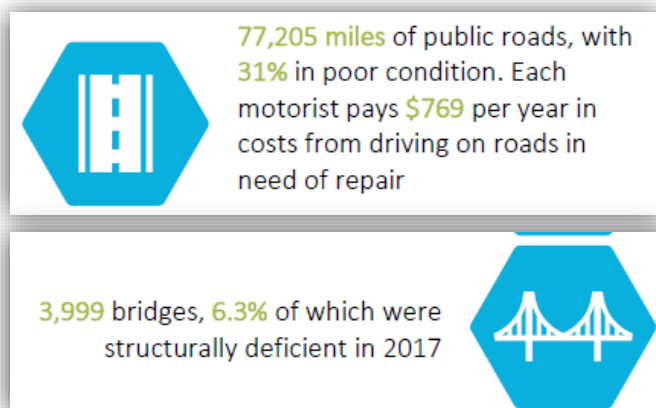
e. Roadway Maintenance

Roadways play a crucial role in economic development because they provide access to employment, health, education, recreation, and social services. Poorly maintained infrastructure increases costs, and deferring maintenance escalates the costs and risks associated with an aging transportation network. Investment in maintenance of transportation infrastructure now lowers the future cost of repair or replacement.

For the region to remain competitive in the national and global economy, it is essential that maintenance is prioritized above projects that add capacity to the network.

The Federal Highway Administration projects that for every dollar spent on roadway infrastructure maintenance there is a return of \$5.20 in the form of lower vehicle repair costs, decreased delays, reduced fuel consumption, improved safety, lower long-term road and bridge maintenance costs, and reduced vehicle emissions due to improved traffic flow.¹⁵ The following chart illustrates an increased emphasis toward maintaining the region’s existing roadway infrastructure and transit investment when it comes to programming transportation funds.

Figure 4-13: Key Facts about NM’s Infrastructure



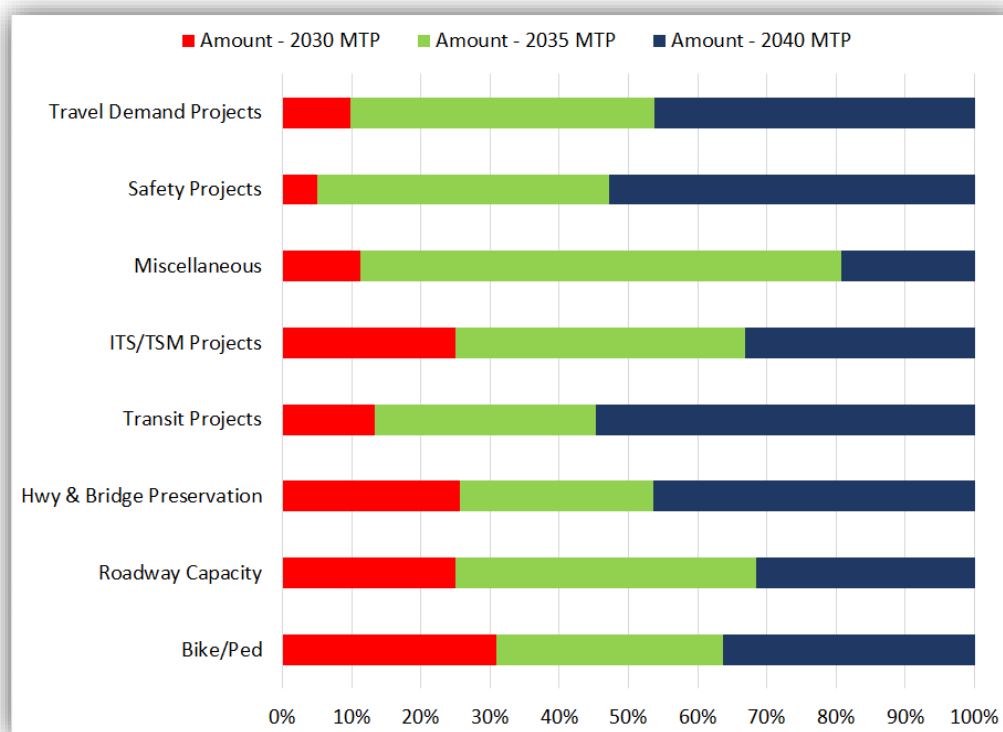
Asset Management Plans

The FAST Act emphasizes the inventory of infrastructure and maintenance costs through the lens of performance-based planning. Specifically, State DOTs are now required to produce and maintain a Transportation Asset Management Plan (TAMP) that includes:

1. Inventories of pavement and bridge conditions.
2. Identification of management objectives and measures.
3. Financial and investment strategies to address deficiencies across the system and sustain a desired state of good repair.

¹⁵ 2017 Infrastructure Report Card, 2017, www.infrastructurereportcard.org/.

Figure 4-14: Types of Capital Investment in the Most Recent MTPs



Categories include good, fair, and poor for both pavement and bridges. The NMDOT has developed the baseline assessment of conditions to meet the FAST Act requirements. Included are established performance two year and four year “targets” to help guide life cycle planning and programming decisions that ensure monies are used wisely and the roadway infrastructure is maintained in a state of good repair. MRMPO is subject to the four-year targets. The assessment relies on the International Roughness Index (IRI) to assess such items as pavement ride quality, surface cracking, and pavement structure into a composite measure, which is the standardized methodology for monitoring conditions across all agencies. The IRI also includes an assessment of future conditions and the identification of construction practices and design procedures to ensure reliable pavement and bridge performance. Because this is a new methodology established by the NMDOT, MRMPO cannot compare this assessment with historic data from past MTPs. **However, this comprehensive database allows MRMPO to summarize all pavement condition for all roadways within its boundaries in a single database with a common baseline that will support future assessment.**

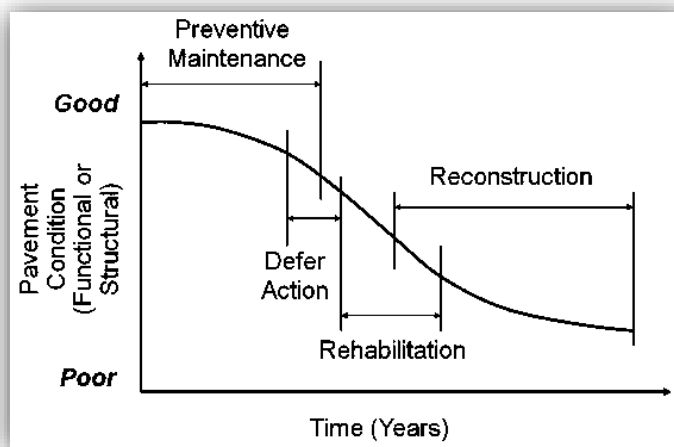
NMDOT Data Collection

Although the FAST Act specifies that TAMPs involve at a minimum the interstates and the National Highway System (NHS), the NMDOT took this opportunity to collect condition data on the entire roadway transportation system including the remainder of non-NHS roadways for the year 2016. This dataset is ideal for a regional assessment as it presents a uniform and consistent methodology across all jurisdictional boundaries. It is with this dataset that MRMPO is assessing pavement and bridge condition in the region. MRMPO will play a key coordinating role to involve all member agencies to ensure that all roadways and bridges are included in this ongoing endeavor, and will continue working with the NMDOT, member agencies, and the Project Prioritization Process to integrate asset management and life cycle performance targets into local project selection and programming.

Pavement and Bridge Conditions

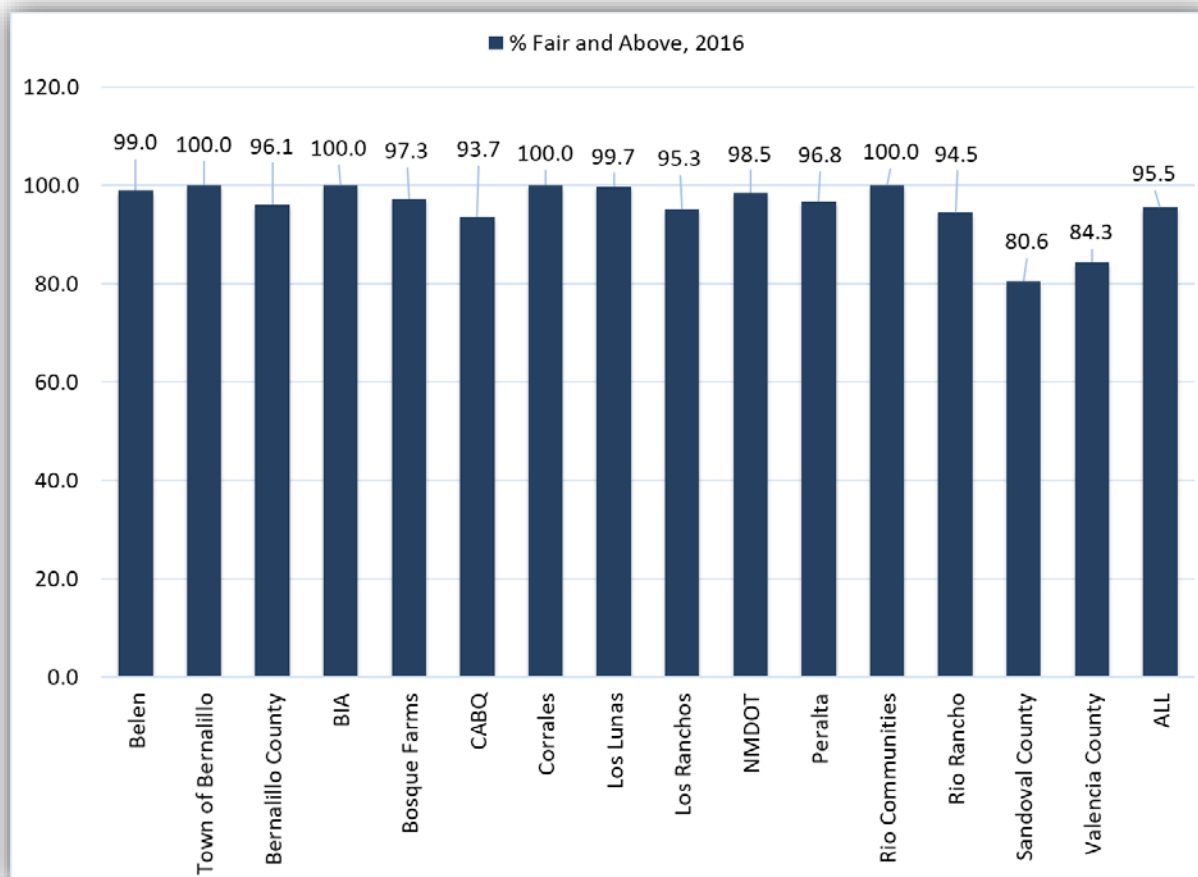
According to the American Society of Civil Engineering's *Report Card on America's Infrastructure*, one-third of all roadways in America are in poor to mediocre condition, and more than a quarter of all bridges are either structurally deficient or functionally obsolete. System preservation among MRMPO agencies is a high regional priority, even with a vast majority of roadway mileage (95.5 percent) reported to be in "Fair" condition or better. Asset management includes bridge infrastructure and relies on the National Bridge Inventory (NBI) standards on bridge deck, superstructure, and substructure condition. New legislation requires that no more than 10 percent of the total bridge deck area on NHS routes be structurally deficient. MRMPO is using the NMDOT's data collection efforts to summarize all bridge ratings on the roadway system (the NMDOT Bridge Section has the responsibility of maintaining bridges for the entire state of New Mexico).

Figure 4-15: Typical Pavement Preservation Curve



Source: Southern Slurry and Micro Surfacing Inc.

Figure 4-16: Local Conditions based on NMDOT Bridge and Pavement Management System



Per the NMDOT's Asset Management database, the percentage of bridge structures in the region that are ranked as structurally sufficient is 98.1 percent, and less than two percent of bridges are rated as either in need of rehabilitation or need replacement entirely.

Local Agency Management

Agency pavement management systems are established within respective public works departments to monitor conditions and ensure that timely maintenance treatments can be deployed to avoid roadway deterioration. The standard pavement life-cycle curve indicates how maintenance enhances the performance as well as lifespan of roads. Deferring roadway maintenance often leads to greater long-term costs, while preventive treatments are almost always cheaper than reconstructing a road. Agencies within the region are varied in the process of refining their respective pavement management systems, however, performance condition targets will be established by the NMDOT for monitoring purposes, and effort is currently being made by MRMPO to develop a coordinated methodology among its member agencies.

f. Roadway Expansion

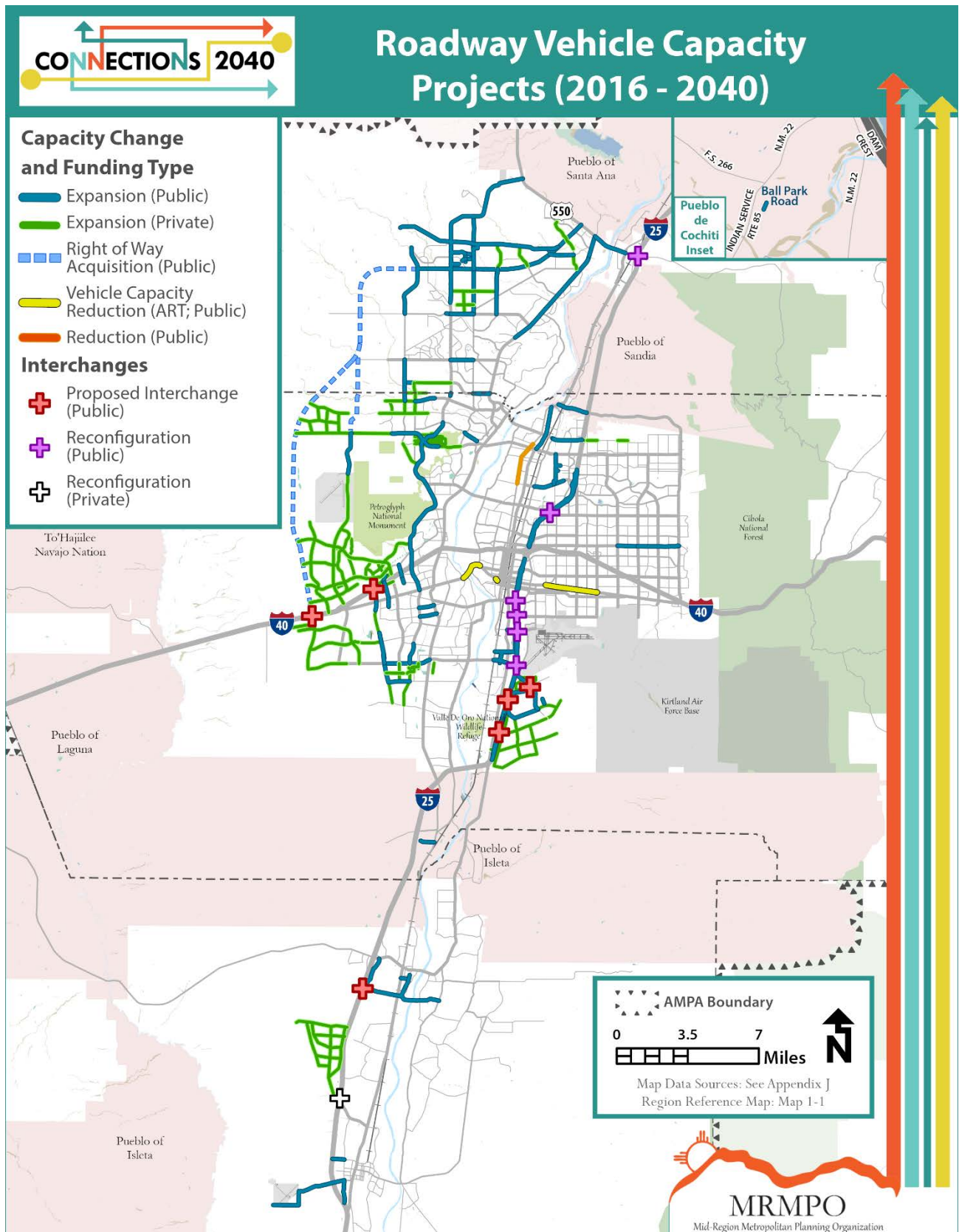
Because growth will continue to outpace the amount of roadway expansion that can be funded and built under the region's fiscally constrained transportation program, there is no practical way the region can build its way out of congestion by adding roadway network. However, adding new roadways or expanding capacity on existing facilities is appropriate in growing areas, such as Rio Rancho, that require new infrastructure to serve them. By 2040, there will be several new communities to accommodate growth, and current bottlenecks on the existing system will worsen in the future growth scenarios, necessitating network expansion and widening in targeted locations. Project proposals that involve increasing roadway capacity and network expansion should be evaluated and prioritized based on whether it fills an identified gap in the overall transportation system. By making calculated connections, we ensure greater returns on our investment toward improving regional mobility by creating a complete transportation network and maximizing the efficiency of existing facilities.

The network expansion projects contained within the lifespan of this MTP can be evaluated through the number of total lane miles. Under the current fiscal and programming constraints the roadway network increases by a total of nine percent by 2040. Roadway expansion projects programmed in the MTP, including new facilities, the expansion of existing facilities, and privately funded roadways for larger master-planned developments are provided in the following map (a full list of projects can be found in Appendix A.). Following that, is a map of the Long Range Roadway System, which shows how the roadway network should develop over time and beyond the 2040 horizon. It is an aspirational map intended to help highlight gaps that should be filled over time.

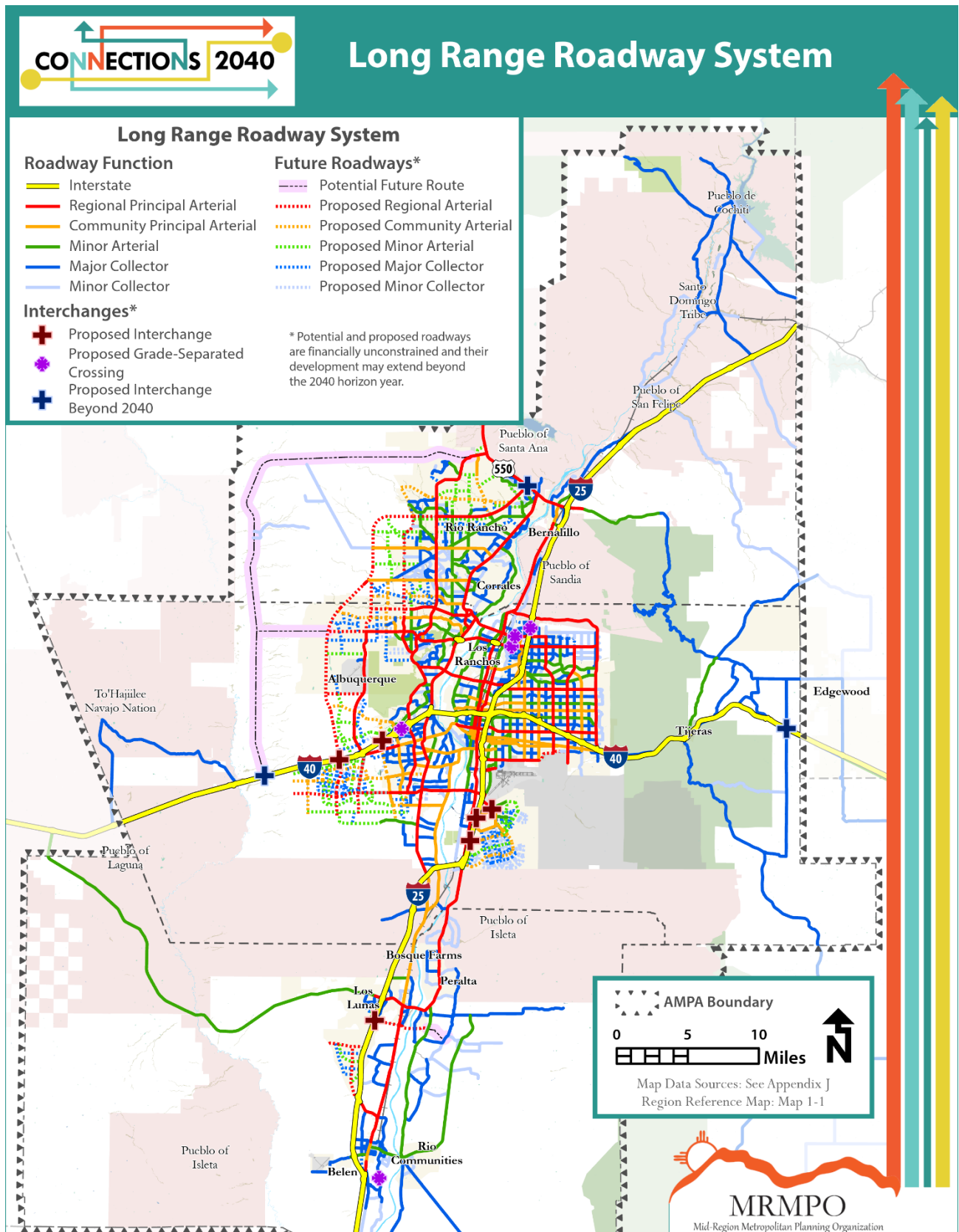
Table 4-7: Roadway Network Lane Miles

Network Expansion	2016	2040	Percent Increase (2016 - 2040)
Network Lane Miles	4,337	4,737	9%
Population	890,559	1,088,619	22%

Map 4-10: Roadway Vehicle Capacity Projects included in the *Connections 2040 MTP*



Map 4-11: Long Range Roadway System (LRRS)



g. Transportation Systems Management and Operations (TSMO)

TSMO is a set of integrated strategies that focus on operational improvements that help to restore and improve the performance of the existing transportation system and should be investigated before committing to the high cost of roadway widening. Many factors contribute to smooth, reliable, and safe traffic flow on existing facilities, including multi-agency coordination and operations strategies such as coordinated management of arterials through corridor analyses, work zones, real time roadway conditions and traveler information, and incident management. These strategies offer network efficiency improvements oftentimes at much lower cost than the alternatives.

Intelligent Transportation Systems (ITS)

One of the most effective and widely used TSMO strategies is Intelligent Transportation Systems, or ITS, which entails a range of advanced technologies to assist roadway operations staff, enhance driver decision making, and improve the flow of travel. The primary benefits of ITS include improved traveler information, improved roadway operations safety, a more efficient use of existing roadway capacity, and smoothed traffic flow. ITS efficiency improvements are particularly significant because they actively manage and improve a driver's "situational awareness" of conditions "downstream," and thus allow greater throughput travel which effectively adds capacity to the system without building new roads or adding new travel lanes.

Integration with the TIP

The ITS Subcommittee has established a role in the review of TIP projects and sometimes the formulation of ITS projects needed in the region. Any project seeking to utilize federal transportation funds that includes ITS elements or connects with other federally funded ITS projects must be consistent with, and included in, the ITS Architecture. The Subcommittee works closely with the Congestion Management Process Committee to apply technical insight on congested corridors with a strong focus on multi-agency and multi-modal operations. This approach to project programming reduces hurdles sometimes caused by cross-jurisdictional coordination and encourages a focus on traffic management and operations. ITS applications employed vary in function and are designed to satisfy specific user needs identified by member agency stakeholders.

All projects submitted for the TIP and MTP are evaluated to determine if they include ITS elements, which are then mapped to the appropriate ITS Services. This step ensures integration between projects in the TIP and MTP. All ITS project deployment activity including ITS specific projects, or other projects that simply include ITS elements, must follow a Systems Engineering process in order to be certified by the NMDOT and Federal Highway Administration.

AMPA Regional ITS Architecture

The *AMPA Regional ITS Architecture* serves as a guiding document and is required of each region by the federal government. This document supports coordinated efforts among various regional stakeholders by outlining regional needs and creating a framework from which to plan, design, deploy, operate, and maintain ITS. This document is updated periodically as part of an ongoing "maintenance plan" (the current version was finalized in 2016) and includes current ITS needs and services. The ITS Subcommittee supports this document and is comprised of planning, engineering, and operational representatives from public sector agencies to promote and coordinate ITS deployment in the region and to manage and maintain the *AMPA's Regional ITS Architecture*. Periodic updates ensure that the document remains current with regional and agency projects and priorities, as well as with the National ITS Architecture Standards.

Systems Engineering for ITS involves an approach that focuses on agency and system needs, and includes advanced technology and communications-enabled roadway operational management strategies. To assist member governments in meeting this requirement, MRMPO, along with the NMDOT ITS Bureau and Federal Highway Administration, have developed online training resources available through the MRCOG and NMDOT websites.

ITS Corridors

The Intelligent Transportation Systems Corridors map identifies specific ITS corridors planned for deployment, making the information accessible to planning and development review communities. This approach has proven effective in broadening awareness of ITS planning in the region by identifying implementation opportunities for a broader range of transportation projects. The ITS Subcommittee further identifies a subset of ITS Priority Corridors that support detailed ITS project development. The following map shows these distinctions. In addition, an evaluation matrix with ITS criteria was developed to rank the need on each corridor based for the most viable and/or highest value ITS Services. The prioritized corridors are consistent with the CMP and provide additional focus on improvements to critical travel corridors already identified within the region.

ITS Real-Time Services

The constant real-time monitoring of roadway conditions and operational management is done either passively (using roadside detection), or actively (by roadway operator staff in management centers). This allows staff the ability to display messages and/or alerts on overhead message boards, adjust traffic signal timing for optimal flow, coordinate with agencies and first responders, and provide enhanced information such as travel time, hazardous conditions, or other contributors to congestion. Often an alert is made far enough in advance so that travelers have time to divert to a different route and avoid the congested area entirely.

Essential ITS Services

The primary components of the *ITS Architecture* are referred to as ITS Services. These services are integral to maintaining a safe and smoothly flowing transportation system. Those currently deployed or being considered by member agencies are provided in the following table.

Regional Transportation Management Center

A Regional Transportation Management Center (RTMC) is in the final stages of development in the region, and it will be the first in the region to house multiple-agency transportation operations in a single co-located facility providing real-time monitoring. The center will consolidate monitoring and transportation management activities across jurisdictional boundaries, including:

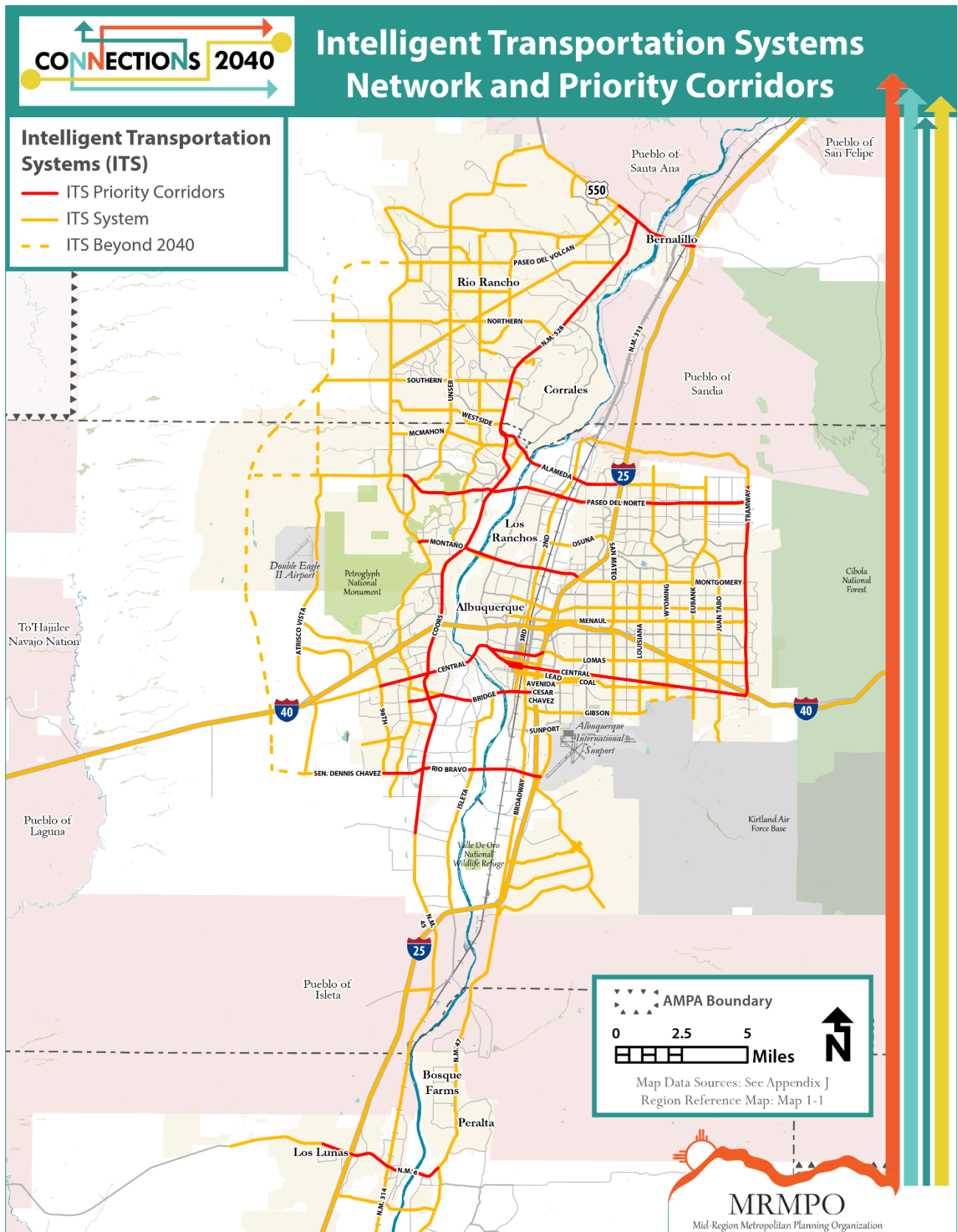
- A single-room video wall comprised of Closed-Circuit Televisions (CCTVs) for shared viewing and monitoring of roadway conditions among all agency staff
- Coordinated reporting of speeds and travel times during peak travel periods
- Coordination of emergency response for traffic incidents or other hazards
- Reporting of hazardous travel conditions such as inclement weather, crashes, or construction-ahead notifications

The benefits are anticipated to be substantial. For example, roadway incidents are one of the greatest contributors to congestion in the AMPA. A Regional TMC that integrates all agencies' roadway monitoring and responses with CCTVs, Dynamic Message Signs (DMS), other monitoring efforts, and the NMDOT's HELP Courtesy Patrols, can shorten response times by as much as 25 percent on the interstates.

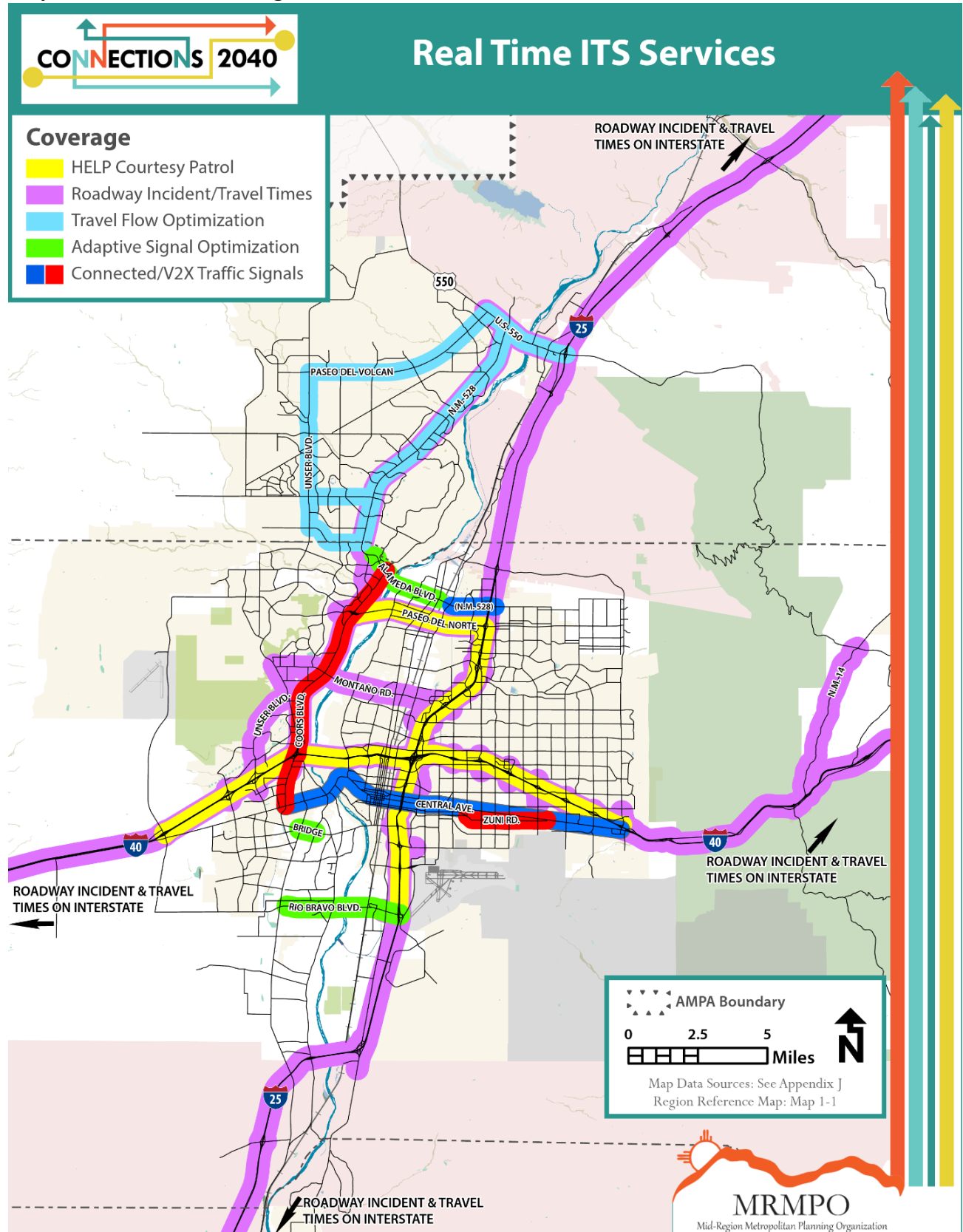
Table 4-8: Primary ITS Services

ITS Services Deployed and being Considered in the AMPA
Traveler information services provide real-time information on traffic conditions and travel times to motorists on roadways and to transit users on upcoming arrival times. These strategies help to improve traveler decision-making by providing information such as downstream congestion, incidents, travel times, next-bus arrival times, and cautionary alerts from adverse weather conditions. This information is made available to roadside devices, websites, or mobile apps.
Network surveillance systems are those that monitor traffic, transit, and roadway conditions and convey information ranging from travel conditions and alerts for travelers, to system status and performance for managing agencies. Devices include visual tools such as closed-circuit television (CCTV), but also include passive data collection devices like traffic sensors using microwave, inductive micro loops, Wi-Fi, or Bluetooth frequency from mobile devices.
Advanced transportation management and arterial operations systems focus directly on roadway and signal control to improve traffic operations in real time. Typically focused at locations where disruptions may be greatest, they generally result in improved safety and flow.
Regional/local transportation and transit management/dispatch centers bring together many ITS services in one facility to coordinate responses to through adjustments in signal timing, issuing traveler information, and communications with emergency responders. Operated either as a single agency facility, or a facility shared by multiple agencies in the region, they promote data sharing and the coordination of response. Data archiving efforts are also an important step in the ITS planning for operations process and can be streamlined through regional transportation management centers.
Incident and emergency management improves roadway operations by connecting dispatch with network surveillance and traveler information systems to reduce response times and ensure that the correct equipment can be dispatched based on actual needs and conditions.
Roadside weather information provides valuable alerts to travelers on the environmental conditions that affect the roadway surface and driving conditions. Information on ambient conditions such as visibility, temperature, wind, and precipitation, as well as road-surface conditions such as ice, moisture, and/or flooding are disseminated via traveler information and roadway maintenance services.
Public transportation operations and management benefits from ITS deployment through services that provide real-time monitoring of transit vehicle operations and dispatch services, trip planning information, and real time bus location/arrival time that is immediately available to the user via mobile apps. Transit station security is also supported via the deployment and remote monitoring of surveillance cameras at transit stations.
Commercial vehicle/freight management relies on ITS to ensure efficient movement of truck freight. According to the New Mexico Trucking Association, the traveler information ITS service that alerts truck drivers of hazardous conditions downstream has proven essential to the efficient and safe operation of freight within the AMPA and the State. Further, Automated Vehicle Inspections (AVI) reduces delays with passive inspection-station certification capabilities that allow responder-equipped freight traffic to enter the state and not be subject to costly inspection stops. In effect, a “bypass” of these stations is allowed while adhering to necessary permitting requirements.
Work zone/construction management serves to minimize the impacts of construction zones by alerting travelers of anticipated delays, detouring, and other cautionary actions needed to avoid hazards in the construction zone.

Map 4-12: ITS Corridors in the AMPA



Map 4-13: Network Coverage of “Real Time” ITS Traveler Information Services



Seamless Travel Management

Member agencies are continually expanding the deployment of crucial TSMO ITS strategies such as real-time adaptive signal control, Bluetooth and Wi-Fi enabled traffic operations monitoring, and up-to-the-minute traveler information. The collective result of these coordinated efforts are the beginnings of a network of seamless travel management that is already providing many benefits to travelers. All of these efforts are crucial to serve the needs of a growing region, and it will be imperative for local entities to continue to coordinate operational management strategies. As the previously identified ITS Services are employed by local agencies, they are laying the formative groundwork for an integrated deployment that will support advances in

vehicle and infrastructure technologies as we enter an age of Connected and Automated Vehicles (explained further in the next section). Advances in communications and sensors deployed in transportation infrastructure continue to offer huge operational, safety, and quality of life enhancements to the users of the system.

ITS Corridors

The number of corridors that provide real-time ITS Services such as travel alerts, courtesy patrols, advanced operations, and optimized flow management at signals has increased nearly 17 percent since 2015 to total of over 350 directional freeway and arterial centerline miles. Further, the number of vehicles traveling on corridors with ITS Services has increased by over 42 percent.

Table 4-9: VMT and Centerline Miles on ITS Corridors with Real-Time Operations

	2012	2018	Percentage Change
Centerline Miles	301.1	352.1	16.8%
VMT	7,586,443	10,779,224	42.1%

Federal Initiatives and Local Agency Implementation

Local agencies have long recognized the value of management and operational strategies. The USDOT has a set of initiatives and programs that provide guidance on innovative approaches to operational management. Standout programs for innovative ITS practices and effective operational strategies being pursued by local agencies include the Strategic Highway Research Program (SHRP2), Everyday Counts Program (EDC), and the National Operations Center of Excellence (NOCoe), which includes the Signal Performance and Timing (SPaT) Challenge.

The Strategic Highway Research Program (SHRP2)

SHRP2 has been in existence since 2006. It was born out a previous federal transportation bill to create a set of area-specific committees to develop policy guidance in the areas of improved safety, highway renewal, improved reliability, and reduced congestion – all geared toward an improved quality of life. Over 60 products have been developed in SHRP2. A notable example of local agency efforts includes the National Traffic Incident Management Responder Training Program (Train the Trainer), which focuses on more effective and faster incident clearance strategies to improve safety and reduce delays resulting from this non-reoccurring congestion.

This program brings law enforcement, fire and rescue, towing and recovery, EMS medical personnel, transportation public works maintenance/operations/planning, and other disciplines together to engage in hands on and interactive incident resolution exercises. This program has been embraced by the NMDOT, is supported by ITS New Mexico, and has been used for training first responder personnel in New Mexico. SHRP2 has also been adopted by the New Mexico Law Enforcement Academy and the New Mexico Fire Training Academy for accreditation. To date, over 1,100 personnel have become certified through the program.

Everyday Counts (EDC)

EDC is a state-based model that promotes the deployment of proven and typically underutilized strategies for improved transportation operation and project delivery. The primary areas of focus are shortened project delivery times, enhanced roadway safety, reduction in traffic congestion, and the integration of automation in transportation. Noteworthy elements supported locally in the AMPA include:

- Adaptive Signal Control (ASC) – Bernalillo County and NMDOT have deployed ASC on several corridors.
- Smarter Work Zones – NMDOT local project-based deployment and a statewide policy is being considered.
- Automated Traffic Signal Performance Measures (ATSPMs) – City of Albuquerque has numerous corridors existing and several are planned.
- Road Weather Management/Weather Savvy Roads - NMDOT ITS and District 3
- Traffic Incident Management – The use of low cost off the shelf technologies for strategies included in the TSM&O/ITS toolbox.
- Crowdsourcing for Operations – The use of mobile-sourced data for operations management is being evaluated by the NMDOT ITS bureau.
- Weather Responsive Management Strategies – Integrated into the NMDOT ITS operations and 511 Road Closure information.

Real Time System Management Information Program (RTSMIP)

The Real Time System Management Information Program (RTSMIP) requires ITS investments on the interstates to provide real-time traffic monitoring and traveler alerts of roadway conditions to improve roadway operations and safety. The NMDOT has met this requirement and has fully deployed RTSMIP on interstates and some state-owned roadways using a combination of travel time data collection, CCTVs, RWIS weather stations, 511 traveler information telephone service, dynamic message signs (DMS), courtesy patrols, and the NMRoads.com traveler information website and mobile app. This traffic management environment is utilized not only by travelers, but also law-enforcement and fire and rescue to incorporate dispatch communications and access to CCTV images. It is critical to note that this requirement is forthcoming for select non-interstate roadways once the Albuquerque Metropolitan Statistical Area (MSA) population reaches one million (the Albuquerque MSA is expected to meet this threshold within the mid-term year of this plan). The interstates are already in full compliance, and this game-changing innovation forms the core of the regional ITS system and will serve the anticipated expansion of this service to the select arterial roadways, resulting in a further integrated ITS systems in the region.

National Operations Center of Excellence, NOCoE

NOCoE is a collective of national transportation entities including the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Traffic Engineers (ITS), ITS America (ITSA), and the National Highway Traffic Safety department under USDOT working through the USDOT's Vehicle to Infrastructure Deployment Coalition (V2I DC). This consortium is interested in advancing new and innovative ways to improve traffic flow and safety using state of the art technologies including communications, vehicle sensors, and advanced signalization infrastructure. As shown in the CMP, many of our corridors experience congestion due to gaps in advanced infrastructure deployment or management practices.

Signal Phasing and Timing (SPaT) Challenge

NOCoE in coordination with the USDOT has put forth a federal initiative called the "SPaT Challenge." The purpose is to support transportation infrastructure owners and operators in the deployment of roadside Dedicated Short Range Communications (DSRC) 5.9 Ghz broadcast radio infrastructure to transmit signal phase and timing (SPaT) data in real-time at signalized intersections. Data include location, speed, and critical operational information of the vehicles, and will support safer and more efficient roadway operations. The communications and messaging take place both "in-vehicle" with messages and alerts directly to the driver, as well as in the actual operations of the vehicle as the roadside sensors communicate with the vehicle sensors to share data such as approach speed, proximity of other vehicles, and other real-time driving conditions. The initiative is in anticipation of the inclusion of these technologies and capabilities in most new vehicles sold within the next several years. This effort is of interest for our members agencies in their role in building and maintaining the transportation infrastructure needed to support the new and emerging advances in smart transportation.

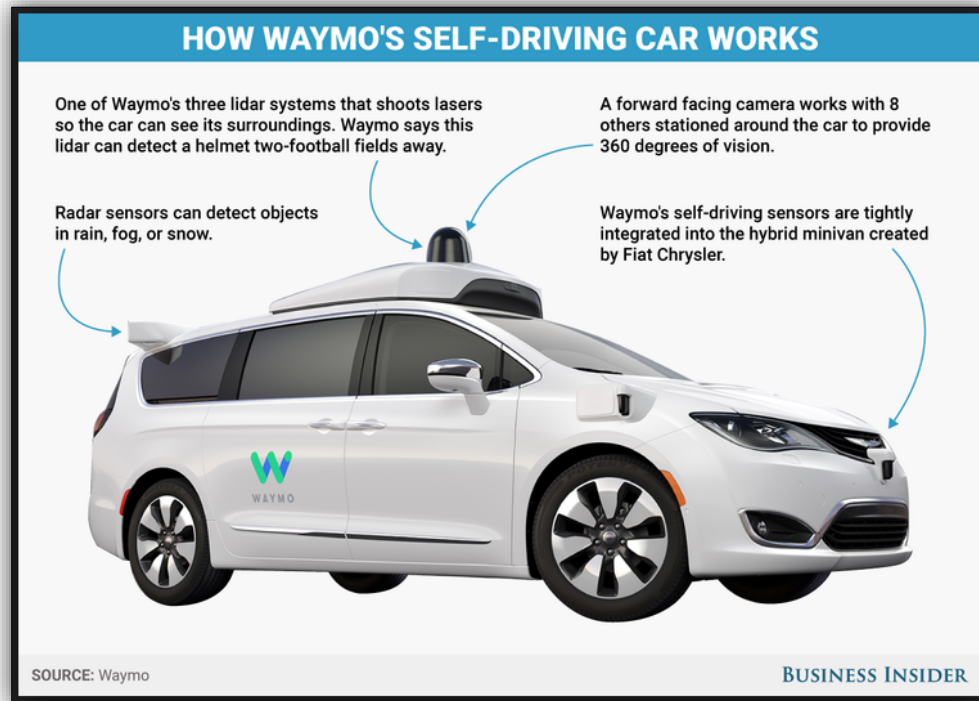
Local SPaT Undertaking along NM 528 and Lead/Coal/Zuni

The SPaT Challenge has been undertaken in the AMPA by the NMDOT in coordination with the City of Rio Rancho along the NM 528 corridor to include up to 18 signals. The details of the project are in development but anticipated to be deployed shortly after this plan is approved. Further SPaT deployment is being undertaken by the City of Albuquerque on Lead/Coal/Zuni with a study that will be underway in the forthcoming year. SPaT corridors are anticipated to support several V2I (explained in the next section) connected vehicle safety and operational applications and is initially envisioned to include features related to safety including lane departures, approaching pedestrian crosswalks, and red-light violations. Additionally, SPaT deployments will support the Mobile Accessible Pedestrian Signal System (PED-SIG) application on a mobile device, which helps visually and physically impaired pedestrians at crosswalks. Many other V2I connected vehicle applications may be developed and deployed locally. Examples of these applications include Signal Priority (transit, freight, other fleet vehicles), Emergency Vehicle Preemption (PRE-EMPT), and Probe-enabled Traffic Monitoring.

h. Connected and Automated Vehicles Technology (CAV)

Widely considered one of the most significant improvements in transportation history, the recent and evolving application of advanced technology (sensors and communications) will change mobility in ways that are just now being realized. Improvements in safety, roadway operations, and energy efficiency are already proving to be tremendous.¹⁶ Currently, the terms “Connected Vehicles” and “Automated Vehicles” refer to the varying levels of advanced vehicle sensing with capabilities to “talk” outside of the car to infrastructure, other cars, and the internet.

Figure 4-17: How a Self-Driving Car Work



Though similar, there are important differences to note; Connected Vehicles enhance the driver's experience and capabilities with operational and driving environment information, and Automated Vehicles combine these enhancements with a move toward driverless operations. Recently, the USDOT identified the term CAV to combine both Connected and Automated Vehicles, however, we distinguish between them as they affect different aspects of transportation planning and operations.

Although the future will be heavily influenced by CAVs with what is considered by the US DOT as “Next Generation ITS,”¹⁷ some near-term obstacles must be overcome. The CAV uses wireless network and sensors to obtain relevant traffic information while driving control is enhanced with onboard sensors. The current state of the practice in advanced mobile communications includes 4G and 5G networks, Bluetooth, and WiFi; the new requirement for 5.9 GHz Dedicated Short Range Communications (DSRC) sets forth another platform that the innovation sector is addressing head on.

¹⁷ USDOT/ITS America Connected Vehicles Taskforce

¹⁷ USDOT/ITS America Connected Vehicles Taskforce

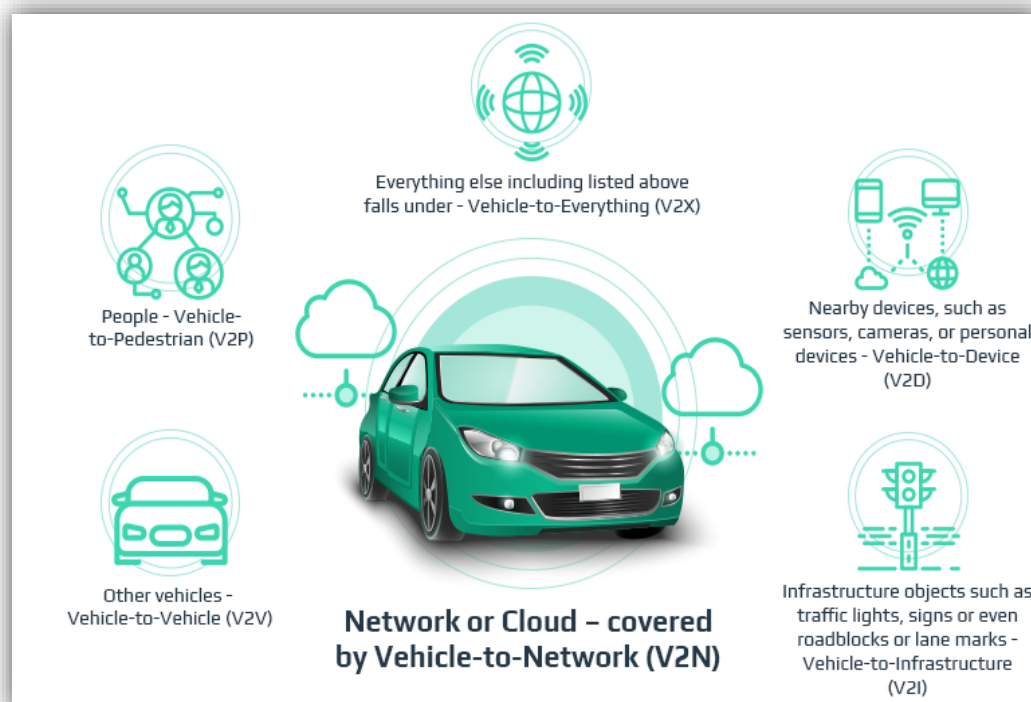
Recent pilot projects have identified that a combination of cellular and DSRC communications prove to offer a more effective approach since mobile communications are more widely adopted and offer a higher level of market penetration. This approach will help resource strapped local agencies more easily modernize the transportation network to take advantage of the safety and operational improvements that this “transformative” CAV infrastructure provides. A summary of what is on the horizon and some key challenges and opportunities we will face are presented in this section.

Vehicle to Everything Technology (V2X)

Nearly every auto manufacturer is offering Connected Vehicles (CVs) which are already beginning to improve travel flow and safety as well as transforming public agency operations. This new and emerging technology is called vehicle to vehicle (V2V), vehicle to infrastructure (V2I), and even Vehicle to Pedestrian (V2P), and is collectively referred to as vehicle to everything (V2X).

- V2V include cars themselves sharing information such as speed, approaching hazards, and braking activity of vehicles ahead.
- V2I (also known as V2N) involves vehicles sharing communications with devices such as signal controllers, data collection sensors for speed, road-surface condition, and presence of pedestrians in crosswalks.
- V2P is a specific reference in V2I that focuses on the needs of pedestrian safety. It establishes that portion of communication between pedestrians and the infrastructure that is typically supported with cell phones in combination with the vehicles.

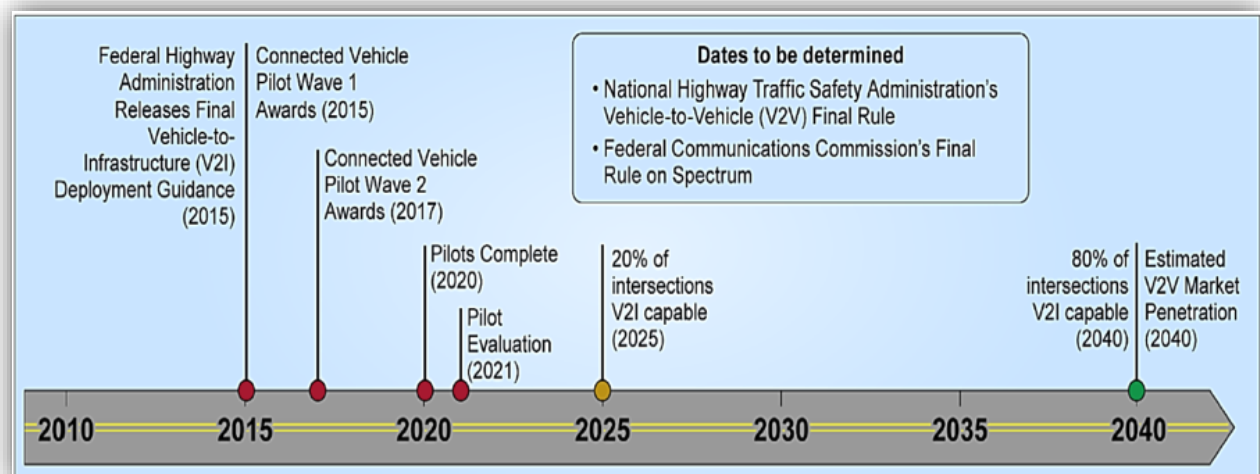
Figure 4-18: Connected Vehicle Communication



Source : <https://www.intellias.com/v2x-basics-connected-vehicle-technology/>

The USDOT and the private sector are moving forward with research, guidance, and applications to help move CVs closer to wide-scale national deployment. The American Planning Association released a report, *Planning for Autonomous Mobility (PAS 592, 2018)* predicting that the earliest year automakers might have a fully autonomous car available to the public is 2020, and that by 2040 approximately 50 percent of cars will be AVs. The report also states that of the 500 largest US cities, only five percent are considering AVs in their comprehensive plans or have in place ordinances pertaining to the safe operation of AVs. Numerous timeline predictions exist, however; it is clear that the incremental adoption of CVs and AVs will continue to be realized within the 2040 planning horizon of the MTP. Though this transition is moving fast, the interoperability of these technologies with the existing roadway systems is crucial among the still maturing technology. The USDOT ITS Joint Program Office has dedicated resources to this topic with a focus on interoperability to “ensure effective connectivity among devices and systems” as part of their *ITS Strategic Plan*.¹⁸

Figure 4-19: DOT’s Connected Vehicle Path to Deployment



Integration with Public Agency Infrastructure

The integration of new technologies and capabilities to public agency infrastructure is a primary concern, not only for the impacts on our member agencies’ budgets and operations, but also in the development of an efficient multimodal transportation system. Changes in roadway infrastructure can take time as they are subject to local budgets, maintenance and replacement cycles, and limited funding. The urgency is high for best-practice methods as we begin to modify our transportation infrastructure to communicate with vehicles for enhanced operations. Agency risk is always a factor when migrating to any new infrastructure component. Agencies must be sure of their effectiveness and the ability to improve the system without liability risk. To that end, the FHWA has sponsored numerous pilot programs across the country to test the benefits, reliability, and practicality of these new applications. From these studies, a set of best practice examples can be used to support policy and implementation decisions.

¹⁸ USDOT ITS Research 2015-2019, ITS Joint Program Office

Federal Policy and State Efforts on AVs

Guidance and standards must be established by federal authorities to ensure a level playing field and coordinated uniform adoption of new technology. The USDOT has designated the National Highway Traffic Safety Administration (NHTSA) as the authority on AVs. In 2016 the USDOT issued the *Federal Automated Vehicles Policy* as a proactive approach to providing safety assistance in the development of AVs in recent years. This was followed in 2017 by the *Automated Driving Systems: A Vision for Safety 2.0* as a non-regulatory guide to support the auto industry and key stakeholders with identifying best practices for safety testing. The USDOT intends that the development and implementation of AVs proceed in an orderly manner to ensure the safety of the traveling public.

In October 2018, *Preparing for the Future of Transportation: Automated Vehicles 3.0* was released which expands the scope to all surface on-road transportation systems. This guidance is structured around three main areas:

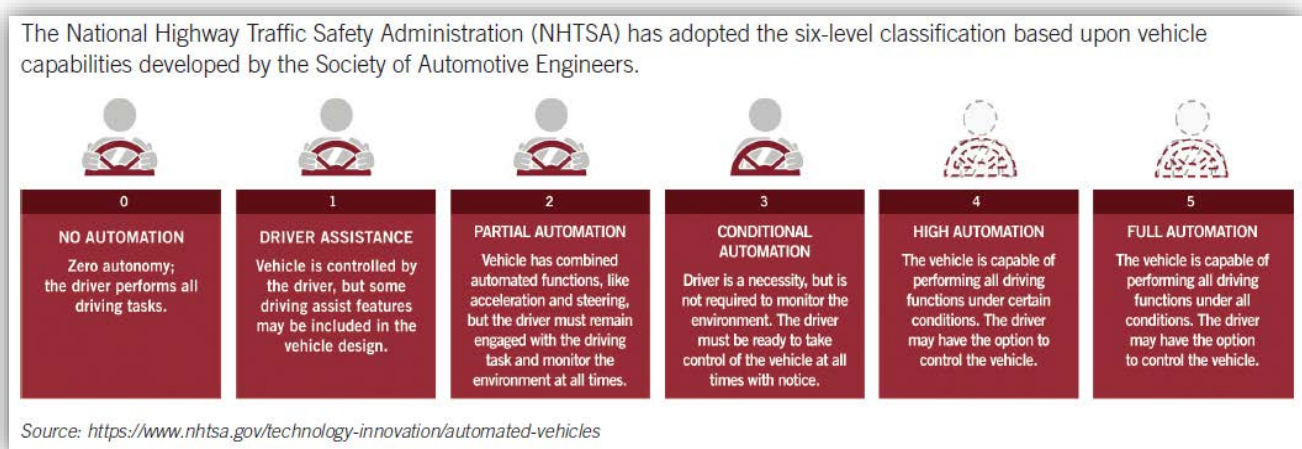
- Advancing multimodal safety
- Reducing policy uncertainty
- Outlining a process of working with the USDOT for the developers of AVs and states

The NHTSA has initiated the rulemaking process requiring that by 2023 all cars sold must be equipped with DSRC-based V2V technology. However, current established industry has been developing 5g LTE cellular (as it also can be used for personal mobile communications). Currently, some systems combine both communications types and it may well be the case that the future systems include the integration of both. The debate continues but one thing is for certain; cellular-based communications are more widespread than DSRC, and to not include them in V2X development might be considered short-sighted.

Automation Levels

In 2014, the USDOT through the Society of Automotive Engineers (SAE) established six levels of automation for AVs ranging from fully manual to fully automated, which correspond to the amount of driver interaction required to operate the vehicles. This standard has been adopted by the industry.

Figure 4-20: NHTSA Established Automation Levels



AV Use in US Cities

A report by the National League of Cities indicates that more than 50 percent of US cities are currently preparing to host AVs in their future. There are current test deployments across the country to evaluate different operational scenarios for their effectiveness and applicability of AVs. Most notable include:

- Single occupancy vehicle app-based rideshares – Pittsburgh, PA, Boston, MA, Chandler, AZ
- Passenger shuttles on fixed route non-public roads – Arlington, TX
- City run permitting process for various types of AV related services – Portland, OR
- Shared electric AVs integrated with public transit – San Jose, CA

AV Progress in New Mexico

The regulatory framework for the implementation of AVs is distributed among federal and state authorities. The federal focus is on the setting and enforcement of Federal Motor Vehicle Safety Standards (FMVSSs) and enforcement of compliance with FMVSSs (to ensure that the public is advised and educated on these issues). States, on the other hand, are responsible for the driver's licenses, vehicle registrations, enacting and enforcement of traffic laws and regulations, safety inspections, and regulating the motor vehicle insurance and liability rules.

Autonomous Vehicle Committee

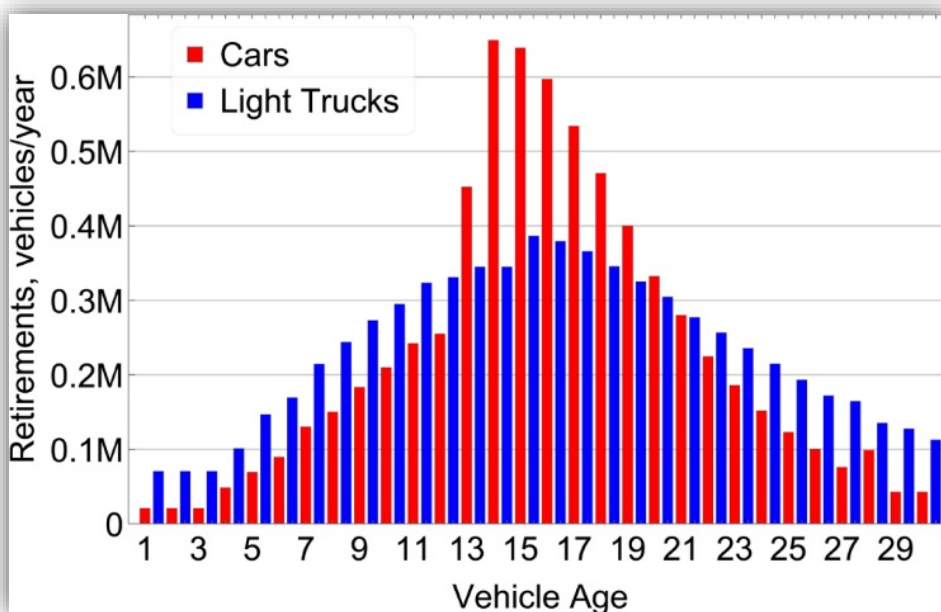
The 53rd Legislature for the state approved Senate Joint Memorial 3, *Autonomous Vehicle Use in New Mexico* which sets forth the process of identifying and addressing issues to ensure the safe and legal operation of AVs on our roadways. The memorial establishes an Autonomous Vehicle Committee, led by the NMDOT, "to review the current and developing technology for autonomous vehicle operation and existing state policy and statutes that may be relevant to autonomous vehicle operations."

The AV committee is comprised of representatives from NMDOT, New Mexico Departments of Public Safety, Tax and Revenue, Information Technology, Economic Development, and the Public Regulation Committee, and accepts input from relevant public and private stakeholders. This group focuses on evaluating current and needed legislation. The insurance industry is involved and has already noted that significant changes will need to be made to fault/recovery rules as AVs enter the driving landscape.

Transitioning to CAVs

With the inevitable transition to Connected or Autonomous Vehicles (CAVs) it is easy to see how we are entering an exciting time of change and opportunity in the transportation sector. The path will be filled with obstacles, especially those concerning safety and market adoption. Numerous issues still need to be addressed before we can expect more widespread adoption. A major factor remains to be the unpredictability of the traveling environment. That, combined with safety concerns, add to the complexity of widespread AV adoption. However, the technology is in continual development, and with nearly every vehicle manufacturer having developed working prototypes, progress is being made. There is no clear-cut approach to widespread adoption of AVs. One factor, for example, is fleet turnover. The vehicle fleet turnover rate is slowing as vehicles continue to be more durable and last longer, thus making the immediate adoption of an AV in many households less likely.¹⁹ Fleet turnover takes much longer than people expect. Note the distribution for the average vehicle lifetime shown, with the average at 19.6 years. Regardless, what is clear is that the future transportation system will involve a change in vehicle type and capability, and will be comprised of a mix of CVs, AVs, and non-connected vehicles.

Figure 4-21: Distribution by age of Vehicle Replacement



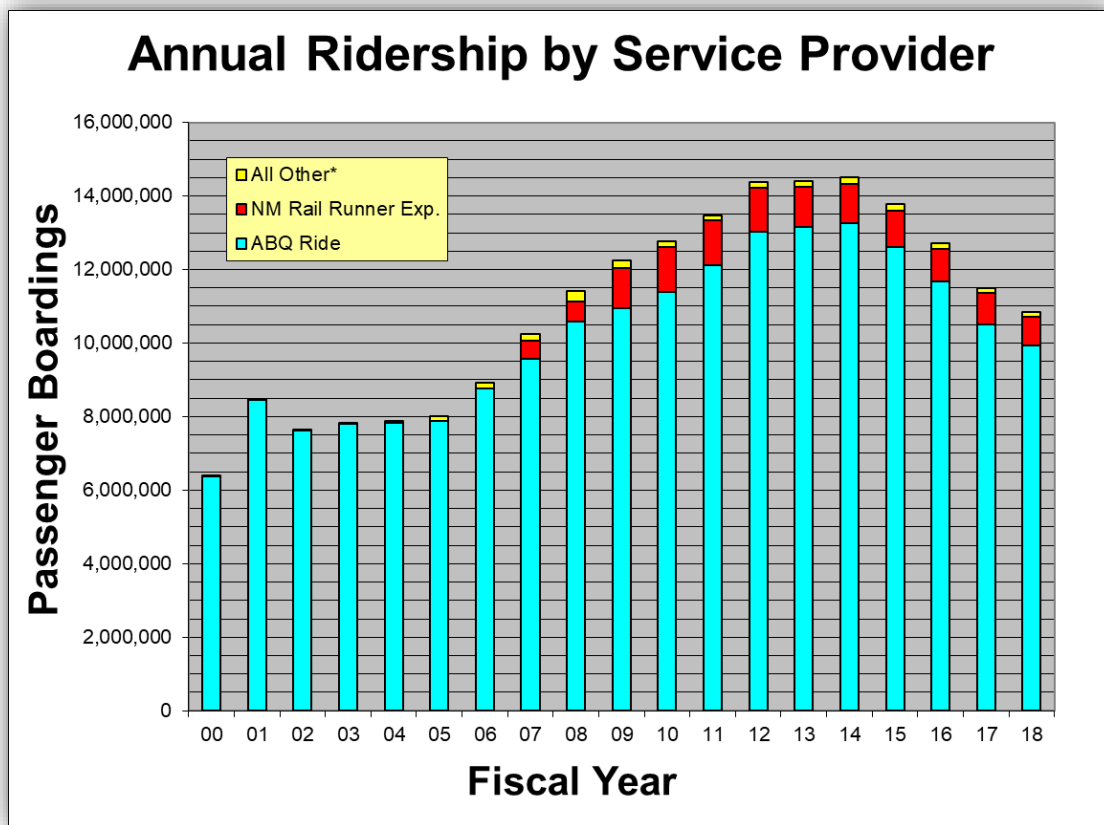
¹⁹ Massachusetts Institute of Technology

4.2 Transit System Performance

a. Rise and Fall of Transit Ridership

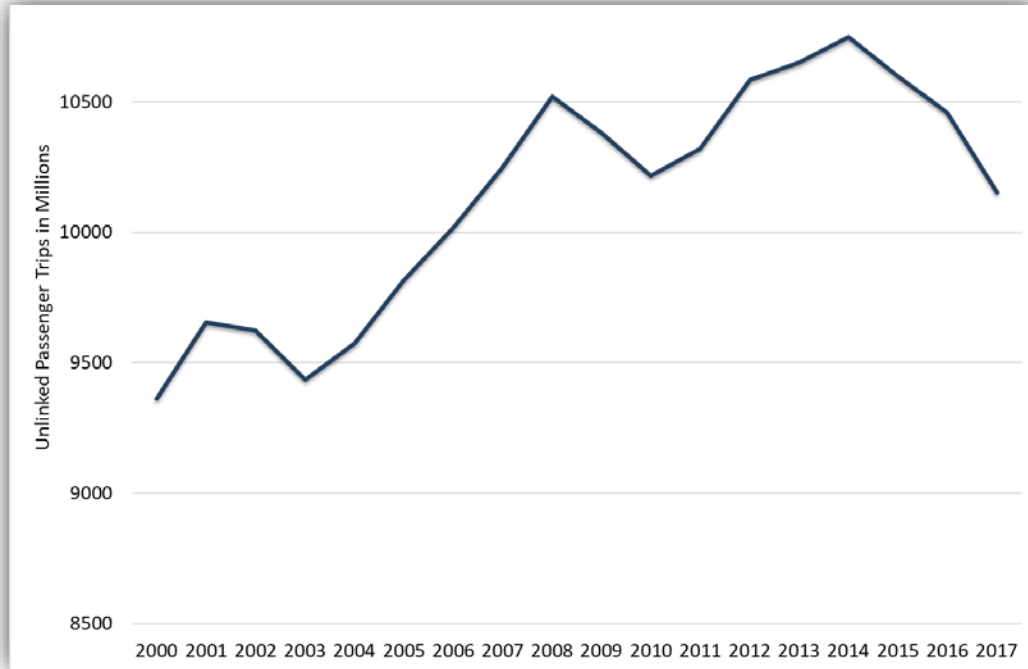
Transit ridership in the Albuquerque metro area was on the rise for much of the past 20 years. Annual transit ridership leveled off in the region between 2012 and 2014 before it began declining in 2015. When the previous MTP was written, transit was growing explosively in the region, outpacing the national trend. Between 1995 and 2012, transit passenger trips increased 120 percent (6.5 to 14.4 million trips) and transit passenger miles traveled increased 365 percent (21.5 to 100.2 million miles). The impressive growth in transit ridership in the region was attributed to the introduction of ABQ RIDE's Rapid Ride service (beginning in 2004) and Rio Metro's NM Rail Runner Express service between Belen and Santa Fe (service began between Belen and Bernalillo in 2006 before being extended to Santa Fe in 2008). Despite recent declines in ridership, with over 11 million annual trips, transit continues to be an important way to fulfill the region's travel needs.

Figure 4-22: Annual Transit Ridership in the Region



Source : <https://www.apta.com/research-technical-resources/transit-statistics/public-transportation-fact->

Figure 4-23: Transit Ridership in the United States, 2000-2017



Source : <https://www.apta.com/research-technical-resources/transit-statistics/public-transportation-fact-book/>

Benefits of Transit

Transit is an equitable mode of transportation that does not require an initial capital investment from users. Transit is therefore a crucial means of transportation for those who cannot afford a car or other private transportation. **In fact, Harvard researchers believe reliable transportation to be the most important means of escaping poverty.**²⁰ Transit also reduces greenhouse gases by moving more passengers with fewer vehicles and requires less road space to move people than cars, therefore reducing roadway demand and congestion. Greenhouse gas emissions are reduced by enabling compact transit-oriented development, which conserves land and decreases the distances people need to travel to reach important destinations.²¹ Area residents already realize many of the benefits that transit can provide to communities, as summarized by the American Public Transportation Association (APTA):

- Greater transportation mode choice
- Increased economic activity
- Access to employment, schools and universities, government services, health care, business, and industry
- Mobility for persons without access to a vehicle or who are not able to drive a vehicle
- Reduced congestion, which results in decreased travel times and fuel consumption
- Savings from lower gas and vehicle-related expenses
- Lower carbon and other pollutant emissions

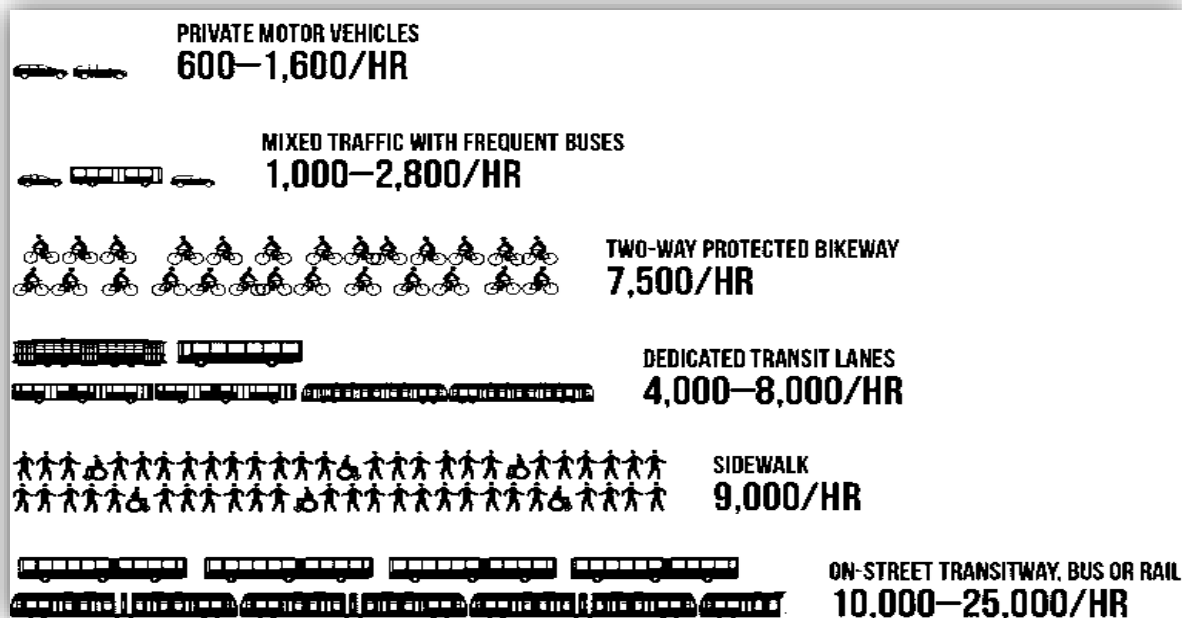
²⁰ https://www.nytimes.com/2015/05/07/upshot/transportation-emerges-as-crucial-to-escaping-poverty.html?_r=1&abt=0002&abg=0

²¹ <https://www.transit.dot.gov/regulations-and-guidance/environmental-programs/transit-environmental-sustainability/transit-role>

Efficient People Movement

Transit is one of the most space efficient means of transportation. Most congestion is caused by too many vehicles in too little road space. One way to reduce congestion is to move more people with fewer vehicles. See below for a representation of how many people can be moved per hour using different modes. Transit is clearly a space efficient way to move people through the region and holds promise as a strategy for alleviating congestion caused by high volumes of single occupancy vehicles.

Figure 4-24: Moving People Per Hour (HR)



Source : <https://nacto.org/publication/transit-street-design-guide/introduction/why/designing-move-people/>

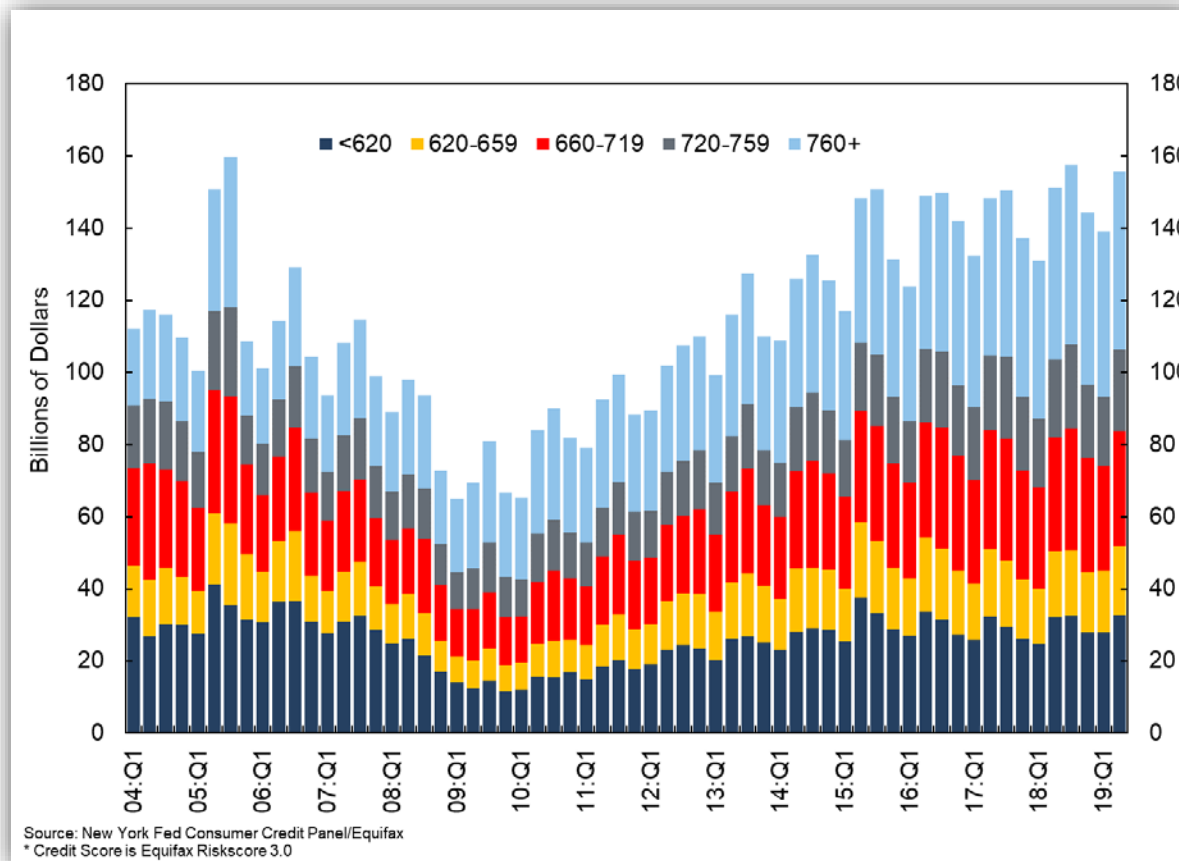
b. Factors Behind Declining Ridership

Passenger trips in 2017 declined by 21 percent in the Albuquerque region since they peaked in 2014. Transit ridership across the country declined by 5.6 percent between 2014 and 2017. The decline in the region's transit use coincides with a growth in vehicle miles traveled (VMT). It is unclear exactly why transit ridership is down across the country, but experts believe worsening transit service, paired with the rise of ridesharing and easier access to automobiles, are primary reasons.

Erosion of Cost Competitiveness

One contributing factor to the decline in transit ridership, according to the American Public Transportation Association (APTA), is that the cost of car ownership is down. Low gas prices and easy access to auto loans are making the cost of owning and operating a car less of a barrier, and it appears that many people who typically have relied on transit are choosing to buy a car instead. The number of auto loans being made has reached pre-recession levels, including pre-recession levels of auto loans being made to people with sub-prime credit scores. The average gas price for the year 2018 (\$2.64) was 24 percent below the average gas price between 2011-2014 (\$3.45) during the post-recession years.

Figure 4-25: Auto Loan by Credit Score



Source : https://www.newyorkfed.org/medialibrary/interactives/householdcredit/data/pdf/HHDC_2019Q2.pdf

The Rise of Ride Sharing and Micro-mobility

Ride hailing apps like Uber and Lyft offer an interesting alternative to using a private automobile that many consumers find slightly cheaper and more convenient than using a traditional taxi service. Proponents of ride hailing apps argue that they enable people to live car-free by giving them access to cars on the occasions they need them. Recent studies have suggested that ride hailing apps may be reducing people's use of transit service. A study conducted by the University of California-Davis Institute of Transportation Studies surveyed ride sharing service users in several major American cities and found that their subjects' transit use declined by six percent²².

The introduction of shared micro-mobility into the region offers a new way of making short trips. Micro-mobility refers to very light vehicles such as electric scooters, bicycles, and electric bicycles that can be used as a means of transportation. Many companies and cities are introducing fleets of shared bicycles and/or electric scooters that are placed at key locations throughout a city and can be rented using an app and left in the public right of way near the user's destination.

²² <https://www.govtech.com/fs/transportation/Study-Ride-Sharing-Decreases-Public-Transit-Use.html>

Between May and September of 2019, Spin Scooters, the name of the current e-scooter service in the AMPA, were used for more than 40,000 trips while the region's bike share program (called Pace Bike Share) logged just under 10,000 in the same period.²³ Nationwide shared micro-mobility use has exploded, with 84 million trips being made in 2018.²⁴ This way of getting around is new and not well understood, but some believe micro-mobility may be competing with transit for some short trips. However, most experts believe the two modes may be more symbiotic than competitive. Researchers at the TransitCenter, a foundation in New York City, have found that shared micro-mobility may help connect more people to transit and overcome the first and last mile problem.²⁵ Micro-mobility may make transit more viable in low density areas where frequent transit cannot be provided within a short walk. Micro-mobility also enables potential transit users to easily travel one or two miles to a transit stop meaning frequent transit can be consolidated on major roads.

Single Occupancy Vehicle Convenience

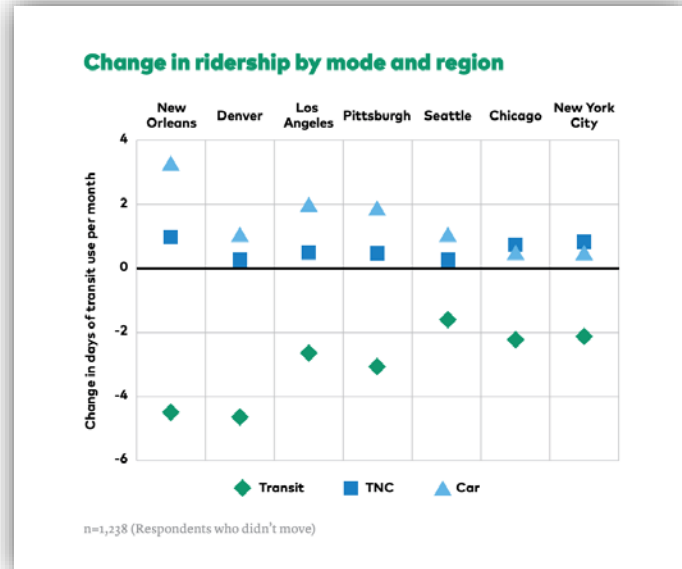
The TransitCenter in New York City has also been surveying residents of several large US cities to try to understand the nationwide decline in transit ridership. In a 2019 study, they found that the car is the main competitor with transit. The TransitCenter research found that ride hailing, or Transportation Network Companies (TNC), like Uber and Lyft were not as significant as new car trips when explaining why the recent transit decline.

“An uptick in driving dominates changes in the transportation market, as car trips unambiguously replace trips on transit and other modes of travel. As buying a car gets easier in a car-friendly world and demanded trips increase and disperse geographically, more people are driving, and more often²⁶.”

