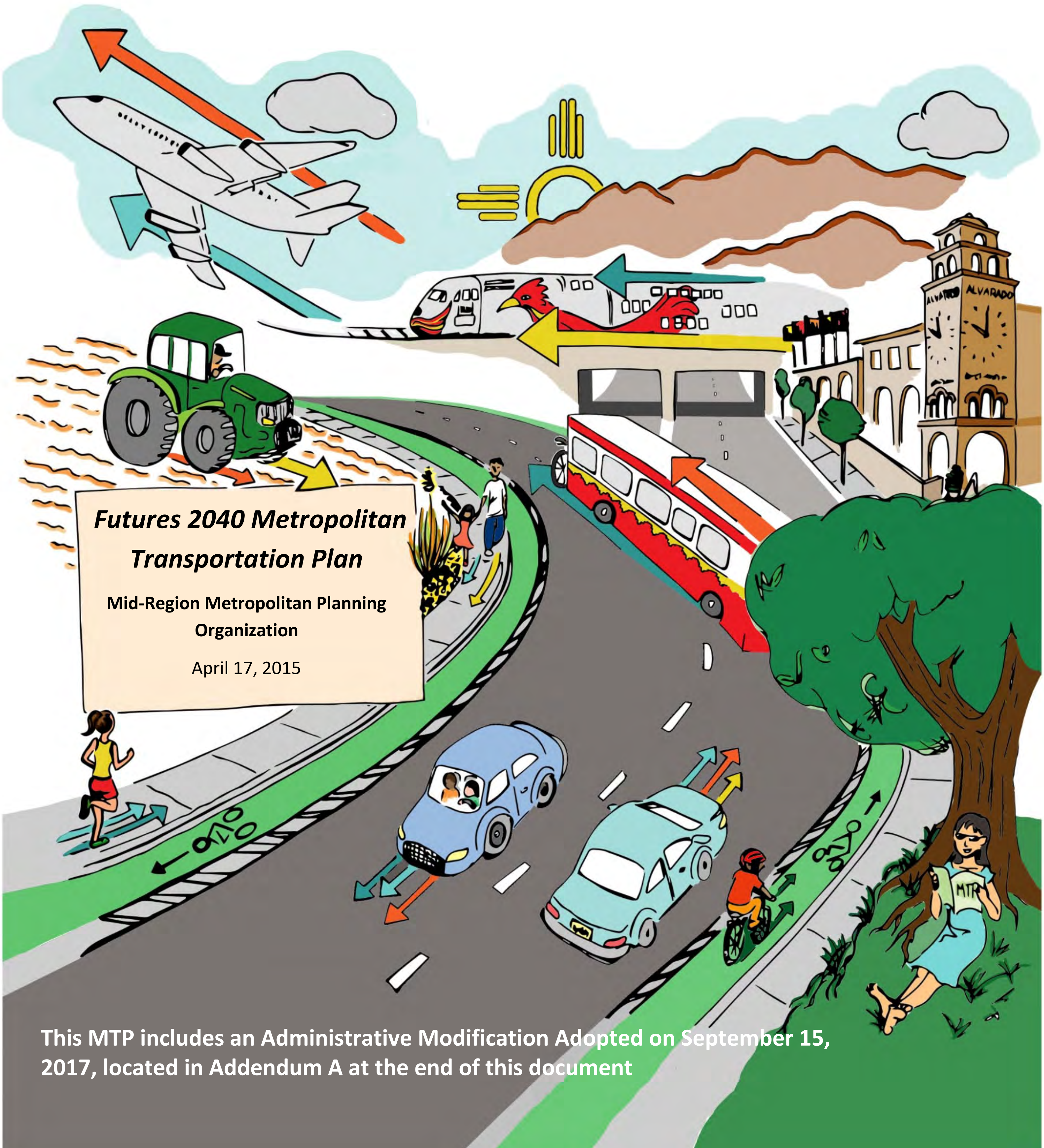
Futures 2040

Metropolitan Transportation Plan



Futures 2040 Metropolitan Transportation Plan

Mid-Region Metropolitan Planning Organization

April 17, 2015

This MTP includes an Administrative Modification Adopted on September 15, 2017, located in Addendum A at the end of this document

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Intelligent Transportation Systems (ITS) Committee
Land-Use Transportation Integration (LUTI) Committee
Long-Range Transportation Systems Guide Committee
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Common Acronyms

AMPA – Albuquerque Metropolitan Planning Area, the planning boundary for the 2040 MTP

AWDT – Average Weekday Daily Traffic

BRT - Bus Rapid Transit which is a level of bus service which copies several characteristics of light-rail. ABQ Ride's Rapid Ride is a "starter" BRT system.

CFR – Code of Federal Regulations

CMAQ – Congestion Mitigation/Air Quality which is a category of Federal aid to states

CMP – Congestion Management Process

CNM – Central New Mexico Community College

CO – Carbon monoxide which is one of the pollutants generated by vehicle emissions

CO_2 – Carbon dioxide which is one of the greenhouse gases suspected of accelerating climate change

EPA – U. S. Environmental Protection Agency

FHWA – Federal Highway Administration

FTA – Federal Transit Administration

FFY – Federal Fiscal Year. In this document, unless otherwise noted, FY refers to the Federal Fiscal Year which begins October 1st and ends September 30th.

ITS – Intelligent Transportation Systems

LUTI – Land Use and Transportation Integration

MAP-21 – Moving Ahead for Progress in the 21st Century the 2012 transportation bill.

MPO – Metropolitan Planning Organization

MRCOG – Mid-Region Council of Governments which administratively houses MRMPO, the designated MPO for the Albuquerque Metropolitan Planning Area.

MRMPO – Mid-Region Metropolitan Planning Organization

MTB – Metropolitan Transportation Board, the policy-making of the Mid-Region Metropolitan Planning Organization

MTP – Metropolitan Transportation Plan

NAAQS – National Ambient Air Quality Standards

NMDOT – New Mexico Department of Transportation

O_3 – Ozone a pollutant attributed to both point source and non-point source pollution generators. Point source generators are facilities such as a coal-burning electric generating plant; non-point source generators are vehicles which emit pollutants (thus not from a single location).

PMT – Person Miles Traveled, the cumulative miles traveled by people in a certain time period on a selected route. This measure accounts for the actual number of people a highway, route or transit system moves. It is helpful comparing various modes of transportation and/or HOV and HOT lanes.

ROW – Right-of-Way or Rights-of Way (plural)

RTPO – Rural Transportation Planning Organization

SIP – State Implementation Plan, a statewide plan that addresses air quality nonconformance issues in order to implement requirements of the Clean Air Act.

SOV – Single Occupant Vehicle

STIP – Statewide Transportation Improvement Program which is a statewide prioritized list of transportation projects covering a four year period. A STIP incorporates metropolitan TIPs "without modification" per Federal regulations.

STP-U– Surface Transportation Program-Large Urban, a subcategory of federal funds for large urban areas (in the AMPA that is the Albuquerque UZA)

TDM – Travel Demand Management

TIP – Transportation Improvement Program which is a prioritized list of transportation projects for a metropolitan planning area covering a minimum four year period. All TIP projects must conform to the MTP. A TIP is to be incorporated into the STIP "without modification" per Federal regulations.

UNM – University of New Mexico

UPWP – Unified Planning Work Program which establishes the planning work that will be undertaken utilizing Federal planning funds.

V/C – Volume/Capacity, which is the ratio of a roadway's (or transit route's) total usage compared to its maximum carrying ability in a defined time period.

VMT – Vehicle Miles Traveled, the cumulative miles traveled by all vehicles in a certain time period on a selected route.

VHD – Vehicle Hours of Delay, the cumulative difference in time for all travelers between the posted speed limit and the observed or actual travel speed

VMT – Vehicle Hours Traveled, the cumulative amount of time spent driving by all motorists in a given day or period of time

Executive Summary

The *Futures 2040 Metropolitan Transportation Plan* (MTP) is the result of a planning process that attempts to understand infrastructure needs and distribute federal funds in ways that best address regional transportation challenges. This task is important because the role of the transportation system—as well as transportation needs—is evolving. Transportation is not an end or an objective unto itself that can be considered independently. It is part of a complex and interrelated regional system and a means of supporting and achieving other outcomes, such as livability, environmental sustainability, and economic activity through the movement of people, goods, and services.

Also evolving is an understanding of the connection between land use and travel demand patterns and the role that transportation plays in creating places where people want to be. The previous plan, the *2035 MTP*, forecasted significant outward expansion and high levels of congestion. Against such a backdrop increased roadway capacity – that is, new lanes and new roads – was shown to be largely ineffective in relieving future congestion. But as the plan demonstrated, land use configurations matter, and they matter a great deal.

2040 MTP Themes

1. Limited funding and emphasis on roadway maintenance and preservation

2. Land use policy as a strategy for accommodating growth and addressing transportation needs

3. Changing travel preferences

Over the last several years there have been frank conversations about the most desirable ways for the region to grow and the potential role of alternative modes, in particular mass transit. Careful deliberation on the best ways to meet the needs of travelers in the Albuquerque Metropolitan Planning Area (AMPA) is particularly important given three sets of pressures on the region's transportation system. These pressures are forcing agencies around the region to think differently about how they invest and what objectives they are trying to meet.

First, at a time of great need in terms of infrastructure improvements, transportation funding is increasingly limited. Due to unpredictable federal policies and declining federal and state gas tax revenues, agencies around the metro area are emphasizing roadway maintenance and preservation. While capacity needs to be expanded in strategic locations, the reality is that every new roadway stretches declining maintenance budgets even further. As a result there are very real long-term transportation challenges that may go unresolved. In particular, the long-running question over the best ways to meet river crossing travel demand remains; other than the Morris Rd alignment in Valencia County, no new bridges have been proposed or are projected to be funded in the lifespan of the *2040 MTP*.

The second set of pressures involves land use patterns and accommodating new growth. While growth has slowed in the last half-decade following the Great Recession and forecasts have been updated accordingly, regional population levels are projected to increase as the economy improves. The AMPA is still expected to increase by more than 435,000 residents, or 50 percent, by 2040 (see Tables EX-1 and EX-2). In some respects, the economic slowdown can be viewed as an opportunity to reconsider the type of growth that has taken place and whether new policies should be pursued to encourage alternatives to the dramatic pace of outward expansion that marked most of the 2000s. The opportunity lies in strategies to grow as sustainably as possible through development patterns that maximize the utility of the existing transportation infrastructure, minimize future maintenance costs, and ensure meaningful transportation options for residents across the region.

Third, changing demographic and market preferences signal a need for a broader range of housing and transportation choices. New Mexico is experiencing a trend towards growth in urban areas with increased demand for walkable, mixed-use communities and housing options near jobs and amenities. There is also a particularly strong desire for access to transit and alternatives to single-occupancy vehicle travel. On a per capita basis, vehicle miles traveled in the AMPA fell 10 percent from 2004 to 2012, while transit ridership grew by more than 80 percent. Particularly noteworthy are the preferences of the Millennial generation (ages approximately 16-34), who indicate the lowest satisfaction levels of any age group when it comes to the transportation system in the Albuquerque area. These changing preferences do not mean that demand will cease to exist for suburban-style housing and lifestyles; but it is clear that there are opportunities to serve a shifting set of preferences while simultaneously developing in ways that support alternative modes of transportation, reduce the need for new infrastructure, and accommodate additional growth.

Table EX-1: Population Projections by County, *2040 MTP* Trend Scenario

Year	Bernalillo	Sandoval*	Valencia	AMPA
2012	675,548	126,490	77,363	879,401
2040	987,080	203,128	127,715	1,317,923
30 Year Growth	**311,532**	**76,638**	**50,352**	**438,522**

*The small portion of Sandoval County outside of the AMPA has been excluded

Table EX-2: Employment Projections by County, *2040 MTP* Trend Scenario

Year	Bernalillo	Sandoval*	Valencia	AMPA
2012	341,452	31,829	15,700	388,981
2040	473,037	72,569	25,563	571,169
30 Year Growth	**131,585**	**40,740**	**9,863**	**182,188**

*The small portion of Sandoval County outside of the AMPA has been excluded

Purpose of an MTP

- Projections of growth over the planning horizon (Trend Scenario)
- Understand impacts of growth on transportation infrastructure
- List of projects proposed for implementation by member agencies
- Provide strategies and recommendations for meeting anticipated challenges

How this MTP is Different:

- Establishes a **Preferred Scenario** for the first time
- Analyzes **climate change** impacts and adaptation strategies
- Identifies potential **action items** produced at the request of the Metropolitan Transportation Board and member agency staff

The *Futures 2040 MTP* was developed concurrently with NMDOT's statewide long-range plan**.** MRMPO and NMDOT utilize the same socio-economic forecasts and revenue projections and identify common issues and strategies in the respective plans.

Scenario Planning

Past MTPs projected future conditions based on anticipated population and employment growth as well as existing plans and policies, and then responded to the challenges identified in the projections. It was a decidedly reactive approach. The *Futures 2040 MTP* introduces a proactive mechanism known as scenario planning to consider the multiple ways in which the region could grow over time and understand the costs and benefits associated with different development patterns.

In particular, scenario planning is a technique that allows stakeholders to understand how policy decisions, land use changes, and alternative investment patterns can impact transportation conditions and other factors in coming decades. It is predicated on the notion that there are many ways the region could grow. In other words, there are a range of potential futures. Over the two years leading up to the adoption of the *2040 MTP*, MRMPO engaged in a scenario planning process with member agencies from across the AMPA that ultimately resulted in two scenarios: a Trend Scenario based on existing plans and policies, and a Preferred Scenario that emphasizes development in regionally-identified activity centers, commercial corridors, and transit nodes.

The *2040 MTP* represents a significant shift in approach by broadening the plan's scope to include not just land use considerations, but means of adapting to climate change. Through a partnership with the U.S. Department of Transportation Volpe Center and a grant from the Federal Highway Administration, MRMPO utilized the scenario planning process to introduce new variables and consider whether different growth patterns make the region more or less resilient to climate change impacts. This effort became the Central New Mexico Climate Change Scenario Planning Project

In the coming decades in central New Mexico, temperatures are expected to gradually rise, while precipitation becomes more variable. The likely result is extended periods of drought followed by intense rainfall events. These changes are expected to have significant impacts on water resource availability and the increased likelihood of wildfires and flooding may place nearby development at greater risk. Climate change may also increase the costs of roadway maintenance. The broader scope has allowed MRMPO to consider new relationships, such as the connection between land use patterns and water consumption, as

Regional Challenges

The following issues were identified through outreach efforts conducted as part of the *2040 MTP*. They are ranked based on the importance assigned by the respondents.

1. Water resources

2. Economic development

3. Diverse housing and transportation options

4. Balance of housing and jobs across the region

5. Shared and active places

6. Create a collaborative and equitable process

7. Historic and rural preservation

Importantly, even though the exercises were conducted by a transportation planning agency, water resource availability was identified as the most pressing challenge facing the region, followed by economic development opportunities.

well as opportunities to reduce transportation-related greenhouse gas emissions.

Future Growth Scenarios

The Trend Scenario, the officially adopted set of projections for the AMPA, reflects a continuation of existing land use plans and policy and represents a view of what would happen if future development takes place in a similar manner as in the past. This includes large-scale land consumption for new housing development accompanied by a separation of land uses that reinforce the region's reliance on single-occupancy vehicles for most travel. As such, the Trend Scenario does not fundamentally address the transportation challenges facing the region, in particular the high demand for trips across the Rio Grande. While a large portion of residential growth will occur in areas west of the Rio Grande, the Trend Scenario anticipates that about half of all new jobs will locate in east Albuquerque. This perpetuates an existing jobs-housing imbalance and a disproportionate need for eastbound river crossing trips in the morning and westbound river crossing trips in the evening.

By contrast, the Preferred Scenario emphasizes additional development in activity centers, along key commercial corridors, and near premium transit nodes (see Map EX-1). The approach of supporting higher density and a mix of land uses in targeted locations specifically addresses a number of challenges identified as part of the MTP development process. These include a broader range of housing and transportation options and balancing the distribution of jobs and housing to bring employment west of the river and additional housing east of the river. Reducing transportation costs and creating places where people want to be are also crucial in making the region more economically competitive.

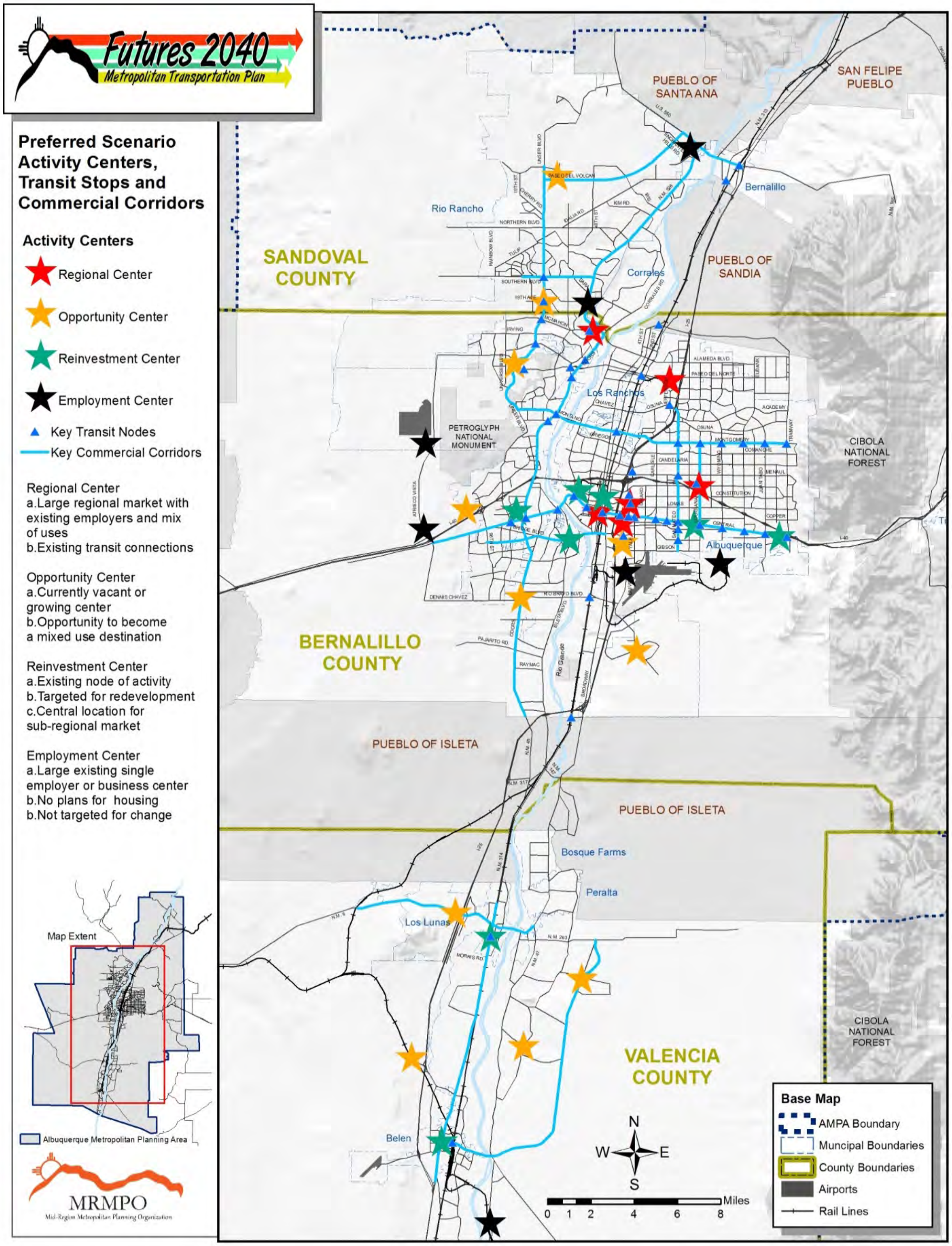
While the Trend and the Preferred Scenarios are based on the same infrastructure network, the Preferred Scenario assumes a greatly expanded transit network. In many respects, transit is an organizing principle for the Preferred Scenario: not only are transit nodes emphasized for additional development, but services are enhanced to provide meaningful connections across the metropolitan area and improve travelers' ability to reach their destinations without relying exclusively on private vehicles.

The differences between the scenarios are noteworthy. While congestion levels are projected to increase under any scenario—a function of growth rates, land use patterns, reliance on single-occupancy vehicles, and limited transportation funding—there are clear benefits associated with Preferred Scenario. The Preferred Scenario results in more households closer to employment sites, amenities, and public transit services and leads to a smaller development footprint than the Trend by reducing the amount of new land consumed, as well as a smaller increase in CO_2 emissions. While roadway conditions generally deteriorate in both scenarios, the Preferred leads to improvements in vehicle speeds and commuting times, and reduction in miles traveled and hours traveled over the Trend Scenario.

Table EX-3: 2012-2040 Growth Rates for Select Performance Measures: Trend and Preferred Scenarios

Performance Measure	Trend Scenario	Preferred Scenario	Total Difference: Preferred vs. Trend
Access			
Housing near Activity Centers	77%	125%	27%
Housing near Transit	66%	120%	32%
Housing near Employment Sites	28%	47%	15%
Transportation			
Systemwide Speed (PM Peak MPH)	-40%	-31%	15%
Vehicle Hours Traveled (PM Peak)	162%	117%	-28%
Vehicle Miles Traveled (Daily)	48%	42%	-4%
Transit Ridership	34%	138%	78%
River Crossing Trips (Daily)	42%	38%	-3%
Average Commute Time	50%	24%	-18%
Sustainability			
New Land Developed (acres)	27%	19%	-5%
Emissions (CO_2)	31%	22%	-8%
Growth in Forest-Fire Risk Areas	84%	63%	-10%

Map EX-1: Key Locations in the Preferred Scenario



Transportation Challenges in the AMPA

- Crossing the Rio Grande
- Dependency on single-occupancy vehicles
- Freight movement
- Emission levels and ozone non-attainment
- Safety
- Access and connectivity

MTP Action Items

- Establish transit mode share goals and target funds for premium transit through the Transportation Improvement Program set-aside
- Project Prioritization Process for evaluating regional benefits of projects for federal transportation funding
- Long-Range Transportation Systems Guide to link roadway design to the surrounding context
- Integrate the MTP with local land use plans
- Consider the consistency of plans and projects with the Preferred Scenario through the MRMPO development review process

Transportation Investments

A look at the capital expenditures for the *2035* and *2040 MTPs* reflects the evolving priorities in the region. The *2040 MTP* identifies about $2.2 billion to be utilized to expand road capacity (of which more than half is privately funded); that number comprises about 35 percent of available capital funds, compared to about $3 billion or 50 percent of available funds targeted for new lanes and new roads in the *2035 MTP*. At the same time, significantly more money has been identified for maintenance and preservation needs. There are also large increases in spending on public transit projects, where approximately 29 percent of all funding will be spent on transit, compared to 18 percent in the *2035 MTP*. This increase can be attributed to additional federal funds allocated to the region for transit operations, as well as a modest increase in local spending.

Table EX-4: Transportation Investments by Project Type, *2040 MTP* versus *2035 MTP*

Project Type	Amount – *2035 MTP*	Amount – *2040 MTP*
Bicycle/Pedestrian Projects (Public)	$241,302,104	$263,944,607
Bicycle/Pedestrian Projects (Private)	$15,859,250	$21,193,000
Roadway Capacity Projects (Public)	$2,248,608,711	$1,036,980,106
Roadway Capacity Projects (Private)	$770,129,498	$1,155,881,922
Highway & Bridge Preservation	$987,183,864	$1,633,985,094
ITS/TSM Projects	$194,534,713	$154,255,556
Misc. (studies, enhancements, etc.)	$271,608,555	$75,131,684
Safety Projects	$64,389,139	$80,858,290
Travel Demand Management	$35,340,413	$37,164,786
Transit Projects	$1,077,503,135	$1,834,671,248
Total	**$5,906,459,382**	**$6,294,066,293**

Achieving the Preferred Scenario

The Trend Scenario is the official growth projection for the AMPA; however, this MTP does not consider the Trend Scenario to be a forgone conclusion or a set of conditions the region should aspire to create. Rather, the Preferred Scenario, which was developed collaboratively among the member agencies of central New Mexico, presents a target for the region through a set of shared principles and recommended action steps.

While demographic shifts make the assumptions in the Preferred Scenario well-founded and reasonable, collective efforts and forward-thinking policies are required for implementation. Agencies with land use authority, the development community, transportation departments that identify and fund infrastructure improvements, and the general public all share this responsibility.

This plan discusses a number of strategies to address regional challenges and can help achieve the Preferred Scenario. These strategies differ by mode and reflect the range of steps that must be taken to ensure more desirable transportation outcomes. From a roadway perspective this means a strong emphasis on efficiency improvements and maintenance. Limited federal funding means the region needs to get as much as possible out of existing infrastructure. Capacity expansion is at times necessary, but should be strategic and undertaken as an option after efforts to maximize the functionality of the existing transportation system.

Transit investments are crucial to support the Preferred Scenario. Multiple Bus Rapid Transit studies have taken place in the last three years, and the Albuquerque Rapid Transit (ART) service proposed for Central Avenue has entered the project development phase and could be operating as early as 2017. Implementing these services should be a high priority for the region. To encourage transit's growing role in the region, the Metropolitan Transportation Board established mode share goals that an aggregate of 20 percent of trips on priority corridors will be taken by transit by 2040. The Board also voted to set-aside 25 percent of sub-allocated federal funds distributed through the Transportation Improvement Program to premium transit projects that support the realization of the mode share goals.

Bicycle and pedestrian improvements will also play a critical role in achieving the Preferred Scenario. Providing new connections, filling in gaps, and expanding the network help create new transportation options, promote healthy lifestyles, and support land use decisions. One important recent policy change is the approval by the City of Albuquerque of a Complete Streets Ordinance to accommodate a broader set of users as a part of roadway construction and reconstruction. The fact that many roadways are under capacity gives the region the flexibility to either introduce additional development or accommodate a greater range of users.

The Long-Range Transportation Systems (LRTS) Guide brings these strategies together through roadway design guidelines that are tailored to the land use context and the role the facility plays in the regional transportation system. The LRTS Guide builds upon past right-of-way guidance and incorporates national best practices for multimodal accommodations. The intent for future roadways is to find the minimum right-of-way needed for quality multi-modal accommodation. For current roadways, the LRTS Guide provides methods to evaluate existing roadways for ways to improve conditions for all users and to better integrate them with surrounding land uses.

Ultimately, regional planning should focus on integrating transportation and land use policies to achieve the best outcomes. The recent slowdown in economic activity provides an opportunity to rethink development patterns and investment priorities. While many residents will continue to prefer rural and suburban lifestyles, the region can create greater options for people who desire a more urban environment by targeting specific locations for mixed-use development and for increased housing options. The Preferred Scenario demonstrates that a long-range vision for growth can have a variety of benefits, including better transportation conditions, fewer investments in new infrastructure, and improved air quality and reduced emissions. Moreover, such development can actually reduce impacts on rural communities and ease water demands and threats to agricultural land by minimizing new land consumed.

The larger scope of the *2040 MTP* and the additional perspectives gained through the climate change project reinforce the need for truly comprehensive long-term decision making and the need to evaluate policy choices through scenario planning. There are crucial challenges facing the region, but there are also many important and exciting opportunities to create an even higher quality of life in central New Mexico.

Chapter 1: INTRODUCTION TO THE *FUTURES 2040 METROPOLITAN TRANSPORTATION PLAN*

1.1 Introduction

The Futures 2040 Metropolitan Transportation Plan (MTP) examines transportation challenges the Albuquerque Metropolitan Planning Area (AMPA) will face over the next 25 years and presents strategies for addressing them. Because it is a transportation plan, it identifies the transportation investments that have been proposed in the planning horizon. However, recognizing that transportation issues are highly inter-related with numerous pressing regional challenges, the plan also delves into topics related to land use, economic development, and sustainability.

The *2040 MTP* is a product of the Mid-Region Metropolitan Planning Organization, a regional government planning agency responsible for long-range transportation planning and for the 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 member agencies and other transportation partners and stakeholders to develop the MTP. MRMPO is not an implementation agency, meaning it does not build or maintain infrastructure projects. Rather, the role of MRMPO and the MTP is to identify long-term regional transportation needs and strategies that should be pursued for addressing those needs.

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 and is intended to be updated and 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. This iteration of the plan is entitled the *Futures 2040 MTP*. The title reflects a new and substantial element of the plan—scenario planning—an effort that developed and measured alternative growth scenarios so that the region can proactively realign its priorities, policies, strategies, decisions and actions to realize a better future. The "futures" in *Futures 2040* refers to the range of potential outcomes that are possible for the AMPA.

The *Futures 2040 MTP* was also shaped by the Central New Mexico Climate Change Scenario Planning Project, a collaboration between MRMPO and the US DOT Volpe National Transportation Systems Center. The pilot project was the result of a federal grant awarded to MRMPO by the Federal Highway Administration and is particularly noteworthy in that it allowed MRMPO to incorporate climate change data and analysis into the scenario planning process used as part of the MTP. In addition to a Trend

[1] MPOs without air quality maintenance violations (known as "air quality attainment") can update their plans every five years. MRMPO's plan must be updated every four years because of its carbon monoxide (CO) limited maintenance status.

Scenario, which represents a likely future based on current policies and development patterns, the scenario planning process resulted in the development of a Preferred Scenario that brings to light an alternative course for regional growth. The Preferred Scenario is a member-driven scenario; that is, it was created and refined based on the desires, goals and priorities of stakeholders representing the various jurisdictions that comprise MRMPO. Although the Preferred Scenario is accompanied by a land use and travel demand forecast, its primary function is to serve as a shared set of guiding principles for shaping land use and transportation decisions over the coming decades in the AMPA. It also serves to guide the recommendations contained within this MTP and inform transportation project selection. Lastly, the Preferred Scenario represents a collaborative commitment from MRMPO and all of the jurisdictions represented at the table to be cognizant and resolute in pursuing future growth across the region in a more sustainable and purposeful manner.

In addition to scenario planning and the incorporation of climate change analysis, other new elements to the plan include:

- *Futures 2040 MTP* is the first update of the MTP since the new surface transportation legislation, MAP-21 was passed. As performance measurement is one of the main focuses of the new legislation, *Futures 2040* aims to be a performance-oriented plan.

- An expanded planning area now includes the City of Belen and all of Valencia County, as well as Sandia, San Felipe, Santo Domingo, and Cochiti Pueblos and the unincorporated communities of Placitas and Algodones in Sandoval County (see Map 1-1).

- The document includes design guidance for new roadways through the Long-Range Transportation Systems (LRTS) Guide. The design guidance is intended to ensure all modes are considered and that appropriate right-of-way widths are developed (see Appendix H).

- The MTP was developed at the same time as the major update to the statewide long-range transportation plan, which was led by the New Mexico Department of Transportation. Plans were developed to be consistent and supportive of each other, utilize the same socio-economic forecasts and revenue projections, and identify common issues and strategies

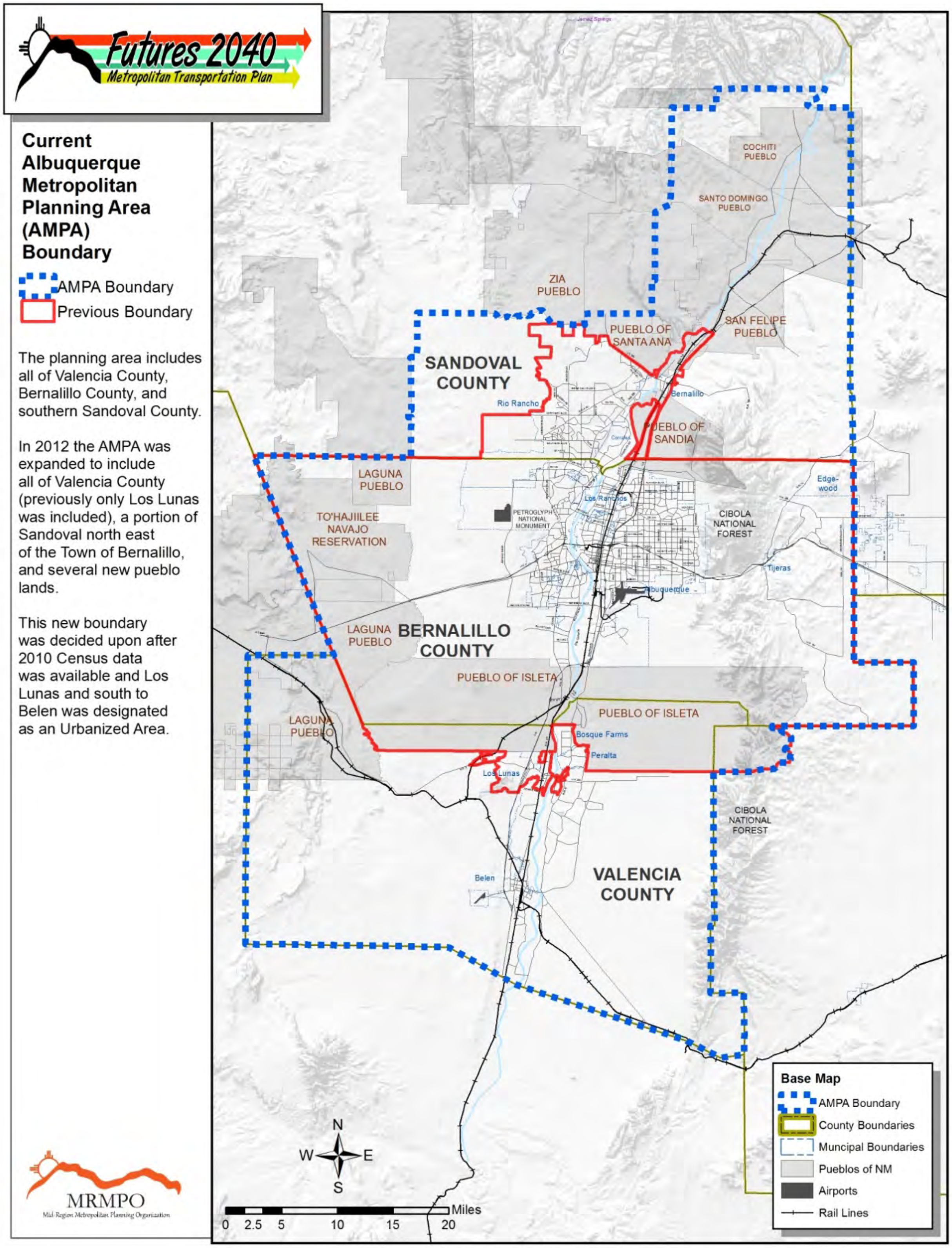
Two final scenarios resulted from the scenario planning process:

The **Trend Scenario**, based on existing land use plans and policies, is the officially adopted scenario for the MTP approved by the Metropolitan Transportation Board.

Whereas the Trend Scenario represents a future similar to that outlined in past MTPs, the **Preferred Scenario** deviates from the Trend by identifying key locations where additional investments could be targeted to realize important transportation benefits.

The Preferred Scenario presents several guiding principles for growth that are designed to address specific regional challenges voiced by local jurisdictions.

Map 1-1: Albuquerque Metropolitan Planning Area Boundaries



2040 MTP Planning Area

The planning area for MRMPO, referred to as the AMPA, and the *2040 MTP* now includes all of Valencia County, Bernalillo County, and southern Sandoval County. This area was recently expanded to include all of Valencia County; previously, only Los Lunas in Valencia County was included in the AMPA, but after the 2010 Census, the Los Lunas area was designated an "Urbanized Area" by the Census Bureau and all of Valencia County was incorporated into the AMPA. The AMPA also includes several new tribal lands and other communities in the northern parts of the planning area. Map 1-1 shows the extent of the AMPA. Within the AMPA's 3,095 square miles there are 11 incorporated communities, eight Pueblos, as well as the To'hajiilee chapter of the Navajo Nation.

List of Jurisdictions

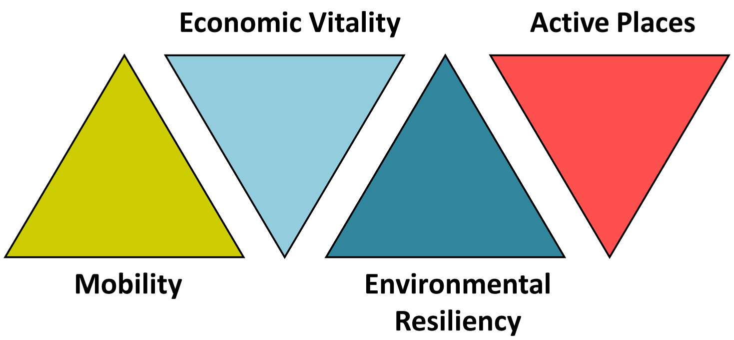
- Bernalillo County
- City of Albuquerque
- City of Belen
- City of Rio Rancho
- City of Rio Communities
- Pueblo of Cochiti
- Pueblo of Isleta
- Pueblo of Laguna
- Pueblo of San Felipe
- Pueblo of Sandia
- Pueblo of Santa Ana
- Pueblo of Santo Domingo
- Sandoval County
- Town of Bernalillo
- Town of Bosque Farms
- Town of Edgewood
- Town of Peralta
- Village of Corrales
- Village of Los Lunas
- Village of Los Ranchos de Albuquerque
- Village of Tijeras
- To'hajiilee Navajo Chapter Government
- Valencia County

Other Stakeholders

- New Mexico Department of Transportation
- Albuquerque Public Schools
- Belen Consolidated Schools
- Bernalillo Public Schools
- Los Lunas Public Schools
- Rio Rancho Public Schools
- Albuquerque Metropolitan Arroyo & Flood Control Authority
- East Sandoval County Arroyo & Flood Control Authority
- Southern Sandoval County Arroyo & Flood Control Authority

1.1.1 *Futures 2040 MTP* Goals and Objectives

Goals, objectives and strategies were developed to guide *Futures 2040*. The goals of the MTP are: Mobility/Moving People, Economic Vitality, Environmental Resiliency, and Active Places. These four goals establish a direction and general priorities for the MTP and also provide a framework to help assess the plan's performance. The goals are similar to those from the previous 2035 MTP, with the exception of the "Active Places" goal, which was added in the *2040 MTP* update in response to increased awareness of the link between transportation and public health and the critical role of transportation investments in place-making. In addition, some objectives have been added or modified in order to measure the performance of the plan over time.



The objectives for each goal are shown in Table 1-1. The objectives spell out the primary ways through which the goals will be met. Strategies for individual modes or topic area to achieve the objectives and thus the plan's larger goals are discussed throughout Chapter 3 and are compiled in Chapter 5 (Plan Implementation).

Table 1-1: *Futures 2040 MTP* Goals and Objectives

GOAL	**Mobility/Moving People**
Goal Description	*Mobility is the concept of moving people and goods efficiently throughout the region and relies upon providing multiple transportation options, ensuring transportation infrastructure is in good working order, and addressing congested locations.*
Objectives	1) Maintain Existing Infrastructure 2) Manage Congestion and Enhance Operations 3) Expand Multi-Modal Transportation Options
GOAL	**Economic Vitality**
Goal Description	*Infrastructure investments support economic activity in multiple ways: creating places where people want to be by offering a range of transportation options that attract and retain workers locally; creating access to jobs, services, and labor markets; and reducing the burden from transportation costs on businesses and individuals.*
Objectives	1) Support Efficient Freight Movement 2) Promote Development in Activity Centers and Key Corridors 3) Enhance the Flow of Goods and Services 4) Ensure Affordable Housing and Transportation Options
GOAL	**Environmental Resiliency**
Goal Description	*Changing temperature and precipitation levels will impact water availability and put the region at increased risk for wildfires, drought, and flooding. These phenomena also affect the built environment, which may be vulnerable to extreme weather and subject to additional maintenance requirements. How the region grows and how residents travel are intertwined and can exacerbate or minimize climate risks. Infrastructure investments should support environmental stewardship to ensure the region's natural resources are preserved.*
Objectives	1) Improve Air Quality 2) Conserve Water Resources 3) Prepare for Climate Uncertainties 4) Minimize Footprint of New Development
GOAL	**Active Places**
Goal Description	*Active places are locations where people can utilize a range of modes and have safe and convenient access to services, recreational opportunities, and destinations such as shopping, school, and work sites.*
Objectives	1) Improve Access to Employment Sites, Services, and Recreational Opportunities 2) Encourage a Mix of Land Uses in Appropriate Locations 3) Provide Healthy, Safe, and Convenient Travel Options

1.1.2 MTP Requirements

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 multi-modal transportation planning process. The transportation plan at the center of this process uses long-term growth projections and anticipated travel patterns to consider long-term regional needs. It is a comprehensive and cooperative planning process that involves all jurisdictions within the metropolitan area and 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.

Fiscally-Constrained Project Listings in the MTP and TIP

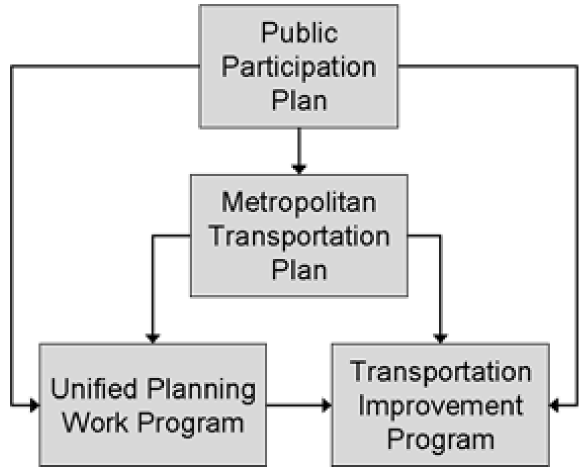
In coordination with the state department of transportation, all MPOs must develop an MTP and a Transportation Improvement Program (TIP). The TIP is the short-range implementing mechanism for the MTP that allows for transportation projects to be funded and eventually built. It lists regionally-significant transportation projects, including all projects that will receive federal funding, over a six-year timeframe and is updated every two years. For a project to be in the Transportation Improvement Program (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. The MTP provides the framework for proper consideration of whether projects meet regional transportation needs and are effective investments for the AMPA. The MTP and TIP must also be consistent with the latest federal transportation law, Moving Ahead for Progress in the 21st Century (MAP-21), signed into law by President Obama in 2012. Administrative regulations for MAP-21 are found in Title 23 of the Code of Federal Regulations, Part 450.

Title 23 of the Code of Federal Regulations includes the planning factors that must be considered as part of the metropolitan transportation planning process (23 CFR 450.306(a)) as well as specific elements that must be included in a metropolitan transportation plan (23 CFR 450.322). MRMPO's planning process is consistent with the planning process requirements and *Futures 2040* includes all federally-required elements for transportation plans. The planning factors and plan requirements that must be addressed in a long-range transportation plan are included in section 4.3. In addition, MAP-21 includes seven goal areas that regions must strive toward as part of their planning programs and transportation decisions. Table 1-2 shows how the MTP goals and objectives support the MAP-21 goal areas.

Table 1-2: Connection between MAP-21 Goal Areas and MTP Goals and Objectives

MAP-21 Goal Area	*2040 MTP* Goal & Objective
Safety	*Goal:* Active Places
	Objective: Provide Healthy, Safe, and Convenient Travel Options
Infrastructure Condition	*Goal:* Mobility
	Objective: Maintain Existing Infrastructure
Congestion Reduction	*Goal:* Mobility
	Objective: Manage Congestion and Enhance Operations
System Reliability	*Goal:* Mobility
	Objective: Manage Congestion and Enhance Operations
Freight Movement and Economic Vitality	*Goal:* Economic Vitality
	Objective: Support Efficient Freight Movement
Environmental Sustainability	*Goal:* Environmental Resiliency
	Objective: Improve Air Quality; Minimize Footprint of New Development
Reduced Project Delivery Delays (To Promote Economic Vitality)	*Goal:* Economic Vitality
	Objective: Enhance the Flow of Goods and Services

Other MPO Requirements



Federal transportation regulations require MPOs to create a Unified Planning Work Program (UPWP) and a Public Participation Plan. The UPWP outlines transportation planning activities that will be conducted by the MPO. All activities must be in compliance with the MTP. The Public Participation Plan defines the process for providing citizens and all interested parties reasonable opportunities to be involved in the metropolitan transportation planning processes including in the development of the MTP and TIP.

In relation to air quality regulations, MRMPO must make a conformity determination on its MTP in accordance with the Clean Air Act and EPA conformity regulations (40 CFR part 93; more description on air quality regulations can be found in the air quality section in Chapter 3.9). The Federal Highway Administration and Federal Transit Administration must make a conformity determination on the plan as well. In addition, the MTP must conform to the State Implementation Plan Revision: Limited Maintenance Plan for Carbon Monoxide for Albuquerque/Bernalillo County, New Mexico, as well as the Albuquerque/Bernalillo County Air Quality Control Board transportation conformity regulations (New Mexico Administrative Code [NMAC] Title 20, Chapter 11, Part 3).

The planning and public input processes conducted by MRMPO are required to comply with Title VI of the Civil Rights Act of 1964 (U.S.C. 23 §450.334.a.3) and the Environmental Justice Orders, discussed further in this chapter.

Statewide Long-Range Transportation Plan

The *Futures 2040 MTP* was developed concurrently with the update to the statewide long-range transportation plan. Federal transportation law (23 USC 135(b)(1)) 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 updated their plans on roughly the same timetable and participated in exchanges of data, information, and ideas at critical stages in their respective planning processes. In the case of MRMPO, coordination was achieved through the participation of staff in various working groups and a coordinating committee that NMDOT established to develop its statewide plan. Similarly, NMDOT staff participated in the MTP Steering Committee and Land Use and Transportation Integration (LUTI) Committee. NMDOT staff also participated in MRMPO's scenario planning workshops.

1.1.3 Contents of the MTP

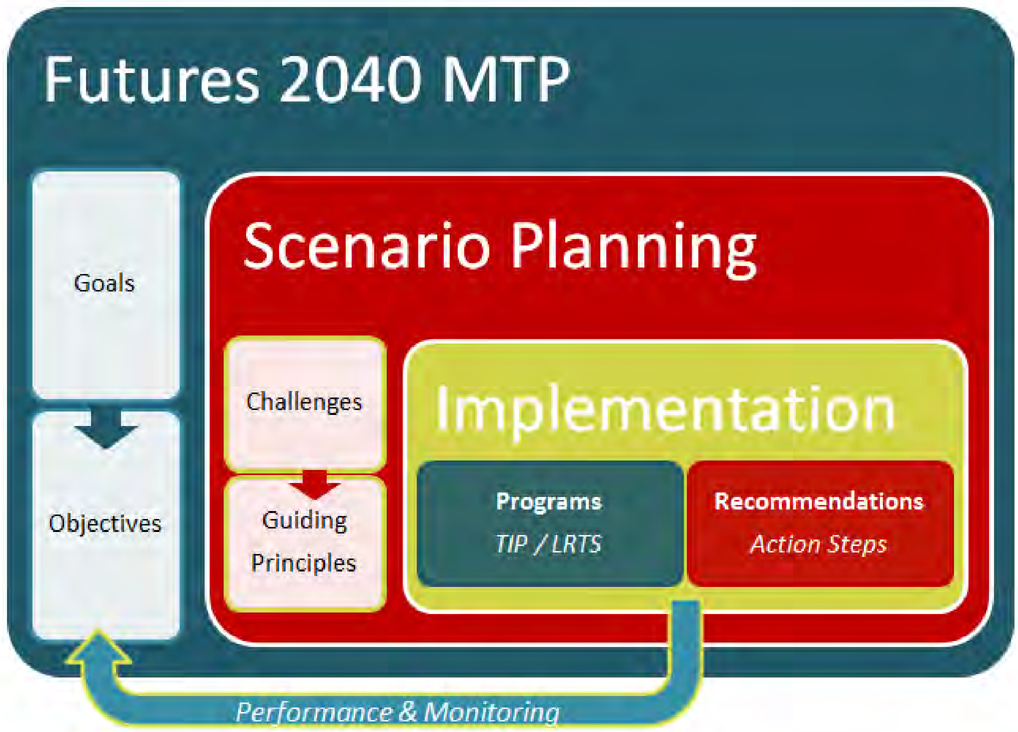
The *Futures 2040 MTP* represents a continuing, cooperative, and comprehensive transportation planning process to identify existing conditions, anticipate future needs, and prioritize projects that support the goals and objectives of the plan. However, the MTP development process not only results in a transportation plan, but also provides the opportunity to consider and possibly 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 *2040 MTP* is not just a product and a means of disseminating information, but also represents a means of bringing together regional stakeholders to make recommendations and develop strategies for improving the transportation system.

Besides the fact that it 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 mobility, economic vitality, active places and environmental resiliency, better outcomes for the region will result. This is true not only in terms of transportation conditions, but also livability, economic returns, regional competitiveness, and sense of place, to name just a few. The plan also promotes regional cooperation and public and stakeholder participation in the transportation planning process.

The *Futures 2040 MTP* is a multi-faceted plan that covers a wide range of challenges and issues facing the region. Within the MTP framework lies the scenario planning efforts that consider how land use policies and transportation investments can best address the plan's larger goals. Ultimately, the planning process leads to specific programs, recommendations, and action items that address regional needs and support the guiding principles of the Preferred Scenario.

The document itself explores current and projected conditions before considering appropriate strategies to address regional challenges. **Chapter 2** explores the levels of expected growth in the AMPA, the scenario planning effort, and the components of the Preferred Scenario. **Chapter 3** discusses transportation and other related challenges in the region and how they may be addressed in the coming decades. **Chapter 4** assesses how the Trend and the Preferred Scenario perform and other means of tracking progress in the region in terms of addressing long-term transportation needs. Finally, **Chapter 5** considers steps to implement the *2040 MTP* and support the principles of the Preferred Scenario. The reader should note that while individual sections in Chapter 3 provide strategies and opportunities related to the specific mode or issue being addressed, these strategies are coalesced into recommendations and action items that are organized by subject (e.g. transportation, land use, or the environment) in Chapter 5. Supplemental materials can be found in the **Appendices**, including a full list of all projects proposed by member agencies for implementation by the year 2040.

Figure 1-1 Components of the *Futures 2040 MTP*



In addition to the list of projects for implementation, an MTP is a combination of tools and datasets that can be utilized by member agencies and the general public for project development and decision-making purposes. For this reason, analysis related to housing and transportation affordability or accessibility to area hospitals and transit stations are presented alongside the Trend Scenario socio-economic and travel demand forecasts. To make the MTP more user-friendly, the first page of each section of Chapter 3 contains a side panel outlining critical components and important products.

1.2 Development of the *2040 MTP*

The *Futures 2040 MTP* is the culmination of several years of research, analysis, outreach, and coordination with member governments and the general public. It is a comprehensive effort to establish a regional transportation vision, identify potential growth patterns, and create a list of projects that will be funded and implemented over the coming decades. An MTP is also an extension of previous efforts. Land development and transportation infrastructure projects require time to finance and implement, meaning there is overlap and consistency from plan to plan. But new data and trends require constant rethinking of projections and transportation needs.

In effect, the MTP is an ongoing effort; as soon as one update is complete, the process begins again. The development of the *2040 MTP* began with efforts to share the previous MTP with business groups, neighborhood associations, and other stakeholders around the region. This outreach and education is critical in identifying and addressing regional concerns over time. MRMPO also convenes representatives from member agencies through a range of committees, including an MTP Steering Committee that oversees the development of the plan and determines how to integrate the MTP into local policy. The Congestion Management Process (CMP) Committee exists to monitor the progress of the MTP and forward the strategies identified in the MTP as they relate to congestion along regionally significant corridors and highways. Along the way, new priorities emerge for the region and its member governments.

New Data and Improved Tools

The period following the adoption of an MTP is dedicated to updating tools, acquiring new data, and researching trends in transportation policy. In addition to ongoing collection of transportation data, the *2040 MTP* development cycle was marked by major efforts to understand travel behavior in the region. In fall and winter 2013, the Mid-Region Household Travel Survey was conducted to understand how transportation patterns vary depending on factors such as age, household size, income, vehicle ownership rates, and place of residence. In spring 2012, an on-board transit survey was conducted to identify the socioeconomic characteristics of transit users, where riders travel to and from, and how these factors vary based on the type, frequency, and location of transit service.

MRMPO also developed sophisticated modeling tools to improve its ability to project future growth and transportation patterns. These include a new land use model (UrbanSim) that was utilized in creating socioeconomic forecasts, and new implementation of the travel demand model (CUBE) that directly incorporates the data from the household travel survey and the on-board transit survey.

Much has been written about changing travel patterns across the county, particularly among the millennial generation and their increased preference for urban living and alternative modes of transportation, as well as the changes in overall market demands that accompany those trends. The MTP considers how these trends apply in the Albuquerque Metropolitan Planning Area, how they may impact regional growth patterns, and whether transportation investments identified by member agencies and strategies currently being pursued will effectively meet the evolving needs of the region. For more on these trends, see Chapter 3.1.

Building an understanding of the cares and concerns of the public is a critical part of the MTP development process. In particular, public participation is not just a means of educating the public on the plan itself, but a means of generating feedback. Public participation spanned the entire MTP development cycle, with rounds of public meetings held in November 2013, May 2014, and January 2015. Outreach methods also included information tables at public events and presentations to neighborhood associations and public questionnaires that allowed respondents to express their opinions on the transportation system and identify preferred improvements. These efforts allowed for comprehensive feedback of the most critical challenges facing the region, and ultimately informed the plan's goals and objectives.

Project Identification

The MTP contains a list of all transportation projects proposed for implementation over the life-span of the plan. This project list is proposed by member agencies, with analysis conducted by MRMPO to ensure that sufficient federal and local funding exists to implement the proposed projects. MRMPO does not lead the design or construction transportation projects, but does work with member agencies to identify funding sources and analyzes infrastructure needs. Ideally, the information contained in an MTP informs the projects proposed by member agencies.

Many projects carry over from one MTP to the next; however, new priorities emerge and projects may be added or dropped. One particular area that is emphasized to a greater degree by agencies in the AMPA is roadway maintenance and preservation. The reality of operating and maintaining an ever-increasing transportation network on tightening budgets means that new capacity projects have greater competition for limited dollars and are to be undertaken only when necessary. For this reason, there are some notable differences in the roadway projects contained in the *2035* and *2040 MTPs*.

Scenario Planning

A major new component of the *Futures 2040 MTP* is the use of scenario planning. Scenario planning involves the comparison of multiple patterns of future growth using performance measures to determine the most desirable outcomes. The use of scenario planning exemplifies how metropolitan transportation plans are part of an ongoing process. The trend scenario in the *2035 MTP* projected high levels of congestion along the region's river crossings.[2] MRMPO heard repeatedly from its member agencies and the general public that the growth patterns that contributed to the deteriorating transportation conditions identified in the plan did not represent a desirable future. Scenario planning is a means of introducing a proactive planning approach that encourages integrated land use and transportation decision-making. Rather than projecting one future based on existing plans and policies,

[2] An MTP trend scenario is based on existing plans and policies reflects what would happen if recent development practices continue in the coming decades

the *2040 MTP* provides alternative growth scenarios and investigates the results so that a more desirable future can be achieved.

The scenario planning process involved a number of steps designed to translate regional challenges into scenario concepts, which were eventually modeled and analyzed for their performance and ability to address regional challenges. A workshop was held in June 2013 to introduce the concept of scenario planning to regional stakeholders and discuss regional challenges. Two additional workshops were held in the summer of 2014 to collaboratively build and evaluate a series of alternative growth scenarios. Iterations of the MTP scenarios were presented at each workshop, with feedback sought on how best to address regional goals and provide a reasonable alternative to the Trend Scenario of the *2040 MTP*. The workshops were complemented by continuous feedback from member agency staff through the Land Use and Transportation Integration (LUTI) and MTP Steering Committees. The Preferred Scenario that resulted from this process contains the organizing principles for the plan and serves as a target to strive towards regarding the future of transportation and land use in the region. See Chapter 2 for more information on the scenario planning process.

1.3 Public Participation

Public participation for *Futures 2040* was conducted in accordance with MRMPO's Public Participation Procedures adopted by the Metropolitan Transportation Board in January 2013.[3] Outreach strategies used to promote awareness and gather feedback included questionnaires, public meetings and open houses, requests for comments posted on the MRCOG website, and promotion at community events. (Select findings from the *2040 MTP* Questionnaire can be found in the Transportion Trends section in Chapter 3.1; a summary report can be found in Appendix J). Public meetings and the survey were publicized in a variety of ways, including via print ads in local newspapers, radio ads, social media, the MRMPO e-newsletter, partner websites, Facebook pages and Twitter feeds, press releases, and other on-line events listing forums and newsletters.

The goal of MRMPO's Public Participation Plan is to provide the public and concerned stakeholders meaningful access to the planning process at each stage of its development. For *Futures 2040*, the main goals of the public outreach efforts were to increase knowledge about and engagement in the regional long-range planning process and to solicit feedback from as wide and diverse a group possible.