Figure 4-26: Pace Bike Share in Albuquerque



Figure 4-27: Comparison of Change in Transit Ridership



Source: <https://transitcenter.org/publication/whos-on-board-2019>

²³ <https://www.abqjournal.com/1366980/e-scooters-log-more-than-40000-trips-so-far.html>

²⁴ <https://nacto.org/shared-micromobility-2018/>

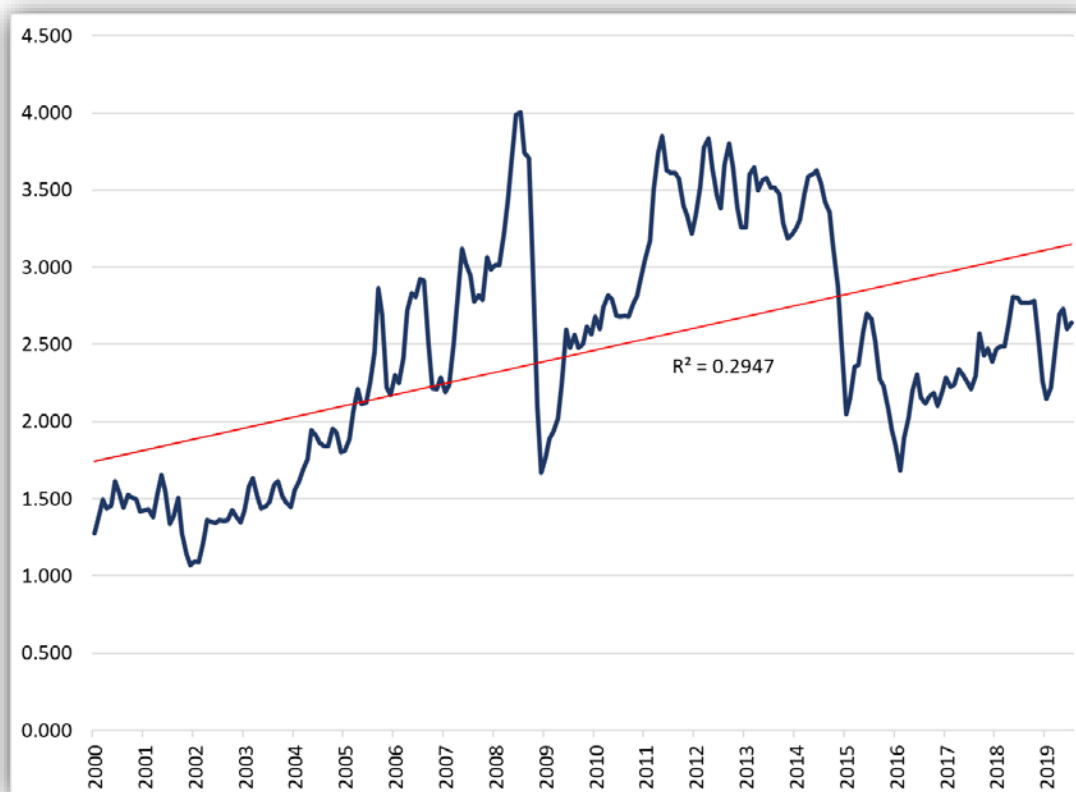
²⁵ <https://www.govtech.com/fs/transportation/Micro-Mobility-Is-Here-to-Stay-Cities-Should-Act-Accordingly.html>

²⁶ <https://transitcenter.org/publication/whos-on-board-2019/> “Who’s on Board?” 2019

Reliance on Easy Credit and Low Gas Prices

In the Albuquerque metropolitan area, driving a car is the most convenient and fastest way to get around for virtually all trips. In the past, transit has been attractive primarily because it is cheaper than owning and operating a car. When there are fewer barriers to financing a car and lower operating costs, it follows that more people will drive, and fewer will take transit. **However, relying on easy credit and low gas prices to meet the public's transportation needs may not be wise.** In the event of an economic downturn, people who took out loans for cars may miss payments and have their cars repossessed, in which case, they will need access to economical and reliable public transportation. The same goes for gas prices should they rise again.

Figures 4-28: Average Historical Gas Prices (Federal Reserve Economic Data)



Bus Service Investment

The American Public Transportation Association (APTA) found through data analysis and focus groups that bus service across the country is worsening (likely because of factors such as the reduced speed of buses in service and the rising costs of monthly bus passes), and customers are leaving as a result²⁷. Between 2000-2017, bus ridership fell nearly 16 percent, but rail ridership grew by 43 percent during the same period.²⁸ This demonstrates that investments made in recent years in rail transportation have attracted new riders, while a lack of investment in bus service is responsible for the worsening service and falling ridership.

²⁷ <https://www.apta.com/wp-content/uploads/Resources/resources/reportsandpublications/Documents/APTA-Understanding-Recent-Ridership-Changes.pdf>

²⁸ Ibid

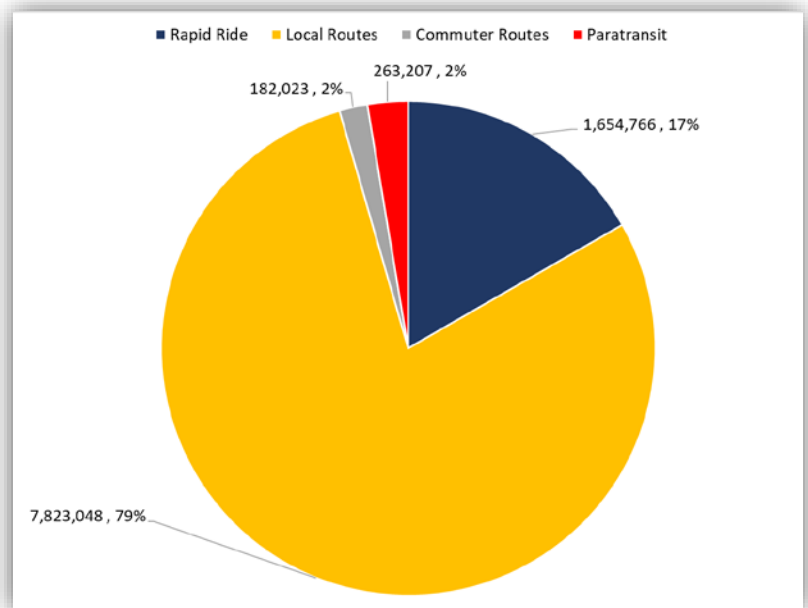
In the Albuquerque metropolitan area, few investments have been made in transit since the creation of ABQ RIDE's Rapid Ride services until the recent inception of the Albuquerque Rapid Transit service along Central Avenue which began in November 2019. It is possible that more transit riders can be attracted through further improvements in service.

c. Regional Transit Partners

City of Albuquerque Transit Services (ABQ RIDE)

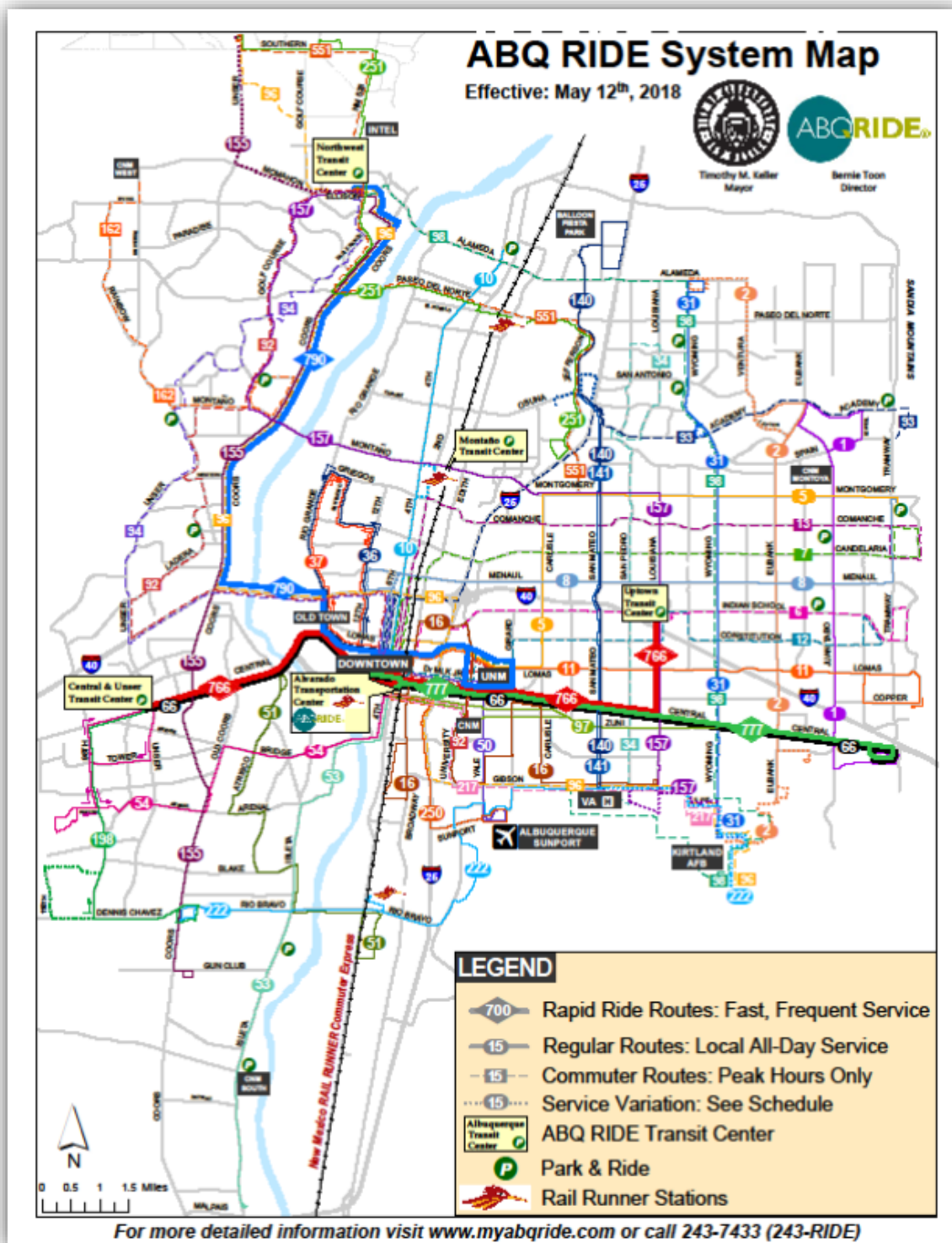
ABQ RIDE was founded with the City of Albuquerque's acquisition of the struggling, privately-operated Albuquerque Bus Co. and Suburban Lines in 1965. ABQ RIDE currently operates the following types of bus services (shown in the chart here and described in the bulleted list below) within the City of Albuquerque and portions of the City of Rio Rancho, Village of Los Ranchos de Albuquerque, and unincorporated Bernalillo County. The chart shows the distribution of Fiscal Year (FY) 2018 ABQ RIDE passenger trips by mode (ABQ RIDE's fiscal year starts in July and ends in June; FY 2018 started in July 2017 and ended in June 2018). Notably, over 95 percent of all passenger trips are supported by local and Rapid Ride routes, whereas commuter and paratransit services form a comparatively small share of overall ridership.

Figure 4-29: Albuquerque Ride Transit Trips by Mode, FY 2018



- Two Bus Rapid Transit routes: Two previous Rapid Ride routes changed over to Bus Rapid Transit called Albuquerque Rapid Transit, or ART, in November of 2019. These routes have their own right-of-way allowing them to be more consistent in terms of timing (reliability), and more frequent – stopping at each station around every eight minutes. They are also 60-foot articulated buses able to carry more passengers.
- One Rapid Ride route: Rapid Ride functions as a premium service with stops placed approximately one mile apart; thus, they travel at a higher speed than the local routes that they commonly overlap. The 60-foot articulated Rapid Ride buses also serve more developed stops and stations than local and commuter routes.
- 22 local routes: Local routes operate primarily along arterial streets at both peak and mid-day hours, and typically serve bus stops that are located one-quarter mile apart or less.
- 16 commuter routes: Commuter routes connect outlying residential areas with major employment centers during AM and PM peak hours only.
- Paratransit: ABQ RIDE's Sun Van paratransit provides door-to-door service in Albuquerque and portions of Bernalillo County for riders who have satisfied eligibility requirements per federal requirements (49 CFR 37.131).

Figure 4-30: ABQ RIDE Service Locations and Operations



Rio Metro Regional Transit District (RMRTD)

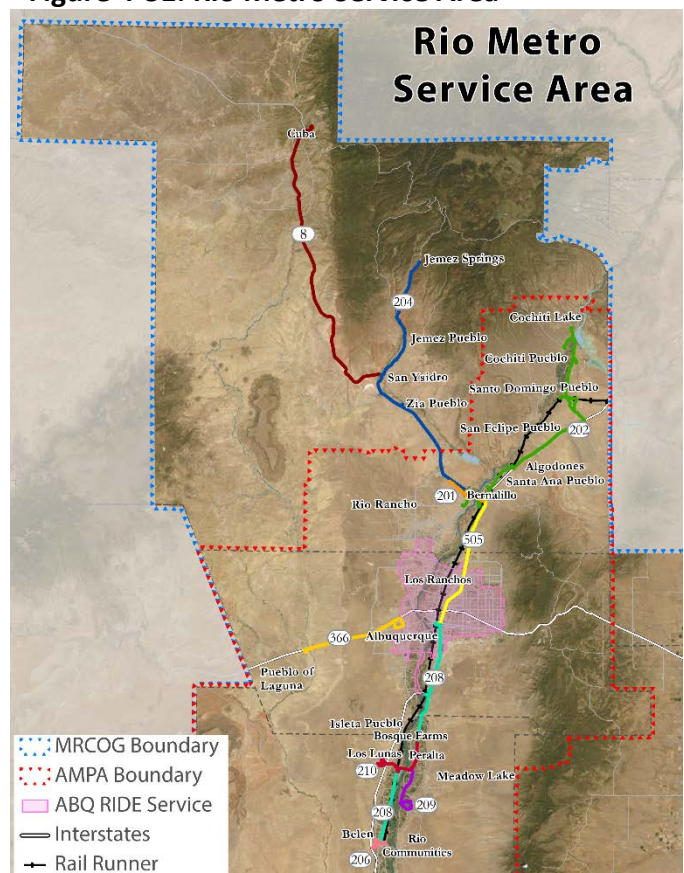
Another reason for the dramatic growth of transit in the AMPA is directly attributable to the development of the Rail Runner and the creation of the Rio Metro Regional Transit District (RMRTD), or Rio Metro. Rio Metro traces its origin to the New Mexico legislature's passage of the Regional Transit District Act in 2003 and its authorization in 2004 allowing transit districts to levy up to a 1/2-cent gross receipts tax. Subsequently, in 2005 the Mid-Region Transit District was created and later renamed the Rio Metro Regional Transit District in 2008. That same year, Bernalillo, Sandoval, and Valencia County voters passed a 1/8-cent gross receipts tax, one-half of which was solely dedicated to funding the New Mexico Rail Runner Express, which the State of New Mexico was responsible for developing in the early and mid-2000s.

Rio Metro provides several transit services throughout the three-county region, some of which Rio Metro assumed from local agencies following passage of the gross receipts tax.²⁹ As such, Rio Metro's combination of intercity, urban, suburban, and rural services, while uncommon to most transit providers, establishes a far-reaching and regional transit network that complements ABQ RIDE.

Rio Metro services include:

- **New Mexico Rail Runner Express:** The Rail Runner is a commuter train that operates on 97 miles of track and connects several communities, including Belen, Los Lunas, Isleta Pueblo, Albuquerque, Sandia Pueblo, Town of Bernalillo, Kewa Pueblo, and Santa Fe.
- **Commuter** routes: Five commuter bus routes in Sandoval County, four in Valencia County, and one in Bernalillo County connect residents to Rail Runner Stations and major commercial, educational, and employment destinations.
- **Dial-a-Ride:** Rio Metro provides Dial-a-Ride transit to persons traveling within most of Valencia County and to senior citizens or disabled residents in Rio Rancho. Similar to paratransit, a trip must be requested one day in advance.
- **Job Access:** The Job Access program provides taxi rides and/or bus passes to Temporary Assistance for Needy Families (TANF), low-income, senior and other individuals with disabilities living in Bernalillo County who have limited transportation options to access work or job training opportunities.

Figure 4-31: Rio Metro Service Area



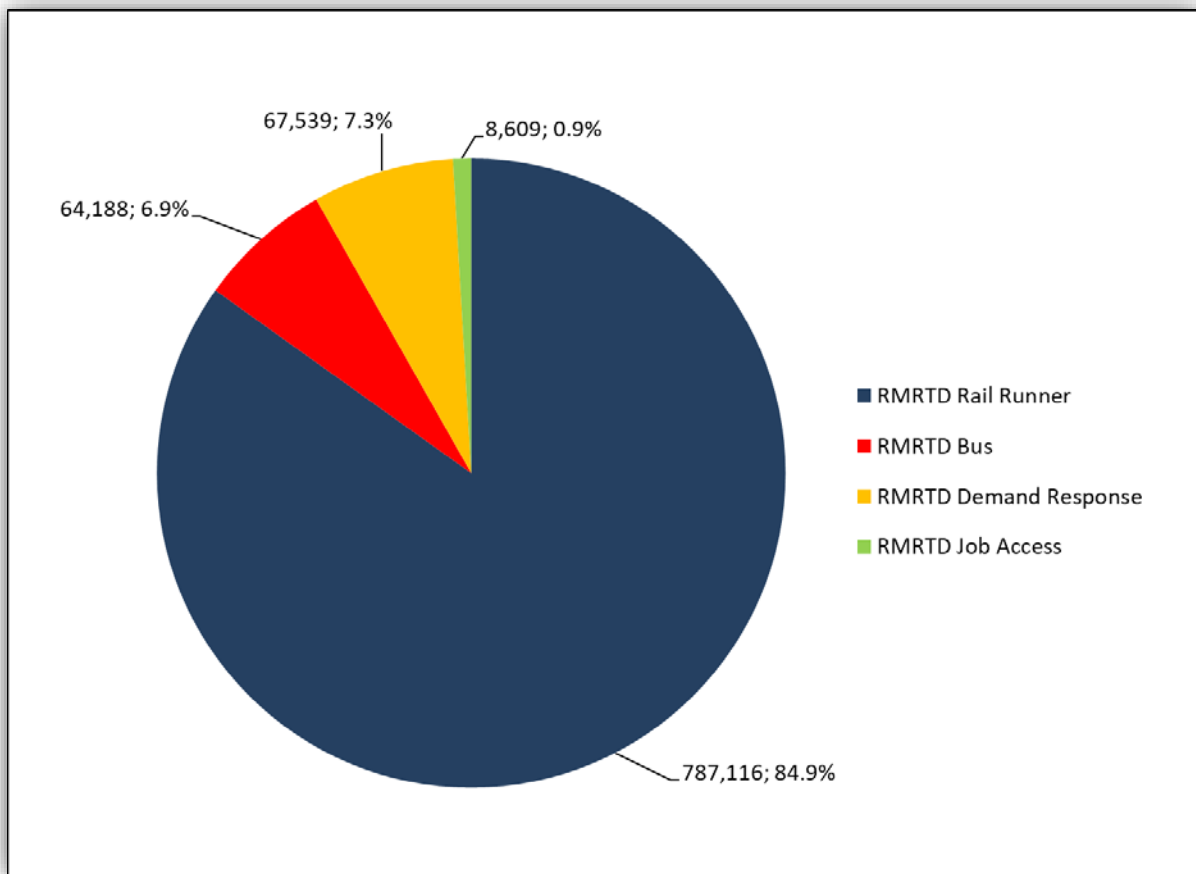
²⁹ Reflecting the jurisdictions it serves, Rio Metro is governed by a Board of Directors comprised of 20 elected officials from Albuquerque, Belen, Bernalillo, Bernalillo County, Bosque Farms, Corrales, Los Lunas, Los Ranchos de Albuquerque, Rio Communities, Rio Rancho, Sandoval County and Valencia County. The Board of Directors may exercise powers granted by the Regional Transit District Act, including the authority to determine routes and schedules, issue bonds, establish fares, request an increase in the gross receipts tax by the voters, and adopt a budget.

- Intergovernmental services: Rio Metro funds routes operated by ABQ RIDE, including the 790 Rapid Ride. Rio Metro also provides funding for the New Mexico Department of Transportation's Route 500, a park-and-ride service that connects Albuquerque, and the NM 599 Rail Runner Station in Santa Fe with Los Alamos.

Passenger Trips and Miles Traveled

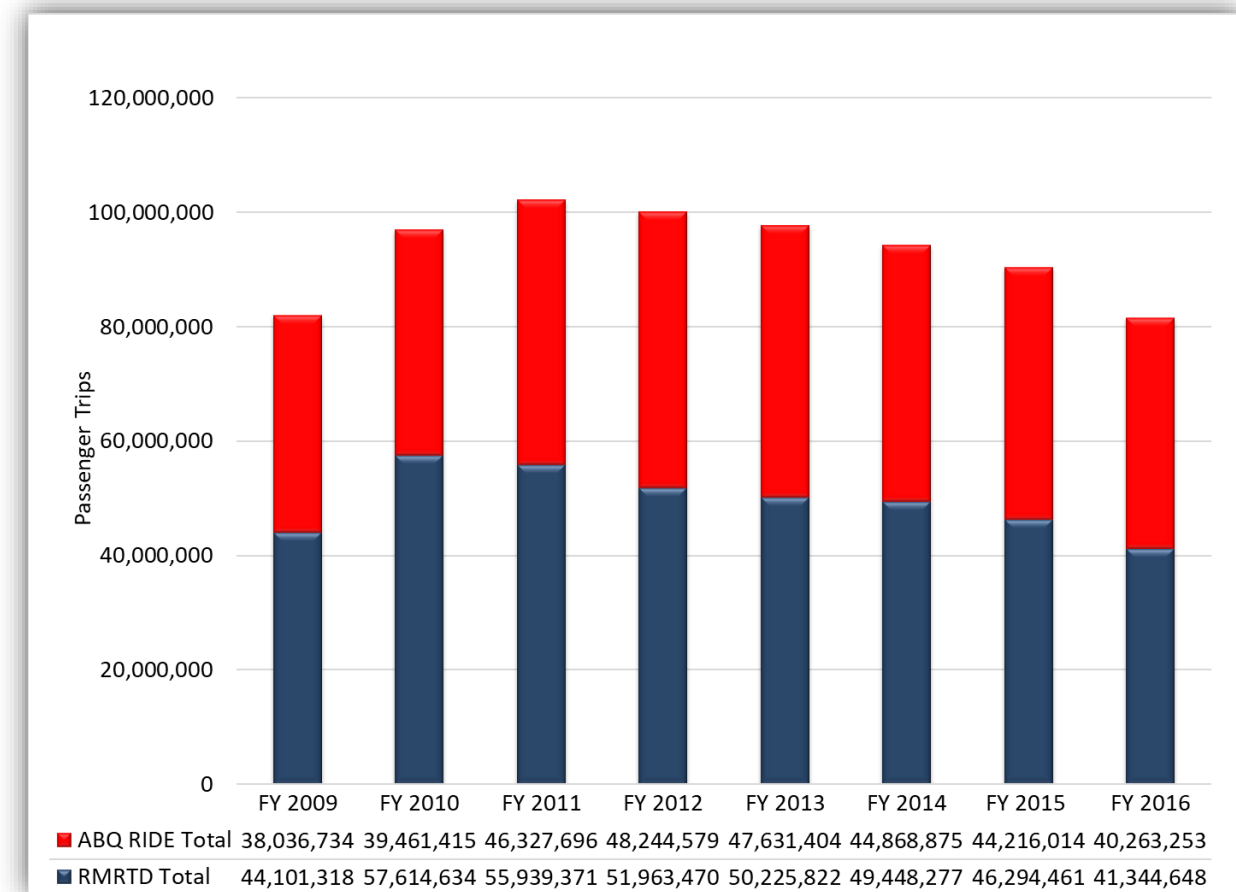
In total, Rio Metro provided 927,452 passenger trips in FY 2018, excluding ABQ RIDE trips attributable to Rio Metro funding. The Rail Runner accounted for 85 percent of those trips, followed by Dial-a-Ride services (7.3 percent), commuter buses (6.9 percent), and Job Access (one percent). When compared to ABQ RIDE, Rio Metro carried approximately one-tenth the riders in FY 2018; however, passenger trips are not the sole measure of transit use. Passenger miles traveled is also an important measure.

Figure 4-32: Rio Metro Systemwide Passenger Trips, FY 2018



In FY 2018, ABQ RIDE passengers logged 35,124,037 passenger miles traveled while Rio Metro riders logged 37,976,104 passenger miles traveled, most of which were generated by the Rail Runner.

Figure 4-33: Rio Metro and ABQ RIDE Passenger Miles Traveled, 2008-2016



Paratransit Services

The Americans with Disabilities Act of 1990 requires that transit agencies providing fixed routes, such as ABQ RIDE’s Rapid Ride and local routes, also offer “complementary” and “comparable” paratransit service to persons with disabilities. ABQ RIDE’s Sun Van paratransit provides door-to-door service in Albuquerque and portions of Bernalillo County for riders who have satisfied eligibility requirements. Per federal requirements (49 CFR 37.131), paratransit service must be provided:

1. At least three-quarter miles from any fixed route
2. During the same hours and days as the fixed route
3. For a fare no more than twice the comparable fare of the fixed route
4. Based on reservations made the previous day
5. With no restrictions on trip purpose or the number or trips

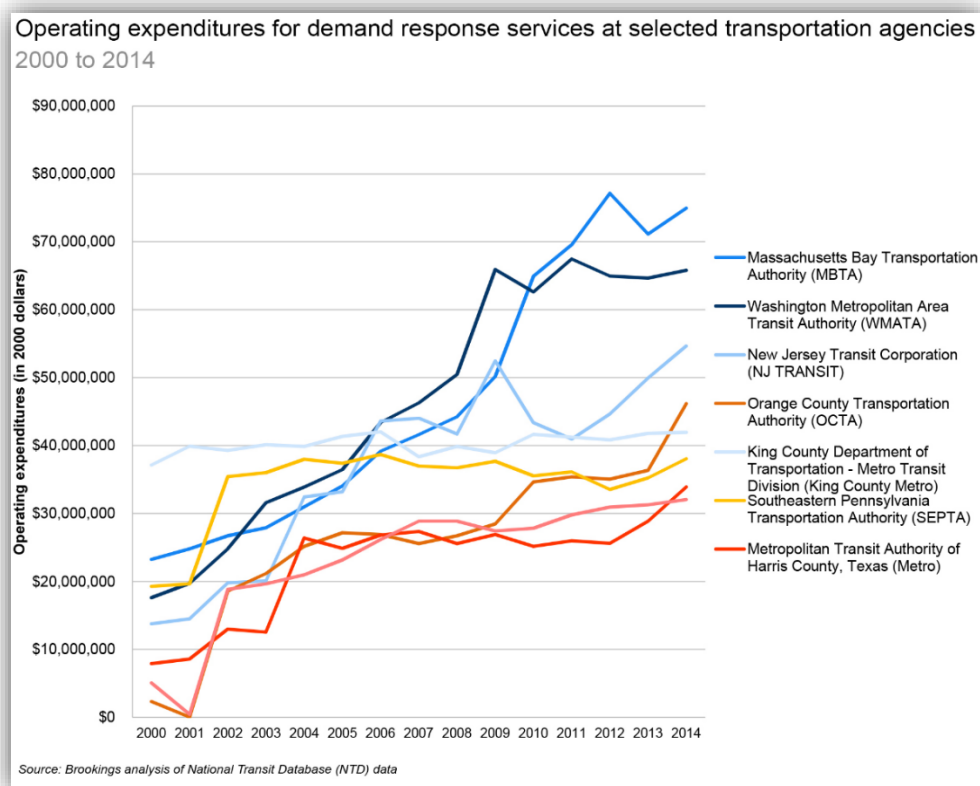
Access for Elderly and People with Disabilities

Paratransit provides crucial access to the elderly and people with disabilities. The importance of paratransit is likely to grow considering Americans aged 65 or older are set to increase from 15 to 20 percent of the nation's population by 2030.³⁰ The popularity of paratransit service has grown steadily since the passage of the ADA paratransit mandate, with transit agencies spending a collective \$5.2 billion in 2013, or 12.2 percent of transit costs nationwide.³¹ In 1998, paratransit service accounted for only 3.2 percent of total transit expenditure. **The passage of the ADA Act of 1990 did not provide additional funding to transit agencies to help them comply with this mandate.**

Cost of Paratransit

The U.S. Government Accountability Office found in a 2012 report that a paratransit trip costs, on average, \$29.30, or roughly 3.5 times as much as an average fixed route trip.³² The same report also found that the average cost of a paratransit trip had gone up 10 percent between 2007 and 2010. These numbers pose a troubling problem for transit agencies across the country. Transit providers must make do with the same operating costs despite the rising cost of meeting paratransit needs.

Figure 4-34: Operation Expenditures for Demand Response Services



Many agencies want to improve service by providing later run times or new routes, but doing so would also increase their paratransit liability, making such expansions financially difficult.

³⁰ <https://wagner.nyu.edu/rudincenter/2016/09/new-report-intelligent-paratransit#>

³¹ <https://www.brookings.edu/research/how-lyft-and-uber-can-improve-transit-agency-budgets/>

³² https://wagner.nyu.edu/files/rudincenter/2016/09/INTELLIGENT_PARATRANSIT.pdf

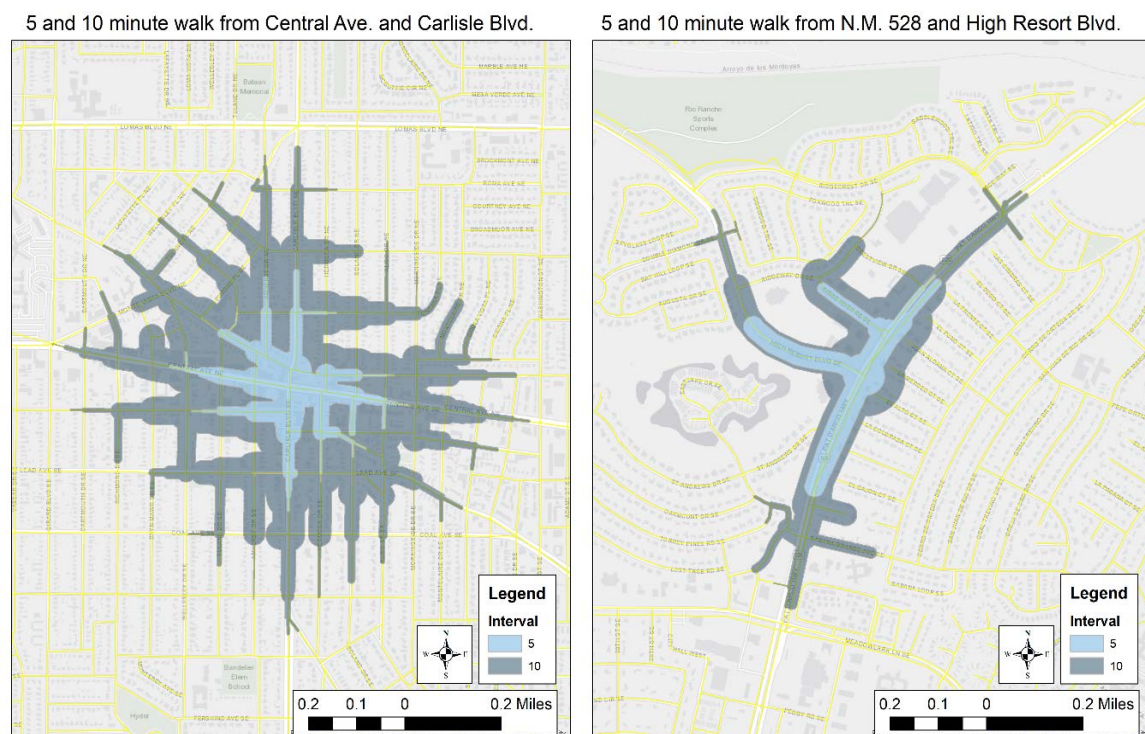
Paratransit provides a crucial service to people in need of transportation. Paratransit should be invested in and made as efficient for users as possible. Moving forward however, more operational funding for transit providers is crucial to meet growing paratransit demand and increase the reliability of fixed route services.

d. Transit Supportive Development

Transit service enables the type of compact land development envisioned in the Target Scenario. More compact land development helps reduce vehicle miles traveled in the region by bringing a wide array of destinations closer together. Reducing peak hour VMT is a stated goal of the FAST Act, and it calls out transit as a key strategy to reduce VMT.³³ Shifting people from cars to transit will be a key strategy to ease congestion. Unfortunately, there are still many barriers to efficient transit service that discourage cost-effective, local transit service in the region:

- The Westside remains characterized by low-density residential development served by a hierarchy of streets that concentrate traffic on a few arterials, rather than a grid network that more equally distributes traffic, which results in more Westside arterials exceeding capacity.
- As the footprint of the Westside continues to grow, it expands ABQ RIDE and Rio Metro's service areas, and has the potential to dilute the level of service to existing areas if additional revenue is not generated to support this growing population and geographic area.
- Poor pedestrian connectivity limits the number of individuals living within a walkable distance of a transit stop (desirably ¼-mile) as illustrated in the image below.

Figure 4-35: Impacts of Poor Connectivity



³³ <https://www.fhwa.dot.gov/fastact/factsheets/metropolitanplanningfs.cfm>

- Thus, a bus must travel farther in this circuitous setting to reach the same number of riders that it might reach in higher-density neighborhoods aligned along a more linear corridor (a longer route also requires more buses to maintain the same frequency as a shorter route, which exacerbates operating costs).
- Furthermore, a bus operating in ever-increasing congestion will experience declining average speeds. As average speeds decrease, and a bus takes longer and longer to complete its route, more buses will be required to preserve frequency. If additional buses cannot be supplied to offset increasing travel time, frequency will decrease, and ridership may decline.

What does Successful Transit Look Like?

Implicit in these observations is a common theme in this MTP: land use patterns, densities, and road connectivity are some of the strongest determinants of single-occupancy vehicle congestion *and* the viability and success of transit. This is evidenced by the fact that ABQ RIDE's most successful local and Rapid Ride routes, located along the Central Ave and I-25 corridors and within the near Northeast Heights, serve major activity centers such as Downtown, Uptown, UNM/CNM, and Journal Center with relatively high employment and population densities. This synergy is bolstered by the presence of a well-connected street grid and many neighborhoods that are home to more transit-reliant populations. Conversely, it is generally inefficient to extend local bus service to low-density residential areas such as the Westside and far Northeast Heights.

Nevertheless, such an assertion raises a common dilemma: should transit providers strategically locate services (spend money) to maximize ridership—often times to the detriment of less transit efficient locations—or should they strive for consistent geographic coverage throughout their entire service area, regardless of performance?³⁴ How do we best address equity and river crossings in this dilemma?

In the case of serving Westside neighborhoods, ABQ RIDE (with some funding assistance from Rio Metro) has tried to balance ridership and coverage by offering some local routes, limited commuter routes, and the popular 790 Rapid Ride to connect northwest Albuquerque and Rio Rancho homes to Eastside jobs.

Transit Oriented Development (TOD)

Transit Oriented Development (TOD) refers to the creation of compact, mixed used, and walkable communities focused around high quality transit connections.³⁵ **These types of communities can reduce driving by residents up to 85 percent.**³⁶ Allowing dense, mixed use development around transit stations increases the number of potential transit riders as well as destinations that can be easily reached using transit. For TODs to occur, local governments must encourage their development through land use planning, zoning laws, and changes to building codes.

Target Scenario and Transit

The Target Scenario envisions higher density development along major corridors and connecting key centers throughout the region. Reliable transit service is crucial to supporting higher density residential, business, and leisure space mixed-use areas. Building higher density usually means relaxing parking requirements and relying on other forms of space-efficient transportation such as transit and walking. Many cities are relaxing zoning restrictions that control minimum parking requirements or height restrictions to support higher density areas.

³⁴ A more in-depth analysis of this issue is presented in Jarrett Walker's *Human Transit*, published in 2012 by Island Press.

³⁵ <https://www.transit.dot.gov/TOD>

³⁶ <http://www.tod.org/>

e. Transit Service Expansion

In response to the high levels of congestion projected in previous MTPs and limited funding for new major roadway investments, the Metropolitan Transportation Board (MTB) adopted mode share goals in 2010 through Resolution 10-16 MTB that prioritized transit's role in offsetting congestion at river crossings. By 2035, the MTB desired that transit account for 20 percent of all river crossing trips. The resolution also targeted funds available through the Transportation Improvement Program (TIP) to achieve this goal. Specifically, the resolution required that **25 percent of sub-allocated federal funds beginning in 2016 be programmed for capital improvements that implement new or improved Bus Rapid Transit or other premium transit modes as identified in the 2035 MTP.**

Priority Investment Transit Network and Mode Share Goals

As a proactive step during the drafting of the *Futures 2040 MTP*, the MTB realigned the transit mode share goals to better support the principles of the Target Scenario. For example, because the previous goals focused solely on increasing mode share at river crossings in the AMPA, a project such as the University Corridor Rapid Bus Service (or the UNM/CNM Bus Service) along University Blvd (which does not cross the river) was ineligible to receive funding set aside to achieve those goals despite its high-ridership potential and value to the region.

The MTB Resolution 15-01 passed in January 2015 still includes a 20 percent transit mode share goal by 2040 and the allocation of 25 percent of STP-U and CMAQ³⁷ funds but now more meaningfully focuses those funds on an expanded priority investment transit network shown below. Current mode shares are also provided in the table.

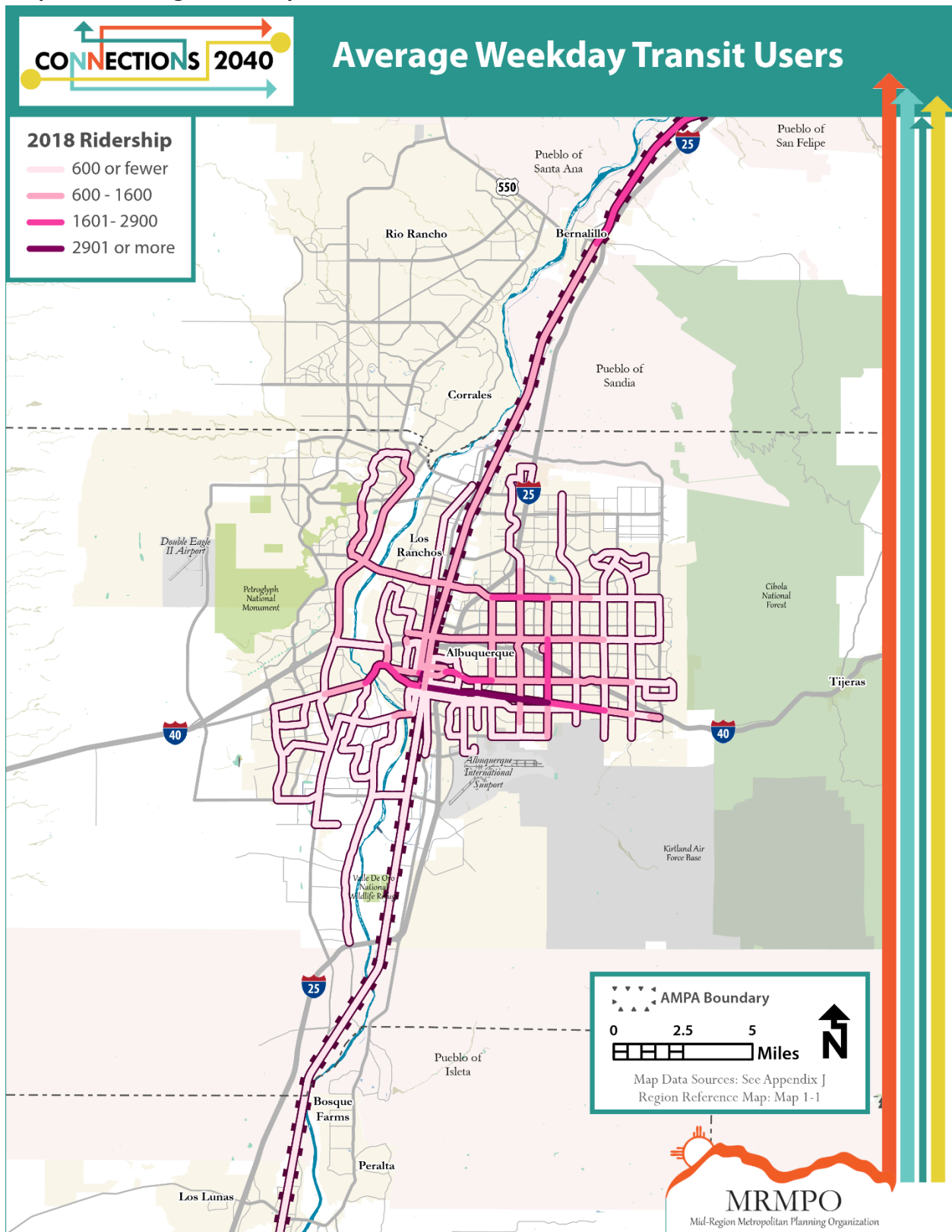
Table 4-10: Mode Share for Selected Corridors³⁸

Corridor	Average Mode Share	Peak Mode Share	Peak Link Location
Bridge Blvd.	0.9%	2.30%	Isleta-8th
Central Ave.	10.8%	21.20%	Girard-Carlisle
Coors Blvd	1.1%	2.10%	Paseo del Norte Interchange
Jefferson St	0.5%	1.10%	Osuna-San Antonio
Lomas Blvd	4.9%	10.60%	2nd-3rd
Louisiana Blvd	5.2%	8.39%	Lomas-Constitution
Montgomery Blvd	2.4%	4.73%	San Pedro-Louisiana
Montaño Rd	2.82%	3.05%	Rancho Caballero-4th
San Mateo Blvd.	2.5%	4.04%	Kathryn-Zuni
Interstate 25/Rail Runner	1.3%	5.46%	US 550 Interchange

³⁷ STP-U and CMAQ are federal funding categories programmed through the Transportation Improvement Program (TIP).

³⁸ Some of the corridors included in the priority network are not listed in the table because service on those corridors does not currently exist.

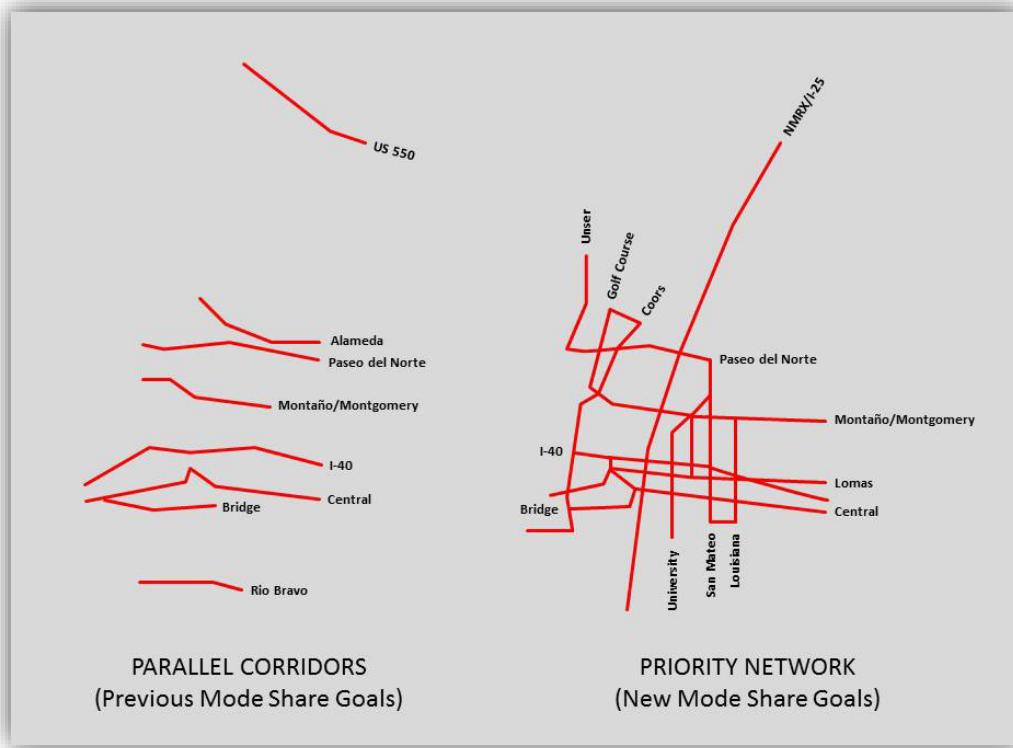
Map 4-14: Average Weekday Transit Users, 2018



Priority Investment Network Connectivity

An even more fundamental reason for this change is a function of geometry. The previous mode share goals supported a series of parallel corridors that did not intersect (river crossings). However, the new mode share goal supports a potential frequent network that more closely aligns with the Target Scenario and facilitates connectivity between routes and activity centers. Instead of targeting east-west river crossings indiscriminately, the new network focuses on key river crossings where the application of transit is most practical, congested corridors, and major activity and employment centers that attract riders.

Figure 4-36: Previous and Revised Network Comparison



Stated another way, it is not enough for a rider to get across the river—which is a significant barrier that cannot be ignored—but also to their desired destination. The AMPA’s future transit network must accomplish both. The Albuquerque Rapid Transit project along Central Avenue is the first beneficiary of this revised policy—bringing to bear both local funds and federal funds derived from the transit mode share set aside to compete for and complement Federal Transit Administration Small Starts funds. In later years, the University Corridor Rapid Bus Service could likewise be the next logical recipient for set-aside funds based on the relative priority that Rio Metro’s Board assigned to both projects. Nevertheless, Resolution 15-01 MTB is structured so that the Transit Priority Investment Network may be revised during each MTP cycle (every five years) to reflect the AMPA’s evolving transit needs.

Operational Funding Challenges and CMAQ Funds

These additional TIP funds counterintuitively highlight the greatest challenge to expanding transit service in the AMPA: operational funding. The federal funds that R-10-16 MTB target, specifically STP-U and CMAQ, are primarily available for capital improvements, such as the acquisition of land for and the design and construction of new park-and-ride lots and Bus Rapid Transit systems. Although these funds are critical for matching other local, state, and federal sources when implementing new services, they are not authorized to sustain long-term operations.³⁹ At the time the R-10-16 MTB target was passed, the region was in non-attainment for air quality, and MRMPPO was given a portion of the state's CMAQ allocation to program in the Transportation Improvement Program (TIP). However, the region is currently in attainment, and therefore is not allocated a dedicated portion of the state's CMAQ funding to program. Therefore, the MTB resolution to program 25 percent of funding to transit projects only applies to STP-U funding.

Labor, fuel, maintenance, vehicle replacement and administration are the primary determinants of a transit system's on-going expenses, and, over the long term, can outweigh the capital investments required to introduce new services. Also, investments in long-distance and/or low-ridership routes generally result in higher operating costs.

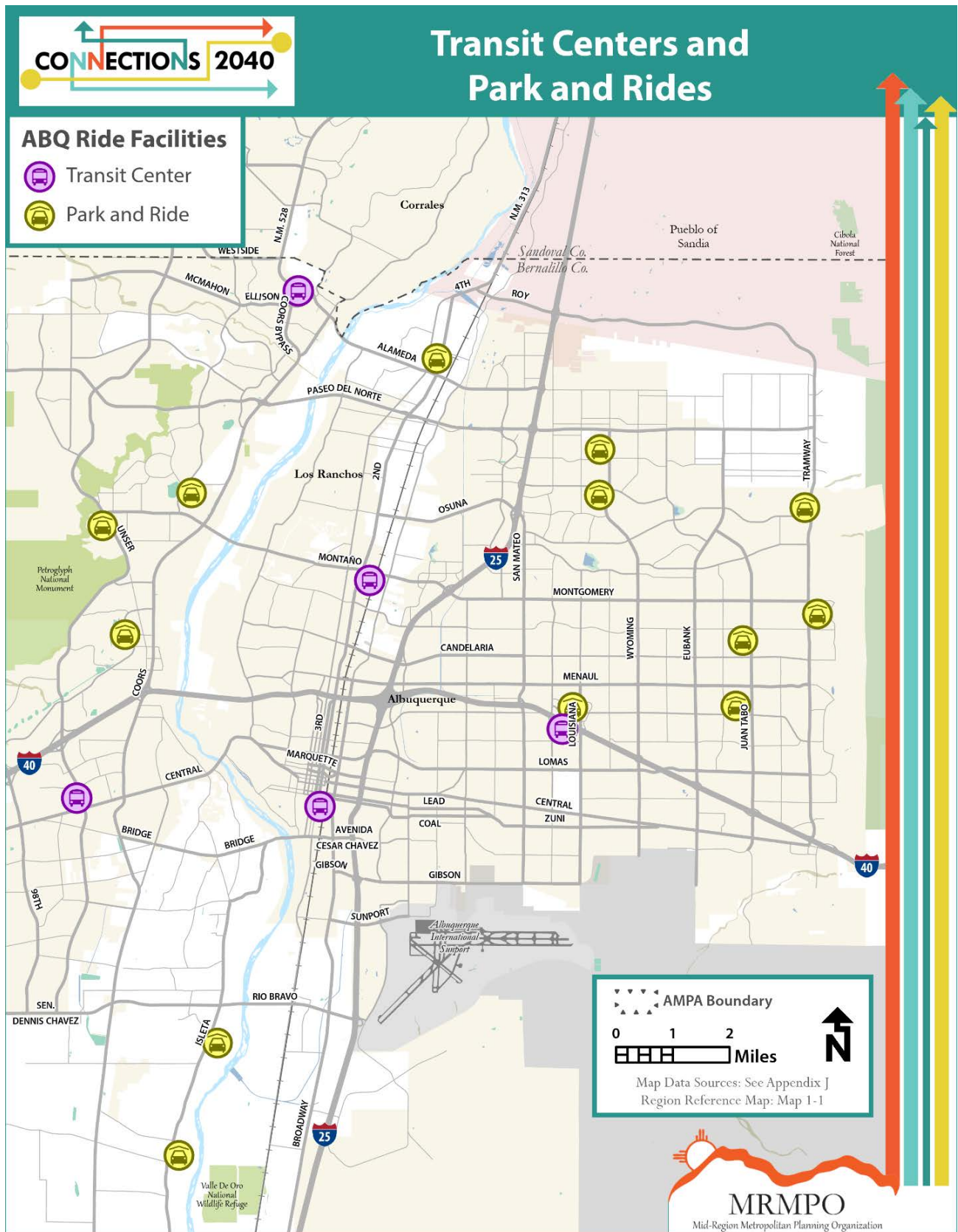
Presently, both ABQ RIDE and Rio Metro are utilizing all available revenue sources to operate existing services. Any new service such as a new route, or increasing the frequency of an existing route, would require either the elimination or restructuring of existing services, or an additional sustainable revenue source. The efficiency of that service would likewise affect the efficacy of any new revenue source.

As plans and projects continue to recommend and investigate future transit services, new sources of operating funds would be required. However, both ABQ RIDE and Rio Metro's operating budgets are at capacity, with very little room to provide additional service in response to demographic pressures. Rio Metro's operating budget for FY 2018 (excluding reserves) was \$40,964,290. The primary source of local funding is a 1/8th cent gross receipts tax, which is currently estimated to generate \$25.5 million per year. Federal funds comprise the largest share of the remaining funds. ABQ RIDE's FY 2018 budget of \$52,200,921 depended heavily upon several local sources supplemented by federal funds.

Park and Ride Opportunities

Park and ride lots offer a valuable transportation alternative, especially for those who live in suburban or rural areas far from transit service. Park and ride lots are parking areas next to transit stations that allow people to park their cars and ride transit into the city center. This reduces congestion on the most critical roadways leading to job centers. There are park and ride lots at several Rail Runner stations, enabling long distance commuters the option to more easily take the train. ABQ RIDE has several park and ride locations at transit centers. Two locations specifically cater to Westside residents looking for a transit alternative to driving downtown or to UNM. The map below shows ABQ RIDE park and ride facilities.

Map 4-15: ABQ RIDE Park and Ride Locations



f. Future Transit Network and Services

Priority Investment Transit Network

The Priority Investment Transit Network discussed already is focused on a network of transit corridors with high ridership potential that are eligible to receive funding set aside by Resolution 15-01 MTB. These routes (established during the previous MTP). serve dense parts of the Albuquerque metro area, and regional decision makers and staff believe they could reach a 20 percent mode share by 2040. This network does not designate what type of service exists on which streets, it only indicates regional corridors that have high transit ridership and land use density.

Long Range Transit Network (LRTN)

Rio Metro and ABQ RIDE staff, as well as the Land Use and Transportation Integration Committee, were consulted on updating the regional Long Range Transit Network (previously identified as the Conceptual Network). Minor changes were made to reflect the impact of growth on our region and to capture updates to the Target Scenario. The Long Range Transit Network is an aspirational transit network that is not fiscally constrained and captures how the AMPA's overall transit network could feasibly grow in the region. This transit network is akin to the Long Range Roadway System and the Long Range Bicycle System. This transit network is expansive and includes routes that serve areas that are not dense and that have less frequent service. Therefore, it includes more defined types of service, ranging from Bus Rapid Transit (BRT) and Rapid Ride, to Primary, Secondary, and Tertiary bus routes.

The Long Range Transit Network incorporates new projects and enhancements to existing services – and ties them to a proposed revenue source. If community leaders and voters desired to make a greater investment in transit, Rio Metro's remaining 3/8-cent gross receipts tax (GRT) capacity is likely the most appropriate funding source. Based on current receipts, such an increase would generate approximately \$76.5 million annually. For the purposes of this analysis:

- Rio Metro's bus services and ABQ RIDE's Sun Van paratransit receive additional funding (\$14.8 million) proportionate to their share of the combined 2018 operating budgets of ABQ RIDE and Rio Metro. The Long Range Transit Network assumes that Rio Metro's existing bus services will continue, while also allowing expansion commensurate with population growth. ABQ RIDE paratransit service would likewise grow to meet the increased demand of an aging population and the expansion of the fixed-route network by the 2040 horizon.
- The Rail Runner receives less than its proportionate share (\$15.8 million) of revenue because no major extensions of the Rail Runner or similar rail projects are proposed in the AMPA. Instead, efforts to expand operations focus on increasing frequency. Also, much of the funds would support the construction of capital projects that emphasize efficiency, such as sidings and second main tracks that would reduce delay.
- The remaining balance of revenue (\$46 million) is provided for expanded bus service and an additional BRT line generally aligning with ABQ RIDE's existing service area⁴⁰. The rationale for this distribution is not so much based on this area's disproportionate share of the population (and, consequently, tax revenue generation); rather, the Albuquerque area has the proven potential to provide the greatest return in terms of both ridership and service efficiency. This allocation essentially values ridership without sacrificing coverage throughout the region.

⁴⁰ There is an additional BRT service proposed that would run along Paseo Del Norte and Unser connecting to Rio Rancho dubbed the Northwest BRT. After meeting with regional transit providers, it was deemed unlikely that the service would reach BRT level by 2040 and is implemented as a Rapid Ride service in the LRTN. The Northwest corridor is, however, described as someday supporting BRT on the illustrative list in Appendix B.

In addition to the distributions noted above, approximately one-fifth of the funds committed to each service type were withheld to fund vehicle replacement and maintenance of capital assets; thus, any new services funded by the gross receipts tax increase would be sustained by that same source. Additional Federal Transit Administration (FTA) formula funds would likely defray some of these costs.

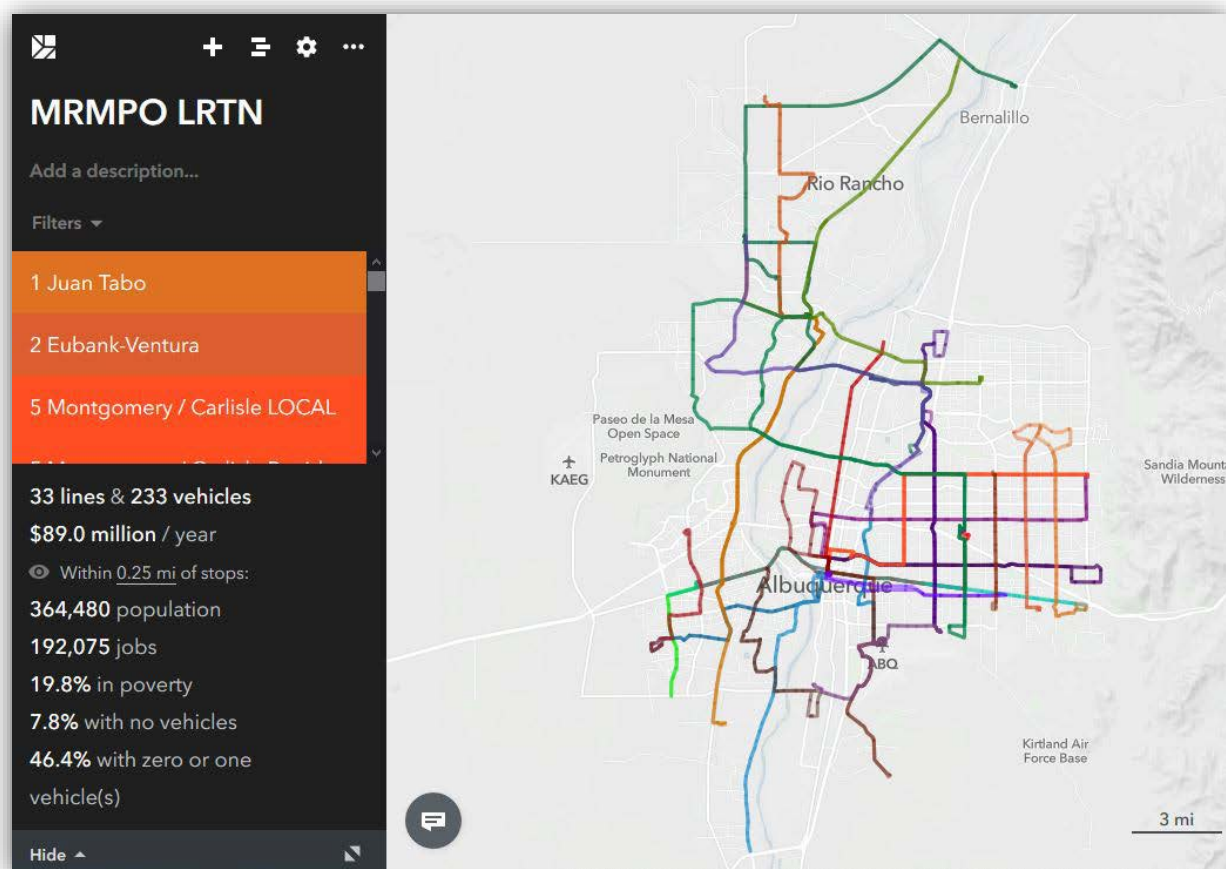
Potential Costs and Access to Future Transit

Once an updated Long Range Transit Network was agreed upon, MRMPO staff used Remix, a web hosted transit planning application, to create a model of the transit network in order to gain an idea of how much such a system would cost and how many residents and businesses would be reached by the service. Remix allows planners to plot lines representing transit routes and design schedules, the application then estimates how long a bus would need to navigate the route and how much it would cost with the assumption 1 hour of bus operation costing \$100.

Target Scenario Transit Network

In addition to the Priority Investment Transit Network there is a Target Scenario Transit Network, which includes a core network of transit routes that are a subset of the Long Range Transit Network. These were developed by highlighting specific routes that would best support anticipated growth and the regional centers of the Target Scenario, as well as support the guiding principle of enhancing transit-oriented development. These core bus routes have at least 15-minute frequencies. This network is shown in Chapter 3 (The Target Scenario).

Figure 4-37: Screenshot of Remix LRTN



The LRTN was modeled with peak headways of 7-15 minutes for the BRT and Rapid Ride services, 15 minutes for primary routes, 25 minutes for secondary routes and 35 minutes for tertiary routes. The modeled network would cost \$89 million annually, which could be met with the additional \$46 million generated annually by a 3/8th cent GRT tax. If this network were built, 572,336 residents and 263,676 jobs would be within a half mile of a bus stop. 387,458 residents and 209,360 jobs would be within a half mile of a high frequency bus stop (15-minute frequency or higher).

The 2040 Long Range Transit Network (LRTN) comprises an approximately 103 percent increase in vehicle revenue hours over the 2018 transit network. In the current system 104,731 people and 77,588 jobs are within a half mile of a high frequency (15-minute frequency or higher) transit stop. If the Long Range Transit Network existed today 387,458 people and 209,360 jobs would be within a half mile of a high frequency bus stop. **With far more people and destinations close to high frequency service, it is more likely that we will achieve our 20% transit mode share on key corridors in the region.** The Long Range Transit Network should be viewed as a rough approximation of what is possible. Were this analysis to come to fruition, a far more detailed planning and modeling exercise incorporating public input would be necessary.

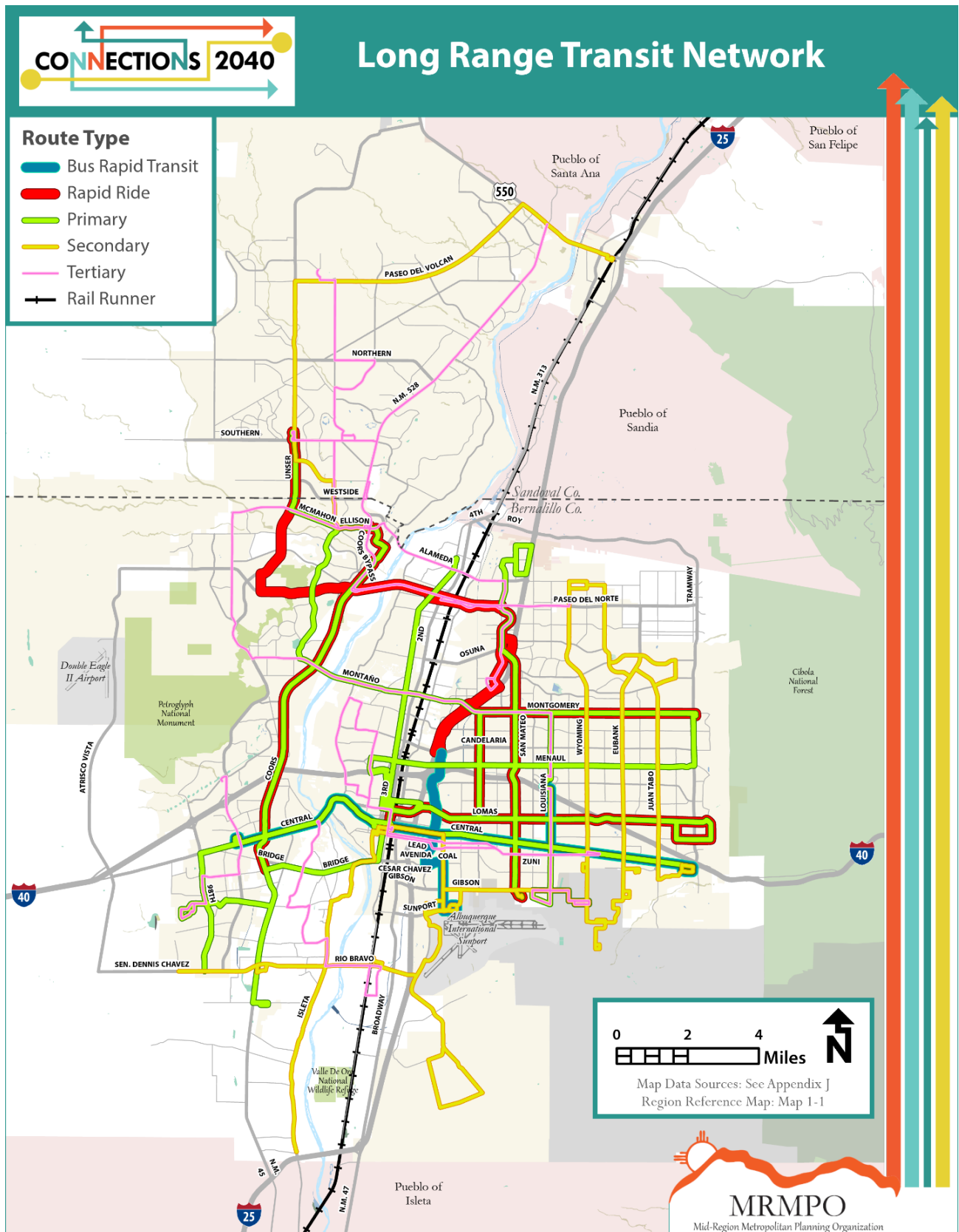
Demographic Data for Potential Transit Lines

Remix gives transit planners the ability to investigate the demographic attributes surrounding potential transit lines. An analysis of the demographic data within a one-quarter mile of each bus route in the LRTN shows which routes serve the greatest number of impoverished people. The percentage of people living in poverty, as well as the percentage of people who do not own vehicles is an indicator that there is a demand for reliable transit service around a particular transit line and further investment should be considered. Minority population and people with disabilities are groups whose needs have historically been ignored and should be considered moving forward.

Table 4-11: Long Range Transit Network Demographics from Remix

Route	Population	In Poverty	Minority	With Disabilities	With No Vehicles
SYSTEMWIDE STATS	364,911	20%	61%	14%	8%
97 Zuni Express	18,488	37%	63%	15%	19%
222-Rio Bravo/ Rail Runner/ KAFB	7,090	33%	75%	17%	16%
50 Airport / Downtown Mesa Del Sol	8,759	33%	55%	13%	20%
66 Central Avenue	39,599	32%	70%	16%	15%
UNM/CNM BRT	6,533	32%	59%	12%	16%
53 Isleta	11,756	31%	81%	20%	9%
766 ART	13,393	29%	61%	15%	16%
141 San Mateo Rapid Ride	18,264	28%	58%	15%	13%
140 San Mateo LOCAL	18,973	28%	58%	15%	13%
51 Atrisco / Rio Bravo	9,420	27%	88%	22%	6%
54 Bridge / Westgate	18,245	25%	88%	14%	7%
31-Copy Wyoming	22,361	22%	54%	14%	9%
10 North Fourth Street	11,206	22%	67%	15%	10%
8 Menaul	24,097	22%	57%	15%	9%
198 98th / Dennis Chavez	13,271	21%	89%	10%	1%
11 Lomas Local	25,469	21%	52%	15%	12%
11 Lomas Rapid Ride	25,469	21%	52%	15%	12%
36 12th Street / Rio Grande	13,678	21%	61%	16%	9%
5 Montgomery / Carlisle LOCAL	29,281	20%	51%	14%	11%
5 Montgomery / Carlisle Rapid Ride	29,281	20%	51%	14%	11%
157-Cottonwood / Montano / UTC - Primary	38,599	20%	59%	15%	10%
1 Juan Tabo	28,513	18%	46%	15%	8%
SW Unser Blvd Tertiary	16,749	18%	85%	11%	2%
155 - Coors Rapid Ride	29,341	17%	70%	13%	4%
155 Coors	29,341	17%	70%	13%	4%
251 ABQ-Rio Rancho Rail Runner Shuttle	7,471	17%	56%	16%	6%
157 Cottonwood / Montano / UTC - Tertiary	54,651	16%	59%	14%	8%
Alameda Tertiary	8,608	14%	59%	13%	4%
NM 528	12,100	13%	53%	16%	4%
Rio Rancho	16,613	13%	59%	12%	2%
2 Eubank-Ventura	28,237	12%	44%	13%	5%
17-Paseo Rapid Ride	17,204	11%	59%	11%	3%
Golf Course Rd./ Broadmoor Blvd.	13,313	11%	56%	13%	3%

Map 4-16: Long Range Transit Network



Opportunities to Increase Transit Ridership

Transit ridership in the Albuquerque metropolitan area rose explosively between 2005 and 2012, then dropped precipitously between 2014 and 2018.

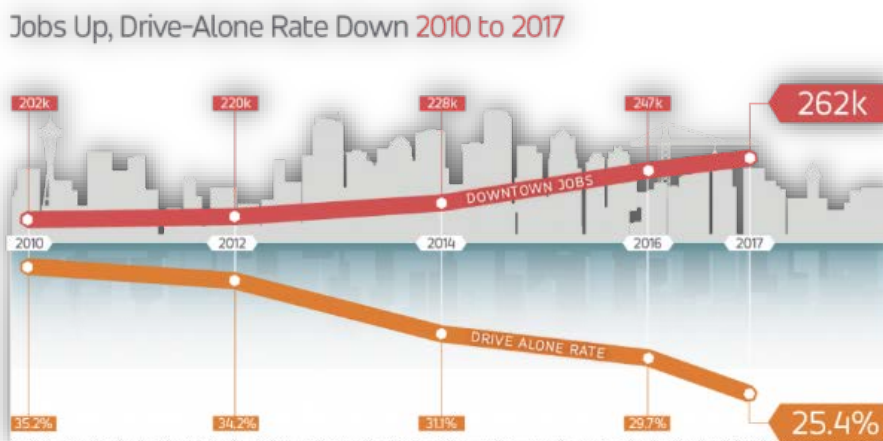
Transit use is not only declining in Albuquerque, it is in decline across the country. A small handful of American cities are bucking the trend and increasing transit ridership. The most impressive example of this is the City of Seattle. Seattle (one of the fastest growing cities in the country) has increased its overall transit use by 11 percent in the last ten years.⁴¹ **Despite a 19 percent growth in jobs and a 20 percent growth in population, Seattle has reduced the use of single occupancy vehicles.** The number of people entering downtown Seattle has shifted away from single occupancy vehicles and towards transit, walking, biking, and carpooling. The bulk of the shift has been shouldered by transit, with 48 percent of commuters entering downtown via transit in 2017, up from 42 percent in 2010. Driving alone into downtown fell from 35 percent in 2010 to 25 percent in 2017.⁴¹ In 2015, only 25 percent of the city's households were within a 10-minute walk of high-frequency bus service, and after only three years of investment in service expansion, 67 percent of Seattle's households were within a 10-minute walk of high frequency service.

Seattle's Success Story

In 2014, Seattle voters approved the Seattle Transportation Benefit District Proposition 1 (STBD) to fund an expansion in transit service as well as programs to increase ridership throughout the city. This proposition is funded with a 0.1 percent sales tax increase and a \$60 license fee (see footnote below). These revenue sources generate roughly \$50 million a year for six years between 2014 and 2020. Since 2015, 6,780 weekly bus trips have been added in Seattle. The Seattle Transportation Benefit District investment in service expansion and increased bus frequency has Seattle close to reaching a key transit goal of the city, which is to have high frequency bus service (10-minute or less headways) within a 10-minute walk of 72 percent of the city's households by 2025¹. The Seattle Transportation Benefit District also devotes money to subsidizing transit passes for youth and low-income families and improving on time service. Clearly, Seattle has proven that investing in transit service provision leads to gains in ridership.

The experience in the Albuquerque Metro Area mirrors that of Seattle in that when major investments were made to improve transit service in the mid-2000s (such as in ABQ RIDE's Rapid Ride and Rio Metro's Rail Runner) ridership climbed.

Figure 4-38: Commute Seattle Drive Alone Percentages



⁴¹ https://www.seattle.gov/Documents/Departments/SDOT/TransitProgram/STBD/2018STBDAnnualReport_FINALv2.pdf

4.3 Roadway, Rail, and Air Freight Assets

Albuquerque is located at the intersection of the I-40 and I-25 interstate facilities, which NMDOT identifies as the major freight designated routes for truck freight. As noted in the Greater Albuquerque Transportation and Logistics Feasibility Study, conducted in 2017 by MRCOG with key member agencies, New Mexico is a trucking state situated at the crossroads of the two longest interstates (Interstate 40 and Interstate 25) in the US. According to a July 2013 report from the American Transportation Research Institute (ATRI), this important intersection is number 121 of the 250 most congested in the United States. I-40 serves as a major cross-country route because it connects the Port of Long Beach, CA, to eastern markets. In addition, hours of service regulations require trucks to drive no more than 11 hours per day and work no more than 14 hours.

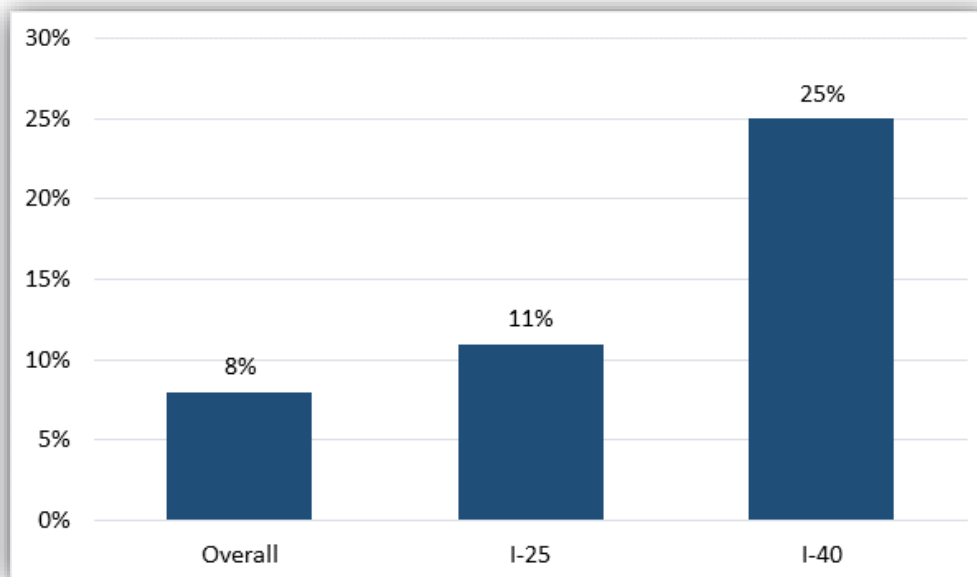
This makes New Mexico a logical stop for trucks driving east from California. In addition, Albuquerque is about 12 to 14 hours from Houston, TX, another major port. According to a recent report by the Brookings Institute and JP Morgan Chase, Albuquerque falls within the top quintile of interstate traders with a 91.2 percent interstate share.

Our region, therefore, plays a crucial role in linking the country's freight network and preserving and maintaining interstate facilities is of significant national and regional interest. The quality and functionality of a region's freight assets and infrastructure are critical.

Freight Vehicle Counts

The overall percentage of commercial vehicles (those vehicles larger than passenger car, truck, or two-axle six-tire truck) in the region is about eight percent. However, when considering the proportion of commercial vehicles on I-40 through, the percentage jumps to nearly 25 percent, indicating the importance of interstate freight travel along the I-40 corridor.

Figure 4-39: Percentage of Commercial Vehicles out of Total Traffic Volume



Source: NMDOT 2040 Long Range Multimodal Plan, 2015

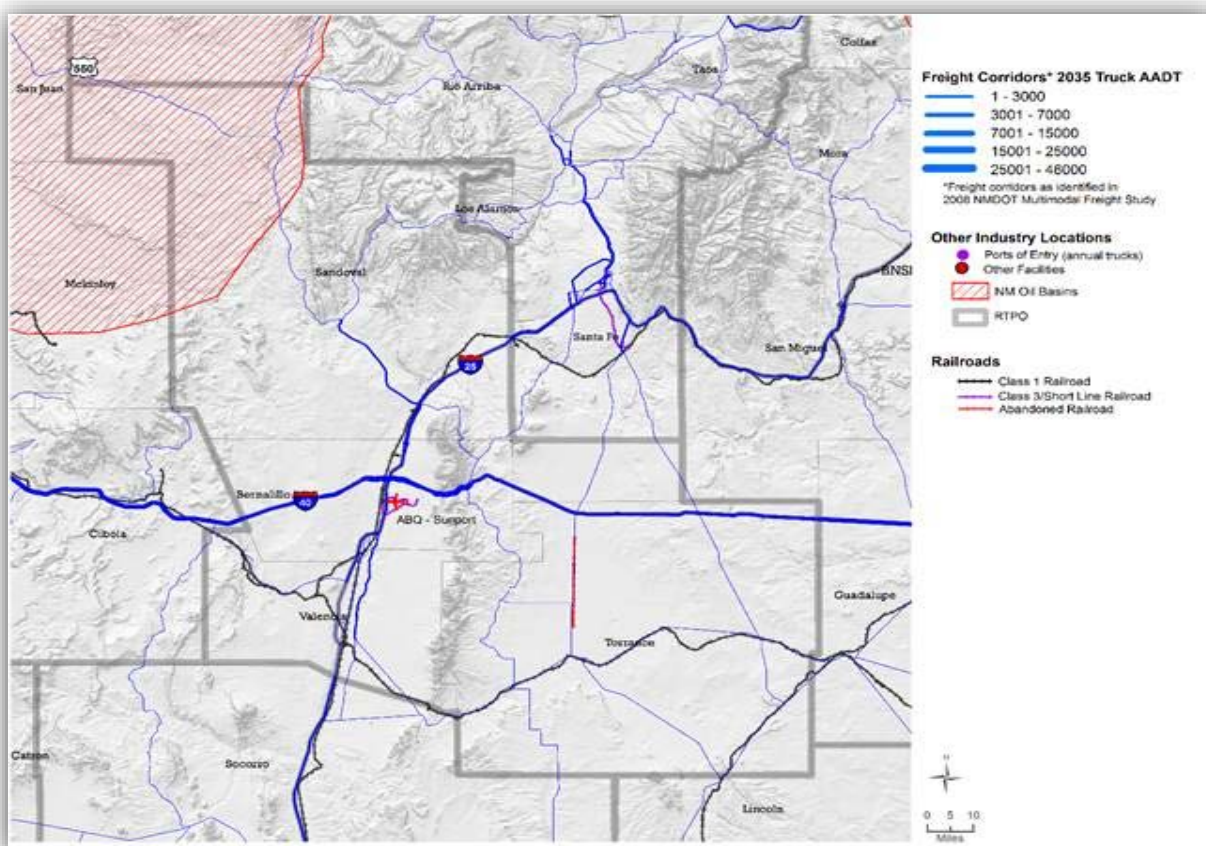
Commercial vehicle counts on I-25 are not nearly as high, with 11 percent of all traffic volume classified as commercial vehicles at the southern boundary of the region. Roadway performance on the Freight Network is sourced from the NMDOT as well as the National Performance Management Research Data Set (NPMRDS) for volumes and speeds on the National Highway System⁴²

Data from New Mexico Department of Public Safety, Motor Transportation Division shows that the vast majority of these trucks, roughly 85-90 percent, are crossing the state without conducting local deliveries.

a. Future Truck Traffic

According to the Federal Highway Administration's Freight Analysis Framework (FAF) I-40 at the western regional boundary had annual average daily truck traffic of 8,670. **By 2040, that number is projected to increase by 240 percent to over 20,000, comprising over 43 percent of all traffic.** I-25 at the northern boundary of had annual average daily truck traffic of nearly 3,900 trucks and is forecasted to reach over 6,300 trucks in 2040. This level of growth in truck freight travel not only indicates the value of maintaining the roadway infrastructure in the region in good working order but will place additional strain on that same infrastructure and contribute to growing congestion challenges.

Figure 4-40: 2035 Truck Average Annual Daily Traffic on Freight Corridors



⁴² As noted elsewhere in this document, MRMPO is in the process of working with the NMDOT to reconcile differences in performance monitoring between the Congestion Management Process and the National Performance Measures (PM). The NPMRDS dataset is used in combination with the MRCOG Freight Network to show freight-only speeds from NPMRDS.

There are no exclusive truck-only lanes within the region, meaning that truck traffic is not given any priority and must operate on the same roadway lanes as general purpose vehicles. With no truck lanes programmed in future years of the MTP, the amount of freight traffic operating under congested conditions (measured in lane miles of roadway) becomes a serious issue that will adversely affect trucking operations including lengthened delivery times and increased operational costs. The current and anticipated growth of truck freight travel taking place under congested conditions for each scenario in the MTP is shown below.

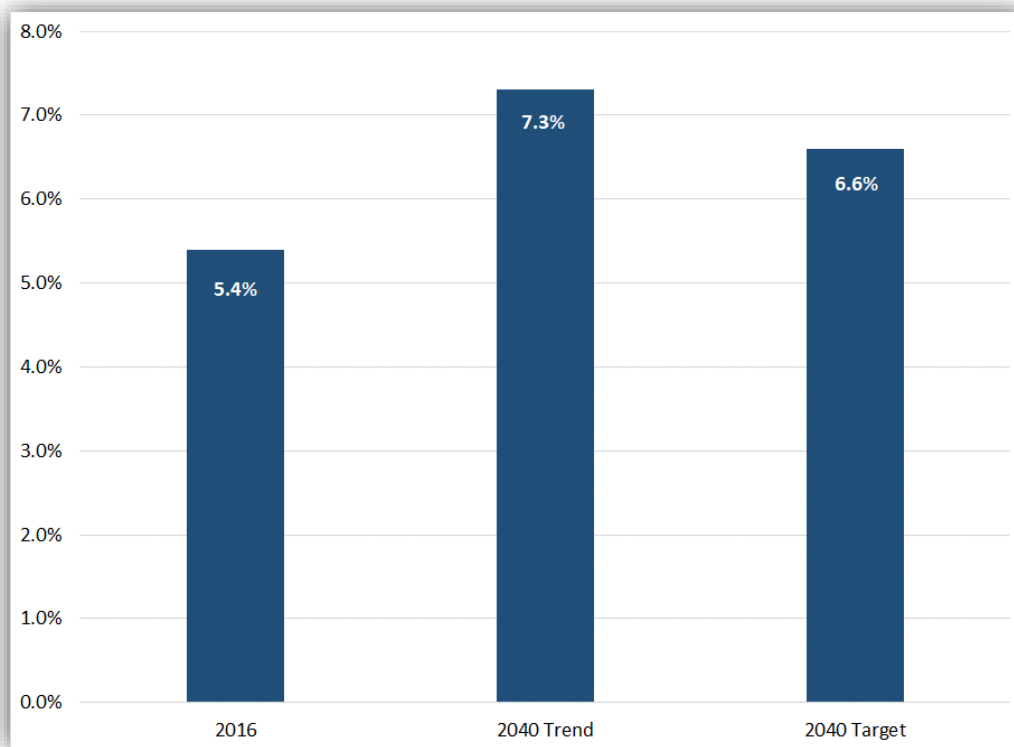
Trend versus Target Scenarios

An analysis of several of the primary freight corridors was performed for the modeled 2016 Base Year and the Trend and Target Scenarios using the travel demand model. A summary of the key corridor basic operating conditions is provided in the table below. Since there are no specific truck lanes or other preferential roadway designations for freight traffic in the region, commercial vehicles traveling these corridors are subject to the same traffic levels and congestion as other motorists. Conditions are generally worse in the Trend Scenario than the Target, although the overall network volumes are approaching capacity in both scenarios.

Table 4-12: Performance Measures on Primary Freight Corridors, 2016 and 2040 Scenarios

Freight Corridor	PM Peak Hour V/C Ratio			Total PM Peak Hour VHD		
	2016	2040 Trend	2040 Target	2016	2040 Trend	2040 Target
US 550	0.54	0.61	0.62	506.5	832.1	554.8
NM 528	0.56	0.6	0.60	444.5	784.3	681.7
Coors Blvd - North of Central Ave	0.63	0.67	0.69	719.3	839.3	837.8
Coors Blvd - South of Central Ave	0.33	0.41	0.47	170.4	255.9	237.2
Central/Lomas	0.52	0.60	0.61	821.1	1,373.3	1169.4
Bridge Blvd	0.54	0.65	0.67	395.5	881.1	678.8
Rio Bravo Blvd	0.60	0.69	0.62	340.8	758.9	543.0
Alameda Blvd	0.72	0.79	0.76	761.3	1,315.9	951.1
Gibson Blvd	0.52	0.63	0.63	226.0	333.1	347.3
Interstate 25	0.6	0.61	0.58	411.0	328.5	288.7
Interstate 40	0.62	0.70	0.68	610.5	2232.7	1433.9
Network Average or Total	0.62	0.64	0.57	7,630.9	9,935.1	7,723.7

Figure 4-41: Commercial Vehicle Network Operating under Congested Conditions



Primary Freight Network

To help prioritize freight related improvements and understand truck travel patterns, a primary freight network was developed with stakeholders in the region. The map identifies corridors that support through movements; not depicted are those routes with adequate vehicle weight capabilities that serve local delivery. Also shown are the various locations around the region where truck freight travel is restricted. Such restrictions have important implications, particularly for deliveries across the Rio Grande. Primary corridors include I-25, I-40, Coors Blvd, NM 528, Alameda Blvd, and several other river crossing facilities.

General Freight Concerns

Long-haul truckers have voiced concern that the interstates are not functioning as well as they need to make timely and efficient deliveries. Congestion is a major concern, while safety is also a high priority among local freight stakeholders. Other observations and concerns among the region's freight community include the following:

- Insufficient truck parking and a lack of rest areas to accommodate overnight stays
- Freeway closures due to incidents are increasingly costly to carriers (and ultimately consumers)
- In the event of full long-term roadway closures, long-haul freight companies are expressing the desire to not be staged in short-term parking facilities, rather, they prefer to be turned-around and allowed to make the larger detours to get back on the road en route to final destinations
- Traffic delays are compounded by the inability of tow vehicles to reach and clear disabled vehicles
- Poor communication with trucking associations and drivers about truck restrictions

- Incident management – lack of information during weather or other closures results in costly delays and could be mitigated through the following actions:
 - o Truck detouring – direct trucks to appropriate stops when incidents occur
 - o Staging rest areas – identifying appropriate staging areas for trucks when incidents occur
- Insufficient turning radii for certain truck sizes
- Lack of education on safety and knowledge about truck blind spots

Truck/Freight Restrictions

Regional freight stakeholders also shared common concerns related to freight restrictions dealing with weight and river crossings:

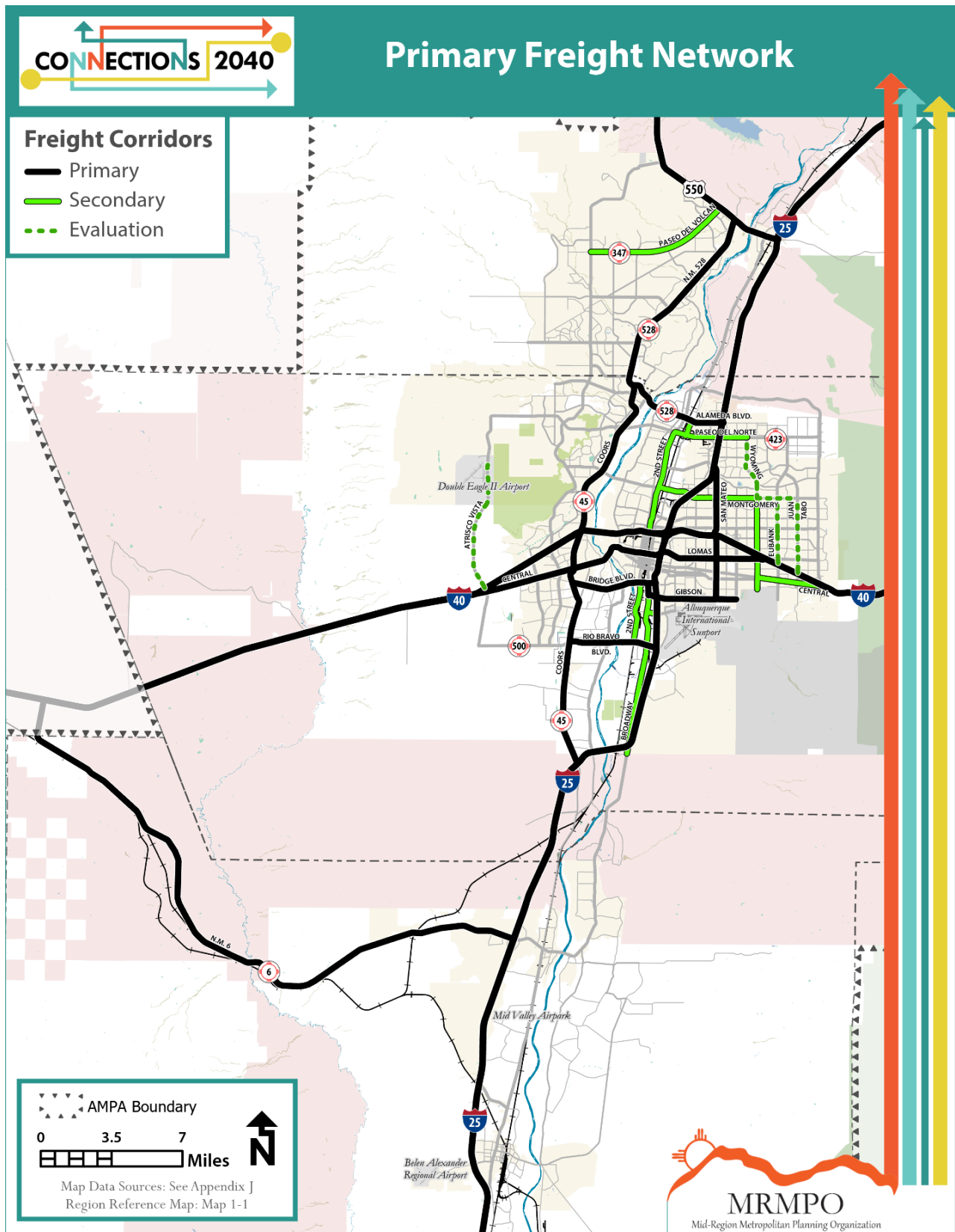
- Weight and bridge height restrictions: There are truck restrictions on facilities that make local trips longer and more costly than they need to be. Additionally, time of day/day of week restrictions further hamper the movement of goods and compound congestion at critical times. Weight and bridge height restrictions on the river crossings at Paseo del Norte and Montañito Rd mean that shippers must route their fleets across I-40 or Alameda Blvd to serve high-growth markets on the west side of the Rio Grande.
- River crossing restrictions: Due to bridge heights and certain areas that do not have infrastructure designed to support freight movement, crossing the Rio Grande is one of the greatest challenges facing local haulers. The lack of truck-accessible bridge crossings means that under interstate closures, Alameda Blvd – the sole arterial bridge crossing between I-40 and US 550 – takes on a disproportionate volume of truck traffic.

Truck restrictions/lack of alternative routes: A further impediment to freight movement on the Westside is the restriction on Unser Blvd from Ladera Rd to Rainbow Blvd. This restriction effectively makes Coors Blvd the sole north-south arterial for freight movements west of the river. Atrisco Vista Blvd, well west of significant commercial development, functions as an arterial route for through movements to markets in far northwest Albuquerque and Rio Rancho.

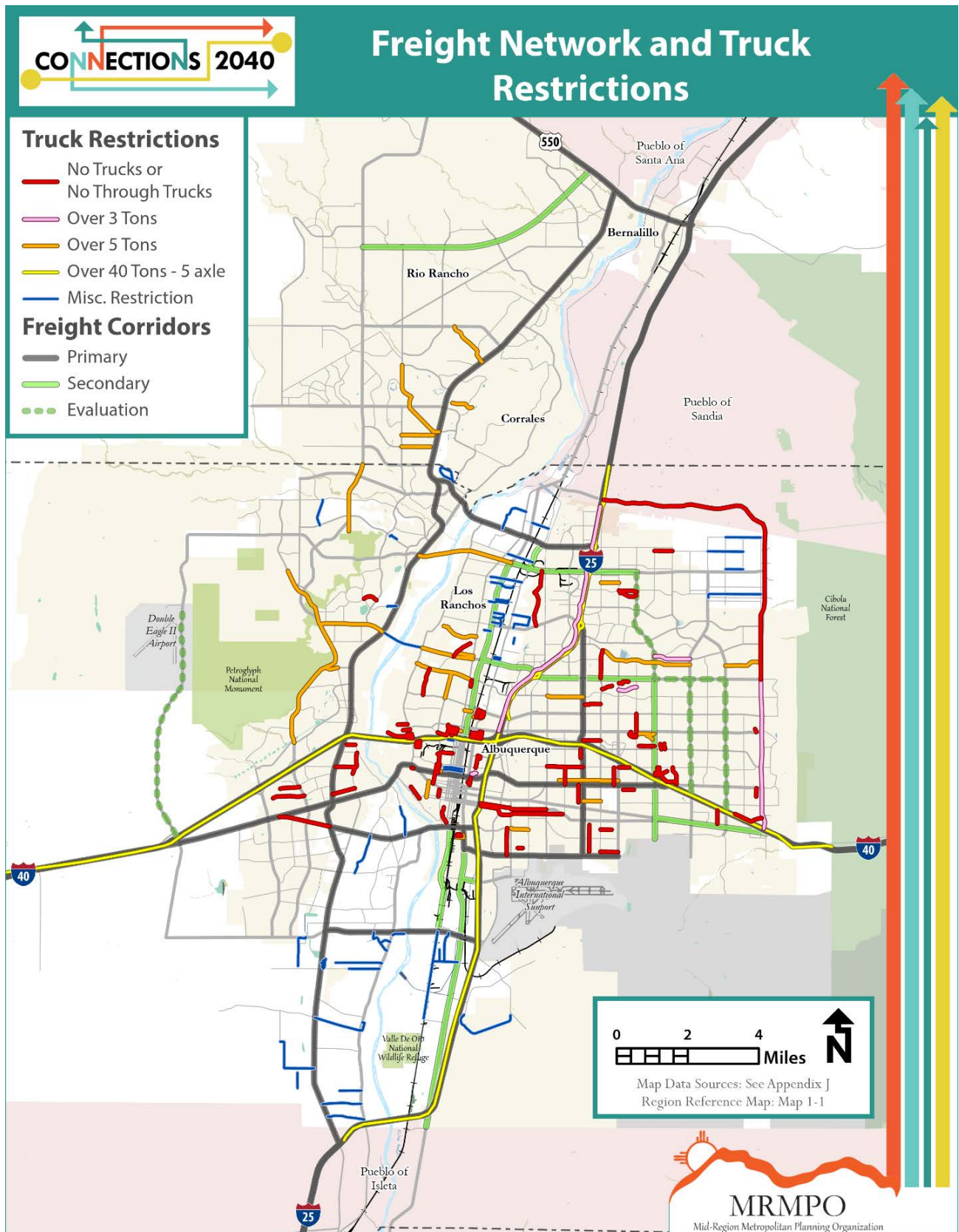
Freight Network Speeds

Roadway performance on the Freight Network is sourced from NMDOT and the National Performance Management Research Data Set (NPMRDS) and includes speeds on the National Highway System. As noted elsewhere in this document, MRMPPO is in the process of working with NMDOT to reconcile differences in performance monitoring between the Congestion Management Process and the National Performance Measures (PM). The NPMRDS dataset is used in combination with the MRCOG Freight Network to show freight-only speeds from NPMRDS (see the map below).

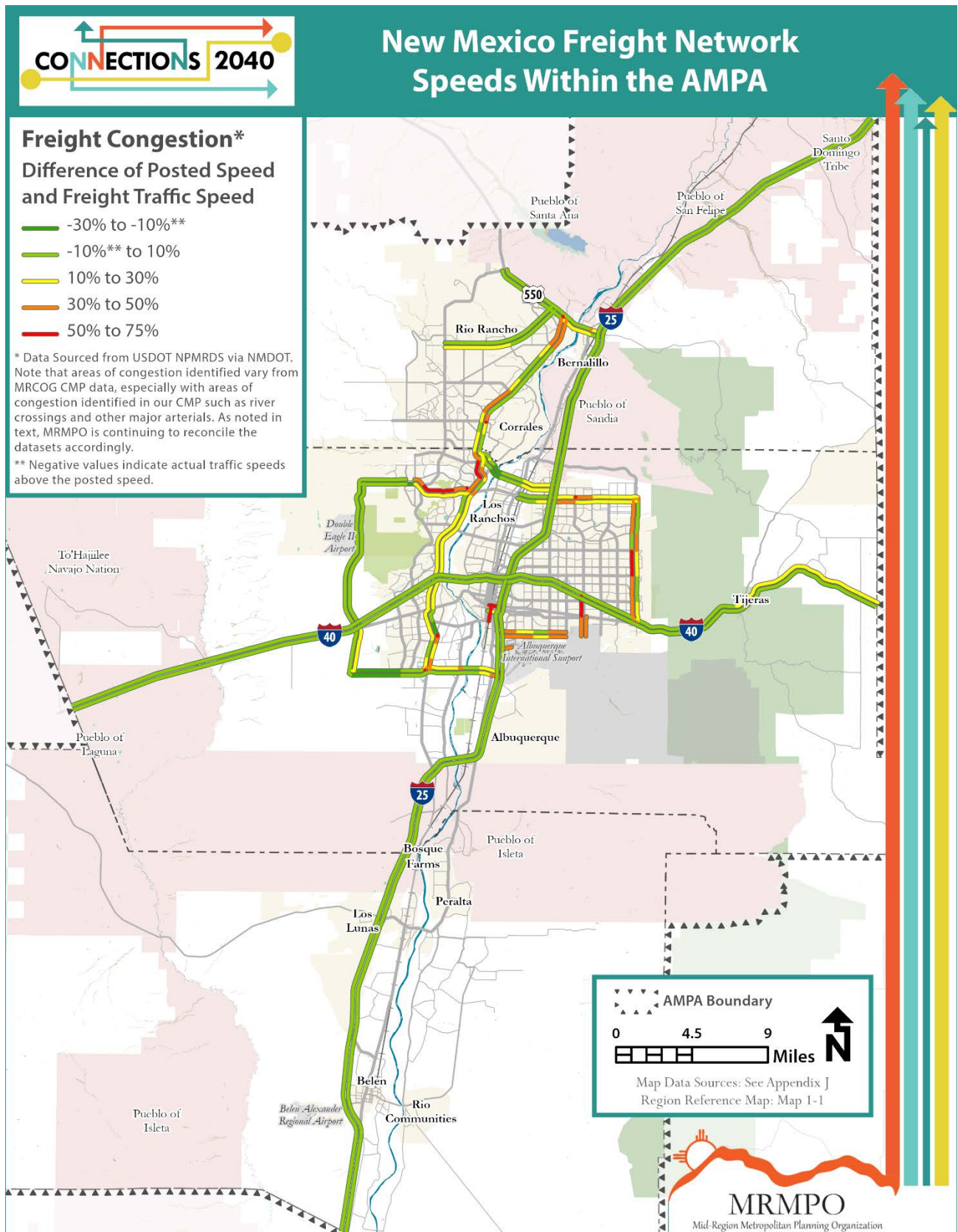
Map 4-17: Primary Freight Network



Map 4-18: Freight and Truck Restrictions



Map 4-19: Freight Speeds



b. ITS and Commercial Vehicle Operations (CVO)

Commercial Vehicle Operations (CVO) is the deployment and integration of ITS with freight movement. Employing and integrating ITS with freight movement is critical to achieving efficient freight movement and supporting the region's freight network. According to the New Mexico Trucking Association, the Traveler Information ITS Service (NMRoads.com) that alerts drivers of hazardous conditions downstream has proven essential to the efficient and safe operation of freight movement. Alerting freight operators of impending lane reductions, closures, or inclement weather conditions allows them to plan their route accordingly to avoid or minimize any associated delays. Many freight corridors have no viable or parallel route alternative within the region, which necessitates a decision to detour far upstream, sometimes hundreds of miles away. The I-40 corridor through the Tijeras Canyon is a particularly weather sensitive area that suffers full closures due to snow and/or ice conditions during the winter season. In the event of closures, staging areas also become an issue as trucks must exit the freeway to find adequate areas to lay in wait until the facility is passable.

Transportation Sector Industry

According to the American Association of State Highway and Transportation Officials (AASHTO), the transportation sector, which includes highways, railroads, waterways, ports, and airports, freight is a \$1.2 trillion industry that generates eight percent of the nation's jobs and supports industries that make up 84 percent of the economy. More information on the economic impacts of freight are included in chapter 6.

Parking and Lay in Wait Facilities

Urban areas, where there are higher concentrations of commercial properties, require short-term staging parking for vehicles waiting to make a pickup or delivery at a specific location. This demand is in addition to the need for short breaks and overnight rest to satisfy Hours of Service (HOS) requirements. Many commercial businesses have specific windows during which trucks can be on site to load or unload their goods. The NMDOT and area enforcement entities continue to work with the motor carriers to identify viable options (such as the New Mexico State Fairgrounds). However, as mentioned previously, long-haul freight companies have expressed the desire not to be staged in short-term parking facilities in the event of longer-term full roadway closures and would prefer to be allowed to turn around and make the larger detours to get back on the road en route to their final destinations.

Penalties and Levies

Distribution and warehouse facilities want to maintain the most efficient truck delivery schedule possible to maximize onsite labor and resources, and therefore may add penalties to trucks arriving late for deliveries or pickups. Large retail shippers, such as Walmart and Amazon, levy penalties on tardy deliveries (including companies and drivers), a punishment which has become more common in the industry.¹ These factors, along with HOS regulations puts more pressure on drivers to show up early.

The private sector can play a role in providing truck parking, particularly shippers and receivers who generate a significant portion of the truck parking demand. When local jurisdictions allow for new development, but do not also account for the increased level of truck parking needs, the costs for mitigating these needs are passed on to others. Requiring shippers and receivers to provide on-site parking or contribute their fair share to the cost of a common parking area, will help meet the parking demand while also help spread the costs of providing truck parking.

Inspection Stations

Freight/trucking commodities is a regulated activity subject to certifications on weight/load, safety records, and other permitting as required by each state. Inspection stations are typically located at ports of entry and are administered by state motor transportation divisions. In order to minimize delay that these stops may incur on trucks en route the New Mexico Motor Transportation Division has employed an automated vehicle identification (AVI) system, *PrePass*, that allows for pre-screening at designated inspection stations. The designated *PrePass* weigh stations in New Mexico are located along the I-25 corridor at Anthony and Raton, the I-40 corridor at Gallup and San Jon, and at the I-10 corridor at Lordsburg. Based on 2012 *PrePass* activity data, approximately 85 to 90 percent of all trucks entering the state pass through along these interstate corridors. Automated systems like *PrePass* help to ease congestion around inspection facilities and result in operating cost savings for freight operators. Ultimately these cost savings are passed on to consumers.

Pro-Miles Software

Another encouraging example of ITS is the Pro-Miles software, currently being tested by the Department of Public Safety, Motor Transportation Division. This software would replace the automated commercial system (ACS), which is used to track, control, and process the movement of all goods and especially goods imported into the United States. ACS is considered an antiquated and slow permitting system. All commercial motor carrier vehicles that pass through New Mexico Port of Entry Stations must obtain clearance certifications. Pro-Miles software allows for faster management of the permitting process when paired with new scanning technology such as license plate readers. Since this software is electronic, acquiring the required freight trucking permits to enter, leave, or travel through New Mexico would require less time, and freight trucks would not be required to stop at each state point of entry. Pro-Miles has the capability of interactive routing, so the software can alert truck drivers upstream of an accident and of potential detours. This software also enables improved data collection about freight truck routes and congested areas. Full deployment of Pro-Miles is anticipated for March 2020.

Freight and Logistics Committee (FLC)

In pursuit of a more organized freight planning framework for the AMPA, MRMPO has established a Freight and Logistics Committee (FLC). The committee is a subcommittee to the TCC whose purpose is to provide recommendations on improving the transportation infrastructure in support of the flow of goods across all modes in the MRCOG region. Membership includes MRMPO member agencies as well as other public agencies and private associations with pertinent interest in improving freight and goods movement within the AMPA and MRCOG region. Specific areas of focus include policy, freight and truck restrictions, and the identification, evaluation, and potential recommendation of candidate parcels ideally suited for cargo-oriented development (COD), as well as any other freight related matters in the region. The committee met in the Fall of 2019 and some important issues are listed below:

- Consideration of last-mile distribution and same-day/two day deliveries as industry standard
- Provision of parking demand and capacity
- Promotion of Trucking Centers
- Restrictive environments that discourage inter-state trucking, such as weather and lack of by-pass
- Effects of newly enacted Electronic Data Logs (EDLs) and impacts to the existing traffic during peak and off-peak times
- Desirability from the industry to pursue public private partnerships (PPPs) as a policy-driven tool for additional funding of projects
- Coordination of local, regional, and State-wide activities

c. Regional Rail and Air Assets

Historically, railroads have had an important role in the prosperity of the Albuquerque metro area, supporting not only regional and interstate commerce, but also in supporting local employment and economic activity. Due to the nature of rail as a long-haul type of mobility service, it is important to consider the impacts of rail in a larger context.

Rail System

There are 2,055 miles of railroad right-of-way in New Mexico, which help connect the east and west coasts. 2,023 miles of the network is owned by Class I railroads and shortline railroads. The network includes two major transcontinental rail corridors, both of which are critical to the movement of goods on the national freight network. Two Class I railroads, BNSF Railway and Union Pacific Railway, own 85 percent of the freight railroad in New Mexico. The shortline railroads, which comprise 15 percent of the ownership, run a variety of different services throughout the State of New Mexico. Numerous rail spurs exist within the region, some of which are abandoned but could offer excellent opportunities for expansion. One in particular is the Kirtland Air Force Base (KAFB) Rail Spur extending to the south of the Albuquerque Sunport which is anticipated to support Sunport South currently in development.

The primary link between ABQ and major markets via rail is the BNSF Transcontinental Route (Transcon), a 2,239-mile freight route linking the Ports of Los Angeles and Long Beach with Kansas City and Chicago. This route crosses east-west through the region passing through Belen, which is 35 miles south of Albuquerque and also home to a major BNSF yard. BNSF also operates the El Paso subdivision line, which is a 221-mile long track from Belen, NM south to the Mexican border in El Paso, TX. This subdivision serves as one of the BNSF's primary rail connections between the United States and Mexico.

New Mexico Rail Runner Express

Part of New Mexico's rail network includes a section of NMDOT owned track right-of-way, a total of 133 miles through the counties of Valencia, Bernalillo, Sandoval, and Santa Fe. The State purchased the track from BNSF in order to build the New Mexico Rail Runner Express, which is the State's first commuter rail service. Although the State owns both the track and the commuter rail service, it does not operate the service directly, and instead has operating agreements with Rio Metro Regional Transit District (Rio Metro) and Santa Teresa Southern Railroad (SFS) for rail operations and maintenance of its right-of-way. The tracks run through Albuquerque and are central to the MRCOG region and also carries freight traffic between the BNSF Transcon line in Belen and Albuquerque.

Airport Services

Albuquerque International Sunport (ABQ) is the primary airport serving the MRCOG region. It is a medium-sized hub with commercial airport service and is a major port for the State of New Mexico in addition to the MRCOG region. Sunport is located in the southern part of Albuquerque, approximately 4 miles southeast of the central business district. The next closest commercial service airport to MRCOG is in Santa Fe, which is approximately 50 miles northeast of Albuquerque. There are also four public use airports in a 35-mile radius of the city.

Rail Activity and Intermodal Connections

A key component of rail activity within the region includes what are known as “transload” facilities, which provide a critical link for the transfer of cargo among the three modes of freight: highway, rail, and air.

“Transload” is a general term for moving goods from one mode to another. Typically, it refers to bulk or other goods moving between truck, rail, and/or barge via trailers, hoppers, or flatbeds. “Intermodal” specifically refers to moving containerized goods (either international or domestic) via truck, rail, and/or ocean carrier (less commonly via barge).

Several of these intermodal transload facilities have recently developed in the region providing further support for an integrated freight system. They include:

- **Major Market Rail Connection:** The BNSF rail yard in Belen is located at an important junction in BNSF’s rail network. It connects west coast freight from the Ports of Oakland, Los Angeles, and Long Beach via the Gallup subdivision, and connects to east coast ports and logistics parks in Chicago, Kansas City, and other major cities via the Clovis subdivision from the east. In addition, Belen connects Mexico freight rail via the El Paso subdivision, which extends through Chihuahua down to Silao, Mexico.
- **New Mexico Transload:** The first transload facility in the MRCOG region opened in spring 2016. The New Mexico Transload facility, which is located off South Broadway Boulevard in Albuquerque, handles a wide range of products, including palletized goods, bulk liquids, bulk solids, construction materials and equipment. Additional transload facilities in the region are being considered at Albuquerque, Belen, or Los Lunas
- **BNSF Intermodal Facilities:** There is a BNSF intermodal ramp in Albuquerque that primarily handles UPS shipments to and from Chicago, and also a facility that handles some automobile traffic. However, the MRCOG region is primarily served by intermodal yards in El Paso and Amarillo, Texas.

Airport Freight Activities

The main air freight activities are through the expedited carriers – FedEx and United Parcel Service (UPS) - and their partners - Empire Air (provides express feeder service for FedEx), AmeriFlight (express service for FedEx to and from Phoenix), and South Aero (feeder airline to UPS). These operations are housed in the southern part of the airport, with a sorting facility and ground servicing equipment to load and unload air freight for storage. An additional air cargo facility of approximately 29,700 square feet is immediately adjacent to the terminal apron in the northern part of the airport. Primarily used for belly cargo for passenger airlines, this facility is currently underutilized. The airport has plans to build a new facility. In the past, ABQ has discussed removing the freight facility entirely in order to expand Concourse B.

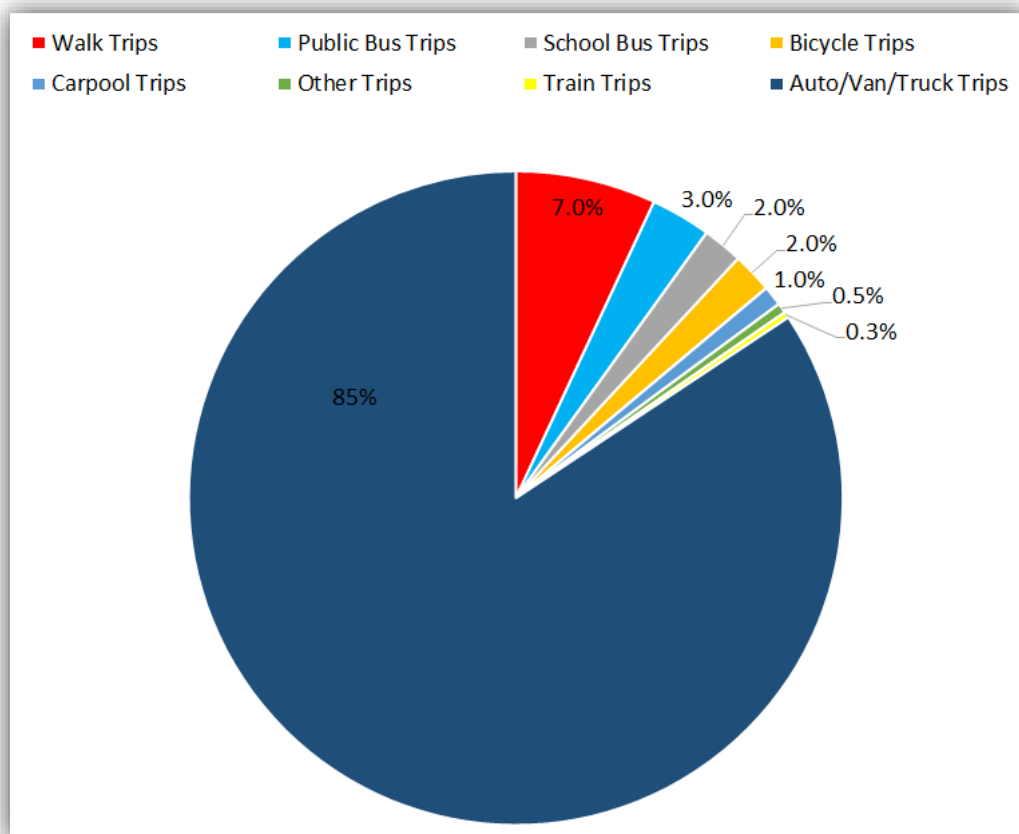
CHAPTER 5: ACTIVE TRANSPORTATION

Active transportation is a term that refers to human-powered transportation modes, such as walking and bicycling. Transit is sometimes considered active transportation because it usually involves a pedestrian or bicycle trip to get to or from the transit trip; however, in *Connections 2040 MTP* transit is addressed in the Optimized Mobility chapter (Chapter 4). This chapter focuses on pedestrian and bicycle travel and the mobility aspects of these modes, as well as the health benefits and safety concerns. Closing gaps that exist in the bicycle and pedestrian networks and further developing their infrastructure, as well as improving travel safety, is critical for not only a well-functioning active transportation system, but for smooth and safe travel for everyone in our region, regardless of how they are getting around.

5.1 Pedestrian and Bicycle Travel Conditions

The latest Mid-Region Household Travel Survey (2014), which is the most comprehensive survey of people living in the region, shows that seven percent of trips are made by walking, and two percent of trips are made by bicycling. Clearly, trips taken by walking and bicycling make up only a modest share of the total trips taken in the region. Nevertheless, there are important benefits associated with traveling by these modes, including improved public health outcomes, economic resiliency, and reduced reliance on single-occupancy vehicles.

Figure 5-1: Percentage of Trips by Mode



Source: Mid-Region Household Travel Survey, 2014

a. Collecting Active Transportation Trip Data

To build off of the Household Travel Survey and provide a better dataset for pedestrian and bicyclist travel patterns and counts, MRMPO has been building a non-motorized counts program using short duration counts, permanent counters, and Strava data (user-collected data using a smart phone app). Complementing this data collection is bike share and Bike to Work Day data. These programs have grown considerably over the last five years and provide both quantitative and qualitative insight into the use of bicycle facilities and the needs of riders.

Accurately capturing pedestrian and bicyclist data is vital to improving these modes of travel. Sometimes this can be a difficult task because of factors like weather, safety perception, and quality of the infrastructure that could impact a person's decision to walk or bicycle. However, collecting data on walking and biking is essential to getting a better understanding of the use of these modes, safety issues, and needed infrastructure improvements. Indeed, demand for and development of technologies by both agencies and the public that support more accurate and robust non-motorized counts is growing.

Permanent and Short Duration Counts

MRMPO manages seven permanent counters on different trails throughout the Albuquerque metro area. These permanent counters collect both pedestrian and bicyclist activity and provide crucial data for these activities on the trail network. In addition to these permanent counters, short-duration counts are collected via a video screen line approach based on national best practices. All pedestrians and bicyclists passing a designated line are counted, which is similar in approach to tube counts for motor vehicles. MRMPO collects such data at various locations from May through September, one weekday at peak AM and PM hours, and one weekend day from 11am-1pm, and for special events.

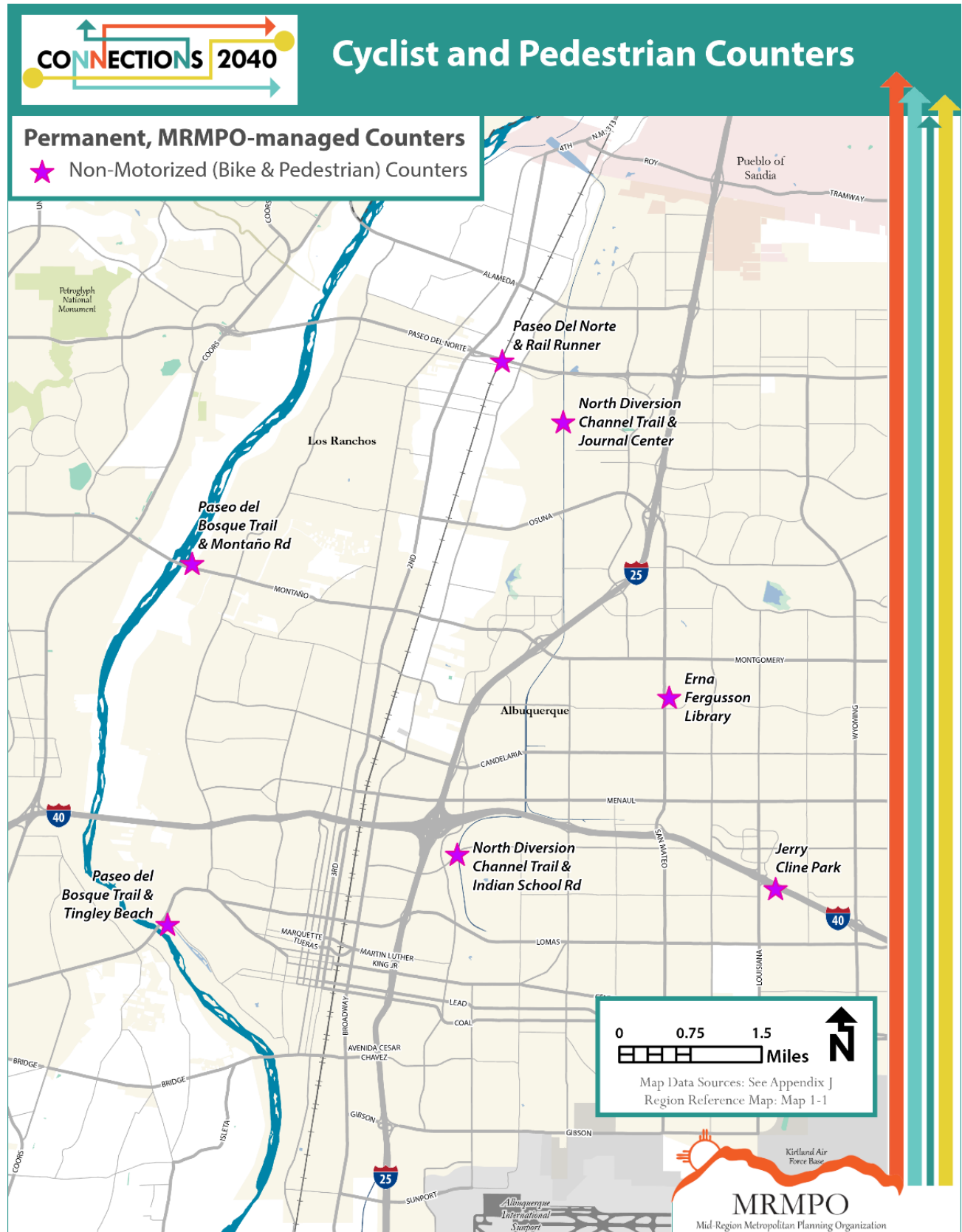
Benefits of Before and After Counts

MRMPO typically collects short duration counts for projects that are specifically meant to enhance bicyclist and/or pedestrian activity. For example, with the addition of a new buffered bicycle lane, MRMPO would collect counts before and after the lane was added on a roadway. ***This kind of data is important because it generally shows that bicycling on a particular roadway increases when a dedicated facility is added.*** This kind of result indicates that there is latent demand for such facilities, and it is likely the increase in trips is from people who want to ride but will only ride if infrastructure is put in place that helps them feel safer. These types of analyses support the argument that more bicycle facilities are needed, even when, on the surface, there does not seem to be enough demand for such facilities.

Bike Share Data

The bike share program run by the Rio Metro Regional Transit District collects trip, trip duration, gender, zip code, and GPS data on routes riders take. These datasets are extremely useful in future bicycle planning efforts as we gain a better understanding of exactly where riders are bicycling and, in turn, where limited funding should be dedicated to expanding and improving connections among existing bicycling facilities. Additionally, this program exemplifies a latent demand for these types of services considering its rapid growth and use in the region. The details of this program are provided later in this chapter.

Map 5-1: Permanent Counter Locations

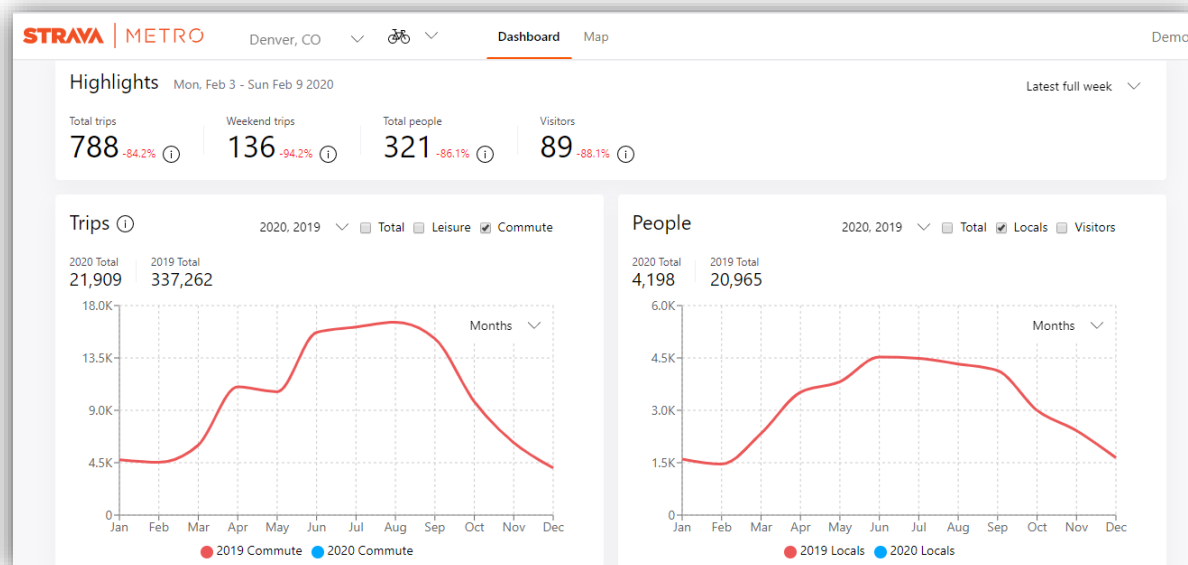


Strava Metro Data

Further data collection includes the use of smart phone technology that is becoming more popular and comprehensive for regional use. To that end, MRMPPO purchases bicycling and pedestrian data from Strava Metro. People can track their cycling, walking, and running activity (speed and distances) with a Strava application on a smart phone or with a GPS device. Strava removes all identifying information from the users and aggregates the data to a linear street and trail map.¹ Furthermore, Strava data gives some insight into travel patterns that could indicate common routes that are likely either better connected across the region, or where people feel safer riding or walking. Strava data can also be correlated with permanent count data to provide estimate counts for an entire area surrounding a permanent counter. The drawback is that Strava trips represent only a small segment of the total trips taken by the walking and cycling community, and the data are obviously biased toward people who choose to use the application. Nevertheless, this data is helpful to show the relative usage on streets and trails for this segment of the population, and Strava use is expanding to more segments of the population and becoming more common for commute trips.

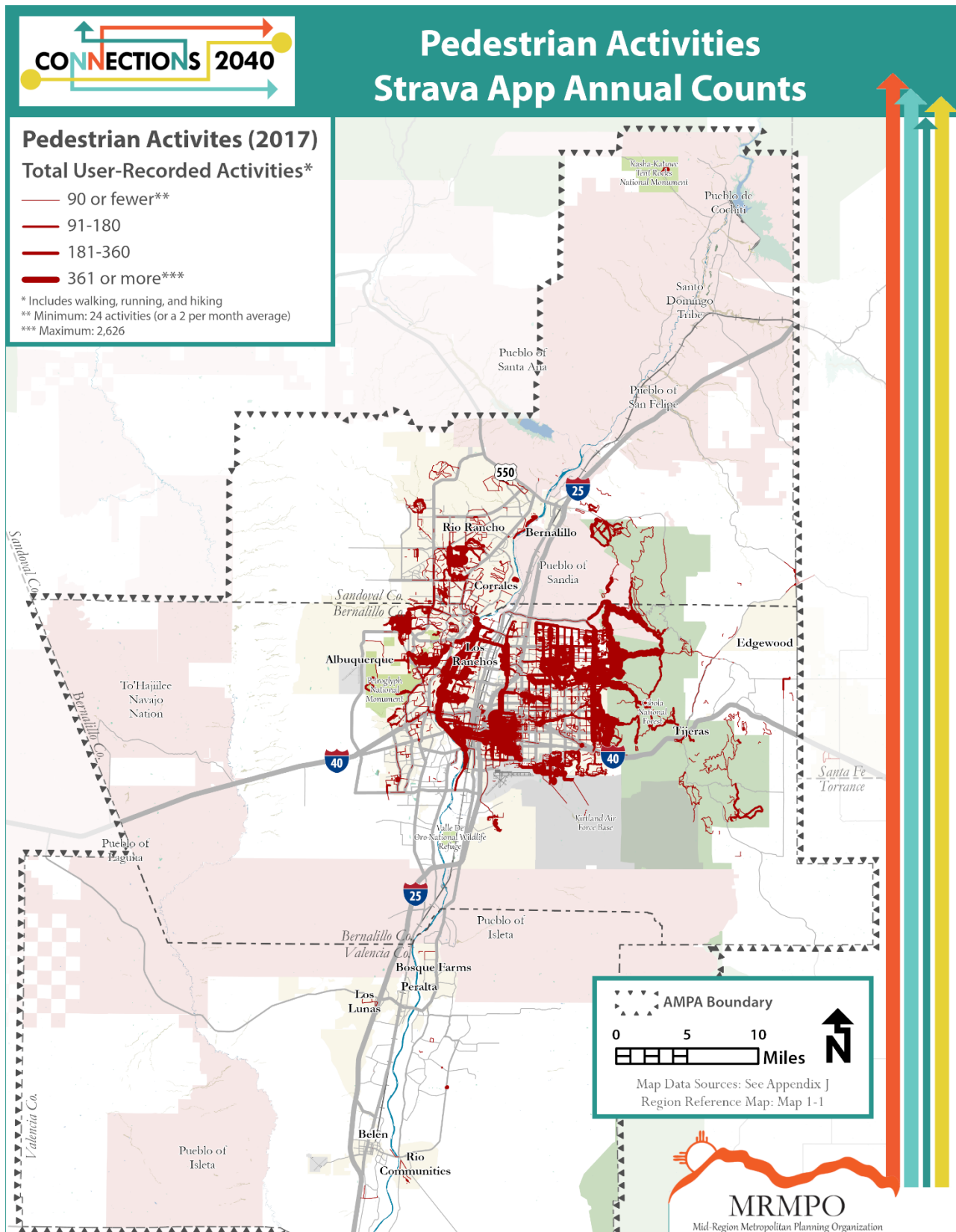
The following maps indicate that people use the many great trails or multi-use paths that exist in the region particularly along the Rio Grande, Tramway, and for recreation in the Sandia Mountains. Additionally, there are clearly two different patterns for bicyclists, versus people walking, in terms of locations that frequently being used (with the exception of Downtown which has high trips for both modes). The bicycle riding patterns show certain long-distance corridors and the pedestrian activity includes more concentrated centers, pointing to opportunities for better facilities in these higher use locations. This data has great potential to be further explored to support transportation infrastructure decision-making in our region, and will be an integral part of MRMPPO's Active Transportation committee going forward. Functionality of this data source is growing rapidly with a recently added online dashboard. The figure below provides a snapshot of the online platform for Strava data. This figure shows Denver, Colorado but the Strava team is in process of presenting New Mexico data online as well.

Figure 5-2: Strava Metro Online Dashboard Demonstration

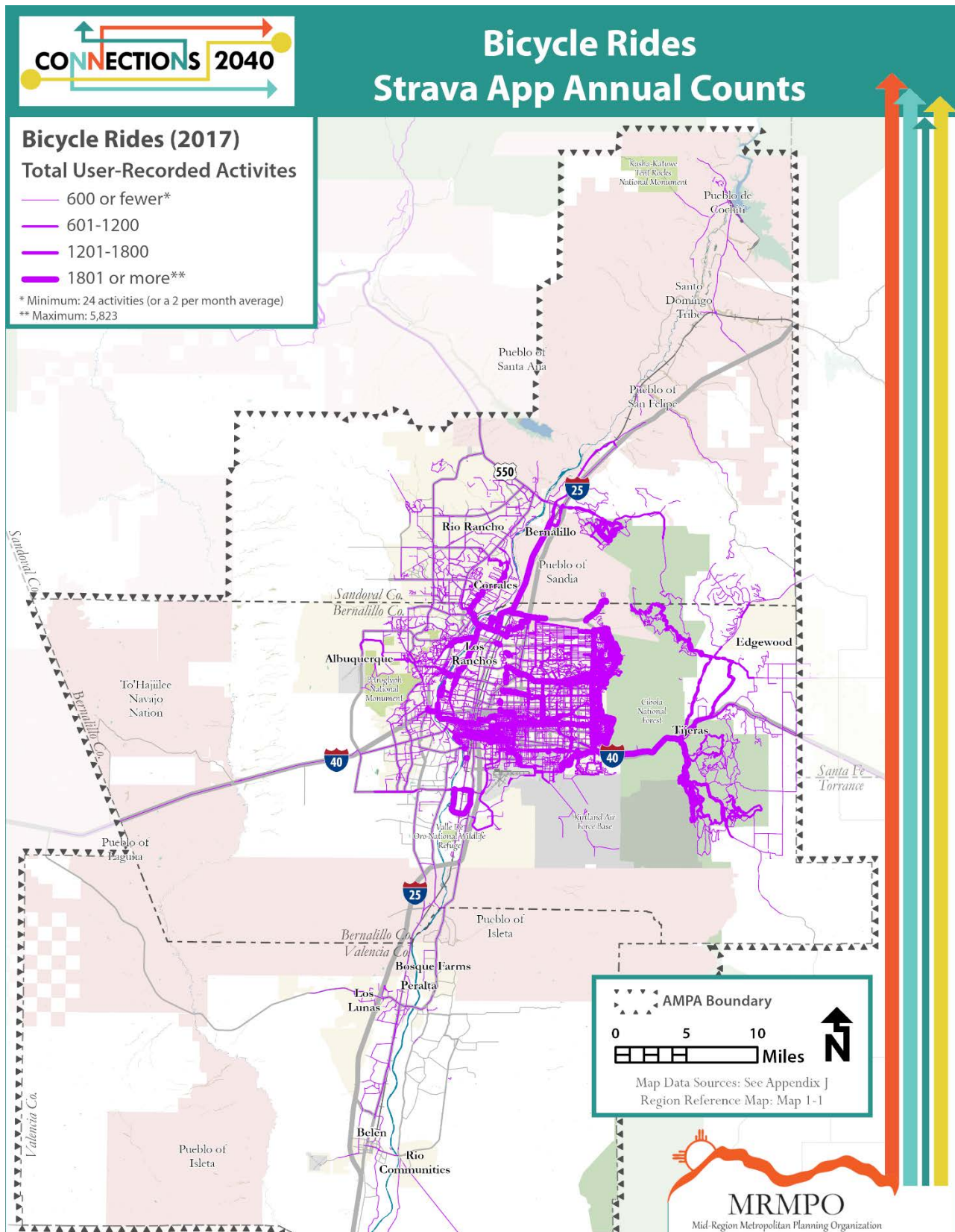


¹ Strava uses the Open Street Map roadway network.

Map 5-2: Strava Metro Pedestrian Counts, 2017



Map 5-3: Strava Metro Bicycle Counts, 2017



Bike to Work Day Data

Each year, MRCOG partners with the City and other local entities to plan and carry out a Bike to Work Day (BTWD) event. BTWD occurs as part of a national campaign called National Bike Month. Albuquerque's event features about 13 to 15 cycle stops where riders can stop on their way to work to meet other bicycle commuters, receive free safety promotional materials, and take MRCOG's BTWD survey. The survey is conducted every year and was designed to examine public perceptions of Albuquerque's bicycle-friendliness and help create a more bicycle-friendly community. Highlights of a recent survey include:

- When planning a route to use, respondents prefer bicycle lanes and routes with fewer and slower cars.
- Over two-thirds of survey respondents reported that bicycling in the Albuquerque area was "getting better" because of improved and expanded bicycle infrastructure such as protected and buffered bike lanes, green "paint," bike boulevards, and flex posts.
- For the third year in a row, respondents who thought bicycling conditions were "staying the same" or "getting worse" felt that poor driver behavior (including aggressive behavior, inattentive driving, speeding, and running lights) was the cause.
- For the third year in a row, bicycling for exercise or recreation was the most common bicycle trip purpose.
- Just over half of respondents reported bicycling to work one to five or more times per week.

Figure 5-3: Bike to Work Day Stop in Albuquerque



b. Active Transportation Opportunities

Capturing Short Trips

There are indications that walking and bicycling could be a more common way to get around. Nineteen percent of driving trips are less than 2.5 miles, which is approximately a 15-minute bicycle ride. Eleven percent of driving trips are under a mile, which is approximately a 20-minute walk. In fact, according to the 2017 National Travel Survey *more than half* of vehicle trips are less than four miles. This is a substantial amount of trips. Shifting these short trips to walking or biking could have a major impact on our air quality, personal health, and overall quality of life.²

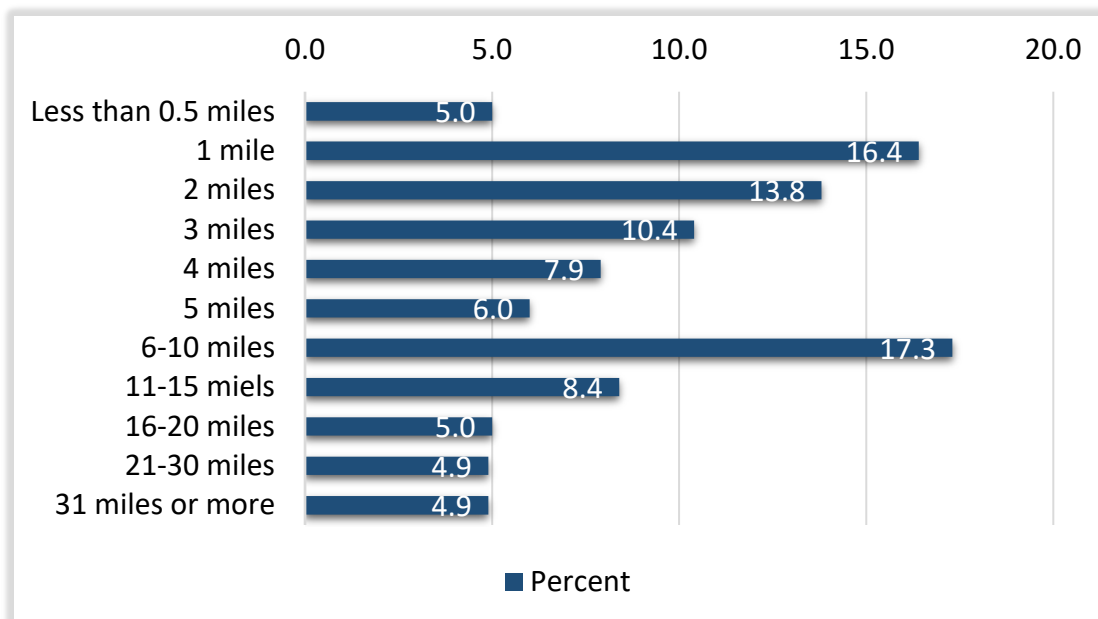
Mid-Region Household Survey Findings

Further supporting the possibility of shifting these trips is that, in the households participating in the Mid-Region Household Travel Survey, 56 percent reported having bicycles and 20 percent of households include someone who takes some form of walking or bicycle trip on a regular basis, indicating that biking as an activity (or intended activity) is widespread.

National Household Travel Survey

“Car trips of under a mile add up to about 10 billion miles per year. That’s like the entire population of Chicago driving to Las Vegas and back! If we all chose to power half of these short trips with our feet instead of petroleum, assuming an average fuel economy of 22 mpg and an average fuel price of \$2.50/gallon, we would save about \$575 million in fuel costs and about 2 million metric tons of CO₂ emissions per year. That’s like taking about 400,000 cars off the road each year. The total financial savings are even bigger — almost \$900 million dollars — when you include savings on maintenance and tire replacement.”

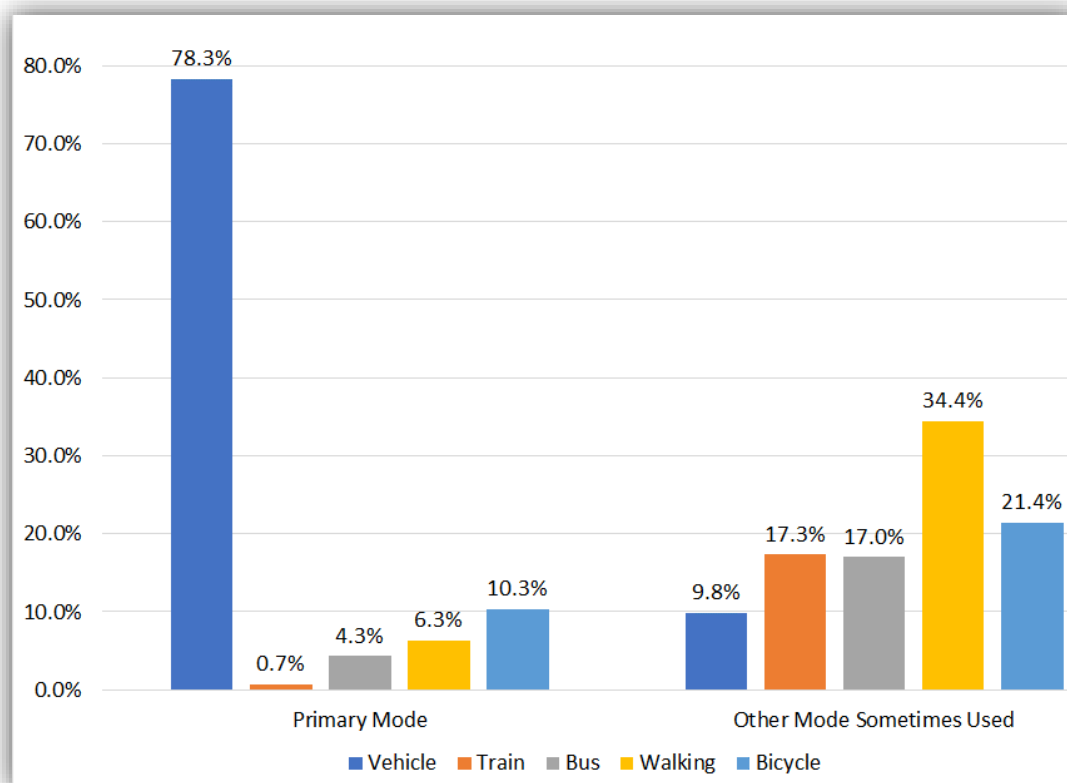
Figure 5-4: Share of US Vehicle Trips by Distance, 2017



² Environmental Protection Agency 2015 article (EPA-420-F-15-021) published by the Office of Transportation and Air Quality

Additionally, the 2040 MTP Questionnaire³ asked people about transportation besides their primary mode, and 34 percent indicated they walked and 21 percent bicycled. Combined with the number of short trips that people make by car, these results make a good case for the potential to replace some trips with walking and biking. Increasing the frequency of people walking or bicycling is a realistic goal for the region and will require a variety of strategies improving including the safety and comfort of the existing bicycling and pedestrian system.

Figure 5-5: What is your Primary Mode of Transportation? What other Modes do you use?



Designing Transportation Systems for Everyone

The design of cities and communities play a critical role in personal safety and impact the way that people engage with, move through, and experience their environment. Access to transportation options (driving, walking, biking, and transit) that are safe, convenient, and affordable can positively impact a person's everyday life. Historically, much of the planning and designing for bicycling (and pedestrians) has been for the "Strong and Fearless"⁴ type of riders, as described in the following figure, but there is a gradual movement towards capturing more types of bicycle riders. The key to a well-functioning bicycle network rests in focusing on the "Interested but Concerned" riders.

³ A report on the 2040 MTP Questionnaire results can be found on MRCOG's website: <https://nm-mrcog.civicplus.com/DocumentCenter/View/3951/Connections-2040-Questionnaire-Report-PDF>

⁴ These bicyclist types were originally developed by Roger Geller at the City of Portland, OR but have been expanded and are now used nationally.

Figure 5-6: Four Types of Bicyclists from City of Fresno Active Transportation Plan



For pedestrians, there is a similar notion of designing for a broad age range – eight to 80 years old⁵ – which is a comparable approach that realizes the immense impact that the design of the built environment has on our ability to travel by other modes other than the automobile.

A clear way to enhance our transportation system for everyone is to improve the safety and comfort of walking and biking facilities. This effort will capture short trips by people of all ages and abilities, and the benefits will be far reaching from decreasing the cost of crashes economically and emotionally, to improving the quality of our air, and supporting our physical and psychological health.

Gender Parity in Design Details

Men, women, and children encounter our built environment in different ways and have different design and safety needs. For women and children, design elements such as adequate street and sidewalk lighting, well-surveilled parking, and clear sight lines in public spaces may be important factors in how safe an area feels to walk or bike. These everyday design details come to light when reviewing data about men's and women's transportation use. Women walk fewer steps each day than men, largely because of personal safety.⁶ They also bicycle less than men; women account for 29.1 percent of bicycle trips vs. 70.9 percent for men.⁷ Several studies and research have identified a variety of reasons for this bicycling gap, including but not limited to a lack of safe bicycle infrastructure, social pressures, complex trip patterns (women are often responsible for domestic chores and shuttling others), and harassment. By ensuring gender and

Women as a Safety Barometer

Cities that invest in protected or separated bicycle infrastructure experience increases in female ridership. Minneapolis saw an increase in female ridership after investing in protected bicycling infrastructure. New York City also saw an increase in female ridership along corridors with protected bike lanes.¹ Protected or separated bicycling facilities not only provide a safer space for bicyclists, they also provide physical separation from vehicles and more protection from potential verbal harassment.

⁵ From the 80 cities concept that if everything done in our cities works for an 8-year old and an 80-year old, it will work well for everyone. See (<https://www.880cities.org/>).

⁶ Shadwell, Talia. (2017). Paying to stay safe: why women don't walk as much as men. The Guardian

⁷ US Census Bureau, 2011-2015 American Community Survey 5-year estimates

age parity in walking, biking, and transit use as an explicit goal in transportation, particularly in the design of our streets and built environments, safety is improved for everyone (for sources in text box above see footnote below⁸).

c. Approaches to Changing Behavior

Design plays a critical role in whether a person is going to walk, bike, or take transit to daily destinations such as work, school, shopping, medical appointments, or recreation. In addition to design, other actions can help attract more people to walking and bicycling including education, encouragement, and enforcement.

Education and Outreach Impacts

With the availability and connectivity that smartphones offer, the opportunity for distracted driving increases, especially regarding texting and talking on the phone while driving. A focus on trying to discourage this driver behavior is paramount. Behavior campaigns are one way to educate people about using our public roadways and shift attitudes towards being aware of the rules of road for all people no matter how they are traveling along or across it. Additionally, an important facet of behavior campaigns is to focus on younger drivers to change future driver behavior for years to come.

Behaviors can be difficult to change and need to be done in concert with other tactics; however, there are numerous public health campaigns that have been successful in shifting behaviors. For example, we have seen substantial changes in seatbelt use and a significant reduction in the number of people smoking cigarettes despite their addictive qualities. Generally speaking, fewer people engage in drinking and driving and are well aware of the consequences.

Pedestrian, bicyclist, and driver behaviors can also change, and more people can learn the rules of the road for not just driving but bicycling and walking as well. **Driver education needs to be expanded to include ALL the rules of the road and must encourage everyone to look for one another.** Furthermore, our understanding and safe use of different types of facilities and streets such as roundabouts, bicycle boulevards, pedestrian crossing signals, and shared roads has evolved over the last 10 years as we see more of this type of infrastructure and will continue to do so if we put effort into this type of education and outreach.

Local Education and Outreach Efforts

There are a number of existing efforts underway in the region that encourage people to walk and bike more. Officially organized efforts such as the City of Albuquerque's annual Bike to Work Day event and bike rodeo program, the PACE bike share program, the Healthy Here's Initiative's wellness referral program, Prescription Trails, and Rio Metro advertising campaigns aim to encourage people to bicycle and take the bus or train for more trips.

There are also grassroots efforts that have been successful for the same purpose, including Slow Roll 505 and the ABQ CíQlovía. Encouragement efforts that are successful in other regions may have potential here including Walk and Ride to School programs and strong participation from the private sector in Travel Demand Management efforts.

⁸ Baker, Linda. (2009). Getting more bicyclists on the road. The Scientific American; Reeves, H. (2012). "Spokes & soles // As infrastructure improves, more Twin Cities women bike," Southwest Journal, 11 June 2012; Teferra, Roha. 2011. Protected bike lanes means more female ridership; Clabots, Barbara. (2016). Even in the most bike-friendly states, women are left behind. Yes Magazine.

The City of Albuquerque's Bicycle/Pedestrian Safety Education Program (BSE), which receives funding through MRMPO, provides educational activities that support safe biking and walking. Their Bicycle Safety Education Classes are a national model. These classes have a strong focus on teaching children in Albuquerque Public Schools about bicycle safety, and they provide "bike rodeos" that are a hands-on obstacle course for kids to help learn the rules of bicycling.

Figure 5-7: ABQ CiQlovía, 2018



Focused Traffic Enforcement

Road safety campaigns or public service announcements (PSAs) are most successful when used in coordination with legislation and law enforcement. Road safety campaigns working toward increasing seat belt use and decreasing drunk driving, such as "Click it or Ticket" and NMDOT's "ENDWI" have been effective, in part, because they were tied to targeted law enforcement campaigns. Other high-profile campaigns that have had an impact in our region include Look for Me, Superblitz, and 100 Days & Nights of Summer traffic safety. Enforcement efforts should target the most dangerous driving behaviors to reduce fatalities and serious injuries and could also include an informational element – officers can be part of spreading messages about safety – such as when pedestrians have the right-of-way or how high-speed crashes are more likely to result in death.

Because our police force does not have the capacity to be everywhere all the time, a data driven approach enables law enforcement to target key issue areas and employ intelligent transportation system options in places where law enforcement cannot be. With new technologies and focused enforcement efforts, the job of making sure we are all traveling safely is improved. **Certain types of interventions are far more effective than others and understanding what the data is telling us to focus our efforts on can make a**

world of difference in the safety of our roadways. This requires not only continued coordination with law enforcement, but also continued evolution of data collection to better inform safety needs and solutions.

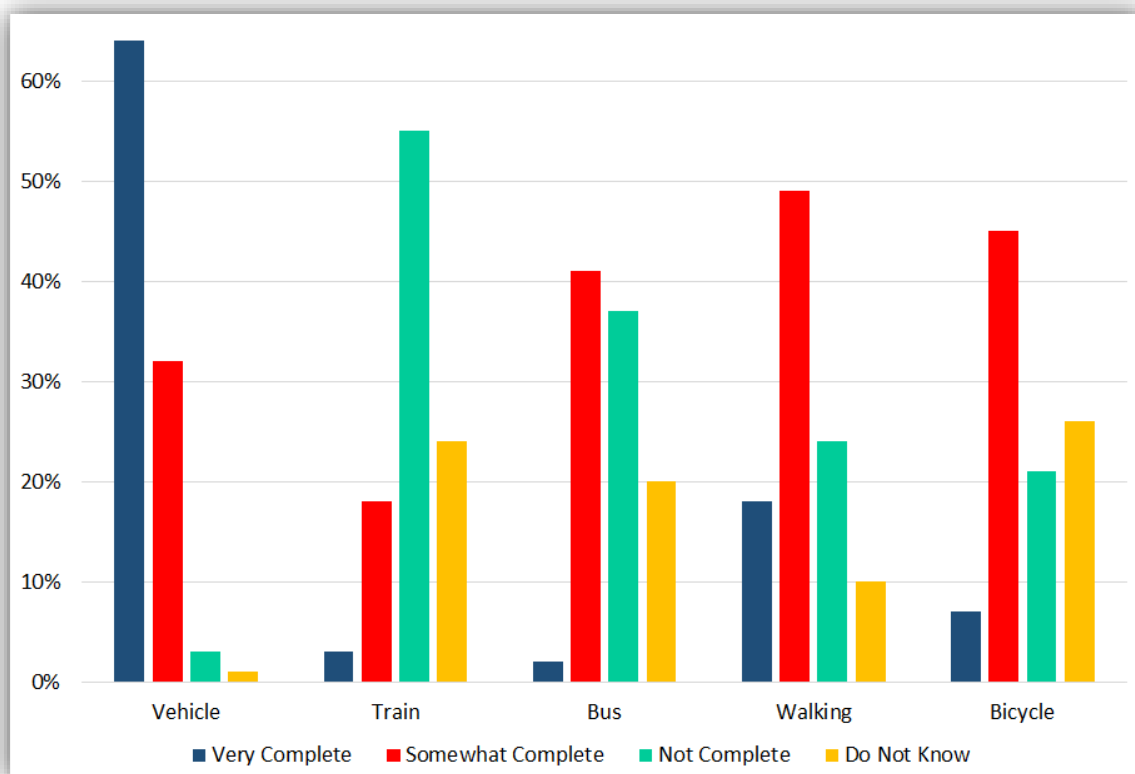
d. Closing Network Gaps

According to the *Connections 2040 MTP* Questionnaire, a low number of respondents reported they felt that walking and bicycle networks were ‘very complete’ at 18 and seven percent, respectively. The region includes many physical barriers for walking and bicycling routes, particularly with the river and the interstate system, and the public has consistently requested addressing gaps that exist in the bikeway network through comments, questionnaire responses, and at outreach events.

Figure 5-8: NMDOT “Look For Me” Campaign



Figure 5-9: How Complete do you Consider the Transportation Networks?



In recent years some progress has been made in this regard with the construction of pedestrian and bicycle grade-separated crossings. The importance of closing gaps is reflected in the Project Prioritization Process. For instance, where a project makes a connection between two existing links of the bikeway and trail network, that project receives more priority points than a project that only extends the network. Closing gaps in the bicycle and pedestrian networks provides better access to jobs, services, and other destinations such as schools, grocery stores, and recreation. Importantly, it also provides more encouragement for people to bike and walk.

Gaps identified through various outreach efforts in the MTP development include crossing I-25, especially at Paseo del Norte and Alameda, I-40 in downtown Albuquerque, Isleta Drain Trail, the eastern end of Sunport Boulevard, and along NM 6 in Valencia County. There are also simple connections that can be made by providing bike and walking paths through the end of a cul-de-sac head street.

Measuring the Effectiveness of Connectivity

Through the use of MRMPO's in-house Transportation Accessibility Model (TRAM) tool, MRMPO can measure by mode, including biking or walking, how well a new connection can improve accessibility in the case of an existing gap in a network. For example, perhaps bicyclists or walkers find it difficult to cross a busy road. TRAM analyses can show how a new planned crossing would benefit the surrounding community by calculating how many people would be served and how many jobs would be accessible if the crossing existed. As shown in the graphic and table below, connecting Sunport Boulevard over I-25 would greatly improve bicycle accessibility and access to services to the surrounding area.

Figure 5-10: Bicycle Accessible Areas with the Sunport Extension

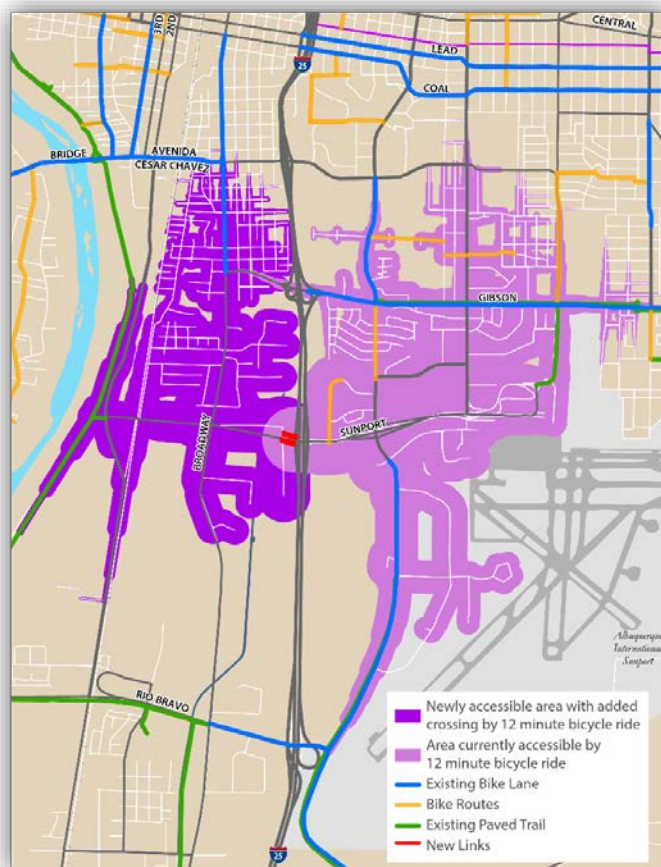


Table 5-1: Improved Bicycle Accessibility with Sunport Boulevard Crossing Over I-25

	2016 Population	2016 Households	2016 Jobs
Sunport without Connection	7,441	3,080	11,647
Sunport with Connection	11,479	4,325	13,488
Difference	54%	40%	16%
% Change	70%	38%	68%

Source: US Census, InfoUSA, MRMPO TRAM Model.

5.2 The Future of Active Transportation

Over the last 10 years, there has been a reframing in approaches to bicycle infrastructure and ensuring the built environment is designed better for the most vulnerable users of our roadways – people of all ages and abilities who are walking. Improving the safety and comfort for people walking and biking in turn improves safety for everyone using our roadways.

To this end, activity centers in the Target Scenario focus on providing higher residential and employment densities in key locations to support more walkable places. Being able to complete trips by walking within these centers is an essential element in providing overall regional mobility and access.

For bicycling, more consideration has been given to female riders and creating bicycle facilities with a higher level of comfort, or less stress. As a result, more riders at a variety of ages and riding levels can be supported and the latent demand for bicycle riding fulfilled. Since most transit trips begin or end with a walk or bicycle ride, more multimodal enhancements help transit access as well.

Improving Access with Bike Share

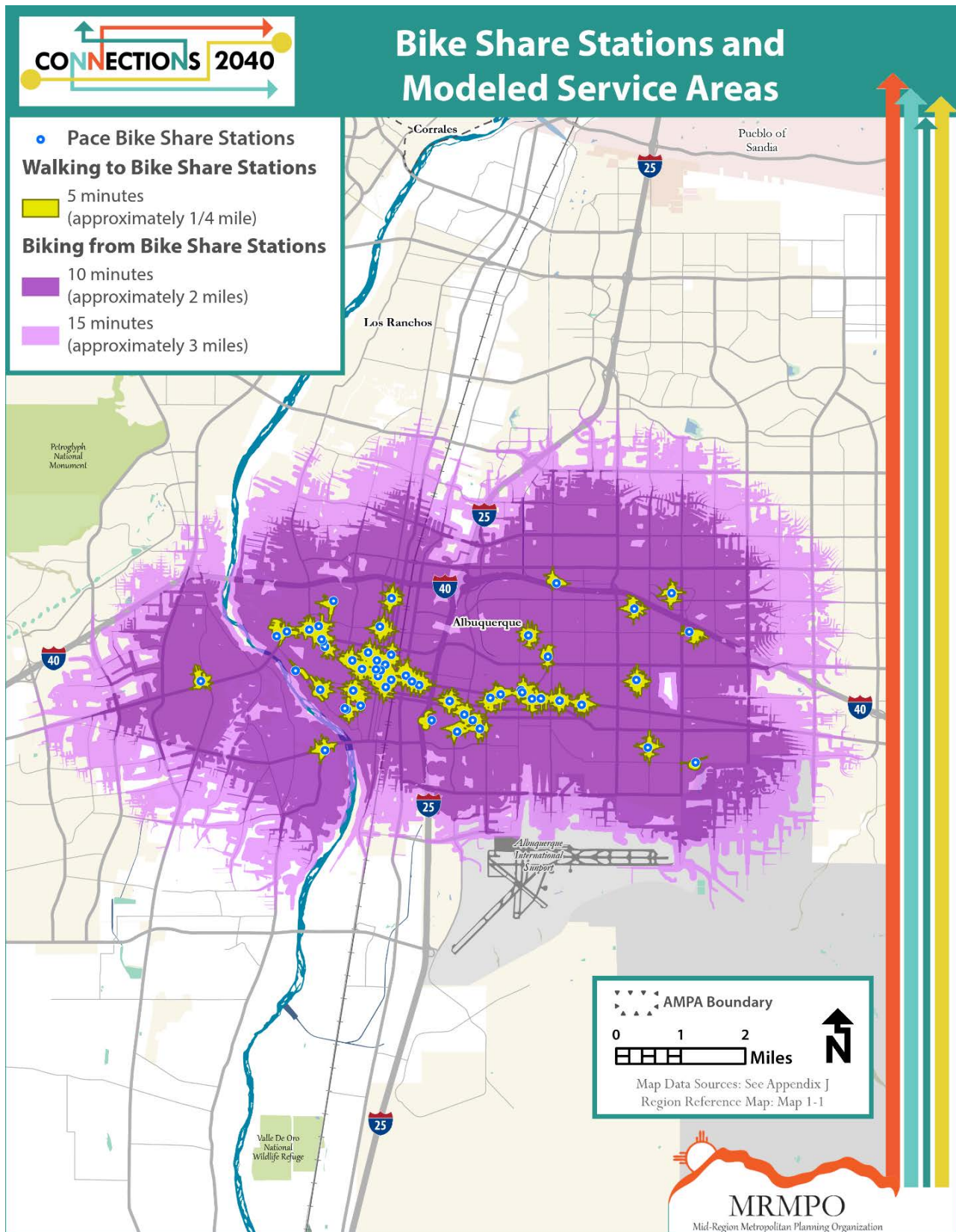
Bike share is an element of the transportation system that consists of a network of stations where bikes are publicly available for short-term rental through several different fare options. Bike share trips are typically short in distance and duration. This type of infrastructure and access to bikes can have a considerable impact on improving the transportation system for more active transportation modes. Bike share programs not only provides access to bikes for travel, but also supports more places for bike parking, a barrier to widespread biking, which should be a part of planning processes similarly to parking requirements for automobiles.

The Downtown ABQ Main Street Initiative and MRCOG partnered on a pilot bike share program in downtown Albuquerque, which launched on May 15, 2015, with 75 bikes and 15 stations. This pilot program had over 10,000 trips taken by over 2,400 people. The pilot program also investigated the feasibility of a larger, more regional bike share system. Starting in May 2016, the program moved under the management of the Rio Metro Regional Transit District (RMRTD) to expand the program beyond downtown. Through a competitive request for proposal process, RMRTD selected a vendor to operate a scalable bike share program branded as Pace ABQ. The program launched in April 2018 with 200 bikes and 30 station. By June 2018, an additional 50 bikes and 10 stations were added to the network. RMRTD has funding secured through the Transportation Alternative Program (TAP) for continued development of bikeshare in the Albuquerque Large Urban Area and RMRTD remains interested in expanding bikeshare along the Rail Runner corridor to Santa Fe.

Public agencies should be mindful of ongoing shifts in the bikeshare industry. Commercial providers are diversifying their portfolio of micro-mobility services to include pedal-assist bikes and e-scooters, in addition to their traditional docked bikeshare systems. Research published by McKinsey & Company suggests that micro-mobility services “could theoretically encompass all passenger trips of less than 8 kilometers (5 miles), which account for as much as 50 to 60 percent of today's total passenger miles.” However, the McKinsey study forecasts that micro-mobility will only capture 8 to 15 percent of the theoretical market.⁹ Municipal and state governments are also enacting regulations for public safety and responsible use of public right-of-way. Planning the future expansion of publicly owned or sponsored bikeshare will likely require flexible plans that can adapt to changing regulatory and market conditions.

⁹ <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/micromobilitys-15000-mile-checkup>

Map 5-4: Bike Share Stations and Distance Contours



Long Range Bikeway System (LRBS)

Creating connected and premium networks of bicycling facilities can make bicycling a safer, more convenient, and more attractive option. Examples of bicycle facilities that can increase comfort, safety, and potentially lead to more bicycle ridership include infrastructure separated from motor vehicles (such as bike paths), protected bike lanes, and bicycle boulevards. The Long Range Bikeway System (LRBS) provides an aspirational view of how people in the region would like the bikeway network to develop over time and is not limited to the 20-year horizon or funding limitations of the MTP project list.

For *Connections 2040 MTP*, MRMPO's Active Transportation Committee had a primary role in updating the LRBS. The LRBS provides high-level guidance about providing future facilities and is based on the National Association for City Transportation Officials (NACTO) guide for "Designing for All Ages and Abilities." As a result, there is now a greater focus in the latest LRBS on creating more protected bikeway facilities that serve the "Interested but Concerned" riders discussed earlier. For more details on the guidance that MRMPO is proposing, the Long Range Transportation Systems guide was also updated as a part of this MTP. Ultimately, local governments will determine what type of facility to provide and are encouraged to implement a more premium option to get us closer to an all ages and abilities network that will support more people who want to ride, but are afraid to do so. To the degree reasonable, the guidance shown below was used to develop new proposed bicycle facilities along with local knowledge of the roadway's function and characteristics.

Bicycle Facility Guidance

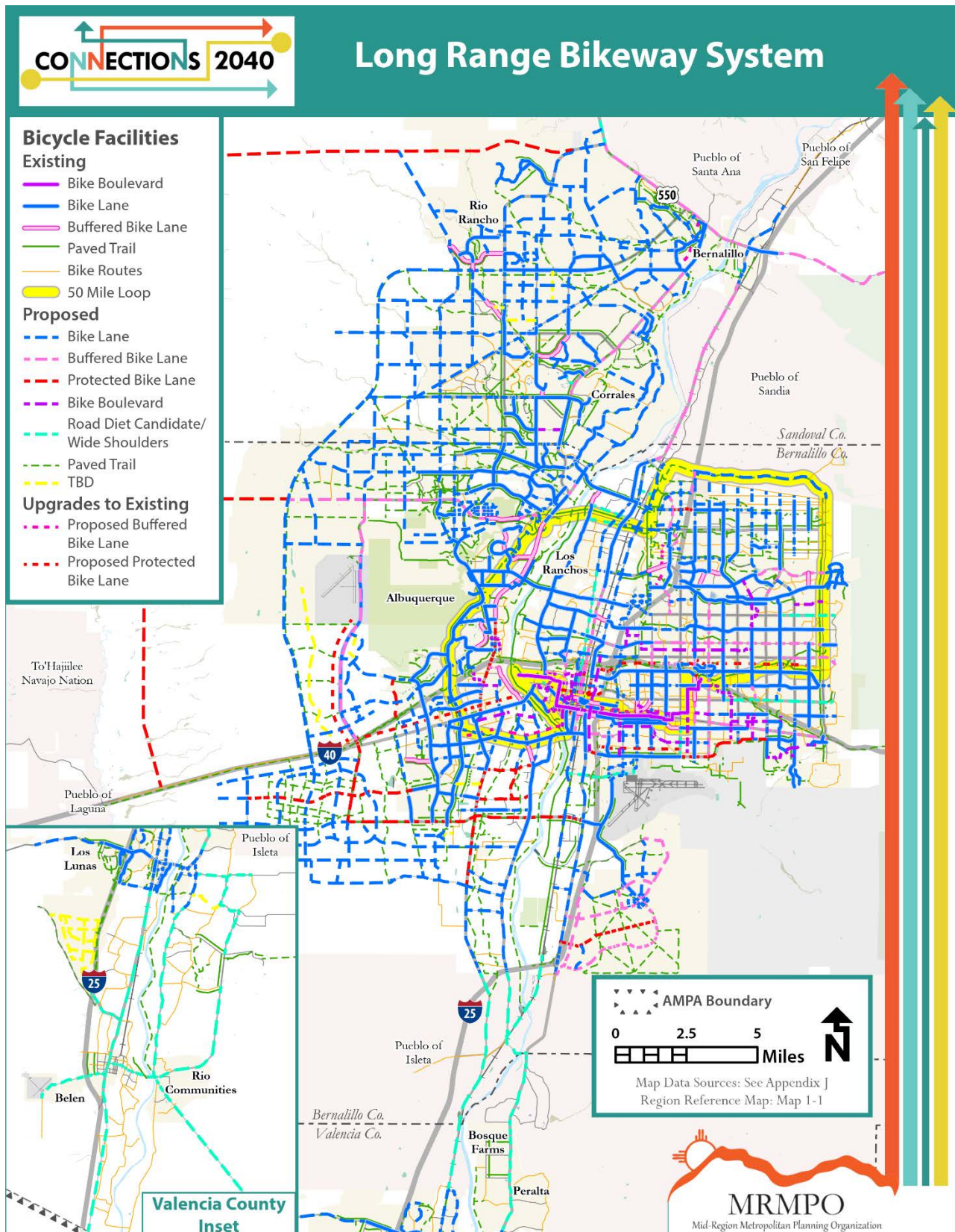
The LRBS does not provide prescriptive design guidance about specific treatments, but rather indicates what kinds of facilities might best serve a wider variety of people. For example, if the LRBS indicates that a protected bike lane is proposed for a given roadway, it is providing guidance on the best and highest use. Unfortunately, this type of facility may not fit within the Right of Way limits or may not be appropriate for other reasons and therefore may not be implemented. Also, the LRBS does not determine what type of bike facility should be built, but rather provides sound guidance based on current traffic counts, speed, and the type of roadway.