[3] The Public Participation Procedures are available on MRCOG's website at www.mrcog-nm.gov. For more on scenario planning outreach, see Chapter 2.

There were three main outreach stages during the course of the plan's development.

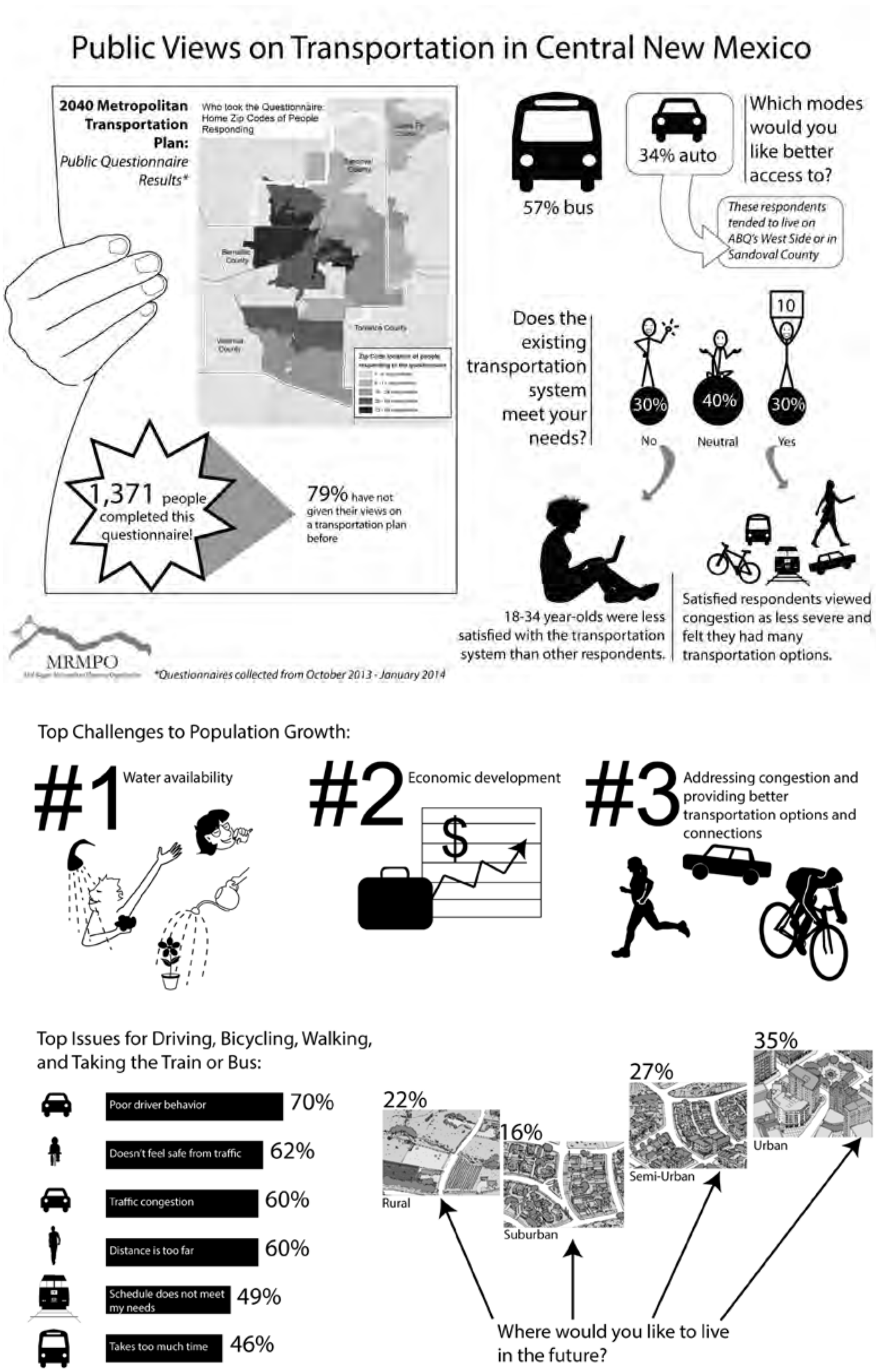
1) MTP Kick-Off (October 2013-March 2014): The upcoming MTP development process was presented and feedback was solicited on potential goals and regional challenges in public meetings. New elements to the MTP were introduced and the questionnaire was undertaken to gather people's views on transportation in the AMPA. An MTP Facebook page was developed and launched.

2) MTP Analysis Phase (April 2014-November 2014): In this phase of outreach, feedback on regional challenges was summarzied and presented, results of the questionnaire were reported, and feedback on the conceptual growth scenarios was sought. In this outreach phase, MRMPO staff attended community events to help promote participation in the MTP process and introduce the plan to new audiences. MRMPO also hosted open houses in an attempt to appeal to new participants. The medium proved more interactive and enabled MRMPO staff to discuss issues with attendess in an in-depth manner. Feedback was also solicited on the conceptual scenarios in this phase.

3) MTP Draft Phase (December 2014-April 2015): Comments were solicited on the draft MTP in December and January and comments were solicited on the final draft in March. Public meetings were held in January to present the draft MTP and to gather feedback on the document, particularly on the plan's findings. The document was posted on-line and its availability for review was promoted on the MRCOG website, partner websites and social media pages, via email blasts and MRCOG and MRMPO social media and MRMPO's newsletter, as well as other methods.

Comments and feedback received from the all three phases of public participation were integrated into MTP products (e.g., conceptual scenarios) and used to guide the document itself. A list of all public presentations given and forums where the MTP materials were promoted is available in Appendix I. Figure 1-2 shows an infographic summarizing key findings from the *2040 MTP* Questionnaire.

Figure 1-2: Summary Findings Handout from *2040 MTP* Questionnaire



Chapter 2: Demographics, Scenario Planning, and the Future of the Region

2.1 Regional Profile

The Albuquerque Metropolitan Planning Area (AMPA) is geographically situated in central New Mexico and encompasses 3,095 square miles. Within the AMPA lie Bernalillo County, Valencia County, and the majority of the populated portion of Sandoval County, 11 incorporated places, eight Pueblos and the To'hajiilee Navajo Reservation. 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 including the U.S. Fish and Wildlife Service, National Park Service, and U.S. Forest Service. The AMPA is bisected by the Rio Grande, which supports the Bosque ecosystem, irrigates farmland, and carries water for household consumption.

The AMPA contains New Mexico's largest concentration of population and jobs. As of 2012, it is home to approximately 879,000 people and 389,000 jobs, which represents 43 percent of the state's population and about 48 percent of its jobs. Table 2-1 illustrates how existing population, housing, and employment are distributed by county within the AMPA.

Bernalillo County is the most populated county in the state and serves as a hub of social and economic activity. Major employers in the county include the University of New Mexico (UNM), Central Community College of New Mexico (CNM), Sandia National Laboratories, and Kirtland Air Force Base.

Sandoval County is the fastest growing county in the state due to rapid development within the City of Rio Rancho. The county contains a mix of semi-urban, suburban and rural settings and is home to Intel Corporation, University of New Mexico and Central New Mexico Community College campuses, Sandoval County Regional Medical Center, Presbyterian's Rust Medical Center, and several Pueblos.

Table 2-1: AMPA Population and Employment by County

	Bernalillo County	Sandoval County *	Valencia County	Total
Population	675,548	126,490	77,363	879,401
Share	77%	14%	9%	100%
Housing	287,318	48,600	30,313	366,231
Share	78%	13%	8%	100%
Employment	341,452	31,829	15,700	388,981
Share	88%	8%	4%	100%
** Sandoval County numbers reflect the portion in the AMPA only.*				

Valencia County is the location of the state's newest Urbanized Area, the Los Lunas Urbanized Area, which was designated following the 2010 Census. Valencia County's economy is rooted in agriculture and much of the valley continues to be farmed today, while several key centers including the Village of Los Lunas and the City of Belen have flourished as both residential and commercial communities.

The City of Albuquerque is the region's largest incorporated place in the AMPA as well as the most densely developed. The City of Rio Rancho is the second most populated municipality, while the Town of Bernalillo ranks second in density.

Table 2-2: Population and Density for Incorporated Places within the AMPA, 2012

Incorporated Places	Population	Land Area (square miles)	Population per Square Mile
Albuquerque	555,417	189.2	2,936.4
Belen	7,255	17.8	408.3
Bernalillo	8,413	5.2	1,608.6
Bosque Farms	3,889	3.9	997.2
Corrales	8,453	11.0	767.8
Los Lunas	15,168	15.7	966.7
Los Ranchos de Albuquerque	6,087	4.3	1,402.5
Peralta	3,643	4.4	820.5
Rio Communities*	5,625	7.6	743.1
Rio Rancho	90,818	103.9	874.1
Tijeras	547	1.2	463.6
Incorporated Population	705,315	364.2	1,936.6

* Rio Communities population is derived from the Census Designated Place boundary.

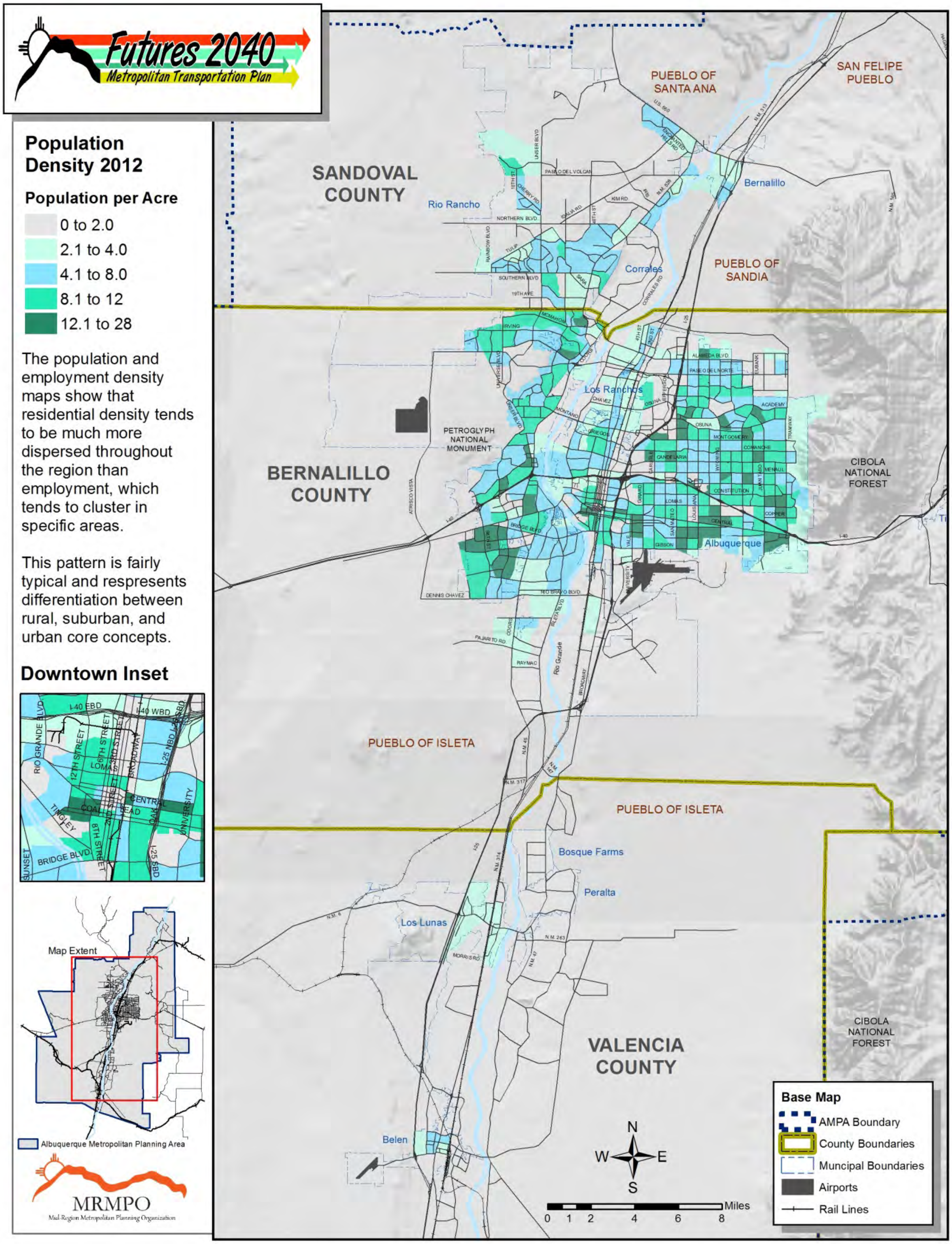
Source: *US Census Bureau, Population Estimates, American Community Survey*

Maps 2-1 and 2-2 show concentrations of residential and employment activity within the AMPA in 2012. These maps are based on Data Analysis Subzones (DASZs), which is 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.

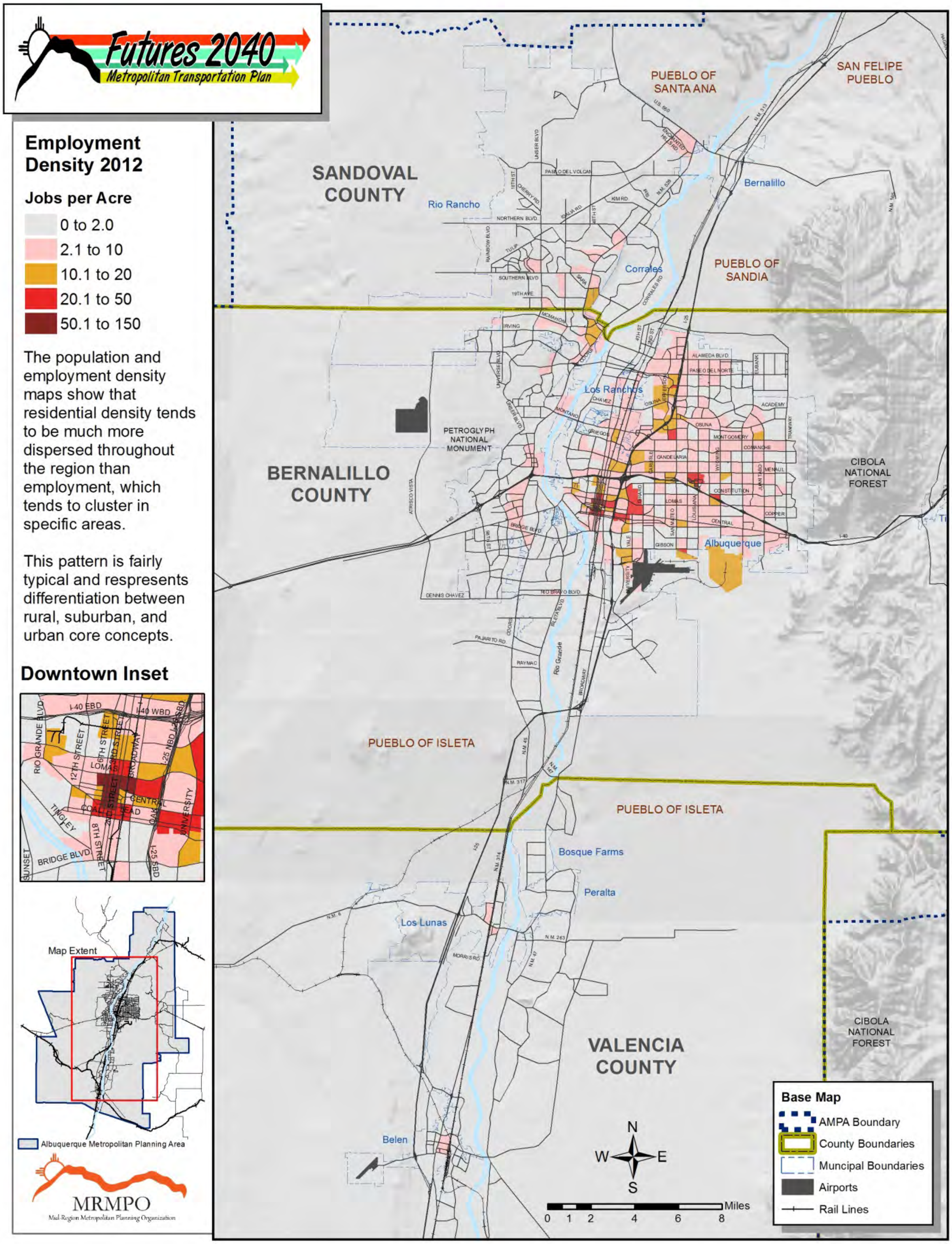
Residential development is dispersed throughout the region with varying densities. Within the City of Albuquerque, Downtown Albuquerque and the near northeast and southeast parts of the city constitute some of the earliest and most dense neighborhoods. Following 1960, the city expanded into the far northeast heights as well as west of the Rio Grande. The Southwest Mesa experienced rapid growth of dense residential subdivisions during the early to mid-2000s. To the north, the City of Rio Rancho incorporated in 1981 and experienced fast-paced growth over the following three decades.

Employment concentrations form many of the region's activity centers and serve as major destinations for residents throughout the region. These areas appear on Map 2-2 in darker shades of red and include North I-25/Journal Center, Downtown Albuquerque, UNM/CNM, Sunport, Kirtland Air Force Base, ABQ Uptown, Intel, and Cottonwood. Other employment destinations in the region include Rio Rancho City Center, Atrisco Business Park, Cordero Mesa, Los Morros Business Park, and Los Lunas and Belen town centers, among others. The majority of all jobs, approximately two-thirds or 142,000 jobs, lie outside of employment centers and are scattered among the region's corridors and neighborhoods.

Map 2-1: Population Density by DASZ, 2012



Map 2-2: Employment Density by DASZ, 2012



2.2 Historical Growth

Since 2000 the AMPA has experienced dramatic shifts in growth rates and development patterns. A large part of the last decade brought rapid growth and significant expansion that further fueled a dispersed population. The *2035 MTP* reported that between 2000 and 2008 the AMPA grew by 128,000 people, a rate of two percent per year, and consumed 20,000 additional acres for residential use. At the same time, the AMPA gained approximately 32,000 new jobs. The Great Recession slowed growth substantially as population levels between 2008 and 2012 rose by an average of just one percent per year. Over the same period, the metropolitan area lost an estimated 23,800 jobs. Employment loss and economic stagnation continues to be one of the key challenges facing the region today.

Figure 2-1: Population and Employment Growth, 2000-2012

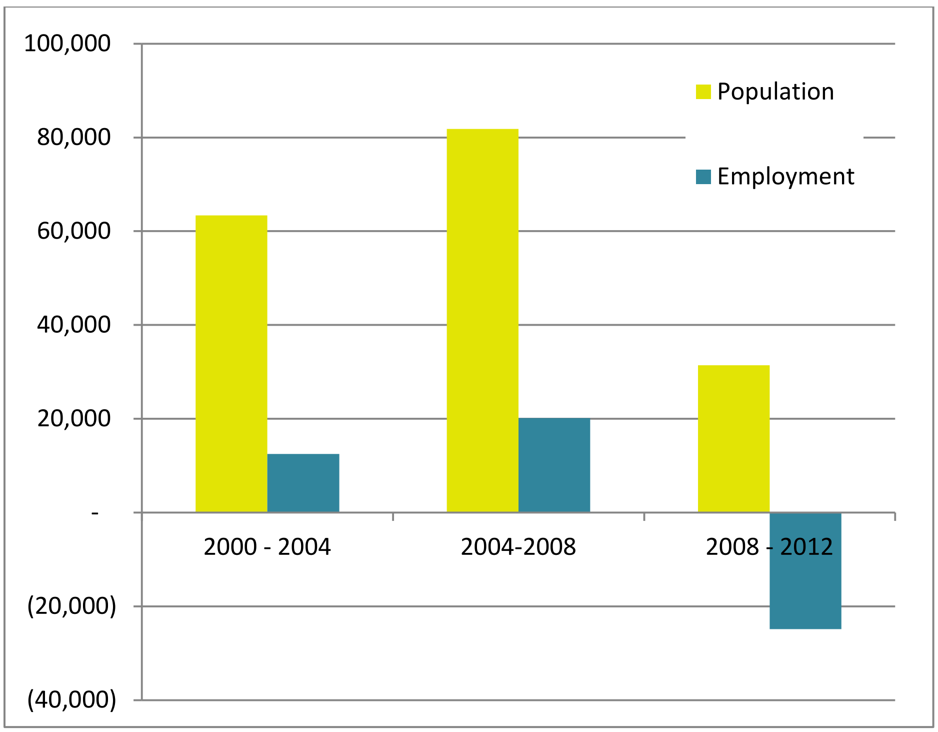
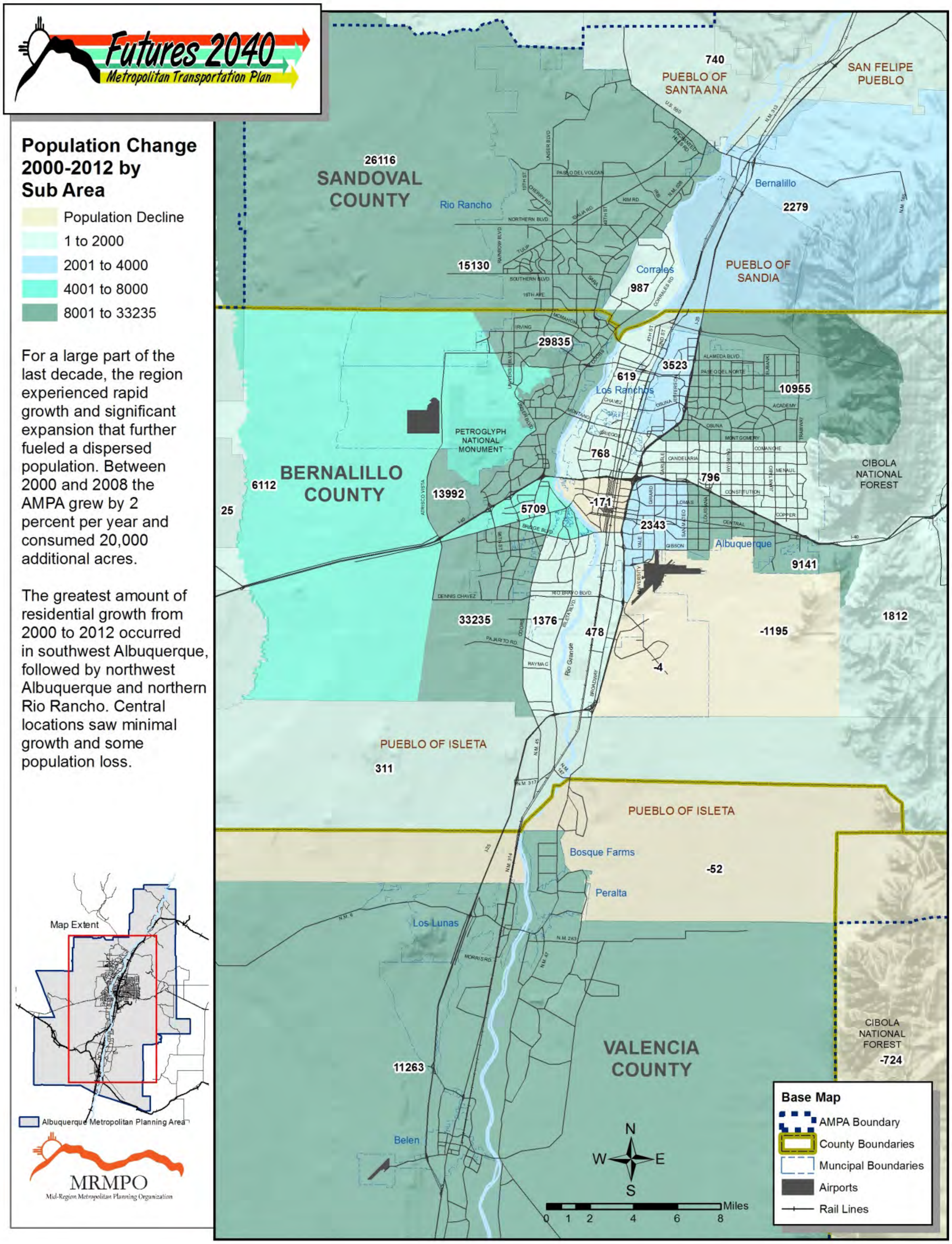
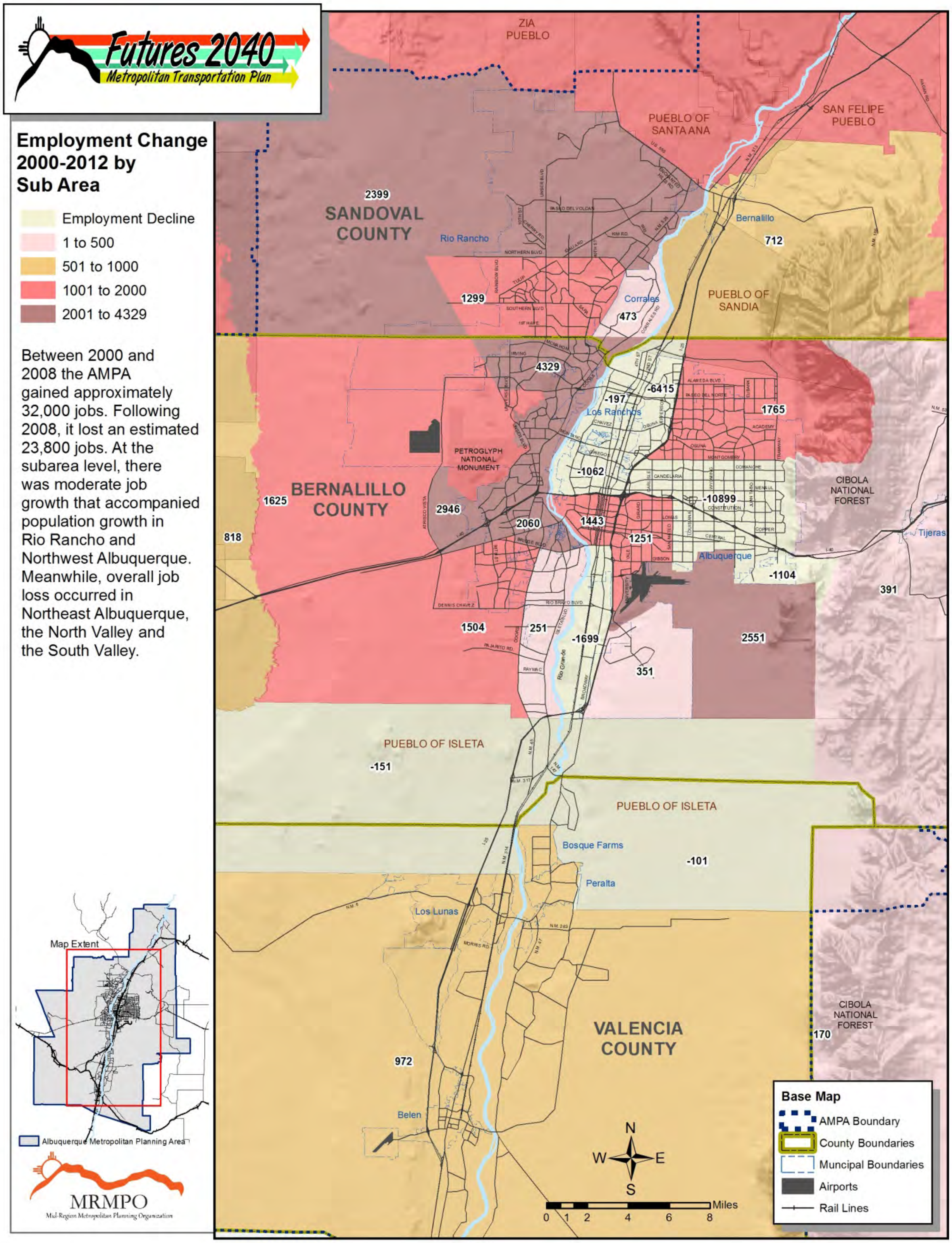


Figure 2-1 illustrates the incremental pace of growth over the past 12 years. In the first four years of the decade population growth was strong and employment growth was stable. Between 2004 and 2008 rapid population growth continued as housing construction peaked along with employment. Following 2008, population growth slowed and overall employment dropped to levels not seen since 2000. Maps 2-3 and 2-4 depict population and employment change by subarea in order to show concentrations of new growth, and loss, within the AMPA since 2000.