Table 5-2: MRMPO Recommended Bicycle Guidelines based on Roadway Attributes

Motor Vehicle Speed	Max Motor Vehicle Volume (ADT)	Key Operational Considerations	Bicycle Facility Proposed
Less than or equal to 25 mph	Less than 6,000	Low Curbside Activity*	Buffered Bicycle Lane, Bicycle Lane, Bicycle Boulevard
	6,000 to 10,000	Low Curbside Activity	Protected Bicycle Lane, Buffered Bicycle Lane, Bicycle Lane
Greater than 25 mph	10,000 or Greater	Low Curbside Activity	Protected Bicycle Lane, Buffered Bicycle Lane
High speed limited access roadways, natural corridors, or geographic edge conditions with limited conflicts	Not Applicable	High Pedestrian Volumes	Bike Path with Separate Walkway or Protected Bicycle Lane
		Low Pedestrian Volumes	Shared Use Path or Protected Bicycle Lane

*High Curbside Activity such as frequent buses, high vehicular congestion, or turning conflicts should first consider a Protected Bicycle Lane

Map 5-5: Long Range Bikeway System (LRBS)



Long Range Pedestrian Facilities

Priorities for improving the pedestrian network and pedestrian facilities in the AMPA must focus on developing walkable centers and safer conditions for pedestrians walking along and across streets. Focusing on areas such as activity centers, schools, parks, transit stops, and areas with high crash rates will help target locations that could benefit most from improvements to the safety and comfort of pedestrian infrastructure. Because of the high pedestrian fatality rates in this region, it is imperative that we work on bringing different methods, data, partners (such as community health professionals, community organizations and advocates), and approaches together in an equitably-minded way to ensure the pedestrian network—and pedestrian safety—improves over time. This can also help ensure that improvements are designed appropriately and located where the need is greatest.

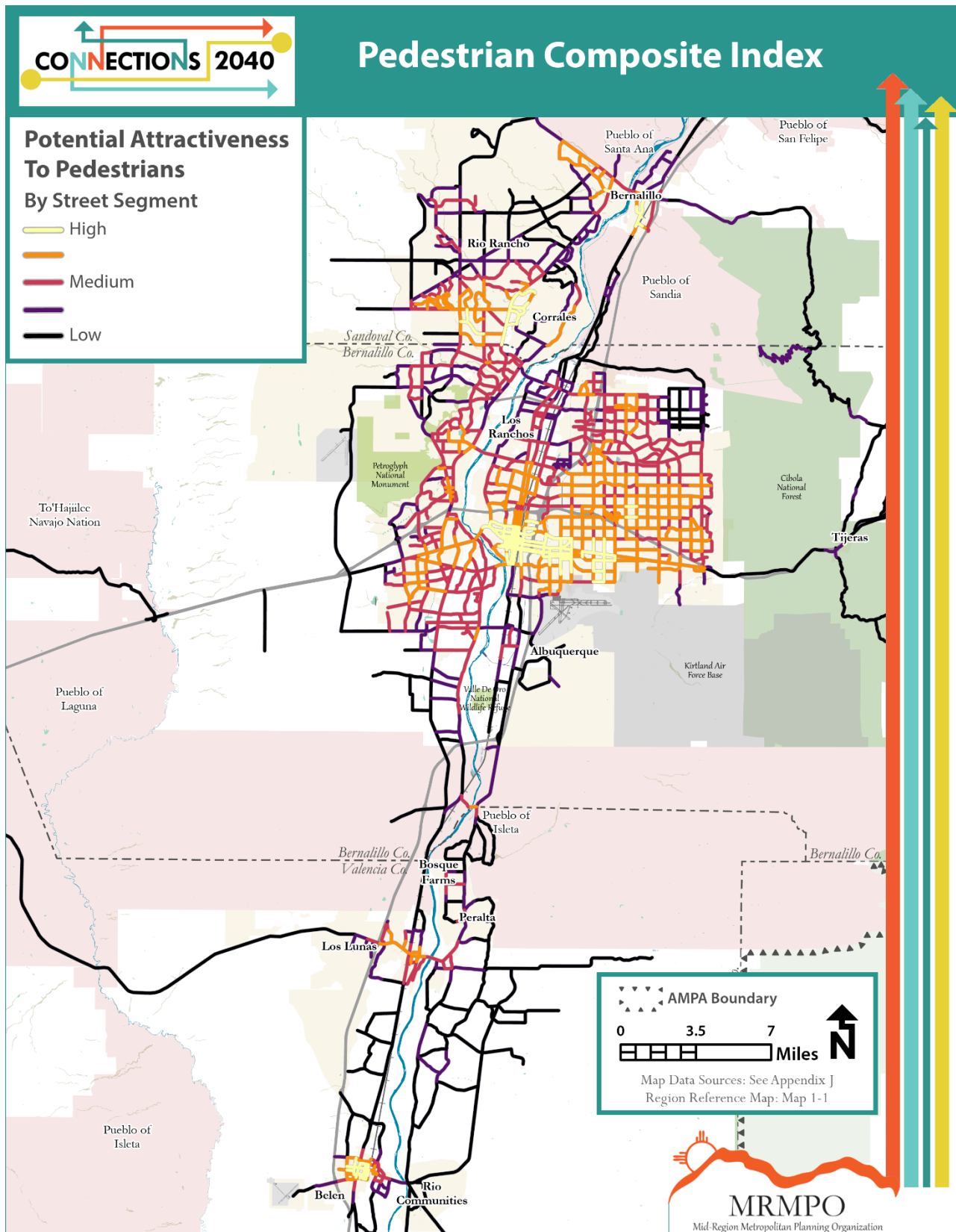
MRMPO updates and maintains the Pedestrian Composite Index (PCI). The PCI previously used regional data to compare features that deter pedestrian travel (crashes, speeds, volume, number of lanes) and features that generate pedestrian activity (transit, schools, retail densities, residential densities). This Index has evolved over the years and currently focuses on roadways with high generator scores instead of both deterrents and generators. This was done because MRMPO has subsequently developed other regional tools such as the High Fatal and Injury Network (HFIN) and Road Diet analyses, which already highlight areas with deterrent features.

The PCI tool helps compare roadways in the region and provides a wide variety of pedestrian related data for segments of roadways to help show where pedestrian improvements could be most beneficial. However, it does not provide details, such as the presence and width of sidewalks, which are necessary to calculate pedestrian level of service. Nor does it provide information on future demand for walking. Currently, MRMPO does not have access to sidewalk conditions information or a substantial pedestrian traffic count database, but as local jurisdictions gather this data, MRMPO will be able to expand this assessment to include sidewalk condition and width.

Table 5-3: Inputs to Pedestrian Composite Index

Pedestrian Generator Data
• Proximity to schools, bus stops, parks, community centers • Proximity to higher density areas of jobs and housing • Proximity to higher roadway connectivity • Percent of population 16 years+ who walk or take transit to work (latest ACS data) • Percent of households with 0 vehicles or fewer vehicles than workers (latest ACS data)

Map 5-6: Pedestrian Composite Index (PCI)



5.3 Roadway Safety Priorities

a. Safety Concerns and Crash Statistics

For active transportation to be a viable way to travel in our region much needs to be done to improve the safety for pedestrians and bicyclists. Overall, the data indicate that walking in New Mexico is much less safe than in other states.¹⁰ New Mexico and the City of Albuquerque frequently rank as one of the highest states and cities for pedestrian fatalities per capita and bicyclist fatalities¹¹ consistently rank in the top 10 compared to other states.

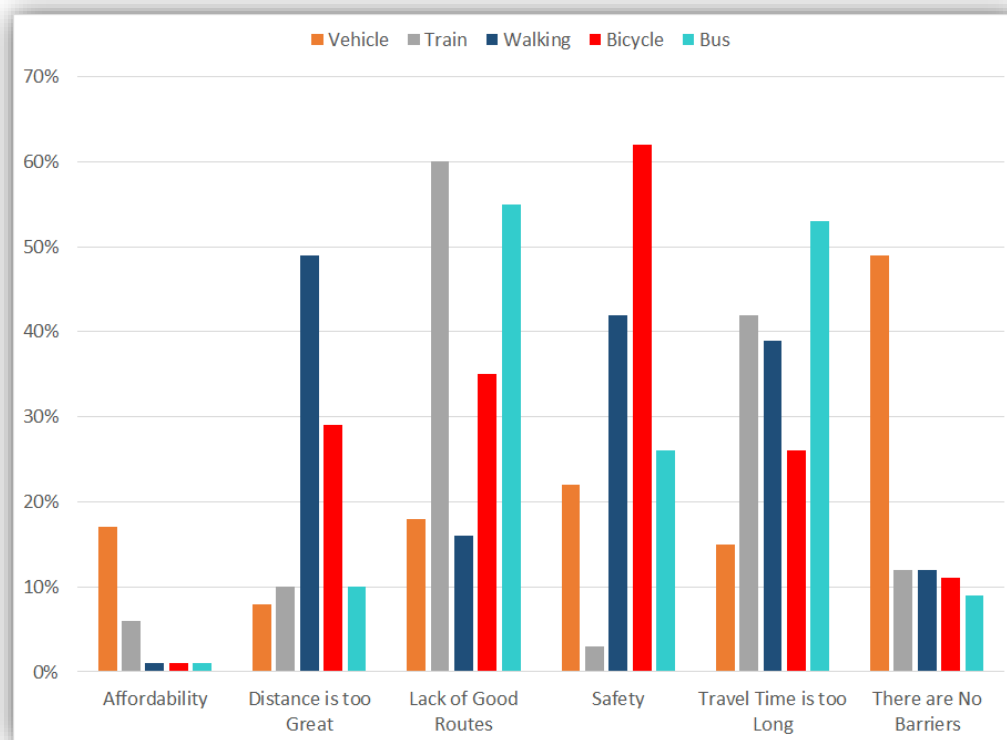
The MTP Public Questionnaire asked peoples' opinions about their most common transportation concern. Safety from traffic was reported as the most common concern for bicyclists. Open-ended responses also revealed that discontinuous bicycle facilities are a large concern. For walking, the most common issue is that distances are too far and people have safety concerns related to traffic and sidewalk conditions.

High Pedestrian and Cyclist Fatalities

New Mexico's pedestrian fatality rate per 100,000 residents is continually one of the highest in the nation. Compared to the national average of 16 percent, the state's pedestrian fatalities comprise 19.5 percent of total crashes. Nationally, bicycle fatalities comprise on average about 2.28 percent of all motor vehicle crash deaths. Although the proportion of bicycle fatalities in New Mexico was below the national average at 1 percent, the bicycle fatality rate per 100,000 residents has exceeded the national bicycle fatality rate in the past three years.

**see footnotes for sources*

Figure 5-11: Top Reported Issues for All Transportation Modes, 2040 MTP Questionnaire



¹⁰ <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812681>

¹¹ <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812507>

Pedestrian and Bicycle Crash Data Overview

In our region, a total of 147 fatal and 1,325 injury crashes involving pedestrians occurred between 2013 and 2017. This is a substantial increase from previous five-year sets. Even more concerning is that the percentage of fatal crashes involving pedestrians has increased by 72 percent since 2013. In fact, crashes involving pedestrians account for only one percent of all crashes, but when you look at fatal crashes, 30 percent involved a pedestrian. **Of the pedestrian involved crashes**

with fatal outcomes, 27 percent are in dark conditions and the majority (98 percent) are vehicles going straight and hitting a pedestrian crossing the road. For bicyclists, there were 966 motor crashes involving bicycles from 2013 to 2017 in our region. Crashes involving bicycles accounted for one percent of all crashes but accounted for four percent of fatal crashes. **Of the 10 fatal crashes, seven occurred on a facility without bike infrastructure.** The following map shows the density of pedestrian crash data over this five-year period and plots bicycle involved crashes. This map gives a general idea of the problem locations in our region and was developed by isolating urban versus rural crash data so that the metro area did not overpower the results of the rural areas.¹²

Table 5-4: AMPA Pedestrian and Bicycle Crash Severity, 2013-2017

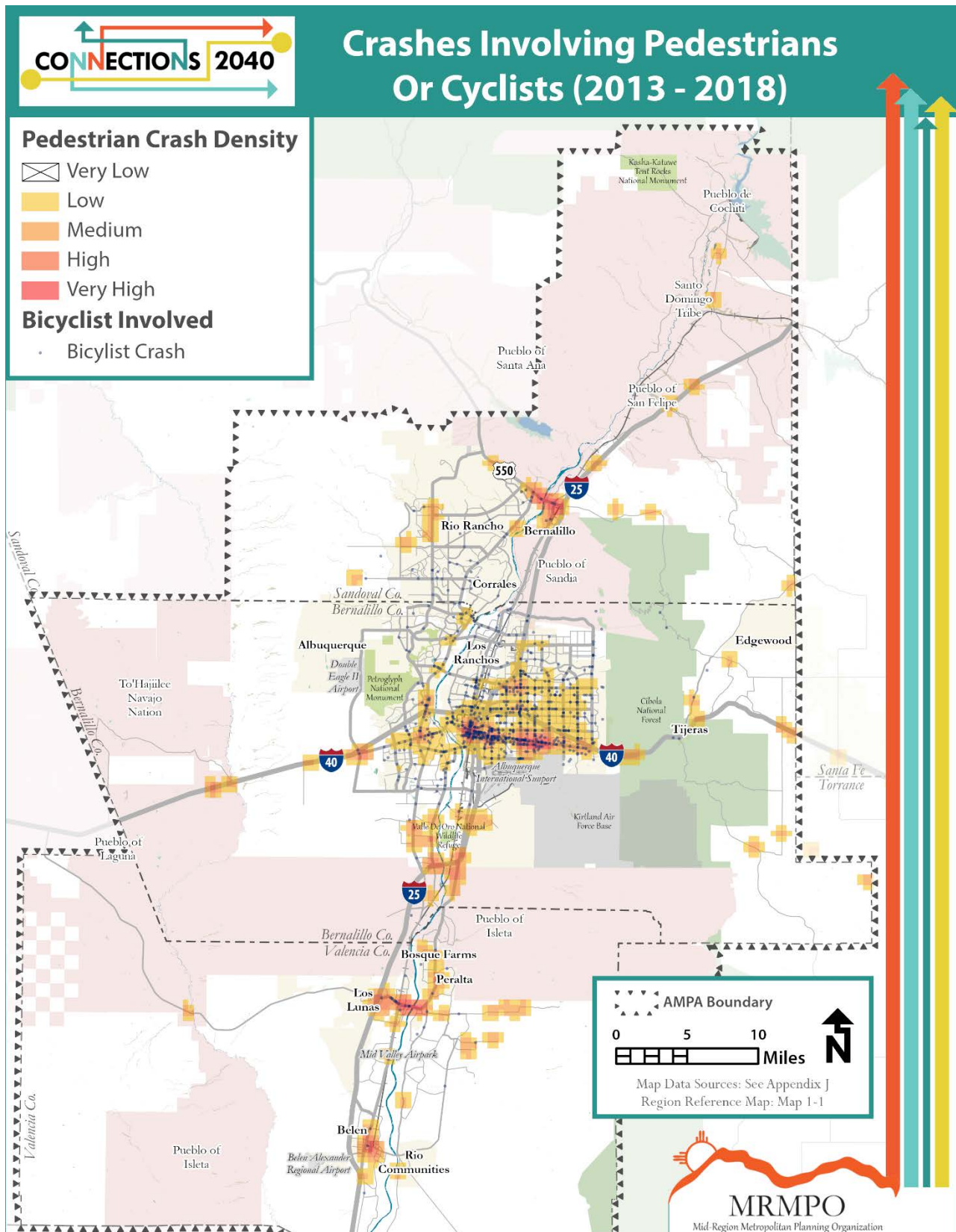
Bicycle Crash Severity	Count
Fatal Crash	10 (2% of fatal crashes)
Injury Crash	805 (2.5% of injury crashes)
Property Damage	151 (0.002% of property damage crashes)
Pedestrian Crash Severity	Count
Fatal Crash	147 (30% of fatal crashes)
Injury Crash	1,325 (4% of injury crashes)
Property Damage	129 (0.002% of property damage crashes)

Figure 5-12: Bicyclist in AMPA



¹² MRMPO staff has also developed a safety map using fatal and injury crashes per mile and per intersection volumes, called the High Fatal and Injury Network (HFIN) that is shown in this chapter's discussion of the RTSAP.

Map 5-7: Crashes Involving Pedestrians or Cyclists



Implementing Road Diets to Increase Safety

A road diet is essentially a reallocation of roadway space that aims to reduce dangerous speeding and improve infrastructure for vulnerable road users, such as pedestrians, people with disabilities, and bicyclists. The most common type of road diet reconfigures an undivided four-lane roadway into a three-lane roadway, with one travel lane in each direction and a two-way left turn lane in the center. This reconfiguration decreases conflict points (opportunities for crashes) and creates space for bicycle lanes or parking spaces in each direction of travel. The bike or parking lane also provides pedestrians with a traffic buffer, increasing their comfort on the sidewalk. According to the USDOT, road diets can reduce traffic crashes to a very large degree:

- In small urban areas across the nation with populations around 17,000 and roadways with up to 12,000 trips (daily volume), crashes dropped about 47 percent after a road diet was implemented.
- In larger metropolitan areas in the US with populations around 269,000 and roadways with up to 24,000 trips (daily volume), the crash reduction was roughly 19 percent.

The combined estimate from all the best studies predicts that crashes will decline an average of 29 percent after a four-to-three-lane road diet. Because road diets are a low-cost and proven safety countermeasure, MRMPO identified potential road diet candidates in the AMPA and integrated those into the Long Range Bicycle System map. The analysis is found in the *RTSAP*.¹³ The City of Albuquerque has implemented several successful road diets, including along segments of Central Avenue, Zuni Road, San Pedro Drive, and Rio Grande Boulevard.

b. Vision Zero and Preventing Crashes

Vision Zero is a commitment to create safer streets for all of us, whether we are walking, biking, driving, or taking transit, and regardless of our age or ability. Vision Zero policy is an integral part of the *RTSAP* and many of the strategies listed in the *RTSAP* are related to a changing paradigm in how we address dangerous crashes. For decades, there has been an implicit assumption that an inevitable amount of death and injury is acceptable on our public roadways¹⁴. However, these traffic collisions are not **accidents**; they are preventable **crashes**. Vision Zero is a systematic approach for preventing fatalities and serious injuries.

Figure 5-13: Traditional Safety Approach versus Vision Zero



Source: <https://visionzeronetwork.org/wp-content/uploads/2017/10/Why-VZ-is-Different-1024x444.jpg>

¹³ <https://www.mrcog-nm.gov/255/Safety-Analysis>.

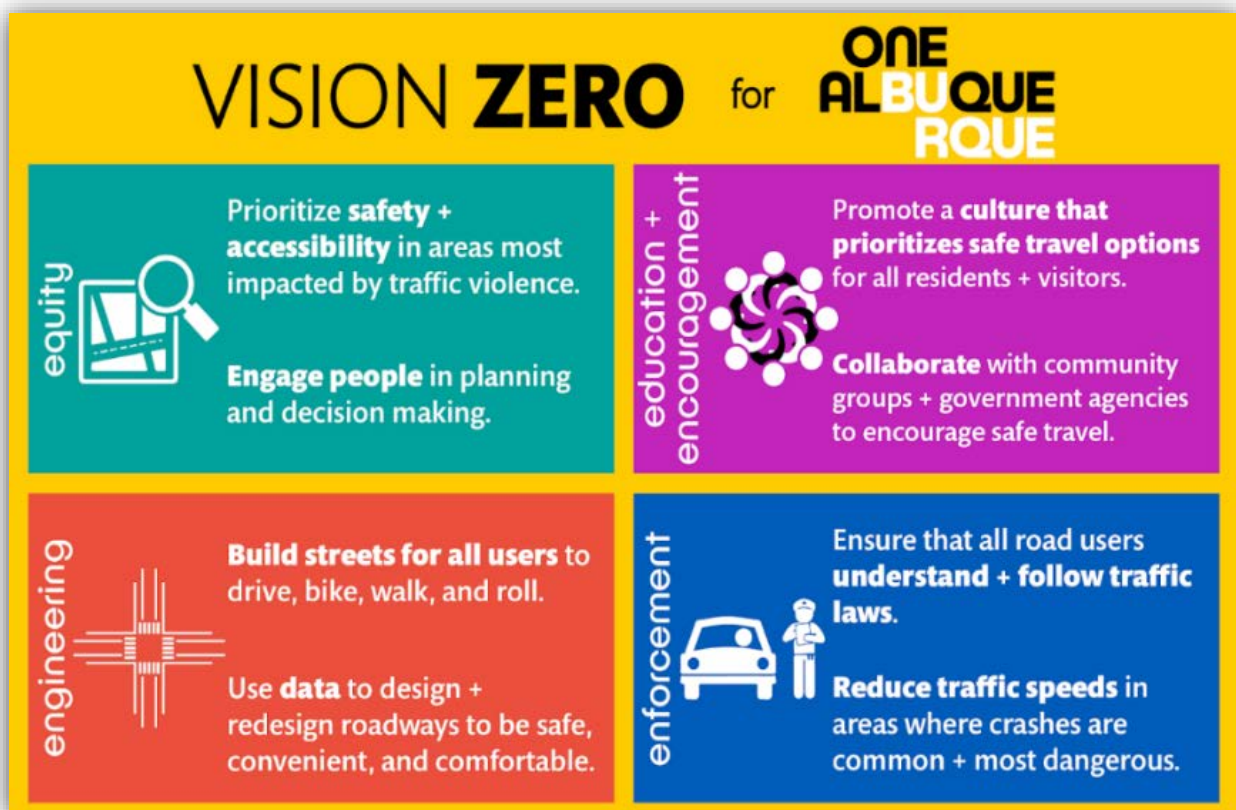
¹⁴ Morris, 2016.

Vision Zero is used around the world to eliminate traffic fatalities and serious injuries while increasing safe, healthy, equitable mobility for all. Sweden first implemented the Vision Zero concept in 1994 and reduced its traffic fatalities by half since 2000.¹⁵ Such a radical vision for safety was not adopted without resistance from political economists and experts in the transportation sector. Most did not believe zero fatalities were achievable and that fatalities were just a consequence of transporting people. However, the success of Vision Zero programs around the world and in the United States show that fatal and injury crashes can be reduced significantly. Since its conception, countries (Sweden, the Netherlands, the United Kingdom, Norway, and more), state DOTs (Rhode Island, Virginia, Michigan, Minnesota, and Pennsylvania), and cities (Boston, New York City, San Francisco, Seattle) have adopted the goal of zero fatalities.

Vision Zero City of Albuquerque

In May 2019, Mayor Keller signed an Executive Order committing the City of Albuquerque to work toward the goal of zero traffic deaths by 2040. The City will start by developing a Vision Zero Action Plan guided by Equity, Education and Encouragement, Engineering, and Enforcement. The City of Albuquerque will work toward zero traffic fatalities, paying particular attention to vulnerable roadway users such as pedestrians, bicyclists, and people with disabilities.

Figure 5-14: City of Albuquerque’s Vision Zero Goals



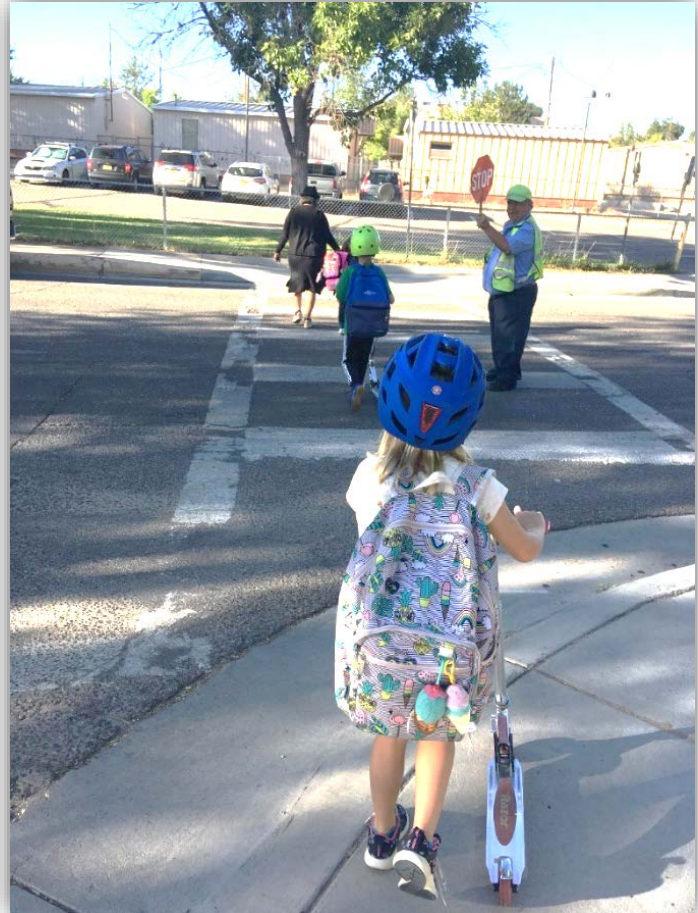
¹⁵ *Economist*, 2014.

APS Vision Zero for Youth Initiative

As children are among the most vulnerable users of the transportation system, it is critically important to address their access to active transportation as well as their safety while traveling. APS is in the process of planning for a district-wide Vision Zero for Youth initiative to be implemented in all schools, elementary through high school.

The initiative will involve both pedestrian and bicyclist safety curriculum and a public awareness campaign directed at drivers. APS aims to fill an important gap by teaching students how to navigate pedestrian and bicycle infrastructure. The awareness campaign component of this initiative will aim to increase safety awareness to drivers and reduce speeds near schools during and outside of school hours.

Figure 5-15: Children Scooting to School in Albuquerque



5.4 Public Health Connections

In the early 20th century, the emerging field of urban planning sought to address public health through land use zoning that separated harmful uses (such as industrial factories) from residential uses. Later in the century, urban planning and public health diverged into separate fields as planning became more concerned with design. Today, the fields of planning and public health are increasingly converging to address significant public health challenges related to the built environment, as the connection between the modern built environment and public health outcomes are becoming better understood and documented through research and studies. MRMPPO recognizes the importance of the convergence of the public health and planning fields at the national and local levels and that the formation of partnerships will be key in addressing significant health challenges. It is now understood that transportation issues are tightly connected to pressing health concerns and that transportation planning will be a key strategy in addressing these concerns in their totality.

a. Physical Activity impacts on Health Conditions and Equity

Currently in New Mexico, only 52.2 percent of adults and 26.3 percent of youth are meeting aerobic exercise guidelines (150 minutes a week), and more than a quarter of adults are getting “little to no leisure time physical activity.”¹⁶ Encouraging walking and biking is a crucial ingredient for a healthy community. There is substantial evidence that sedentary lifestyles negatively impact mental and physical health, and it is a widely accepted fact that physical activity positively affects health. Since many trips happen within walking or cycling distance from a trip’s origin, providing safe and inviting conditions to encourage the use of active modes for these trips is an important strategy for improving a community’s health. An indicator of lack of physical activity includes rising obesity rates. To that end, many have named obesity a national epidemic. In 2002, a study estimated that obesity was responsible for over nine percent of total health care spending in the United States.¹⁷ By and large, New Mexico has followed the national trend of a dramatic rise in obesity rates. The state’s 2010 adult obesity rate was 25.6 percent, more than double the rate in 1990.¹⁸ While a recent report found that obesity rates are beginning to stabilize in New Mexico, there is still much more that needs to be done to bring the rates down to acceptable levels.¹⁹

Obesity is an important public health issue and is associated with diseases such as heart disease and high blood pressure. In the United States and in New Mexico, heart disease is the leading cause of death. It has been estimated that obesity and its related health problems rival tobacco use in negative health impacts.²⁰

¹⁶ New Mexico Department of Health, Public Relations. “Half of New Mexico adults meeting aerobic exercise guidelines,” *Healthy Living*. 2014

¹⁷ Finkelstein, E. A., Fiebelkorn, I. C., Wang G. “National medical spending attributable to overweight and obesity: how much, and who’s paying?” *Health Affairs Web Exclusive*. 2003

¹⁸ New Mexico Department of Health, Chronic Disease Prevention and Control Bureau, “Complete indicator profile of obesity: adult prevalence,” 2013

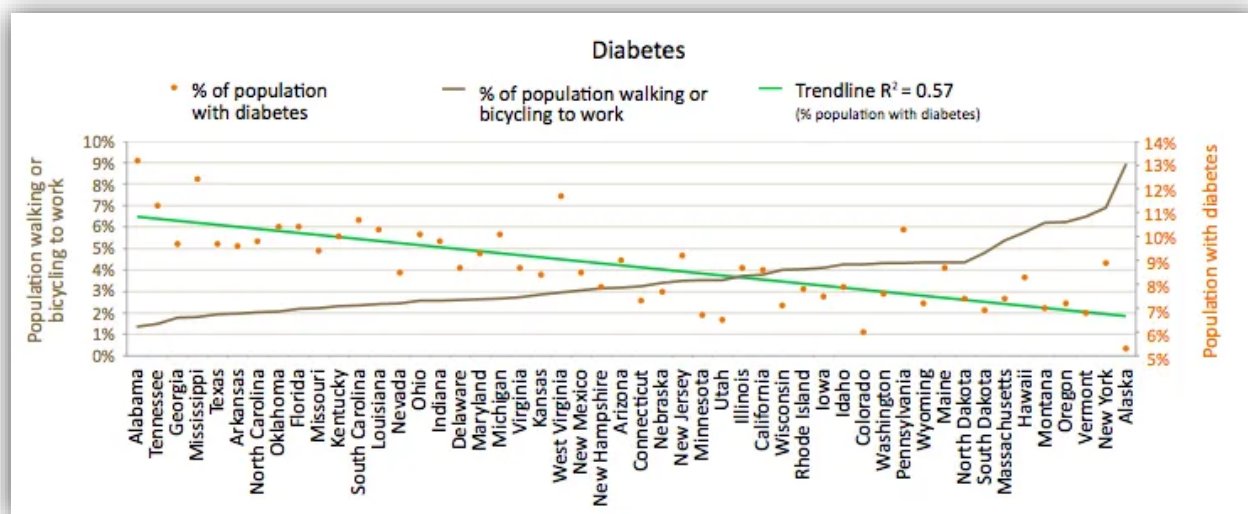
¹⁹ New Mexico Department of Health, Public Relations, “Exercise shouldn’t be a chore.” *Healthy Living*, 2014

²⁰ Simcoe Muskoka District Health Unit, “The Impact of the Built Environment on the Health of the Population: A Review of the Review Literature,” 2007

Tackling Inactivity with Active Transportation

A moderate amount of physical activity is associated with a reduction in mortality, depression, and reduced frequency of dementia. These issues are relevant to transportation and land use planners because a person can meet their daily physical activity needs by using active modes of transportation such as bicycling, walking, and even taking transit.^{21 22} One study found that **“each additional hour spent in a car per day was associated with a 6 percent increase in the likelihood of obesity,”** and that the inverse is true for public transit users due to the fact that transit users walk to and from transit stops.²³ The inverse relationship between the percentage of workers who commute by biking or walking and the percentage of people diagnosed with diabetes is shown below.²⁴ There are other benefits too; in particular, switching from driving to more active modes can measurably reduce emissions and improve air quality.²⁵

Figure 5-16: Percentage of People Diagnosed with Diabetes and Workers who Bicycle or Walk



Benefits of Connected Street Networks

An active transportation system is more than sidewalks, bike lanes, and transit services; it is also influenced by the layout and design of the broader roadway networks, which alone can have significant impacts on health outcomes. One study found that “more compact and connected street networks with fewer lanes on the major roads are correlated with reduced rates of obesity, diabetes, high blood pressure, and heart disease among residents,” even when controlling for food environment, land uses, commuting time, socio-economic status, and street design.²⁶

The figure below shows two street networks, the second of which illustrates how greater connectivity can be achieved through a well-designed street network that has a grid network with shorter block lengths, a greater number of intersections, and roadways with fewer lanes.

²¹ Killingsworth, R., De Nazelle, A., & Bell, “Building a new paradigm, improving public health through transportation,” *ITE Journal-Institute of Transportation Engineers*

²² Dill, J., “Bicycling for Transportation and Health: The Role of Infrastructure.” *Journal of Public Health Policy*, 2009

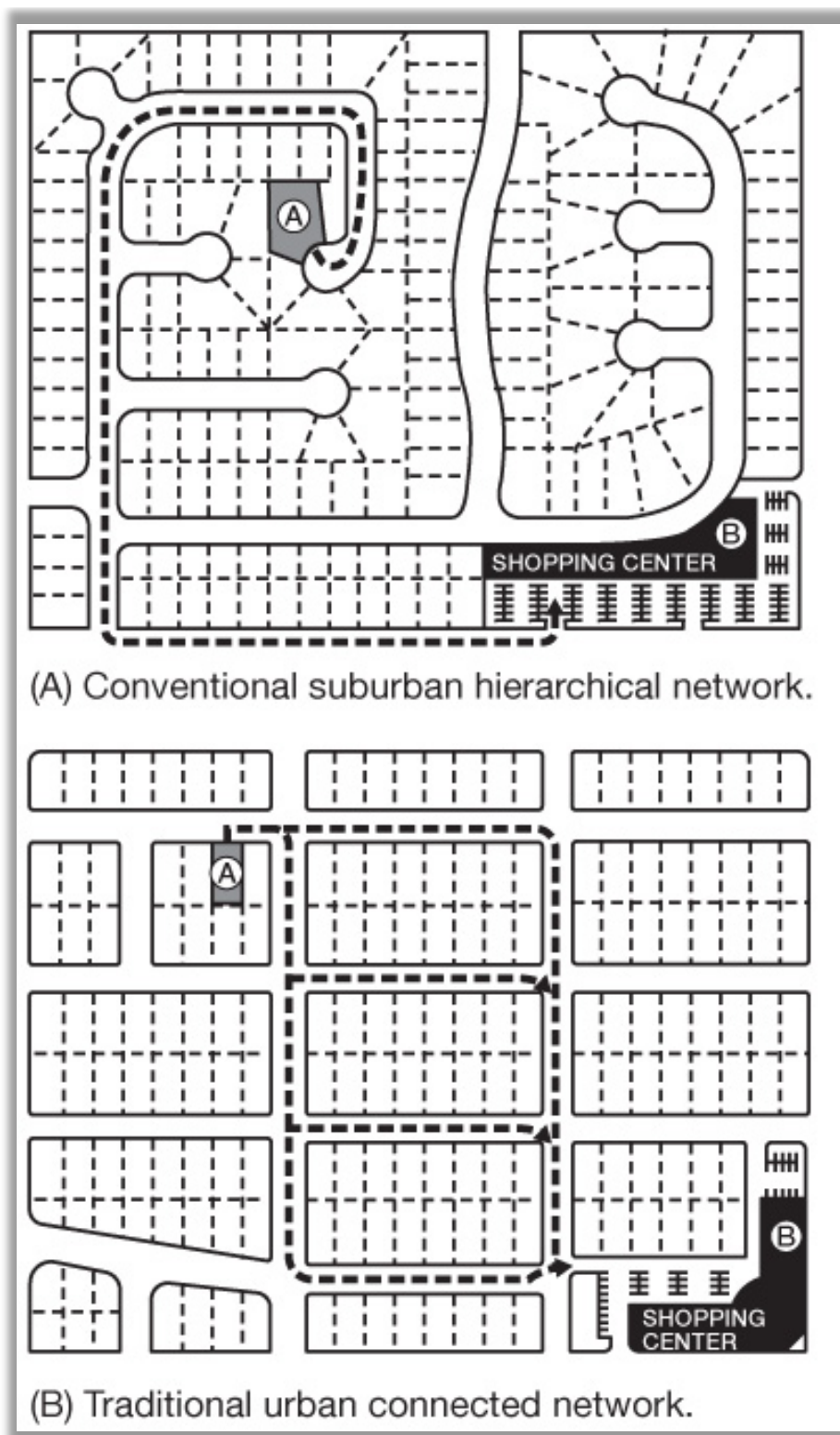
²³ Frank, L. D., & Kavage, S., “Urban planning and public health: a story of separation and reconnection.” *Journal of Public Health Management and Practice*, 2008, p. 214

²⁴ Alliance for Biking and Walking using US Census and CDC data

²⁵ Litman, T., “Transportation and Public Health.” *Annual Review of Public Health*, 2013

²⁶ Marshall, W. E., Piatkowski, D. P., & Garrick, N.W., “Community design, street networks, and public health.” *Journal of Transport & Health*, 2014

Figure 5-17: Different Roadway Networks and their Effects on Connectivity

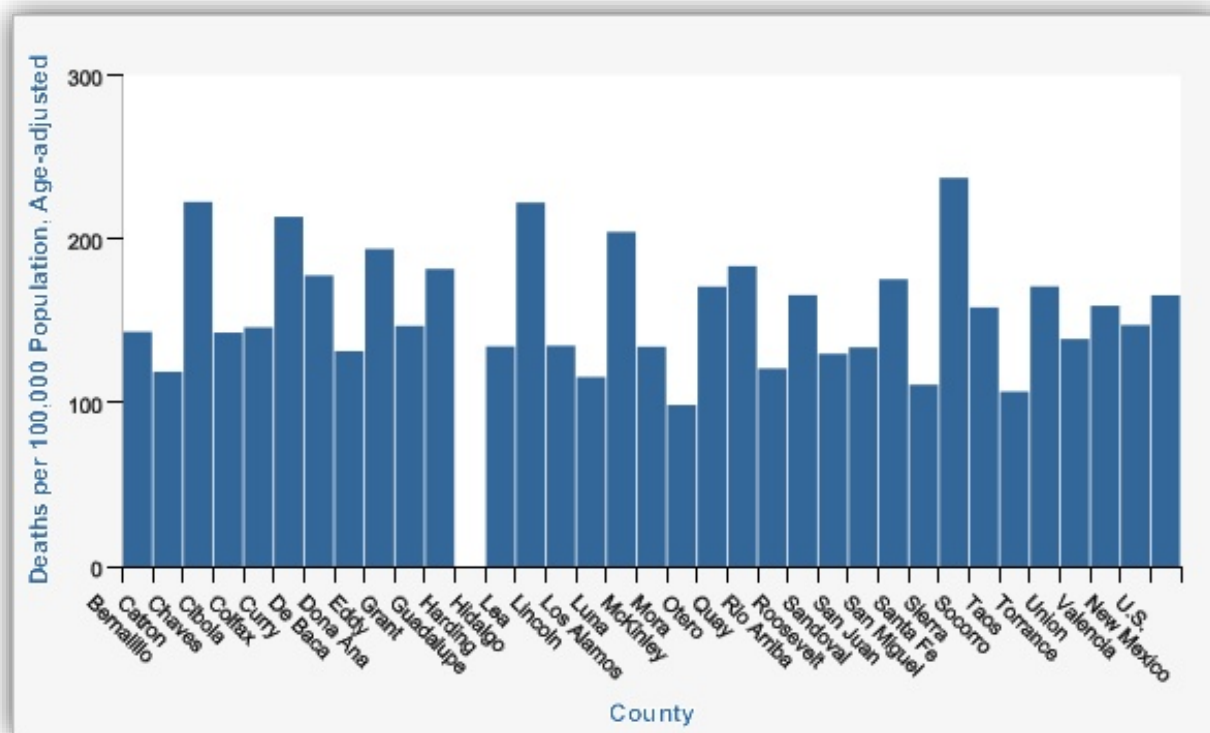


Addressing Health Inequities

The Center for Disease Control (CDC) defines health inequity as “a difference or disparity in health outcomes that is systematic, avoidable, and unjust.”²⁷ Health disparities are often analyzed by categories of race, ethnicity, and income, and health inequities clearly exist by these groupings in the region. As transportation is geographic in nature, analyzing geographic disparities in health may be most appropriate for determining how transportation planning can address related health issues. Data from the New Mexico Department of Health Bureau of Vital Records shows that **there are clear disparities in the geographic distribution of the mortality from chronic diseases such as cardiovascular disease.**

Over the last 10 years, heart disease has been responsible for an average of 3,406 deaths per year in New Mexico. In 2017, it accounted for 21 percent of all deaths in the state.²⁸ MRMPO is investigating the issues of health disparities in the region through a partnership with Presbyterian Community Health and the Bernalillo County Community Health Council as part of the Centers for Disease Control’s Racial and Ethnic Approaches to Community Health (REACH) Healthy Here Initiative. Under the initiative, partners are working together across disciplines to address risk factors of poor nutrition, physical inactivity, and prevention, access to health care, and disease management related to chronic disease.

Figure 5-18: Heart Disease Deaths per 100,000 Population by County, New Mexico, 2015-2017²⁹



²⁷ Centers for Disease Control and Prevention. “Social determinants of health.” Retrieved Mon, 08 December 2014 from Web site: <http://www.cdc.gov/socialdeterminants/Definitions.html>

²⁸ New Mexico Department of Health (NMDOH)

²⁹ https://ibis.health.state.nm.us/indicator/complete_profile/CardioVasDiseaseHeartDeath.html

b. Health Related Transportation Initiatives

The *Futures 2040 MTP* established the connection between transportation conditions and health outcomes and identified analytical tools to make this connection more evident. The *Connections 2040 MTP* expands on this connection and analysis. Further integrating health considerations into regional planning will require a range of efforts, including increasing collaboration between planning agencies and community health organizations, improved technical analysis, and engaging community members about issues and opportunities related to public health and transportation. Fortunately, a range of efforts are taking place across the AMPA that do take a more holistic approach to transportation planning. The following ongoing efforts and potential strategies focus on transportation planning through the lens of equity and community health through transportation planning.

Recent Health-Related Transportation Initiatives

- ABQ CiQlovía, Albuquerque's annual open streets event, temporarily closes different streets to promote bicycling, walking, and public health. MRMPO and the NM Complete Streets Leadership Team started the event in 2014 and continued to manage it through 2016. Starting in 2017, the event moved to a new neighborhood, the International District, and a new group of organizers representing that neighborhood and the public health community took on management of the event. MRMPO continues to support and promote the event.
- Healthy Here is an initiative among the Bernalillo County Community Health Council, Presbyterian Community Health, the International District Healthy Communities Coalition (IDHCC), and the Mid-Region Council of Governments. Healthy Here is working to change systems and environments to make it easier for Hispanic and Native American residents of the International District, the North Second and Fourth Street Corridors and the South Valley to access healthy foods, be physically active, and manage chronic disease. The initiative uses a collective impact model to implement strategies involving wider access to fresh produce and locally grown food, safe and comfortable pedestrian access to daily destinations, and clinical linkages to wellness programs. Healthy Here has been funded in part since 2014 by the Center for Disease Control and Prevention's Racial and Ethnic Approaches to Community Health (REACH) program.
- An interdisciplinary team from the Albuquerque metro area was one of nine teams nationally selected to attend a 2018 Walkability Action Institute (WAI) training course in Decatur, GA in April 2018. The WAI, hosted by the National Association of Chronic Disease Directors (NACDD) and Centers for Disease Control and Prevention (CDC), is a multi-day "course" for interdisciplinary teams comprised of public health, transportation, planning, elected officials, and other disciplines. The team developed a Walkability Action Plan that included goals and action steps that the team members committed to initiating within their own organizations and agencies. This effort focuses on improving pedestrian conditions in the AMPA through the lens of equity and health.

5.5 Local Enhancements to Active Transportation

MRMPO encourages policies, projects, and programs that support active modes of transportation and active places. This includes not only addressing the safety and connectivity of the transportation system in order to make walking, biking, and transit more viable, but also promoting land use and design decisions required to make such active modes of transportation more attractive. Much of this work has been done through the development of the *Long Range Transportation Systems (LRTS) Guide*, and the Target Scenario, of which aspects have been implemented by local jurisdictions. This section provides information on some active transportation-related policies, plans, and projects that have been enacted since the adoption of the previous the *Futures 2040 MTP* in 2015.

Policies and Ordinances

City of Albuquerque Complete Streets Ordinance

In January 2015, the City of Albuquerque adopted a Complete Streets Ordinance. The ordinance aims to implement cost-effective improvements for multi-modal travel by taking advantage of opportunities as they arise during routine maintenance and street reconstruction projects. It also adopts, by reference, nationally-recognized standards for multi-modal facilities to complement existing standards in the City of Albuquerque's Development Process Manual, improves communication about street projects, and requires the City to consider multimodal level of service (MMLOS), rather than just conventional vehicle level of service (LOS), when working on larger roadway projects. Since the ordinance's adoption, there have been several successful complete streets and road diet projects completed.

The Complete Streets Ordinance was updated in August 2019. The update addresses equity measures for street design and project prioritization, strengthens language for project applicability, and reinforces language regarding exemptions from the ordinance.

Shared Active Transportation Ordinance

Albuquerque's City Council adopted a Shared Active Transportation Program Ordinance in the fall of 2018. Shared active transportation programs provide small vehicles such as bicycles, scooters, E-Bikes, e-scooters, or other small wheel vehicles, for rent to the public over short periods of time. Typically, trips on shared active transportation devices are short in distance and can serve as a tool to move away from single occupancy vehicle trips. Shared active transportation programs (such as bikeshares and scooter shares) are required to have a permit to operate in the City of Albuquerque. Currently, one e-scooter company is operating under a one-year pilot program. All users of these programs are required to follow state and local rules, and any rule that applies to bicycles also applies to e-scooters.

No Parking in Bike Lane Ordinance

As of December 19, 2018, stopping, standing, or parking in a bicycle lane is prohibited in the City of Albuquerque. The ordinance, which was recommended in the 2015 *Bikeways and Trails Facilities Plan*, supports the designation of bicycle lanes as travel lanes. The presence of motor vehicles in bike lanes is dangerous because it forces cyclists to confront vehicle traffic as they maneuver around the obstacles in the bicycle lane. Stopping, standing, or parking in a bike lane can result in a ticket.

Downtown Walkability Analysis and Downtown Safe Zone Boundary

In March 2015, the Downtown Walkability Analysis was adopted as a city policy for prioritizing multi-modal improvements in Downtown Albuquerque. This study was completed in the fall of 2014 by Jeff Speck, the author of *Walkable City: How Downtown Can Save America One Step at a Time*. This Downtown Walkability Analysis provided recommendations and rationale to improve walking and biking in the region's urban core. The plan identified several proposed projects and specifically recommended a 25 mph speed limit for the study area. The City of Albuquerque passed a resolution in March 2019 to create a Downtown Albuquerque Safe Zone, bounded by Lomas Boulevard to the north (but not including Lomas), the BNSF railroad tracks to the east, Coal Avenue to the south, and 8th Street to the west. The policy directs the City to identify transportation improvements for multimodal safety within this area. The policy sets the speed limit within the Safe Zone at 20 mph or lower. Speed limits signs have been replaced to reflect these new speed limit changes as well as adjustments to traffic signal timing. The policy also supports and prioritizes infrastructure improvements or alterations to streetscapes to support the 20mph limit.

Plans and Studies

Bernalillo County's Pedestrian Safety Action Plan

This plan is a 10-year Rank 2 facility master plan. It includes an overview of existing bicycle and pedestrian related plans, studies, and ordinances, inventories existing facilities, and identifies and prioritizes future facility needs as well as policy changes. The plan is based on staff research, peer review, and community meetings in conjunction with the regional transportation plan. The existing conditions and inventories are evaluated by planning area and include health and safety concerns. Some of the recommendations that came out of this plan are a Complete Streets policy, pedestrian and bikeway projects, and improving coordination with partner agencies.

Village of Los Lunas Bicycle Plan

In August 2016, the Village of Los Lunas published their *Bicycle Master Plan*, signaling their intentions to improve the connectivity of existing bicycle infrastructure. The plan encourages bikeways where none had existed and provides a vision for active transportation for the Village to pursue. Bicycle treatments include a mix of multi-use paths, traditional bike lanes, and routes.

Figure 5-19: Village of Los Lunas Bicycle Master Plan



City of Albuquerque's Bikeways and Trails Facility Plan

The City of Albuquerque's *Bikeways and Trails Facility Plan* (BTFP) was adopted by the City Council in May 2015. The BTFP updated and combined the City's bikeways and trails plans into one resource. Combining these plans can help the City of Albuquerque improve overall network connectivity and provide better coordination and management of the growth of this system. The overarching plan purpose is to ensure a well-connected, enjoyable, and safe non-motorized transportation and recreation system throughout the metropolitan area. The BTFP reflects the desires of area residents to continue developing and improving a multi-use trail and bikeway network for commuting and recreational uses, as well as daily needs. The BTFP describes the existing system, policies, programs, recommendations, and proposed projects. This plan guides future investment in Albuquerque's bikeways and trails system, including facility improvements, new facilities, priority connections, maintenance, and education/outreach programs.

Bridge Boulevard Corridor Redevelopment Plan

Bernalillo County's Bridge Boulevard Corridor Redevelopment Plan seeks to proactively couple increases in land use densities and employment opportunities along Bridge Boulevard with key pedestrian, bicycle, and transit improvements. As one of a few urban river crossings, multimodal improvements to this corridor will be important for safety and connectivity. Five Points/Bridge Boulevard was identified as an Activity Center by MRMPO with a large potential for redevelopment for additional activity.

Walkability Action Plan

A Walkability Action Plan was developed by an interdisciplinary team of health and transportation and elected officials from the Albuquerque metro area who were invited to participate in a training workshop in 2018. The Plan identified four goals to improve understanding of pedestrian issues and to improve conditions for pedestrians with action steps to achieve each goal.

ADA Transition Plans

Section 504 of the Rehabilitation Act makes it illegal for the federal government, federal contractors and state and local governments receiving federal funds to discriminate on the basis of disability. It requires state and local governments to ensure persons with disabilities have equal access to any programs, services or activities receiving federal funding. This includes pedestrian facilities in the public right-of-way. It is imperative that local jurisdictions in the AMPA incorporate barrier removal into existing efforts and ensure that new facilities are built to meet ADA compliance standards. Most local jurisdictions in the AMPA have completed Americans with Disabilities Act (ADA) Transition Plans that include a complete or partial inventory of pedestrian facilities in the public-right of-way and steps to ensure pedestrian facilities comply with the ADA.

The *LRTS Guide* provides street typology matrices and basic guidance on right-of-way set-asides that meet ADA compliance standards generally but do not provide guidance for specific access requirements. Specific pedestrian improvement projects must refer to the New Mexico Department of Transportation's ADA Pedestrian Access Standard Drawings. These drawings conform to ADA requirements and provide guidance for compliance with the Proposed Accessibility Guidelines for Pedestrian facilities in the Public Right-Of-Way (PROWAG).

Projects

Silver Avenue Bicycle Boulevard

The Silver Avenue Bicycle Boulevard from Yale Boulevard to Carlisle Boulevard was studied by the City of Albuquerque in 2015 to identify specific improvements that could benefit and better serve bicyclists. The study resulted in the relocation of stop signs, traffic calming tools such as traffic circles at intersections, redesign of on-street parking, and a bi-directional protected lane on Carlisle to improve the crossing. Starting in the summer of 2018, the City of Albuquerque began to study the portion of Silver Avenue from Yale Boulevard to the Paseo Del Bosque Trail. This project will work to continue improvements and enhancements to this bicycle corridor and enable it to serve a variety of bicycle riders with different levels of comfort. Additionally, this low stress corridor connects key centers and transit nodes.

Alameda Drain Trail

Bernalillo County and the City of Albuquerque are constructing a multiuse trail along Matthew Avenue from Fourth Street NW to Second Street NW and along Second Street NW from Matthew Avenue to Roy Avenue in the North Valley. Currently, four phases are funded in the Transportation Improvement Program (TIP) as far north as Alameda Boulevard. The project includes green infrastructure/low impact development design, landscaping, wayfinding, and other trail amenities.

Second Street SW Corridor Improvement Project

Bernalillo County, with its partner the US Fish and Wildlife Service, is reconstructing five miles of Second Street SW from the Valle de Oro National Wildlife Refuge Visitor Center to Rio Bravo Boulevard using multiple federal and local funding sources (FLAP, TAP, STPE, GO Bonds, and NRPA grant). The corridor includes a multi-use trail, pedestrian bridge, green infrastructure/low impact design, landscaping, storm drainage, intersection improvements, and sidewalks. The roadway segment has been completed as far north as the South Diversion Channel. The multi-use trail has been completed to Prosperity Avenue and is under construction to Rio Bravo Boulevard. Additional FLAP funding has been secured to reconstruct the roadway with storm drainage and sidewalks to Rio Bravo Boulevard in FY 2021.

50-Mile Activity Loop

As part of *ABQ the Plan* (a long-term strategy for investment developed by the City in 2014), the City of Albuquerque is building a 50-Mile Activity Loop. When completed, the Loop will provide a contiguous network of trail and on-street facilities for walking, running and bicycling in an effort to increase quality of life for residents, enhance economic development opportunities, promote tourism, and spur private sector investments. As of 2019, the Activity Loop is over 90 percent complete.

Figure 5-20: City of Albuquerque 50 Mile Loop



Crucial improvements made in 2018 include the connection of the Paseo Del Norte Trail to the Piedra Marcadas park trail on the west side of Coors Boulevard and the connection of Silver Avenue's Bicycle Boulevard to the Paseo de Las Montañas trail. The Activity Loop builds upon existing infrastructure, focuses on providing key connections that link important destinations and trails, and promotes health and wellness benefits for Albuquerque residents and visitors. The Activity Loop also travels through parts of the South Valley and the International District, two areas with disproportionately poor public health outcomes. Project phases 6 and 7 will fill gaps in the southwest corner of the Activity Loop. In this area, the project was intertwined with the reconstruction of the Central-Unser intersection and redevelopment of the Bridge Boulevard corridor. The anticipated completion for this project is early 2021. There are several 50-Mile Activity Loop signs at different points around the city. An interactive map of the loop can be found here: <https://www.cabq.gov/50-mile-activity-loop>.

Bernalillo Railroad Crossing

The Town of Bernalillo constructed a new pedestrian crossing at the Downtown Bernalillo Rail Runner Station. The closest existing crossing is approximately 0.35 miles to the south, at Avenida Bernalillo (requiring a 0.7-mile detour from this desired location). The pedestrian crossing improves safety for locals who are known to cross the tracks to get to the other side of town. Construction of the at-grade crossing was completed in 2019. In the future, a second phase of the project will extend pathways around the crossing and enhance the markers that guide pedestrians.

Dr. Martin Luther King Jr. Avenue Bike Lane Improvements

A highly visible improvement to Albuquerque's bicycle network came in the form of bright-green thermoplastic buffered bike lanes installed along Dr. Martin Luther King Jr Avenue (MLK). The modifications to MLK greatly improve bicyclist safety and level of comfort along a key corridor connecting the University of New Mexico to downtown Albuquerque. The project intended to calm traffic by reducing the width of vehicle lanes from 13 ft to 11 ft. It also widened the existing bike lanes and provided a buffer from vehicle traffic. The design introduced bike boxes at major intersections to increase awareness of cyclists at intersection stops, provide a visible place for bicyclists to wait at intersections, and prevent vehicles from hitting bicyclists when turning right.

Indian School Undercrossing at the North Diversion Channel Trail

Indian School is the one remaining at-grade crossing for the North Diversion Channel Trail, which is a multi-use trail that runs from Tucker Ave NE to the Albuquerque International Balloon Fiesta Park. This project will create an underpass under Indian School. The project is a collaboration among the City of Albuquerque Department of Municipal Development, Parks and Recreation, and Albuquerque Metropolitan Arroyo Flood Control Authority. The completion of the underpass will greatly improve the safety for bicycle commuters, recreational riders, runners, and pedestrians. It could also encourage more residents and visitors to use the nearly nine-mile trail to attend the Albuquerque International Balloon Fiesta via bicycle, which could help to reduce associated vehicle traffic challenges.

Albuquerque Rapid Transit (ART)

The Albuquerque Rapid Transit project has a dedicated bus guideway through most of the nine-mile corridor that runs along Central Avenue. Construction began on the corridor in 2016 and bus service began in November 2019. Along with reimagining Central Avenue with premium bus service, according to the City of Albuquerque, over 1,000 individual ADA improvements were made along the corridor from Coors to Louisiana. Improvements include updating non-compliant curb ramps and drive pads and the addition of pedestrian-scale lighting. Sidewalks throughout much of the corridor were also widened to six feet and street trees were planted, which has helped to create a more pedestrian-scaled environment throughout

the corridor. Crash data and the High Fatal and Injury Network show that the Central Avenue corridor and several intersections are hotspots for crashes and fatalities—especially for pedestrians. The intention was for these corridor improvements to help create a safer environment not only for pedestrians, but for people using all modes.

HAWK Signals

In the fall of 2015, the City of Albuquerque installed a High Intensity Cross Walk (HAWK) signal, or Pedestrian Hybrid Beacon, at the intersection of Lomas and Alvarado as part of the 50-mile Activity Loop. The three-bulb signal is designed to make it easier and safer for pedestrians and bicyclists to cross busy roads. HAWK signals are an FHWA proven safety countermeasure that have been shown to result in safety benefits such as a 69 percent reduction in pedestrian crashes, 29 percent reduction in total crashes, and 15 percent reduction in serious injury and fatal crashes³⁰. The light mimics a stoplight where there otherwise wouldn't be one. When the signal is activated by a pedestrian, it shows flashing yellow, solid yellow, solid red, and then blinking red lights. As with traditional traffic lights, motorists should proceed with caution during yellow lights, stop on red lights, and may proceed after stopping if no one is in the crosswalk when the lights are flashing red. As part of the ART project, five HAWK signals were added throughout the corridor at ART stations to enhance pedestrian accessibility. In addition, HAWKs have been installed at Louisiana and Nathalie in the Northeast Heights in Albuquerque and on Isleta Boulevard in Bernalillo County. Bernalillo County is currently installing a midblock HAWK Signal crossing near Texas and Central Avenue in the International District to serve transit riders and pedestrians accessing a UNM health clinic, senior apartments, and the Tiny Homes Village. The HAWK Signal was identified as a priority in the Healthy Here's International District Pedestrian Safety Action Plan.

Figure 5-21: Pedestrian Hybrid Beacon in Bernalillo County



³⁰ https://safety.fhwa.dot.gov/provencountermeasures/ped_hybrid_beacon/

CHAPTER 6: ECONOMIC LINKAGES

The economy is inextricably linked to transportation and land use. Investing in new transportation projects creates construction jobs and injects money into the economy. Transportation infrastructure plays a critical role in making a region competitive in terms of both supporting existing industry and labor and attracting new businesses and a talented workforce. Economic activities also include efficient goods movement, personal well-being and wealth, the creation of vibrant places, and ensuring efficient use of public funds. This chapter explores these different facets of the economy.

6.1 Economic Impact of Transportation Spending

The projects listed in *Connections 2040 MTP* have a combined total of \$5 billion in public dollars for capital transportation investments through 2040. These funds contribute to a stronger economy. Whether it is through creating and sustaining construction jobs, supplying contract work to engineer and design firms for project planning, or through right-of-way and land acquisition - the dollars we put towards investing in our infrastructure ripples throughout our entire economy in the following ways:

- 1) Direct jobs are created among the firms that design and build the project.
- 2) Indirect jobs are created when those businesses purchase supplies and equipment and services from other businesses to support their work.
- 3) Induced jobs are created when the workers involved in the projects take the money that they earn and put it back into the economy by making purchases that support themselves and their families.

Upgrading and maintaining transportation infrastructure is critical for mobility, safety, and access. Furthermore, there are broader economic benefits of transportation investments which can be substantial. The following table illustrates the economic impacts of infusing new federal transportation dollars into our economy over the life of the MTP.

a. Economic Impact of MTP Spending

Of the \$5 billion public capital transportation dollars in the MTP, \$4.1 billion is considered “new money” infused into the regional economy by the federal or state government. The impact of the \$4.1 billion is shown below:

Table 6-1: Economic Impacts of New Transportation Dollars (MTP 2016-2040), 2020 Dollars

Cumulative Benefits to Economy:	
<i>Average Annual Employment</i>	2,017
<i>Gross Regional Product (GRP)</i>	\$5.5 billion
<i>Real Personal Income</i>	\$4.1 billion
<i>Personal Consumption Expenditures</i>	\$3.7 billion

Source: MRMPO, REMI Model

MTP project spending is expected to have a considerable impact on the regional economy. Projects will result in an average of approximately 2,000 jobs per year that would not otherwise have been created. **Public transportation spending is also expected to have a cumulative impact on our GRP of \$5.5 billion between 2016 and 2040.** Personal incomes are projected to rise by \$4.1 billion, the majority of which will re-enter the economy in the form of increased expenditures on goods and services. These benefits capture just the transportation dollars and not the additional economic impact of an improved network (which is illustrated in section 6.2 of this chapter).

b. REMI Policy Insight Model

To analyze the impacts of transportation spending, MRMPO uses the Regional Economic Model, Inc. (REMI). REMI was designed to measure the impact of new jobs, policy shifts, and spending in an area and how these changes ripple throughout the economy. The REMI model is calibrated specifically to the MRMPO region and based on the most recent data available. The REMI model and its dynamic methodologies are well respected and used by organizations throughout the world to analyze regional economies. (See Appendix H for a description of the REMI methodology). Below are the definitions for the variables in Table 6-1.

Table 6-2: Economic Indicators

EMPLOYMENT	Employment is the estimate for number of jobs. This includes both part time and full time jobs as well as those who are self-employed. Employment figures presented here do not include unpaid family workers or volunteers. In the REMI model, employment is affected directly by output and labor productivity and indirectly by various transportation efficiency improvements and access.
GROSS DOMESTIC PRODUCT (GDP)	GDP is the total value of consumption, investment, and government spending in the region. Investments and government spending not only impact GDP directly, but also help create jobs and spur further consumption. GDP can also be seen as the total value of final goods and services produced within the regional economy.
REAL PERSONAL INCOME	Real Personal Income is the current dollar value of all personal earnings from wages, investment, and other earning streams.
PERSONAL CONSUMPTION EXPENDITURE	This is the dollar amount of disposable income put back into the economy through purchases of goods and services by individuals. Higher wages lead to higher disposable income and generally higher levels of consumption.

6.2 Economic Impact of Network Efficiency

Proper provision of transportation infrastructure can be a valuable tool for fostering economic development and can result in a number of benefits. As shown in the previous section, economic gains are incurred through the direct investment of federal dollars for the design and construction of transportation projects. In addition, economic gains are the result of improved network operations. For example, roadway efficiency can be realized from strategies including network expansion, safety improvements, and Intelligent Transportation Systems implementation, which help manage congestion and allow for a smoother flow of goods and people. Improvements in mobility and access reduce the effective distances between locations and reduce overall transportation costs.¹ This is referred to as the economic impact of network efficiency.

a. Economic Impacts of MTP Projects

Economic impacts to the MRMPO region associated with the improved mobility, or “network efficiency” gained by building the projects proposed in the *2040 MTP* are shown below. These benefits are above and beyond the impact of the construction and maintenance dollars associated with building the projects. The figures presented in the table indicate increases over a “no-build” scenario that models transportation conditions if the projects listed in the MTP are not built.

Table 6-3: Economic Impact of Network Efficiency Improvements

Economic Impacts of MTP Roadway Expansion Projects between 2016 and 2040 (2020 Dollars)	
User Benefits (2016 - 2040):	
<i>Travel Time Savings</i>	\$1,962,052,664
<i>Vehicle Operating Cost Savings</i>	\$78,863,205
<i>Safety Benefits</i>	\$47,779,559

Source: MRMPO, REMI Model

Mobility improvements over the next 24 years translates into a travel time savings of approximately \$1.9 billion over the life of the plan. In addition, vehicle operating expenses save an additional \$79 million, and safety benefits total approximately \$48 million. These results demonstrate the role of transportation projects as an important aspect of the regional economy and a huge driver of economic activity.

b. REMI TranSight Model

MRMPO used the REMI TranSight model to evaluate the economic impact of projects listed in the *2040 MTP*. TranSight is an extension of the REMI Policy Insight model that is compatible with MRMPO’s travel demand model and uses the number of trips, vehicle miles traveled, and vehicle hours traveled to calculate the economic benefits of transportation improvements. Rather than actual project costs, economic impacts are based on increased labor market access, decreased commuting costs, and lower transportation costs for delivering goods and services. More information concerning specific details and operation of the REMI TranSight model are included in Appendix H.

¹ Laube, M.M., L. Rainville, and W.M. Lyons. “A Multi-Modal Approach to Economic Development in the Metropolitan Area Transportation Planning Process,” Volpe Center, 2014

The TranSight analysis presented in this section only measures the impacts of roadway capacity and expansion projects associated with the *2040 MTP*. It does not include economic benefits associated with alternative modes of transportation or operational strategies such as Intelligent Transportation Systems and intersection improvements. While these transportation improvements are clearly of great value, they are not reflected in this analysis because they are not simulated within the travel demand model environment.

TranSight Economic Indicators

Several factors are commonly used to quantify economic benefits for roadway expansion or efficiency improvements. These are:

- 1) Travel Time Savings
- 2) Vehicle Savings
- 3) Safety Benefits

Travel Time Savings

Travel time savings provide individuals with more leisure time by effectively shortening necessary trips, like trips to work. Time savings create large economic benefits for businesses by providing cost savings for transporting goods and materials. Additionally, time savings makes communities more attractive for future business investments by reducing costs and allowing workforces to be drawn from larger areas. Time savings may induce new businesses to form, or existing businesses to expand, by reducing costs that had made operations prohibitively expensive.

Vehicle Savings

When roadway improvements reduce congestion and allow drivers to reach their destinations in less time there may be fuel and vehicle operation savings for individuals and businesses. These savings come in the form of fuel savings and general wear and tear on the vehicle that can be incurred by more trips, longer trips, and stop-and-go traffic.

Safety Benefits

Reduced congestion generally decreases the number of vehicle accidents but may increase accident severity.^{2, 3} Vehicle accidents cause undue repair costs, property damage, lost earnings, travel delays, medical and injury expenses, and may result in undue loss of life. Each of these factors hinders the local economy and places financial strain on individuals. Transportation projects promoting safety result in sizable increases in economic benefits.

Total Economic Impact of the MTP

When combined, the estimated impact of new transportation spending in the region and the transportation system's network efficiency improvements are substantial. The REMI TranSight model estimates that this MTP generates an additional:

1. **\$9 billion in GRP (2016 – 2040)**
2. **\$3.5 billion in wages and salaries (2016 – 2040)**
3. **5,500 additional jobs per year (on average)**

² Ibid.

³ Cambridge Systematics, "Crashes vs. Congestion - What's the Cost to Society?" AAA, 2011

6.3 Economic Well-Being

Our ability to easily and affordably access the things we need affects our daily quality of life. However, households are often forced to sacrifice housing options for affordable transportation, transportation options for affordable housing, or find that there are simply no options that meet their needs affordably. This section delves into the economic well-being of our region's households by exploring different housing options, transportation costs associated with housing location, and how those living in poverty are most likely to require access to daily destinations by transit or by foot.

a. Housing Affordability

In a report published in May 2002 by the Millennial Housing Commission it was asserted that, "Affordability is the single greatest housing challenge facing the nation" (Millennial Housing Commission 2002). According to the Department of Housing and Urban Development (HUD),

"...families who pay more than 30 percent of their income for housing are considered cost burdened and may have difficulty affording necessities such as food, clothing, transportation and medical care."⁴

Housing and transportation costs combined are an even better indicator of how cost burdened a family is and this concept is further explored in the next section. However, when evaluating just housing costs, this 30 percent standard has become the most widely accepted measure of housing affordability in the United States. In the AMPA, one of every three households (32.3 percent) spend over 30 percent of their income towards housing expenses. Included are households considered to be facing an extreme housing cost burden; **17.5 percent of AMPA households spend 50 percent or more of their income on housing.** The hardest hit are households that rent their homes. Approximately 35 percent of households in the AMPA are renters which is on par with the national average. However, almost **half of all renters in the AMPA exceed the 30 percent standard (48.6 percent).** This is due to the relatively low median incomes of renters when compared to owners (\$33,000 compared with \$66,000).

Offering a Range of Housing Options

One way of improving affordability is offering a range of housing options. In fact, this is an important theme of this MTP. One of the guiding principles for the Target Scenario is to encourage diverse housing options. And a pathway listed to implement the MTP as described in Chapter 9 is to promote a diverse mix of housing in cost, unit types, and neighborhood settings.

The Census Bureau's ACS describes current housing distribution by several broad categories as shown in the following table. When compared with the nation, the region's housing stock is overrepresented in single family housing and mobile homes, while underrepresented in attached housing and multi-family.

⁴ Department of Housing and Urban Development,
http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/affordablehousing

Table 6-4: Housing by Units in Structure in 2017, Albuquerque MSA & United States

	Albuquerque, MSA		United States	
	Number	Percent	Number	Percent
Single family	277,718	71.4%	92,789,782	67.5%
Attached housing 2 - 4 units	24,345	6.3%	10,905,172	7.9%
Multi-family 5 units or more	51,502	13.2%	25,084,209	18.3%
Mobile homes	35,333	9.1%	8,500,432	6.2%
Other	258	0.1%	127,713	0.1%
Total Housing Units	389,156	100.0%	137,407,308	100.0%

Source: US Census Bureau ACS 1-year 2017

Multi-Family Housing

Multi-family housing is often seen as an affordable housing option. However, in the AMPA a tight demand for quality apartments has made renting an apartment out of reach for many. According to CBRE Albuquerque, rents across the AMPA increased 7.5 percent between September of 2018 and September 2019 with apartments at a 96 percent occupancy rate. Much of the multi-family housing currently under construction is located along major transit routes which is beneficial to renters who may rely on public transportation. However, a large portion of newer multi-family developments are marketed towards above average income earners and less accessible to households with limited financial means. There are some notable exceptions however, one example is the conversion of several historic motels along the Central Avenue corridor into low income housing units.

Manufactured Homes

While Albuquerque is underrepresented by multi-family housing (its share of the housing market is lower than the national average and other cities of similar size) it has a high share of mobile and manufactured housing. In the region there are 35,000 households living in mobile homes (9.1 percent of households compared with 6.2 percent nationwide). It is likely that the sizable share of mobile homes among our overall housing stock indicates that this may be a viable alternative to households seeking affordable housing. While typically considered a more rural housing option, this is certainly not always the case. There are 16,000 households living in mobile homes within urban neighborhoods in the region.⁵

Households living in mobile and manufactured homes have considerably lower incomes than the general population. The median income for a household living in a mobile home in the Albuquerque metropolitan area is approximately \$33,000 annually, while the median income for all households is \$50,906. In an article published in the journal titled, *Housing Policy Debate* (Sullivan, 2019), the authors found that while households that reside in manufactured homes are typically more economically disadvantaged than conventional renters and homeowners, they pay a smaller percentage of their income on housing costs.

⁵ Urban neighborhoods is defined here as housing located within the Albuquerque Urbanized Area, which is established by the US Census Bureau based on housing unit density criteria.

The Missing Middle

Termed by architect Daniel Parolek, missing middle housing is defined as, “a range of multi-unit or clustered housing types compatible in scale with single-family homes that help meet the growing demand for walkable urban living”.⁶ The missing middle housing types include, townhomes, duplexes, bungalows, and live/work spaces. These housing types are a medium density alternative to the traditional single family or large-scale multifamily options. The Integrated Development Ordinance (IDO), recently adopted by the City of Albuquerque, provides more opportunities for housing of this type in order to promote transit-oriented development in targeted areas. Missing middle housing can help to provide a level of density that is transit supportive and walkable while maintaining a neighborhood scale. The region is underrepresented in this type of housing (6.3 percent compared with 7.9 percent nationally).

Co-Housing, Co-op Housing, and Multi-Generational Housing

In the 2040 MTP Questionnaire there was a question which read, “What type of housing would you like to live in in the future (in the next 20 years or so)?” There were a large number of respondents who wrote in alternative options to those provided, including co-housing and similar shared housing types. There are a variety of co-housing options that offer a range of initial investment including; ownership, shareholding, and renting. The co-housing model allows residents to live in individual units while sharing common facilities that usually include a communal dining and recreation area. Co-housing may be an affordable option for people in varying stages of life by providing a support system and an overall sense of community. Some examples of cohousing communities in the region include; Vecinos del Bosque and Acequia Jardin. These communities are well positioned for access to retail and transit. The City of Albuquerque’s Integrated Development Ordinance (IDO) promotes co-housing by adding the “cottage development” use. Cottage developments allow for the maximum Floor Area Ratio (FAR) of multiple dwelling units on lots that, typically, only allow for single family residential development.

Figure 6-1: Multi-Unit Housing in Albuquerque



⁶ Opticos Design, 2020.

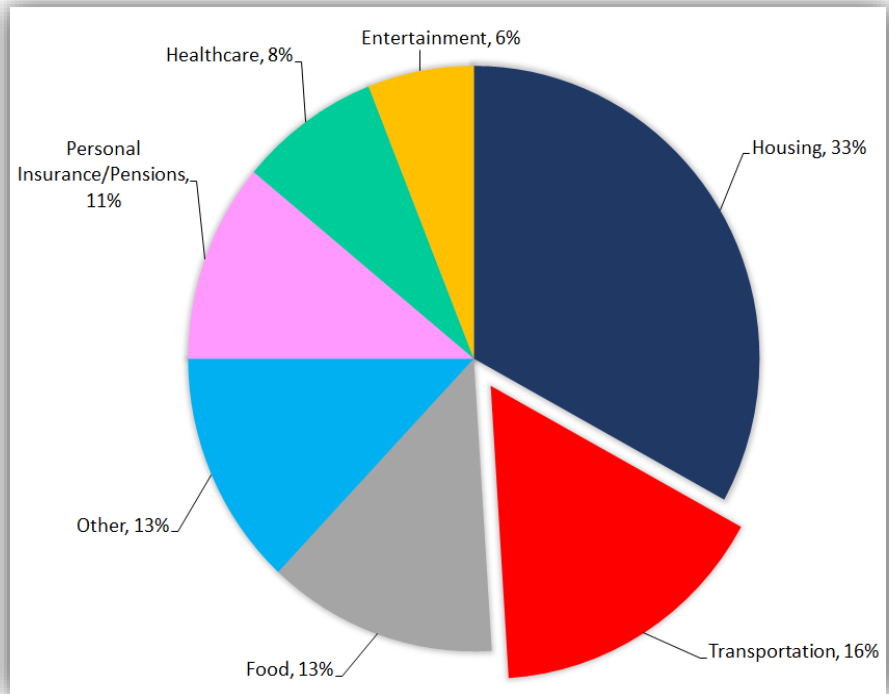
b. Housing and Transportation Costs

Housing affordability is an important component to the issue of economic well-being and is vital to ensuring that the region is livable for current and future residents. However, it is an incomplete picture without consideration of transportation expenses. Transportation is typically a household's second largest cost, and a family that lives far away from their daily destinations in order to find affordable housing may be losing those savings due to higher spending on transportation. When evaluating economic well-being of the region's households it is important to view housing and transportation costs together for a complete picture of some of the less visible barriers to economic health.

Center for Neighborhood Technology (CNT) Housing + Transportation Affordability Index

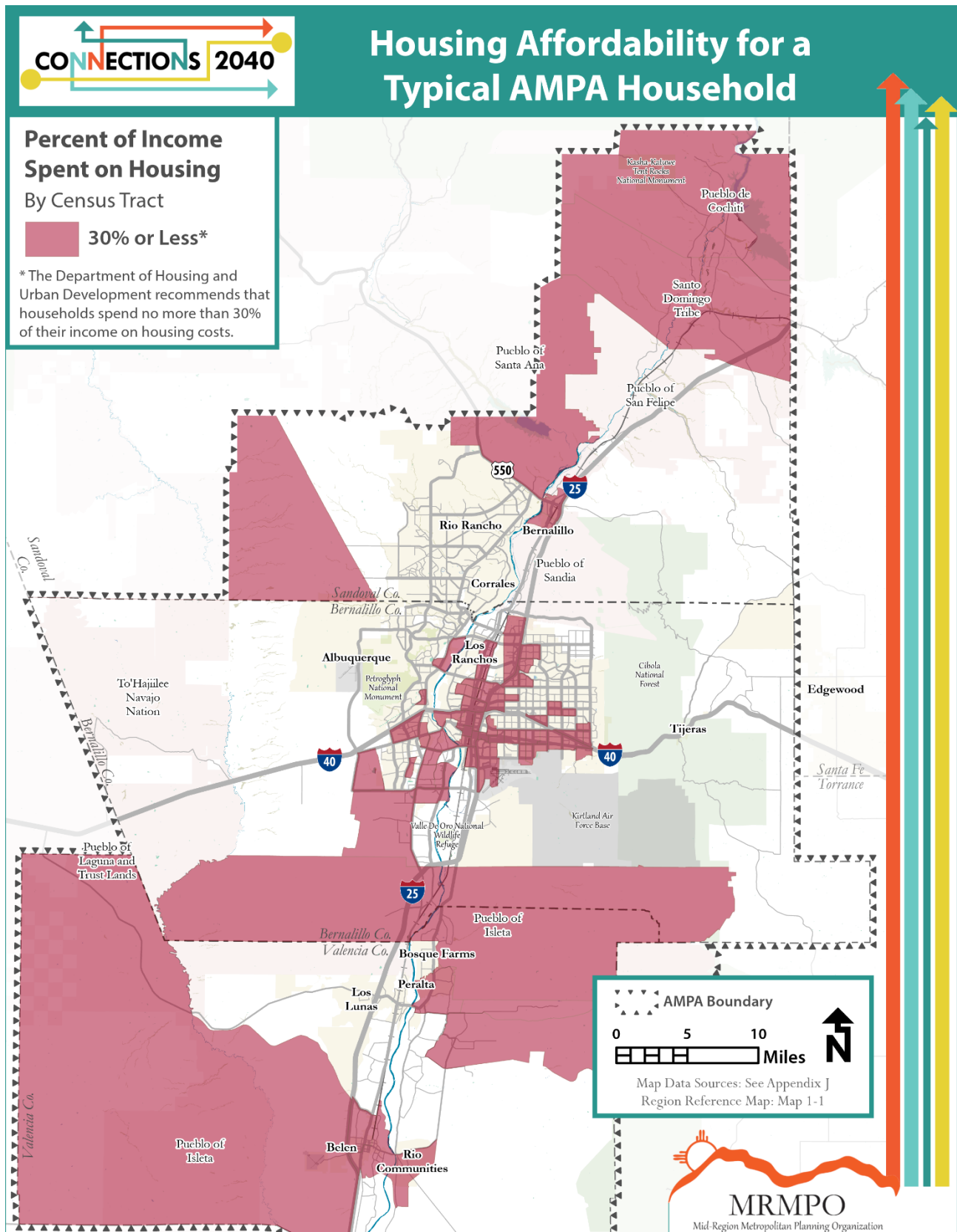
The Center for Neighborhood Technology (CNT) has developed a tool called the Housing + Transportation Affordability Index that integrates both housing and transportation costs to provide a more realistic measure of an area's affordability. CNT has found 15 percent of income to be an attainable goal for transportation spending as a share of total income. Therefore, by summing the guidelines that a family should spend no more than 30 percent of their income on housing and 15 percent on transportation, CNT has established that no family should spend more than 45 percent of their income on combined housing and transportation costs.

Figure 6-2: Household Costs by Category

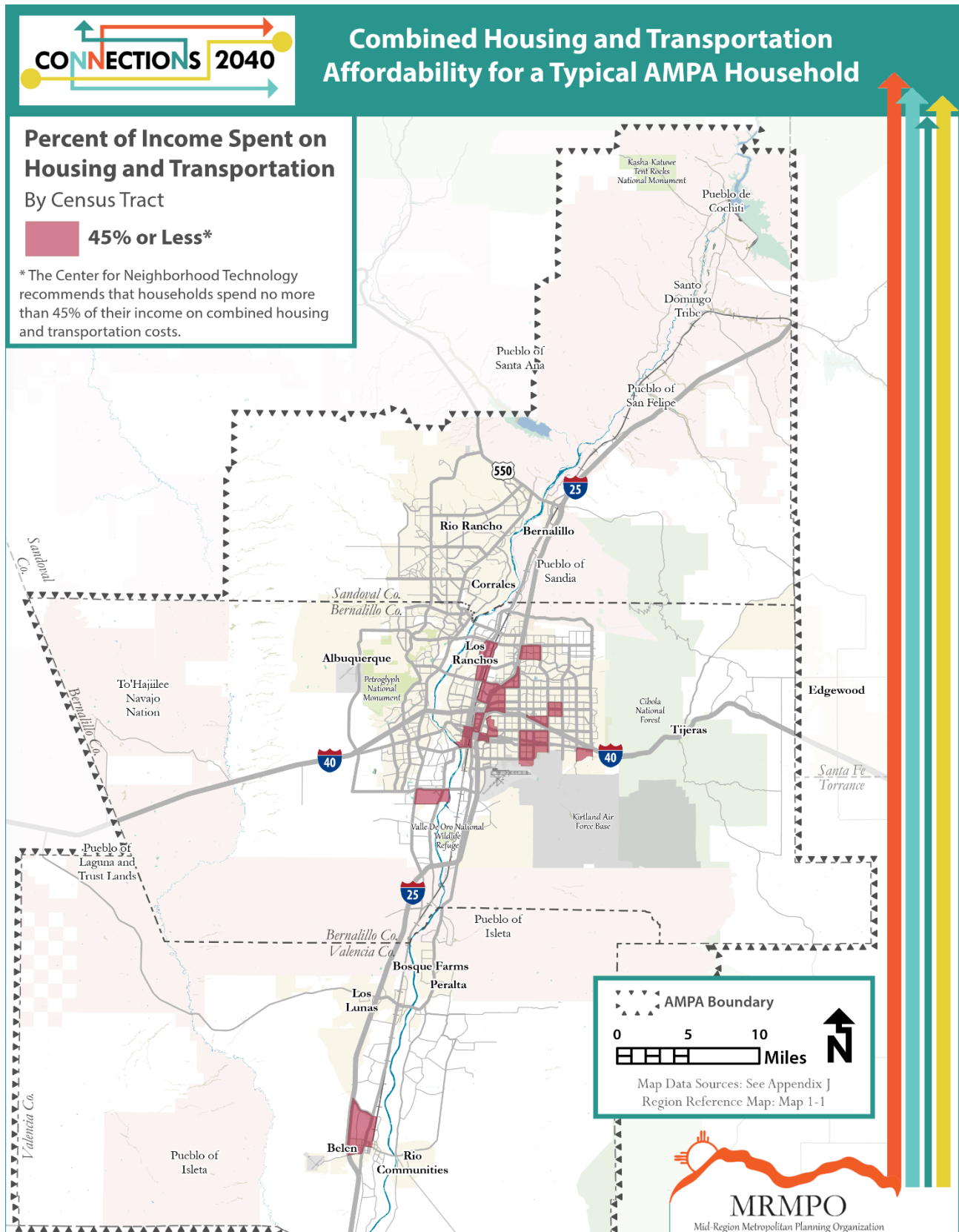


The following maps were produced using CNT's Housing and Transportation Affordability Index data and demonstrate that geographic areas which appear affordable when looking only at housing costs, are revealed as unaffordable when combined with estimated transportation costs. The rose-colored shaded areas in the first map show the areas that are considered "affordable" when just considering housing costs. The following map adds transportation costs into the mix, and the rose shading shows areas where a household earning median income would be expected to spend under 45 percent of their income on housing and transportation combined. When the costs of housing and transportation are considered together the metropolitan area becomes much less affordable.