Map 2-3: Population Growth by Sub-Area, 2000-2012



Map 2-4: Employment Growth by Sub-Area, 2000-2012



The greatest amount of residential growth from 2000 to 2012 occurred in southwest Albuquerque, followed by northwest Albuquerque and northern Rio Rancho. Central locations including the North Valley, South Valley, and Southeast and Near Northeast Heights saw minimal growth and some population loss as a result of few new homes built and smaller household sizes. Job growth was slow but in general accompanied population growth in Rio Rancho and northwest Albuquerque. Job growth was dismal in southwest Albuquerque where one new job was gained for every 22 new people. At the same time, job loss occurred throughout the core, which in the context of overall job loss in the metro area is to be expected given that these are the same areas with the greatest concentration of jobs. It is notable that Downtown Albuquerque and the area east of Downtown remained on the positive side of employment growth over the decade due to key projects that brought jobs into the area, including the new courthouse buildings and expansions at UNM Main Campus, a new Children's Hospital at UNMH and CNM expansion.

Jobs-Housing Balance

The subject of river crossing congestion was highlighted throughout the *2035 MTP* and continues to inform conversations related to future growth and transportation in the region. Jobs to housing balance, displayed as a ratio (jobs/housing), is a useful metric for understanding and anticipating travel demand, particularly across the river. Ratios above one are considered a healthy balance, and it is generally assumed that a higher jobs-housing ratio equates to more opportunities to live close to work and shop close to home, thereby enabling shorter driving distances.

Table 2-3: Jobs-to-Housing Balance East and West of the Rio Grande

Jobs-Housing Ratio	2000	2004	2008	2012	2000-2012
East of the Rio Grande	1.6	1.51	1.5	1.39	-0.21
Housing	199,242	209,484	215,080	219,694	10%
Jobs	319,099	317,060	323,496	306,296	-4%
West of the Rio Grande	0.67	0.68	0.65	0.56	-0.11
Housing	94,808	112,495	137,652	146,537	55%
Jobs	63,647	76,820	89,307	82,685	30%
AMPA Average	**1.3**	**1.22**	**1.17**	**1.06**	**-0.24**

Table 2-3 shows that the ratio of jobs to housing throughout the AMPA has declined in recent years. The primary cause for the decline is job loss. The table also illustrates an imbalance between jobs and housing west of the Rio Grande where homes outnumber jobs by nearly two to one. Considering that there is an average of 1.18 workers per household, this means that the majority of Westside workers are commuting across the river for work. It is clear that although the Westside has been successful in attracting jobs over the past decade, rapid housing growth has outpaced job growth further widening the existing jobs-housing imbalance.

2.3 Regional Growth Forecast

Every metropolitan transportation plan begins with a growth forecast. By identifying the likely origins (homes) and destinations (work, shopping, and recreation sites) of trips, as well as the paths that connect them, planners are able to anticipate future transportation needs. Forecasts must be built upon the most recent information available in regards to both demographic and economic trends. This need is exemplified by the events that followed the Great Recession of 2008. Since the recession the AMPA has experienced changes in growth trends, including slowed birth rates, a decline in migration, and job loss. This updated information has been integrated into the assumptions that underlie a revised population and employment forecast for the *2040 MTP*. Tables 2-4 and 2-5 illustrate the population and employment forecasts for the AMPA.

Table 2-4: AMPA Population Forecast

	Bernalillo	Sandoval*	Valencia	AMPA
2012	675,548	126,490	77,363	879,401
2040	987,080	203,128	127,715	1,317,923
30 Year Growth	**311,532**	**76,638**	**50,352**	**438,522**

*The small portion of Sandoval County outside of the AMPA has been excluded.

The AMPA is projected to grow by 438,500 people, or 50 percent, over the next 28 years. Approximately 71 percent of that growth will take place in Bernalillo County, while Sandoval County will capture 17 percent and Valencia County will capture 11 percent. At the regional level, the forecasts contained in the *2040 MTP* are based on projections from the Geospatial and Population Studies (GPS) department at the University of New Mexico. The projection technique is based on historical birth rates, mortality rates, and migration patterns, and has proved accurate over the long-term.

Table 2-5: AMPA Employment Forecast

	Bernalillo	Sandoval*	Valencia	AMPA
2012	341,452	31,829	15,700	388,981
2040	473,037	72,569	25,563	571,169
30 Year Growth	**131,585**	**40,740**	**9,863**	**182,188**

*The small portion of Sandoval County outside of the AMPA has been excluded.

Employment growth is expected to slightly lag the pace of population growth, with a 47 percent increase in jobs expected by 2040. Bernalillo County is expected to capture 72 percent of that growth, Sandoval County will capture 22 percent, and Valencia County will carve out 5.4 percent of the new jobs to the AMPA.

Shifting Age Dynamics

The forecast is noteworthy not just for the total levels of population growth, but the shifting age dynamics. In particular, New Mexico is expected to transition from one of the youngest states to perhaps one of the oldest. The population pyramids shown in Figures 2-2 and 2-3 demonstrate the changing age composition over time. For ease of comparison, the following data considers all of Valencia, Bernalillo, and Sandoval Counties, including the relatively small population in Sandoval County outside of the AMPA boundaries. Whereas the population bulges formed by the Baby Boomer (persons approximately 50 to 68 years of age) and Millennial (approximately 14 to 32 years of age) generations can be clearly observed in 2012, the distribution of population by age groups is less pronounced in 2040.

Table 2-6: Population by Age Group, 2012 and 2040

Age Group	2012	2040	Change
Less than 15 Years	20%	18%	-2%
15-64 Years Old	67%	61%	-6%
65 Years and Older	13%	21%	+8%

The population pyramids reveal a considerable increase in the senior population (65 years and over), which grows from 13 to 21 percent of the population as the Baby Boomers continue to age and as life expectancy increases (see Table 2-6). These numbers represent a substantial level of growth: the total number of residents age 65 years and over grows from 117,600 to 278,300, an increase of 137 percent. Although the share of youth (age 15 years and under) shrinks slightly as a percentage, the number of residents increases from 183,000 to 241,400. As a result, the working age population will continue to decline as a share of the overall population.

The dependency ratio measures the number of dependents per 100 workers. Dependents are considered persons not typically in the labor force (youth and seniors), and workers are assumed to be those most likely in the labor force (ages 15 to 64). While this is somewhat crude (not everyone between 15 and 64 is in the labor force and not everyone over 65 retires), it is nonetheless a useful measure to gauge potential pressure on the work force and other economic indicators. The projection shows that today there is about one dependent for every two workers. In the future this is expected to increase significantly to nearly two dependents for every three workers.

There are important implications of these age dynamics on travel patterns and transportation needs. In particular, changes in labor force participation rates mean that commuting trips in the peak period will form a smaller percentage of daily trips compared to today, although the total number of commuting trips in the peak periods will increase as the population grows. Overall, there will likely be changes in traffic patterns as trips are dispersed across the day. Similarly, changing age dynamics will impact the types of trips that are taken, including an increase in trips related to healthcare and medical assistance and greater reliance on some form of public transit as some residents may no longer be able to drive themselves

Figure 2-2: Population Pyramid, 2012

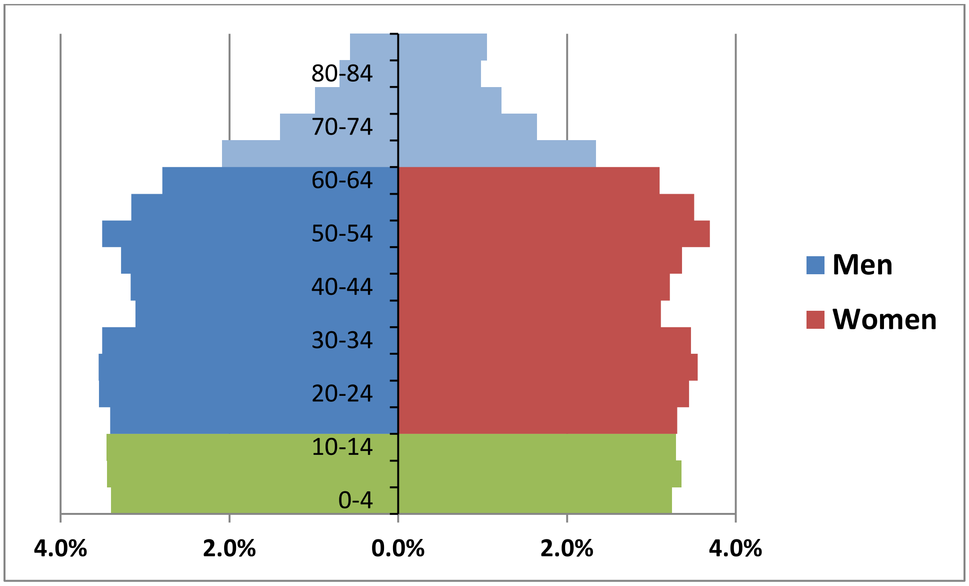
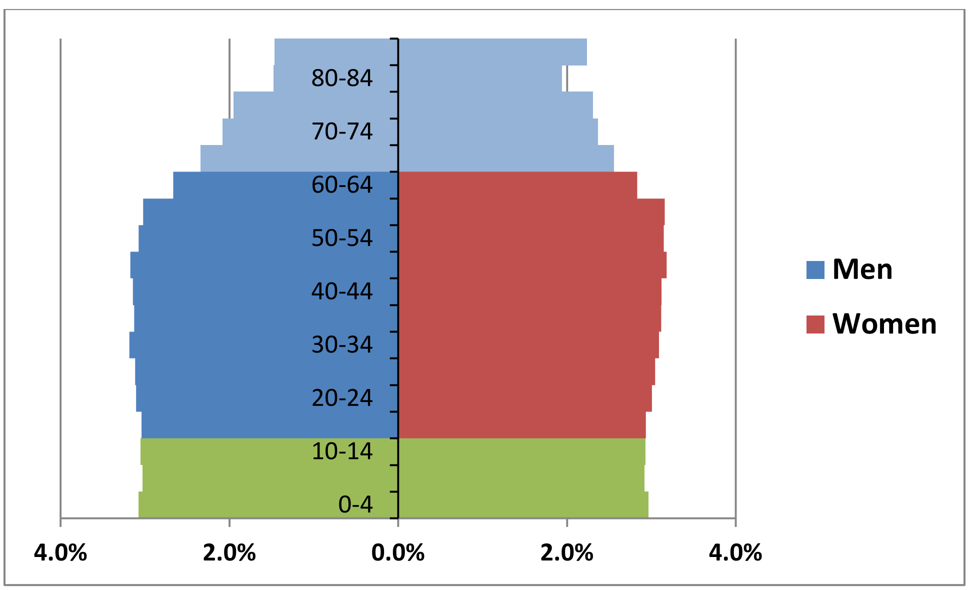


Figure 2-3: Population Pyramid, 2040



2.4 Trend Scenario

Understanding historical growth is critical for projecting land use patterns and anticipating future growth. Certainly, preferences and policies change and unforeseen events do occur and result in shifts in development patterns. However, the forecast must be based on existing trends as they relates to population, land use, and employment, and it must be rooted in current plans and policies. This is why the MTP forecast is referred to as a "trend scenario" – it 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 for this MTP was developed using several key sources of information. The forecasting process began with the GPS county-level population projections for the year 2040 which were aggregated to the four-county level to set a regional 2040 target for population. MRMPO supplemented the GPS projections with a 2040 employment forecast using a regional economic model. Next, local zoning regulations, existing land use information, current development projects, and development constraints such as open spaces, waterways, and federally protected lands were compiled into spatial databases. MRMPO feeds these inputs into a regional land use model that geographically distributes growth based on a combination of historical growth patterns, allowable use, remaining capacity, and site attractiveness measures. Finally, interviews with developers, planners, and others were held to check assumptions and solicit feedback on draft forecasts. This process spans two years and relies on a considerable amount of input from the planning, transportation, and development communities in the form of personal interviews, workshops and committee meetings.

The Trend Scenario assumes a financially constrained roadway and transportation network as proposed by member governments between the base year (2012) and the forecast year (2040). It is important to note that the *2040 MTP* contains a more limited set of roadway expansion projects than the *2035 MTP*, as a greater share of regional monies are likely to be directed toward maintenance and preservation than in the past. In this scenario the transit network is expected to see limited service expansion, as well as the implementation of the Albuquerque Rapid Transit on Central Ave. Operational funding required for other major transit projects has not been identified and such services are not included in the scenario.

The Trend Scenario socioeconomic forecast is described using large sub-regions that include 1) City of Albuquerque, east of the Rio Grande; 2) City of Albuquerque, west of the Rio Grande; 3) remainder of Bernalillo County, which includes unincorporated communities as well as the Villages of Los Ranchos and Tijeras; 4) City of Rio Rancho; 5) remainder of Sandoval County that is within the AMPA; and 6) Valencia County.

Table 2-7: Housing Distribution by AMPA Sub-Region, 2012 and 2040

	2012 Housing Units		2040 Housing Units	
Sub-Region	Total	Share	Total	Share
East Albuquerque	172,499	47%	240,088	44%
West Albuquerque	67,477	18%	94,336	17%
Remainder of Bernalillo County	47,342	13%	82,702	15%
Rio Rancho	34,588	9%	58,469	11%
Remainder of Sandoval County	14,012	4%	17,976	3%
Valencia County	30,313	8%	53,240	10%
Total	**366,231**	**100%**	**546,811**	**100%**

**Numbers are based on an aggregation of DASZs and not municipal boundaries.*

At the sub-regional level, the existing housing distribution will remain similar over the forecast period. The biggest gains in housing shares in the AMPA are seen in Rio Rancho, remainder of Bernalillo County, and Valencia County, each of which sees an increase in share by two percentage points. East Albuquerque and west Albuquerque add 67,500 and 27,000 homes respectively but both decrease their share of housing in the metropolitan area.

Table 2-8: Employment Distribution by AMPA Sub-Region, 2012 and 2040

	2012 Employment		2040 Employment	
Sub-Region	Total	Share	Total	Share
East Albuquerque	250,705	68%	341,838	63%
West Albuquerque	32,755	9%	54,140	10%
Remainder of Bernalillo County	57,992	16%	76,954	14%
Rio Rancho	19,650	5%	54,071	10%
Remainder of Sandoval County	12,179	3%	18,603	3%
Valencia County	15,700	4%	25,563	5%
Total	**388,981**	**106%**	**571,169**	**104%**

**Numbers are based on an aggregation of DASZs and not municipal boundaries.*

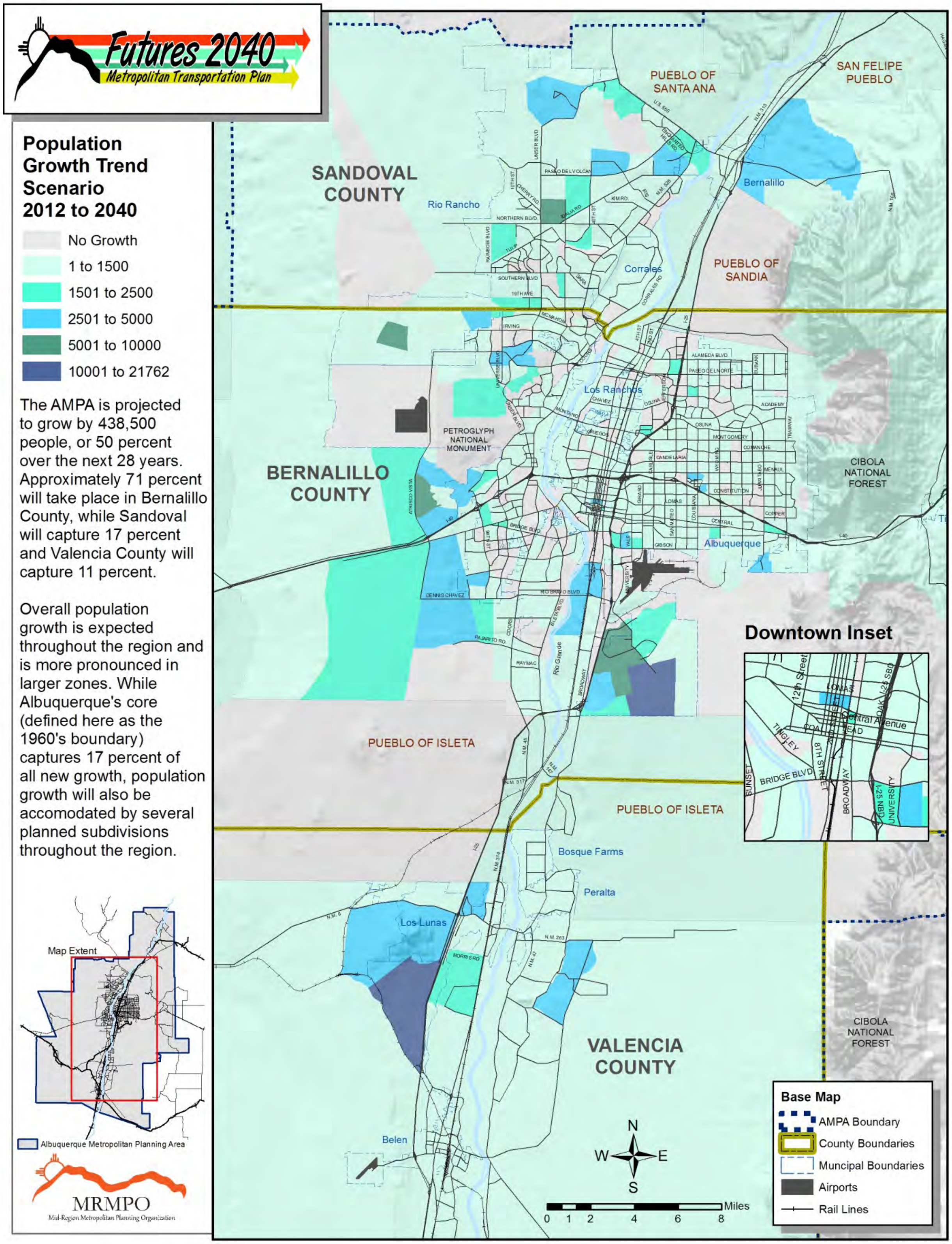
In terms of employment distribution by sub-region by 2040, east Albuquerque and the remainder of Bernalillo County will decrease in their shares of overall jobs, while the employment shares for west Albuquerque, Valencia County and Rio Rancho will increase. Rio Rancho's job growth represents a significant shift to its current imbalance between housing and jobs as it becomes more attractive as an employment destination as the metropolitan area expands.

Maps 2-5 and 2-6 illustrate forecast population and employment growth by DASZ. The maps depict absolute numbers and are not normalized by acres. While this is a useful way to visualize future growth because it emphasizes areas that are expected to change most in character, less obvious are the smaller DASZs that contain a high level of existing development and see increases in density. These maps should be used in combination with the zone-level datasets in order to get a full picture of the forecast.

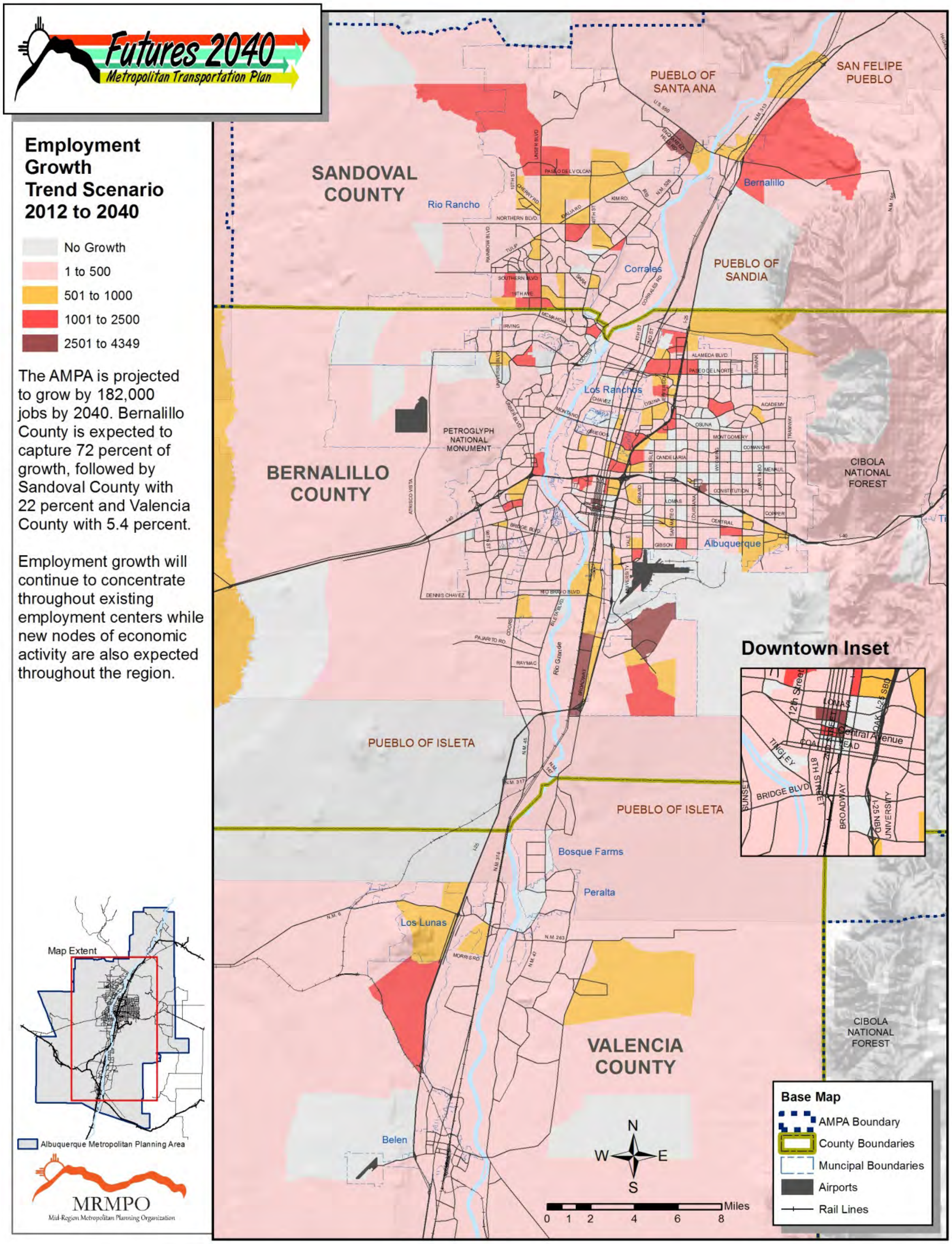
Using the Trend Scenario

The Trend Scenario is available to the planning and transportation community so that plans may be developed with consideration of what the future may look like if current conditions persist over the horizon period. However, the socioeconomic forecast associated with 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 that the MTP is updated every four years. There are many uncertain conditions in the region’s future, be they related to the wider economy, development market forces, demographic trends, availability of natural resources, fiscal constraints, or a change in regional priorities. These uncertainties should be considered alongside the Trend Scenario when it is being referenced.

Map 2-5: Population Growth for the Trend Scenario, 2012-2040



Map 2-6: Employment Growth for the Trend Scenario, 2012-2040



2.5 Scenario Planning Process

Rethinking the Future

While the years following 2008 were devastating to the economy, the pause from growth presented an opportunity for regional stakeholders to look back on historical development patterns and consider what they would like to see in the future in terms of a shared vision. Much of this dialogue has been captured in MRMPO's scenario planning activities documented throughout this plan. As it relates to where people live and work, it was revealed through the workshops held as part of the scenario planning process that priorities are shifting from infrastructure expansion to targeted investments, and that network connectivity, activity centers, and a creative mix of uses have become important parts of the conversation going forward.

One key element behind the shift in dialogue is a growing understanding of how demographics are shaping market demands. The Millennial generation, roughly between the ages of 14 and 32, number approximately 240,000 in the AMPA. National and local surveys indicate that this generation's preferences are changing housing and land use patterns. That is, more than past generations, Millennials express a strong interest in urban lifestyles and a desire to live closer to jobs and amenities. They are also more likely to take transit and non-motorized modes than other generations (see Chapter 3.1 for more details).

In addition, the Baby Boomer generation, with a population of over 200,000 in the AMPA, will also continue to impact transportation and development patterns. While many Boomers will "age in place," others will relocate and demand smaller dwellings and easier access to services and amenities. For some, aging will bring the loss of the ability to drive, and for those people, as well as those with low incomes or physical disabilities, access to transit will be critical.

Another factor in this conversation is a raised awareness about dwindling financial resources during a time of growing need. Tighter budgets have led to an increased emphasis on collaboration, creative financing strategies, and discussions about how to form public/private partnerships in order to maximize return on investment. Understanding that there is not enough money to realize every desired project, public officials are emphasizing catalytic projects that are likely to leverage existing infrastructure and help to connect the dots between major activity centers and transit nodes. While these are relatively new discussions, they are already playing out in meaningful ways: Innovate ABQ, an effort that brought together the City of Albuquerque and the University of New Mexico to plan the transformation of a key site in Downtown Albuquerque into a learning and technology campus, is one key example. The Albuquerque 2030 District, a private sector led effort that aims to "reduce the environmental impacts of building operations and construction while maximizing Albuquerque's economic viability and profitability for building owners, managers, and developers" is another. It is likely that this new way of doing business will play a large role in shaping how and where the region develops in the future.

Finally, there is the ongoing concern over the issue of congestion along the river crossings. While roadway expansion can and should still occur 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. Rather, a combination of strategies will be required to tackle this issue, and land use will be an important tool in the toolbox. There is a call for more jobs on the Westside to serve the residents there and help foster a "reverse commute," while residential density in proximity to transit can be key to creating opportunities for multi-modal transportation options.

These factors are among several that underlie the call from member agencies to consider an alternative to the Trend Scenario. The remainder of this chapter describes the scenario planning process and the components of the Preferred Scenario, which represents a set of guiding principles for shared land use and transportation decisions over the coming decades in the AMPA.

Defining Scenario Planning

MPOs must develop a trend scenario for their regional long-range transportation plans that considers how development will unfold based on existing plans and policies. Scenario planning allows planners to consider "what if" questions as they relate to land use and transportation decisions that may lead to a very different picture of the future. This type of planning allows for comparisons between different scenarios and has the power to inform decision-making related to transportation priorities, land use strategies, and infrastructure investments.

A comprehensive scenario planning process is accompanied by an evaluative component that draws upon performance measures in order to better understand the costs and benefits of various future development patterns on the transportation network, environment, and economy. Alternative scenarios may consider different land use patterns, different development mixes, and alternative transportation networks, thereby facilitating a direct link between land use and transportation planning. Evaluating the effect of these changes on key performance measures related to access and mobility better equips planners to understand how the regional may fare given different policy decisions. In some ways, scenario planning can be best described as a tool to better evaluate the trade-offs of different growth patterns.

State of the Practice

Since 2004, the Federal Highway Administration (FHWA) has encouraged transportation-focused scenario planning as an approach that enhances the traditional planning process. This type of scenario planning is a technique designed to help citizens and stakeholders in the public and private sectors understand how demographic and land-use changes could potentially impact transportation networks in a state, community, region, or study area.

- FHWA Scenario Planning Guidebook (February 2011)

Scenario planning enables a more proactive planning process and can be integral in developing strong collaboration among member agencies. Through a nearly two-year effort facilitated by MRMPO staff in concert with member agencies and other stakeholders, the region explored what the future could look like and what the impacts of different future growth scenarios might be.

Building off the 2035 MTP

The *2035 MTP* contained an initial attempt at scenario planning by looking at a “Compact Scenario” in addition to the Trend. This scenario included a simple analysis of the impact of changes in land use patterns on the transportation system by looking at what would happen if the region developed in a more compact form. There were significant, and positive, impacts on the transportation system when growth occurred differently (see Table 2-9). This exercise brought to the forefront the importance of looking at the impact of land use decisions on transportation outcomes. This analysis also demonstrated that there may be effective alternatives to building and maintaining costly new infrastructure to address congestion.

Table 2-9: Travel Statistics from *2035 MTP* and Compact Development Scenario, 2035 PM Peak Hour

PM Peak Hour	MTP 2035	Compact Scenario	Percent Difference
Vehicle Hours of Delay	160,154	123,654	-23%
Vehicle Hours Traveled	228,812	189,354	-17%
Vehicle Miles Traveled	3,077,065	2,946,946	-4%
Average Speed	13.4	15.6	16%

Land Use and Transportation Integration (LUTI) Committee

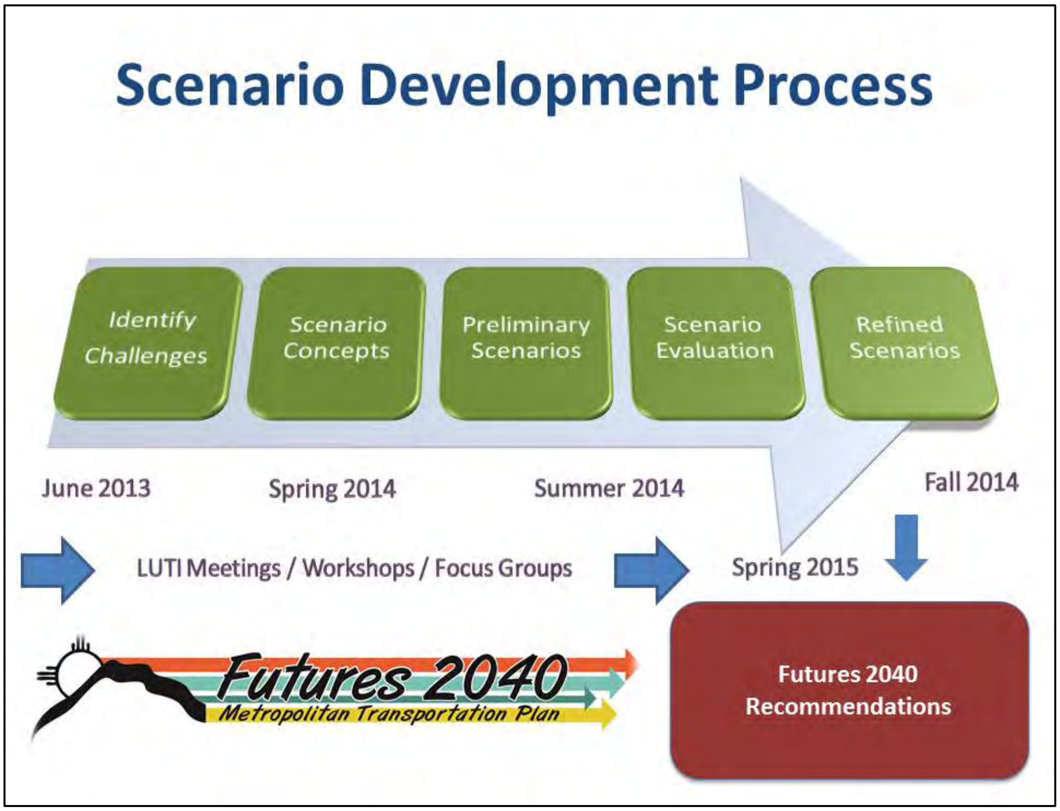
An integrated scenario planning process includes a wider variety of stakeholders and new metrics that help guide decision-making so that land use and transportation solutions are complementary. To support a more robust planning process and better integration of land use and transportation planning in the region, a Land Use and Transportation Integration Committee (LUTI) was formed in 2012 that includes planners and engineers from local jurisdictions, including Rio Rancho, Albuquerque, Los Lunas, Belen, Bernalillo County, the New Mexico Department of Transportation, Rio Metro, and ABQ Ride. This group meets regularly and became the steering committee for integrating scenario planning into the *Futures 2040 MTP*.

A successful scenario planning process relies on both an understanding of the current and future transportation networks (including roadways and transit) and an understanding of the current land use framework including zoning, metropolitan redevelopment areas, and expected development opportunities. For example, in order to develop more walkable areas there needs to be both well-connected street networks (transportation) and a mix of uses and density to support it (land use). LUTI provided a forum for land use and transportation specialists to ask questions of each other and work together to come up with ideas and solutions for regional challenges. In brief, the committee helped create connections at the professional level to discuss better ways to integrate land use and transportation plans, policies, codes, standards and design throughout the region, resulting in a more comprehensive planning process.

Participation Process used for Scenario Planning

MRMPO developed a comprehensive public outreach process as part of the scenario planning efforts (see Figure 2-4). In addition to general public outreach, representatives from a variety of professions were brought into the process, including public health advocates, housing specialists, elected officials, natural resources experts, rural area representatives, neighborhood associations, economic development managers, and developers and business groups. In some cases interactive workshops were developed to discuss a range of topics, and in other cases small focus groups met to discuss pressing issues.

Figure 2-4: *2040 MTP* Scenario Planning Process



Three intensive workshops were held throughout the process that included staff from member agencies who sit on MRMPO committees and public agencies involved in the Central New Mexico Climate Change Scenario Planning Project. The first workshop, a two-day event that took place in June 2013, was made possible by a technical assistance grant from the Federal Highway Administration and helped kick-start the scenario planning process. About 70 participants engaged in group discussions, keypad polling, and mapping exercises to provide input on the potential challenges and opportunities they envisioned for the region's future. A panel of expert peers also participated in the workshop and helped lay the foundation for building a successful process.[1]

The next two intensive workshops took place in July and August of 2014. These workshops were made possible through a grant awarded to MRCOG that became the Central New Mexico Climate Change Scenario Planning Project. The Climate Change Project advanced the already occurring scenario planning process by providing additional analysis on the potential impacts of climate change on the region, including droughts, wildfires, flooding, and water availability. This project introduced a range of new stakeholders to the metropolitan transportation planning process and strengthened partnerships between MRMPO and many of the local agencies dealing with flood and fire risk, and other environmental impacts. See Chapter 3.14 for more on the project and the integration of climate analysis into the long-range planning process.

Identifying Regional Challenges

A significant part of the initial outreach efforts was spent gathering information from a wide array of stakeholders regarding what they felt were the most pressing regional challenges and needs. MRMPO integrated results from similar discussions held over the course of several workshops related to transit-oriented development which were sponsored by the New Mexico District Council of the Urban Land Institute. Importantly, even though the exercises were facilitated by a transportation planning agency, water resource availability was identified as the most pressing challenge facing the region, followed by economic development. The information collected from these workshops, focus groups, and online surveys was synthesized into the key regional challenges and needs shown in Figure 2-5. MRMPO translated these challenges into "scenario concepts," which provided an initial description, or narrative, of the different ways the region might grow and how to relate challenges into potential policies or strategies (see Figure 2-6).

[1] The expert peers were Michael Skipper, Executive Director, Nashville Area MPO, and Rob Terry, Senior Regional Planner, Fresno Council of Governments (Fresno COG).

Figure 2-5: Regional Challenges / Needs

Water Resources
- Future water availability and delivery
- Water conservation and protection
- Understand how development patterns impact water use
- Aging infrastructure

Economic Development
- Job creation and diversification
- Retain families and young professionals
- Living wage and quality of life

Diverse Housing / Transportation Options
- Affordable housing in areas with a mix of uses and access to transit
- Housing choices that appeal to the workforce and an aging population
- Connectivity of roadways, transit, trails and paths
- Access, quality and safety issues among all modes

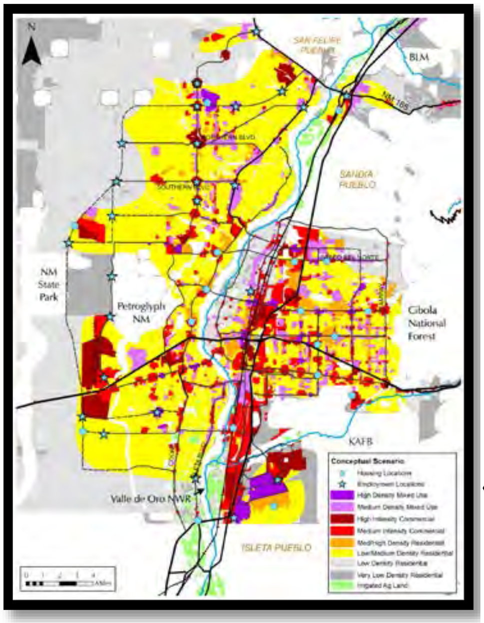
Balance of Jobs and Housing
- River crossing congestion
- Sprawl development without jobs strains the transportation system
- Some development types and locations are not feasible to serve with transit
- Jobs west of the Rio Grande

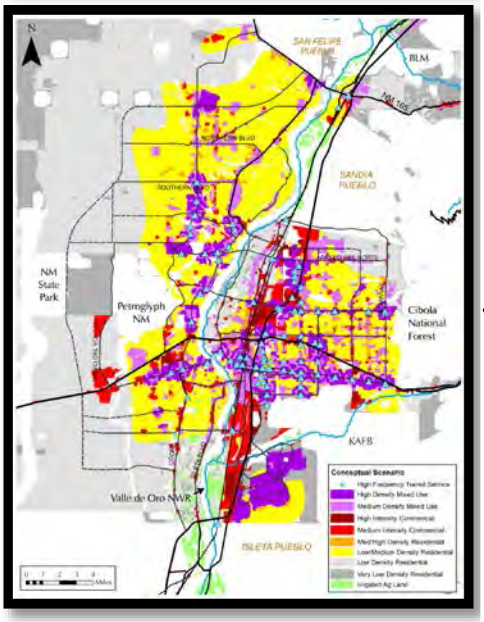
Shared and Active Places
- More examples of quality mixed-use developments
- Attractive public spaces to gather and socialize
- Underutilized activity centers
- Abandoned properties and vacant sites in key locations
- Frequency of transit service to major destinations

Historic and Rural Preservation
- Retain cultural heritage and neighborhood identity
- Balance rural character with urban growth
- Loss of open space and agricultural land
- Historic preservation of main streets and original town sites.

Climate Change / Resiliency
- Disconnect between development patterns and resiliency and climate impacts
- Awareness of changing temperature and precipitation on energy demands, transportation infrastructure, and fire/ flood risk
- GHG emissions impacted by fleet composition and land use

These challenges represent the synthesis of local feedback collected from thousands of surveys, hundreds of workshop participants, and dozens of focus group attendees.





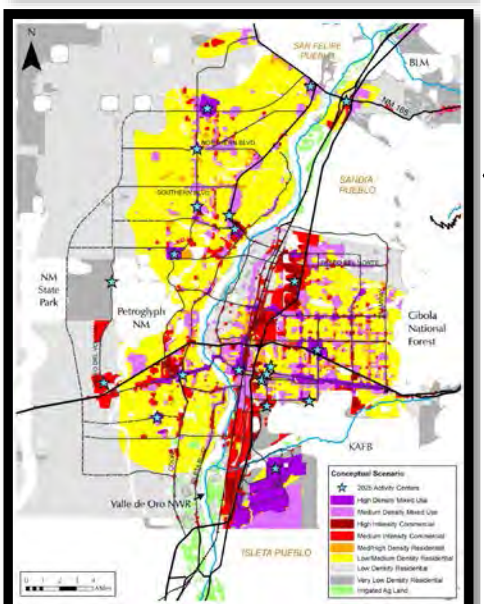


Figure 2-6: Scenario Concepts

The maps show the following land uses:

- commercial (**red**)
- mixed use (**purple**)
- multi-family (**orange**)
- single-family (**yellow**)
- low density residential and rangeland (**gray**)
- irrigated agricultural land in (**green**)

⇦ Allowable Uses

The Allowable Uses Scenario is a simplified Trend Scenario and is derived from existing zoning and comprehensive plans across the region. In effect, this scenario depicts what type of development can be pursued over the next 25 years under existing plans and policies. For modeling and visual purposes, aggregated zoning categories were developed. Policy information from various plans throughout the region was also referenced, including: the City of Albuquerque/Bernalillo County Comprehensive Plan, the Rio Rancho Development Vision, and the Valencia County Comprehensive Plan, with particular attention paid to identified centers and corridors.

⇦ Emerging Lifestyles

The Emerging Lifestyles Scenario addresses changing socio-demographics and focuses on providing a range of housing and transportation options. It reflects a change in travel behavior and an interest in living closer to services and entertainment. Emphasis is placed on compact development in targeted centers and locations near transit to meet the housing demands of a range of age demographics. From a transportation perspective, this scenario reflects an increased preference for alternative modes, including public transportation. For modeling and visual purposes, parcels within a ¼ and ½-mile of existing and future high frequency transit stops were designated for medium-density and high-density mixed-use development and multi-family housing.

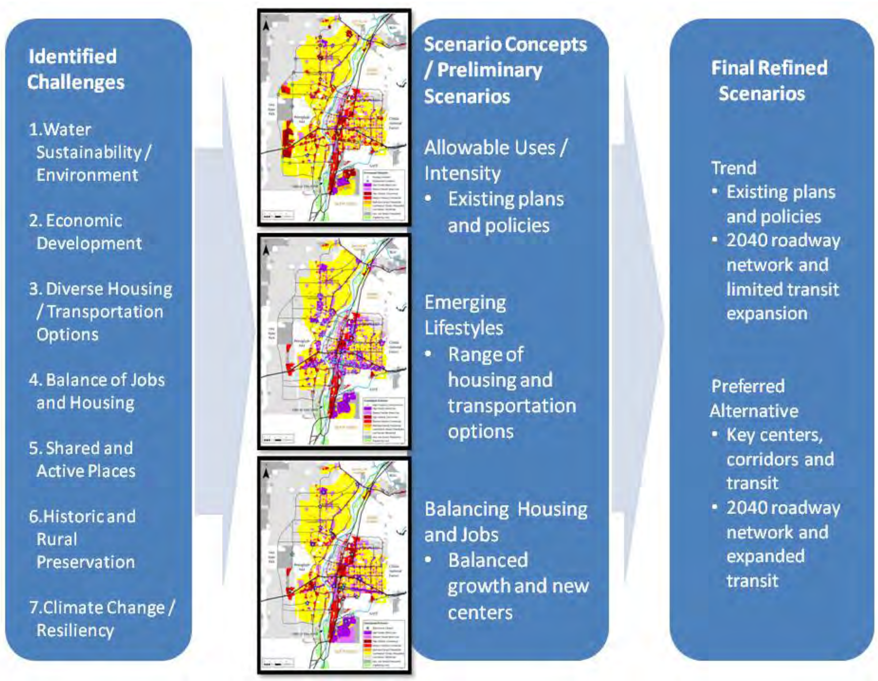
⇦ Balancing Housing and Jobs

The Balancing Housing and Jobs Scenario responds to a desire expressed by multiple stakeholders across the region to see a greater balance between housing units and jobs in key locations. In this scenario new job growth and commercial development is the focus in Rio Rancho, west Albuquerque, village and town centers, and parts of unincorporated Bernalillo County. For modeling purposes, in addition to targeting commercial zoning near predominantly residential areas, housing is targeted around existing employment sites. New centers are also identified in Valencia County around the forthcoming Belen intermodal facility and UNM Valencia Campus.

2.6 Preferred Scenario

The initial scenario concepts explicitly addressed many of the regional challenges, particularly “Diverse Housing/Transportation Options,” “Balance of Jobs and Housing,” “Shared and Active Places,” and “Economic Development.” Other challenges were more appropriately evaluated as performance measures to assess how well the scenario addressed each challenge (e.g., “Climate Change/Resiliency,” “Water Resources,” and “Historic and Rural Preservation”). In addition, many of these challenges identified are addressed in the implementation recommendations for the Preferred Scenario.

Figure 2-7: Translating Regional Challenges into Scenarios



After reaching agreement with member agencies on the scenario concepts, MRMPO staff developed preliminary scenarios that could be modeled and evaluated. Performance measures were also developed to evaluate the costs and benefits of each scenario and to allow for direct comparison among the scenarios. Much of this work took place at the two intensive summer workshops in 2014.

The scenario development process was iterative: MRMPO staff would present scenarios to the public and member agencies before refining the scenarios and calculating performance measures. The ultimate goal of this process was to develop a preferred alternative, or in other words, an agreed upon refined scenario that best addresses regional challenges and identifies key locations for future development and transportation infrastructure investments over the next 25 years.

The scenario planning process revealed a broad set of future objectives, including: more transit service, a mix of uses in key locations, 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 preservation of historic and cultural assets. Some of these objectives cannot be specifically addressed through land use scenarios. However, all are within the purview of local jurisdictions and can be addressed through locally implemented programs and policies. Some of the objectives voiced by stakeholders appeared in 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.

After reviewing the performance measures related to the preliminary scenario concepts, stakeholders agreed that the Emerging Lifestyles Scenario should be the starting point for development of a single preferred alternative. However, many participants indicated a need for greater concentration of employment activities west of the river, an element of the Balancing Housing and Jobs Scenario. Feedback also reflected a greater desire for mixed uses east of the river and more proactive planning west of the river. Following the second workshop, MRMPO staff refined and finalized a Trend Scenario based on existing plans and policies and a Preferred Scenario based on a hybrid between the Emerging Lifestyles and the Balancing Housing and Jobs Scenarios.

Principles of the Preferred Scenario

The Preferred Scenario is an alternative socioeconomic and land use forecast that is based on several guiding principles that were developed and refined through the collaborative scenario planning process. They are as follows:

1) Local land use policy decisions impact the larger region, particularly as they relate to transportation; therefore it is critical to link land use and transportation decision-making to effectively address regional mobility.
2) Future population growth and increased traffic congestion will contribute to a continued increase in transit ridership and a demand for service expansion.
3) Concentrated development within key centers and transit nodes create the mix of activity and connections that enable transit to succeed.
4) A diverse mix of uses coupled with appropriate design standards within key centers and transit nodes increase the potential for shorter trips and enhance the propensity for bicycle and pedestrian trips.
5) A greater emphasis on growing employment centers west of the Rio Grande will allow for more work, shopping and medical trips to occur locally, thereby alleviating congestion on river crossings.
6) A greater emphasis on affordable and diverse housing options in closer proximity to jobs, shopping, and medical facilities east of the Rio Grande will increase household location choices while reducing travel demand.
7) Changing demographic composition and preferences increase the likelihood that the guiding principles behind the Preferred Scenario will coalesce with consumer demand.

8) Development patterns that maximize the utility of existing infrastructure have the potential to equate to significant cost savings for local jurisdictions as it relates to service delivery and infrastructure costs.

Key Locations of Preferred Scenario

The key locations identified through the development of the Preferred Scenario, including activity centers, transit nodes, and commercial corridors, form the backbone of the Preferred Scenario (see Map 2-7). These features were identified by the LUTI committee and presented at multiple stakeholder workshops for feedback and revision. These components should be considered a starting point for discussions following the release of the *2040 MTP* as they will clearly evolve over time as growth occurs and jurisdictions update local plans.

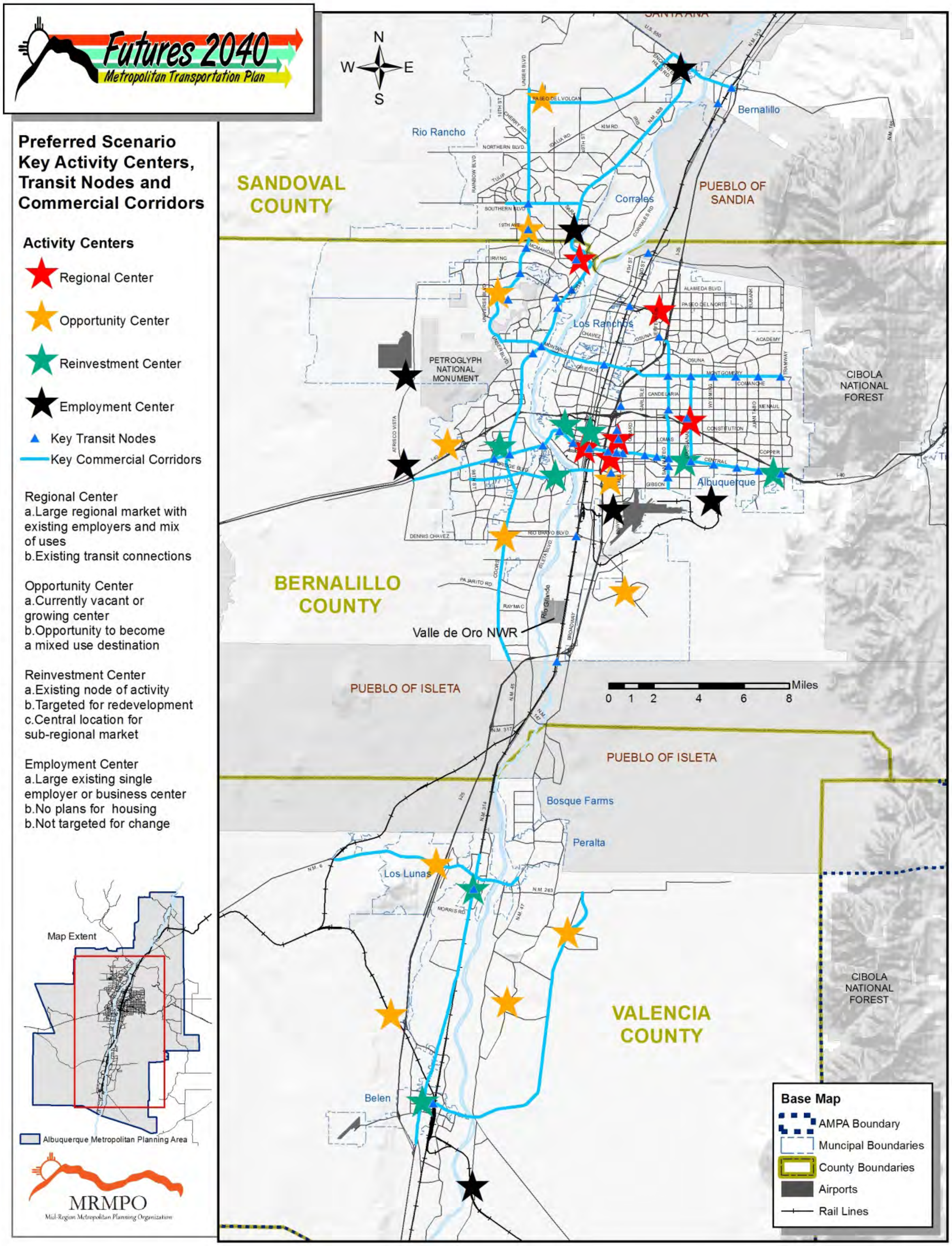
The key *transit nodes* refer to transit stops that are either currently or expected to have high frequency of service in 2040. Substantial input was provided by local transit planners. The *commercial corridors* do not necessarily have transit use on them, but have been identified by planners as active and highly traveled, and provide important connections in the multi-modal transportation system. Key *activity centers* are areas of concentrated employment and economic activity and are categorized by type in order to clarify the types of improvements that make sense given the character of the area. The activity center character types are described in Table 2-10.

The principles of Preferred Scenario and the key locations map will inform many aspects of the work performed at MRMPO and agencies in the region. Stakeholders also developed an initial list of recommendations for implementing the Preferred Scenario (see Chapter 5.3). The next step in the scenario planning process is to evaluate these locations in more detail and determine the specific mix of land uses, socioeconomic characteristics, and transportation infrastructure that would be appropriate for the location.

Table 2-10: Activity Center Characteristics

Type	General Characteristics	Location	Status
Regional Center	Large regional market with existing employers and mix of uses. Currently served by public transit.	CNM Main Campus	Existing
		Cottonwood Mall	Existing
		Downtown Albuquerque	Existing
		Jefferson St/North I-25	Existing
		North UNM	Existing
		Uptown	Existing
Opportunity Center	Growing center or one that is currently underutilized. Opportunity to become a regional mixed-use destination.	Coors and Rio Bravo	Future
		Belen Intermodal Center	Future
		Manzano Center (Valencia County)	Existing
		Mesa del Sol	Future
		Rio Rancho City Center	Existing
		Rust Medical Center	Existing
		South UNM	Existing
		UNM Valencia	Existing
		Volcano Heights (NW Albuquerque)	Future
		West Los Lunas	Existing
		Westland Village Center (North of I-40)	Future
Reinvestment Center	Existing hub of activity, but targeted for redevelopment or additional activity. Potential sub-regional center.	Atrisco Business Park	Future
		State Fairgrounds	Existing
		Downtown Belen	Existing
		East Gateway (East Central Ave)	Existing
		Five Points / Bridge Blvd	Existing
		Los Lunas Rail Runner Station	Existing
		North Downtown	Existing
		Sawmill District (Old Town area)	Existing
Employment Center	Business center or location of large single employer. No plans for housing or major changes in uses.	Atrisco Vista & I-40	Future
		Double Eagle II Airport	Future
		Intel (Rio Rancho)	Existing
		Kirtland Air Force Base	Existing
		US 550 / Rio Rancho	Existing
		Sun Ranch Industrial Park	Existing
		Sunport International Airport	Existing

Map 2-7: Key Locations for the Preferred Scenario



2.7 Modeling Land Use

MRMPO uses an integrated land use model (UrbanSim) and travel demand model (CUBE Voyager) system in order to forecast future growth and travel demand. These models are tools to help regional stakeholders understand the anticipated benefits and costs associated with different land use and transportation decisions. The Trend Scenario was modeled using inputs that reflect current conditions. The Preferred Scenario was developed using the inputs from the Trend as a starting point; however, key policy changes were simulated to reflect the guiding principles of the Preferred Scenario. Policy changes are represented within the land use and travel demand modeling environments using three specific levers: 1) zoning, 2) transportation networks, and 3) development incentives.

Zoning

Zoning sets the parameters for development related to the land uses and densities allowed on a particular parcel. Developing alternative zoning required the selection of key locations in the region and redefining the growth potential in terms of allowable uses, maximum units per acre, and maximum buildable commercial space. Changes to allowable use affects what type of development may be built on the parcel. Changes to units per acre and floor area ratio (FAR) affect the remaining developable capacity for an area. While zoning dictates what type of projects and densities *could* occur in a specific area, the attractiveness of the site and market demand determine whether or not a parcel is actually developed.

The Trend Scenario assumes that future use and density on a parcel will conform to existing zoning regulations. In the Preferred Scenario, zoning was modified in key locations to allow for a greater mix of uses and higher intensities of development.

Transportation Networks

Roadway projects identified by member agencies form the basis for future-year transportation networks. Alternative road and transit networks can support the development of an alternative scenario by coding new transportation links and introducing them into a travel model simulation. Alternative networks will have an impact on mode split, travel times, vehicle miles traveled, and land development patterns.

The Trend Scenario includes the fiscally constrained roadway network identified by member agencies for investment by 2040. The transit network assumed for the Trend Scenario includes the existing network and frequency of service plus the addition of Albuquerque Rapid Transit on Central Ave. The Preferred Scenario assumes the same financially constrained roadway network as the Trend. However, it assumes transit expansion through new sources of revenue, in particular an infusion of capital funding through the Federal Transit Administration's Small Starts program or an increase in the transit-specific gross-receipts tax (GRT) from 0.125 cents to 0.5 cents. The 3/8-cent GRT increase could raise an additional $60+ million per year for transit service and capital expenditures. As part of the Preferred Scenario, a conceptual future transit network was developed to identify how new transit revenues equal to that generated by the increase in GRT could be utilized (see conceptual transit network in Chapter 3.4).

Policy Incentives

Simulating policy incentives and their effects is possible within the UrbanSim framework through adjustable levers that have been built to increase the development potential of an area that is targeted for additional investment. These incentives may be related to the development process with expedited approvals or waived or reduced permitting fees, for example. They may be regulatory through measures such as density bonuses, parking reductions, or relaxed design criteria. They also might represent financial incentives such as the creation of tax increment financing districts, impact fee reductions, or shared infrastructure costs.

It is important to note that areas that are incentivized remain subject to all other modeling constraints. For example, if a parcel has no remaining capacity or if it is not zoned for certain types of development, the policy incentive will have no effect. The lever increases likelihood but does not ensure future development. It is also important to note that locations for which no incentive has been applied may still experience considerable development. This is especially true where areas exhibit multiple favorable criteria that have historically factored into development decisions or if there are known development plans in the future growth assumptions. This approach preserves the integrity of the underlying regulatory framework and market influences and therefore produces a plausible scenario that could occur under different conditions.

The Trend Scenario is guided by current conditions and therefore it does not assume any additional policy incentives beyond what is in place today. The Preferred Scenario assumes that public entities will utilize incentives within their jurisdiction that will increase the likelihood of development in key locations. Table 2-11 summarizes the main differences between the two scenarios.

Table 2-11: Main Differences between the Trend and Preferred Scenarios

COMPONENT	SCENARIO	
	Trend	Preferred
Zoning	Existing	Alternative Zoning in Key Areas
Incentives	Existing	Key Activity Centers, Transit Nodes & Commercial Corridors
Roadways	2040 MTP Network	2040 MTP Network
Transit	2012 + Albuquerque Rapid Transit (Central Ave)	2040 Expanded Network

While the UrbanSim model is a powerful simulation platform for understanding urban systems, its strength lies in its ability to simulate growth patterns, respond to policy changes, and inform decision-making *at a regional scale*. It does not address issues of urban design nor should it be used to predict land use and intensity at detailed geographic levels such as individual parcels. . Like most simulation models, its performance is strongest in areas that contain multiple data sources and information points. In rural areas in particular, data availability and accuracy is sometimes a challenge. As such, when forecasting small areas MRCOG will often perform customized forecasts in order to supplement the DASZ level forecast and draw upon additional research and personal interviews. Users of this forecast should keep this in mind when working with the 2040 socioeconomic forecast.