Map 6-1: Housing Affordability in the AMPA, 2017



Map 6-2: Combined Housing and Transportation Affordability in the AMPA, 2017



Looking only at housing affordability, 89 percent of block groups in the AMPA are considered affordable for a family of four (using 30 percent or less of a household's income spent on housing as the threshold for what is considered affordable). **When household and transportation costs are combined, however, only five percent of block groups are considered affordable** (are within the 45 percent combined cost guideline). This is primarily because block groups with lower housing costs are located farther from jobs and other trip purposes, thus increasing transportation costs to the average household. If a household is transit dependent this further exacerbates the household burden given the limited transit service outside of the urban core.

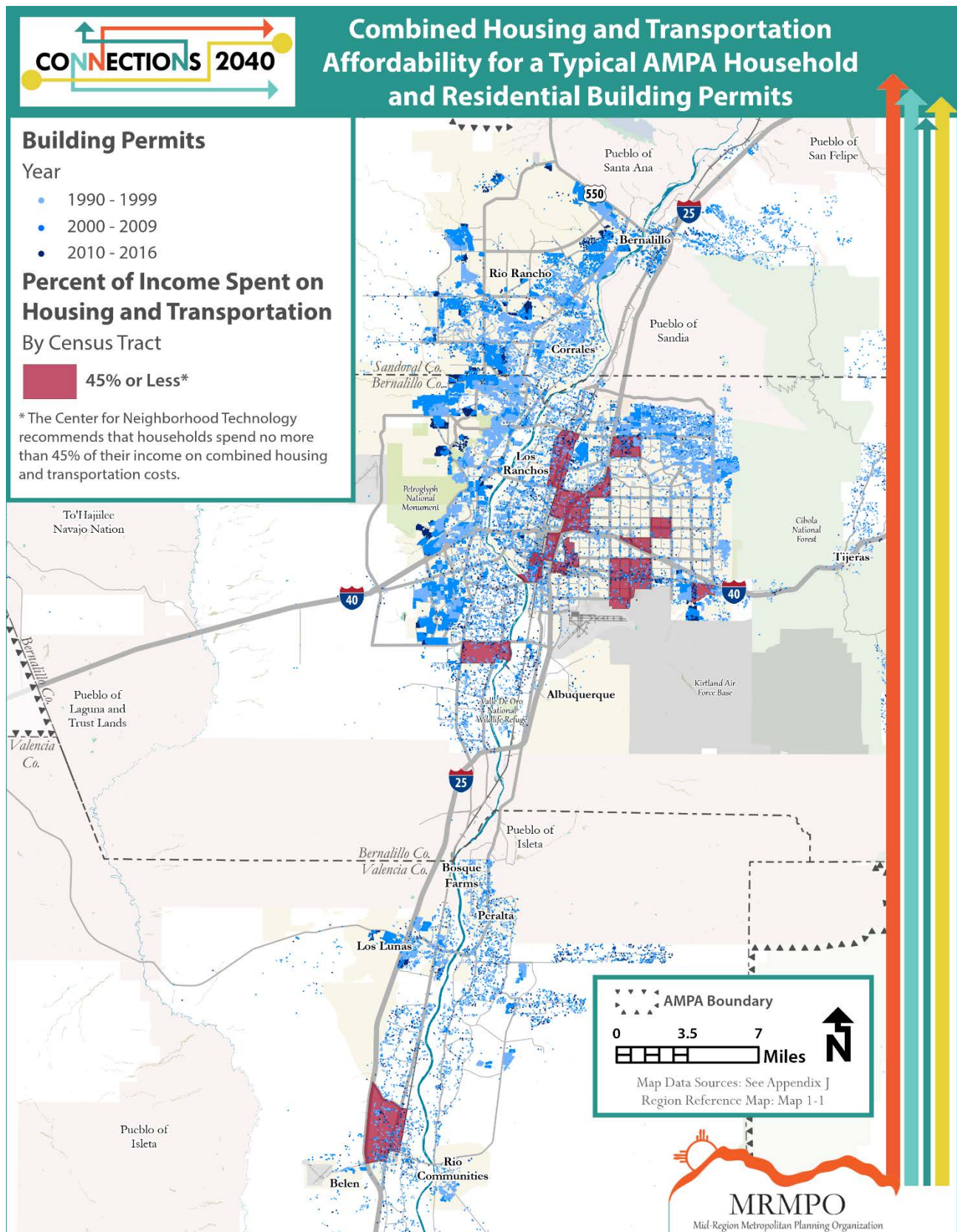
Location of Historical Growth

Building permit data show that over the last 20 years, growth has increasingly occurred farther from areas that are served by transit and considered "affordable" when housing is considered with the cost of transportation. Outward development patterns make it challenging for transit providers with limited resources to offer viable transit services to all residents. Housing that is increasingly located farther from job centers and other destinations leads to longer trip lengths as well as the necessity for personal vehicles to carry out everyday activities. The relationship between dispersed development patterns and affordability is clear:

- Transportation costs are a function of vehicle ownership and operating expenses.
- Vehicle operating costs are higher if more travel is required.
- Vehicle ownership is a necessity if distances are too great for trips to be achieved by other modes.

Even if individuals choose to drive for all trips regardless of length, vehicle operating expenses can be reduced if those trips are shorter. Hence, reducing trip lengths can improve affordability by either reducing vehicle ownership rates or by reducing vehicle operating costs. The following map highlights the disconnect between housing and transportation affordability and the location of new growth.

Map 6-3: Combined Housing and Transportation Affordability and Residential Building Permits



c. Transportation Equity

Transportation equity means ensuring that there are affordable, reliable, and safe means of travel available for those who need it to reach their jobs, healthcare services, and perform routine errands. When compared with the nation, the AMPA has higher poverty, lower incomes, and a greater share of disabilities. The disproportionate need in our region underscores the importance of addressing equity issues as it applies to transportation access throughout the metropolitan area.

Table 6-5: Select Equity Data, 2017

	Albuquerque MSA	United States
Median Income	\$50,906	\$60,336
Persons living Below Poverty	15.5%	13.4%
Children under 18 living Below Poverty	20.2%	18.4%
Persons Living with a Disability	15.0%	12.7%

Source: US Census Bureau Public Use Microdata Sample, 2017

Regional data reveal that workers who are living in poverty travel differently than those living above the poverty level. Specifically, our most economically vulnerable are more likely to carpool, use public transit, and walk to get to where they need to go. While the table below applies to work commutes, it is likely that a heavier reliance on modes other than a private vehicle translates to all trip purposes. This is because low-income households are far less likely to have access to a vehicle than an average-income household. **While five percent of all households do not own a vehicle, 12 percent of lower-income households are without a vehicle.**

Table 6-6: Means of Transportation to Work by Poverty Level, 2017

Albuquerque Metropolitan Planning Area (AMPA)	Below Poverty	At or Above Poverty Level
Drove Alone	71.5%	80.0%
Carpool	12.7%	10.4%
Public Transit	3.3%	1.5%
Walk	4.4%	1.6%
Taxicab, Motorcycle, Bicycle, or other Means	2.5%	2.2%
Worked at Home	5.5%	4.4%

Source: US Census Bureau Public Use Microdata Sample, 2017

Although transportation costs are substantial for all households, they are particularly challenging for low-income households. It is just not economically feasible to service the entire region with quality transit service. Therefore, households that live farther from their daily destinations are more likely to require personal vehicles for transportation. However, because housing affordability increases the farther a household is willing to live from their jobs and centers of activity, the burden of vehicle ownership costs fall disproportionately on low-income households. Chapter 9 continues this discussion with an analysis of low-income households and communities of color and access to healthcare and transit services.

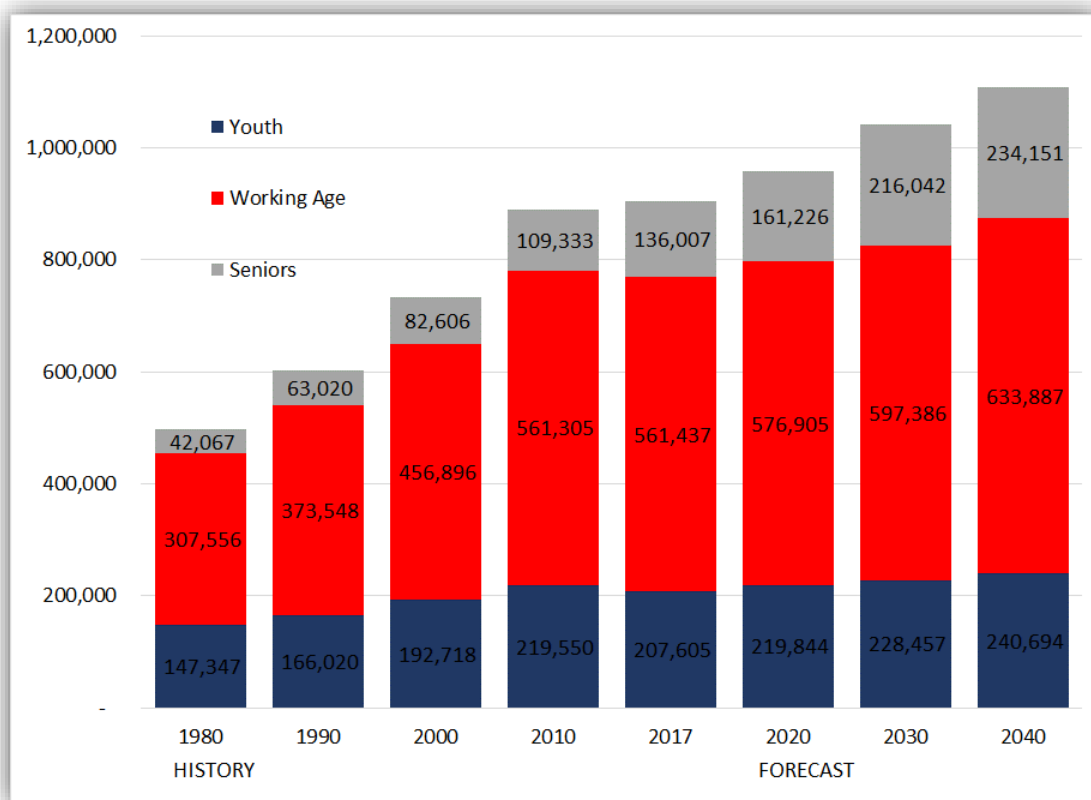
6.4 Place-Making as an Economic Driver

A considerable source of economic uncertainty facing central New Mexico is changing population dynamics. Recent trends demonstrate declining birth rates and high levels of out-migration. These trends suggest the potential for a decreasing labor force and a future imbalance between an aging and increasingly dependent population and fewer workers to support them. This creates uncertainty about the future of business and industry in central New Mexico. One way to attract and maintain a talented workforce is to create vibrant and unique places throughout the region.

a. Declining Workforce and Aging Population

New Mexico has historically had one of the youngest populations of all states. This provided the regional economy with young professionals, a solid base for the workforce, and attracted business and industry. However, a look at the changing age composition reveals an emerging regional challenge; a declining workforce as a share of the total population.

Figure 6-3: Shifting Age Composition in the Region



Source: US Census Bureau Decennial Census, American Community Survey, UNM-GPS

In 1980, 62 percent of the population was what we might consider “working age”, falling between the ages of 18 and 64. Due to the increasing number of millennials entering the workforce that share has risen to 65 percent today. However, as our population ages and baby boomers continue to enter retirement the share of working age population will decline, and is projected to fall to 57 percent of the population by 2040. Meanwhile, the share of the 65 plus population will rise from 15 percent today to 21 percent by 2040.

b. Place-Making and Transportation Benefits

Retaining young professionals and providing support for the senior population can be aided by transportation and transit investments that make New Mexico a more desirable place to be. Rather than thinking of the transportation network as simply a means of conveyance, it can also build communities and make critical connections. In a regional context, the experience of a place is from the time that you leave home until you arrive at your destination, and the fabric in between. In 2018, Brookings established the “Bass Center for Transformative Placemaking,”⁷ in order to create place-led policies and practices that will bridge the nation’s increasing spatial divides shaped by market disruptions and changing demographic and household compositions. This approach has a strong regional focus by connecting residents and businesses to regional markets, and is described, in part, as aiming to, “Nurture an economic ecosystem that is regionally connected, innovative, and rooted in the assets of its local residents and businesses.”

Transformative Place-Making

The rich cultural history of the AMPA provides a unique opportunity for transformative place-making. By incorporating history, tradition, and quality of place, strategies can emerge to invigorate social, economic, and civic life. Planning for a diverse mix of land uses in areas identified in the Target Scenario as being “regionally significant,” can promote communities with dense walkable areas while preserving open space, ecosystems, agricultural areas, and places with cultural and or historical significance.

The Target Scenario represents a 30,000-foot view of the region by establishing high level guiding principles that have been developed collaboratively with the intent of making the AMPA a more desirable place to be and traverse. By honoring unique places and emphasizing the importance of viewing the region as a whole system, the Target Scenario sets a tone for the region. And by emphasizing transportation and housing choices, diversity, and balance, it also sets a direction. MRMPO believes that by addressing transportation needs with a keen focus on other aspects that impact quality of life, this transportation plan is an important element of the region’s overall economic health.

Future Workforce

Transportation systems can be designed to strategically make areas attractive for businesses and housing while connecting communities. **Walkable and transit-friendly communities may be more attractive to a younger workforce.** This dynamic is important given the findings of the MTP Questionnaire, which show that young residents are least satisfied with the available transportation options and demand investments in alternative modes more than other age groups. Cities around the world have recognized the benefits of transportation in creating communities that are attractive to younger residents, which strengthens the future workforce. Such investments that promote a sense of place also have the benefit of improving quality of life for all members of the community.

A study conducted by George Washington University and Smart Growth America⁸ found a significant correlation between the educational attainment of its workforce and the gross domestic product per capita (GDP). **Metro areas with higher levels of walkability tend to have a population with higher educational attainment.** While it is uncertain whether there is a causal connection between walkability and the attractiveness of a place to a more educated workforce, there does appear to be a relationship between the two. Transportation systems can be utilized to create connected communities that are more attractive to businesses, and a younger, more educated, workforce.

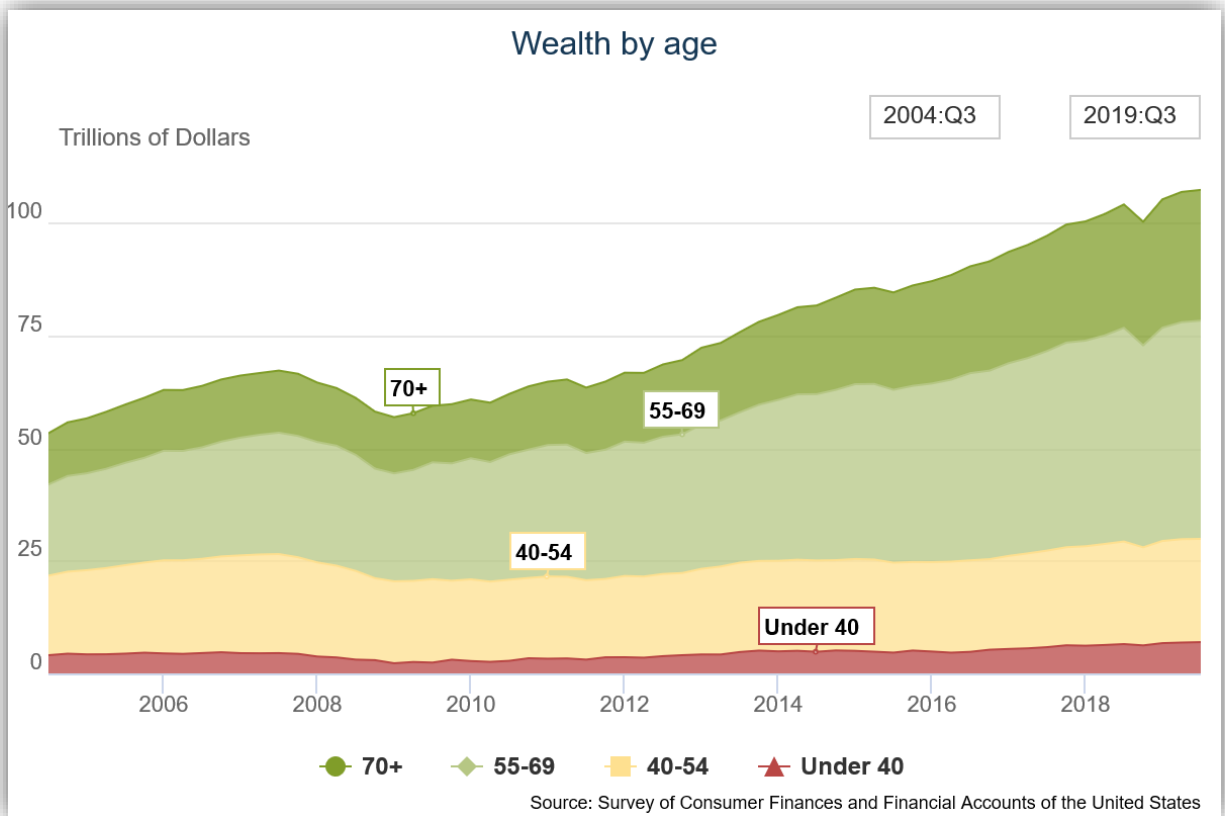
⁷ Vey, J. S., H. Love, “Transformative Placemaking: A framework to create connected, vibrant, and inclusive communities,” 2019

⁸ Hadden Loh, T., C. B. Leinberger, & J. Chafetz, “Foot Traffic Ahead: Ranking Walkable Urbanism in America’s Largest Metros,” 2019

c. Investing in the “Longevity Economy”

Creating communities that are attractive to retirees by providing places to age comfortably and safely with appropriate housing and access to community and social services is economically advantageous for the region. The figure below is based upon data from the *Survey of Consumer Finances and Financial Accounts of the United States* and illustrates that people between the ages of 55-69 have the largest percentage of wealth in the country.⁹ Due to their relatively high incomes and low demands for services, retirees can boost demand for goods and services, and increase government revenue by paying taxes. Transportation, including a robust transit network that is accessible to people of all ages and abilities, and walkable communities, is an important factor in promoting active aging and creating an appealing place for retirees.

Figure 6-4: Wealth by Age



⁹ Board of Governors of the Federal Reserve System. (2019, December 23). *Distribution of Household Wealth in the U.S. since 1989*. Retrieved from [www.federalreserve.gov](https://www.federalreserve.gov/releases/z1/dataviz/dfa/distribute/chart/): <https://www.federalreserve.gov/releases/z1/dataviz/dfa/distribute/chart/>

d. Supporting Innovation

It is also important that transportation projects help build an environment that is friendly to innovation and business. Projects that emphasize access and mobility are of particular value to private enterprise by reducing the costs of doing business and make the region more attractive to new industry. MRCOG, in coordination with other government entities, has undertaken an economic branding campaign to guide future policy and investment in such a way that Albuquerque becomes a destination for innovation.

Ingenuity Central Campaign

The “Ingenuity Central” campaign is focused on economic development, planning, and policy making which encourage entrepreneurship and foster collaboration between business, government, and individuals. MRMPO and the region can support these economic development efforts through improving transportation connections to destinations where innovation takes place, and supporting active modes of travel (bike, walk, scooters...) within key centers to foster interaction and even perhaps “collisions” of creative thought.

Figure 6-5: Deep Dive Coding Workshop



<https://www.bizjournals.com/albuquerque/news/2017/07/21/how-abq-tech-courses-are-faring-amid-a-downward.html>

6.5 Fiscal Stewardship

Growth within a metropolitan area is often considered a measure of economic health. Growth fuels a broader tax base, a larger workforce, and generates spending within a community. However, while growth generates additional revenue, it also comes with the need for additional spending. New population must be supported by services such as schools and public safety and infrastructure such as roads and utilities. Financing projects that support new growth while maintaining the quality of existing services and infrastructure can be a difficult balance for local governments.

Cost of Growth

To help alleviate some of the financial burden of growth, local governments across the nation are increasingly pursuing development projects that both maximize existing infrastructure and minimize infrastructure expansion. This is done with two goals in mind: one, to reduce upfront capital costs for new roads and other infrastructure, and two, to limit the future inventory of roads and infrastructure that need to be maintained and operated over time.

The idea that municipal financial benefits are achievable through land use and development strategies has existed in planning since the 1970s. Infrastructure development (e.g., new roadways, utilities, water, and sewer) and maintenance represent significant costs to municipalities. Compact development in targeted locations has been widely used as a strategy to serve larger populations with transit, alleviate the demand on already stretched emergency services, and reduce upfront capital costs for infrastructure as well as ongoing maintenance.¹⁰

A national survey of literature supports this and demonstrates through multiple case studies that compact development has saved municipalities an average of 38 percent in infrastructure spending and an average of ten percent for providing public services compared to more traditional development patterns.¹¹

Cost of Density

An increase in density incurs costs as well. By intensifying activity within already developed areas roads may receive greater wear, schools may require more supplies and staffing, and emergency services will be in higher demand. Infill costs also include land acquisition, utility upgrades, power and electrical upgrades, code compliance and fiber optics installation. While the cost of densification is not insignificant, measuring it can be a challenge. A literature search of the public infrastructure costs associated with increased density finds a general consensus that while there are increased demands with densification they are minimal in comparison to the magnitude of public costs associated with expansive development patterns.

“The increase in per capita expenditures associated with an increase in density is quite small in relation to the reductions associated with developed land.”¹²

MRMPO made an effort to take density costs into consideration in its fiscal impact assumptions in the following section. By using a per capita approach to school cost estimates, the FIT model accounts for the increased demands of density as it relates to school infrastructure. The FIT model also accounts for the increased transit investment that will be required to support transit-oriented development under the Target Scenario and incorporates those costs in its operations assumptions.

¹⁰ Burchell, R.W., G. Lowenstein, W.R. Dolphin, C.C. Galley, A. Downs, S. Seskin, K.G. Still, and T. Moore, “Costs of Sprawl - 2000”

¹¹ Fulton, W., I. Preuss, A. Dodds, S. Absetz, and P. Hirsch. 2013. “Building Better Budgets: a national examination of the fiscal benefits of smart growth development,” 2013

¹² Goodman, C.B. 2019. “The Fiscal Impacts of Urban Sprawl: Evidence from U.S. County Areas.”

a. Fiscal Impacts of Growth

In our efforts to better understand the impacts of growth patterns on infrastructure costs and services within the region, MRMPO developed a new model called the **Fiscal Indicator Tool (FIT)**. FIT is a model that is designed to compare the upfront and recurring costs between different growth scenarios in order to inform the discussion regarding the efficient use of public dollars. Rather than relying on national studies and cost assumptions, the FIT model provides regional decision-makers with figures that are based on local land use data and cost factors compiled through local documentation and personal interviews with experts in the field.

How FIT Works

The FIT model estimates the capital and the maintenance and operations (M&O) costs that will be expected for select infrastructure types (roads, transit, schools, and fire stations) between the 2016 base year and the 2040 horizon year under both the Trend and the Target Scenario. Calculations are driven by an estimate of additional infrastructure triggered by growth in newly developed areas, such as the demand for new roads or schools, as well as an estimate of M&O for those new facilities. FIT also estimates costs of service improvements necessitated by growth in existing built areas for schools and transit. The value of FIT is in identifying the cost savings potential under alternative growth scenarios.

Limitations of FIT

The focus of the FIT model is on specific types of infrastructure that are wholly or partially funded by local taxes and impact municipal budgets. FIT is not intended to measure all costs of growth to society, nor is it an exhaustive look at all infrastructure needed to support growth. For example, municipal services such as parks, libraries, and community centers are also influenced by the location of growth but were excluded from the model. In addition, FIT does not estimate the cost of infrastructure funded mostly by user-charges such as water and wastewater infrastructure. In these cases, costs are consumed by individual households who eventually absorb the cost of infrastructure expansion regardless of the growth scenario. Nonetheless, discussions related to water use and utility infrastructure are integral to the broader societal implications of growth in the region.

The FIT model also does not estimate the revenue side of the growth equation. The revenue side would include both Gross Receipts Taxes (GRT) and property taxes. These are not considered in this analysis because MRMPO assumes land use scenarios incur the same total amount of growth (population and jobs) added to the region by 2040. That is, the level of growth is “net neutral” to the scenario, and only the distribution changes. Holding this constant has the advantage of being able to attribute the measures of the scenario performance (cost, miles traveled, commute times) to the one factor that did change; the actual distribution of growth. In terms of GRT, the same population between scenarios is assumed to generate the same GRT. And while property tax revenues are indeed affected by location (development in key locations garner higher taxes), the FIT model does not attempt to forecast variability in property tax revenues based on location or density of growth.

Capital Cost Estimate

In total, the Trend Scenario is estimated to require approximately \$223 million more in new infrastructure than the Target Scenario to support projected growth through 2040 in the MRCOG region. This figure represents the cost of constructing new public facilities and infrastructure triggered by new growth only. It does not address existing public infrastructure needs. Recognizing existing unmet needs is not a trivial point, for example, Albuquerque Public Schools estimates that its current schools have pre-existing capital needs of over \$5 billion.

Table 6-7: Estimate of Capital Costs Incurred by New Growth, 2016 – 2040

New Population = 194,000 New Households = 67,000 New Jobs = 72,000

Indicators	Scenarios		Comparison	
	Trend Cost	Target Cost	Difference	% Difference
Local Roads	\$324,000,000	\$298,000,000	-\$26,000,000	-8%
Schools	\$530,455,981	\$475,861,872	-\$54,594,109	-10%
Fire Stations	\$266,000,000	\$266,000,000	\$0	0%
Transit Extension	\$2,176,435	\$2,021,776	-\$154,659	-7%
Transit Expansion	\$65,000,000	\$65,000,000	\$0	0%
Major Road Projects	<u>\$141,971,431</u>	<u>\$0</u>	<u>-\$141,971,431</u>	<u>-100%</u>
Total	\$1,329,603,847	\$1,106,883,648	-\$222,720,199	-17%

Source: MRMPO, BHI, Economic & Planning Systems, FIT model

**Major road estimates represent only the cost differences between the Trend and Target Scenario, and not the total cost of new roadway infrastructure.*

***Transit extension is a basic level of service in newly developed areas, where transit expansion assumes enhanced transit service to support transit-oriented growth.*

Major road projects represent the largest difference between scenarios at \$141 million, followed by schools at approximately \$55 million, local roads at approximately \$26 million, and, finally, transit extension at \$155,000 of additional cost. It is assumed that the Trend and Target will require the same level of new transit investment, which represents rapid bus service along University corridor.

Local road costs are often funded by the developer of the housing project and directly through public revenue. Excluding local roads from the capital cost comparison, the Trend Scenario costs approximately \$197 million more than the Target scenario.

Maintenance and Operations Estimate

The Target Scenario is projected to cost approximately \$23 million per year more to operate and maintain than the Trend Scenario. This figure represents the cost of maintaining the new facilities triggered by new growth only, not the full M&O costs for all existing infrastructure today.

Higher operating and maintenance costs in the Target Scenario are exclusively a result of higher costs of transit operation. These higher costs stem from an assumption of better and more frequent transit service in the Target Scenario, which helps support denser land use patterns. The Trend Scenario has higher operating and maintenance cost for each of the other infrastructure types included in the analysis. If transit is excluded, then the Target Scenario costs approximately \$7 million per year more than the Target Scenario. In short, the cost of more frequent transit service is almost offset by the reduced operating costs for other infrastructure types.

While more frequent and better transit service costs more, it also represents and creates other regional benefits, including a reduction in congestion through fewer cars on the road as well as a reduction in the number of car accidents.

Table 6-8: Annual Maintenance and Operations Cost Estimates of New Growth

New Population = 194,000 New Households = 67,000 New Jobs = 72,000

Indicators	Scenarios		Comparison	
	Trend Cost	Target Cost	Difference	% Difference
Local Roads	\$19,000,000	\$17,000,000	-\$2,000,000	-11%
Schools	\$37,865,042	\$34,036,909	-\$3,828,133	-10%
Fire Stations	\$110,833,333	\$110,833,333	\$0	0%
Transit Extension	\$7,589,448	\$7,062,076	-\$527,372	-7%
Transit Expansion	\$42,772,613	\$73,227,099	\$30,454,487	71%
Major Road Projects	\$620,071	\$0	-\$620,071	-100%
Total	\$218,680,507	\$242,159,418	\$23,478,911	11%

Source: MRMPO, BHI, Economic & Planning Systems, FIT model

**Major road estimates represent only the cost differences between the Trend and Target Scenario, and not the total cost of new roadway infrastructure.*

***Transit extension is a basic level of service in newly developed areas, where transit expansion assumes enhanced transit service to support transit-oriented growth.*

b. Understanding the Results

The Target Scenario focuses new growth in regional activity centers and along key transit corridors, promotes more job opportunities west of the Rio Grande, and encourages the preservation of rural areas and open space. As a result, the Target Scenario has a slightly more compact land use footprint than the Trend, attracts more jobs to the westside, and generates a higher intensity of development in regional activity centers and along key transit routes. The Target Scenario, by definition, is designed to optimize areas that are currently served by existing infrastructure.

Putting New Growth in Perspective

It is important to emphasize that the Trend and the Target Scenarios both start with the same land use conditions in 2016, and that the FIT model only measures the impacts of new growth. To put this in perspective, of the 1.1 million people expected to live in the region by 2040, the new growth represents just under 200,000 people, or less than 20 percent of the total expected population. Therefore, the majority of our land use has already been determined by where people live and work in the region today. As such, the Trend and Target Scenarios do not dramatically differ in terms of their overall land use patterns, and the full extent of M&O costs are going to be significant under both scenarios. The FIT model measures only the additional capital investments triggered by new growth in one scenario over another, plus the additional M&O costs associated with the new facilities that serve that growth.

Key Takeaway

In an era of fiscal uncertainty and reliance on federal and state discretionary funds, it is more important than ever that transportation projects be planned and undertaken to minimize future financial risk while providing needed transportation services. Given that growth will occur, planning for and promoting a more efficient development pattern for service delivery may provide local jurisdictions cost savings while providing comparable services.

c. FIT Methods

In all cases, local resources were used in order to provide an approximation of costs for select infrastructure types. In addition to using land use information and roadway costs from MRMPO collected for this MTP, FIT relies on infrastructure and cost data from local planning and budget documents, and interviewed stakeholders from key organizations and agencies in the region to better understand a more complete picture of how the region builds and funds infrastructure. Cost assumptions are standard costs commonly used in developing estimates by practitioners in the field. Where decisions were required, MRMPO made an effort to remain conservative in its assumptions so as not to overstate differences between the scenarios.

Population and Job Growth

Population and employment forecasts are consistent with the regional control totals that were used to create the Trend and Target forecasts for the MTP. That is, 2040 population projections are from University of New Mexico's Geospatial Population Studies, and the employment projections come from the University of New Mexico's Bureau of Business and Economic Research extended to 2040 by MRMPO using the REMI Model. The total amount of growth is exactly the same in both the Trend and Target Scenario, with the difference being the location of growth within the region.

Land Use

The land use data source is the same database used by the MRMPO land use model which was developed based on local land use and zoning information. The Trend and Target land use forecasts are the same as those used for the development of this MTP and represent a "most likely" scenario (Trend) based on current plans and policies, and an "alternative" scenario (Target) based on stakeholder feedback on desirable future land use patterns. The base, Trend and Target land use layers exist as spatial databases which were converted into half mile grid cells in order to produce a consistent equal area unit of geography to evaluate and compare household and job densities. These densities were used to understand roadway, transit, and fire service areas under existing conditions as well to formulate an estimate of additional infrastructure required by each scenario.

Existing Service Areas

In order to estimate the level of new infrastructure required under different growth scenarios, MRMPO needed to distinguish which areas are currently serviced by existing infrastructure. In order to make this determination, MRMPO developed a geographic boundary that depicts land that can reasonably be considered an existing service area, or an "infill" area.¹³

¹³ The American Planning Association (APA) describes infill as new development or "redevelopment that optimizes prior infrastructure investments and consumes less land than is otherwise available." The National League of Cities describes it as "new development that is sited on vacant or undeveloped land within an existing community and that is enclosed by other types of development."

The general agreement found in the literature and among planning experts defines land as infill it is:

- 1) Located within an established community or urban area;
- 2) In close proximity to or surrounded by existing development;
- 3) Served by road, water, and sewer infrastructure.

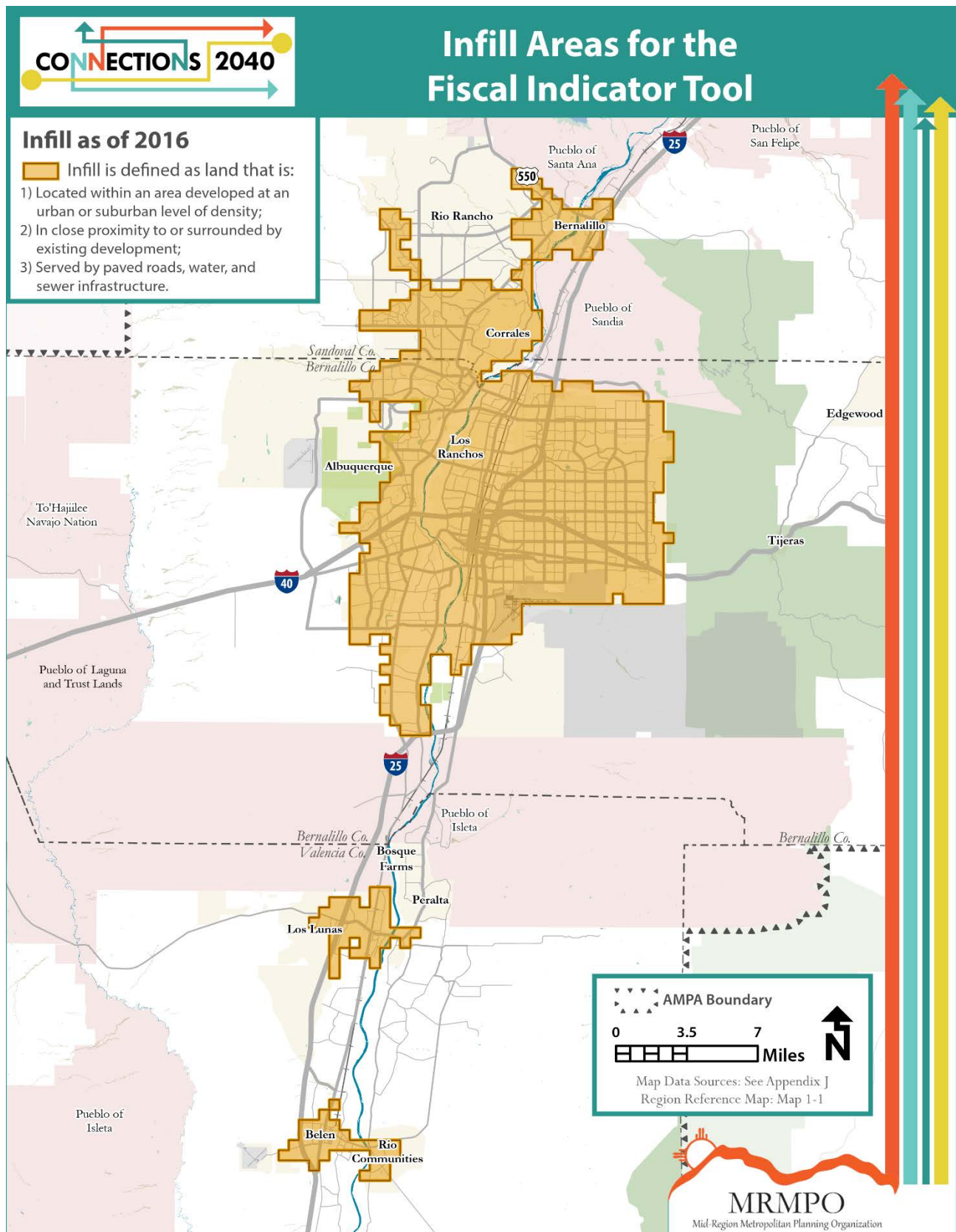
As such, land was determined to represent infill if it was located in an area that has public water service, sewer service, is on a paved road, and is in a contiguous and established development of housing units or jobs. There were a handful of modifications applied to these criteria based on local knowledge. These are described below.

- Paved roads data was unable to be obtained in Los Lunas and Belen so water and sewer service data were used to create the infill boundary and paved roads were spot checked with aerial imagery.
- The Town of Bernalillo, Belen and Rio Communities do not yet have spatial files for water and sewer service. As a result, municipal boundaries and the paved roads file were used to estimate infill. These municipalities have their own water and wastewater systems so the municipal boundary should be a reasonable proxy for the service area.
- A household density threshold, combined with a paved road density threshold, was used instead of water and sewer service in order capture areas such as Corrales and North Albuquerque Acres. These areas have a road density similar to neighboring infill areas and are surrounded by existing development, however they do not have municipal water and sewer service.

MRMPO visually inspected the resulting map to ensure results were consistent with local knowledge. The map was vetted by member governments through individual interviews and before its technical committees. The following map shows the resulting infill boundary, outside of which would be considered greenfield for the purposes of the FIT model.

It is important to note that the FIT model does not estimate a future infill boundary. Rather, the infill boundary will be evaluated and revised periodically to account for new growth and the subsequent expansion of infrastructure as additional analyses are performed.

Map 6-4: Infill Areas for the FIT Model



Roadways

Local roads: The demand for new local roads is based on the density of new households and job growth in greenfield areas in each scenario. While infill areas have the infrastructure in place to sustain additional growth, development occurring in greenfield areas, by definition, do not have the infrastructure and will therefore need for new roadways and incur additional M&O costs to maintain the new roadways. Maintenance of existing roads is assumed to be necessary in the Trend and Target Scenario and not included as part of the calculation of the M&O.

It is important to note that capital cost for local roads are typically financed by the developer, and then ultimately paid for by the homebuyers. As a result, these are not typically costs paid for by local governments and may be omitted from the capital cost assumptions. However, new local roads expand the inventory of roadways that need to be maintained. M&O costs are typically borne by local governments.

Major roads: Major roadway (collector and above) differences between the Trend and Target is not calculated within the FIT model, but rather based on differences between growth scenarios using the MTP project list. While this initial effort was completed by MRMPPO staff during FIT model development, future iterations will incorporate input from local agencies through MRMPPO's various committees.

Road costs and assumptions were provided by municipal development departments, the City of Albuquerque's Development Process Manual, and the City of Albuquerque's Unit Price Guide. The cost assumptions were adjusted based on geographic area.

Transit

Transit extension: Transit extension refers to new demand triggered by growth in areas that are currently unserved by transit. The service assumptions required by growth incurred in both the Trend and Target Scenarios are determined by the levels of existing transit service in comparable areas, based on household and job density. The Trend Scenario incurs higher M&O costs, however, because it entails more outward growth patterns and assumes that existing routes will need to be extended in some areas to accommodate increased demands for service.

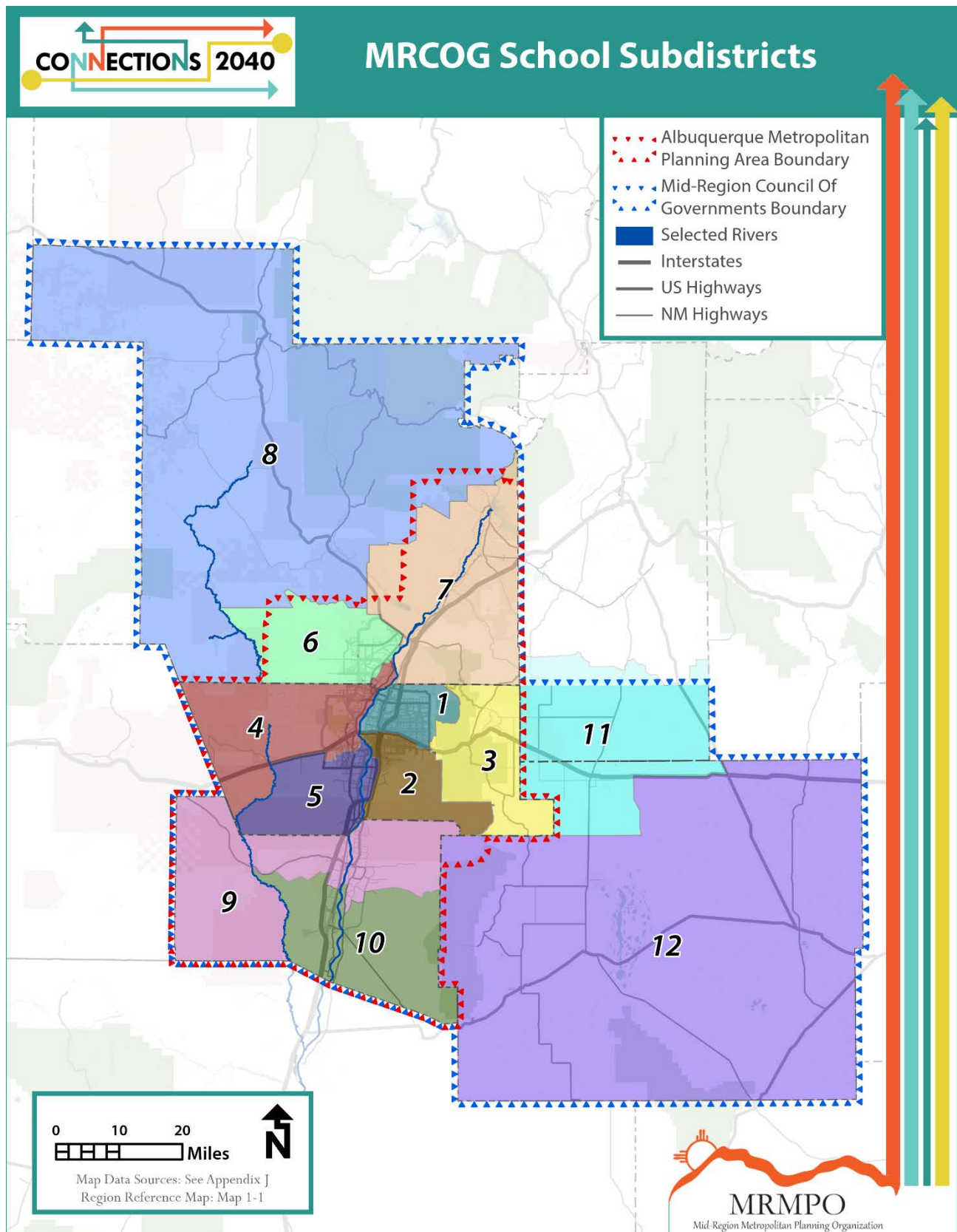
Transit expansion: Transit expansion refers to enhancements to existing service areas through additional routes and higher frequency. Transit expansion is a policy choice meant to support increased density or transit-oriented development. Given that the Target Scenario's goal is to increase transit investment and transit-oriented development, this scenario assumes a larger investment in transit operations. Aside from the purchase of new buses to service the University Corridor valued at \$65,000,000, neither scenario assumes any additional capital costs for new rolling stock. The actual route differences between the Trend and Target are determined by MRMPPO staff in collaboration with regional transit providers outside of the FIT model. The Trend Scenario assumes higher frequency of buses along several core routes along with new rapid ride type service along major corridors of Paseo del Norte, Lomas, Montgomery and San Mateo. These costs are reflected as M&O costs of the Trend Scenario using cost factors provided by ABQ RIDE.

Transit service and route data is provided by the local transit agencies, who also verified all cost and service assumptions.

Schools

While road and transit infrastructure demand is calculated based on household and job densities, school demand is based on "school subdistrict" boundaries, which is an aggregation of school attendance areas. These boundaries were developed using actual school administrative boundaries and practical boundaries (ie. the Sandia Mountains, county lines) that may approximate actual population sheds for individual schools.

Map 6-5: School Subdistrict Boundaries for the FIT Model



The FIT model is based on the assumption that a household will send their child to a neighborhood public school with capacity. While student transfers, homeschooling, charter schools, and private school alternatives are certainly a reality, this behavior is not predicted within the FIT model. When capacities of existing schools within a school subdistrict are met, it is assumed that new facilities will be needed, through portables, adding classrooms, or building a new school. The cost triggered by this additional demand is calculated on a per student basis and the same incremental cost factor for demand that exceeds capacity is used regardless of location. Maintenance of existing schools is assumed to be necessary in the Trend and Target Scenario and not included as part of the calculation of the M&O.

The Trend Scenario requires (in per capita costs) what amounts to one new elementary school over the Target, as the Target Scenario development patterns better maximize existing capacity. M&O costs represent the cost associated with maintaining only the additional facilities needed in the Trend over the Target.

School enrollments and capacities of existing facilities, average student generation rate per dwelling unit, average school capacity and size, and new school construction costs and operating budgets were provided by two major school districts in the region, Albuquerque Public Schools and Rio Rancho Public Schools.

Fire Stations

Fire stations are situated across geographic areas to ensure adequate response times to residents and businesses. Many jurisdictions identify a target response time for fire emergencies of four-minutes, however actual response times vary based on geographic density and connectivity of existing roadways. The basic assumption made by the FIT model is that response times in new growth areas should approximate existing service in similar locations. Based on development patterns and densities, it is estimated that the Target Scenario will require 6 fewer fire stations by 2040. M&O cost savings of the Target Scenario are the equivalent of not having to maintain those stations.

Fire service area assumptions and costs associated with building, supplying, and maintaining new stations were developed through interviews with local fire officials and by using the 2019 Albuquerque Approved Budget.

6.6 Goods Movement ¹⁴

An efficient and reliable transportation system creates a competitive edge by providing efficient freight movement and the ability to deliver products at a lower cost. For consumers in the area, improved access to these goods raises their standards of living. The synchronization of multimodal freight movement and the enabling the transfer of goods between different freight modes to occur more seamlessly will result in a more efficient and economical freight transportation system. Altogether, these efforts support the region's freight system and play a critical role in meeting the MTP's goals of supporting the region's economic vitality and mobility.

a. Freight Assessment

The geographic area of MRMPO is positioned at the junction of two significant interstates, I-40 and I-25, with direct access to the BNSF Railway Trans-continental line. Additionally, air cargo and passenger service is offered by the Albuquerque International Sunport. While the region faces challenges, such as an overall industrial base smaller than the national average, the region's research and technology sector – centered on multiple national laboratories and the University of New Mexico – is robust. To capitalize on these strengths, **MRMPO facilitated a Transportation and Logistics Hub Study to more precisely assess the region's competitiveness and ability to attract freight-related industries** and identify ways to improve the region's overall economic competitiveness and position it as an international transportation and logistics hub.

Freight Assets

The MRCOG region has a number of important freight transportation assets that could facilitate international trade if the region's industrial capacity was sufficient to fully utilize them:

- Interstate I-40 is one of America's highest volume truck routes connecting the west coast ports of Los Angeles and Long Beach to the east coasts. Interstate I-40 intersects with I-25 in the center of the City of Albuquerque.
- The BNSF Railway's Southern Transcontinental (Transcon) Line is the busiest intermodal freight rail corridor in North America, connecting Los Angeles with Chicago, and it passes through the MRCOG region. All the trains on this high-density rail corridor make a mid-route stop at the Town of Belen.
- BNSF's Southern Transcon connects Belen to its El Paso Subdivision line, the only line it owns that crosses the Mexican border. The rail line parallels I-25, which connects Albuquerque through a five-hour truck drive with Interstate I-10, the El Paso metropolitan area, and Santa Teresa, New Mexico's rapidly growing industrial center and Mexican border crossing.
- The first transload facility in the region opened in spring 2016. The New Mexico Transload facility, in the City of Albuquerque, handles a wide range of products, including palletized goods, bulk liquids, bulk solids, construction materials and equipment. Additional transload facilities in the region are being considered in Albuquerque, Belen, and Los Lunas.
- The Albuquerque International Sunport, the region's international airport, is less than six miles from ramps to I-40, I-25, and the BNSF rail facilities in Albuquerque. In addition, the Sunport is home to a Foreign Trade Zone, which effectively amounts to a duty-free port. Currently, the main freight activity at Sunport is through the expedited carriers FedEx and United Parcel Service (UPS) and their partners.

¹⁴ Information presented in this section contains modified text from the *Transportation and Logistics Hub Study*, prepared for the Mid-Region Council of Governments by Cambridge Systematics, Inc. with GLD Partners in conjunction with Center for Neighborhood Technology, March 23, 2017.

The MRMPO region has an opportunity to grow and diversify its economy by leveraging its transportation infrastructure, strengths in technology and workforce developments, and regional partnerships to support existing employers and attract new businesses. By making targeted, regionally-focused investments that leverage the trade gateways – air, rail, and highway – to build its manufacturing and technology economy, MRMPO and its partners can cultivate an economy of robust growth. Moreover, increasing the freight- and logistics-based economy will support growth in the region as a whole – not just for a particular city or county.

Project Development Opportunities

The Hub Study found that the Albuquerque region is competitive in a number of land economics factors, including land availability, labor costs, and regulatory environment. It identifies several development opportunities that capitalize on existing strengths in order to position the region as a competitor when businesses are selecting sites for new locations.

Develop an Albuquerque International Sunport Investment District (AISID): Airport investment districts are opportunities to collaboratively leverage investments and attract businesses that can capitalize on the logistics advantages of the airport. AISID could be coupled with the region’s strong research and technology sector to forward its commitment to be an important player in technology advancements over the next 25 years. This would have the added benefit of bringing additional cargo services to the Sunport.

Assess Potential for a Rail-Related Investment District: There have been a number of proposals and projects intended to capitalize on opportunities related to connection to the BNSF Transcon Line in Belen. Developers broke ground on one such project in Los Lunas in December 2016, a rail spur to a planned 1,400 acre Central New Mexico Rail Park. This industrial park has been certified by BNSF as ready for immediate development, and as such is a candidate to be the centerpiece of a rail-related investment district that could lead to additional industry in the region. It would be advantageous to develop a rail-related collaborative investment program that would focus on identifying and cultivating opportunities for businesses that can take advantage of proximity to the rail lines.

b. Industrial Opportunities

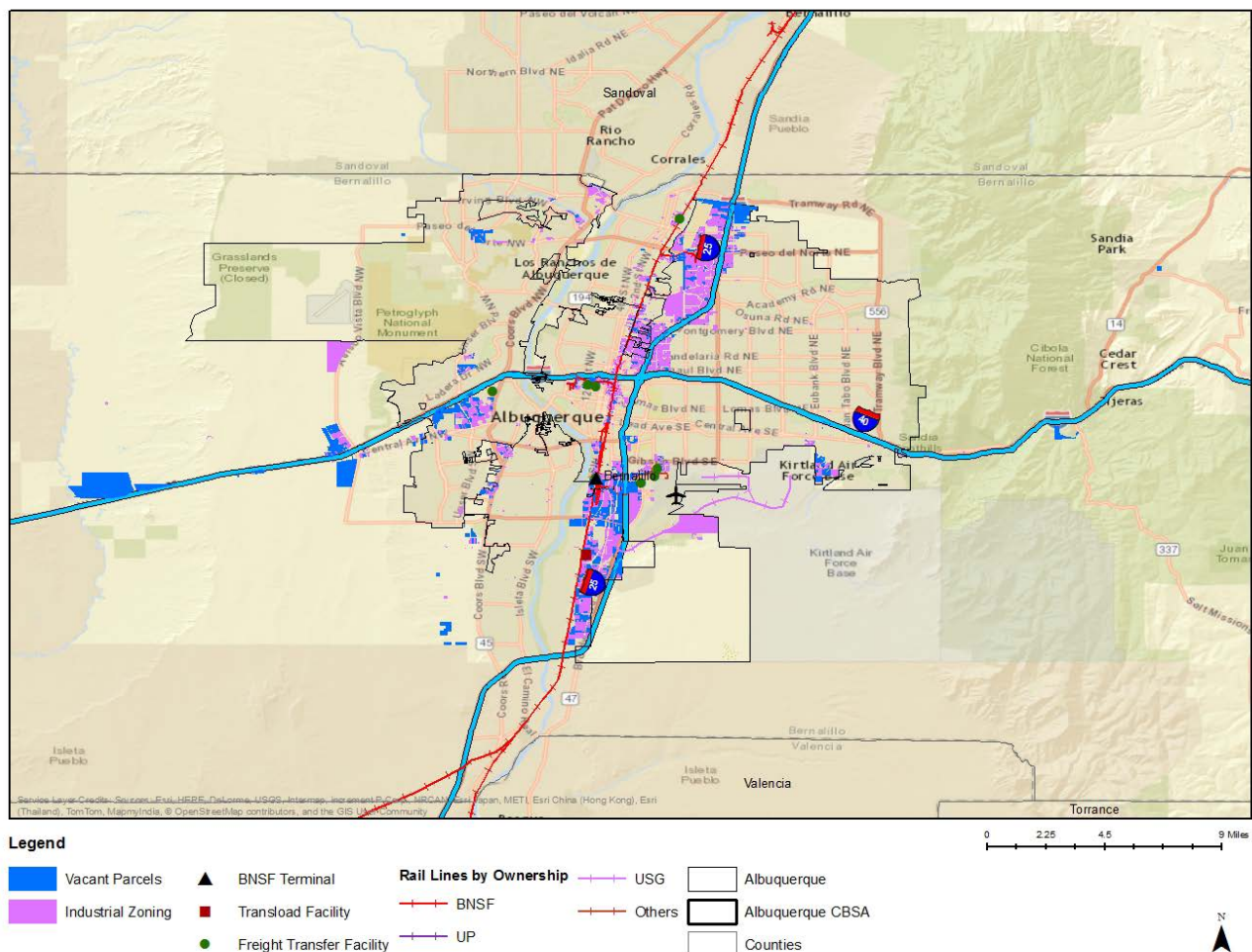
The region must grow and diversify its industrial economy to reach a scale of economic activity and supply chain efficiency that fully utilizes the region’s freight assets. The manufacturing sector is relatively weak, with less than half of the national average in terms of employment. However, the Research and Technology base is robust in the region, and the HUB Study found opportunities to capitalize on specialty industries such as automotive technology, food manufacturing, plastics and composite materials, and others. At the same time that economic development efforts are focused on supporting, retaining, and attracting industries, complementary efforts should ensure the availability of high-quality industrial infrastructure sites, workforce, and connections.

Industrial Site-Certification Programs

The MRCOG region, and in particular Bernalillo County, has dozens of vacant or severely under-utilized, industrially zoned sites proximate to rail, highway, and air transportation that can be leveraged to attract new business to the region.

Over 1,500 acres of industrially zoned land in 27 sites as well as five proposed industrial park projects (totaling more than 4,200 acres) have been identified as suitable for Cargo-Oriented Development, which is a type of compact, transportation-focused, minimally invasive industrial growth. Other sites in the region could also be made more attractive to future industrial investors. A “certified ready” industrial site program or “precertification program” can help expedite development and raise the profile of the region’s industrial properties. Certified site programs also give local governments a tool to direct development to places where they would like economic growth to occur in order to achieve public goals such as the creation of jobs in low-income neighborhoods, the reduction of truck mileage to achieve environmental objectives, the restoration of brownfields into productive land, or the realization of local land use plans.

Figure 6-6: Industrial Zones and Vacant Land in the Region



Source: Transportation and Logistics Hub Study

Site-certification programs help mitigate the flaws that many sites currently have, especially in older industrial districts, which make it difficult for private firms to redevelop them. Many of these sites, with proactive action, could return to the market as strong candidates. These include properties without clear ownership title, properties that are suspected of having or actually contain environment contamination, or properties fragmented into numerous small parcels. By establishing an inventory of certified ready sites, the region’s economic development officers will be able to respond immediately to many corporate searches and other industrial attraction opportunities as they arise. Certification programs are becoming more popular as a tool for public agencies to cultivate and direct economic development.

Industrial Land and the Target Scenario

A number of substantial benefits follow from current patterns in the geographic distribution of industrial business locations in the MRCOG region, which is fairly compact, focused around major transportation assets and largely central to the population. The necessary distance of truck trips within the region is shorter than would be required by a more diffuse industrial pattern. Containing demand for truck mileage in this way limits intraregional costs of shipping, traffic congestion, air pollution including greenhouse gasses, highway maintenance costs, and the risk of accidents. Additionally, the overall costs of providing infrastructure including water, power, and sewage are constrained when development areas are limited.

Continuing to develop in a generally compact development pattern also makes jobs more accessible to the majority of workers than a more diffuse distribution of businesses would be. The potential for worker access that relatively compact development provides could be realized by further improvements in the region's public transportation system. An example of a meaningful upgrade in the region's transit system is the Albuquerque Rapid Transit (ART) line. The ART will increase the speed and frequency of transit service along Albuquerque's Central Avenue –the primary east-west artery that links downtown Albuquerque with neighborhoods at the city's edges. The ART will speed workers' connections to numerous north-south bus lines that give them access to jobs in industrial districts.

Challenges of Compact Growth

Relatively compact development also entails a number of challenges. In many cases industrial districts will continue to be close to residential areas, and as industrial areas fill up, they may come to annoy neighbors or even pose public health risks. Compact development also frequently involves difficulties for industrial developers, such as assembling adequate land, dealing with obsolete buildings or environmental contamination, as well as time delays in securing development permissions. These problems often drive developers to build on virgin land, reducing their development costs but at the cost of the public and regional economic benefits noted above.

If the Target Scenario is to be achieved, that is, policy makers choose to realize the benefits of compact development without incurring negative consequences, they will need to insist on design and technology standards that will make industrial businesses good neighbors while smoothing the path for development in desired locations.

CHAPTER 7: ENVIRONMENTAL RESILIENCY

Located in the Middle Rio Grande Watershed, our region contains mountain peaks and riverbeds, is made up of eight distinct “eco-regions”, and is home to a remarkable diversity of native plant and animal life. Not always green, it is nonetheless fairly rich in “green space”; home to the Cibola National Forest, Sandia and Manzano National Wilderness Areas, Rio Grande Valley State Park (the Bosque), and hundreds of other parks and open spaces. To support federal legislation that requires transportation plans to identify “natural resources” that may be impacted by transportation development, this chapter focuses on datasets and analysis that supports opportunities to be stewards of our natural environment. Specifically, it delves into where natural resources intersect and impact the built environment.

One dataset in particular, the National Land Cover Data¹, not only provides a snapshot of our environmental and manmade landscape, but supports water quality and biodiversity assessment, and can illustrate change over time for developing areas and encroachment into wildlife habitat. The data highlights developed open space, natural forests, man-made trails, and other types of vegetation and wetlands, as well as the intensity of developed lands. Together, these types of land cover provide an abundance of recreational areas that are available to most residents of the region. Our networks of trails, transit service, sidewalks, and roads connect people to these amenities, and it is important that access to these destinations is equitable. Further discussion and analysis of accessibility to natural recreational amenities can be found in Chapter 9, Implementation of the MTP.

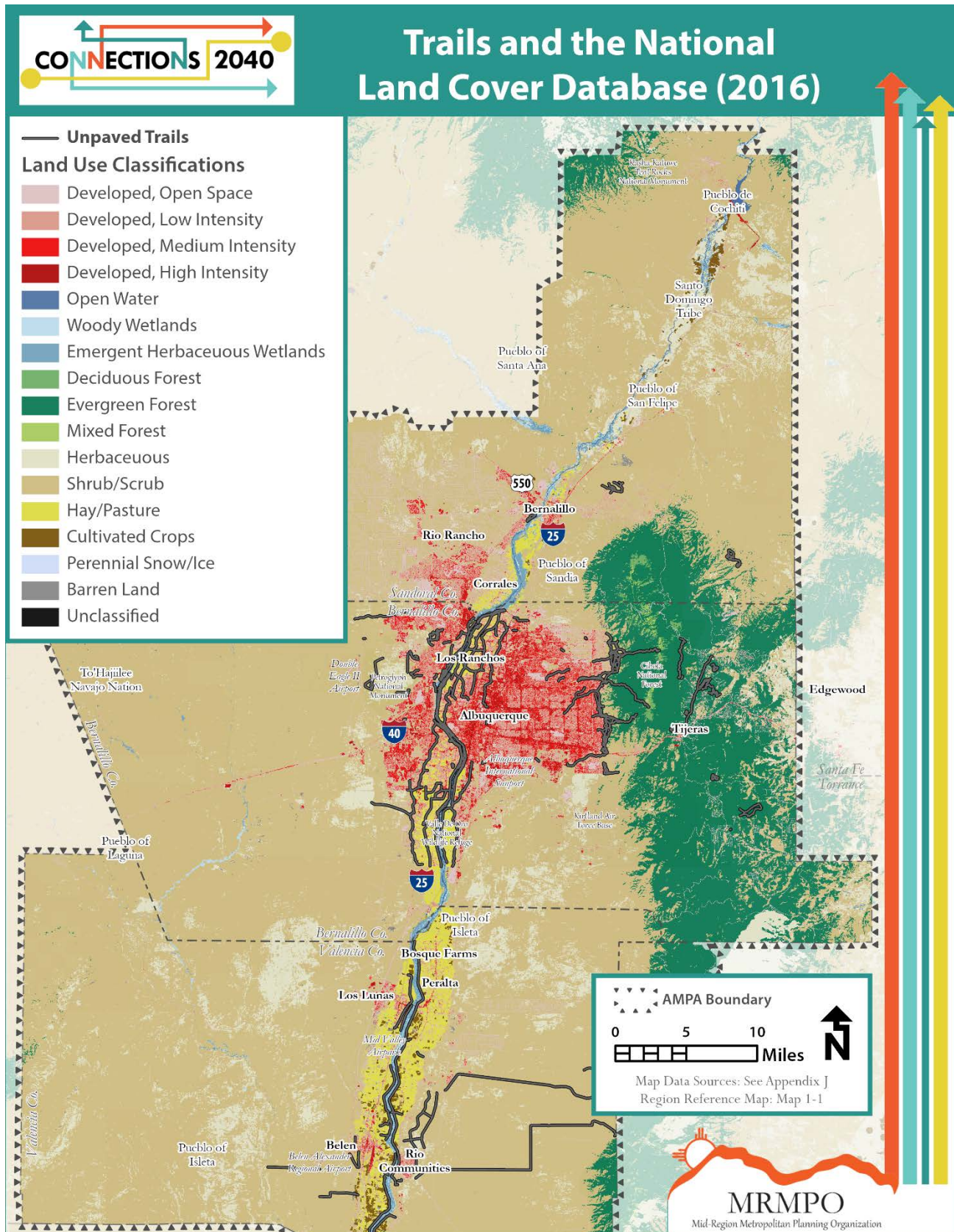
Safeguarding a Resilient Environment

As we build transportation infrastructure in our region, safeguarding a resilient environment is necessary both for wildlife and human quality of life, now, and in the future. **“Resiliency”, put simply, is essentially a measure of the ability to recover from negative impacts.** A resilient environment then, is one that has the strength and health necessary to go on easily providing the “ecosystem services” that support life on earth. These invaluable ecosystem services are naturally occurring processes that would be extremely costly and impossible to engineer – including the removal of harmful pollutants from the air and water, climate stabilization, mitigation of natural hazards such as flooding, and the provision of food and habitat for the other species of life that have important ecological roles to play.

In fact, “biodiversity,” or the variety of species an environment can support, is perhaps the most significant measure of that environment’s resiliency. Therefore, what is good for other species of life is also good for us.

¹ U. S. Geological Survey (USGS) Bureau

Map 7-1: National Land Cover Data Classifications with Trails



Transportation Development and Environmental Impacts

When retrofitting existing roadways or planning for future transportation systems, identifying natural resources and understanding wildlife habitats and movement, helps to pinpoint types of mitigation activities that have the greatest potential to restore and maintain environmental functions. While new construction projects may require more site-specific study of associated environmental impacts, this chapter provides a broad overview of the link between transportation systems and their environmental impacts, and provides some best practices for mitigating these impacts.

Green Infrastructure

From a land use and transportation planning perspective, the complex, living network of natural systems and processes that support environmental resiliency can be thought of as “green infrastructure”, in contrast with the grey, concrete materials of built infrastructure.

More commonly known for its beneficial role in stormwater management, green infrastructure at a broader scale can be conceived of as all the natural elements of the landscape that work together to perform the work of ecosystem services and support the life of its inhabitants.

Because of the broadly mitigative effects and multiple benefits of supporting green infrastructure health wherever possible, the Long Range Transportation Systems (LRTS) guide provides additional information on implementation of “Green Street” design, such as specific roadway designs that incorporate green stormwater infrastructure (GSI) and low-impact development (LID) principles.

Water Resources

Based on the inherent link between transportation, land development, and the availability of water, it is also important for transportation plans to include and reference regional water plans, and for the regional water plans to reference the projections for population growth and areas of development demand contained in the MTP. Furthermore, when conducting outreach for the MTP, using our water resources wisely is an often cited concern, particularly as we grow into high desert areas on the fringes of existing development with limited supplies of water, or if we need new access to existing water utility systems (even if there is capacity).

Climate Change Mitigation

Climate change is an important topic in transportation planning. The transportation sector of the economy is the leading source of climate-disrupting greenhouse gas emissions in the United States and impacts of forest fires and the resulting flooding on our roadways are expected to increase. For the previous MTP, MRCOG was awarded a federal grant to incorporate climate change into its transportation planning process. This project examined the relationship between growth patterns, development pressures, and climate change projections unique to our southwestern region. As a part of this *Central New Mexico Climate Change Scenario Planning Project (2015)*, MRMP staff consulted with federal, state and local wildlife, land management, and regulatory agencies to identify environmental impacts associated with climate change projections.²

Environmental Impacts commonly associated with Transportation Development

1. Habitat fragmentation
2. Wildlife movement conflicts
3. Altered hydrology and water contaminants
4. Air pollution and greenhouse gas emissions

² The following federal agencies provided funding and/or technical assistance for the Central New Mexico Climate Change Scenario Planning Project: the Federal Highway Administration, U.S. Department of Transportation Volpe Center, U.S. Fish and Wildlife Service, Bureau of Land Management, U.S. Army Corps of Engineers, Bureau of Reclamation, National Park Service, U.S. Forest Service, Federal Transit Administration, Federal Emergency Management Agency, Department of Homeland Security, and the Environmental Protection Agency.

To support regional stakeholders in reducing exposure to these hazards and minimize the negative impacts of climate change, this chapter also measures and examines areas of heightened risk.

7.1 Crucial Habitat

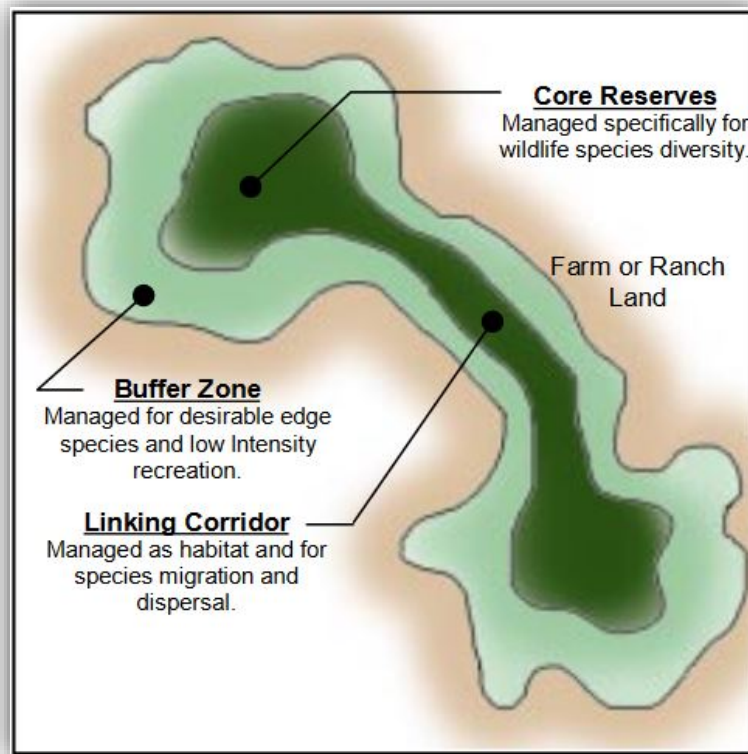
For a species to survive in a landscape or watershed, they must have access to habitat resources sufficient to maintain a viable population. Transportation networks crisscross the landscape, which fragments and degrades habitats by introducing light, noise, pollutants, and competitor species along the edges of bisected habitat areas. All of these “edge effects” cause wildlife to modify their behavior and change micro-climatic conditions that limit the species.

For vegetation, particularly in arid environments, transportation and utility corridors act as reservoirs and conduits for invasive and problematic species. Vehicles are a continuous source of non-native seeds, and rights-of-ways are fertile grounds for weedy species that germinate and seed quickly. These areas also receive water from pavement runoff and are subject to frequent disturbance from road and vegetation maintenance - characteristics which inhibit establishment of slower-developing native species.³

a. Habitat Fragmentation and Wildlife Movement

Habitat edges act as barriers to movement, causing some predators to travel along them. High predator densities along edges can result in higher mortality for edge-dwelling prey species or species moving through narrow corridors. As habitats become smaller, they are also less likely to provide the food, cover, and available mates necessary to support the wildlife community. Landscape ecologists and conservation biologists have formulated several basic concepts and principles that can be used to guide wildlife planning.⁴

Figure 7-1: Core Reserves, Buffer Zones, and Linkages



³ New Mexico Department of Game and Fish. 2016. State Wildlife Action Plan for New Mexico. New Mexico Department of Game and Fish, Santa Fe, New Mexico, USA

⁴ Adams and Dove, 1989

Spatial Patterns for Wildlife Conservation

Conservationists focus on the spatial relationships between patches, corridors, and the matrix. Even though these concepts were developed for regional landscapes and large protected patches such as national parks and wildlife refuges, they are equally effective at smaller scales. Understanding these concepts and principles can help ensure more informed decisions about how best to use corridors to re-create landscapes that are more functional and less intrusive.⁵

Many species use the cover of tree canopies and connected areas of vegetation as travel corridors for linking various habitat resources within their home range. Roads crossing these important routes increase risk of dangerous wildlife-vehicle collisions and act as barriers to safe movement for animal life-cycle requirements such as seasonal migrations for breeding, birthing, or feeding. This circulation is critical to meeting the survival needs of various species, and safe movement can be facilitated through a number of design options.

The type of edge created by vegetation management along roadways influences wildlife crossing behavior, for instance, and can be designed accordingly. A “hard” linear edge may be employed in places where crossings are to be discouraged, while a more inviting, “soft” transition of an irregular edge can be used to encourage crossing where it is safest to do so.

Ideal Pattern for Wildlife Conservation

Preserve important nodes (core reserves), provide corridors (linkages) between nodes, and establish multiple use (buffer zones) around the nodes and corridors. In addition to these three concepts, several ecological principles can be used to configure landscapes into patterns most beneficial to wildlife:

Patches

- Large reserves/patches of vegetation are better than small reserves/patches.
- Connected reserves/patches are better than separated reserves/patches.
- Several reserves/patches (redundancy) are better than one reserve/patch.
- Nearness is better than separation.

Corridors

- Continuous corridors of vegetation are better than fragmented corridors.
- Wider corridors are better than narrow corridors.
- Two or more corridor connections between patches (redundancy) are better than one.
- Natural connectivity should be maintained or restored.

Structure

- Structurally diverse corridors and patches (convoluted horizontal boundaries and vegetation of various heights) are better than simple structures.
- Native plants are better than introduced plants.

⁵ USDA, NRCS. November 2004. National Biology Handbook. Title 190, Subpart B – Conservation Planning, Part 613: Conservation Corridor Planning at the Landscape Level – Managing for Wildlife Habitat. Washington, DC.

Tijeras Canyon Safe Passage

A successful regional example of an effectively designed wildlife crossing is the Tijeras Canyon Safe Passage Project. Located where I-40 and State Highway 333 pass through Tijeras Canyon – a critically important point for wildlife movement. The canyon links the Sandia and Manzano mountains, and the creek running through it is the only source of water for wildlife for miles around. The project successfully facilitates safe animal crossings by using eight-foot-tall game fences to funnel animals coming down from the Sandias into a single spot across NM 333. There, their weight activates flashing lights that warn drivers to slow down. If they try to head up or down the highway, an electrified mat on the roadway delivers a slight shock, encouraging them to move across the roadway. Once across and down in the creek bed, animals can pass below I-40 and make their way into the Manzanos, or head back to the Sandias.⁶

Figure 7-2: Tijeras Canyon Safe Passage Project



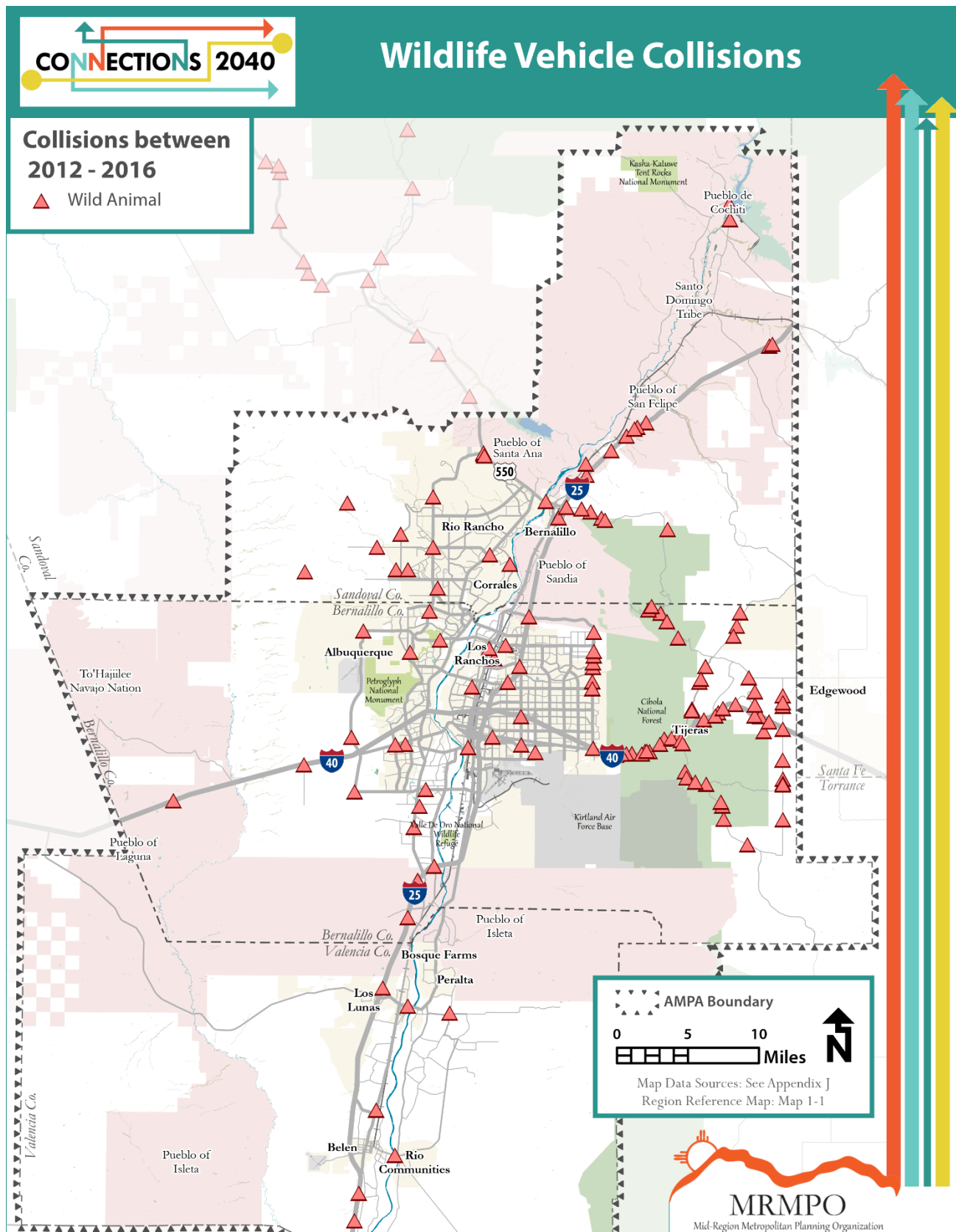
Wildlife Corridors Act

Another regionally significant event is the recent passage of the Wildlife Corridors Act. This Act directs the New Mexico Department of Game and Fish and the state Department of Transportation to develop an action plan to identify key roads and other barriers impacting wildlife migration, and to direct construction for safe animal passage and road safety. This legislation will be a paramount stepping-stone in ensuring that populations of deer, elk, pronghorns, black bears, and other key species can safely traverse their habitats across the state. The map below identifies known locations with high incidence of wildlife vehicle collisions. Key corridors are also identified in the New Mexico Forestry Division's Statewide Strategy and Response Plan, identifying where opportunities for new connections may be made between existing natural areas.

The map below gives some indication of corridors that experience a higher amount of wildlife collisions. Clearly, roadways passing through or at the edge of Cibola National Forest experience many crashes, however there are also locations within the more urban environment such as NM 550 and South Coors that also experience these types of wildlife involved crashes.

⁶ <http://nmpoliticalreport.com/2018/09/17/safe-passage-getting-wildlife-where-they-need-to-go-en/>

Map 7-2: Wildlife – Vehicle Collisions, 2012-2016



b. Evaluating Crucial Habitat Areas

New Mexico Crucial Habitat Assessment Tool

The New Mexico Crucial Habitat Assessment Tool (NM CHAT) was developed to identify general areas where habitat of threatened and endangered species are known to exist, bringing greater certainty and predictability to planning efforts by establishing a common starting point for discussing the intersection of development and wildlife. It is designed to reduce conflicts and surprises while ensuring wildlife values are better incorporated into land use planning, particularly for large-scale linear projects. NM CHAT provides landscape-level, non-regulatory, conservation information to support project planning, but is not intended for project-level approval and does not replace or supersede site-specific consultation with appropriate agencies, including the New Mexico Department of Game and Fish (NMDGF) and the U.S. Fish and Wildlife Service.⁷

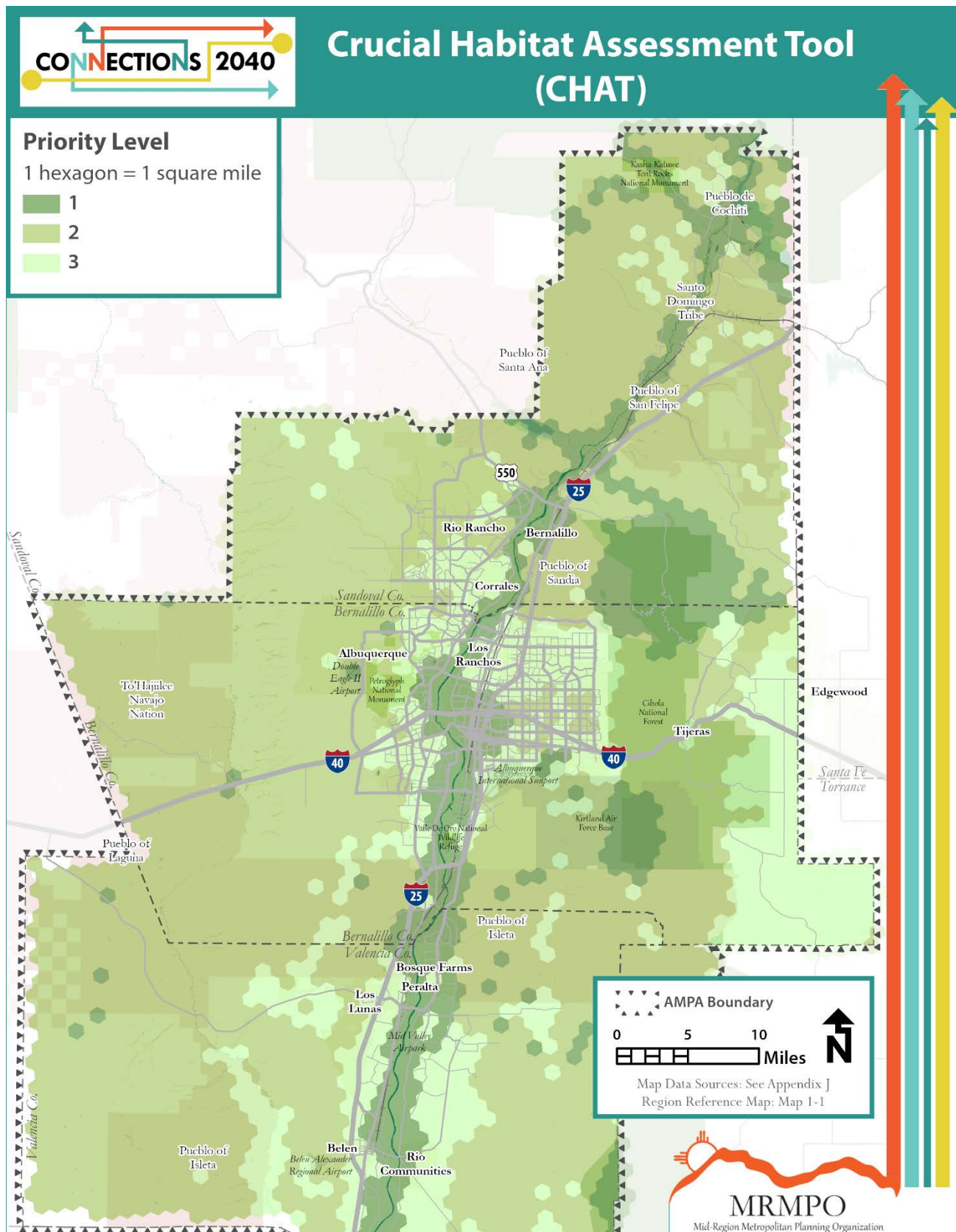
Assessing the NM CHAT Rankings

CHAT rankings do not identify instances where wildlife species are threatened by human impacts, but rather the locations that are most critical to preserve. It is therefore important to distinguish between the impacts of existing versus new development since many impacts are already being felt. It is generally preferable to allow additional growth in places that have already been developed since the species that inhabit these areas are more adapted to urban living. **Impacts on less crucial areas with no existing development are greater than the impacts of further development in locations already part of the human-wildlife interface.** Nevertheless, since the Target Scenario includes additional housing and employment in locations with existing development near sensitive habitat areas, it is important to reconcile development and habitat needs.