Select Model Features

The introduction of UrbanSim into the MRMPO land use forecasting framework allowed for additional enhancements to the previous forecasting process. These enhancements help describe some of the elements that influence growth and explain some of the differences when compared with previous forecasts. In particular, the following features have been introduced into the modeling methodology:

- Household Mobility: the UrbanSim model simulates the movement of households within the region through a household transition model. Household relocation results in a more dynamic forecast and growth in areas that may otherwise remain static or see decline due to shrinking household size. This allows for new families to repopulate existing areas as they change in character and become more attractive over time.

- Vacancy Absorption: UrbanSim contains a vacancy model that allows for vacancy rates throughout the region to respond to changes in attractiveness of areas over time as well as changes in consumer demand. Vacancies were previously handled only in changing neighborhoods and remained relatively consistent in areas that did not experience significant growth.

- Demographic Characteristics: The demographic model in UrbanSim does not explicitly simulate changing housing preferences of various age groups. However, household characteristics including age of householder, presence of children, and income are factored into where households choose to locate and relocate.

- Redevelopment: In the past, redevelopment of existing built areas was primarily driven by known projects and specifically targeted areas. The UrbanSim model has the capacity to detect areas that may be attractive for redevelopment even if they are not currently identified for reinvestment. New growth in established areas may occur as long as it is permissible by zoning. This capability supports a more organic forecasting process for infill and redevelopment activity that is triggered by factors that have been historically known to influence new growth.

- Accessibility: The concept of access is introduced into the land use forecasting methodology in two important ways. One, travel time, rather than distance, is used to develop several of the equations that determine the allocation of future growth. The introduction of travel time over proximity allows for a more realistic measure of access as it influences growth. Two, the land use model and the travel demand model are integrated via an automatic feedback loop. That is, the UrbanSim model operates until 2025 at which time it feeds the socioeconomic forecast to the travel demand model to create a travel forecast for year 2025. Travel time data is fed back to the land use model, which is then run until 2040. As such, future congestion on the transportation network is allowed to shape future growth in a manner that is a better reflection of reality.

2.8 Scenario Comparison

By using an alternative set of assumptions regarding regional policy and priorities, the Preferred Scenario provides insight into how different the region might look given changes in plans and policies. The true value of this exercise, in addition to the collaborative visioning process, is in the performance evaluation of the scenarios. By analyzing how the scenarios compare based on a variety of measures one can better understand and anticipate the costs and benefits associated with growth and growth-related regulations. The impact of the Preferred Scenario on transportation performance is highlighted in Chapter 3.2. A review of all performance measures can be found in Chapter 4. The measures in Table 2-12 reveal the extent to which the simulation responded to the alternative set of zoning and policy incentives on which the Preferred Scenario is based.

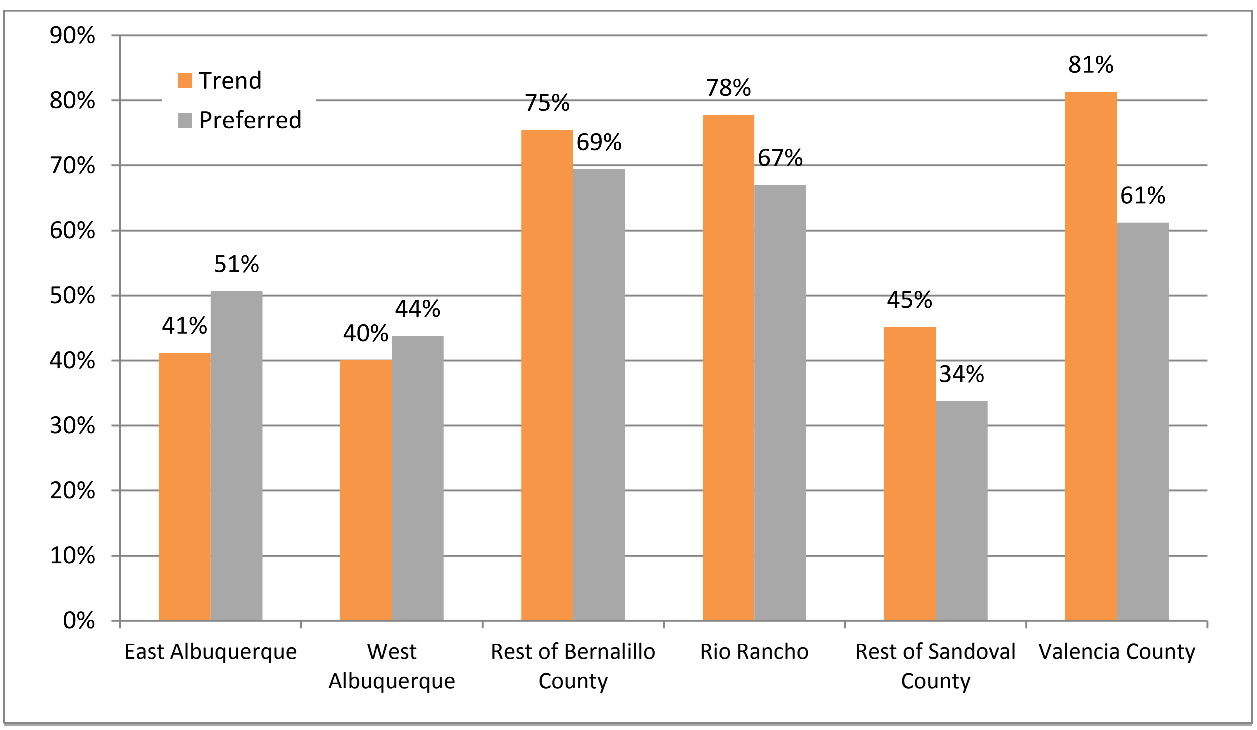
Table 2-12: Select Performance Measures, 2012, 2040 Trend and Preferred Scenarios

Performance Measure	2012	Trend	Preferred	Preferred vs. Trend
Access				
Households within Activity Centers	51,840	91,578	116,695	27.4%
Households within 1/4-mile of Transit Nodes	19,646	32,658	43,151	32.1%
Jobs within Activity Centers	152,684	222,951	250,372	12.3%
Jobs within 1/4-mile of Transit Nodes	97,153	119,911	127,421	6.3%
Jobs within 1/10-mile of a Commercial Corridor	72,202	102,426	126,902	23.9%

In particular, the Preferred Scenario is effective at improving accessibility to major centers, employment sites, transit nodes and corridors. In comparison with the Trend, 27 percent more households are located within a mile from activity centers and 32 percent more households are located within ¼-mile to transit in the Preferred. Employment responded positively to the Preferred Scenario as well, exhibiting a 12 percent greater likelihood of locating near centers, a six percent increase in proximity to transit, and a 24 percent increase along key commercial corridors.

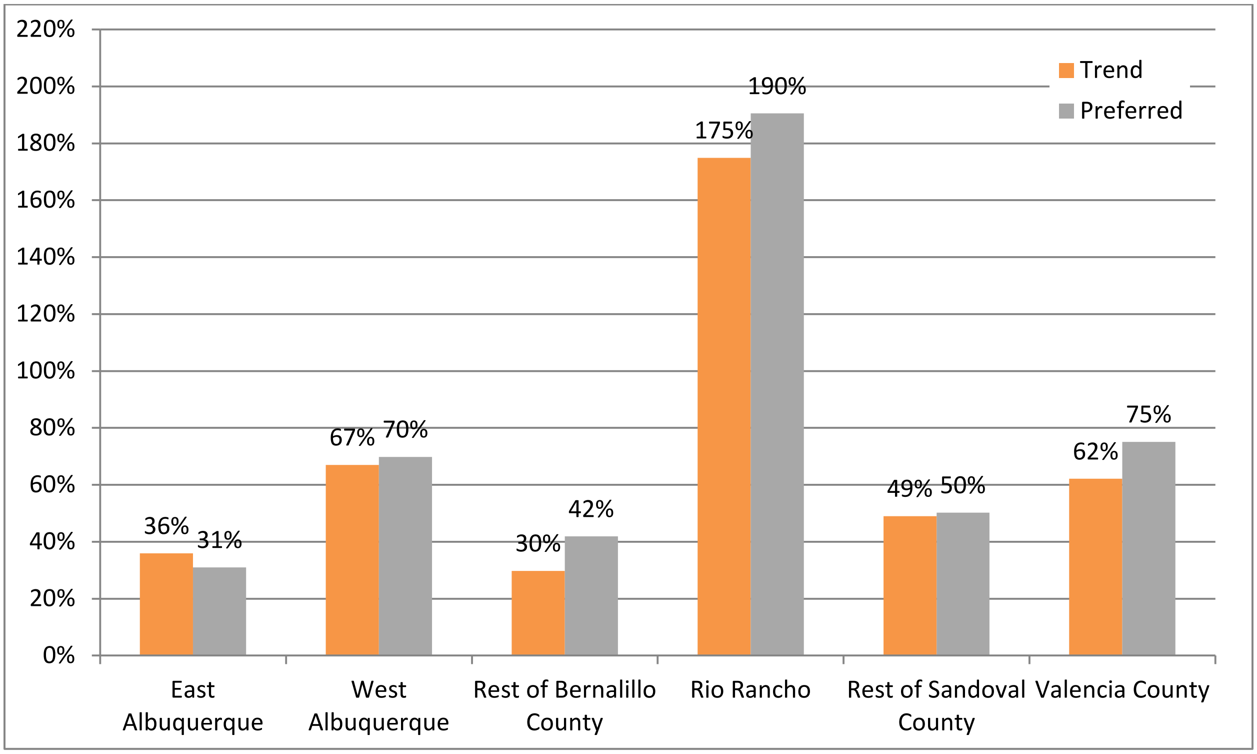
Results of the Preferred Scenario were compared to the Trend by sub-regions within the AMPA. Figures 2-8 and 2-9 illustrate how the scenarios differ in terms of the percent growth of new housing and jobs. Maps 2-8 through 2-9 show the spatial differences in the distribution of population and employment growth between the Trend and Preferred Scenarios.

Figure 2-8: Growth in Housing by Sub-Region, 2040 Trend and Preferred Scenarios



The Preferred Scenario exhibits slightly faster housing growth in the City of Albuquerque, both east and west of the Rio Grande, than the Trend, demonstrating the effectiveness of the Preferred Scenario in attracting housing closer to activity centers, particularly east of the Rio Grande. All other sub-regions see a slight decline in pace of housing growth. This is the result of a higher attraction of housing near activity centers and transit nodes, which are highly concentrated in the City of Albuquerque.

Figure 2-9: Growth in Employment by Sub-Region, 2040 Trend and Preferred Scenarios



The Preferred Scenario shows faster job growth west of the Rio Grande than the Trend due to a heavier emphasis on Westside employment centers, another guiding principal of the Preferred Scenario. Areas outside of the City of Albuquerque experience an increase in the pace of employment growth relative to the Trend. This will have the effect of positively influencing the balance between jobs and housing in the AMPA. Table 2-13 illustrates how the jobs-housing ratio compares between the base year and the Trend and Preferred Scenarios.

Table 2-13: Jobs-to-Housing Balance, 2012, Trend and Preferred Scenarios

Jobs-Housing Ratio	2012	Trend	Preferred
East of the Rio Grande	1.39	1.37	1.31
Housing	219,694	305,419	317,667
Jobs	306,296	417,755	414,799
West of the Rio Grande	0.56	0.64	0.68
Housing	146,537	241,392	232,639
Jobs	82,685	153,414	158,252
AMPA Average	**1.06**	**1.04**	**1.04**

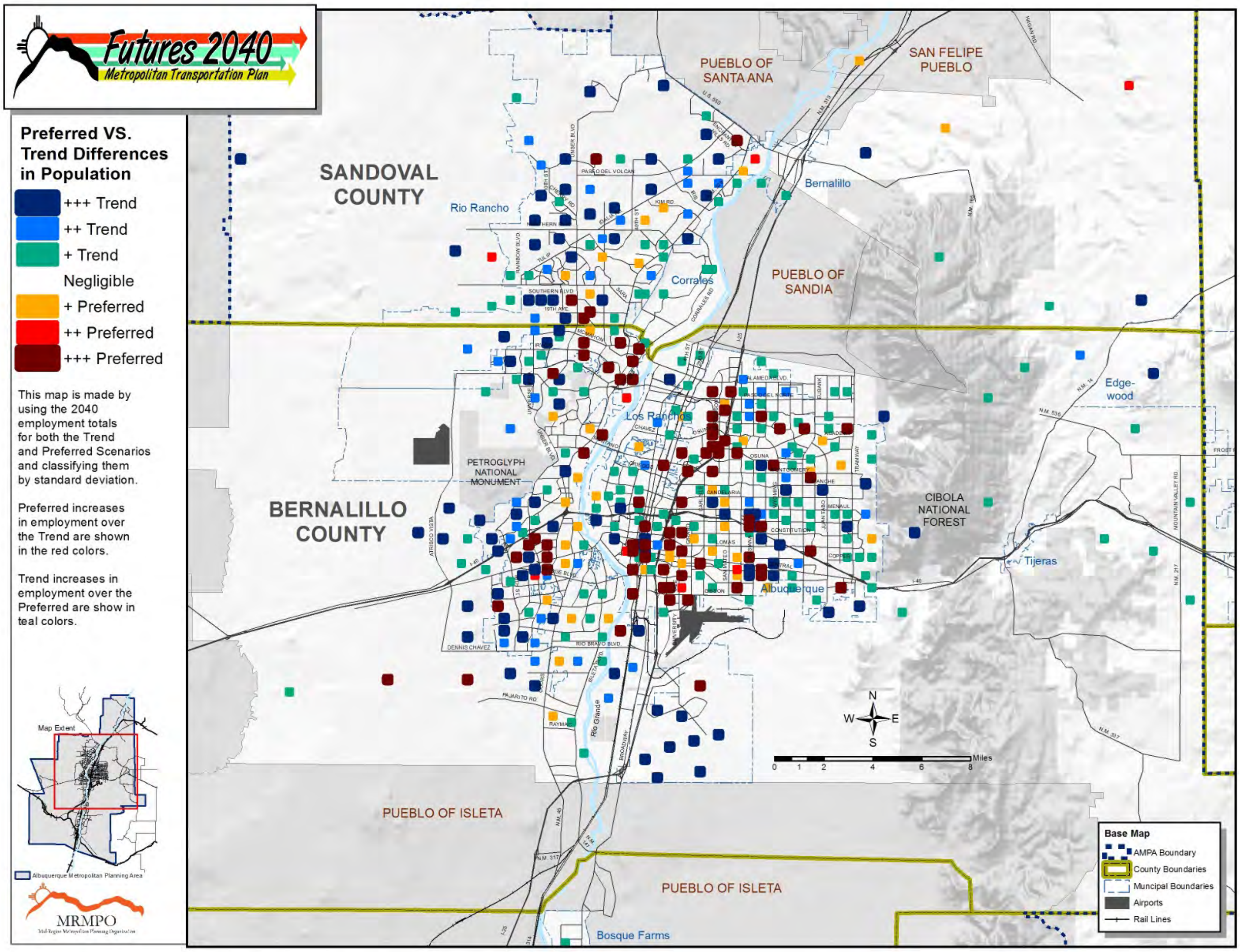
The jobs-housing ratio west of the Rio Grande improves over 2012 under both the Trend and Preferred Scenarios. The greatest improvement is in the Preferred Scenario due to more Westside job growth coupled with more Eastside housing growth in the Preferred when compared with the Trend. These tables demonstrate that relatively small differences in policy, in particular emphasizing development in certain locations, can have a positive impact on access to jobs, and can create the conditions where shorter trips lengths and travel by non-motorized modes is possible.

Table 2-14: Developed Acres, Trend and Preferred Scenarios

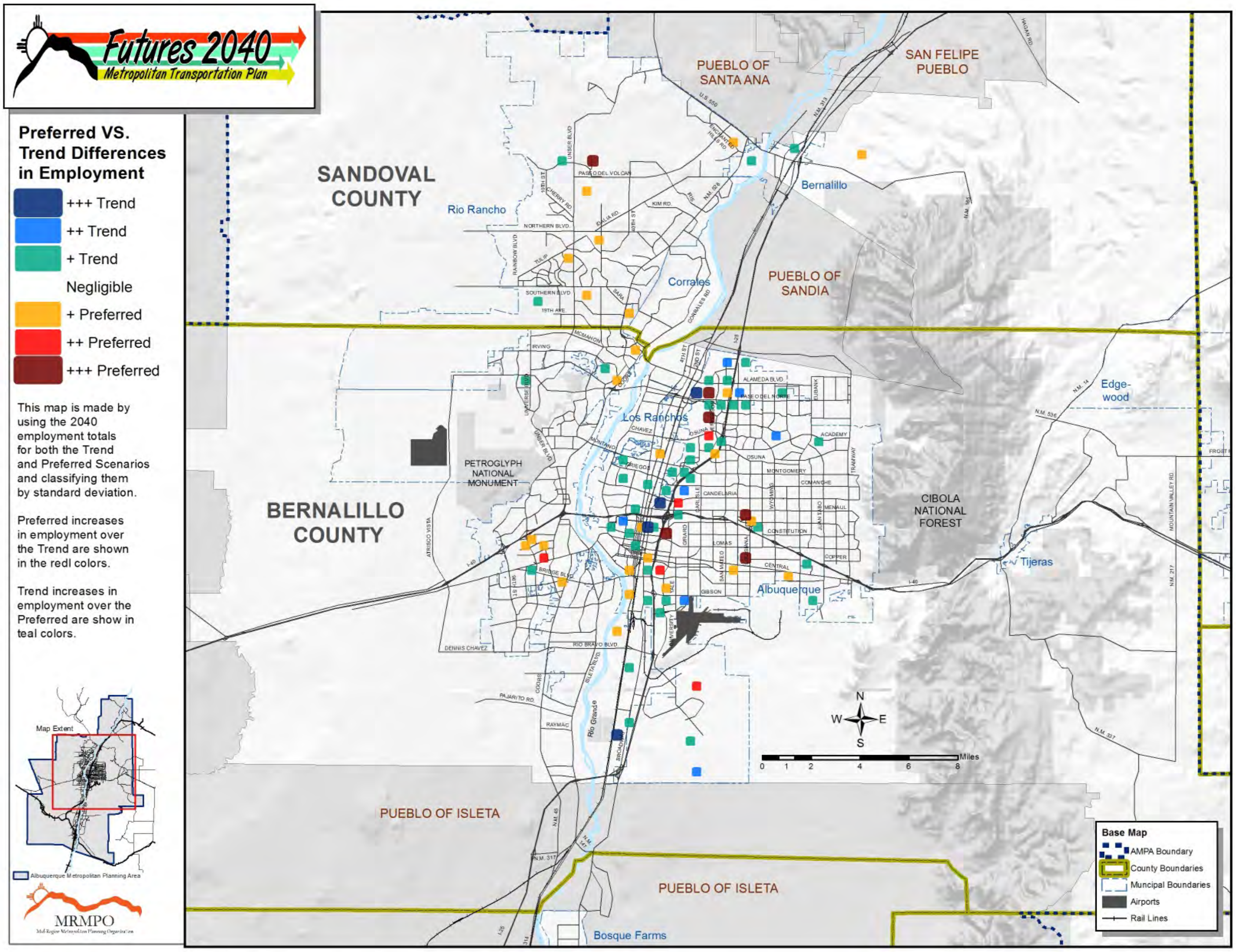
Performance Measure	2012	Trend	Preferred	Preferred vs. Trend
New Land Developed	233,398	261,054	247,695	-5.1%
Residential Acres	134,431	194,914	182,275	-6.5%
Commercial Acres	12,746	24,847	24,411	-1.8%

Land consumption by residential and commercial uses was also compared between the Trend and Preferred Scenarios. Table 2-14 illustrates these measures. The Preferred Scenario results in a smaller development footprint, consuming approximately 13,000 fewer acres, or five percent less land, than the Trend Scenario. This is an important difference given that the total number of households and jobs are the same in both scenarios, and as such, the Preferred Scenario absorbs the same amount of growth in less space.

Map 2-8: Population Differences between Trend and Preferred Scenarios



Map 2-9: Employment Differences between Trend and Preferred Scenarios



Chapter 3: REGIONAL CHALLENGES, NEEDS, AND STRATEGIES

This chapter addresses the myriad needs and challenges facing the region. As the region's understanding of these issues has grown, so has the recognition that many of these issues are interrelated. Transportation investments are increasingly considered for their impacts on air quality, whether they are promoting active transportation and improving public health, and whether projects contain design elements that promote safety for all users. Perhaps most importantly, the relationship between land use patterns and transportation conditions impacts how easily individuals can access jobs, services, and amenities by different modes, the transportation options that are available, as well as the costs associated with daily travel needs.

The great challenge in transportation planning is that many of these needs are at times contradictory and need to be balanced. Travelers want to be able to reach their destination as quickly as possible and freight needs to be shipped across the region, yet creating livable places and safe conditions for bicyclists and pedestrians are important priorities as well. Similarly, the region must not view congestion as a universal ill, but something that must be managed and for which different strategies apply in different places.

The *2040 MTP* considers many of these challenges in the context of growth patterns and scenario planning. Understanding the distribution of housing and employment sites is critical for projecting future travel patterns, availability of transportation modes, and accessibility to jobs and services. And it is the same set of growth patterns that affect land consumption and natural resource needs, including water, which is a consideration in the MTP for the first time.

It is also critical to examine regional challenges through the lens of changing preferences and travel patterns. Inherent to the Preferred Scenario is that future housing and transportation decisions will not be made using the same criteria as even a few years ago. This chapter begins by exploring the rapidly changing travel behavior patterns and consumer preferences of residents of the Albuquerque Metropolitan Planning Area (AMPA). Understanding these trends will prove critical for identifying appropriate transportation infrastructure investments that make the metropolitan area a place that can attract new businesses and retain local talent, and more simply, a place where people want to be.

To make this chapter more accessible to the reader, each section contains a side panel outlining key takeaways and components related to the mode or topic area, as well as the relationship between the mode or topic area and MTP goals and objectives. Strategies are provided at the end of each section as appropriate. The strategies contained within Chapter 3 are coalesced into recommendations and action items in Chapter 5.

Issues Discussed in Chapter 3

3.1 Transportation Trends and Changing Preferences

For decades, the average American traveled greater distances every year than they had the year before. Vehicle ownership rates continued to increase and it appeared that the appetite for vehicle travel was insatiable. But in the mid-2000s vehicle travel peaked and individual behavior slowly began to change. At first it was assumed that behavior differences were purely a function of a struggling economy. Only now is it becoming apparent that those changes are more structural in nature.

Across the United States there is renewed interest in downtowns, urban living, and a migration to metropolitan areas in general. Accompanying these population shifts are changing lifestyles and increased preference for walkable, mixed-use neighborhoods and access to alternative modes of transportation. To be clear, these changes do not reflect a wholesale shift in American travel patterns. Private vehicles will remain king, but the long-term trends have changed such that driving will likely decrease over time and trips by other modes are likely to increase.

The clearest indicator of changing transportation patterns is the decline in per capita vehicle miles traveled (VMT), a trend that began several years before the Great Recession and continued even after the recovery. After growing by an average 1.8 percent per year from 1970 to 2004, per capita VMT fell by about eight percent from 2005 to 2012. In fact, nationwide per capita VMT dropped for nine straight years since its peak.[1]

In a Nutshell…

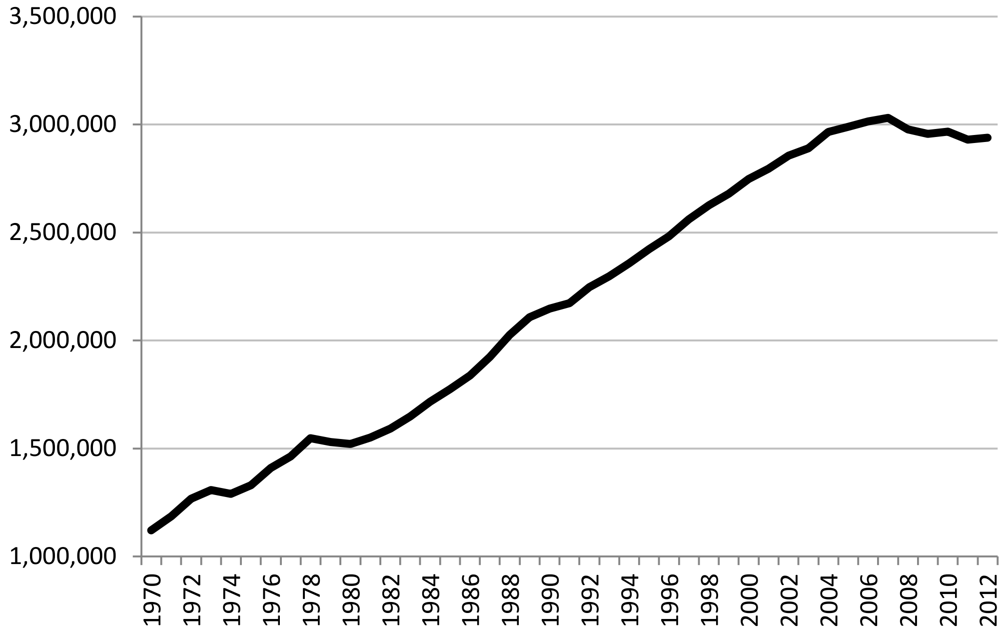
Takeaways: Travel behavior in the AMPA is changing. Daily driving rates are now decreasing and there is increased demand for alternative modes of transportation. Providing a range of housing and transportation options is critical for meeting the evolving needs of Albuquerque area residents.

Components: This section utilizes national and local data on observed travel behavior and stated housing and transportation preferences. Local data is drawn from the Mid-Region Household Travel Survey and the MTP Questionnaire.

Goals and Objectives: Meeting the range of transportation needs and creating broader options are directly related to the MTP goals of *Mobility*, *Economic Vitality*, and *Active Places*.

[1] Federal Highway Administration, http://www.ssti.us/2014/02/vmt-drops-ninth-year-dots-taking-notice/

Figure 3-1: Total Nationwide VMT (Millions), 1970-2012



While total amounts of driving have declined, Americans' relationship with driving also seems to be experiencing subtle shifts. In particular, vehicle ownership rates are decreasing – the number of registered vehicles per household dropped by five percent from 2006 to 2011[2] – while the percentage of young persons *without* drivers licenses has increased substantially (the percentage of senior citizens *with* drivers licenses has increased dramatically over this time).[3]

The demographic group that is driving many of these changes is the Millennial generation (the largest generation since the Baby Boomers, and generally identified as those born between the early 1980s and the year 2000), which appears to be choosing to behave differently when it comes to housing and transportation choices. Studies based on National Household Travel Surveys found that Millennials not only utilize alternative modes at a higher rate than other generations, but also at a higher rate than persons of the same age did one decade earlier. Compared to 16-34 year-olds in 2001, 16-34 year-olds in 2009 took 15 percent fewer total trips, but 24 percent more bike trips and 16 percent more walking trips. At the same time, distances traveled by transit increased by 40 percent, and vehicle miles traveled decreased by 23 percent. The drop in VMT was shared across income categories and was not simply a function of different economic conditions in 2009; VMT decreased by 16 percent among employed

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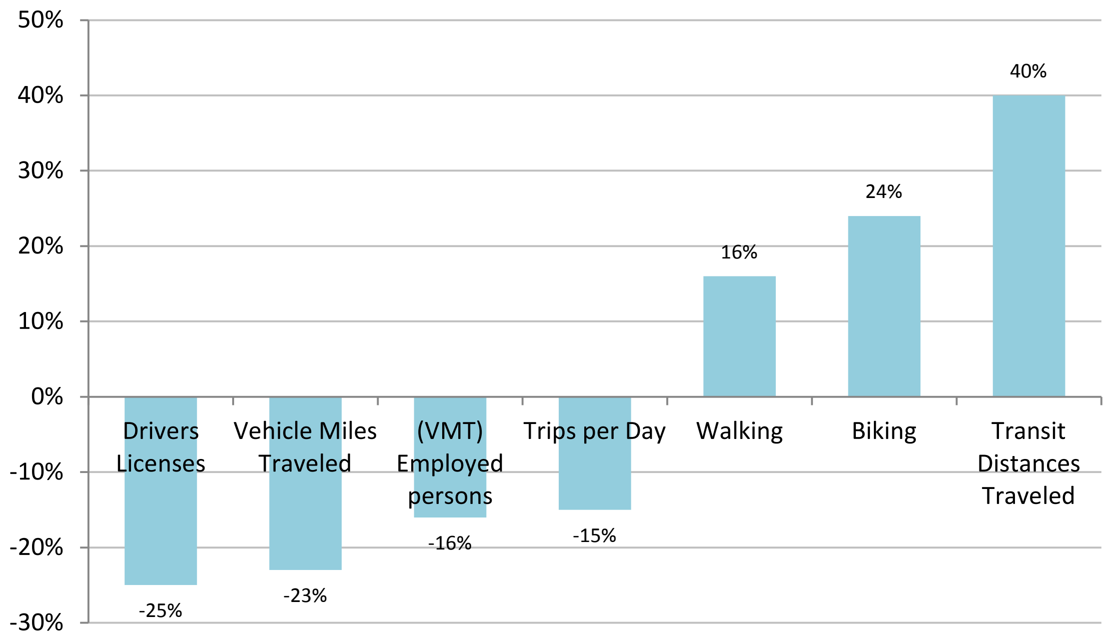
[2] Michael Spivak, "Has Motorization in the US Peaked?" University of Michigan Transportation Research institute, July 2013

[3] University of Michigan Transportation Research institute, cited in *The Atlantic*, "The Dramatic 30-Year Decline of Young Drivers (In 1 Chart)," July 20, 2012

young persons, and individuals living in "households with annual incomes of over $70,000 increased their use of public transit by 100 percent, biking by 122 percent, and walking by 37 percent."[4]

Figure 3-2: Change in Behavior Among 16-34 Year-olds, 2001 vs. 2009



In particular, Millennials demonstrate an increased preference for urban lifestyles with access to amenities and a range of transportation options, with 77 percent indicating they plan on living in urban core areas.[5] The urbanizing trend accompanies trends in household composition in which family sizes are shrinking and the age at which families are having children is increasing, thus delaying the need for larger homes. Other studies have found that Millennials may indeed elect to pursue home-ownership and lifestyles similar to previous generations, albeit at a later time in their lives, and not all Millennials will engage in such lifestyle behaviors.[6] But the changing rates, and the sheer size of the Millennial generation, are likely to drive demand for greater housing and transportation options for many years to come.

The impacts of these trends extend beyond transportation and housing considerations. According to a report from the City Observatory, college-educated Millennials are moving disproportionately to inner-city neighborhoods and city centers, and are driving urban revitalization. These migration patterns are important indicators of the desirability of a place and can help fuel economic growth as firms locate closer to local talent.[7]

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[4] Frontier Group and U.S. PIRG, "Transportation and the New Generation: Why Young People are Driving Less and What it Means for Transportation Policy," April 2012
[5] Robert Charles Lesser & Co. Survey, 2011
[6] Demand Institute Housing & Community Survey, 2013
[7] City Observatory, "City Report: The Young and Restless and the Nation's Cities," October 2014

3.1.2 Trends in the Albuquerque Metropolitan Planning Area

It is important to consider not just national trends, but to understand local behavior as well. MRMPO collects a range of transportation data, including traffic counts, travel times, and transit ridership, and tracks regional-level transportation patterns over time. Two recent efforts also provide insight into transportation values and behavior in the AMPA: the Mid-Region Household Travel Survey, which asked participants to record their actual travel behavior on a given weekday; and the *2040 MTP* Questionnaire, which allowed respondents to state their opinions on the existing transportation system.

Transportation Data

Similar to the nation at-large, per capita VMT rose for decades before reaching its peak in the AMPA in 2004 with the average resident traveling more than 24 miles per day. That number has declined by ten percent through 2012, with the average resident now traveling less than 22 miles per day. And similar to national trends, the shift began several years before the Great Recession (see Table 3-1). Total VMT did grow during this span, but at a rate much lower than that of population growth.

Table 3-1: Summary Transportation Statistics, 2004-2012

Measure	2004	2012	Growth % - 2004-2012
Population - AMPA	691,758	875,061	26%
Population - Bernalillo County	600,449	673,460	12%
Vehicle Miles Traveled - Total	16,735,195	18,966,203	13%
Vehicle Miles Traveled - Per Capita	24.2	21.7	-10%
Transit Ridership	7,823,498	14,277,115	82%
Passenger Miles Traveled	21,477,415	100,245,174	367%

At the same time that per capita driving fell, transit ridership surged and far exceeded the rate of population growth. From 2004 to 2012, transit ridership grew by 82 percent to surpass 14 million annual trips across all services. Not only are Albuquerque area residents utilizing transit more, the distances transit users are traveling has increased dramatically, suggesting important shifts in the way people are using transit. From 2004 to 2012, transit passenger miles traveled increased by 367 percent, one of the highest rates of increase in the country.[8] The biggest sources of new ridership and longer-distance trips are the New Mexico Rail Runner Express, which carries approximately 4,000 passengers a day a distance of more than 40 miles per trip, the introduction of the ABQ Ride Rapid Ride system, and policies to provide free transit passes to UNM and CNM students, faculty, and staff.

[8]Frontier Group and US PIRG, "Transportation in Transition," November 2014

Figure 3-3: Per Capita VMT in the Albuquerque Metropolitan Planning Area, 1970-2012

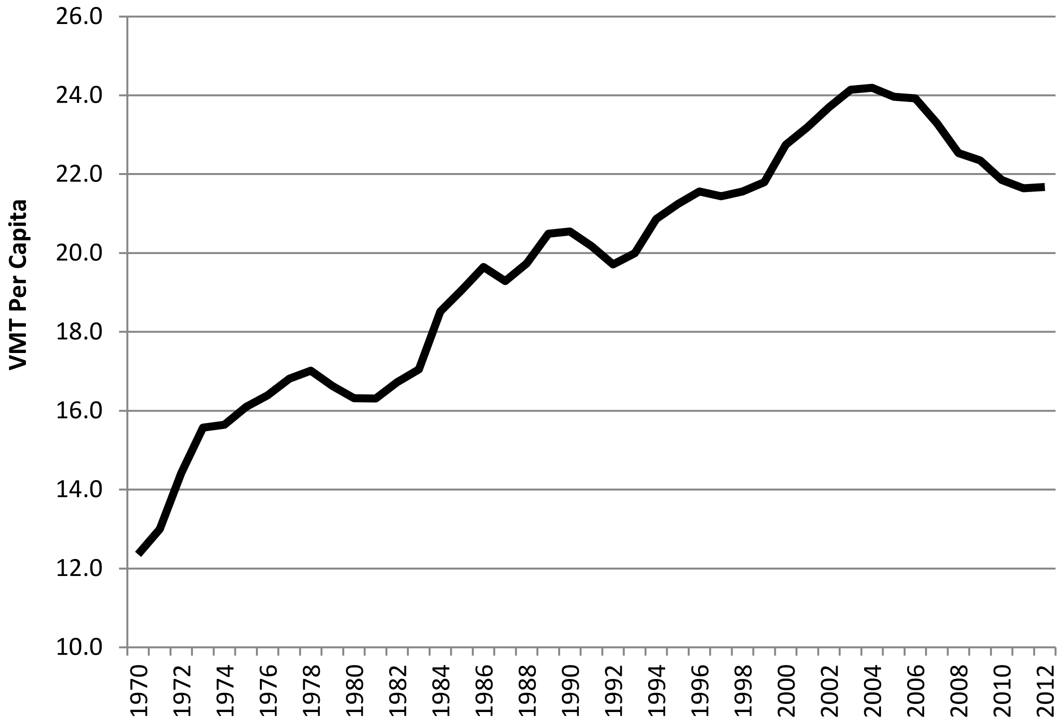
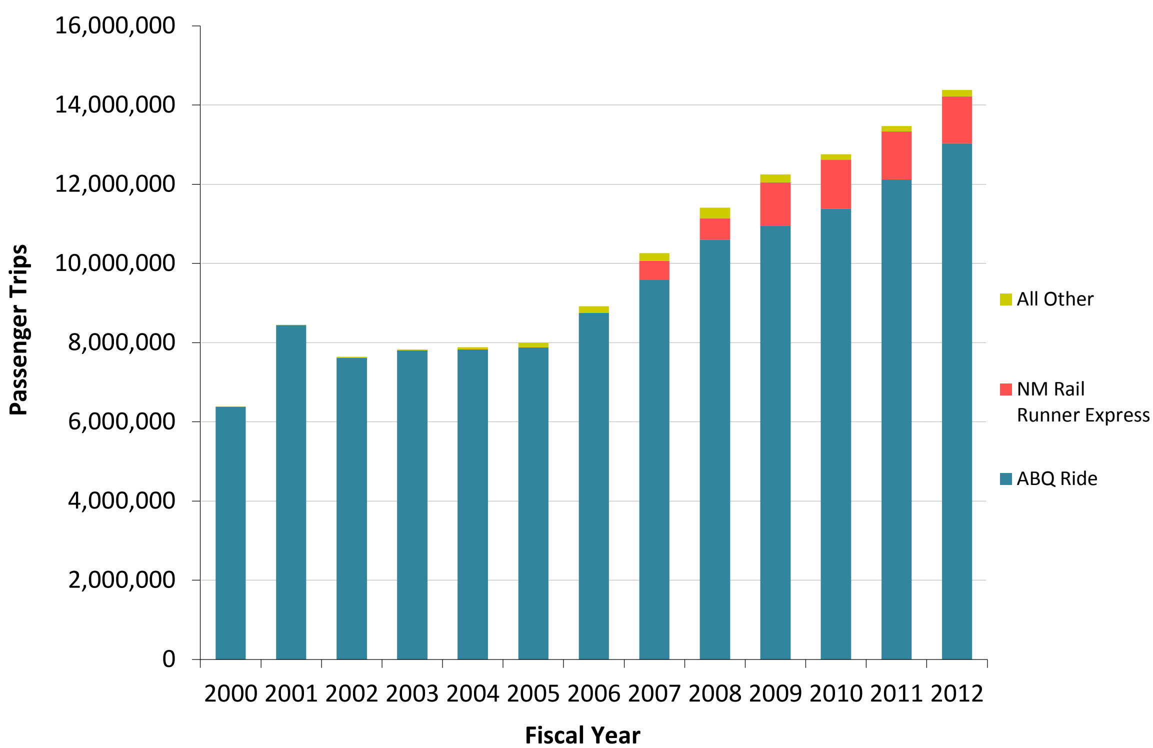


Figure 3-4: Transit Ridership by Service Provider, 2000-2012



Mid-Region Household 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 the Mid-Region Travel Survey.[9] The comprehensive random sample study marked the first time in more than twenty years that day-to-day travel patterns around the region were analyzed. A lot has changed in the last two decades: the region has grown by more than a quarter of a million residents, highways have been greatly expanded, and a series of new mass transit services have been introduced, including the Rail Runner and ABQ Ride's Rapid Ride System. In other words, the time was more than ripe to study local travel patterns.

Table 3-2: Household Travel Survey Responses by County

County	Households	Share	Population	Share
Bernalillo	1,658	67%	675,548	77%
Sandoval	464	19%	126,490	14%
Valencia	349	14%	77,363	9%
Total	2,471	100%	879,401	100%

Household travel surveys are conducted specifically to inform a range of planning efforts, including updates to MRMPO's travel demand model which helps project future travel patterns and provides insight into future infrastructure needs. Such surveys also offer a unique opportunity to understand how traveler behavior varies according to factors such as household size, age, income, and place of residence. In the process, it also provided a chance to see whether national trends apply in central New Mexico.

Table 3-3: Travel Characteristics by Age Group

Age Group	Number of Trips	Average Distance (Miles)	Distance per Trip (Miles)
Millennials (16-31 years of age)	3.72	22.8	6.46
Gen-X (32-49 years of age)	4.52	37.3	8.42
Boomers (50-67 years of age)	3.99	25.9	7.52
All Ages	3.55	24.8	7.16

Note: These groups reflect the age of respondents at the time of the survey.

Particularly noteworthy is the fact that persons aged 16-31, roughly equivalent to the Millennial generation, travel just over 22 miles per day, or about 37 percent fewer miles than persons aged 32-49, which corresponds to Generation X. Persons over age 50 also tend to travel shorter distances each day, due in part to the fact that not as many of them are commuting to work or giving children rides.

[9] To ensure meaningful analysis, MRMPO oversampled in Sandoval and Valencia Counties, meaning respondents from those counties formed a larger percentage than the population share (see Figure 3-2).This disproportionate sampling allows more meaningful analysis of travel behavior by residents of those counties, and far better understanding of how travel behavior varies from county to county.

Although the number of trips taken by different age groups is fairly comparable among different generations – Seniors take the fewest trips per day (3.55 trips) and Generation Xers take the most (4.52 trips) – Millennials travel the shortest distances for individual trips.

The Household Travel Survey also revealed important differences based on place of residence. On average, Bernalillo County residents age 16 years or older on average travel about 23 miles per day, while Sandoval County and Valencia County residents travel 33 miles per day and 40 miles per day, respectively. The highest percentage of biking, waking, and transit trips are taken by Bernalillo County residents (however, walking forms a relatively small share of overall trips; slightly more than eight percent of trips by Bernalillo County residents were walking trips, while 11 percent of trips nationwide are walking trips).

And in keeping with national trends, Millennials also bike, walk, and utilize public transit at higher rates than other age groups. Taken together, these data points provide a clear indication that walking trips are most commonly performed by young adults in more urban settings.

Figure 3-5: Alternative Mode Share by County, Household Travel Survey

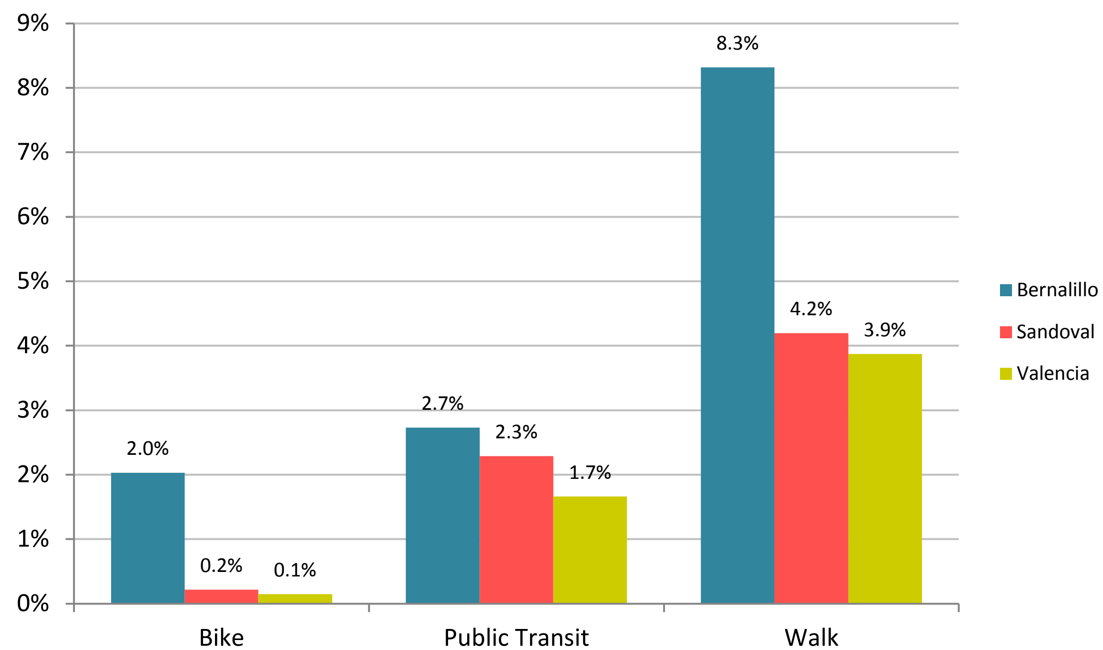
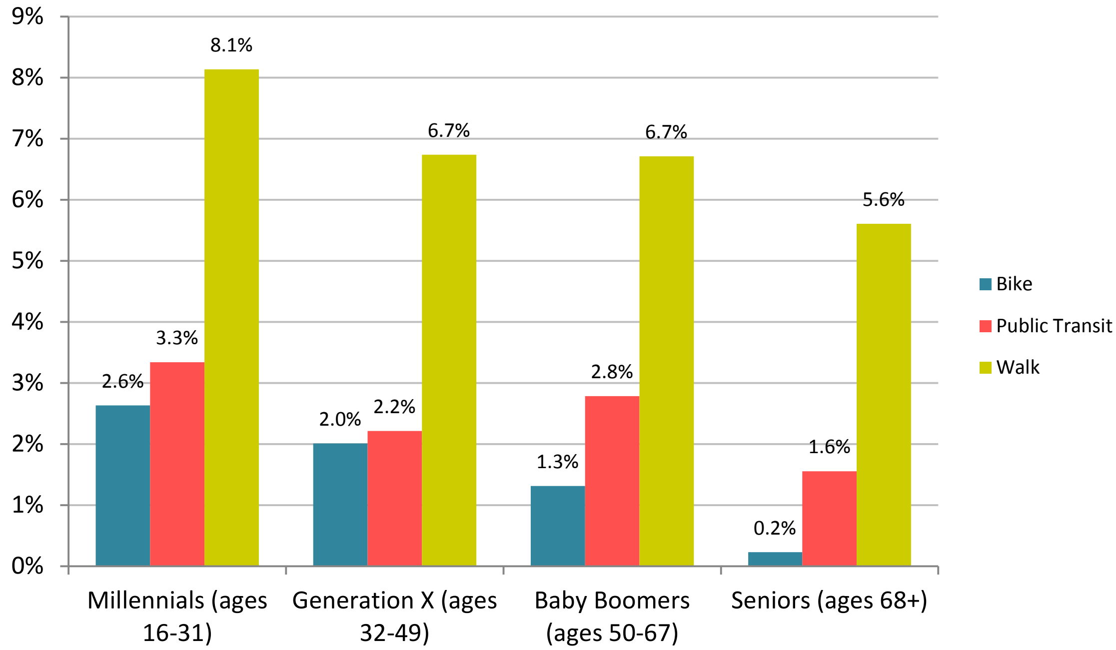


Figure 3-6: Alternative Mode Share by Age, Household Travel Survey



2040 MTP Questionnaire

In contrast to the Mid-Region Household Travel Survey, which was not an attitude survey and was invitation-only to ensure an accurate cross-section of residents and household types, the *2040 MTP* Questionnaire was designed to gather people's opinions about transportation needs and challenges across the region. The questionnaire was open from October 2013 through January 2014, and garnered over 1,300 participants. While the questionnaire was neither random nor statistically significant, it is useful for MRMPO's understanding of how the public views the region's transportation system and what types of improvements should be made.

Stated satisfaction levels formed an almost perfect bell curve, with the highest number of participants expressing a neutral opinion on the transportation system. Overall, 31.7 percent of respondents indicated the system met their needs either "well" or "very well." More revealing were responses by age. While more than 41 percent of seniors (aged 65 years and older) view the transportation system favorably, younger respondents were less positive; only a quarter of 18 to 34 year-olds indicate their needs are met, the lowest of any age group by a significant margin.

Figure 3-7: Levels of Satisfaction with Overall Transportation System, *2040 MTP* Questionnaire

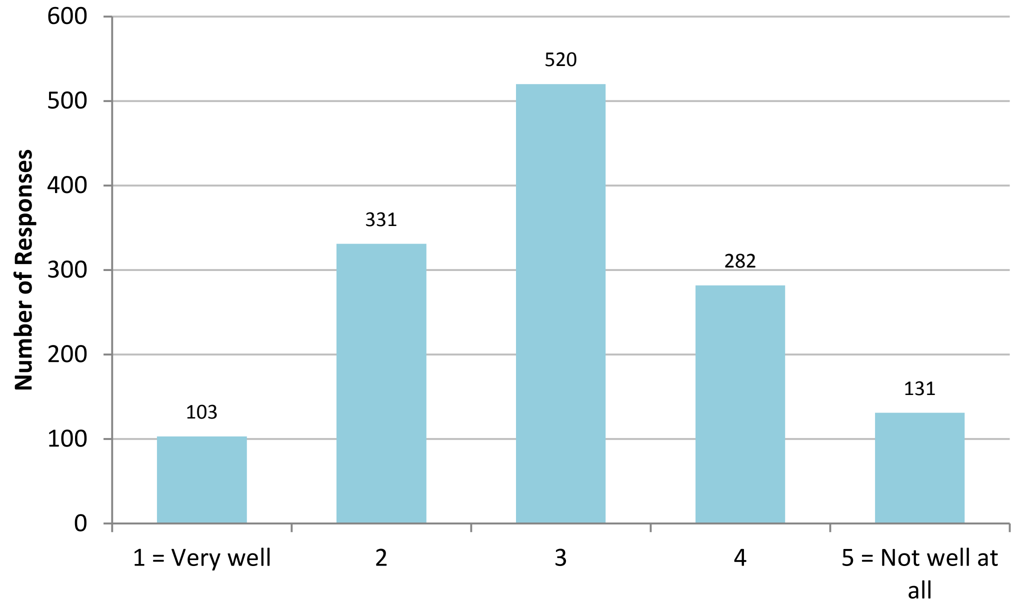
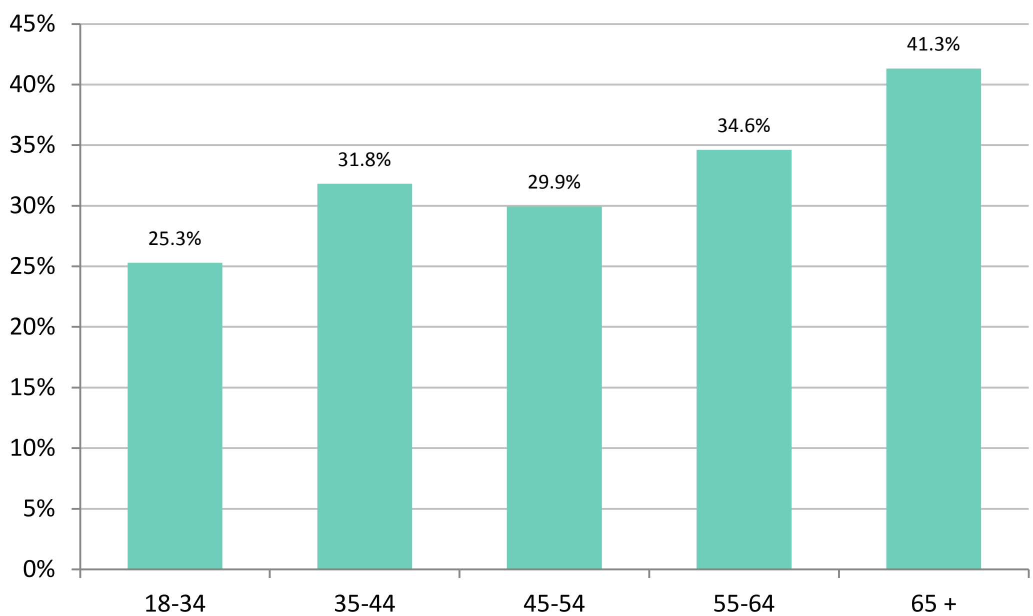


Figure 3-8: Levels of Satisfaction by Age, *2040 MTP* Questionnaire



To determine how the transportation system could be improved, respondents were asked to identify the modes they would most like to see improved upon. A majority of respondents (57 percent) indicated they would like to see increased bus transit service, while 46 percent and 45 percent viewed bicycle and rail transit improvements as particularly important. Curiously, roadway and pedestrian improvements were the least cited modes (34 and 33 percent respectively). Collectively, the results reveal a clear need to provide transportation options and create the lifestyle opportunities that are necessary for attracting and retaining young professionals. In short, there is a role to be played in selecting smart transportation investments and creating a more attractive and economically competitive Albuquerque metropolitan area.

The MTP Questionnaire also revealed something of a mismatch between available and desired housing options. In terms of current housing, nearly half (47 percent) of residents live in either rural or suburban settings, with the greatest number of respondents (37 percent) classifying their current setting as semi-urban. However, far more respondents indicated that they live in suburban settings today than would like to in the future, and far fewer respondents indicated that they live in urban settings today than would like to in the future.

Housing preferences by age group are also illuminating. Particularly noteworthy is the fact that 71 percent of 18 to 34 year-olds, a group comparable to the Millennial generation, indicated a desire to live in semi-urban or urban settings; this number is remarkably close to the 77 percent of Millennials who reported wanting to live in urban cores in a national survey. However, preference for more urban living was shared by a majority of respondents of all age groups. The age group least inclined to prefer urban settings were respondents 45 to 54 years of age.

Figure 3-9: Housing Preferences by Location, *2040 MTP* Questionnaire

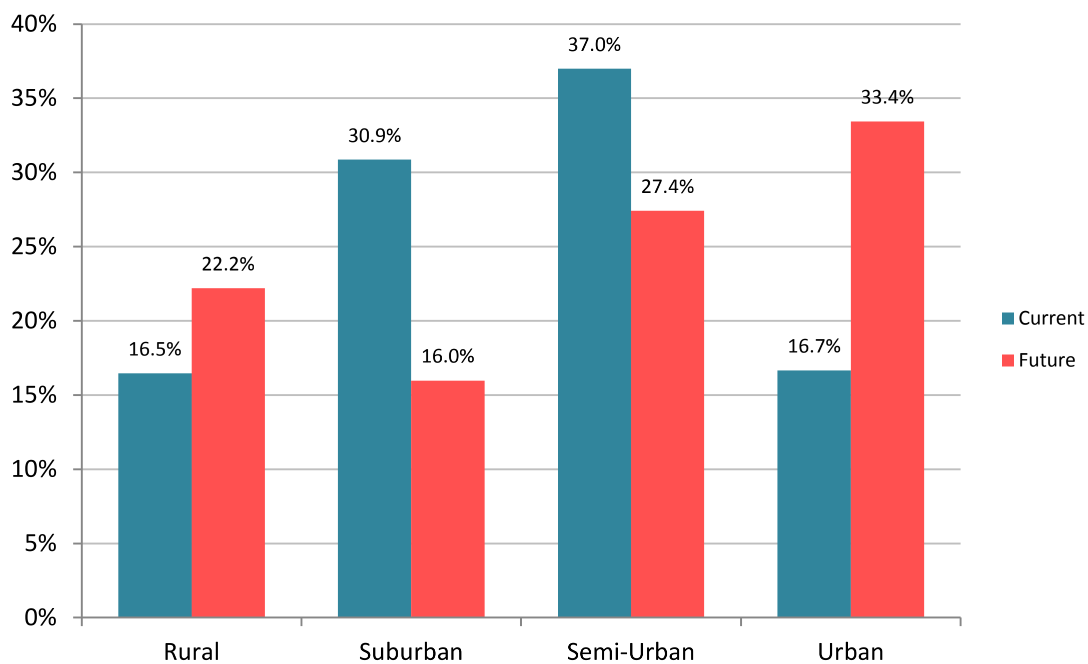
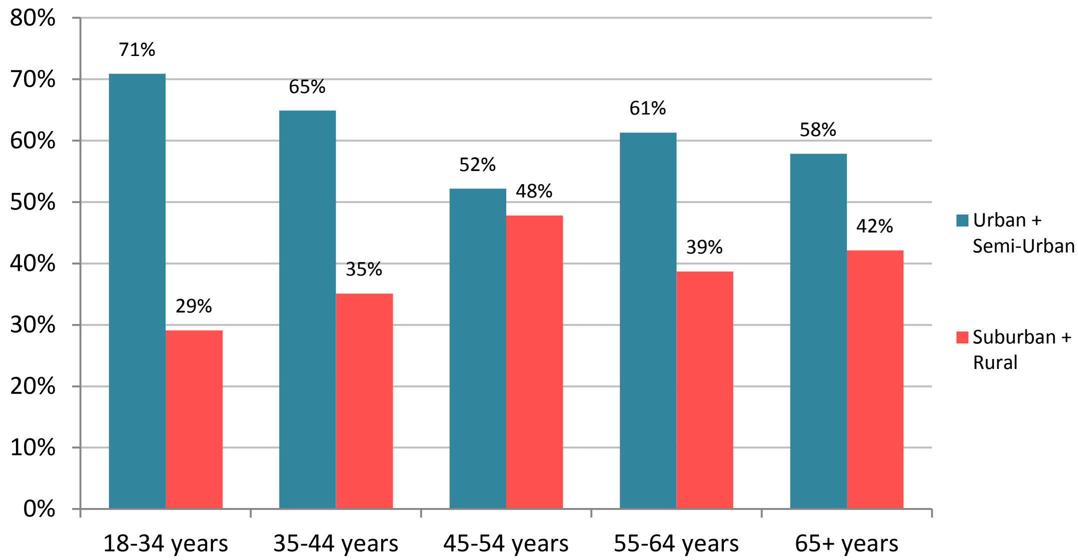


Figure 3-10: Housing Preferences by Age, *2040 MTP* Questionnaire



Summary

The trends and patterns described here add an extra dimension to the transportation challenges facing the region. Funding for transportation projects is becoming increasingly limited, and there is renewed emphasis on maintaining the region's existing infrastructure. Taken together, these trends justify a move away from transportation planning practices that prioritize capacity expansion and respond to the now-outdated assumption that driving rates will increase indefinitely. Rather, the region should transition to planning for a greater range of community types and transportation models. Moreover, the consistency between observed behavior and stated preferences at a local and national scale indicate that the region should in fact pay attention to national trends and research.