The following map illustrates areas that are most likely to provide crucial habitat and conservation potential, depicted in darker green hexagons.

⁷About New Mexico Crucial Habitat Assessment Tool. nmchat.org/about.html. Accessed 25 November 2019.

Map 7-3: Crucial Habitat Assessment Tool (CHAT)



Bernalillo County Greenprint Project Assessment Tool

As an example of an alternative model for identifying high conservation-value lands, the “Greenprint” is a comprehensive mapping process recently undertaken when Bernalillo County’s Open Space Division partnered with the Trust for Public Land (TPL). This effort produced a county-wide map with broad stakeholder input to guide where public funds should be spent to protect open space. The Greenprint process was initiated when Bernalillo County voters approved Mill Levy funds designated for the purpose of “acquiring, improving, operating, and maintaining natural areas, open spaces, and cultural, historic, and nature education sites within the County to protect drinking water sources, wildlife habitat and agricultural land, including along the Rio Grande, and to allow children and families to get outdoors in nature.”

The resulting GIS models, maps and Project Assessment Tool allowed properties to be scored by how well they support a selected range of conservation priorities identified as being important to the public, including protection of wildlife habitat. Other resource conservation goals were to:

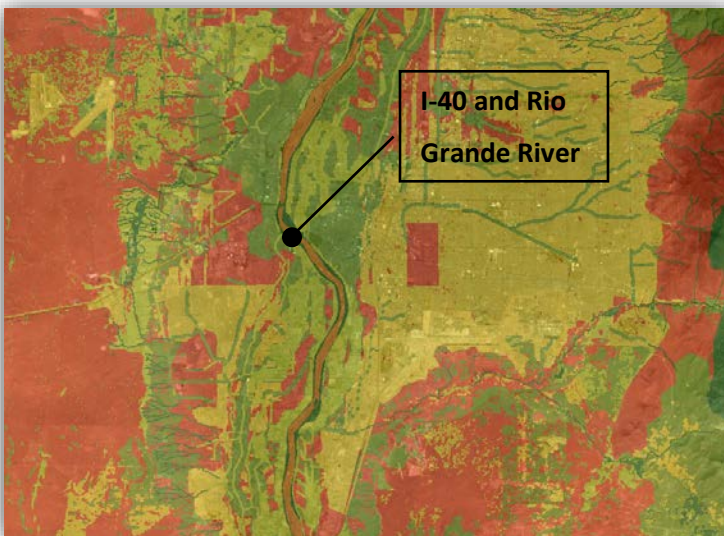
1. Protect water quality in rivers and streams (top community priority).
2. Preserve local agriculture and food production.
3. Protect important cultural and historical sites.
4. Provide public access to healthy outdoor recreation.

To identify the lands most valuable for conservation as wildlife habitat, the model combined data from multiple wildlife management agencies, including the NM Department of Game & Fish, the Fish & Wildlife Service, the US Forest Service, and in consultation with agency biologists developed a weighting scheme to highlight those areas identified by these multiple sources as having conditions attractive to wildlife.

Greenprint High Ranking Locations

In the figure shown, the darkest green areas are those ranked with highest value, and those in red of lowest value. Clearly, the model indicates that overall, high elevation mountain forest and vegetated riparian areas near the rivers and natural acequias best meet the resource needs of a variety of local wildlife.

Figure 7-3: Bernalillo County Greenprint Close Up



Due to the selected model criteria, the highest valued habitat is in some places located directly adjacent to the lowest valued, but the ecology of “edge effects” as discussed earlier indicates that encroachment of intensive development reduces habitat value, and areas immediately adjacent to high quality habitat are also valuable to conserve or improve upon for wildlife needs.

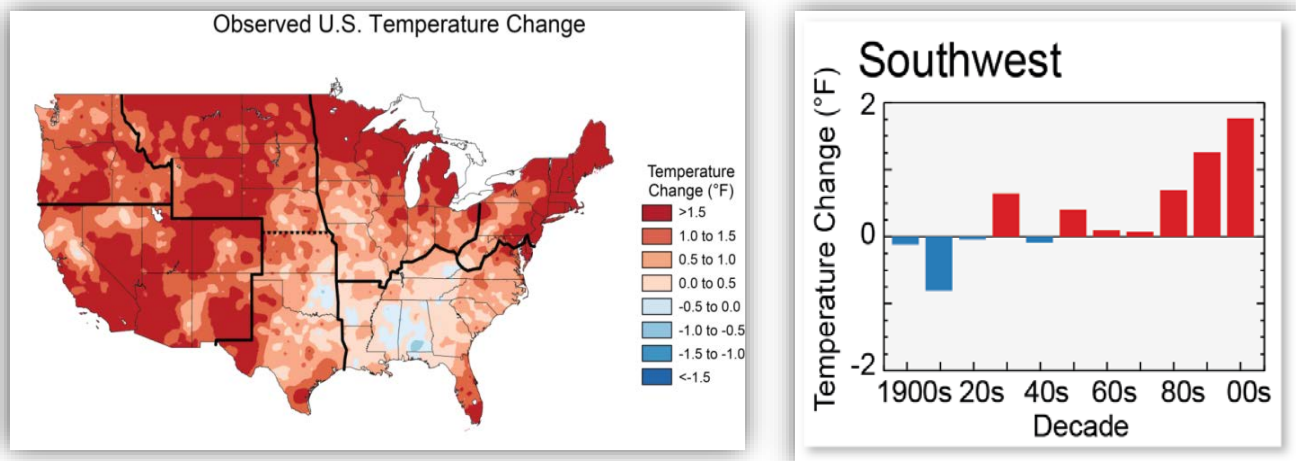
7.2 Temperature and Precipitation Changes

The *Central New Mexico Climate Change Scenario Planning Project (2015)* analysis is important for ensuring future environmental resiliency. Changing temperature and precipitation levels are expected to lead to increased risk of wildfires, flooding, and heat-related illness and deaths. The following information depicts current and future expectations with respect to precipitation and temperature and emphasizes how to prepare for and mitigate the impacts of these natural hazards.

a. Climate Change Projections

The effects of climate change on temperatures in central New Mexico are particularly acute. Over the period of 1971 through 2011, average temperatures in the Upper Rio Grande Basin, in which the AMPA is situated, rose at a rate of just under 0.7°F per decade, approximately double the global rate of temperature rise.⁸

Figure 7-4: Observed U.S. Temperature Change, 1901-2012; Observed Temperature Change Decadal Bar Graph, 1900s-2000s, U.S. Southwest⁹

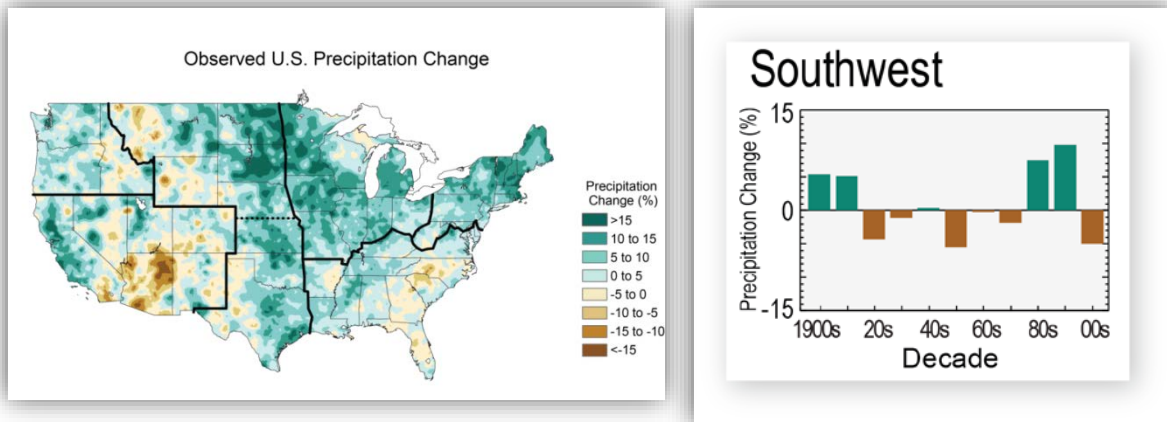


Annual precipitation is more likely to decrease than increase, but perhaps only by a small margin. **The true impact of changes in precipitation will be felt in the variability.** Climate experts anticipate that central New Mexico is likely to experience increased frequency of droughts, followed by increasingly extreme precipitation events. As a result, annual precipitation may not change greatly, but the nature of precipitation is expected to change.

⁸ Bureau of Reclamation, *Upper Rio Grande Impact Assessment*, Executive Summary, S-iii

⁹ U.S. Global Change Research Program www.globalchange.gov

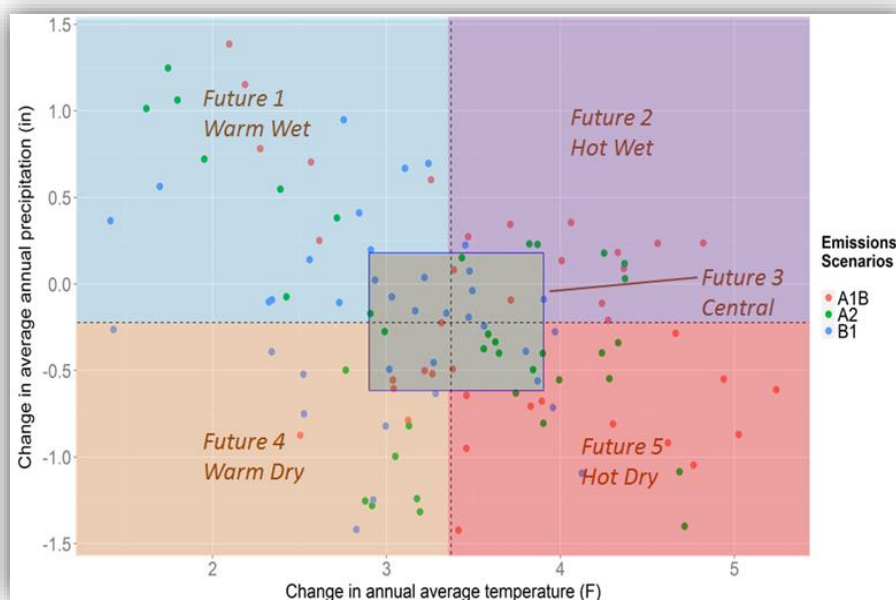
Figures 7-5: Observed U.S. Precipitation Change, 1901-2012; Observed Precipitation Change Decadal Bar Graph, 1900s-2000s, U.S. Southwest¹⁰



Climate Futures in the Albuquerque Area

Detailed analysis on future climate change impacts in the Albuquerque metropolitan area were conducted as part of the Central New Mexico Climate Change Scenario Planning Project. Potential changes in temperature and precipitation were identified by general circulation models using three emissions scenarios.¹¹ The data can be grouped into four climate scenarios, or climate futures, as well as a central tendency value based on data points between the 25th and 75th percentile. The most common grouping, or central tendency characteristics, indicates that average annual temperatures will increase 3-4°F by the year 2040. In addition to greater overall average temperatures, the number of days with temperatures over 100°F is also expected to increase.

Figure 7-6: Change in Annual Temperature and Precipitation Levels, Summary of Global Circulation



¹⁰ U.S. Global Change Research Program www.globalchange.gov

¹¹ Data analysis conducted by US DOT Volpe Center following a methodology employed by Bureau of Reclamation and Sandia National Labs for the *Upper Rio Grande Impact Assessment*. CMIP3 data was utilized for this analysis.

b. Impacts to the Built Environment

Due to these changes in precipitation and temperature, and the subsequent forest degradation due to increased fires in conjunction with flooding events, maintaining a resilient environment will only continue to be increasingly problematic. Furthermore, concentrations of nitrogen, phosphorus, suspended solids, and salt may increase as soil qualities degrade in response to a rise in evaporation rates for surface water and increased precipitation intensity. This would ultimately create a greater volume of pollutants in the river, with potential consequences for water quality. There is also evidence that precipitation events may become more extreme, meaning rainfall events that may have had a one percent annual probability (i.e. a 100-year design storm) may occur more frequently. Expected impacts to the built environment were discussed in a report¹² produced specifically for the *Climate Change Scenario Planning Project*. Some of the report's findings are summarized below.

Droughts

Droughts will have a range of impacts to humans and to the natural environment. Extended periods between rainfall events can impact the viability of local vegetation, reduce habitat for aquatic fish and bird species, and impact land animals in the surrounding riparian zones. Drought patterns may therefore require more water to support existing activities and ultimately necessitate adaptation in farming techniques and the types of agricultural products that may be produced. Taking care of soil quality around the region improves drought resilience by increasing the ability of soils to retain water.

Wildfires

Increased periods without rainfall can also increase the risk of wildfires. While forest fires are a natural part of the landscape, the frequency and ferocity of events has increased dramatically in recent years. In fact, 19 of the 20 largest recorded wildfires in New Mexico have occurred since 2000. The State of New Mexico Energy, Minerals & Natural Resources Department, Forestry Division lists 305 fires in Bernalillo County from August 10, 1993, to August 10, 2004, with more than 5,000 acres burned. Two wildfires along the Rio Grande in the summer of 2003 cost the State, City, and County almost \$14 million, burning nearly 400 acres, and resulting in the temporary closure of Interstate 40.¹³ Such events are likely to continue, with impacts on the health of forest lands and greater threats to the built environment.

Flooding

Extreme precipitation events that follow periods of prolonged drought also create the conditions for flooding events, which may become more extreme with climate change. New Mexico has a long history of flash flooding problems. Many minor flash flood events occur each year during New Mexico's summer monsoon season. Bernalillo County has suffered damage from numerous major floods and localized flash flooding since 1893. Flood control infrastructure will be more burdened and likely need supplementation in the future, even as overall water supplies decrease.

¹² Economic Management, Inc., "Climate Changes Effects on Central New Mexico's Land Use, Transportation System and Key Natural Resources"

¹³ https://www.bernco.gov/uploads/FileLinks/1470d2e55af641018c84db709d9a9ab4/bernalillo_county_base_EOP.pdf

Exposure and Mitigation

Ultimately, how the region grows and its ability to adapt to climate change impacts are interrelated. Minimizing growth in at-risk locations requires development forms that also lead to better transportation outcomes, a smaller regional footprint, and lower levels of water consumed for residential purposes. Therefore, it is helpful to take a look at future development patterns in comparison to where vulnerabilities will be felt the most with respect to climate change impacts. Five climate change-related components were considered through the scenario planning process and evaluated using performance measures. Chapter 3 contains specific performance measures for some of these that evaluate the extent of these impacts for both the Trend and the Target scenario, and the differences between them. Some of these have already been discussed, but in total included the following components:

- High flood risk areas: level of development in FEMA-designated 100-year floodplains
- Forest fire risk areas: level of development in wildland-urban interface areas
- Crucial habitat areas: level of development in high ranking areas using the Western Governors' Association Crucial Habitat Assessment Tool
- Water consumption: number of gallons of water consumed by residential users per year
- Emissions levels: CO₂ tonnes per day

At Risk Locations

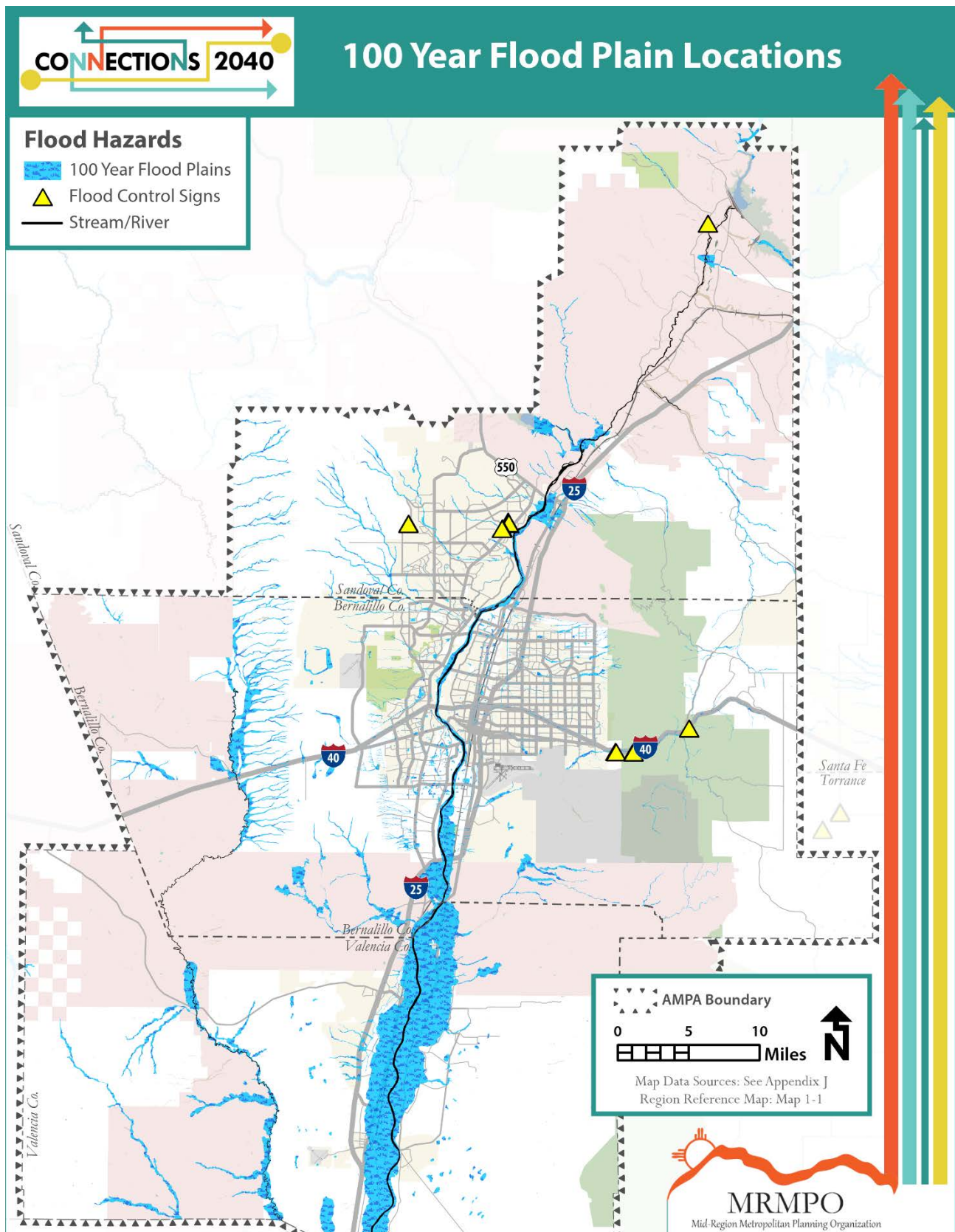
All of these components are addressed in this chapter, plus the impacts of extreme heat. Of interest, from a scenario planning perspective, is whether emphasizing development in certain locations, such as generally low-risk activity centers, can result in decreased levels of development in at-risk locations. Since these measures lend themselves to spatial analysis, it is possible to observe the differences between the current and future year conditions and the extent to which households and other structures interact with these vulnerable locations.

Flood Risk Areas

FEMA designates 100-year floodplains based on the extent of impact likely from a 24-hour 100-year precipitation event. In the AMPA, floodplains are generally located along the Rio Grande and arroyos that flow into the river system. As the frequency and intensity of extreme events (i.e., the 100-year design storm) are projected to increase and impervious surfaces associated with new development expand to cover more ground and increase runoff volumes, individual floodplains will likely be enlarged, but FEMA-designated floodplains are currently the official tool for assessing the risks associated with extreme precipitation events across the region.¹⁴

¹⁴ The Southern Sandoval County Arroyo Flood Control Authority performed a detailed analysis of the potential change in peak flow associated with increases in the 100-year design storm event for the Calabacillas Arroyo. SSCAFCA found that 10 percent increase in the design-storm resulted in a 25 percent increase in flow, while a 25 percent increase in rainfall led to a 75 percent increase in flow for that system. These results must be considered hypothetical and cannot be extrapolated upon in terms of impacts to all arroyos or floodplains. However, the analysis demonstrated that precipitation events of increased intensity did place additional structures at risk along the Calabacillas Arroyo system.

Map 7-4: FEMA 100-year Floodplains in the Region



Forest Fire Risk Areas

According to the University of Wisconsin's SILVIS Lab, wildland-urban interface (WUI)¹⁵ refers to the "area where structures and other human development meet or intermingle with undeveloped wildland." Not only does new development pose a threat to the natural environment, but the climate literature indicates the natural environment (i.e., WUI areas) may be at greater risk due to wildfires and pose an increased threat to homes and structures. It is because of the inherent and growing conflicts in these areas that the "WUI highlights the need for ecological principles in land-use planning as well as sprawl-limiting policies to adequately address both wildfire threats and conservation problems."¹⁶

Reducing Wildfire Risk

If you live in a WUI zone or area with increased risk of wildfire exposure, there are several precautions you can take to protect your home and yard against a wildfire. Create a zone of "defensible space" around your house that will slow the wildfire down and possibly direct it around your home. To do this, you must view your yard as a fuel source. Fire will only burn if fuel is present. Fuel can be items such as your landscaping, woodpiles, and decks. If the wildfire gets to the house, another line of defense is the type of materials used on your home's exterior. Building or retrofitting your home with non-flammable materials is another good idea. Finally, have a plan. Become familiar with your community's disaster preparedness plans and create a plan for your family. Identify escape routes from your home and neighborhood and designate an emergency meeting place for your family to reunite if you become separated.

Wildland Intermix and Interface Area Definitions

Intermix communities are places where housing and vegetation intermingle. In intermix areas, wildland vegetation is continuous, more than 50 percent of the land is vegetation, and density is greater than 1 house per 16 ha.

Interface communities are areas with housing in the vicinity of contiguous vegetation. These areas have more than 1 house per 40 acres, have less than 50 percent vegetation, and are within 1.5 mi of an area that is highly vegetated.

Creating a Defensible Space

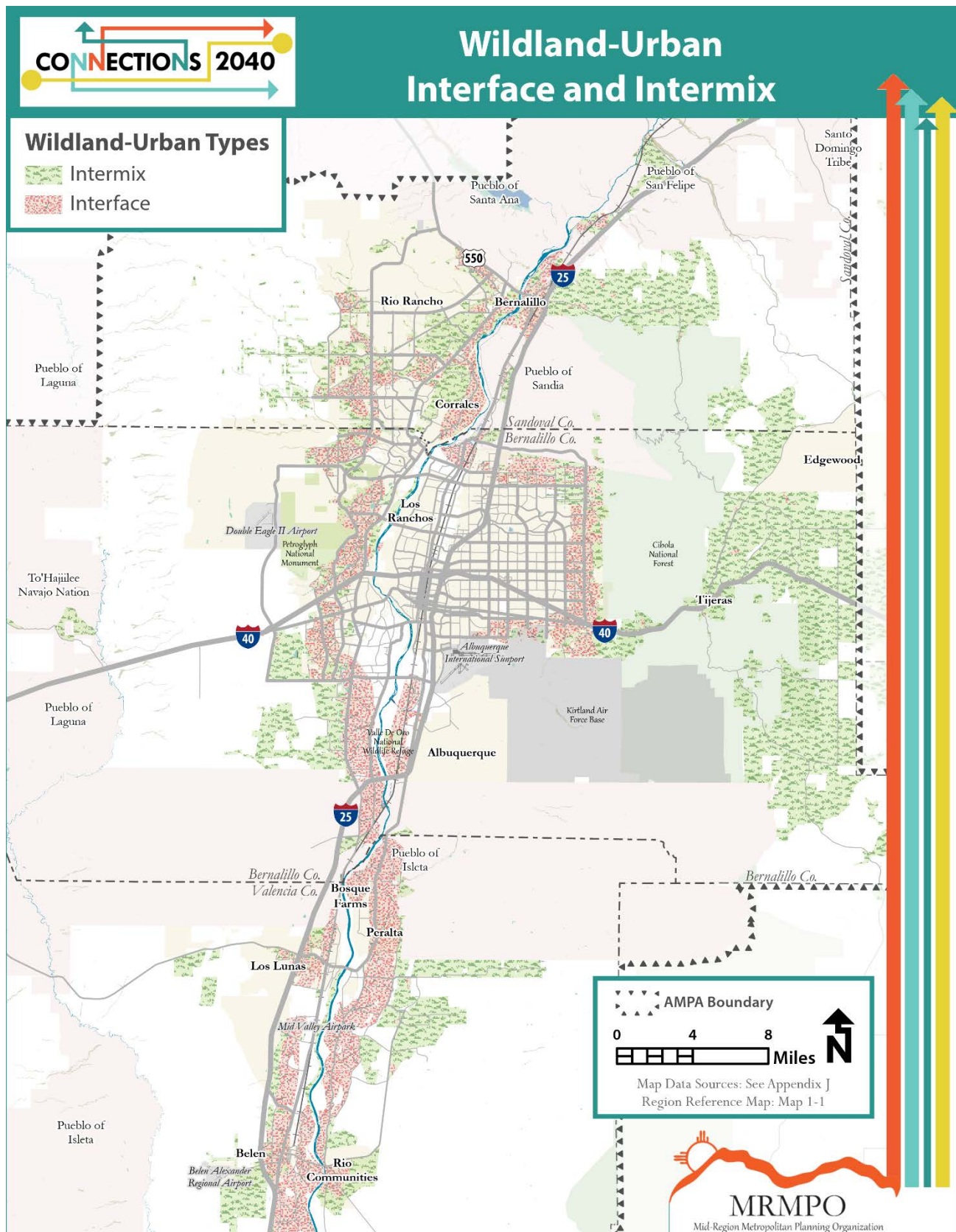
There are some steps you can take within 30 feet of your home, 50 feet if you live in a heavily treed area, or 100 feet if your home is on a hillside.

- Introduce more native vegetation.
- Space trees at least 10 feet apart.
- Keep trees and shrubs pruned.
- Move firewood and storage tanks away from home and clear areas at least 10 feet around them.
- Mow your lawn regularly and dispose promptly of cuttings and debris.
- Trim branches so they do not extend over roof or near the chimney.
- Keep the grounds around your home free of pine needles.
- Store flammable liquids in approved metal safety cans.
- Do not connect wooden fencing directly to your home.
- Clear your roof, gutters, and eaves of debris.

¹⁵ <https://www.nrs.fs.fed.us/data/wui/>

¹⁶ V.C. Radeloff, et al. "The Wildland-Urban Interface in the United States," *Ecological Applications*, 2005, p. 799

Map 7-5: WUI Areas in the Region



Impacts of Extreme Heat

The consequences of these temperature changes even though they are only a few degrees, can be extreme. Heat is already responsible for more fatalities per year on average than any other weather-related hazard in the United States.¹⁷ Recent epidemiologic findings on heat related health impacts have shown a range of impacts on morbidity outcomes including cardiovascular, respiratory, and even mental health responses. Further, heat causes undesirable side effects of psychiatric medications.¹⁸ The homeless, elderly, obese, diabetic, and the very young are all especially vulnerable to heat-related illness and death. Urban areas are particularly vulnerable to the impacts of heat, since they concentrate large numbers of vulnerable people in settings where ambient temperatures are often higher than suburban and rural areas due to the “urban heat island” effect.

Urban Heat Islands

Urban Heat Islands (UHI) are where the concentrated energy of people, vehicles, and manmade materials in urban environments combine to make ambient air temperatures more extreme than in surrounding areas, and nighttime temperatures remain high for longer periods of time. The annual mean air temperature of a city with 1 million people or more can be 1.8–5.4°F (1–3°C) warmer than its surroundings. In the evening, the difference can be as high as 22°F (12°C).¹⁹ During extreme heat events, which are exacerbated by urban heat islands, the resulting demand for cooling can overload power distribution systems and require a utility to institute controlled, rolling brownouts or blackouts to avoid power outages. Those without access to effective indoor temperature control are then made more vulnerable to heat-related health effects.

In addition, a growing body of research points to “intra-urban” heat islands, or areas within a city that are hotter than others due to the uneven distribution of heat-absorbing buildings and pavements, and cooler spaces with trees and greenery. These differences can result from disparities in the way communities are planned, developed, and maintained.²⁰ There are often correlations between hotter neighborhoods and demographic characteristics of residents, with factors such as race and income often playing a role in who bears the brunt of extreme heat.

Planting Trees

Planting trees for shade and other vegetation for cooling via evapotranspiration are the most effective means of mitigating UHI. This can be done with new and retrofitted roadways in addition to locations like parks and residential properties. Sharing many of the benefits associated with green infrastructure as a whole, the “triple bottom line” benefits (economic, ecologic, and social) of healthy urban trees are enormous and bear repeating.

Benefits of Trees in the Built Environment

- Increasing neighborhood property values
- Filtering up to a third of fine particle pollutants within 300 yards of a tree
- Protecting biodiversity – including habitat for migrating birds and pollinators
- Reducing obesity levels by increasing physical activities like walking and cycling
- Reducing rates of cardiac disease, stroke, and asthma due to improved air quality
- Managing stormwater – keeping pollutants out of waterways and reducing urban flooding
- Cooling city streets by 2-4 degrees fahrenheit – reducing deaths from heat and cutting energy use

¹⁷ National Weather Service

¹⁸ Petkova, Elisaveta P et al. “Health impacts of heat in a changing climate: how can emerging science inform urban adaptation planning?” *Current epidemiology reports* vol. 1,2 (2014): 67-74. doi:10.1007/s40471-014-0009-1

¹⁹ U.S. Environmental Protection Agency. “Heat Island Effect.” EPA.gov/heat-islands. Accessed November 25th, 2019

²⁰ U.S. Environmental Protection Agency. “What is the Heat and Equity Connection?” EPA.gov/heat-islands/heat-islands-and-equity. Accessed December 4th, 2019

Tree Canopy

As part of its Urban Conservation Program, the Nature Conservancy conducted an inventory of the Albuquerque metro area tree canopy, which in 2018 was found to cover only 10% of the total area, and being lost at the third highest rate in the nation.²¹ Recently, a new effort led by the Albuquerque City's Parks and Recreation Department is refocusing its efforts to create an effective program to support a thriving urban forest. A challenge was also issued to Albuquerque residents to help plant at least one tree for every kid, with the goal of planting 100,000 trees around the city in the next ten years.

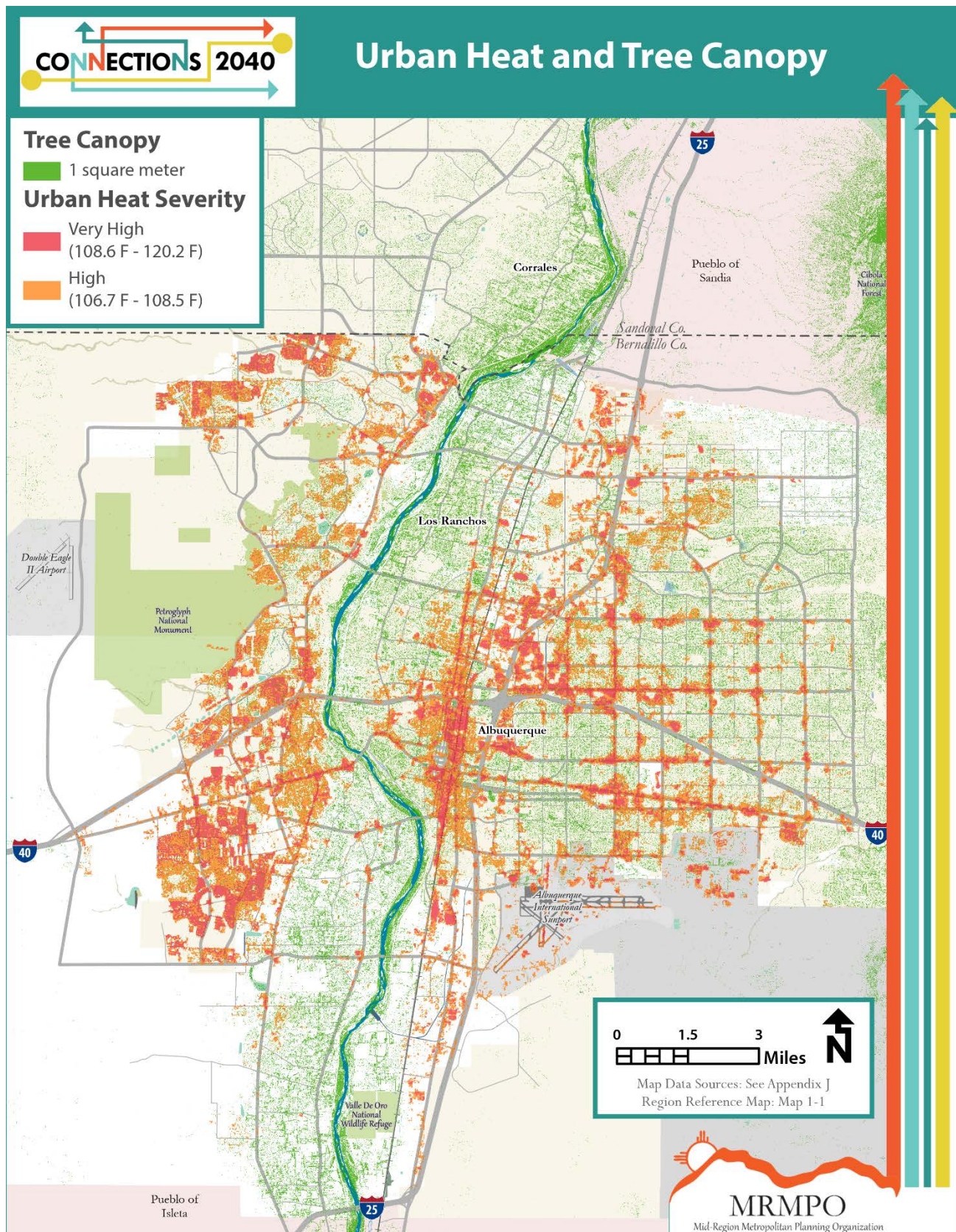
The map below combines data provided by the Trust for Public Land's Urban Heat Island analysis²² performed as part of the Greenprint initiative with Bernalillo County and tree canopy inventory by the Nature Conservancy²³ to identify priority locations for new tree plantings, parks, and green infrastructure interventions. Generally, the map shows that the hottest areas of the urban environment are the downtown core and predominantly industrial areas near I-25 and I-40 where the tree canopy is low in comparison to impervious surface area, as expected.

²¹ Hurteau, Sarah and Miller, Amy. "The Importance of Tree Canopy in Urban Conservation." The Nature Conservancy presentation to the City of Albuquerque Air Quality Control Board, February 14, 2018. cabq.gov/airquality/air-quality-control-board/documents/03-tree-canopy-presentation.pdf. Accessed November 25th, 2019.

²² Generated from LANDSAT Satellite Sensory Data of land surface temperatures in June and August of 2014 and 2015 plus National Land Cover Dataset impervious surface estimates, to create a scaled overlay representing extreme heat areas.

²³ Mapped from 4-band 1-meter resolution aerial photographs captured in the summer of 2016 by the National Agriculture Imagery Program (NAIP) using a Classification and Regression Trees (CART) classifier and hand digitized training data in Google Earth Engine (GEE).

Map 7-6: UHI and Tree Canopy in the Albuquerque Metro Area



7.3 Water Resources

Discussions surrounding growth within a drought-stricken, arid region of the United States inevitably develop into a debate around the availability of water and how prepared, or unprepared, our region is to accommodate the forecasted growth within the region. The discussion on growth would be lacking if it did not at least recognize the role that water availability and future land use and transportation demands play in overall future development.

a. Regional Water Planning

The Middle Rio Grande Region is one of 16 water-planning regions in New Mexico. It comprises Sandoval, Bernalillo, and Valencia counties—an area covering more than 5,000 square miles. Around half of New Mexico’s population lives within this area, making the region the largest urban water user in the state. Guided by the New Mexico Office of the State Engineer Interstate Stream Commission, the first regional water plan was created in 2004. The development and implementation of this initial water plan was intended to support policies, programs, and projects that meet the goals of the plan. Recognizing the limited resources and consistent overuse of the region’s water, the mission of the regional water plan was to balance water use with renewable supply.

In 2014, the State of New Mexico began the process of updating the regional water plans throughout the state, enlisting support by groups previously involved in their creation. Specific to the Middle Rio Grande Regional Water Plan, the Interstate Stream Commission (ISC) began utilizing the Mid-Region Council of Governments Water Resources Board to develop a steering committee to guide the development of the updated plan for this region. The steering committees worked with the ISC and the general public to update the plan, and in 2017 the 2016 Middle Rio Grande Regional Water Plan was adopted. The primary purpose of the 2016 Regional Water Plan is to protect existing resources and prepare to meet future water demands.

Regional Water Plan

Key projects from the 2016 Middle Rio Grande Regional Water Plan providing a larger regional or sub-regional impact:

- Watershed management
- Treated effluent reuse
- Water resources database
- Stormwater management
- Regional collaboration for drinking water systems

Water Supply & Demand in the Southwest

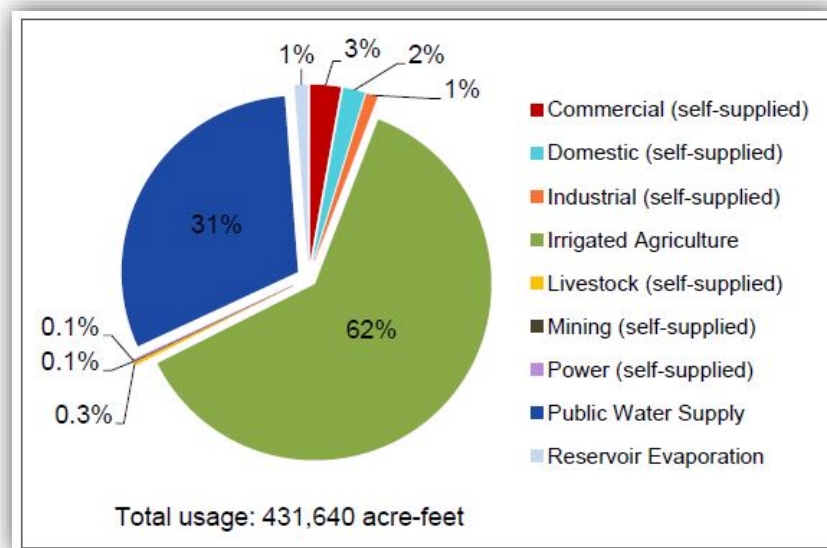
There are many climate change implications relating to water availability within the southwest. Usable, manageable water supply is projected to decline due to continued and anticipated loss of winter snowpack. Supply of water (as well as the ability to store water) in the U.S. southwest will likely decrease as well. In addition, there is expected to be a simultaneous increase in water demand for landscaping, irrigation, and agriculture due to the projected increases in temperature and increased commercial and residential demand. The projected decrease in water supply will be intensified by this increase in demand, resulting in an even further widening of the gap between supply and demand.

The administrative water supply in the region is based on 2010 withdrawals of water and is an estimate of future water supplies that considers both physical availability and compliance with water rights policies. Because of its reliance on surface water, the region has a high degree of vulnerability to drought, especially for irrigated agriculture, and the estimated annual shortage in drought years is expected to range from 207,357 to 282,108 acre-feet. The figure below illustrates the total projected regional water demand under high and low demand scenarios, and shows the administrative water supply and the drought-adjusted water supply.

b. Water, Transportation, and Land Use Connection

In addition to population growth distribution, land use practices influence how much water is needed for general consumption. How the region grows impacts demand through the types and density of development and the resulting landscaping and irrigation needs. Given that the region faces less precipitation, or precipitation occurring in major events, as well as increasing temperatures that are likely to increase drought conditions and limit water availability, it is important to consider the relationship between future land use and future water demand. The *Central New Mexico Climate Change Scenario Planning Project* evaluated the impacts of the built environment on water use. Future land-use scenarios were evaluated for their effect on residential water consumption.²⁴ Rather than engaging in an argument about whether the region *should* grow, such knowledge can help inform how the region *can* grow most sustainably.

Figure 7-7: Total Regional Water Use by Sector, 2010



Development Footprint and Land Use Impacts

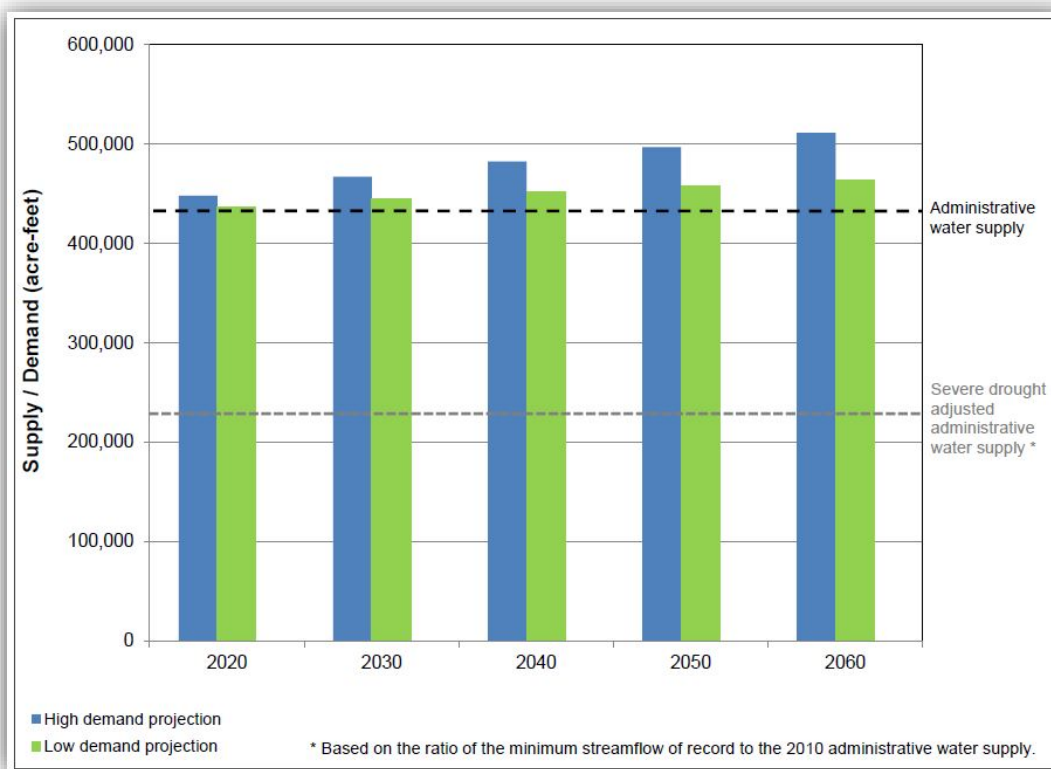
The main factor affecting water supply is the development footprint of the metropolitan area. This footprint is made up of surfaces such as buildings and paved roadways, which decrease the amount of land-area available for rainwater to permeate the surface and replenish ground water resources. Evaluating resiliency to drought, as it relates to changes in water supply, is determined by the amount of land developed in each scenario. **It can be rationally assumed that scenarios with more acres of developed land are less resilient since they will place greater limits on ground water recharge.**

Land Use Type Impacts on Water Consumption

At the same time, the main factor affecting water consumption is the type of land use. The project team evaluated water consumption data from the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) and the New Mexico Office of the State Engineer to create water consumption rates for each major category of land use. These water rates were then used to estimate the total water consumption of each scenario based on the amount of land developed by each land use category.

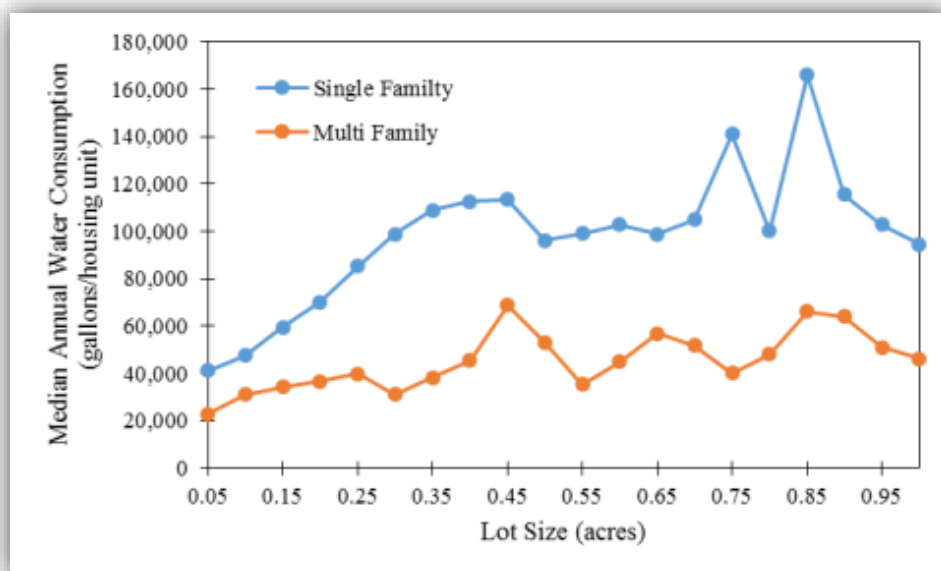
²⁴ Scenario analysis related to water demand was performed by the University of New Mexico as part of the Climate Change Scenario Planning Project. Much of the work in this section is taken directly from the final report developed for that project.

Figure 7-8: Available Water Supply and Projected Demand



Note: Tribes and Pueblos in New Mexico are not required to provide water use data to the State.²⁵

Figure 7-9: Residential Water Consumption Rates by Lot Size, Bernalillo County



Source: ABCWUA, UNM

²⁵ Figure ES-2. Total Regional Water Use, 2010. Executive Summary, Middle Rio Grande Regional Water Plan, 2017

Water use accounts were provided by the ABCWUA to determine how water consumption varied by land use, lot size, and year of construction. Residential water consumption per housing unit increases as lot sizes increase. This trend is most notable for single family homes with less than half-acre lot sizes. As lot size increases above one-half acre, the association between lot size and water consumption decreases (the trend breaks down among larger lot sizes). **The analysis indicates that single family housing units use far more water than multi-family housing units.** Also, there is a sharp drop in water consumption rates for homes built after 2009. This is because lot sizes are getting smaller and tend to have less irrigated landscaping. Efficiency improvements may also play a role.

Site and Roadway Design Applications

Low Impact Development (LID)

LID is an approach to site design intended to reduce alterations to the natural, existing hydrology of land under development. LID encourages the use of permeable paving materials, and the clustering of buildings in a subdivision to maximize open space and reduce runoff volume by reducing the area of impervious surfaces like cement and asphalt.

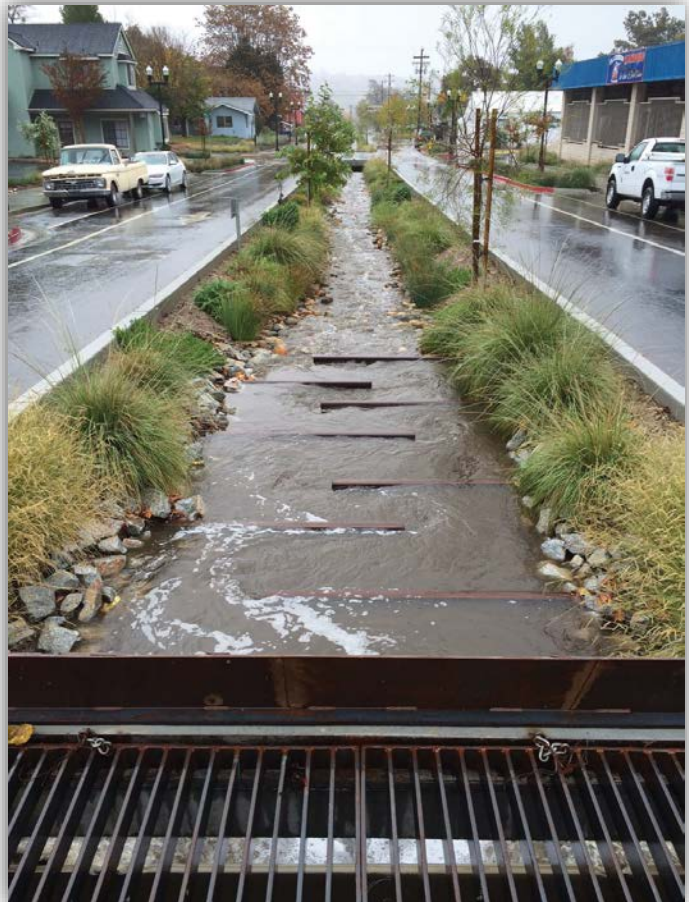
Green Stormwater Infrastructure (GSI)

Impervious surfaces of streets and sidewalks alter existing hydrology, conveying stormwater runoff with erosive speed and a load of vehicular fluids which can pollute soils and waterways. GSI is a complimentary approach that provides effective ways to conserve and reuse water by using natural areas to slow it down, filter out pollutants, and allow stormwater to be used to feed vegetation and recharge the aquifer (see “Green Streets” in the LRTS Guide for more information).

Municipal and Developer Incentives

The benefits of LID are supported by the Environmental Protection Agency (EPA) in its Municipal Separate Storm Sewer System (MS4) requirements. City policies can either encourage or discourage the use of LID tools. Many cities have already adopted incentives for both public and private development to encourage increased LID. For the developer and builder, potential incentives might include expedited reviews, tiered fees, and even exceptions to certain planning requirements such as overall density, setbacks, parking, and landscaping. For homeowners, incentives might include rebates, cost savings from reduced landscape water use, and increased property values.

Figure 7-10: Stormwater Median



Source: NACTO Urban Street Stormwater Guide

7.4 Transportation Security and Critical Infrastructure

In an emergency, it is likely that the typical functioning of the transportation system would be affected and altered in some way. Critical components of the region's transportation infrastructure could be blocked or damaged, altering the performance of the system and possibly taking away important access points. Even if there is no direct damage to transportation infrastructure, an emergency could create atypical transportation patterns that overwhelm the carrying capacity of critical roadways or otherwise compromise the functionality of the transportation system.

It is overwhelmingly the case that measures to improve the general performance of the regional transportation system, are complementary, if not exactly the same as, those needed to improve the performance of the region during an emergency situation. Maintaining existing infrastructure, expanding multi-modal transportation options, preparing for climate uncertainties, improving access to key sites, and encouraging a mix of land uses in appropriate locations, are all strategies that improve transportation security while also fitting within the stated *Connections 2040 MTP* goals and objectives.

Potential Hazards

Potential hazards resulting in emergency situations commonly identified in existing plans include:

- Natural events such as drought, wildfire, flooding, earthquakes, or severe winter weather
- Civil disturbance/mass gathering with imminent threats of violence
- Release of hazardous material
- Energy or fuel shortage
- Disease outbreak
- Pipeline accident
- Nuclear incident
- Terrorist attack
- Utility outage

a. Transportation Security

Transportation security includes preparations and plans to prevent, manage, and respond to potential regional threats that would require an emergency response. Because different types of incidents require different responses, it is impossible to have a specific plan for every type of event. It is for this reason that emergency operations plans in the region take an “all hazards” approach, focusing primarily on establishing a framework for coordinating communications and responsibilities among various departments and agencies involved in mobilizing a response. Plans focusing on these more organizational elements of emergency management allow for more flexibility and adaptability to changing circumstances and unknown threats, be they caused by nature, technical failure, human accident, or human intention.

Several stakeholders at the state and federal levels are involved in transportation security issues. Emergency Operations Plans in the region have a tiered approach to responding to emergency situations depending on the magnitude of the event. If the first responders are overwhelmed, they may call for the activation of a local Emergency Operations Center which coordinates additional resources and may even request assistance from neighboring jurisdictions. In the case that local emergency operations are overwhelmed, the State of New Mexico Emergency Operations Center can be activated. In extreme cases, help from the federal government may be called for.

State All Hazard Emergency Operations Plan

The New Mexico Department of Homeland Security and Emergency Management (DHSEM) has primary responsibility for maintaining the NM All Hazard Emergency Operations Plan, enacting the Emergency Operations System, coordinating the state response, and staffing the NM Emergency Operations Center (EOC). The Emergency Operations System provides the structure for organizing, coordinating, and mobilizing resources. In the event the primary state EOC becomes inoperable there is one fixed alternate EOC as well as one contingency EOC.

The contingency EOC consists of a mobile DHSEM command vehicle with an equipment cache to establish an EOC capability at any suitable location.²⁶ The New Mexico All-Hazard Emergency Operations Plan applies to state departments, agencies, special districts, commissions, boards, all divisions of tribal, pueblo, nations, and local government, and volunteer private organizations with emergency responsibilities. The plan designates preparation, response, and recovery activities by each agency.

Local Emergency Operations Plans

Bernalillo County and the City of Albuquerque manage an Emergency Operations Center, where the municipalities upper management with designated response roles assemble to determine the best course of action during significant emergency events. To better prepare for and minimize vulnerability to such hazards, the New Mexico Office of Emergency Management (NMOEM) and the Federal Emergency Management Agency (FEMA) provided support to undertake a hazard mitigation planning process. The resulting Hazard Mitigation Plan for Bernalillo County / City of Albuquerque identifies and profiles hazards that can affect the metro area, assesses vulnerability to these hazards, and identifies mitigation actions. The Plan also includes an implementation strategy for preferred mitigation actions, as selected and prioritized by a multi-jurisdictional community-based planning team.

Transportation Aspects of Emergency Support

MRMPO coordinates as appropriate with state departments designated support agencies of the Transportation Emergency Support Function (ESF). The purpose of the ESF is to establish procedures for using state transportation resources in an emergency affecting transportation systems and infrastructure. The New Mexico Department of Transportation (NMDOT) is the coordinating agency for the designated support agencies before, during, and after an incident.

Activities within the scope of this ESF include:

- Collecting, evaluating, and sharing information on transportation infrastructure damage and analyzing the impact of the incident on transportation operations locally and regionally
- Coordinating the movement of people and resources to, from, and within the incident area
- Coordinating requests for federal and civil transportation support (including air traffic control)
- Participating in decisions regarding issues such as critical facilities closures, quarantines, and evacuations
- Identifying temporary alternative transportation solutions that can be implemented by other agencies when systems or infrastructure are damaged, unavailable, or overwhelmed
- Coordinating the restoration, recovery, and safety/security of the transportation infrastructure

Regional Transportation Management Center (RTMC)

A Regional Transportation Management Center (RTMC) housing multiple-agency transportation operations in a single co-located facility is in the final stages of development in the AMPA. The Regional TMC will consolidate monitoring of traffic conditions, improve communications, reduce traveler delays, and improve safety for all users of the transportation system. It will also play a critical emergency management role across jurisdictional boundaries by assisting in the coordination of emergency response for traffic incidents or other emergencies and reporting of hazardous travel conditions to drivers via dynamic message signs.

²⁶ New Mexico Dept. of Homeland Security and Emergency Mgmt. *State of New Mexico All-Hazard Emergency Operations Plan*. Revised, December 2016.

MRMPO's Role and the Regional Impacts

While the MRMPO is not named specifically in these plans, the data and tools available through MRMPO could be valuable resources in emergency preparedness planning. The City of Albuquerque and Bernalillo County constitute the State's most populous area and, consequently, have the most residents at risk of exposure to hazardous material releases. The "Big-I" intersection in the middle of Albuquerque and railway freight traffic present the highest potential routes for some type of hazardous material release. A preliminary study of the hazardous materials traffic through Bernalillo County identified 22,000 railcars containing hazardous materials flowing through Albuquerque in a single year.²⁷ A possible mitigation action for mobile hazardous materials may be to restrict hazardous materials transportation through the most populated portion of the County during peak traffic times. Additional transportation security planning efforts for the region could involve the following:

- Conduct vulnerability analyses on critical regional transportation facilities and services
- Analyze the transportation network for redundancies in moving large number of people and for strategies dealing with "choke" points and bottlenecks
- Analyze the transportation network for emergency route planning/strategic gaps in the network
- Provide a forum for security/safety agencies to coordinate prevention strategies
- Conduct transportation network analyses to determine most effective recovery investment strategies
- Act as a forum for regional assessment of organizational and transportation systems response
- Conduct targeted studies on identified deficiencies, priority reconstruction needs and recommend corrective action to restore critical and strategically important transportation facilities

NMDOT Monitoring and Inspections

The NMDOT monitors and inspects commercial transports in an effort to ensure that hazardous material movement is conducted in compliance with mandated regulations.²⁸ In the event of a release, agencies from local fire departments up to the federal level may need to be involved. With support from the Regional Transportation Management Center, NMDOT personnel would assist in coordinating the containment response; safety and security related actions concerning movement restrictions, closures, quarantines, and evacuations.²⁹ Typically, hazardous material releases also cause severe damage to transportation routes and facilities. The transportation system has a unique connection to the threat posed by the possible release of hazardous material, in that hazardous materials are transported through the region daily. Hazardous materials can include toxic chemicals, radioactive materials, infectious substances, and hazardous wastes. An accidental hazardous material release can occur wherever hazardous materials are manufactured, stored, transported, or used. Such releases can affect the nearby population and contaminate critical or sensitive environmental areas.

²⁷ Hazard Mitigation Plan for Bernalillo County / City of Albuquerque, New Mexico, Final Report – May 2007

²⁸ Bernalillo County/City of Albuquerque/ Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA)/Village of Los Ranchos de Albuquerque/Village of Tijeras Hazard Mitigation Plan, July 14, 2015. P.170

²⁹ City of Albuquerque Comprehensive Emergency Management Plan; Annex III: Response Functions; Emergency Support Function #1 – Transportation. August 2019.

b. Critical Transportation Infrastructure

Broadly considered, “critical infrastructure” is all assets, systems, and networks, physical or virtual, that are so vital that their incapacitation or destruction would have a debilitating effect on security, public health and safety, the economy, or any combination thereof. Some crucial examples are the utility and supply systems that deliver food, water, fuel, electricity, and climate control to our homes and places of work. In emergency situations, a well-functioning transportation system is especially important for transporting responders and resources, accessing affected areas and critical services such as hospitals and shelters, transporting debris to disposal sites, and providing evacuation routes if necessary. Local examples of critical transportation infrastructure are:

- Interstate highways – important trucking supply lines and primary evacuation routes in case of large-scale emergencies
- Transit service - ABQ Ride, Albuquerque Rapid Transit and Rio Metro Regional Transit shuttles will be the primary means of getting citizens without privately-owned vehicles to safety
- Rail lines – important for freight supply and passenger transportation within and outside the region
- Airports – in addition to the Albuquerque International Sunport, the AMPA is home to the Kirtland Air Force Base, Double Eagle II Airport, the Mid-Valley Airpark, and Belen Regional Airport
- Fuel supply lines

Evacuation Routes

While primarily a State, tribal, and local responsibility, Federal support may be required for large-scale evacuations. Such evacuations may include moving incarcerated persons, patients, and those with special needs in local hospitals, nursing homes, and extended care facilities, as well as zoo animals, household pets and service animals out of impacted areas. Significant transportation and shelter coordination and resources would be required. Incident response efforts may also involve air operations for search and rescue, medical transport, and evacuation flights.

Anticipating the movement or evacuation of large numbers of people from affected parts of the region, state and local emergency operations plans identify Interstate 25, Interstate 40, US Highway 550, US Highway 60, and US Highway 380 as roads to be used for primary evacuation routes.

State and local plans expect that the majority of evacuations will take place via personal vehicles and that those without access to private vehicles will be serviced by bus involving local transit agencies gathering residents to safe pick-up sites, and departing to congregated care and shelter facilities in established safe zones. Additional traffic control will be necessary to ensure orderly flow of traffic, coordination of parking at reception and registration centers, and directions to assistance facilities. It would be an exceedingly rare event that would require a full evacuation of the region, however there are some local stakeholders who are concerned about the lack of alternative routes within and leading out of the region, as well as limited access points to these routes.

Fuel Supply

The transportation system will not be able to serve emergency operations if there is insufficient fuel for vehicles. This makes the threat of an energy shortage particularly difficult to address when it comes to transportation, especially if the energy shortage affects fuel supply. Currently the region depends heavily on petroleum, and as of 2019, there were no formal plans in the region to deal with a disruption in fuel supply. Under “informal” policies, the 2012 Energy Assurance Plan, written for the State of New Mexico Energy, Minerals and Natural Resources Department, states that the City of Albuquerque would be able to operate for two to three weeks in the event of a fuel disruption.¹ This is concerning to stakeholders who fear that a fuel shortage would not only cause a region-wide emergency but would also cripple the abilities of emergency management operations. Diversifying fuel options by supporting alternative fuel supply infrastructure is a recommended way to improve resiliency in this area.

The ability to address evacuation is limited by the region’s river and mountain topography, but also the prohibitive costs of constructing and maintaining additional routes that would provide redundancy in the transportation network.

c. Network Resiliency

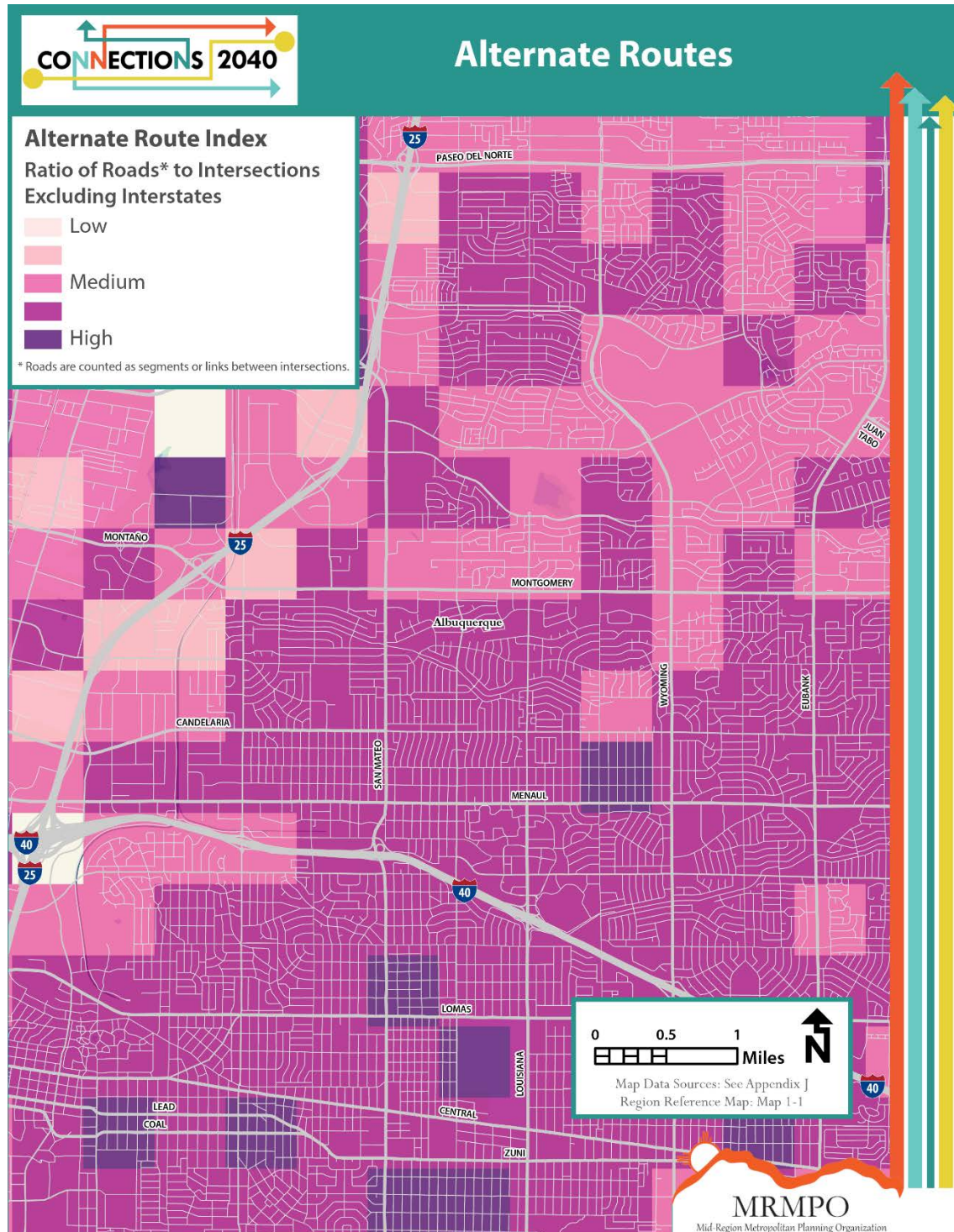
Improving the ability to respond to these kinds of situations is more easily addressed through the design and layout of internal roadways. **The layout of road networks in certain neighborhoods in the region makes them more vulnerable.** In these typically rural and suburban neighborhoods, too few access roads and a lack of connectivity provide insufficient ingress and egress points should there be a need for large numbers of vehicles to simultaneously enter or exit. This setup could exacerbate transportation challenges during an emergency. Upon review of these emergency planning documents, and recent correspondence with local and state security focused departments, groups, and committees, MRMPO finds that the best way to address transportation concerns under an all-hazards approach to security planning is to improve transportation system resiliency and flexibility. Following are general aspects of the region’s transportation system that are key to maintaining resiliency and flexibility in the wake of an emergency situation. Efforts to improve regional transportation security should focus on these aspects.

<u>Increasing connectivity:</u> Increasing the connectivity of roadways, including local streets, would improve the performance of the transportation system in an emergency by permitting better access to and from affected or otherwise important sites, as well as increasing the possibility of using alternative routes for evacuations.
<u>Promoting alternative fuels:</u> The loss of a gasoline and/or diesel fuel supply within a community could be devastating during an emergency event, debilitating first responders and others. Diversifying fuels is a preparedness strategy that should be implemented prior to, and during, an emergency event. By diversifying the types of fuel used within the community, not all fleets will be impacted by a specific fuel outage. Possible alternative fuel options include natural gas, electric, hybrid, propane, and biodiesel.
<u>Promoting alternative modes of transportation:</u> Alternative modes provide more options for moving people in and around the region both at the onset of an emergency event as well as during the recovery phase. In New York City after the terrorist attack of 9/11, the redundancy of the transportation system — that is, the options available from roadway, transit, and pedestrian pathways — enabled residents to continue to move throughout the city. ³⁰ Additionally, transit can be run on alternative fuels and generally requires less fuel on a per person basis. Therefore, increasing transit capabilities in the region would provide flexibility in the event of a fuel shortage.
<u>Promoting a mix of land uses and complete neighborhoods:</u> An emergency event may create challenges with distributing key resources and services to residents as well as communicating information. Areas that have well-defined and accessible civic and public places, such as schools, neighborhood centers, and commercial districts, make it easier to coordinate these aspects of emergency operations. These places put immediate resources nearer to residences and provide nodes for distribution of resources, information, or medical countermeasure procedures.
<u>Maintaining a state of good repair:</u> Keeping roadways in a state of good repair is needed to ensure that infrastructure can handle extreme events and evacuation needs during and emergency situation.
<u>Increasing Intelligent Transportation Systems (ITS) and traveler information services:</u> ITS can be used to collect and analyze real-time roadway conditions during an emergency. Traveler information services inform the traveling public about roadway conditions and alternative routes that may be utilized, thereby reducing congestion and increasing response time of emergency vehicles.

³⁰ Dornan, D. L., Maier P.M. “Incorporating security into the transportation planning process.” *NCHRP report 525: Volume 3*, 2005

The map example below illustrates how in certain areas there is redundancy should there be an emergency situation, and in other areas there are fewer through options, or only circuitous routes exist allowing access to major roadways or locations like the airport. The map shows equal area grid cells to see what sort of connectivity exists in neighborhoods. Spacing and connectivity of new major roadways in our region is critical to consider ensuring safety and security. The benefits don't stop there as more connectivity also provides better disbursement of traffic flows and less congested roadways.

Map 7-7: Alternate Routes along the Local Network



7.5 Air Quality Concerns

Due to rising population and employment in the region, total vehicle miles traveled in the AMPA is expected to increase considerably and directly contribute to an increase in on-road vehicle emissions. These concerns are amplified by the possibility that ground level ozone concentrations will one day exceed National Ambient Air Quality Standards (NAAQS). Consequently, the AMPA must find methods to substantially reduce emissions and maintain healthy air quality into the future. It is important to note that today the region has generally good air quality. Ensuring this remains the case will be important for maintaining a high quality of life as well as meeting federal funding requirements for transportation projects.

a. Transportation Conformity and State Implementation Plans

Per the Clean Air Act, federally-supported transportation plans such as the MTP, transportation improvement programs (TIPs), and federal projects receiving federal funding in nonattainment or maintenance areas for a transportation related criteria pollutant (carbon monoxide, particulate matter, nitrogen dioxide, ozone) must conform to air quality State Implementation Plans (SIPs) and maintenance plans for getting back into attainment or staying in attainment for the NAAQS. Such plans and projects must demonstrate that they will not inhibit progress toward attainment or interfere with maintaining attainment. The process for making a formal finding of conformity to a SIP is known as a transportation conformity determination.

Generally, a transportation conformity determination is made through a process called “interagency consultation,” which is prescribed in air quality regulation. It can require analysis to demonstrate that the total emissions projected for that plan or TIP are within the on-road mobile source emissions limits (also known as “budgets”) established in the appropriate SIP. The decision about whether a transportation plan, program, or federally funded project meets criteria for a conformity determination rests with the AQCB, the MPO, EPA, FHWA and FTA. This decision is the affirmative written documentation declaring that the transportation plan conforms to the SIP’s purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving prompt attainment of such standards.

MRMPO is currently in attainment for all the NAAQS and the limited maintenance period for carbon monoxide expired June 13, 2016. Thus, the MRMPO is not subject to the conformity determination requirements. No such determination is needed for adoption of the currently proposed MTP and TIP.

Congestion Mitigation Air Quality Funding (CMAQ)

Non-mandatory Congestion Mitigation Air Quality (CMAQ) funding is administered by the New Mexico Department of Transportation (NMDOT) and is available statewide for projects and programs that improve air quality and reduce congestion. NMDOT administers CMAQ on behalf of the Federal Highway Administration (FHWA). Pursuant to the FAST Act, transportation projects that fall into one of the following three broad categories are eligible for CMAQ funding.

1. Projects that reduce the number of vehicle trips and/or vehicle miles traveled (VMT);
2. Projects that reduce emissions related to traffic congestion; and/or
3. Projects that reduce the per mile rate of vehicle emissions through improved vehicle and fuel technologies.

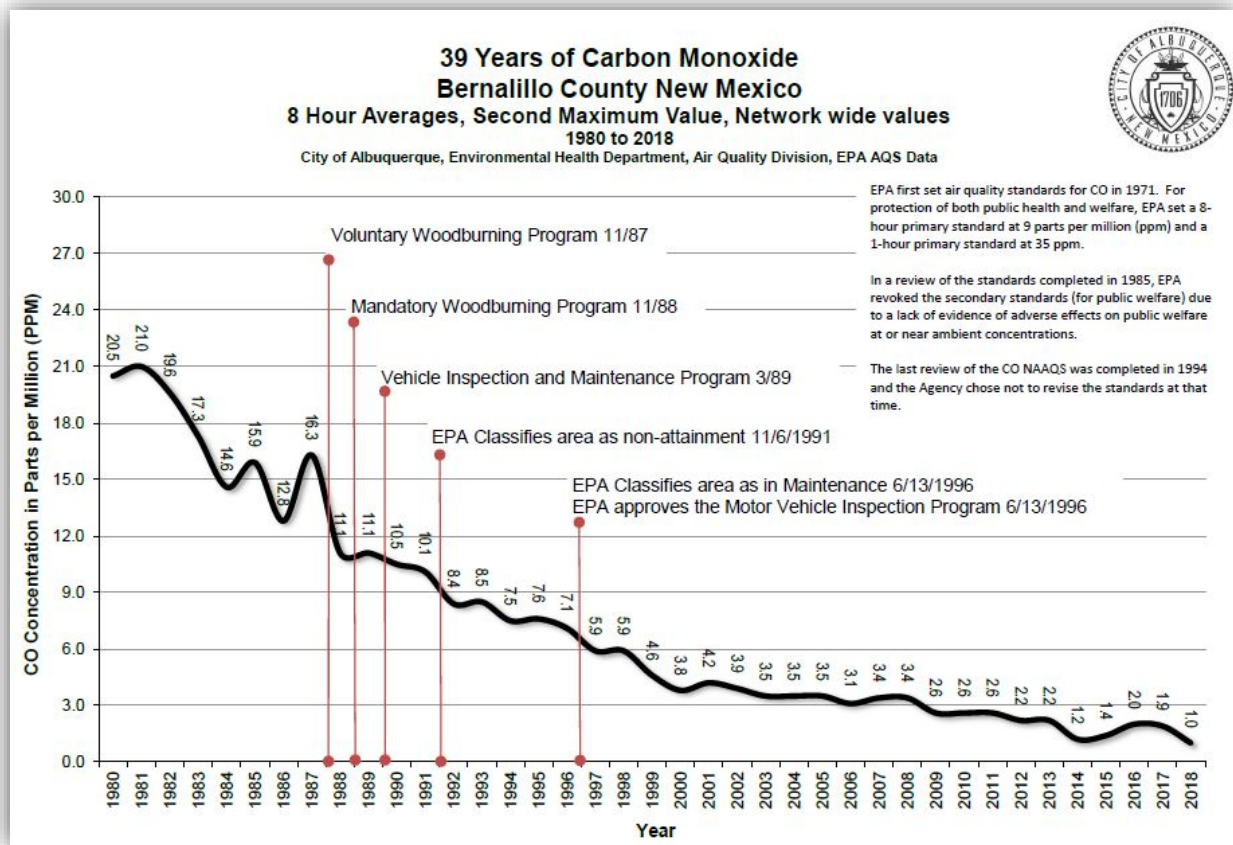
For more details on the Congestion Mitigation Air Quality Program, please refer to the *NMDOT FFY 2020 Congestion Mitigation and Air Quality (CMAQ) Improvement Non-Mandatory Program Guide*.

Air Quality Monitoring

Air quality is monitored within Bernalillo County by the City of Albuquerque Environmental Health Department, Air Quality Program. For all other areas within the AMPA that are outside of Bernalillo County, air quality is monitored by the New Mexico Environment Department, Air Quality Bureau. Areas are designated as attainment or nonattainment according to whether they meet NAAQS for each criteria pollutant based on collected monitoring data. NAAQS are federal standards that establish an air quality concentration to protect public health and welfare. The NAAQS are set for six principal pollutants also known as criteria pollutants. The six criteria pollutants are Ozone (O₃), Nitrogen Dioxide (NO₂), Carbon Monoxide (CO), Particulate Matter (PM_{2.5} & PM₁₀), Sulfur Dioxide (SO₂), and Lead.³¹

Since Bernalillo County was designated in nonattainment of the carbon monoxide (CO) standard in the early 1990s, no subsequent nonattainment designations for any federal air quality standards regulating the six criteria pollutants promulgated by the U.S. Environmental Protection Agency (EPA) have occurred within the AMPA. With respect to CO, the Albuquerque - Bernalillo County Air Quality Control Board (AQCB) adopted a State Implementation Plan (SIP) for reaching attainment that included several effective control strategies that have brought the area into compliance status. The plan was a great success. Not only did the area reach attainment but in fact CO levels have continued to stay well below the standards.

Figure 7-11: Carbon Monoxide in Bernalillo County, 1980-2018



³¹ Since sources of lead are virtually non-existent in the city/county area, the EPA has approved an exception to area monitoring requirements for this pollutant.

The 2019 design value³² for CO, based on the latest quality-assured data available at this time, is 1.1 parts per million (ppm) for the 8-hour CO NAAQS and 2.2 ppm for the 1-hour CO NAAQS. These values represent 11.7 percent and 6.3 percent of the relevant standards, respectively.

Limited Maintenance Plan

Under the recently expired Limited Maintenance Plan (June 2016), the MTP had conformed to other requirements, including interagency consultation, financial constraint, a minimum 30-day public comment period for the plan, and other federal planning requirements. The FHWA, in consultation with the EPA, had determined that the current 2040 MTP for the Albuquerque Metropolitan Area met those requirements and therefore is in conformance with the former Limited Maintenance Plan. Should the region fall into non-attainment for other regulated air pollutants in the future, MRMPPO will work closely with all stakeholders and outline all necessary steps and requirements it must perform to obtain conformity within this document and subsequent MTPs and any applicable State Implementation Plan (SIP).

Future Ozone and Transportation Conformity Issues

The next concern on the horizon is ground level ozone. Ozone near the Earth's surface is a type of pollutant not directly emitted, but instead produced by a complex chemical reaction between ozone precursors in the presence of sunlight and heat. Principal among the ozone precursors are volatile organic compounds (VOCs) such as raw fuel vapors and oxides of nitrogen (NOx) formed primarily during the combustion of fossil fuels. The primary control of ozone formation is based on regulating emissions of volatile organic compounds and oxides of nitrogen. Since ozone does not form immediately, and because heat and sunlight are actors in its creation, ozone can form miles away from the original source of its precursors and forms more readily during the hot summer months. As elevated temperatures directly increase the rate of ground-level ozone formation, and the primary source of electrical energy in the region is coal-burning power plants, global warming will further exacerbate this effect by increasing demand for energy needed to cool homes and businesses.

National Ambient Air Quality Standard (NAAQS)

The current National Ambient Air Quality Standard (NAAQS) for ground level ozone is 70 ppb³³, which is where measurements for the Albuquerque metro area currently register (100% of the NAAQS). Since the level is not yet exceeded, the area is in attainment at this time. The EPA has progressively lowered the ozone standard over time: to 80 ppm in 1997, 75 ppm in 2008, and 70 ppm in 2015, and is projected to decide on a revised standard in October of 2020. Should the standard be lowered, or ground level ozone levels increase beyond current concentrations that would result in Bernalillo County and other parts of the AMPA exceeding the standard. This could lead EPA to designate the area in nonattainment, triggering the need for a SIP that delineates how the area proposes to reach attainment status. The nonattainment status and subsequent submittal of a SIP would have an impact on how federally funded transportation projects in the region are evaluated with regard to conformity to the SIP. In the meantime, the region can take steps to minimize transportation-related emissions, including analyzing the air quality impacts of transportation projects, and implementing mitigation strategies included here in the MTP.

³² "Design value" is a measurement of the ambient air concentration of a pollutant over time. This measurement must be approved by the EPA and must use EPA-approved monitoring methods.

³³ A more complete statement of the standard is that ozone concentrations must not exceed 70 parts per billion, calculated by obtaining the annual fourth-highest daily maximum 8-hour concentration, averaged over three years. Complete details on the standard can be found in EPA's Federal Register publication promulgating the ozone NAAQS, Federal Register volume 80, no. 206, October 26, 2015, page 65,332.

Ozone Public Awareness Campaign³⁴

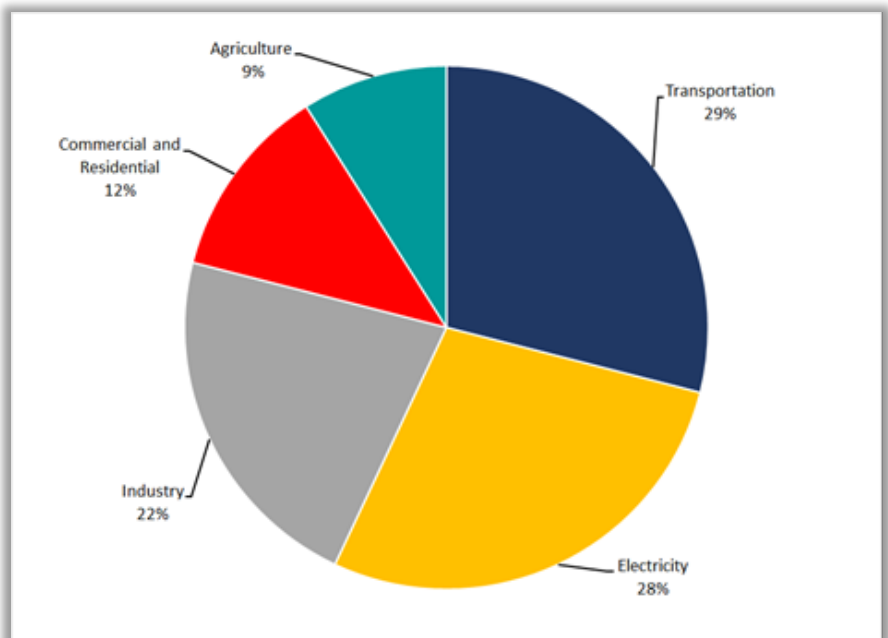
The City of Albuquerque Environmental Health Department has initiated a campaign to raise awareness of causes and remedies for ground level ozone. Individual choices in our region can have a positive impact on ozone pollution. Examples of what each of us can do to reduce emissions that cause ozone include:

- Conserving electricity at home and work
- Walking, biking, carpooling, or using transit to get around
- Refueling your vehicle after dark or when temperatures are cooler to reduce VOC emissions from the gas pump
- Turning off your engine when waiting in line at a drive-through or picking up the kids from school
- Keeping your car tires inflated because better gas mileage means reduced exhaust
- Driving the speed limit

b. Greenhouse Gases

Greenhouse gases (GHGs) enter the atmosphere through the burning of fossil fuels, as well as certain industrial processes and land use practices, but they differ from other emissions in that GHGs also trap heat in the atmosphere. **Over 90 percent of the fuels burned for transportation are petroleum based, and the transportation sector of the economy is the leading source of climate-disrupting greenhouse gas emissions in the United States.**³⁵ CO₂ is 97 percent of the total GHG emissions produced by transportation.³⁶ Like all other communities across the world, the Albuquerque metropolitan area must consider ways to reduce global carbon dioxide (CO₂) emissions, which is the primary greenhouse gas created through human activity.

Figure 7-12: US Greenhouse Gas Emissions by Sector, 2017



Transportation Sector

Roughly equaling the energy sector in U.S. contributions, transportation produces 29 percent of the nation's GHG emissions and therefore represents an important opportunity for curbing global climate change. The on-road sources of GHGs include automobiles, buses, trucks, and other vehicles traveling on local and highway roads. While reducing GHG emissions from these sources positively impacts climate change outcomes, many of the strategies for reducing these emissions are also beneficial in addressing other transportation-related pollution from carbon monoxide (CO), fine particulate matter (PM_{2.5}), and ozone precursors. Therefore, for the region to play its role in reducing GHG emissions also means addressing local air quality.

³⁴ For more on how you can help prevent ozone formation, go to www.cabq.gov/ozone.

³⁵ Sources of Greenhouse Gas Emissions, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>

³⁶ Fast Facts: U.S. Transportation Sector Greenhouse Gas Emissions, 1990-2017. EPA-420-F-19-047, June 2019

Fuel Efficiency Standards

The decline in per capita GHG emissions is driven in part by previously adopted federal regulations of the DOT's National Highway Traffic Safety Administration (NHTSA) to require increases in average fuel efficiency for new vehicles nationwide (Corporate Average Fuel Economy standards).³⁷ However, the EPA and NHTSA issued a final action in September of 2019, entitled the "One National Program Rule", finalizing parts of the Safer, Affordable, Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks, which preempts state and local tailpipe greenhouse gas (GHG) emissions standards as well as zero emission vehicle (ZEV) mandates.

Agencies continue work to finalize the remaining portions of the Rule, which would freeze fuel efficiency standards for model year 2021-2026 light duty vehicles to the 2020 target of 37 mpg (previously 54 mpg by 2025), halt requirements on the production of hybrid and electric cars, and drastically cut fines to nearly a third of what was required by Congress in 2015 for automakers that fail to comply with CAFE standards. If implemented, these changes would likely affect future air quality scenarios for the AMPA and is therefore a key concern for the future.

In September 2019, a coalition of 23 states, including New Mexico, filed a lawsuit challenging the current administration's effort to revoke independent state authority. If successful, the Governor of New Mexico has announced plans to set our own fuel economy and pollution standards beginning with model-year 2022 cars, pickup trucks, and SUVs, with a planned increase to an average of 52 mpg by 2025. If the state adopts such a regulation, the Albuquerque - Bernalillo County Air Quality Control Board will be required under state/federal law to do the same."

VMT Per Capita

Vehicles miles traveled (VMT) per capita declined in the previous MTP but has since started going up again after the impacts of the 2008 recession have worn off some. Unless VMT declines again, other strategies for reducing emissions need to be advanced like changes in land use configurations that result in shorter travel distances and an emphasis on alternative modes of transportation that produce either zero emissions or relatively small amounts of emissions per capita (e.g., public transit service).

According to the Transportation Research Board's *Driving and the Built Environment*:

"The greatest opportunities for building more compact, mixed-use developments (and therefore reducing travel demand and GHG emissions) are likely to lie in new housing construction and replacement units in areas already experiencing density increases, such as inner suburbs and developments near transit stops and along major highway corridors or interchanges."³⁸

Emission Free Vehicles

Primarily electrically powered, emission free, or zero emission vehicles (ZEVs) are designed to generate fewer global warming emissions than gas powered cars and emit no tailpipe pollution. Initiated in California in 2012 and later adopted in ten other states, the Zero Emission Vehicle (ZEV) program requires in-state automakers to sell electric cars and trucks. The program's objective is to ensure that automakers research, develop, and market electric vehicles. Thanks in large part to this policy, over 40 zero emission models are available to the public in 2019.

³⁷ Fleet average fuel efficiency is calculated by dividing each scenario's estimated daily CO₂-equivalent emissions by daily VMT. CO₂-equivalent was estimated by MOVES and considers changes in the vehicle fleet, distribution of VMT by roadway type, and traffic speed. VMT was estimated by MRCOG's travel demand model.

³⁸ Transportation Research Board, *Driving and the Built Environment*, Special Report 29, Washington DC, 2009

Three distinct vehicle designs are considered "zero emission" (to varying degrees):

- Plug-in hybrid vehicles - combining a conventional gasoline-powered engine with a battery that can be recharged from the electrical grid.
- Battery electric vehicles - running entirely on electricity and which can be recharged from the electricity grid.
- Hydrogen fuel cell vehicles - running on electricity produced from a fuel cell using hydrogen gas.³⁹

As an increasingly available option for consumers, the extent of their adoption regionally may produce a significant shift in future air quality and GHG projections. Their development also has important implications for transportation infrastructure development needs. For example, electric vehicle (EV) charging stations will be needed near enough to one another to allow drivers to reach them before batteries run down on long distance journeys.

Alternative Fueling and Charging Infrastructure

Anticipating this need, the Federal Highway Administration (FHWA) has since 2016 been supporting the establishment of a national network of alternative fueling and charging infrastructure along the national highway system through its Alternative Fuel Corridor designation program. The goal is to support the expansion of this national network through a process that:

- Provides the opportunity for formal corridor designations on an annual basis,
- ensures that corridor designations are selected based on criteria that promote the "build out" of a national network,
- develops national signage and branding to help catalyze applicant and public interest,
- encourages multi-State and regional cooperation and collaboration,
- and brings together a consortium of stakeholders including state agencies, utilities, alternative fuel providers, and car manufacturers to promote and advance alternative fuel corridor designations in conjunction with the Department of Energy.⁴⁰

Currently, there are no designated alternative vehicle corridors in New Mexico, despite pending nominations in all neighboring states on shared Interstate highways. The Energy Conservation and Management Division's recent Energy Roadmap plan includes the goals of increasing alternative fuel infrastructure and the availability of AFV's and related maintenance services. FHWA data indicate that there are only three electric fast charging stations in the MRCOG region, out of 11 in the state, but according to data provided by the City of Albuquerque, there are currently 133 EV charging facilities located in the City.

³⁹ <https://www.ucsusa.org/resources/what-zev>

⁴⁰ https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/

Figure 7-13: Energy Roadmap for the Southwest

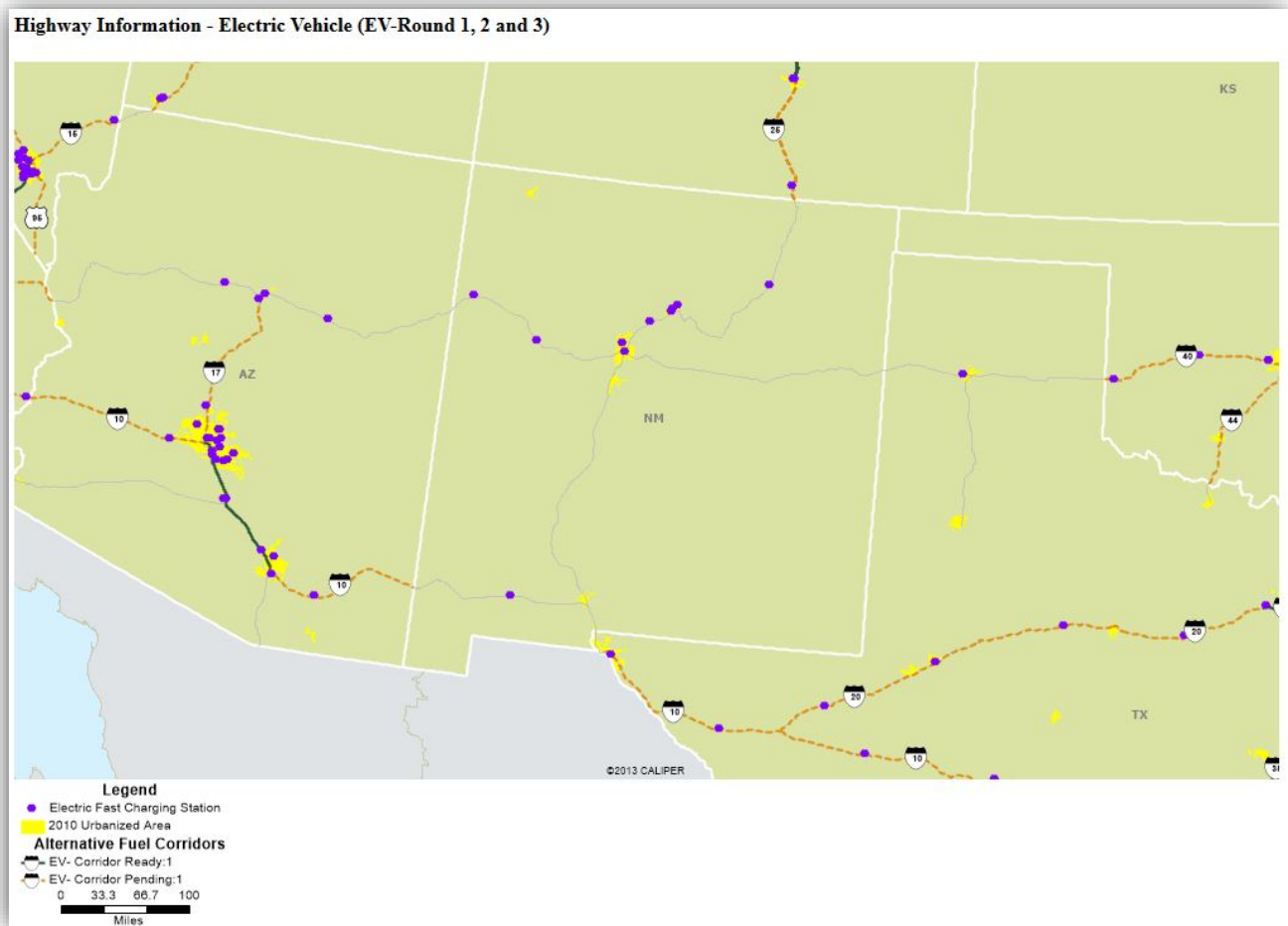
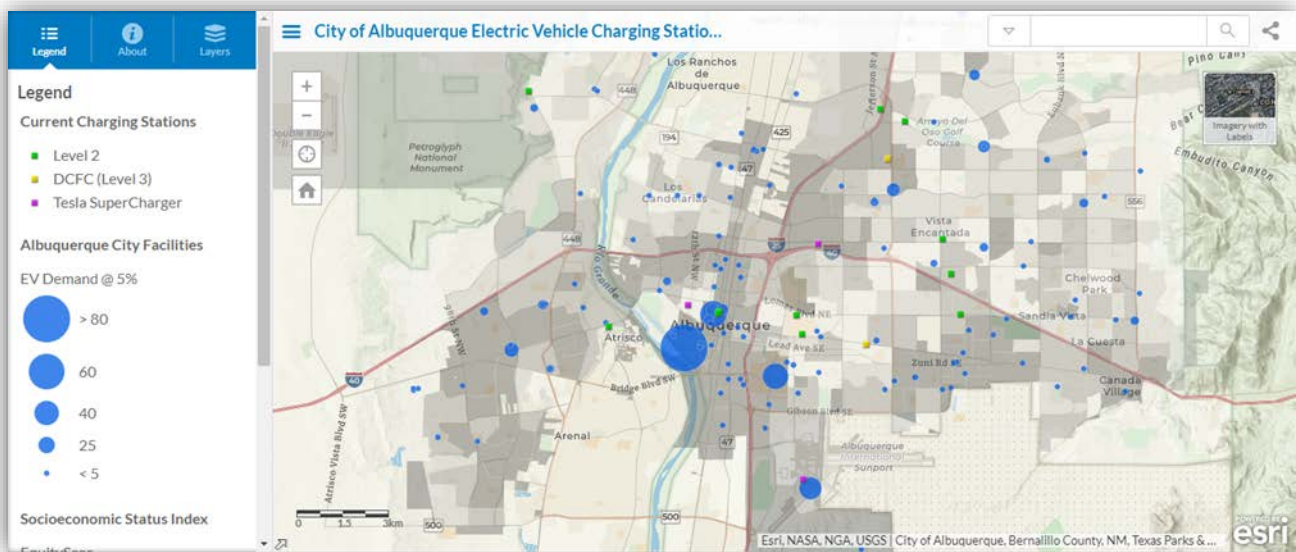


Figure 7-14: City of Albuquerque Electric Vehicle Charging Stations

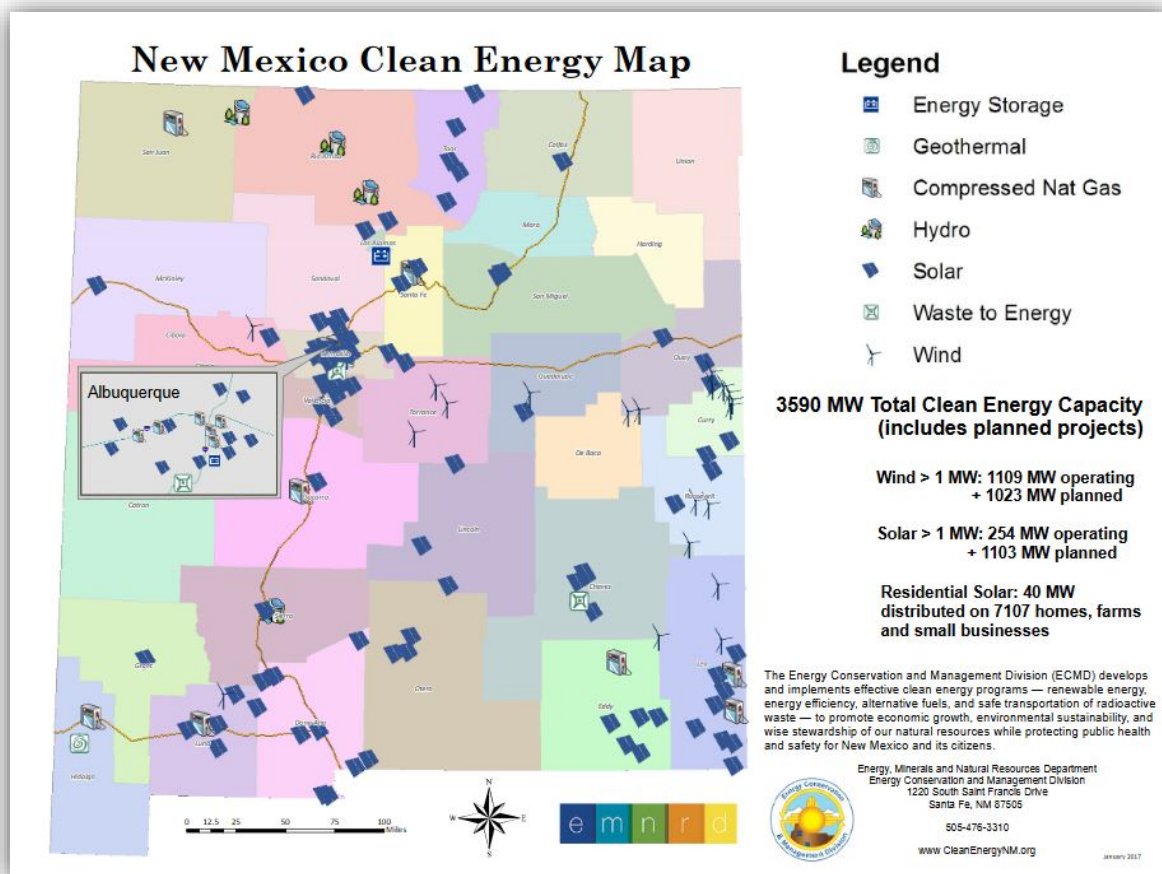


Clean Energy

While electric vehicles have clear benefits for regional air quality, their GHG emissions are primarily shifted over to the energy sector. Aside from household solar panel systems, the Public Service Company of New Mexico (PNM) is the lone provider of electricity for the region, and until recently, coal-burning was their primary power source. Ownership interests in coal fired power plants totaled 983 megawatts (MW) at the end of 2017, but after retiring two units of the San Juan Generating Station, fell to 762 MW in 2018. PNM has proposed reducing coal fired resources further, such that by 2023 it would only own 200 MW and be coal-free in 2032. PNM has worked to significantly reduce emissions over the past 15 years through the installation of additional pollution control technologies, the increased use of renewable energy and natural gas, and the development of extensive energy efficiency and conservation programs for customers, and current plans are to be completely GHG emissions-free by 2040.

Supporting this monumental shift is the March 2019 passage of the Energy Transition Act, Senate Bill 489, a landmark legislation which sets a statewide renewable energy standard of 50 percent by 2030 for New Mexico investor-owned utilities and rural electric cooperatives and a goal of 80 percent by 2040, in addition to setting zero-carbon resources standards for investor-owned utilities by 2045 and rural electric cooperatives by 2050. The bill provides for tens of millions of dollars in economic and workforce support for communities impacted by coal plant closures, as well as the development of renewable replacement power in San Juan County.

Figure 7-15: New Mexico Clean Energy Map



Smart Growth Strategies

Alternative modes of transportation, efficient traffic movement, as well as compact land use patterns have important impacts on air quality. Transportation investments that complement “smart growth” strategies address air quality regulatory requirements while positively influencing regional health and economic outcomes. According to the Environmental Protection Agency, smart growth is defined as **“a range of development and conservation strategies that help protect our health and natural environment and make our communities more attractive, economically stronger, and more socially diverse.”**

Smart growth strategies which advance the Target Scenario and improve air quality include: ⁴¹

1. **Provide a mix of land uses** – where appropriate, allow homes, offices, schools, parks, shops, restaurants, and other types of development to be built near one another—on the same block or even within the same building. This makes it possible for people to live closer to where they work or run errands, eliminating the need to drive for multiple daily needs.
2. **Encourage compact design** – make more efficient use of land that has already been developed by encouraging development to grow up, rather than out, or on empty and underutilized lots. Compact development reduces travel distance between destinations and makes the most of public investments in roads and other existing infrastructure.
3. **Create a range of housing opportunities and choices** – the housing options available in a community will influence a families’ economic opportunities, costs of living, and how much time they spend commuting each day.
4. **Create walkable neighborhoods** – walkable places are created in part by mixing land uses and taking advantage of compact design but are activated by street design that makes walking not only practical but safe and convenient to enjoy.
5. **Preserve open space, farmland, natural beauty, and critical environmental areas** – in addition to the multiple benefits already mentioned in this chapter, the protection and expansion of vegetated areas effectively and naturally improves air quality.
6. **Provide a variety of transportation choices** – high-quality public transportation and safe, convenient biking and walking infrastructure makes alternatives to driving more attractive and reduces the number of polluting vehicles on the road.

⁴¹ *What is Smart Growth?* Smart Growth America, 2019.

www.smartgrowthamerica.org/our-vision/what-is-smart-growth. Accessed 19 November 2019

CHAPTER 8:

FINANCIAL ANALYSIS

Financial analysis of the MTP is not only a federal requirement, it is also good planning practice to ensure that planned transportation projects can be paid for with expected funding sources. This chapter examines the projected revenues and expenditures for projects and programs over the next 20 plus years. This MTP, compared to previous plans, places greater emphasis on maintenance and preservation of existing infrastructure with large-scale highway capacity and transit service expansions limited to strategic locations that provide greater long-term transportation and economic benefits. Beginning with the *Futures 2040 MTP*, the long-range plan shifted funding to preservation of existing infrastructure, such as major bridge rehabilitations over the Rio Grande. This plan, the *Connections 2040 MTP*, continues this emphasis on infrastructure preservation and enhances focus on multimodal network connectivity and land use and transportation integration.

8.1 Financial Legislation and Requirements

a. Federal Legislation

On December 4, 2015, President Obama signed the Fixing America's Surface Transportation (FAST) Act¹ into law providing multi-year long-term funding certainty for surface transportation infrastructure planning and investment. The FAST Act authorized \$305 billion over federal fiscal years 2016 through 2020. The FAST Act maintains a focus on safety, keeps intact the established structure of the various highway-related programs, continues efforts to streamline project delivery and, for the first time, provides a dedicated source of federal dollars for freight projects. The FAST Act upholds national goals and performance measures which will continue to transform the Federal-Aid Highway Program (FAHP) and more efficiently invest federal transportation funds by refocusing attention on national transportation goals, increased accountability and transparency, and improved project decision making through performance-based planning and programming.

Transportation Improvement Program (TIP) Funding

In order to fund all projects programmed in the current FFY 2020-2025 Transportation Improvement Program (TIP), Congress will have to enact an extension of FAST Act or enact a new transportation bill (continuing resolutions to reauthorize, or extend, FAST Act are expected).² However, if Congress does not enact a multi-year extension of FAST Act (or a new bill) by the beginning of FFY 2021 (October 1, 2020), MRMPO will need to review the projects programmed in FFY 2021 and compare those amounts to the federal transportation dollars made available in the continuing resolution funding bill in effect at that time. Based on that review, adjustments to the FFY 2020-2025 TIP may be necessary. Without the passage of a multi-year transportation bill, this would need to be done at the beginning of each federal fiscal year and again, federal regulations would require that the TIP reflect the changed revenue situation if funds are reduced. This is because the TIP must be fiscally constrained, meaning the cumulative funding of all projects programmed in each fund source cannot exceed the total revenue for that fund source. Although the risk of lowered revenue has its greatest impact on the TIP, the MTP is also subject to revision if federal funding is substantially reduced from estimated levels. Federal regulations would require the MTP to

¹ [Fixing America's Surface Transportation \(FAST\) Act](#)

² More explanation of the TIP is found in Chapter 9.



reflect the changed revenue situation before it could be amended through the formal amendment process.

Transportation Funding History

Historically, federal transportation spending has largely been financed by user fees—primarily taxes on gasoline and diesel fuel have financed the Highway Trust Fund since it was established in 1956. The past few years, however, marked a significant departure from this trend, with a greater share of the federal funding source being supported by general revenues. The FAST Act set program spending levels significantly above national dedicated revenues sources, continuing the funding gap between spending and revenues.

Lack of a long-term transportation funding strategy at both the federal and state levels does not allow the NMDOT or MRMPO to reliably estimate funding levels and program transportation projects. It is likely that the scarcity of federal and state funding in the immediate future, coupled with rising costs and increased needs, will require the region to explore alternative funding methods that could include municipalities and tribal governments applying for competitive federal grants (INFRA and BUILD grants, discussed later in this chapter) which are independent of sub-allocated federal funding revenues, additional taxes, bonding, public-private partnerships, implementation of toll facilities, or other innovative financing methods.

While these issues create uncertainty with regard to financial planning for this MTP, the financial assumptions outlined are reasonably expected to be available and provide a basis from which the metropolitan area can plan a transportation system that serves the needs of the region through 2040. If Congress or the state legislature enacts legislation that provides substantially more or less funding than is assumed in this plan, MRMPO will review the TIP and the scheduling of projects in this plan, and consider amendments, if necessary, or make those changes in the development of the next long-range plan update scheduled for adoption in 2025.

State and Local Funding Streams

State and local governments frequently experience stagnant or declining revenues from sources such as property taxes, impact fees, and gasoline taxes, which decreases the amount of state and local funding available for transportation projects. The gas tax's "purchasing" value has steadily diminished since it was last raised in 1993 at the federal level and in New Mexico.³ Moreover, gas tax revenues are likely to be further eroded by future improvements in fuel efficiency (less fuel being purchased) and, even though vehicle miles traveled (VMT) has increased over the last few years, it is uncertain what the average VMT mileage will be, which could result in less fuel being purchased, thus less fuel tax collected.

Local Government Transportation Fund (LGTF)

On the other hand, in 2019 New Mexico had an increase in revenue from oil and gas severance revenue resulting in the establishment of the Local Government Transportation Fund (LGTF). This fund source is reasonably expected to be available in 2020 and perhaps to 2025, depending on oil and gas market prices, rate of extraction, and the political climate in the Roundhouse to maintain this revenue source for transportation.

³ The federal tax on gasoline established in 1993 is 18.4¢ per gallon; the New Mexico tax on gasoline was also established in 1993 and is 18.875¢ per gallon (including the Petroleum Products Loading Fee). It is the eighth lowest in the nation. Neither is indexed for inflation.

Fiscal Constraint

Metropolitan transportation plans are required to be fiscally constrained, meaning that the plan must include sufficient financial information for demonstrating that projects in the MTP can be implemented using committed, available, or reasonably available revenue sources, with reasonable assurance that the federally-supported transportation system is being adequately operated and maintained. In other words, the total cost of all transportation projects and expenditures cannot exceed the cumulative amount of projected financial resources available.

In order to determine the amount of funding available to program for transportation projects, the amount of funding needed to maintain and operate the region's transportation system must be estimated and accounted for. Then the remaining funding can be programmed for future transportation projects. **The table below summarizes this analysis and shows the 2040 MTP to be fiscally constrained with the total cost of all projects not exceeding the funding available.** Appendix D contains more detailed projections of maintenance and operations expenditures. It should be noted that costs for transit operations and vehicle replacement are eligible for certain categories of federal funding, thus reducing funding for capital projects. Therefore, some of the projects in this plan are for items such as vehicle replacement and transit service expansion and operations, not strictly capital projects.

Table 8-1: Summary of Fiscal Constraint

Anticipated Funds Available for Transportation 2016-2040	Amount
Federal Funds for Transportation Projects	\$ 3,863,579,607
State Funds Available	+ \$ 611,309,092
Local Funds Available	+ \$ 5,677,361,395
Total Public Revenue Available	\$10,152,250,094
Private Developer Funding for Transportation Projects	+ \$ 1,297,162,212
Total of All Funds Available for Transportation	\$11,449,412,306
Projected Cost of Maintenance & Operations for All Agencies	- \$ 5,231,159,913
Remaining Funds Available for Transportation Capital Projects	\$ 6,218,252,393
Cost of Publicly Funded Transportation Projects in this MTP	- \$ 4,920,647,322
Cost of Privately Funded Transportation Project in this MTP	- \$ 1,297,162,212
Difference (Funding Available minus Costs)	\$ 442,859¹

¹ This "surplus" of funds is a very small proportion of the available funds but indicates a fiscally constrained MTP.

Note 1: Estimates of federal funds use the FFY 2020 obligation rate for all fiscal years.

Note 2: One percent growth is assumed for all federal highway categories from FFY 2026 through 2040. Federal transit funds are increased based on historical trends from the region's two transit operators.

Note 3: Reduction of funds due to debt service is reflected in all Federal Highway categories through FFY 2027 with funds restored from FFY 2028 through FY 2040 and assumes no additional debt service is encumbered.

Note 4: Refer to Appendix D for more information.

b. Revenues, Expenditures, and Projections

As noted previously, for the MTP to be fiscally constrained, the total cost of all programmed transportation projects and programs cannot exceed the projected financial resources available. One of the difficulties all metropolitan planning organizations and state departments of transportation face is projecting how much funding will be available over a period of more than 20 years while considering the transportation funding challenges previously mentioned. In order to accomplish this, federal regulations require that MPOs, state departments of transportation, and public transportation operators cooperatively develop revenue and cost estimates "based on reasonable financial principles and information." These methodologies and assumptions are explained further in this chapter. Appendix D provides more detailed summaries of federal, state, and local revenue projections.



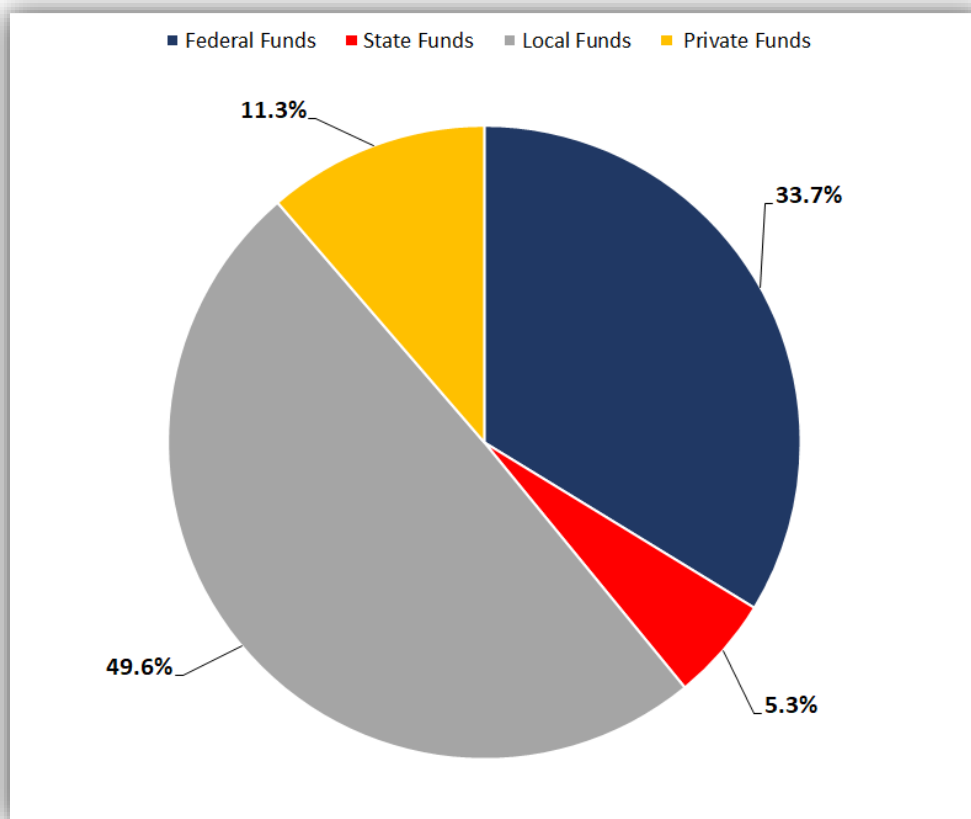
Table 8-2: Projected Funding Available from Public Sources

Transportation Revenue (Public Sources)	Total FFY 2016-2040
Federal Highway Program	\$ 2,259,796,977
Federal Tribal Transportation Program (TTP)	\$ 103,595,333
Federal Lands Program (non-TTP)	\$ 58,779,546
Federal High Priority Projects	\$ 78,664,815
Federal Special Programs (safety, railroad crossing, etc.)	\$ 123,145,108
Federal Transit Administration	\$ 1,239,597,828
Total Federal (includes required matching funds)	\$ 3,863,579,607
State Funds	\$ 611,309,092
Local Funds	\$ 5,677,361,395
Total Public Revenues Available for Transportation Purposes	\$10,152,250,094

Table 8-3: Projected Funding Available from Public and Private Sources

Transportation Revenue (Public and Private Sources)	Total FFY 2016-2040
Public Funds Available for Transportation Purposes	\$10,152,250,094
Private Developer Funds for Transportation Purposes	\$ 1,297,162,212
Total Funding Available for Transportation Purposes	\$11,449,412,306

Figure 8-1: Projected Funding Available from Public and Private Sources, 2016-2040



NOTE: The base year for this plan is 2016 based on availability of complete socioeconomic data; therefore, financial summaries include projects funded and proposed for funding from FFY 2016-2040.

Federal Transit Administration Funds

Federal Transit Administration (FTA) funding is based largely on "formula funds" (i.e., funding distributed nationwide, based on formulas using various criteria) and competitive grants. In the Albuquerque area, transit funding reflects transit ridership and the operation of the New Mexico Rail Runner Express commuter trains which, under federal formula distribution criteria, results in significant federal transit funding allocated to New Mexico. FTA grants such as the funding for the Albuquerque Rapid Transit project are also reflected.

State of New Mexico Debt Service

The federal highway funds allocated to this metropolitan area have been reduced due to debt service to pay back bonds resulting from programs such as CHAT (Citizens' Highway Advisory Taskforce) and GRIP (Governor Richardson's Investment Partnership). Currently, up to 40 percent of New Mexico's statewide annual federal highway revenues through 2027 will be utilized for debt service, greatly reducing the amount of federal funds available for future projects. In 2010 the Federal Highway Administration and the NMDOT entered into an agreement outlining the payment of this debt service. All funding information for federal highway funding categories provided by NMDOT to MRMPPO has routinely accounted for decreases as a result of the state's debt service and is reflected in the funding estimates through FFY 2027.

The reduction due to debt service has been "restored" to estimates in FFY 2028 through FFY 2040 meaning the debt will have been paid-off at that point so more funding will be available for projects after 2027 (assuming no additional debt service against future federal highway revenues is incurred).

Funding Categories and Estimates

- For all FHWA funding categories for FFY 2020 through FFY 2025, the Transportation Improvement Program (TIP) will use funding targets provided by NMDOT.
- For all FHWA funding categories programmed in FFY 2026 and beyond, a one percent annual increase will be applied through FFY 2040.
- Federal funding targets provided by NMDOT are routinely based on the amount available after application of the obligation rate, which is established by the federal government annually. For the purposes of projecting federal revenues for FFY 2021 through FFY 2040, an obligation rate of 93.8 percent is used.
- Funds required to match federal funds shall be calculated and included in the overall funding projections. Currently, under the FAST Act, most federal highway programs in New Mexico have a ratio of 85.44 percent federal with a 14.56 percent match, and most federal transit programs have a ratio of 80.0 percent federal with 20.0 percent match.
- Federal Transit Administration (FTA) funding estimates were also developed cooperatively with NMDOT, ABQ RIDE and Rio Metro. Each FTA funding category was analyzed separately for historical funding trends. Based on historical trends, it was agreed to increase FTA funding categories each year by the following percentages: FTA 5307 by two percent; FTA 5310 by one percent; FTA 5311, 5311(b)(3), 5337, and 5399 by 1.5 percent; and FTA 5311(c)(1) by 2.5 percent. FTA 5339 funding is apportioned to the state for distribution to each small urbanized area transit operator.
- Tribal Transportation Program (TTP) funding estimates were developed using 2020 TTP estimates listed on the Federal Lands Highway website and applying the same assumptions used for other federal highway categories. Funding was held steady at 2020 estimates through 2025, then a one percent annual increase was applied through 2040.
- Given the uncertainties of Congress enacting legislation to increase federal funding for transportation, this plan does not consider additional sources of federal revenue or increases in revenue other than the modest increases noted above.
- There are several types of federal funding that could provide additional funding in the future. These are grant programs for specific purposes or types of projects. These are discussed further at the end of this section. This plan assumes the award of only one grant in the period through 2040.

State Funding

The following assumptions were agreed upon for State fund sources:

For this plan NMDOT and MRMPO agreed to project state funding levels. For the *Connections 2040 MTP*, MRMPO has included some state funding such as State Capital Outlay and the new Local Government Transportation Fund (LGTF). As noted earlier, the LGTF fund source is reasonably expected to be available in 2020 and perhaps to 2025, depending on oil and gas market prices, rate of extraction, and the political climate in the Roundhouse to maintain this revenue source for transportation. MRMPO has not programmed this fund source beyond 2025.



State Revenue Projections

State funding was projected in two major categories: funds used for NMDOT District 3 maintenance and operations, and funds for capital transportation projects. Figures for District 3 maintenance and operations were provided by NMDOT, and it is assumed that all that funding is utilized for those purposes with a one percent annual increase applied through 2040. This is consistent with the methodology used for federal highway funds. It is recognized that state funding for transportation projects is dependent upon action of the New Mexico State Legislature. Significant amounts are authorized in some years with minor amounts in other years. Utilizing an annual average provides a reasonable projection of future state revenues for capital transportation projects. This does not include state funds required to match federal funds; those are automatically calculated and included in the totals for each federal funding category.

Future State Funding Sources

There have been several studies to investigate long-term strategies to increase funding for state transportation infrastructure needs. Options include increasing the state fuel tax, increasing fees for driver's licenses and vehicle registration, implementing new taxes based on vehicle miles traveled, and tolling roads. Thus far, none of these options seems likely to pass into law in the near future. Therefore, this plan does not consider additional sources of state revenue beyond those already in place.

Local Funding

Local agencies provided MRMPO with more detailed and reliable revenue estimates and estimated costs of maintenance and operations (M&O) and their associated M & O budgets.

Local Revenue Projections

Estimates of local revenue used for transportation were provided by the various jurisdictions. These estimates included revenue from general funds, general obligation bonds, development impact fees, municipal gas tax, gross receipts tax, fare box revenue, railroad trackage fees, and other minor sources of revenue. Jurisdictions provided more comprehensive estimates than previous plans. The amount in any given year and annual increases, if any, for each type of revenue varies with each jurisdiction.

Currently, the City of Albuquerque has a ¼-cent gross receipts tax (GRT) for transportation to support roads, transit, and pedestrian/bicycle facilities; for the financial planning purposes of this MTP, it is assumed this tax will continue.

The Rio Metro Regional Transit District collects a ½-cent GRT which is used for operation of the New Mexico Rail Runner Express commuter train service and for regional bus transportation services. For financial planning for this MTP, it is assumed this tax will continue.

Future Local Funding Sources

New Mexico allows for local option sales taxes to be initiated, via referendum, which could be used to finance transportation improvements. Local governments can also issue general obligation bonds subject to voter approval. Only the currently approved Valencia County bond is factored into this plan's revenue projections and no additional bonds by Bernalillo County or the City of Rio Rancho are factored into the projections for this plan. It is assumed by some agencies that future GRT and bond proposals will continue to be approved by voters based on historical results.

The Rio Metro Regional Transit District has an additional $\frac{3}{8}$ -cent GRT taxing capacity which is projected to commence in 2025. If this is not approved, many of the large-scale transit service expansion projects listed in this plan would be delayed indefinitely until funding is obtained. The Albuquerque Rapid Transit project on Central Ave is shown since the federal grant for implementation is within the time frame of this plan (base year 2016-2040).

Private Funding

Private developers also contribute to the construction of the metropolitan area's transportation infrastructure. When large-scale, master-planned communities are approved by local jurisdictions, the developer's agreement with the municipality often requires a commitment from the developer to construct portions of the infrastructure required. Total private development revenues for transportation capital infrastructure are presumed to equal the cumulative total of the estimated cost of all privately funded projects. Essentially, these revenues are "canceled out" by the costs of the privately funded projects. Generally, privately funded projects have no direct impact on fiscal constraint. However, **local agencies do incur a long-term maintenance cost for these developer-built facilities which may be offset either fully or partially with additional tax revenue generated from the new development.**

It must also be noted that the timing of implementation for these privately funded projects is primarily dependent upon the developers' schedules for implementation which, in turn, is highly dependent upon the region's economic climate. Some privately funded projects may be fully or partially funded through alternative financing methods such as TIDs, PIDs, and TIFs (refer to next section).

Table 8-4: Private Capital Revenue and Expenditures

Transportation Revenue (Private Sources)	Total FFY 2016-2040
Private Revenue for Transportation Purposes	\$1,297,162,212
Private Project Expenditures	\$1,297,162,212
Net Gain/Loss	\$ 0

Supplemental Revenue Sources

There are several fund sources available to lead agencies, often on a competitive basis. These are not routinely expected to finance significant portions of the overall program but can provide financial resources for a particular project. Except for a grant already awarded, funds from these categories are not included in the financial plan for this MTP. Any significant future award of funds could be amended into this MTP.

- *New Starts/Small Starts* discretionary grant program has helped make possible dozens of new or extended transit fixed guideway systems across the country – heavy rail, light rail, commuter rail, bus rapid transit, and ferries. New Starts projects are typically greater than \$250 million in total project cost, requesting greater than \$75 million in New Starts funding. The Small Starts program supports fixed guideway projects smaller than the New Starts cost thresholds. Participation in the New Starts and Small Starts programs requires completion of a legislatively directed process for planning and project development. The Albuquerque Rapid Transit project (ART) was funded with Small Starts funding.
- The *Infrastructure for Rebuilding America (INFRA)* grants program provides dedicated, discretionary funding for projects that address critical issues facing our nation's highways and bridges. INFRA grants support fixing the nation's crumbling infrastructure by creating opportunities for all levels of government and the private sector to fund infrastructure, using

innovative approaches to improve the necessary processes for building significant projects, and increasing accountability for the projects that are built. In addition to providing direct federal funding, the INFRA discretionary grant program aims to increase the total investment by state, local, and private partners.

- The *Better Utilizing Investments to Leverage Development*, or *BUILD Transportation Discretionary Grant program*, provides an opportunity for the DOT to invest in road, rail, transit, and port projects that promise to achieve national objectives. Previously known as Transportation Investment Generating Economic Recovery, or TIGER Discretionary Grants, Congress has dedicated nearly \$7.1 billion for ten rounds of National Infrastructure Investments to fund projects that have a significant local or regional impact. The eligibility requirements of BUILD allow project sponsors at the State and local levels to obtain funding for multi-modal, multi-jurisdictional projects that are more difficult to support through traditional DOT programs. BUILD can provide capital funding directly to any public entity, including municipalities, counties, port authorities, tribal governments, MPOs, or others in contrast to traditional Federal programs which provide funding to very specific groups of applicants (mostly State DOTs and transit agencies). This flexibility allows BUILD and traditional partners at the State and local levels to work directly with a host of entities that own, operate, and maintain much of our transportation infrastructure, but which otherwise cannot turn to the Federal government for support.
- The *Sustainable Communities* program was developed through a collaborative partnership between the U.S. Department of Housing and Urban Development, the Federal Highways Administration, and the Environmental Protection Agency. As of this writing, no grants have been awarded to agencies in the AMPA.
- *Tax-increment financing* or “*value capture*” is a mechanism which finances improvements via bonds sold by a special taxing district based on the cost of infrastructure being paid for by properties that are deemed to benefit from the infrastructure. By benefiting properties via transportation improvements, the idea behind tax-increment financing is that the improvement bonds are repaid with dedicated revenues from the incremental increase in property taxes as a result of such improvements (and increase in property value due to the improvements). New Mexico does allow for tax increment financing.
- There are several federal loan and credit programs available. The *Transportation Infrastructure Finance and Innovation Act (TIFIA)* program provides federal credit assistance financing for surface transportation projects in the form of direct loans, loan guarantees, and standby lines of credit. Projects must be of national and regional significance (in other words, included on the long-range transportation system maps). TIFIA financing is generally offered at more favorable interest rates than can be found in private capital markets, and highway, transit, railroad, intermodal freight, and port access projects are eligible for assistance. Each dollar of federal funds can provide up to \$10 in TIFIA credit transportation infrastructure investment.
- For improvements on the freight rail system (which may in turn benefit the state’s and region’s passenger rail system), the *Railroad Rehabilitation & Improvement Financing (RRIF)* program provides direct federal loans and loan guarantees to finance development of railroad infrastructure. Under this program the Federal Railroad Administrator is authorized to provide direct loans and loan guarantees up to \$35 billion, up to \$7 billion of which is reserved for projects benefiting freight railroads other than Class I carriers (regional and short-line railroads would be eligible). Funding can be applied to track and equipment, intermodal facilities, bridges, buildings

and shops, and rail yards. Several other innovative federal financing programs are available but may require state authorization and approval.

- *Consolidated Rail Infrastructure and Safety Improvement (CRISI)* program funds projects that improve the safety, efficiency, and reliability of passenger and freight rail. Projects eligible for funding under this grant program include: deployment of railroad safety technology (PTC/rail integrity inspection systems), capital projects, highway-rail grade crossing improvement projects, rail line relocation and improvement projects, regional rail and corridor service development plans and environmental analyses, any project necessary to enhance multimodal connections or facilitate service integration between rail service and other modes, and the development and implementation of a safety program or institute. The New Mexico Rail Runner Express received a CRISI grant in the amount of \$31,856,050 to implement Positive Train Control (PTC) which is system for monitoring and controlling train movements and is a type of train protection system. This will improve safety for the New Mexico Rail Runner Express, BNSF freight trains and Amtrak.

Maintenance, Operations, and Infrastructure Preservation Funding

In addition to projecting revenues for capital construction, funding available for the maintenance and operations of the entire transportation system is also estimated. Preservation and maintenance of existing infrastructure is critical, and a significant portion of transportation funding is utilized for infrastructure preservation such as roadway rehabilitation, bridge repairs, transit vehicle replacement, etc. Maintenance and operations (M&O) include routine highway maintenance, railroad track maintenance, bus and train vehicle repairs and fuel, equipment maintenance and repair, snow plowing and salting/sanding operations, bike trail maintenance, and transit services operations.

The Transportation Improvement Program funds many capital infrastructure preservation projects on major roads, bridges, and transit systems, transit vehicle purchases and replacements, and some funding for transit operations. Generally, routine M&O is not programmed in the TIP except certain fund sources (such as FTA 5307) can be used for transit operations. However, M&O expenditures must be accounted for in the total amount of funding available for transportation purposes in the MTP. Funds used for maintenance and operations are included in the funding projections of available resources. The projections of both revenues available for M&O and the estimates of M&O expenditures are explained in the following section.

Maintenance and Operations Expenditures

Maintenance and operations expenditures have been projected for the time period of the MTP with the various jurisdictions providing their projected expenditures. The MTP focuses on federal-aid eligible highways and transit systems. However, maintenance and operations budgets do not distinguish between funds spent on major roadways or local streets. Therefore, the methodology used for this MTP is to consider all agencies' entire M&O budgets and entire M&O expenditures to determine how much funding remains available for capital transportation purposes, the vast majority of which is spent on major streets that are roadways generally eligible for federal-aid. Appendix D provides more detailed summaries of projected maintenance and operations expenditures.

Projections of New Mexico's state revenue for transportation purposes include \$611.3 million allocated to the metro area through 2040. This includes \$330.4 million for NMDOT District 3 maintenance and operations. Please refer to NMDOT's statewide long-range plan (*The New Mexico 2040 Plan*) for further analysis of New Mexico highway funding.

Table 8-5: Projected State and Local Maintenance & Operations Expenditures

Jurisdiction	Total FFY 2016-2040
Local Jurisdictions	\$4,900,714,479
NMDOT District 3	\$ 330,445,434
Total Projected M&O Expenditures	\$5,231,159,913

Capital Project Expenditures

Capital expenditures are listed by project in Appendix A. Public capital expenditures include all projects funded with federal dollars and all regionally significant projects funded with state, local, or private funds. The amount of funding available for capital transportation projects was determined by analyzing all revenues available and funds needed for M&O expenditures (see table above).

Table 8-6: Funds Available for Capital Transportation Projects

Anticipated Funds Available for Transportation 2016-2040	Amount
Federal Funds for Transportation Projects	\$ 3,863,579,607
State Funds Available	+ \$ 611,309,092
Local Funds Available	+ \$ 5,677,361,395
Total Public Revenue Available	\$10,152,250,094
Private Developer Funding for Transportation Projects	+ \$ 1,297,162,212
Total of All Funds Available for Transportation	\$11,449,412,306
Projected Cost of Maintenance & Operations for All Agencies	- \$ 5,231,159,913
Remaining Funds Available for Public & Private Capital Transp. Projects	\$ 6,218,252,393

Note 1: Estimates of federal funds use the FFY 2020 obligation rate for all fiscal years.

Note 2: One percent growth is assumed for all federal highway categories from FFY 2026 through 2040.

Note 3: Reduction of funds due to debt service is reflected in all Federal Highway categories through FFY 2027 with funds restored from FFY 2028 through FY 2040 and assumes no additional debt service is encumbered. Refer to Appendices L and M for more information.

Capital Project Expenditures by Project Type

This MTP continues its emphasis on utilizing public funding for preserving the existing infrastructure and funding reflects a continuation in transportation investment priorities across the AMPA, particularly from capacity expansion to infrastructure preservation. Transit funding shown in the figure below includes the FTA grant for the ART project and funding for transit infrastructure and operations, for both ABQ RIDE and Rio Metro Regional Transit District. The Miscellaneous category has increased due to the grant for New Mexico Rail Runner Express Positive Train Control for improved transit safety.

Figure 8-2: 2040 MTP Publicly Funded Projects by Type

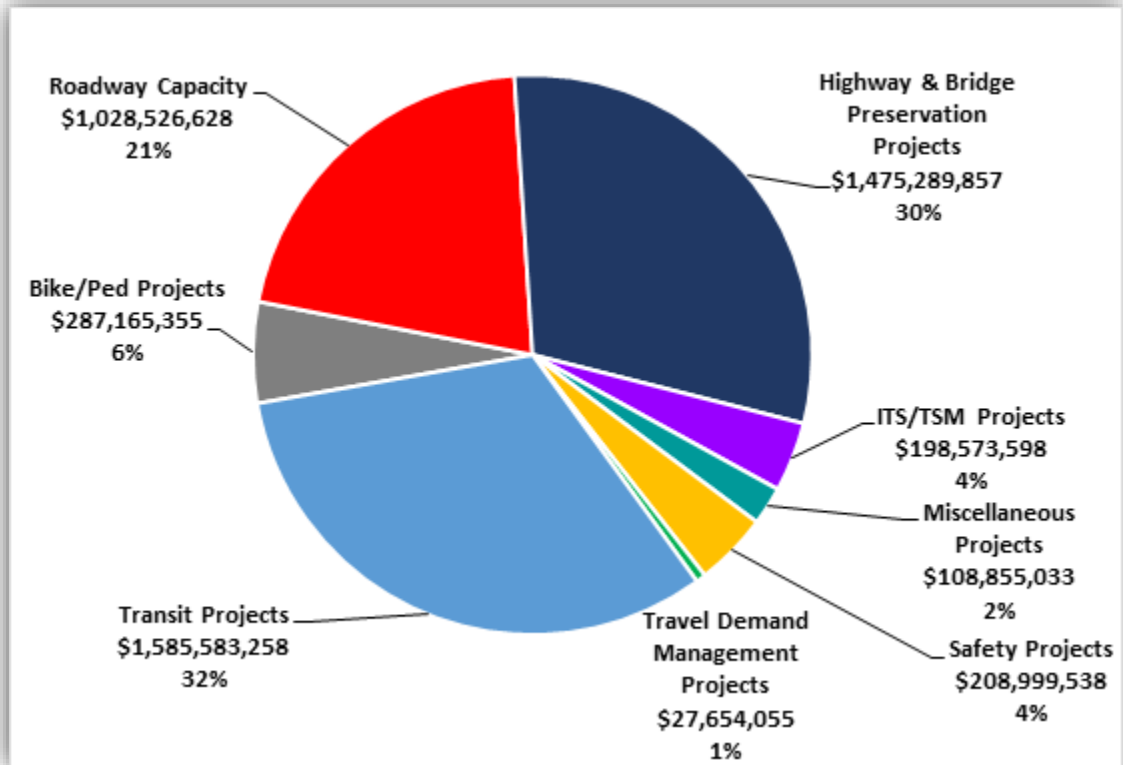
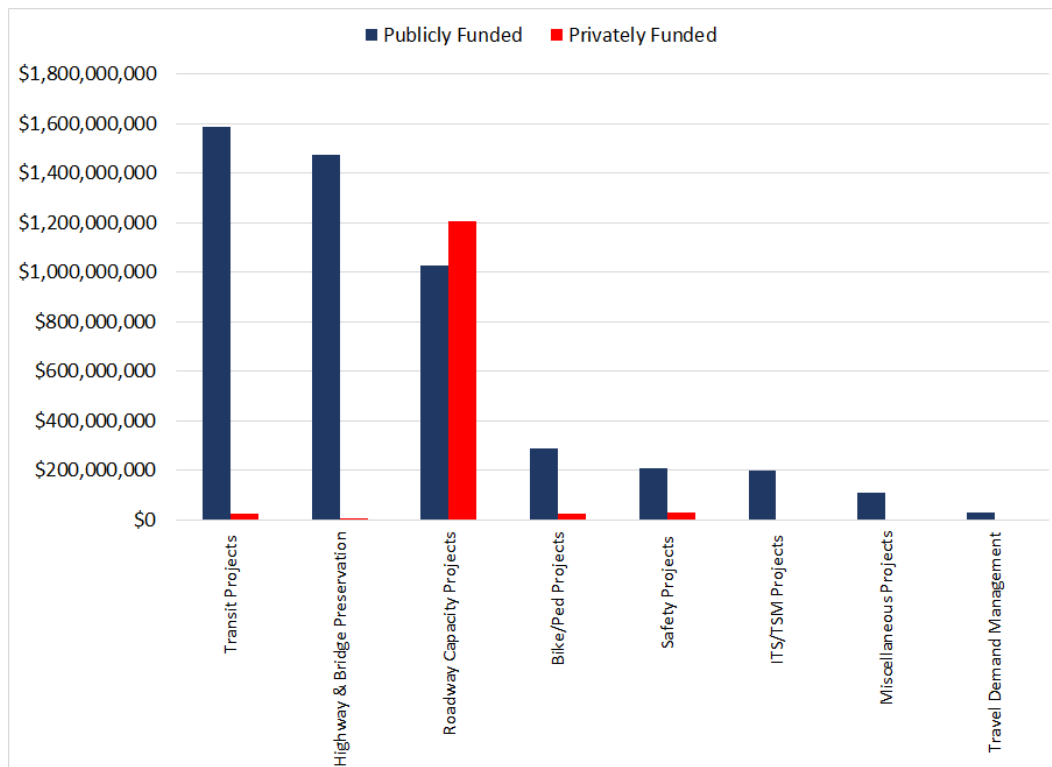


Figure 8-3: 2040 MTP Comparison of Publicly & Privately Funded Projects by Type



This data shows a significant investment by private developers in new roadway construction which increases roadway capacity. These are primarily in developments such as Mesa del Sol, Santolina, Upper Petroglyphs, Quail Ranch, Volcano Heights, Ranch Cielo, etc. The safety project that is privately funded in this MTP is funding from Burlington Northern and Santa Fe Railroad (BNSF) for the construction of the NM 109 Jarales Road Overpass in Belen. The private transit funding is for future Mesa del Sol transit infrastructure.

Table 8-7: Project Expenditures by Type of Project, Comparison of *Futures 2040 MTP* and *Connections 2040 MTP Update*

Project Type	Amount Connections 2040 MTP	Amount Futures 2040 MTP	Difference Connections vs Futures MTP	Numerical Difference
Bike/Ped Projects (Public)	\$287,165,355	\$263,944,607	8.80%	\$23,220,748
Bike/Ped Projects (Private)	\$25,793,000	\$21,193,000	21.71%	\$4,600,000
Roadway Capacity (Public)	\$1,028,526,628	\$1,036,980,106	-0.82%	-\$8,453,478
Roadway Capacity (Private)	\$1,207,744,212	\$1,155,881,922	4.49%	\$51,862,290
Highway & Bridge Preservation (Public)	\$1,475,289,857	\$1,633,985,094	-9.71%	\$158,695,237
Highway & Bridge Preservation (Private)	\$8,000,000	Included under "Roadway Capacity (Private)"	n/a	\$8,000,000
ITS/TSM Projects	\$198,573,598	\$154,255,556	28.73%	\$44,318,042
Miscellaneous	\$108,855,033	\$75,131,684	44.89%	\$33,723,349
Safety Projects (Public)	\$208,999,538	\$80,858,290	158.48%	\$128,141,248
Safety Projects (Private)	\$30,000,000	\$0	n/a	\$30,000,000
Travel Demand Management	\$27,654,055	\$37,164,786	-25.59%	-\$9,510,731
Transit Projects (Public)	\$1,585,583,258	\$1,834,671,248	-13.58%	-\$249,087,990
Transit Projects (Private)	\$25,625,000	Inadvertently left out of chart.	n/a	\$25,625,000
Total	\$5,906,459,382	\$6,294,066,293	-1.21%	-\$76,256,759

Note: See following section for definitions of project type. Refer to Appendix A for listing of projects.

Note: *Futures 2040 MTP* spanned the years 2012-2040 and *Connections 2040 MTP* spans 2016-2040. Although costs of projects increased, this MTP covers fewer years of projects. The next MTP will extend to 2045.

c. MTP Projects Summary

All proposed MTP projects are listed in Appendix A. Listed at the end of this section are some significant and noteworthy projects. In the past, MTPs have included very long-range projects in the previous *Future Albuquerque Area Bikeways and Streets (FAABS)* document and the current *Long Range Transportation Systems (LRTS) Guide* document. Given the fiscal constraints of funding availability and the timing of development and need for these projects, some of these very long-range projects will not be built within the timeframe of the *Connections 2040 MTP* and are therefore not included in this plan. They will, however, remain in the *LRTS Guide*. Appendix C contains a summary listing of these special projects and their status in the *Connections 2040 MTP*. Some projects are also listed in the "illustrative listing" of MTP projects, found in Appendix B, which denotes projects that do not currently have funding available for implementation, but which could be amended into this MTP if funding becomes available through grants, state funds, bond funds, etc.

Federal Aid System

The Metropolitan Planning Organization's purpose is to focus primarily on transportation projects of regional significance.

- For **roadways** this refers to those on the federal aid system. The federal-aid system is determined by highway functional classification which classifies highways and streets based on the function the roadway serves in the overall roadway network. The highway functional classification for the AMPA was revised as a result of the 2010 U.S. Census, receiving final federal approval in February 2014. Roadways eligible for federal-aid are those classified as minor collectors and above in the Albuquerque Large Urbanized Area and the Los Lunas Small Urbanized Area and major collectors and above in rural areas with some exceptions such as special federal funding for off-system bridges, safety improvements, and other special categories of projects.
- For **transit** projects this refers to those transit services that receive federal funding and/or provide inter-regional connectivity (i.e., the NM Rail Runner Express), intra-regional connectivity (ABQ RIDE and Rio Metro services), and services for special needs populations.
- Regionally significant **bicycle and pedestrian projects** are those receiving federal funds and/or those providing regional connectivity (i.e., the North Diversion Channel Trail) and those facilities which are part of the regional bikeway network.

Project Type Categories

Projects in the long-range plan are categorized by one of eight project types: Bike/Pedestrian, Capacity Projects, Highway & Bridge Preservation, ITS-TSM, Safety, Travel Demand Management (TDM), Transit, and Miscellaneous. How a project is categorized is based on the primary reason for the project even though a project may include elements of several categories. For example, a highway reconstruction project's primary purpose may be to rebuild a poor roadway without any additional lanes, but the project could include a new bike trail, replacement of sidewalks, and upgraded traffic signals; however, the project would be categorized as a Highway & Bridge Preservation project. These categories are defined as follows:

- **Bike/Pedestrian Projects** include bicycle trails, bike lanes, and sidewalks, but they can also include projects such as modifying curbs to comply with the Americans with Disabilities Act (ADA), bike lockers, and bicycle safety education programs for children.

- *Capacity Projects* are investments that increase the through-traffic capacity of a roadway or street by adding a significant length of a through-lane. This includes road widening projects, new roadways, bridge widening, and new bridges. It generally does not include projects adding turn-lanes at intersections or the reconstruction/reconfiguration of an interchange unless a new through-lane(s) to the main line is added.
- *Highway and Bridge Preservation Projects* do not add additional through-lanes but improve the condition of the roadway through resurfacing, rehabilitation, reconstruction, restoration, bridge rehabilitation, bridge replacement, bridge deck replacement, bridge repairs, and other similar projects.
- *Intelligent Transportation Systems-Transportation Systems Management Projects* improve the flow of traffic, convey traveler information to the users and/or affect the overall transportation network. Example projects include installing electronic message signs, constructing a traffic management center, upgrading traffic signal equipment, interconnection of traffic signals and its associated communication network, motorist courtesy patrols (H.E.L.P. trucks) which expedite removal of vehicle breakdowns, traffic data collection, and other similar projects.
- *Safety Projects* are focused on rectifying deficiencies that result in unsafe conditions. These include intersection improvements, railroad crossing improvements, median barriers, guardrails, road realignments (such as removing a dangerous curve), adding passing lanes to improve safety (not to increase through-traffic capacity), pedestrian signal upgrades, safe routes to schools improvements, street lighting to improve safety, upgrade of signage and pavement markings, etc. Funding of safety projects generally requires data indicating the existence of unsafe conditions.
- *TDM (Travel Demand Management) Projects* help manage the level of travel on the transportation network by encouraging alternate modes of transportation and/or shifting travel demand away from peak hours.
- *Transit Projects* include all public transportation services such as ABQ RIDE and Rio Metro Regional Transit District services, the New Mexico Rail Runner Express, and transit services for special needs populations. This includes vehicle purchases/replacements, bus stop facilities and shelters, train stations, park and ride lots, railroad track improvements, signalization, bus rapid transit (BRT) construction and implementation, fare collection systems, transit planning, tribal transit programs, and eligible operational costs. Some funding for transit projects is allocated by a formula, thus increases in ridership and some service expansion can result in additional federal funding.
- *Miscellaneous Projects* constitute planning studies, beautification projects, street lighting projects (not safety related), long-term right-of-way acquisition, and some types of multi-modal improvements that do not fit into the other categories

Project Cost Estimating, Timing, and Analysis

Capital project costs are estimated by using one of two methods.

- Some projected costs were provided by the various lead agencies or from corridor studies and transit studies, preliminary design documents, engineers' estimates, environmental documents, or initial project scoping reports. This applies primarily to projects in the MTP and included in the TIP through 2025.

- Other projects had their initial estimated costs based on "unit costs" for various project elements; these unit costs were derived cooperatively among the major agencies and have been used to estimate capital project costs for those projects that have no other documented cost estimates. Primarily, this method applies to long-term projects. Each long-term project estimate from the MTP was reviewed and updated by the sponsoring agency to account for changes in major cost elements (i.e., steel price increases). An annual growth rate of two percent has been applied to project costs beyond the TIP based on agencies' or developers' estimated time frame for project implementation.
- Private funds used for construction of transportation infrastructure have been projected to equal the cost estimates of each privately funded project. Private development costs are provided by developers in proposed project master plans and other documents. The cumulative costs of all privately developed transportation capital infrastructure are considered "private capital revenue." As noted, these revenues are cancelled out by the costs of the privately funded projects. Generally, privately funded projects have no direct impact on fiscal constraint.

Project Timeframes

Timeframes are used for project implementation and travel demand modeling analysis. A project falls into a timeframe based on when the project is expected to be substantially implemented. For example, a roadway project falls into the "near" timeframe if the project is expected to be substantially completed and open to traffic in the year 2030 or earlier. As a result, all projects fall into one of two time periods which is used for modeling congestion and other analyses.

The timeframes for project implementation are divided into two periods: "Near Term" = 2016-2030 and "Late Term" = 2031-2040. To be clear, all projects in Appendix A noted as "Funded" are in the "near-term." The *Long Range Transportation Systems (LRTS) Guide* in Appendix C includes, for future reference, some infrastructure projects that are anticipated for development past the 2040 horizon year of this MTP, which are not part of the fiscally constrained list of MTP projects. The "Illustrative List of Projects" in Appendix B is a listing of projects which are not included in the fiscally constrained MTP project list but which could be amended into this MTP if funding becomes available through grants, future state or local funds, bonds, etc. Below is a listing by travel mode of some of the major projects that are planned for within the lifetime of the *Connections 2040 MTP*:

Major Roadway Projects

- Unser Blvd Corridor Improvements: complete Unser Blvd as a four lane north-south arterial
- I-25 Northbound Widening between Rio Bravo Blvd and Sunport Blvd
- I-25 & Cesar Chavez Blvd Interchange Reconstruction: rebuild and possibly reconfigure the interchange
- I-25 and Gibson Blvd Interchange: reconstruct and reconfigure the interchange
- I-25 & Montgomery Blvd Interchange Reconstruction: reconstruct and reconfigure the interchange
- US 550 Reconstruction and Rio Grande Bridge Replacement: project is under construction
- Sunport Blvd Extension: project is currently under design and will extend Sunport Blvd to Broadway Blvd and has generated a companion project to improve Woodward St between 2nd St and Broadway Blvd

- Northern Blvd Expansion: design and right-of-way acquisition to widen the roadway
- Southern Blvd Reconstruction: design and construction are funded
- Westside Blvd Widening: complete the four lane expansion between Unser Blvd and NM 528
- Rio Bravo Boulevard: eastbound bridge replacement
- Los Lunas River Crossing: construct a new interchange at I-25 on the south side of Los Lunas along the "Morris B Alignment" and build a new road and bridge over the Rio Grande. Design and purchase of right-of-way is underway with construction to follow.
- NM 6 Bridge Replacement over the Rio Grande
- NM 337 Bridge Replacement in Chilili
- Bridge Blvd Reconstruction: address vehicular traffic, pedestrian, and transit conditions between Old Coors Blvd and the Rio Grande. This project is currently underway.
- Paseo del Volcan & I-40 Interchange Rights-of-Way Acquisition: secure the land needed for the future construction of the interchange

Major Transit Projects

Several projects focus on increasing transit mode share to 20 percent by 2040 on corridors included in the priority investment transit network (see Chapter4). Other transit projects will maintain and expand existing service levels.

- Albuquerque Rapid Transit (ART): implement bus rapid transit along Central Ave. The project began operations in 2019. Some features of this service are similar to features along light-rail lines: raised platforms for quick boarding, off-board fare collection, signal priority at traffic signals, doors on both sides of the buses, frequent service, and dedicated transit lanes in certain sections for fast and efficient operation.
- University Corridor Rapid Bus Service (UNM/CNM/Sunport High Capacity Transit): planning will begin for improved transit service in the University of New Mexico/Central New Mexico Community College/Sunport area. This service will complement the nearby ART service on Central Ave described above.
- Commuter Rail: Certain projects will provide improvements and refinements to NM Rail Runner Express service such as increased service and headways, along with infrastructure improvements such as new sidings, double-tracking sections as necessary and major rehabilitation of locomotives and railcars in the later years.
- Positive Train Control (PTC): this federally mandated safety system has been funded primarily by a grant from the Federal Railroad Administration (FRA) and will bring the NM Rail Runner Express into compliance before the installation deadline.
- Park and Ride Development: park and ride facilities will be developed as the metropolitan area expands in order to meet growing demand
- Valencia County Transit Facility: this will construct a new administration and bus maintenance facility in Valencia County for Rio Metro services

Major Bicycle/Pedestrian Projects

- Paseo del Norte Corridor Trail: provide a continuous bike/pedestrian trail along Paseo del Norte and will be constructed in phases
- North Diversion Channel Trail Rehabilitation
- Santo Domingo Multi-Use Trail Phase II: provide a safe connection from the softball fields to the Santo Domingo Trading Post.
- University Blvd Multi-Modal Improvements: construct missing bike lanes
- 2nd Street – Valle de Oro Trail: construct a multi-use trail in the South Valley with a connection to the new Valle de Oro National Wildlife Refuge and other existing trails
- Tijeras Area Projects: construct pedestrian, bicycle and drainage improvements in the village
- Trail Resurfacing and Reconstruction: resurface and/or reconstruct several existing trails in need of improvement
- Albuquerque Bike Share Program: Expand the current bike share program by providing short-term bike rentals in key areas for trip completion. This extends transit and pedestrian trips by providing convenient bicycles.
- Alameda Drain Trail: connect the North Valley to the existing bikeway network
- Central Ave Railroad Crossing Connectivity Improvements: improve pedestrian connectivity between Downtown and East Downtown as part of the "Innovation Corridor"

Major ITS Projects

- ITS Regional Transportation Management Center (RTMC): complete the most significant ITS project planned for the metro area. This project will establish a regional center to enable traffic engineers to maximize highway capacity, manage and divert traffic, change signal timing and signal coordination, and manage incidents as needed based on actual traffic conditions.
- Regional Incident Management Plan: a multi-agency incident management project managed by the MRMPO and involving key transportation infrastructure owners and operators is under development. The Plan will establish an event driven response protocol. It will also include the identification of critical gaps in both infrastructure and coordination, with different scenarios for recurring and non-recurring events having "significant impact."

Major Safety Projects

- NM 109 Jarales Road Overpass over the BNSF Rail Transcontinental Line in Belen
- I-25 and Martin Luther King Jr. Blvd Ramp Improvements
- NM 314, NM 45, and NM 317 Intersection Improvements and realignment in the Pueblo of Isleta
- Rail Corridor Pedestrian Safety Improvements in Town of Bernalillo
- Albuquerque Public Schools Vision Zero for Youth Initiative to create and implement a bicycle and pedestrian safety curriculum for grades K-8.

CHAPTER 9: PLAN IMPLEMENTATION AND EVALUATION

MRMPO is not an implementing agency. That is, MRMPO is not responsible for building infrastructure projects or overseeing the actual construction of transportation facilities. Rather, it is our federal mandate to coordinate regional planning efforts through the development of a long-range plan, to facilitate a process whereby member governments prioritize and allocate funds for transportation projects, and to provide technical assistance where staff may be of service. It is our primary mission to assist our member governments and agencies with the tools and information that may be of use as they implement their own projects and ideally, as they forward the goals laid out in *Connections 2040 MTP*.

With this in mind, this chapter provides a summary of tools available through MRMPO to improve our transportation systems and ensure a safe, equitable, and fiscally responsible future. It begins with a high-level summary of the key documents, plans, and policies that have been developed or established with the guidance of the Metropolitan Transportation Board. Next, there is an analysis and discussion about environmental justice concerns and how this plan affects traditionally underserved populations. Then there is a summary of gaps in transportation planning, both systemic and location-based, that MRMPO has collected through its extensive public outreach process as well as key examples of the many pathways that agencies can utilize to fill those gaps. The chapter ends with some potential next steps for elevating our efforts at MRMPO as we continue to devote our work toward navigating the complexities involved in transportation planning in the Albuquerque Metropolitan Planning Area.

Local Collaboration

MRMPO will continue to work towards the alignment and coordination of local planning efforts and plans, including financial plans, that help result in the orderly, sustainable, and cost-effective improvement of local and regional infrastructure.

Meeting the goals of the MTP and the principles of the Target Scenario requires collaboration among local governments and planning partners in the AMPA who participated in the development of this plan.

9.1 Implementation Tools

The MTP is implemented in various ways, including through existing MPO efforts that help administer the continuing, comprehensive, and collaborative long-range transportation planning process.

a. Transit Mode Share Goal and TIP Set Aside

Transit policy measures including mode share goals and a funding set-aside were adopted by the Metropolitan Transportation Board in previous MTP development efforts. MRMPO's policy body, the Metropolitan Transportation Board, adopted a resolution that calls for 20 percent of all trips along a priority network to be taken by transit by 2040. Along with these mode share goals, a TIP set-aside was adopted that requires a minimum of 25 percent of certain federal funds (currently STP-Large Urban) that are programmed through the TIP be directed toward transit projects that expand service along the Priority Transit Investment Network (see the Priority Investment Transit Network Map in Chapter 4).

While the mode share goals and TIP set-aside are important initiatives, they must be complemented by an integrated vision for land use and infrastructure investments in order to succeed. To help accomplish this, elements of the Priority Transit Network have been added to the Target Scenario as a part of this MTP.

b. Transportation Improvement Program (TIP)

The Transportation Improvement Program (TIP) is a federally-mandated short-term plan that programs funding for transportation projects in the metropolitan area. In order for a project in the AMPA to receive federal highway or transit funding, it must first be included in the TIP. It must also be included in or consistent with the MTP, making the TIP the near-term implementation program for the long-range plan. The TIP must also include non-federally funded projects that are considered "regionally significant." In short, the TIP document functions as the region's mechanism for allocating limited funding resources among various transportation needs and serves as a tool for transportation professionals and the general public to track the use of local, state, and federal transportation dollars.



The TIP covers a six-year period, with the first four years constituting the “Federal TIP” (or the federally-mandated portion) plus two informational years. A “new” TIP is developed every two years by adding the next two subsequent fiscal years. Each fiscal year must be fiscally constrained, meaning that the amount of funds programmed must not exceed the amount of funds estimated to be available in each year¹.

TIP Development

The TIP is developed by MRMPO staff in coordination with the Transportation Program Technical Group (TPTG) using the process established in the *TIP Policies and Procedures* manual. The TIP is then adopted by the Metropolitan Transportation Board of the MRMPO after considering any recommendations of the Transportation Coordinating Committee and after there has been opportunity provided for public comment on the draft document. Once approved by the MTB, the TIP is transmitted to the NMDOT for inclusion, without modification, into the Statewide Transportation Improvement Program (STIP) followed by final approval from the Federal Highway Administration and the Federal Transit Administration.

The Relationship Between the TIP and the MTP

The MTP is a minimum twenty-year multimodal long-range transportation plan that provides a framework for development of the associated TIP. The *2040 Connections MTP* will serve as the AMPA’s roadmap to guide transportation investments and decisions regarding transit enhancements and expansions, bicycle and pedestrian improvements, transportation demand management strategies, Intelligent Transportation System enhancements, and various roadway improvements. Those needs are translated into implementable projects and programmed for federal funds by means of the TIP. While the MTP establishes the goals and framework, the TIP serves as a tool for program and project implementation.

FAST Act TIP Requirements

The current federal transportation authorization bill, the FAST Act, along with the federal regulations, lists requirements for a TIP:

- A TIP shall contain projects consistent with the current metropolitan transportation plan
- A TIP, once implemented, is designed to make progress toward achieving the performance targets
- A TIP shall include, to the maximum extent practicable, a description of the anticipated effect of the transportation improvement program toward achieving the performance targets established in the metropolitan transportation plan, linking investment priorities to those performance targets

To ensure that the TIP implements the MTP, makes progress toward achieving performance targets, and achieves a performance-based approach, each of the MTP goals has been evaluated and linked to one or more of the national goals set forth by current transportation legislation. This helps ensure that MRMPO’s transportation planning and programming processes are inherently performance-based. It is important to note that each individual project will not always align with or satisfy every established performance measure perfectly to allow for, ultimately, achieving adopted targets.

¹ Read more about the TIP here: <https://www.mrcog-nm.gov/277/Short-Range-Plan-TIP>

Because of this reality, MRMPO's goal is to implement a program of projects that will collectively focus on improving surface transportation in the AMPA by focusing our efforts on:

- Improving pavement and bridge conditions
- Improving system performance and reducing traffic congestion AMPA-wide
- Decreasing serious injuries and fatalities
- Reducing on-road mobile source emissions
- Improving freight movement throughout the AMPA

It is through these efforts that the TIP can collectively make an impact in transforming the Federal Aid Highway Program towards a performance-based approach.

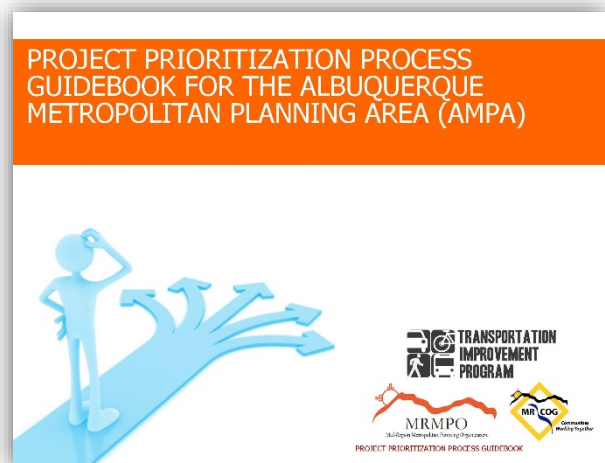
c. The Project Prioritization Process (PPP)

The Project Prioritization Process is used to prioritize and select projects from the MTP for funding through the TIP. Overall, the PPP helps establish a short-range TIP that implements the long-range transportation plan's goals and objectives while adhering to and linking investment priorities to national performance goals, measures, and adopted targets. In developing a new TIP, local agencies submit project proposals to MRMPO staff that are scored and ranked through the PPP. The PPP is structured to prioritize projects which best meet the four goals of the MTP.²

Multifaceted projects that address a number of MTP goals and target key geographic areas identified in the MTP generally receive higher scores. Additionally, each agency proposing projects may provide further qualitative information to aid in the assessment of the various project proposals (e.g., the value of the project to the region, the community, or potential impacts) to help determine which projects should ultimately be programmed in the TIP. In practice, the project scores and ranking tables utilized in the PPP have emerged as a valuable tool and have resulted in an increase in funding for regionally significant and beneficial projects.

The PPP is updated with each TIP cycle as new data becomes available and new policies are introduced. New crash rate, traffic volume, and travel time data are available each year and are utilized to ensure projects are evaluated on the most recently observed transportation conditions. Every four years new socioeconomic data is developed as part of the MTP update. This includes base year population and employment estimates as well as updated projections. Updated socioeconomic data is also used when available.

Figure 9-1: PPP Guidebook



² The 2018 PPP can be accessed here: <https://www.mrcog-nm.gov/DocumentCenter/View/3501/Project-Prioritization-Process-Guidebook-PDF?bidId=>.

d. Collaboration with School Districts

School districts are invited to participate in transportation planning activities at the MPO at the committee levels and at the policy board level. Each metro area school district is eligible for one vote on the Metropolitan Transportation Board or a seat as an associate member (at the district's discretion).

MRMPO and metro area school districts have begun sharing proposals and plans for capital projects in an effort to coordinate school projects affecting traffic on roadways and roadway projects affecting access to schools. In 2019 MRMPO approved a charter for the Transportation Program Technical Group (TPTG), a committee of staff members from various transportation agencies and school districts, to provide guidelines for their coordination efforts. The charter added the following:

Coordination of proposed construction projects of school facilities with public works agencies and nearby schools in order to provide advice and recommendations to the TCC, including the following:

- Impact Assessment - determination of possible traffic impacts of school facilities projects on transportation infrastructure in the vicinity of the project, as well as impacts of construction phase timing on daily school operations.
- Identification of Impacts Needing Further Study – based on the assessment of potential impacts, identify those requiring further analyses and discussion to mitigate the impacts.
- Identify opportunities to apply Federal, local, and school district funds in a coordinated manner to improve network connectivity and access to planned future school sites. Recommendations would be provided to the TCC for consideration during the TIP development process.
- Identify potential Safe Routes to Schools (SRTS) eligible projects, which would improve the safety of school children being transported to/from school.

In addition to the collaboration efforts, a set of guidelines is being prepared that will provide parameters for traffic impact studies by school districts for facility projects. The guidelines will also serve to summarize state laws regarding allowable expenditures and limitations on expenditures by school districts on traffic/access mitigation measures. This is under development and is expected to be completed by Fall 2020.

Figure 9-2: Public School in the AMPA



Source: freeABQimages.com

e. Long Range Transportation Systems (LRTS) Guide

The *LRTS Guide* provides design guidance for new and reconstructed roadways to work toward a more complete, connected, and safe transportation system that meets the needs for users of all transportation modes. MRMPO developed the *LRTS Guide* to respond to the growing need for transportation networks to become more efficient at addressing congestion, providing multimodal options for all users, supporting economic development, and improving public health.

The *LRTS Guide* incorporates multimodal accommodations guidance based on national best practices. The intent for future roadways is to find the minimum right-of-way needed for good multi-modal accommodation and to design transportation networks that support adjacent land uses. In this way, the *LRTS Guide* supports all the MTP goals: Optimized Mobility, Active Transportation, Economic Linkages, and Environmental Resiliency. In addition, the *LRTS Guide* supports the Target Scenario by linking more coordinated land use and transportation planning as well as appropriate design standards to enhance the propensity for bicycle and pedestrian trips.

Complete Streets

The *LRTS Guide* also serves to implement the Complete Streets Resolution (R-11-09) passed by the Metropolitan Transportation Board in 2011 which called for updating documents and policy to integrate Complete Streets. One of the key findings of the 2035 MTP was that the strategy of adding roadway capacity was not sufficient to address congestion across the AMPA. The good news is there are promising strategies that not only address congestion but that also have economic and health benefits. These strategies involve developing Complete Streets by integrating land use and transportation planning to improve conditions for all users.

Figure 9-3: LRTS Guide Document



Figure 9-4: Enhanced bicycle facility in the AMPA



Long Range Systems Maps

By showing where future roadways, bikeways, and transit lines are planned and desired, the region can better assess future connectivity needs and ensure complete and efficient networks are developed. To that end, foundational to the *LRTS Guide* are a series of system maps; the Long Range Roadway System, the Long Range Bikeway System, the Long Range Transit System, and the Pedestrian Priority Index.

Support of the Target Scenario

The *LRTS Guide* supports the *Connections 2040* MTP and the principles of the Target Scenario by providing a means to look at transportation and land use together while also integrating Complete Streets principles, particularly for activity centers where trips taken by transit, walking, and bicycling are encouraged. The Target Scenario is supported by a growing desire to foster public spaces where people like to congregate, and the *LRTS Guide* provides recommendations based on nationally recognized practices on how to make streets more inviting. Instead of creating a parallel effort, the *LRTS Guide* identifies a range of opportunities and provides recommendations for network connectivity, multi-modal accommodation, land use integration at a variety of development levels, and can inform master plans, corridor studies, and individual roadway projects. It is in this way that the *LRTS Guide* weaves the principles of the Target Scenario into current planning efforts.

Figure 9-5: Inadequate Sidewalk



Multimodal Needs

Nationally recognized guidance is included and referenced in the *LRTS Guide*. There is an evolving understanding of multimodal needs, and communities are creating new ways to improve walking, transit, and bicycling conditions. Often minimum design recommendations do not provide sufficient levels of comfort for people to consider changing modes. The *LRTS Guide* helps to prioritize locations where roadway design needs to go beyond minimum accommodations for different modes. For example, activity centers where pedestrian travel is prioritized involves slowing down motorized traffic, providing wider sidewalks, and including street trees to help people choose to walk over driving to destinations within the activity center. Minimum design recommendations would not necessarily have achieved such desired outcomes. The Guide is part of the *Connections 2040* MTP but is also a standalone document.

The *LRTS Guide* has been updated concurrently with the *Connections 2040* MTP and includes updated information and guidance on green infrastructure, intersection design, and road diet applications. The *LRTS Guide* is found in Appendix E of this document.

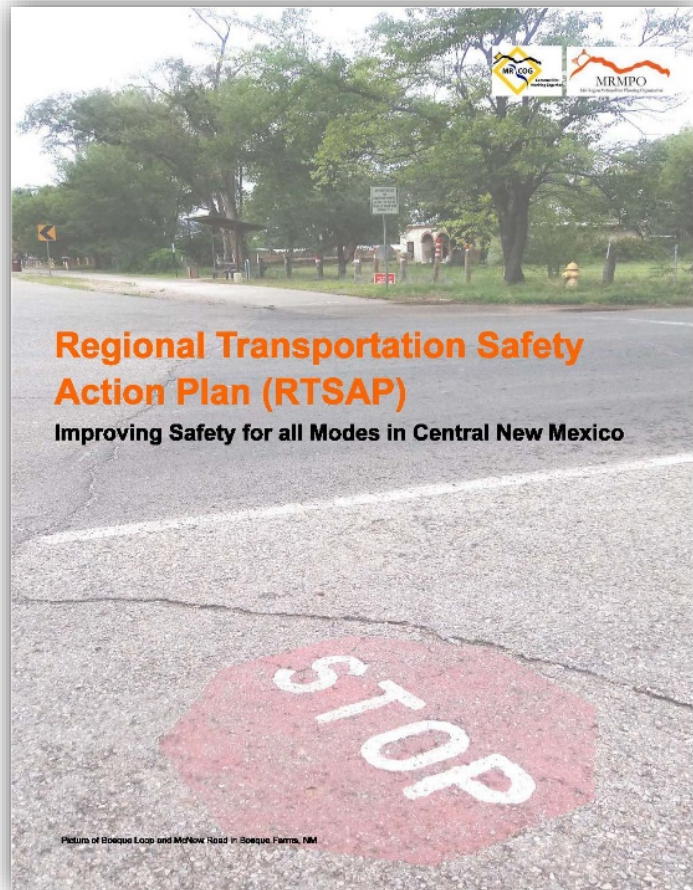
f. Regional Transportation Safety Action Plan (RTSAP)

The RTSAP is a regional comprehensive safety plan that serves as a mechanism for implementing safety policy and street improvements in the AMPA. The latest crash data that is available from the New Mexico Department of Transportation was used for analysis, and the focus of the plan was on determining where fatalities and injuries occurred for walking, biking, motor vehicle, and motorcycle travel.

A highlight of the plan is the High Fatal and Injury Network (HFIN), which ranks both intersection and street segments in the AMPA that are above average, and therefore guides the region on how to better prioritize projects where safety improvements should be made so that they have the greatest impact on preventing fatalities and serious injuries. The plan was adopted by the MTB in 2018 and is much more extensive than previous crash reports. The RTSAP includes a greater safety vision for the region emulated on the Vision Zero belief that traffic fatalities and injuries are not inevitable side effects of the transportation system. Vision Zero takes a proactive stance and recommends strategies to prevent crashes from happening in the first place by prioritizing traffic safety.

The RTSAP is a more elaborative planning effort than previously taken on by MRMPO that expands data analysis, identifies safety emphasis areas, and provides improved action items to prevent future crashes. Top contributing factors to crashes, alcohol involvement, and types of pedestrian crashes were also evaluated. In addition to data analysis, MRMPO also expanded agency and public input, conducted field visits in both urban and rural areas, and incorporated national best practice research as part of the plan development. The RTSAP emphasizes the need to prioritize safety over speed and recommends the adoption of Vision Zero policy.³

Figure 9-6: RTSAP Cover



³ The RTSAP can be found on the MRCOG website here: <https://www.mrcog-nm.gov/255/Safety-Analysis>

g. Congestion Management Process (CMP) Corridor Rankings

The CMP is an ongoing mechanism for discussing regional transportation challenges and identifying strategies for managing congestion by location. A primary function of the CMP is to evaluate the effectiveness of transportation strategies and coordinate regional transportation decision making. Corridors are ranked about every two years. Rankings are based on peak hour traffic volume, average peak hour travel speed, and crash rates. The rankings provide an in-depth analysis of the source and extent of congestion along corridors. They assist local agencies in identifying transportation needs and are used by MRMPO to help determine which projects should receive federal funding. The rankings are used to highlight which corridors could use the most attention for addressing congestion and for ranking projects in the Project Prioritization Process (projects along more congested corridors receive more prioritization points)⁴.

Table 9-1: Top 10 Congested Corridors in the AMPA, 2016

RANK	RTE	V/C Points	Speed Points	Crash Points	Total
1	ALAMEDA BLVD.	67.84	21.33	1.76	90.93
2	ISLETA BLVD.	58.37	22.07	9.40	89.83
3	BRIDGE/CESAR CHAVEZ	57.46	20.26	11.75	89.47
4	U.S. 550	53.21	20.23	6.71	80.16
5	MONTANO	40.22	23.48	11.57	75.28
6	PASEO DEL NORTE	39.02	14.07	12.86	65.95
7	JEFFERSON	24.23	29.71	10.25	64.19
8	RIO BRAVO/DENNIS CHAVEZ	21.21	22.77	14.10	58.08
9	PARADISE BLVD.	31.57	10.88	14.77	57.22
10	SAN MATEO	7.50	32.30	14.30	54.10

h. Incident Management Plan (IMP)

Incident Management Plans help implement congestion management (narrowly) and the Optimized Mobility goal of the MTP (broadly) in the AMPA. IMPs help reduce travel delay due to incidents and improve safety before and after an incident. The ITS Subcommittee will soon be facilitating the development of an AMPA-specific IMP which will foster inter-agency coordination on recurring and non-recurring congestion and incidents, which is key in our region's "congestion toolbox." More information about the regional IMP is found in Chapter 4.

⁴ More information on the CMP and corridor rankings can be found here: <https://www.mrcog-nm.gov/244/Congestion-Management-Process>

i. Intelligent Transportation Systems Architecture (ITS)

The Albuquerque Metropolitan Planning Area Regional ITS Architecture Addendum document establishes a regional framework for coordinated ITS deployment for projects within the AMPA. The document serves as a "consensus blueprint" for all ITS deployment to help meet the identified transportation needs of the region. A subsequent addendum integrates the planned ITS architecture into MRCOG's transportation planning and project programming process by making the ITS consideration part of MTP and TIP project review. In other words, projects approved to receive federal funding through the TIP are reviewed by the ITS Subcommittee for consistency with the AMPA Regional ITS Architecture. In addition, the ITS Subcommittee monitors and evaluates ITS implementation across all jurisdictions to help ensure ITS infrastructure is deployed in a systematic way throughout the region. See Chapter 4 for more information on ITS efforts in the AMPA.

Figure 9-7: Dynamic Message Sign in the AMPA



j. Development Review

MRMPO has a development review process for proposed land use development projects in the City of Albuquerque, Bernalillo County, Rio Rancho, and Los Lunas. MRMPO staff review proposed projects to provide consistency between land use practices and the transportation goals set forth in the MTP, particularly the goals identified in the Target Scenario. MRMPO provides comments to these member agencies regarding specific cases, while also inviting all member agencies to utilize the data and resources we have available to facilitate the integration of land use and transportation planning.

k. Fiscal Indicator Tool

In 2019 MRMPO worked with a consultant team to build a Fiscal Indicator Tool (FIT), which is a model that calculates the major capital and ongoing operation and maintenance costs of public infrastructure under different future growth scenarios. The FIT is a complement to MRMPO's existing analytical toolbox which includes a travel demand model (CUBE), a land use model (UrbanSim), an accessibility model (TRAM), and an economic model (REMI). These models help to implement the MTP by simulating 'what if' scenarios regarding infrastructure or policy alternatives and generating performance measures that allow us to anticipate the future transportation, land use, and economic impacts. The FIT estimates select public costs associated with different growth patterns and land use policies which supports policymakers in their efforts to make the most efficient use of limited municipal resources (see Chapter 6 for more information about the FIT).

I. Target Scenario

The Target Scenario is a guiding vision for growth in the region and plays an important role in the implementation of the MTP. The Target Scenario was developed during the previous MTP and is updated in Connections 2040 with land use and transportation partners in the region thereby renewing the critical link between transportation and land use planning and policy. Through scenario planning we have the opportunity as a region to discuss how we would like to grow in the future and make concrete steps towards smarter development, which in turn enables us to plan more efficient transportation systems and reduce trips and travel delays.

The Target Scenario is integrated into the long-range transportation planning process in various ways. Summary statistics of the scenario's performance is evaluated in Chapter 3 and demonstrates how a shift in development patterns would compare against growth conditions under the Trend Scenario. Coordinated transportation and land use planning results in a stronger economy, better public health and safety, broader environmental resilience, and improved mobility throughout the region. The Target Scenario provides both a toolkit of Guiding Principles and Key Locations that represent best practices for future planning in the region, and a yardstick with which member governments can measure their progress. MRMPO datasets and modeling tools have the capability to assist local efforts to measure our success in moving the needle toward the Target Scenario and project the impact of changes in policy and planning practice. MRMPO staff are available to serve their regional planning partners through technical analysis and facilitating regional efforts to ensure that key aspects of the Target Scenario are integrated into planning policies and products.

Figure 9-8: Activity Center, AMPA



Source: FreeABQimages.com

Local Efforts that Support the Target Scenario

Local jurisdictions were asked what plans have been adopted since the last MTP, whether there were new developments that embody the concepts behind the Target Scenario, and if they felt the guiding principles had been integrated in some of their work. A partial list of some the new plans, updated documents, and projects that are supportive of the Target Scenario are found below. These include new mixed-use designations, preservation of commercial land west of Rio Grande, and expanded locations for multi-family housing. Not all projects and plans are listed.

- Albuquerque/Bernalillo County Comprehensive Plan (ABC to Z) ⁵
- ABQ Ride's Albuquerque Rapid Transit Project
- City of Albuquerque's first HAWK signal
- City of Albuquerque Bus Rapid Transit service
- Completion of 94 percent of the 50-Mile Activity Loop
- City of Albuquerque Bikeways & Trails Facilities Plan
- City of Albuquerque Development Process Manual Amendments
- Mixed-use developments such as Downtown Imperial Building, The Rainforest, One Central, and The Highlands
- Bernalillo County East Route 66 Sector Development Plan
- Bernalillo County West Central Sector Development Plan
- Bernalillo County Sunport Commerce Center Design Overlay Zone
- Bernalillo County Upper Petroglyphs Sector Development Plan
- Bernalillo County Valle del Sol Sector Development Plan
- Bernalillo County Atrisco Vista Blvd extension study from Paseo del Norte to Southern Blvd
- Bernalillo County Bridge Boulevard Phase 2 Reconstruction
- Los Lunas Facebook Center and surrounding development
- Central New Mexico expansions in Valencia County
- Los Lunas Rail Runner Station Community Center
- Belen Aviation related industry development
- Belen Railroad related Industry development
- Santo Domingo Multi-Use Trail
- City of Rio Rancho Unit 10 Specific Area Plan
- City of Rio Rancho residential development along Broadmoor between Northern Boulevard and Paseo del Volcan

Albuquerque Bernalillo County Comprehensive Plan Update (ABC to Z): A Regional Success Story

The City of Albuquerque overhauled its land use and development guiding plans, regulations, and development technical standards in a way that is consistent with the *Futures 2040 MTP*. In fact, the City of Albuquerque and Bernalillo County in their ABC to Z effort rewrote the Comprehensive Plan to emphasize the land use and transportation connection, including enhanced chapters on transportation and land use and a new chapter on urban design. The Comprehensive Plan also adopted new center types that are more reflective of the direction these areas are envisioned to take over time, and identifies and protects areas of consistency for neighborhoods that do not desire change. Downtown and Urban Centers were established to recognize the areas in the City where the most urban growth is desired and anticipated. Employment Centers were established to identify locations to preserve and enhance job growth, industrial, office, and retail development. Finally, the transportation chapter was developed in close consultation with MRCOG staff to establish a policy framework for different road speeds, level of service goals, design features, and access control that is consistent with the Long Range Transportation Systems (LRTS) Guide.



⁵ Bernalillo County has not approved the City adopted 2017 City of Albuquerque and Bernalillo County Comprehensive Plan (ABC-Z).

9.2 Environmental Justice

Environmental Justice (EJ) refers to the “fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”⁶ In particular, environmental justice addresses how communities of color and low-income populations are affected by government actions, including transportation decisions made as part of the metropolitan transportation planning process. The *Connections 2040 MTP* plays an important role in environmental justice by analyzing existing conditions and considering how transportation investments can improve access for low-income and historically marginalized communities.

The three fundamental principles of environmental justice are:

1. Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on communities of color and low-income populations
2. Ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
3. Prevent the denial of, reduction in, or significant delay in the receipt of benefits by persons of color and low-income populations

a. Title VI of the Civil Rights Act

Environmental justice programs stem from Title VI of the Civil Rights Act of 1964, which prohibits discrimination on the basis of race, color or national origin and specifies that recipients of federal funds must certify nondiscrimination. Environmental justice requirements were first issued in 1994 Presidential Executive Order 12898, which directed every federal agency to make environmental justice part of its mission by identifying and addressing all effects of programs, policies, and activities on “minority” and low-income populations.⁷

In 1997, the U.S. Department of Transportation expanded upon the requirements of the 1994 environmental justice Executive Order and clarified the role and responsibilities for transportation decision-makers relating to environmental justice. **In 1999, the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) issued a memorandum providing guidance for implementing Title VI requirements in metropolitan and statewide transportation planning.**

Therefore, the metropolitan transportation planning process must comply with both environmental justice and Title VI requirements. The federal requirements which MRMPO must follow include:

- Ensuring that the MTP and the TIP comply with Title VI of the Civil Rights Act.
- Identifying residential, employment, and transportation patterns of low-income and persons of color so that those populations’ needs can be identified and addressed, and the benefits and burdens of transportation investments can be distributed fairly.

⁶ Environmental Protection Agency, <http://www.epa.gov/environmentaljustice/>

⁷ “Communities of color” and “persons of color” is used for comparison in the environmental justice analyses in this chapter to refer to the Census-identified populations of all ethnic categories other than ‘White, non-Hispanic’.

- Evaluating and improving MRMPO's public involvement processes where necessary to eliminate participation barriers and to engage communities of color and low-income populations in transportation decision-making.

Limited English Proficiency (LEP)

In addition to environmental justice and Title VI requirements, MRMPO must also comply with Executive Order 13166, which requires the organization to take reasonable steps to ensure that Limited English Proficient (LEP) persons have access to programs, services, and information provided by MRMPO. Limited English Proficient persons are persons who do not speak English as their primary language, and have a limited ability to read, speak, write, or understand English.

b. Environmental Justice Assessments

This MTP primarily addresses environmental justice by assessing where low-income and persons of color reside, and how those populations are served by the transportation network, particularly the transit network. The following map highlights census tracts that scored high on the EJ Index⁸, defined as an EJ score of 9 or above, indicating where there is a high concentration of poverty and persons of color based on 2014-2018 American Community Survey. The index gives an idea of where to focus attention when evaluating environmental justice issues. The highest concentrations of these communities are primarily within the City of Albuquerque, including the Southeast Heights, the South Valley, and the Southwest Mesa, as well as among Pueblos.

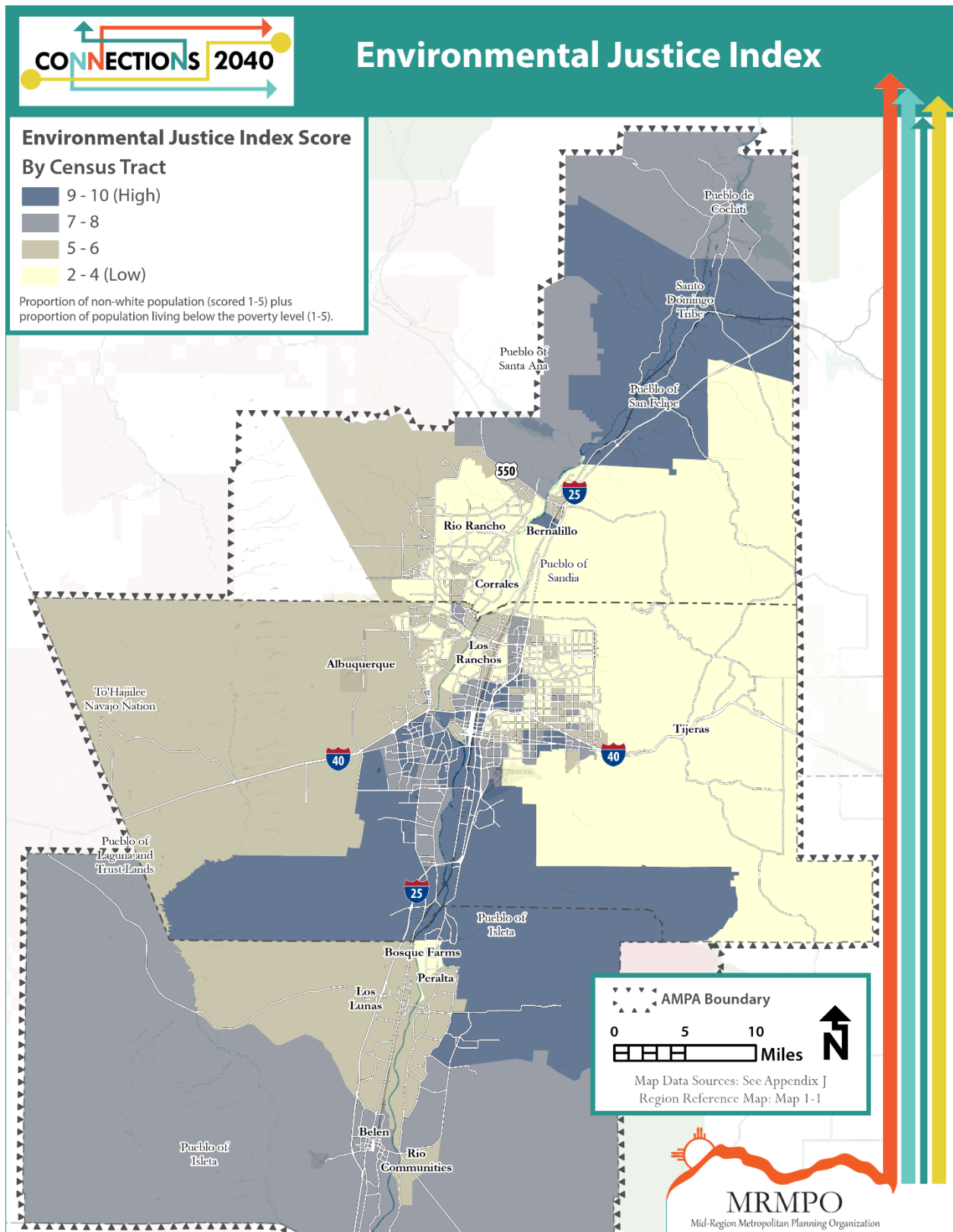
Environmental justice considerations have been incorporated into many important products used in regional transportation decision-making, including the Project Prioritization Process, which helps prioritize which projects will be selected to receive federal funding.

Environmental Justice and Transportation Project Selection

The Project Prioritization Process, which informs how projects are selected for inclusion in the TIP, uses environmental justice criteria as a scoring factor; awarding points to projects if they are located within or adjacent to identified environmental justice communities. Because such an analysis cannot be performed during the Project Prioritization Process, the assumption is made that a project will benefit rather than burden the adjacent community. However, explanation of the project's impacts to adjacent communities is also required since the benefits may not be clear.

⁸ Using "natural breaks" in five classes, percentage of census tract represented by persons of color and individuals with 12 months of income below the poverty level were used to assign a corresponding score between 1 and 5, with the resulting scores combined to produce an overall "environmental justice score" for each tract.

Map 9-1: Environmental Justice Index



Equitable Access and Environmental Impacts

MRMPO's Transportation Accessibility Model (TRAM) was used to assess whether populations living in environmental justice tracts have greater or lesser access to various destinations than the AMPA as a whole. This model provides walking, biking, and automobile time travelled, or distance, along the actual configuration of the roadway network.

TRAM assumes that the sidewalks are present and in good condition and that pedestrians and bikes are not allowed along the Interstate system. The assessment used demographic data from the 2014-2018 American Community Survey in order to compare access to transit, tree canopy, parks and open space, grocery stores and healthcare facilities across the region.

Transit accessibility is particularly important for low-income populations as it is a more economical form of travel that provides access to jobs without having to rely on an automobile.

Approximately 305,000 people, or 34 percent of the AMPA population live within a five-minute walk (1/4 mile) of a bus stop. Within a ten-minute walk (or 1/2 mile), this number expands to around 517,792 people, or about 58.5 percent of the total Albuquerque Metro Planning Area.

Figure 9-9: ABQ RIDE Bus Stop, AMPA



Access to Transit

Access to transit for EJ populations is slightly greater than for the rest of the AMPA. The numbers are close, suggesting equal access, but it is important to consider the difference between equal and equitable. Low-income populations are, in general, more dependent on transit service for their transportation needs, so it makes sense from an equity standpoint that they should be better served by transit than those with less need for it. Analyses such as these can help inform transit planning to bridge the gap between need and equitable access.

Figure 9-10: ABQ RIDE Bus in Downtown



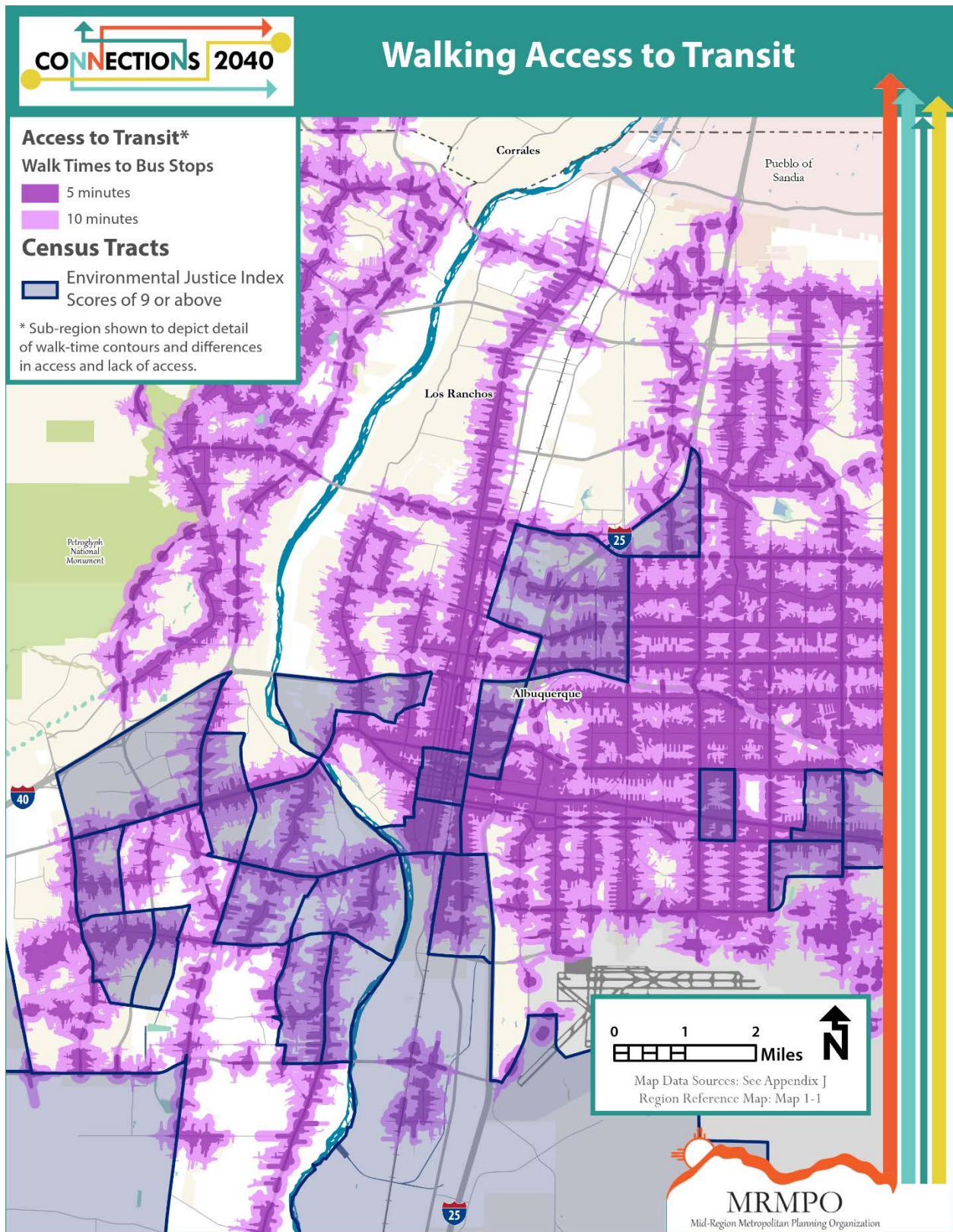
Table 9-2: Accessibility of EJ and Non-EJ Population to Transit in the AMPA, 2018

Average walk time to nearest Bus stop	Population in High EJ Scoring Tracts	% Population in High EJ Scoring Tracts	Population in non-EJ Tracts	% Population in non-EJ Tracts
5 minutes (1/4 mile)	51,505	36%	252,994	34%
10 minutes (1/2 mile)	90,379	63%	427,413	58%

Table 9-3: Accessibility of Transit for Low-Income and Persons of Color in the AMPA, 2018

Persons of Color: 534,478		White, Non-Hispanic Population: 350,000	
Within ¼ Mile of Transit Service	34%	Within ¼ Mile of Transit Service	35%
Within ½ Mile of Transit Service	59%	Within ½ Mile of Transit Service	57%
Population Below the Poverty Level: 147,357		Population Above the Poverty Level: 737,121	
Within ¼ Mile of Transit Service	40%	Within ¼ Mile of Transit Service	33%
Within ½ Mile of Transit Service	65%	Within ½ Mile of Transit Service	57%

Map 9-2: Walking Access to Transit and Environmental Justice Populations



Tree Canopy Coverage

Access to the shade of trees and proximity to cooling vegetation helps to relieve the impacts of exposure to urban heat extremes (see Chapter 7). Studies show that populations in poverty are most vulnerable to extreme heat, partially because they are more likely to depend on transit and non-motorized transportation, and in doing so endure more exposure to harsh outdoor urban environments. Trees, parks, and natural open spaces are an important element of the urban environment for both physical and mental health. Comparison of tree canopy coverage by census tract was performed using a digital inventory of the Albuquerque urban area provided by the Nature Conservancy. This was generated from computerized imagery analysis of 4-band 1-meter resolution aerial photographs captured in the summer of 2016 by the National Agriculture Imagery Program (NAIP). The imagery was further evaluated using a Classification and Regression Trees (CART) classifier and hand-digitized training data in Google Earth Engine (GEE). This data provides a fair estimate of overall area tree coverage.

Figure 9-11: Bosque Trees in the AMPA



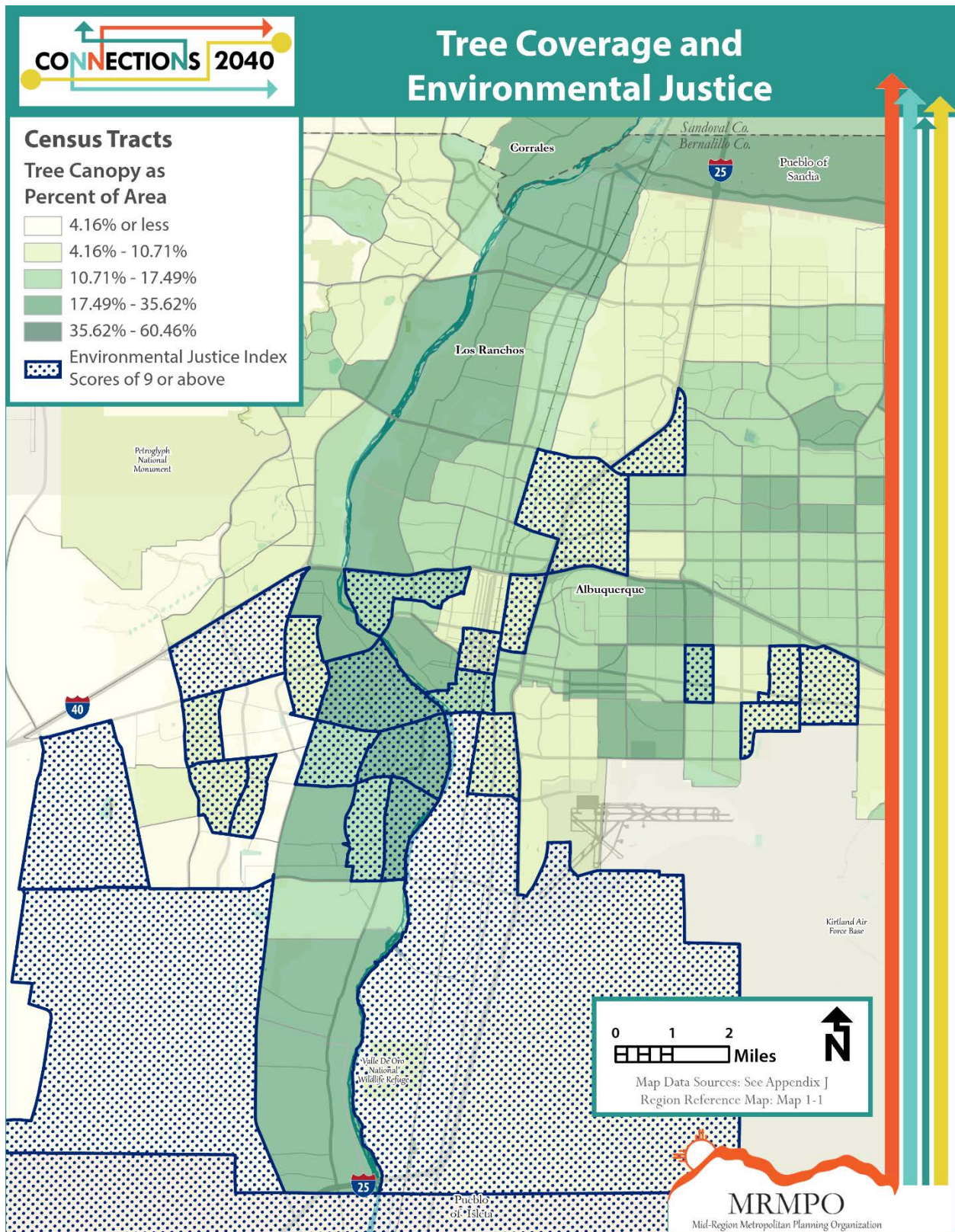
Analysis of the data shows that the majority of high EJ-scoring tracts have less than 10 percent tree canopy, whereas the majority of the remaining AMPA tracts have between 10 and 20 percent. Relatively few tracts have greater than 20 percent canopy, and only two of those has greater than 30 percent coverage (large tracts in the Cibola National Forest).

Table 9-4: Tree Canopy Coverage in the AMPA

Tree Canopy Coverage	10% or less	10-20%	Greater than 20%
EJ Scoring Tracts	63%	30%	7%
Non-EJ Scoring Tracts	29%	60%	11%

These figures reveal a clear disparity between EJ and non-EJ communities related to tree canopy and access to shade. This could be addressed with local policies that require climate appropriate tree planting and other beneficial landscaping when developing residential lots particularly in EJ communities and when constructing affordable housing. In addition, traditional lawns are highly-consumptive water uses, and costs associated with their upkeep contribute to the disparity seen between area incomes and tree cover. Xeriscaping with a selection of drought-tolerant tree species and increased use of water catchment landscape designs are ways to affordably and efficiently support more abundant vegetation in our arid environment. Xeriscaping incentives and rebate programs that are offered by some municipalities are a step in the right direction.

Map 9-3: Tree Canopy Coverage and Environmental Justice in the Albuquerque Metro Area



Urban Heat Islands

Access to tree cover and green open spaces is particularly important in light of climate change projections that indicate an increase in temperature in our region, and the health and mortality impacts associated with exposure to the extreme heat. Heat islands occur in areas within a city that become hotter than others due to disparities in the way communities are planned, developed, and maintained, leading to a concentration of heat-absorbing buildings and pavements and a lack of cooling vegetation. This is a serious environmental justice and public safety issue as populations in poverty, children, the elderly, and those with existing health issues or disabilities are especially vulnerable to heat-related illness and death.

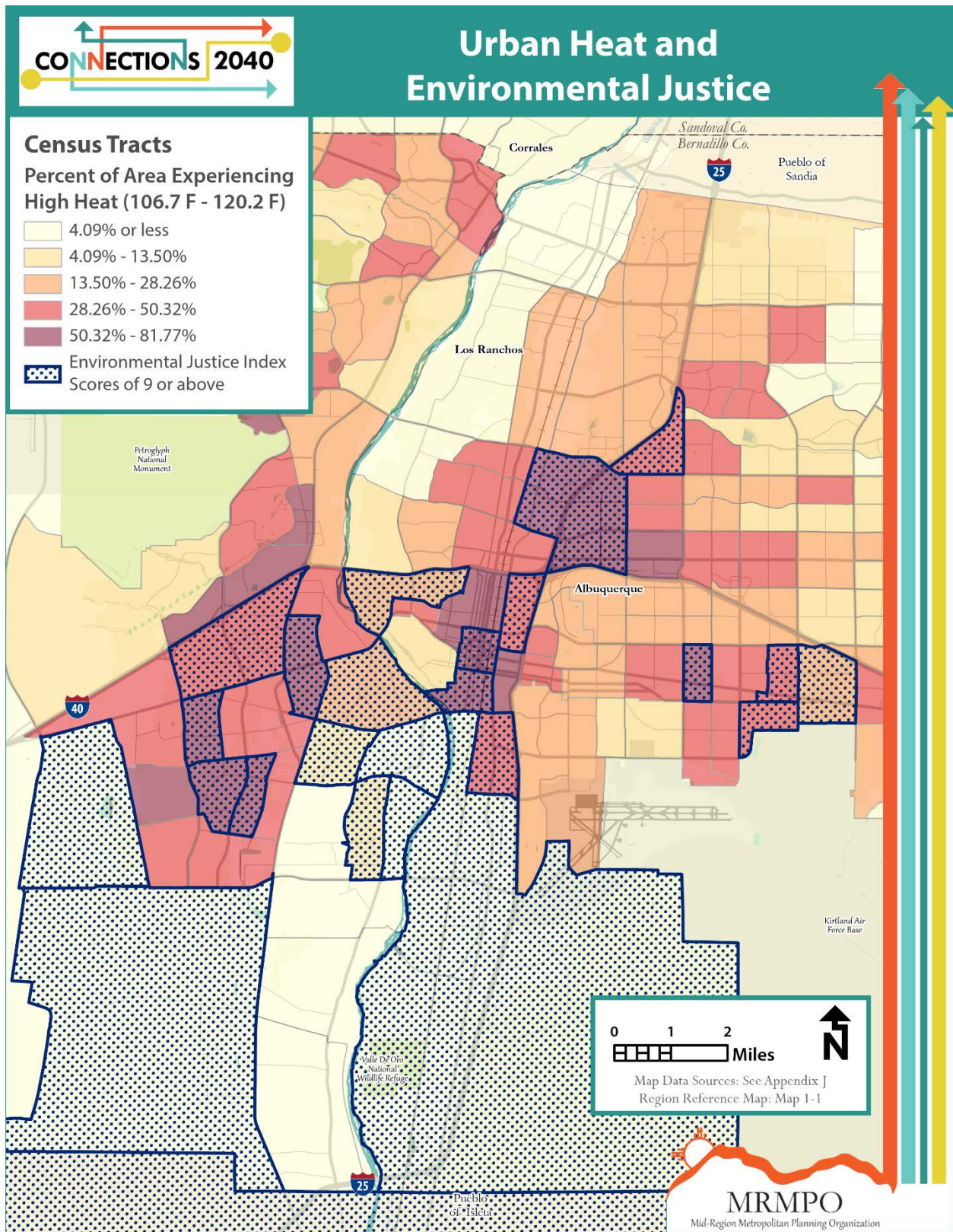
There is a correlation between areas that demonstrate the hottest temperatures and environmental justice communities in the AMPA. Using data provided by the Trust for Public Land's Urban Heat Island study⁹ performed as part of the Greenprint initiative with Bernalillo County, the following map shows census tracts ranked by percentage area covered by islands of extreme heat in the hottest months of the year. Highlighted tracts indicate where the highest concentrations of people of color and those with incomes below poverty combine to score high on the environmental justice index. Areas of highest concentrated heat include approximately 34% of the populations scoring highest on the EJ Index, and only 9% of others. This analysis also indicates that the hottest areas of the city are also home to concentrations of other vulnerable populations such as youth and seniors. The map can help determine priority locations that will more equitably distribute potentially life-saving investments such as additional tree plantings and parks.

Table 9-5: Urban Heat Islands in the AMPA

% of Tract Area w/ Urban Heat Islands of 106.7 - 120.2 F	Household Units with No Car	Under 18 Population	Population 65 and Older	Population with 1 or more Disabilities	Population in High EJ Scoring Tracts (9 or Above)	Population of Low EJ-Scoring Tracts (8 or Below)
0-4%	10.7%	22.7%	31.2%	23.7%	19.5%	24.9%
4-13.5%	15.7%	15.4%	18.4%	16.6%	6.3%	18.5%
13.5-28.3%	22.0%	18.6%	20.9%	19.9%	15.3%	22.0%
28.3-50%	37.6%	27.0%	21.7%	27.9%	24.5%	26.0%
50-81.2%	13.9%	16.4%	7.7%	11.9%	34.4%	8.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

⁹ Generated from LANDSAT Satellite Sensory Data of land surface temperatures in June and August of 2014 and 2015 plus National Land Cover Dataset impervious surface estimates, to create a scaled overlay representing extreme heat areas.

Map 9-4: Urban Heat and Environmental Justice in the Albuquerque Metro Area



Access to Open Space

While the AMPA is rich in outdoor recreation opportunities, environmental justice tracts are comparatively lacking in easy access to public outdoor recreation sites. Lack of convenient access to trees and natural environments is a public health issue, since communities without access face disproportionately high levels of chronic disease and poor health outcomes due to decreased air quality, increasing exposure to extreme heat, and lack of outdoor recreation opportunities. Approximately 55 percent of the population from high scoring EJ Index communities live within a 10-minute walk of a park or open space, while 62 percent for the rest of the AMPA population has comparable access. This analysis included publicly accessible parks and open spaces of the cities, counties, state, and federal agencies for which GIS data was available, and excluded private recreation sites like golf courses and highly “green” agricultural properties in the valley.

Figure 9-12: People Enjoying Open Space Along the Bosque



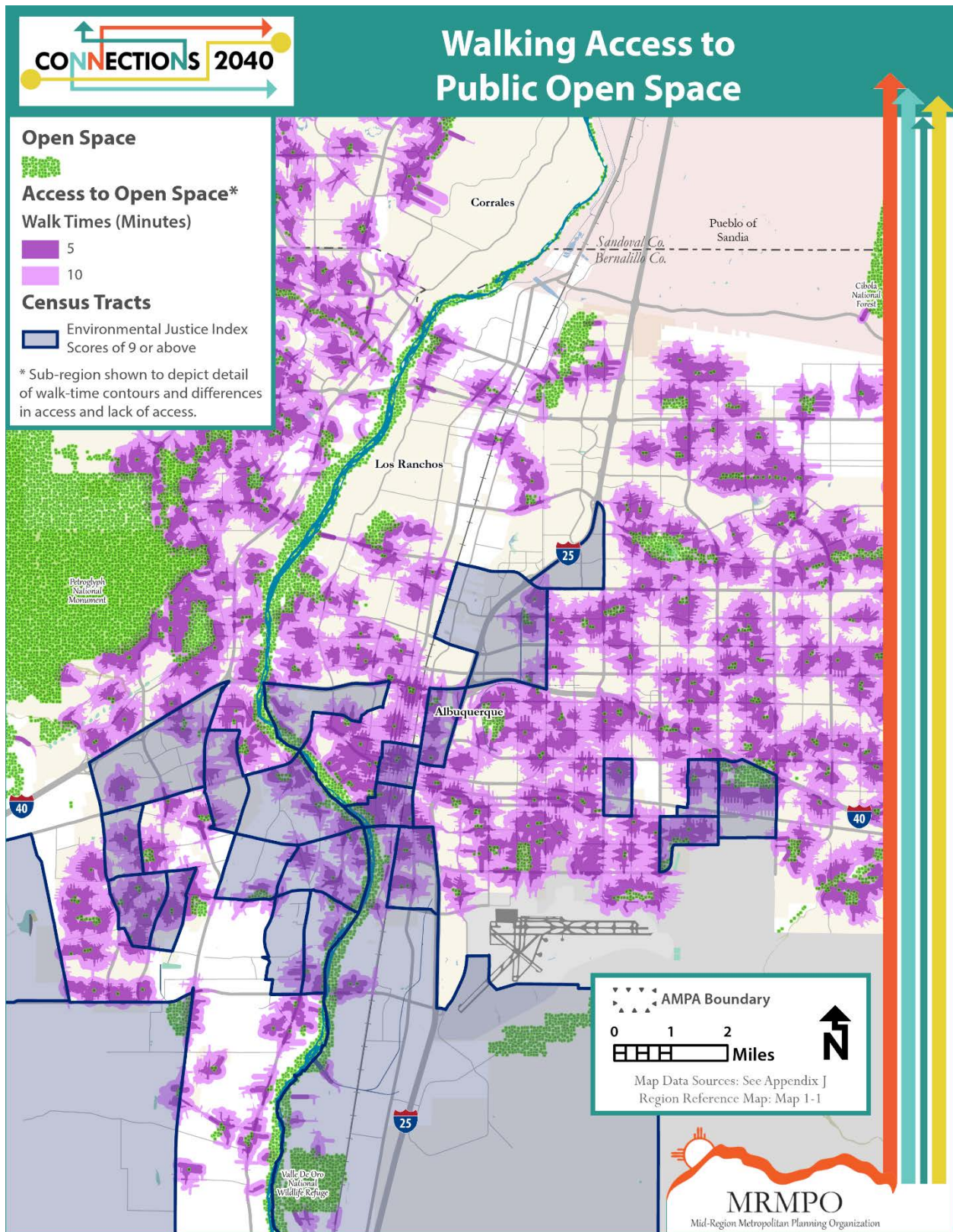
Table 9-6: Accessibility of Outdoor Recreation for Populations in the AMPA, 2017

Average walk time to nearest Park or Open Space	Population in High EJ Scoring Tracts	% Population in High EJ Scoring Tracts	Population in non-EJ Tracts	% Population in non-EJ Tracts
5 minutes (1/4 mile)	40,266	28%	231,364	31%
10 minutes (1/2 mile)	78,782	55%	457,453	62%

The largest gaps in access to open space for high-EJ scoring tracts are the southwest Albuquerque area; the predominantly commercial and industrial areas near Interstate-25 North; and along Central Avenue southeast, and there are several other smaller gaps where new parks could increase access for all. This information is useful to prioritize investments of public funds and to address fair distribution of these essential urban elements. Efforts to increase tree canopies and access to outdoor recreation should not increase housing costs or displace low income communities. According to the Trust for Public Land ParkScore® analysis for the City of Albuquerque, 87 percent of all residents live within a 10-minute walk of a park, far outperforming the nation which stands at 54 percent.¹⁰

¹⁰ See www.tpl.org/city/albuquerque-new-mexico for more details on the ParkScore®.

Map 9-5: Walking Access to Open Space and Environmental Justice Populations



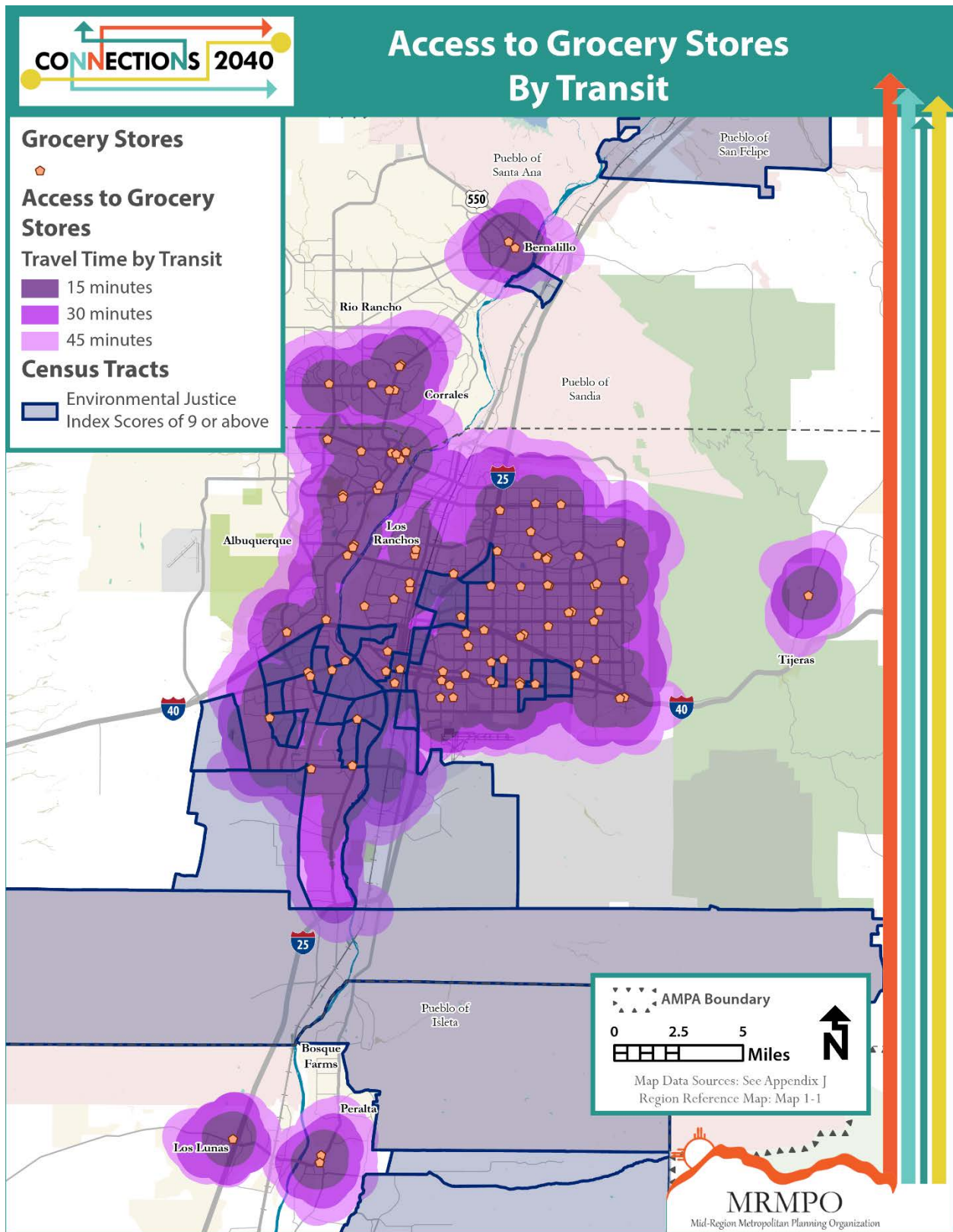
Transit Access to Grocery Stores

An important consideration for transit planning and public health is the relative availability of access to daily services, such as grocery stores. Grocery stores are of great importance because they supply wholesome foods for home-cooked meals, and other items necessary for health maintenance. The ability to reach grocery stores in a reasonable amount of time is especially important for transit-dependent populations who may not have access to a vehicle, but is also a determining factor for others who might choose transit to reduce environmental impacts or simply to save money on the cost of fuel. The results of this analysis show that demographic groups that are more likely to be transit dependent have slightly better access to grocery stores than the general population. Additionally, much of the region's urban area populations can reach a grocery store within 45 minutes or less. The map shows that residents of rural areas, such as in the Village of Corrales or Valencia County, are more dependent on personally owned vehicles for grocery trips.

Table 9-7: Transit Access to Grocery Stores for Various Demographic Groups

	% of Total Pop	% of Households with 65 and Older	% of Occupied Housing Units with No Vehicle	% of Households in Poverty	% of EJ Population
Transit Access within 30 Minutes	57.9%	60.3%	81.3%	69.1%	64.4%

Map 9-6: Access to Grocery Stores by Transit



Accessibility of Healthcare Sites and Facilities

Another important intersection between public health and transportation planning is the ability to access healthcare by transit. The challenge of reaching medical appointments and clinics was raised by the public, especially for those living in rural areas and for those who are transit-dependent. In order to investigate this further MRMPO analyzed accessibility to health services by mapping transit travel time contours from major healthcare facilities that serve the public and provide healthcare on a regular or short-term basis.¹¹ All of these facilities provide Medicare services. The facilities include hospitals, medical centers, and federally qualified health centers. These do not include home health services and nursing homes. Data was collected from the Department of Health & Human Services (HHS), New Mexico Data Collaborative, and Bernalillo County Assessor's Office. Socio-demographic information was incorporated to analyze access for those more likely to need transit service: seniors (over age 65), family households in poverty, and occupied housing units without a car.

This analysis assumes all the healthcare facilities are available to the transit user. However, in reality many people in the region have limited hospital choices depending on their health care provider, and the facilities have varying capacities and abilities to serve potential clients. Despite this limitation, the analysis provides a reasonable view of general accessibility patterns in the region.

The analysis shows that access to major healthcare facilities via transit takes less time for people living in Albuquerque's central and southeast areas, particularly in areas along Lomas Boulevard and in the Northeast along Montgomery Boulevard to Wyoming Boulevard, as well as areas congruent to North I-25. On the Westside, people living in areas near the Bernalillo/Sandoval County line and to a somewhat lesser degree, areas along Coors Boulevard near I-40 have shortest travel times to major healthcare facilities. Compared to the same analysis completed for the last MTP, the people living in the South Valley have much shorter travel times to major healthcare facilities via transit due to new facilities being located on the Westside and an increase in transit routes and stops.

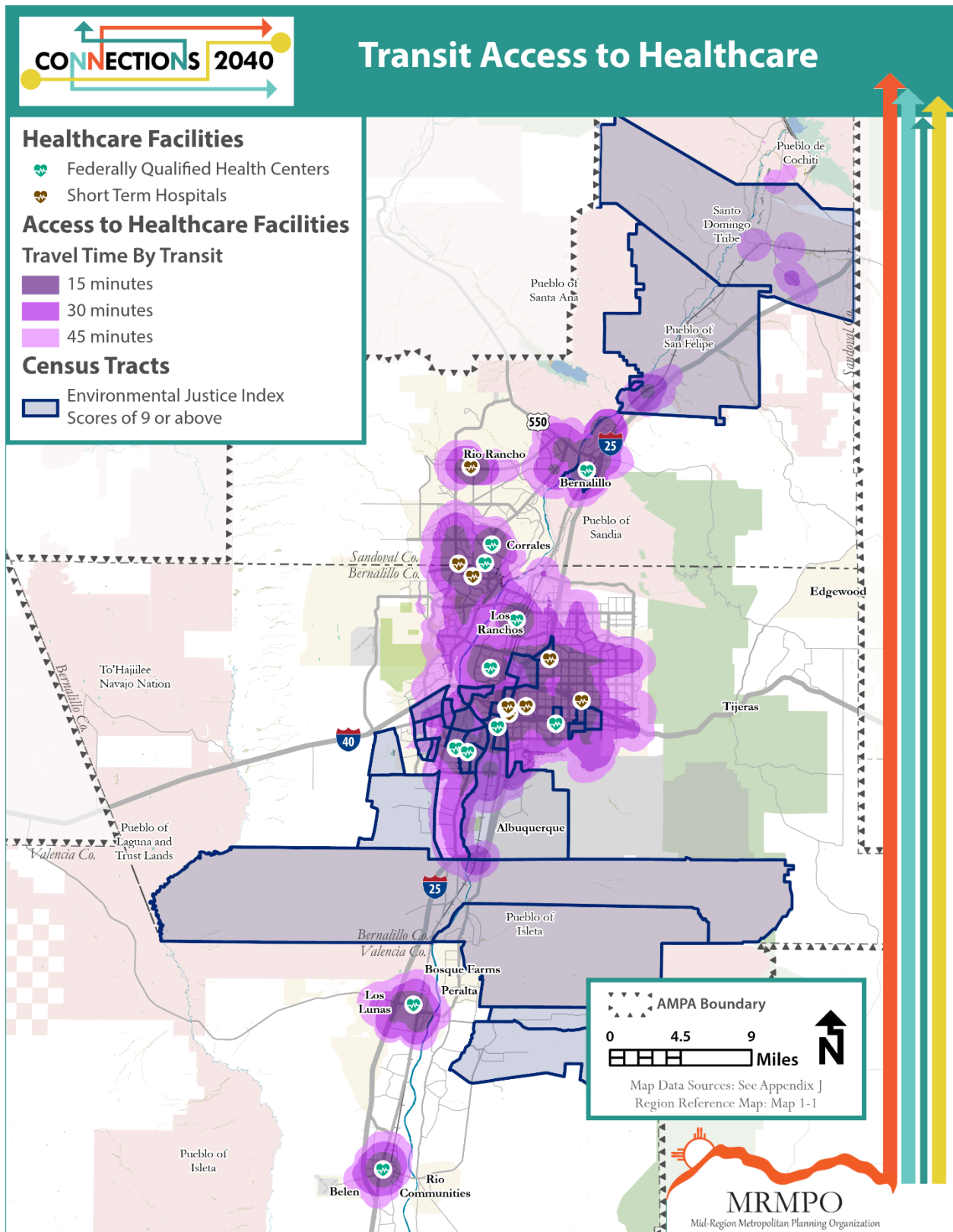
The following table shows that seniors have slightly better transit access to hospitals than the total population, while households without access to a vehicle have much better access to healthcare by transit. EJ populations and households living below the poverty level have moderately better access to healthcare via transit than the total population. In general, populations most likely to depend on public transit are better served in terms of transit access to medical facilities.

Table 9-8: Transit Access to Healthcare Facilities for Various Demographic Groups

	% of Total Pop	Households with 65 and Older	Occupied Housing Units with No Vehicle	Households in Poverty	EJ Population
Transit Access within 30 Minutes	57.9%	60.3%	81.3%	69.1%	64.4%

¹¹ Note that demand response services (e.g., Rio Metro's dial-a-ride in Rio Rancho and Valencia County and ABQ RIDE paratransit) also provide access to healthcare facilities but cannot be incorporated into a TRAM analysis.

Map 9-7: Accessibility of Major Healthcare Facilities by Transit



c. MRMPO Public Outreach

MRMPO offers opportunities to participate in the planning process in different locations across the AMPA to help ensure no geographic area is excluded from its public participation efforts. With respect to engaging communities of Limited English Proficiency, MRMPO translates certain key documents into Spanish (e.g., surveys and the Title VI Plan) and provides contact information in Spanish on its website. Despite MRMPO's efforts at public outreach, there remains much work to be done in terms of engaging the general public, and particularly environmental justice communities, in the transportation planning process. Increased participation leads to better transportation decisions and outcomes for all.

MRMPO continues its efforts for engaging environmental justice and other underrepresented populations. New outreach strategies have been employed by MRMPO staff. For the *Connections 2040 MTP*, MRMPO attended community events and existing organizational meetings, paying particular attention to environmental justice communities, in an attempt to gather more feedback from low-income and minority populations. This was a part of an overarching change in outreach that focused on attending events and meetings that are already on-going, as opposed to inviting people to attend meetings hosted by MRMPO. In addition, more participation from younger adults was sought as participation from this age group has historically been low in MTP public outreach efforts. MRMPO will also perform its planning activities through an equity-minded lens, ensuring adverse effects on low-income and minority populations are avoided, or at least minimized or mitigated.

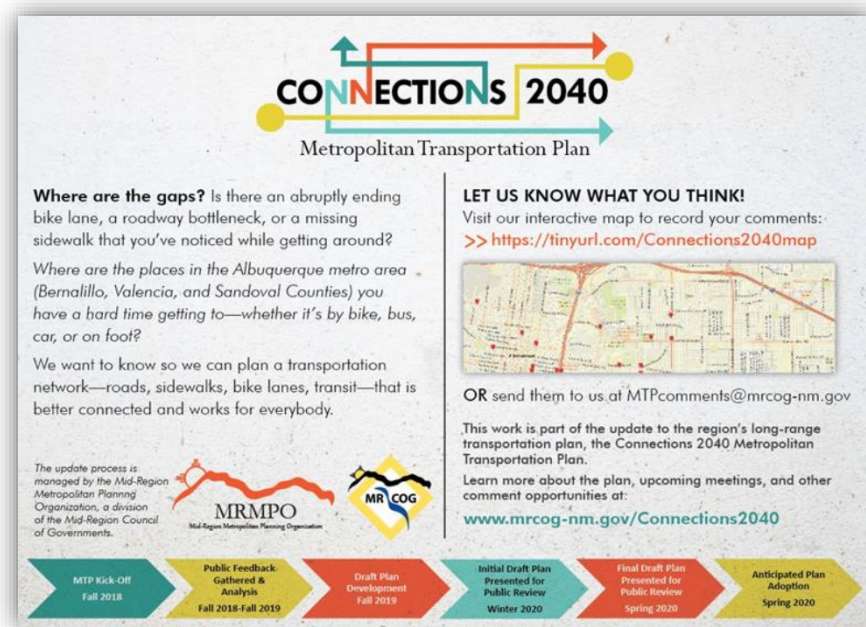
Figure 9-13: MTP promotional postcard in Spanish



9.3 Transportation Gaps in the Region

As part of the development process for *Connections 2040 MTP*, MRMPO staff set out to identify gaps in the transportation system. The term “gaps” is used here to refer to common problem areas or challenges that travelers throughout the region face. Gaps in the transportation system can occur for all modes of travel and include issues such as roadway connectivity and traffic flow, transit route service and frequency, bicycle route connections and safety, and pedestrian crosswalk markings and signal timing.

Figure 9-14: Invitation to the Public to Identify Gaps



Staff developed multiple avenues for feedback on the region’s transportation network. Through various platforms, members of the public and agency staff were asked about the type of transportation problems they face when traversing the region, and where they encounter them. This information was collected using methods that included an interactive online map, in-person public meetings, written comments, and MPO committee discussions.

The feedback staff received fell into two distinct categories: the first is “spot gaps”, which pinpoint a specific geographical location or problem area in the transportation network; the second is “system gaps,” which refer to more systemic transportation issues that can be applied broadly to areas within metropolitan area.

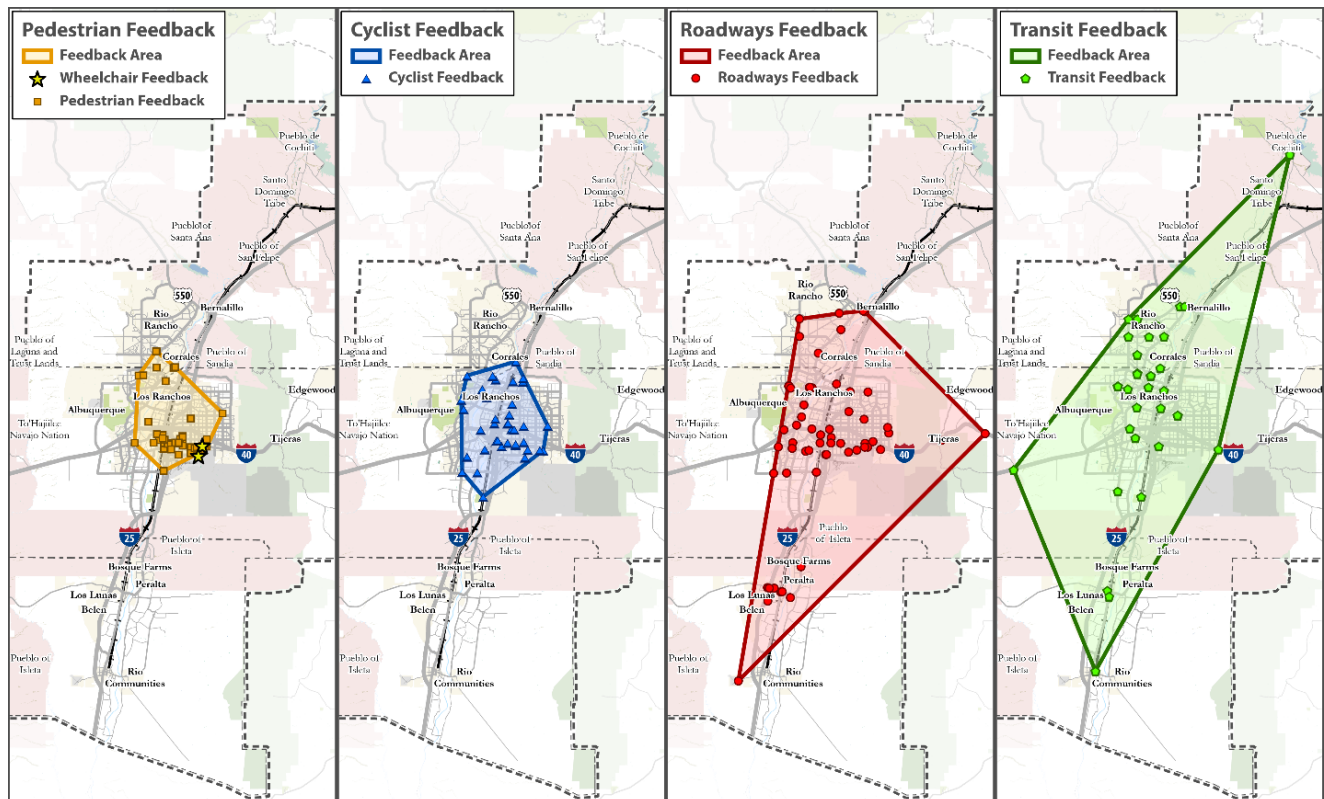
An example of each is provided here:

- Spot Gap example: Crossing the intersection of San Mateo and Montgomery is difficult.
- System Gap example: It is difficult to cross the street at many intersections.

Spot Gaps

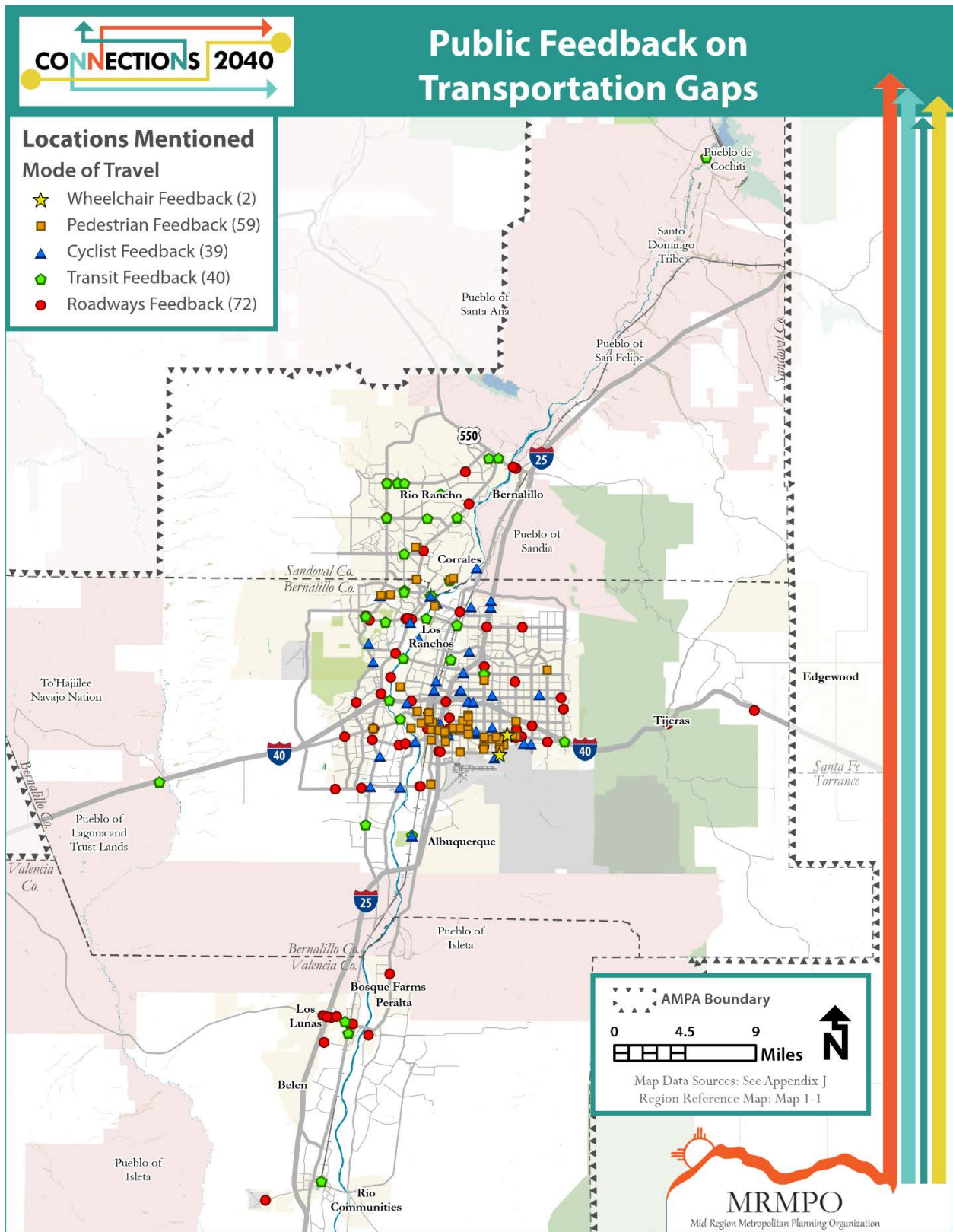
Spot gaps indicate a location where a respondent had a specific transportation issue or concern. Each point on the maps below was submitted by a member of the public or agency staff either using the interactive online map available on MRMPO's website or on paper maps at public meetings. Respondents had the opportunity to click on a location, chose a mode, and then report their concern. The following figure shows the results of that feedback in terms of where issues were observed by mode.

Figure 9-15: Spot Gaps Distribution by Mode in the AMPA



In general, pedestrian concerns were primarily within the urban core of Albuquerque in areas of concentrated pedestrian activity such as the Central Avenue corridor. Bicycle problem areas include popular trails and open space. Roadway concerns had a wider reach and capture issues with the river crossings and other congestion hot spots, and the transit comments spanned the entire region and reflect a desire for expanded transit access. Following MTP adoption, MRMPO staff will work with member agencies to provide greater detail about content behind the comments submitted at specific locations and investigate how the project selection process can assist in addressing these needs. The following map combines all of the spot gap locations identified through the MTP development process.

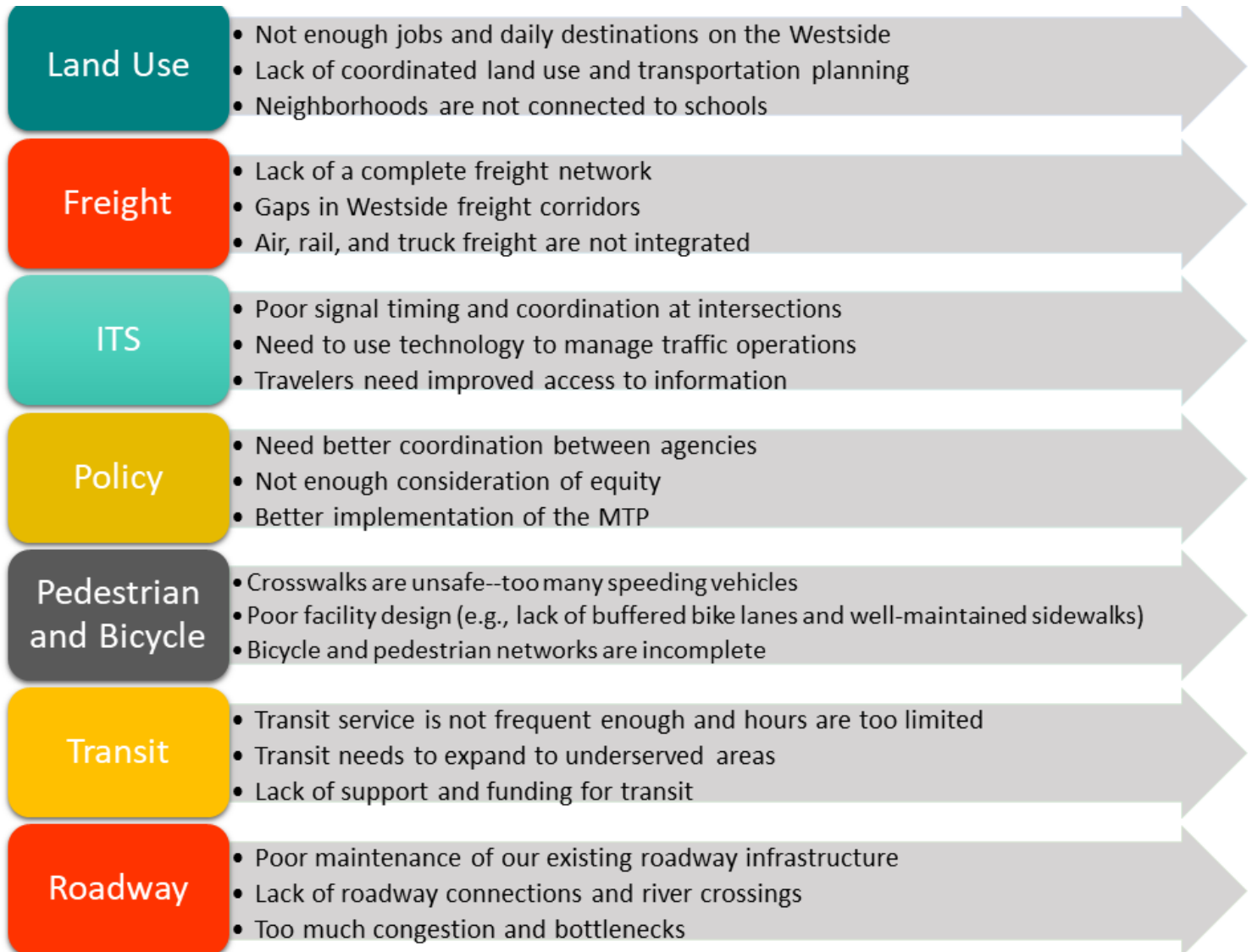
Map 9-8: Public Responses on Transportation Gaps in the AMPA



System Gaps

MRMPO also received a substantial amount of feedback regarding problems attributed to the overall transportation network rather than a specific location. These more general issues are referred to here as system gaps. MRMPO staff worked together to sift through all comments and identify common themes. Staff found that many issues were reiterated multiple times and these were brought forward as the top system gaps and the results are summarized in the following graphic.

Figure 9-16: Top System Gaps in the AMPA as Reported by the Public



Many respondents expressed broad concerns about safety, particularly the safety of persons traveling by foot, bike or transit. While safety comments covered an array of issues from vehicle speeds to street design, the vast majority pertained to crosswalks. Respondents repeatedly remarked that they found existing crosswalks to be unsafe for crossing, disconnected from neighborhoods, and in areas where they felt threatened by speeding vehicles. Comments pertaining to roadway concerns often centered around a need for more bridge crossings, poor signalization at intersections, and a need to maintain existing infrastructure. Transit related comments frequently stated that transit was not accessible or frequent enough. In addition, multiple respondents felt that the freight network on the westside lacked connectivity, and that there was not enough coordination of transportation planning between agencies.

Figure 9-17: Transportation Gap in the AMPA

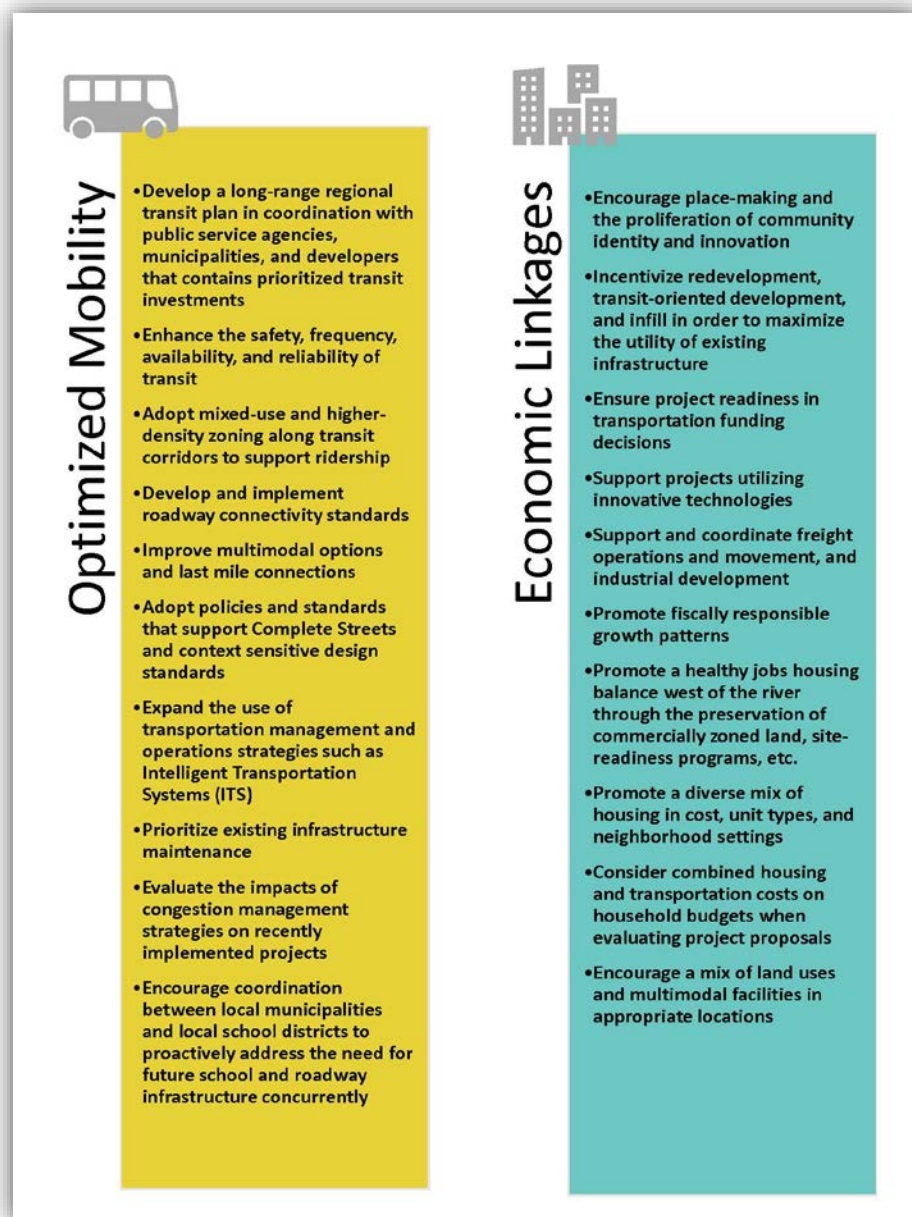


9.4 Recommended Pathways for Achieving the MTP Goals

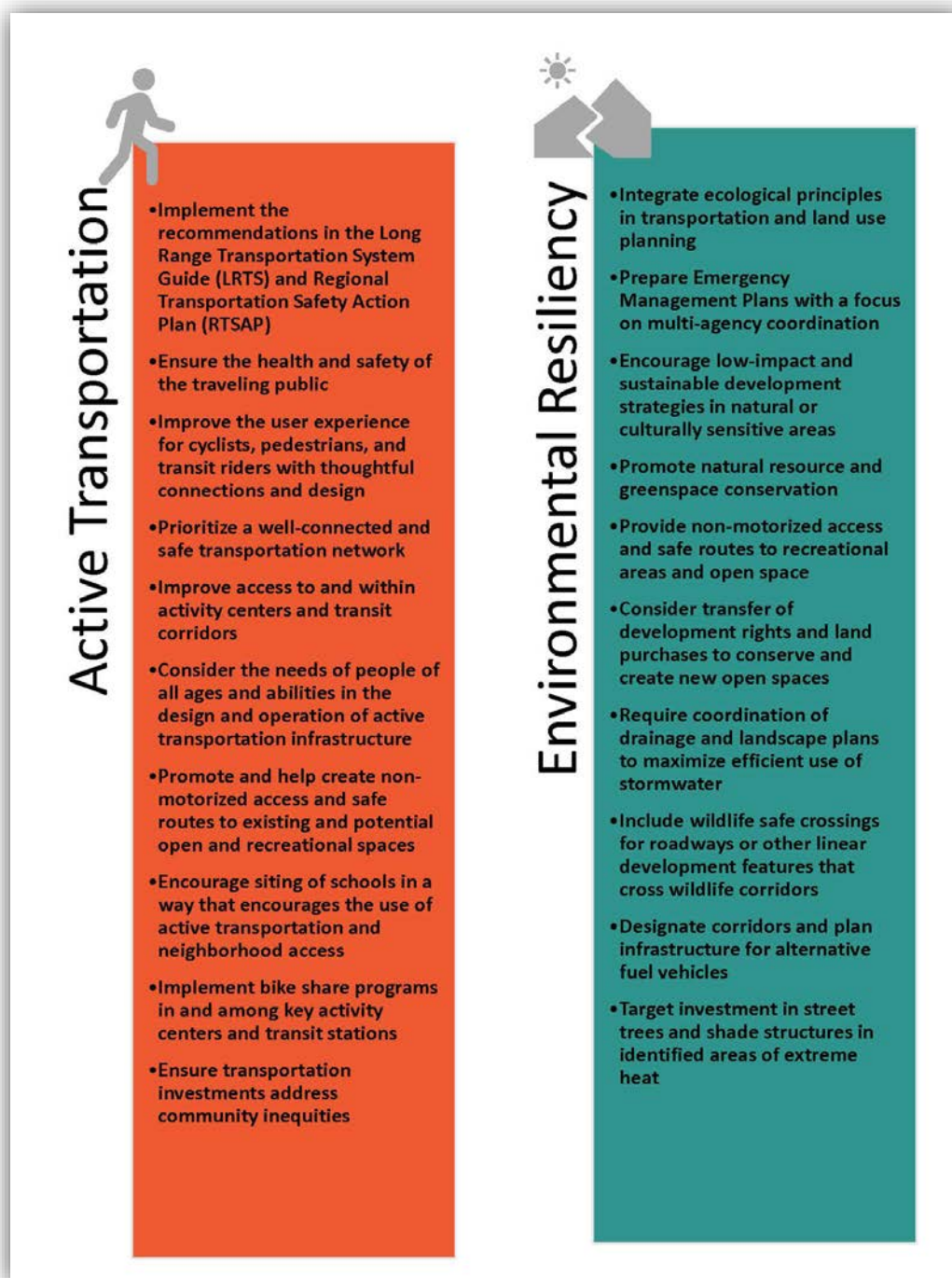
MRMPO staff developed a list of broad pathways, or strategies, to address system gaps identified during the public feedback process. The pathways are the synthesis of strategies in the *Futures 2040 MTP*, strategies identified by MRMPO committees, public comments, and input from other experts in the transportation arena. The following tables provide a summary of the key pathways categorized by MTP goal. A complete list of pathways is available in Appendix G.

While not all pathways are appropriate for all member agencies, this should be considered a toolbox from which jurisdictions and other entities can find appropriate regional strategies. MRMPO staff are available to assist with these efforts upon request.

Figure 9-18: Key Pathways for Meeting the MTP Goals (Optimized Mobility, Economic Linkages)



**Figure 9-19: Key Pathways for Meeting the MTP Goals
(Active Transportation/Environmental Resiliency)**



9.5 Next Steps

The role of the MTP and the metropolitan transportation planning process is to identify regional needs and assist member agencies in transportation infrastructure decision-making. Each MTP is another step toward a more complete and coherent understanding of the overarching challenges facing the region – transportation and otherwise – and the strategies that best address them. The MTP is updated regularly, which helps it remain a relevant and meaningful resource for member agencies and the general public. The process and methodologies are constantly being revised as new information and ideas emerge and each MTP builds on the one that came before.

While the 2035 MTP explored the critical link between land use and transportation, the *Futures 2040 MTP* took the next step to investigate the relationship between alternative development patterns through its scenario planning process. The *Connections 2040 MTP* builds upon a central concept within *Futures 2040 MTP*, existing system preservation, and focuses on identifying and prioritizing gaps in existing networks and improving connections throughout the region.

The MTP will be updated again in five years and will contain new projections and analysis. For the time in between the approval of the *Connections 2040 MTP* and the next update, MRMPO has identified several potential activities to pursue as well as opportunities to advance in-house tools and analytical capabilities. These steps should help to better inform transportation and land use investments and policy decisions. As always, these are regional efforts and will require participation from member agencies throughout the AMPA. Some next steps may include:

- Create additional land use and transportation scenario modeling.
- Research and explore new technologies such as connected and autonomous vehicles, connected infrastructure, and “smart cities” applications,
- Further investigate freight travel and freight corridors, and consider a freight/travel study.
- Use Fiscal Impact Tool to examine full costs of alternative land use scenarios.
- Refine MTP project selection process to better align projects with MTP goals and Target Scenario.
- Revisit MTP goals and pathways.
- Develop an implementation plan for MTP pathways through MRMPO committees.
- Integrate and expand bicycle and pedestrian count data.
- Evaluate progress toward Federal performance measures targets.
- Analyze new 2020 Census data and integrate findings into the next MTP.
- Revise the Project Prioritization Process to include a simplification of the tool, a change to GIS-based review, and integration of PM measures as appropriate.
- Investigate the potential to create a comprehensive regional pedestrian network map including pedestrian infrastructure needs and ADA facilities.

Now it's your turn. Tell us your ideas...you just may see them in the next Metropolitan Transportation Plan!