Evidence suggests growing demand for alternatives to the single-occupancy vehicle and that cities that embrace these changes are the places that are thriving. To attract and retain young workers, the Albuquerque area must address the high levels of dissatisfaction among young residents and the mismatch in housing and transportation options.

3.2 Roadways

The vast majority of travel in the AMPA takes place by private vehicle. As many drivers know firsthand, the region already experiences areas of severe roadway congestion. Future years do not show any sign of reprieve as the area is projected to continue to grow and total vehicle miles traveled continue to rise. According to transportation demand model analyses performed by MRMPO, the severity and number of congested roadways will increase substantially by the horizon year 2040, especially for river crossings and on the Westside.

Addressing the mobility needs of a growing population in a time of limited transportation funding therefore requires creative solutions. This section looks at some of the primary challenges from a roadway perspective that must be addressed as part of the transportation planning process. The MRMPO travel demand model is used throughout this section to examine the impacts of the underlying land use patterns found in the Trend and Preferred Scenarios on future roadway conditions, and considers how the region will maintain and improve the roadway network.

In a Nutshell…

Takeaways: Roadway travel conditions are expected to deteriorate over time and the pace of new road construction will not keep up with demand. Congestion along the river crossings will become increasingly severe. A range of creative management strategies will be required to ensure motorists can reach their destinations.

Components: This section examines existing roadway conditions and the 2012 base year and the 2040 Trend and Preferred Scenarios travel model scenarios. Strategies for enhancing regional mobility within the AMPA are presented, including capacity expansion, asset management, and transportation systems management.

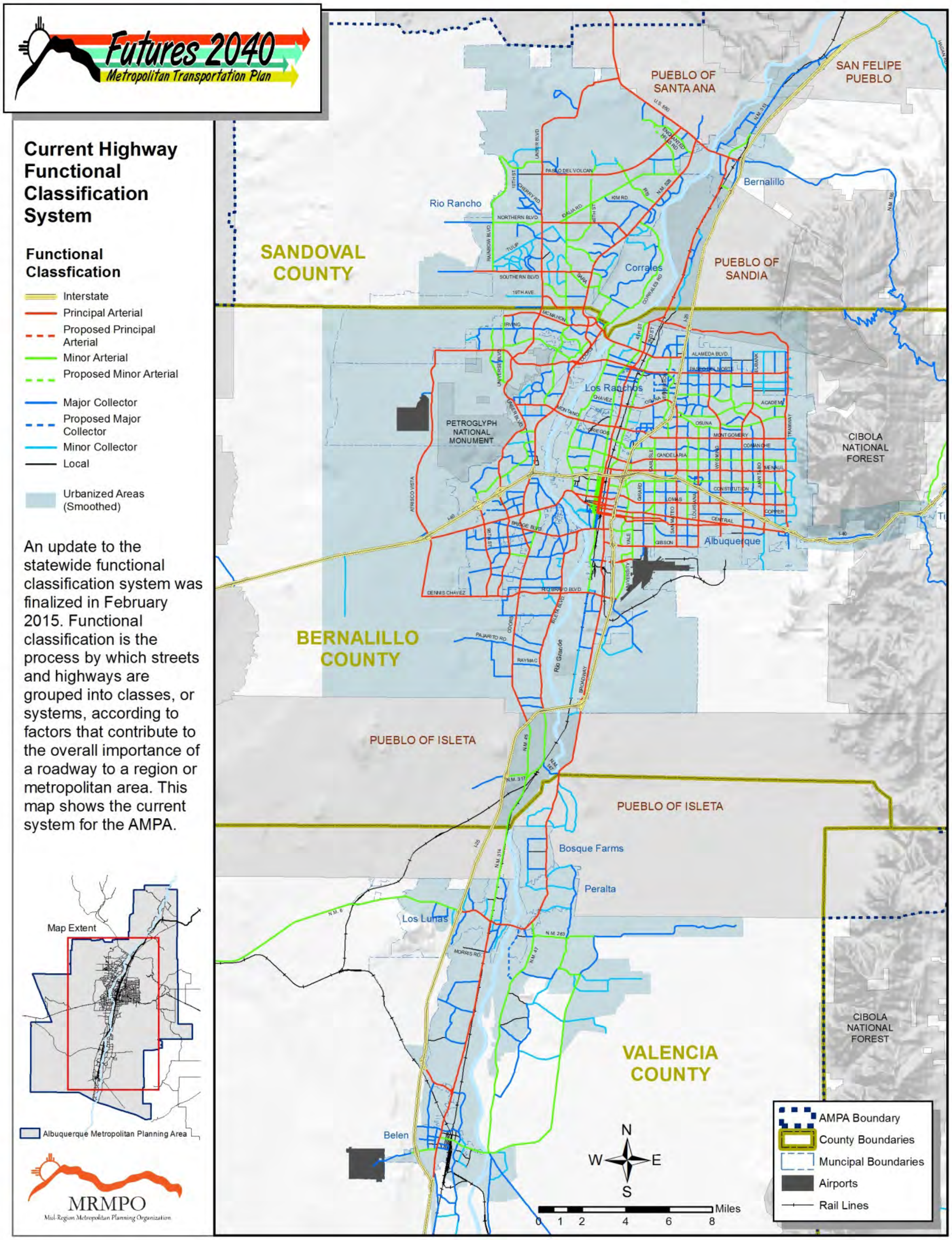
Goals and Objectives: *Mobility* is one of the four goals of the MTP, and can be addressed through preserving the existing infrastructure and managing congestion and enhancing operations. An efficient roadway system directly supports the goal of *Economic Vitality*.

3.2.1 Current Roadway System: Data Collection and Traffic Volumes

MRMPO employs several data sources to establish a picture of past trends and current conditions for roadway conditions in the AMPA. These include:

- Count/volume data from MRMPO's Traffic Counts Program and data from regional partners such as the New Mexico Department of Transportation ITS (Intelligent Transportation Systems) Bureau and other member agencies
- Speed and travel times gathered anonymously from mobile GPS devices
- Regional travel demand model output that reveals travel patterns and origin-to-destination flows
- Infrastructure asset management programs from local agencies
- Travel behavior data from the recent Mid-Region Household Travel Survey

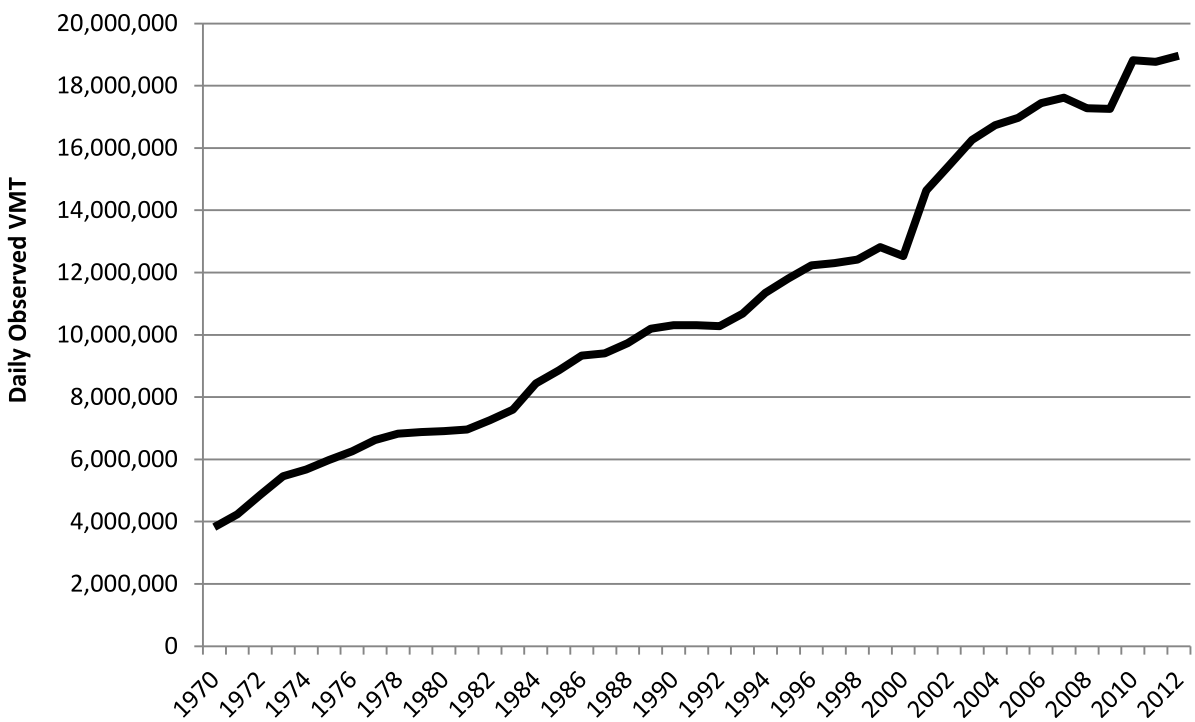
Map 3-1: Highway Functional Classification in the AMPA, 2015



Traffic Counts

Traffic counts are conducted on all federal-aid eligible roadways in the counties of Bernalillo, Torrance, Sandoval, and Valencia, and are coordinated through the MRCOG Traffic Counts Program. They form the basis of the roadway performance monitoring responsibilities of MRMPO. Federal-aid eligible roadways include collectors and arterials and are shown on the current highway functional classification system in Map 3-1.

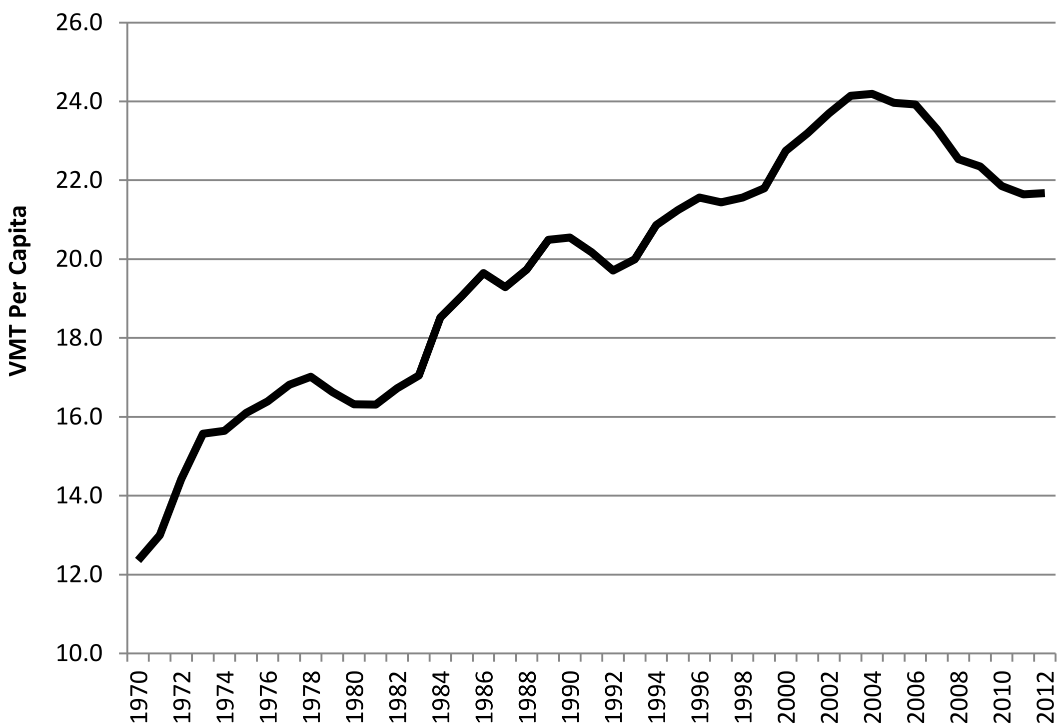
Figure 3-11: Daily Vehicle Miles Traveled in the AMPA, 1970-2012



A key performance measure monitored by the Traffic Counts Program is vehicle miles traveled, or VMT, which reflects the amount of vehicle travel on the roadway network. Figure 3-11 shows the historical trend in daily vehicle miles traveled in the AMPA from 1970 to the present. This time series shows a steady long-term increase in the amount of travel; however, in recent years the counts program has captured a national trend – growth in VMT is actually stabilizing and in some instances going down.

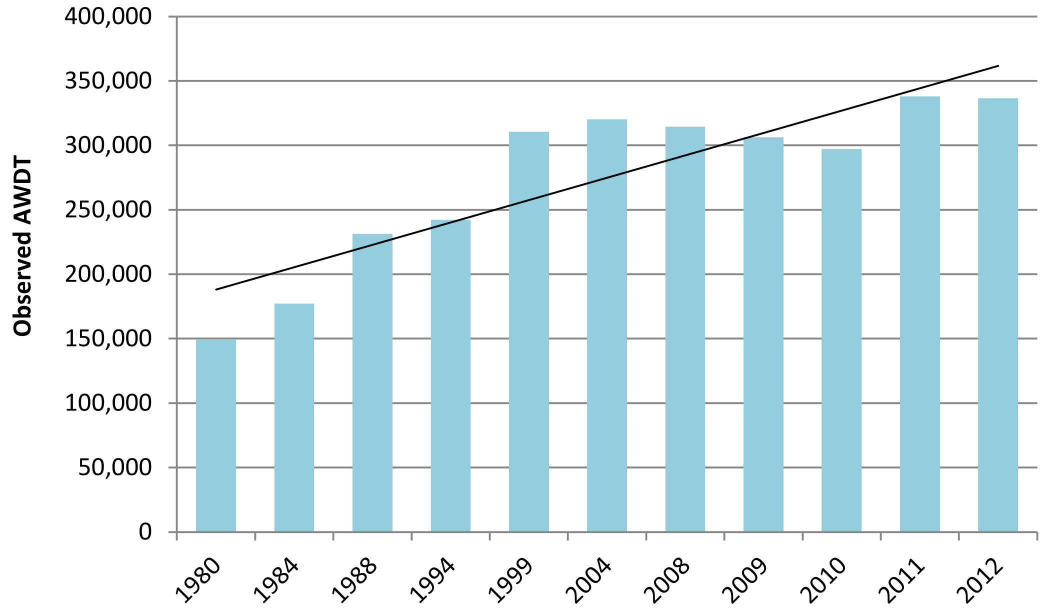
Total VMT for the region provides a measure of the amount of travel taking place on the network, which is both a factor of personal travel as well as population growth. What is not captured in Figure 3-11 is the amount of per capita VMT, or the amount that each individual contributes to the region's daily VMT. As with the total VMT trend, the per capita statistic captures slight variations with observed peaks and valleys reflecting phenomena such as national energy price fluctuations, national and local economic forces, or major local construction projects. As shown in Figure 3-12**,** per capita VMT had generally increased for decades. However, not only did the per capita VMT rate flatten out over time, but there has been a 10 percent decrease in per capita VMT from 2004 to 2012. This reversal in the last decade mimics national trends, and is due to the effects of the Great Recession and reductions in personal budgets (resulting in reduced personal vehicle travel), as well as shifts in traveler behavior and increased preference for transit.

Figure 3-12: Per Capita VMT in the AMPA, 1970-2012



Traffic volumes observed passing through the I-25 and I-40 interchange, also known as the Big-I, are another common index of travel growth in the AMPA. Figure 3-13 illustrates the observed growth from 1980 through 2013; overall, volumes increased by 105 percent during this span. It is important to note the plateau in growth beginning in 2008. Although volumes increased once again as the region recovered from the Great Recession, the rate of growth is well below historical levels.

Figure 3-13: Average Weekday Daily Traffic at the Big-I, 1980-2012

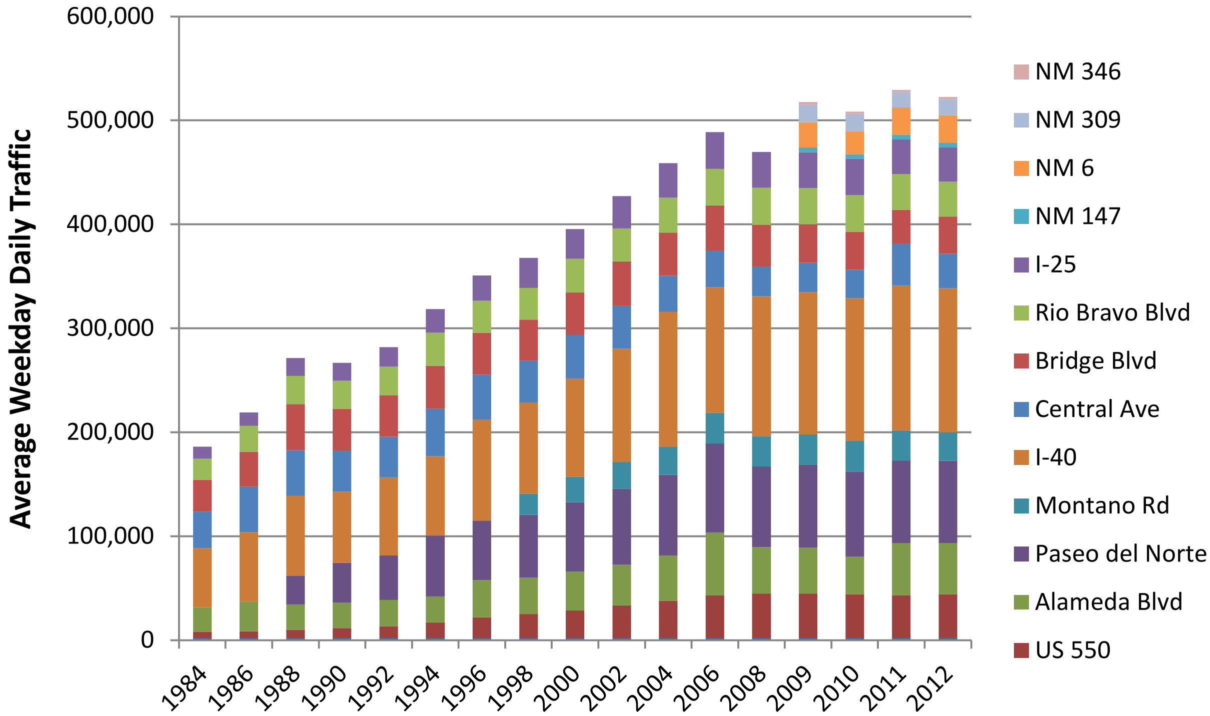


Crossing the River

Recent development patterns—in particular the prolific growth west of the river and in the northwest portion of the metropolitan area—place a heavy burden on the region's transportation infrastructure. As a result, maintaining acceptable levels of service on river crossings has become a challenge, especially during the peak commuting periods. This challenge is an important one to highlight since the only additional river crossing planned in the lifespan of the *2040 MTP* is the Morris Rd alignment in Valencia County.

There are thirteen river crossings within the AMPA, each operating at various levels of service during the morning and evening peak periods of travel and supporting more than 500,000 daily trips across the Rio Grande. A review of historical average weekday traffic data presented in Figure 3-14 shows that demand has steadily increased over the years. The river crossings that serve the northwest portion of the AMPA and employment and activity centers east of the river experience the greatest congestion; these include Montano Rd, Paseo del Norte, Alameda Blvd, and US 550. However, like overall VMT trends, growth has flattened in recent years, perhaps in part due to roadway capacity issues on the river crossings themselves which may discourage travelers from making these trips. Nevertheless, growth in demand is expected to continue in future year scenarios of the MTP as the regional economy recovers and population and job growth continues across the region.

Figure 3-14: River Crossing Traffic in the AMPA, 1984-2012



Commuting Flows

The dynamics of land availability and development patterns have a dramatic effect on transportation patterns. In recent decades much of the new housing stock has been located outside the urban core. Although many population-serving jobs follow these rooftops, job concentrations and major employment centers tend to remain primarily within urban employment centers and corridors where infrastructure is already in place. This distribution of housing and jobs directly impacts commuting patterns and creates a range of transportation challenges. Planners look to travel data from the Census Transportation Planning Package (CTPP), especially for county-to-county commuter flows, to shed light on regional travel patterns. Commuter flows for the four counties in the Albuquerque Metropolitan Statistical Area can be found in Table 3-4.

According to the CTPP, Bernalillo County exhibits the highest rate of internal “capture” at 93 percent, indicating that the vast majority of Bernalillo County residents work in the county in which they reside. The lowest rate of internal capture is Sandoval County at 42 percent with Torrance and Valencia Counties at 48 percent and 49 percent, respectively. The high levels of external commuting trips for residents of these counties means heavy reliance on single-occupancy vehicle travel and places great strain on the regional roadway network.

Table 3-4: 2010 County-to-County Work Flows

County of Residence		County of Work							
		Bernalillo County	Sandoval County	Santa Fe County	Torrance County	Valencia County	In State	Out of State	Total
County of Residence	Bernalillo County	93%	3%	1%	0%	1%	1%	1%	100%
	Sandoval County	49%	42%	5%	0%	1%	2%	1%	100%
	Santa Fe County	6%	0%	84%	1%	0%	1%	8%	100%
	Torrance County	39%	3%	8%	48%	1%	1%	1%	100%
	Valencia County	46%	1%	1%	0%	49%	1%	3%	100%

3.2.2 Current Roadway System: Congestion Levels

Whether it is the result of population increases, overburdened infrastructure, or land-use patterns that increase reliance on vehicles for transportation needs, roadway congestion is increasingly a fact of life in American cities. The result is diminished air quality, losses in economic activity, and increased travel times for individuals. These realities create a series of transportation challenges which need to be addressed in order to ensure that individuals, goods, and services move efficiently throughout a metropolitan region.

It is important to establish the baseline congestion levels in the MTP so that future conditions and alternative scenarios can be evaluated in terms of relative change. MRMPO relies on several methodologies and data sources in this assessment of congested conditions, both of which are presented here. The timeframe for these measures is the PM peak hour, which constitutes the highest volumes and most diverse composition of travel during the day as it includes work-based trips as well as non-work based trips.

Congestion Based on Volume-to-Capacity Ratios

A simple method for indicating congestion on roadways is observing the roadway's volume relative to the roadway's ability to carry that volume, i.e., the volume-to-capacity (V/C) ratio. As traffic volume increases, it affects the ability of roadways to operate efficiently. When volume approaches or exceeds the intended capacity, delay and congestion ensue. The volume-to-capacity measure is simple to compute, providing that the agency has an adequate database of roadway volumes, as well as a robust roadway network inventory. MRMPO has both which makes this statistic a widely-used measure. Current capacity analyses have focused on the peak "hour"; however, as travel demand continues to increase, MRMPO and the region will analyze capacity using the peak period, which covers three hours. This type of analysis reflects the phenomenon called “peak hour spreading.”

The 2012 base year volume-to-capacity data (see Map 3-2) is derived from MRCOG’s Traffic Monitoring Program for the PM peak hour and shows that travelers experience “severe congestion” primarily along river crossings, portions of the interstate mainlines and interchanges, and at arterial corridors carrying excessive amounts of commuter travel. “Over capacity” conditions are also observed at river crossings and portions of the interstate mainline and interchanges, with extensive system degradation shown on arterials. “Approaching capacity” conditions extend to other parts of the network.[10]

Congestion Based on Actual Driving Speeds

Speed is another measure of congestion as trips are often considered in terms of how long it takes to get to a destination. Travel speed and travel time are directly related as speed is a measure of distance and time, as in *miles per hour*. Speed-based congestion is calculated based on the difference between the observed speed and the posted speed limit. Map 3-3 provides 2012 base year conditions; locations where one would expect lower speeds today are apparent, such as at approaches to intersections, known as bottlenecks, or simply areas of high travel demand.

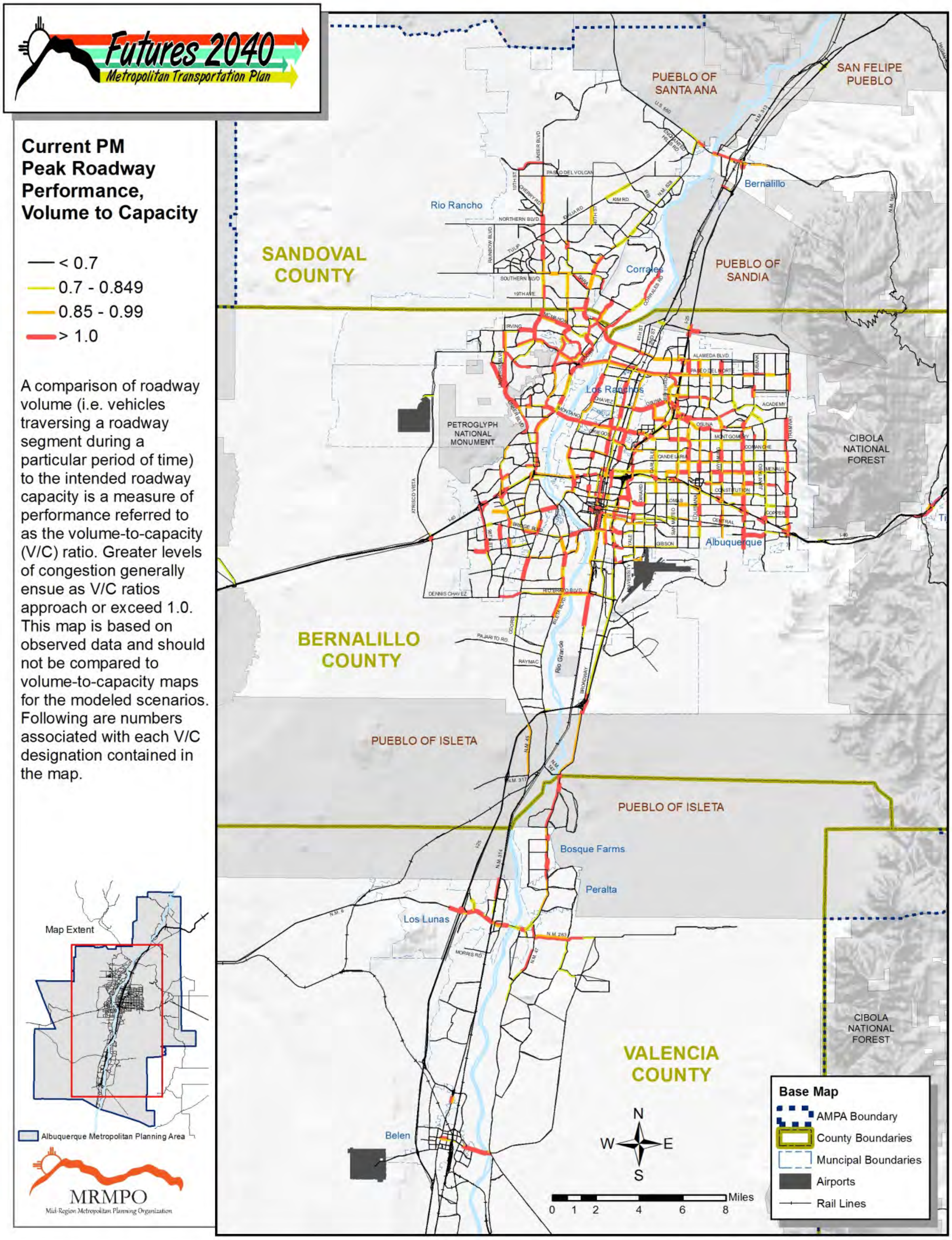
Data Collection Methodology

Travel conditions can be measured in terms of traffic “volume,” or traffic “speed.” Traffic volume is measured as the number of cars/trucks traversing a point on the roadway network during a particular time period, such as peak hour or weekday, and is captured as part of MRMPO’s Traffic Monitoring Program. Traffic volumes on each roadway segment are collected at least once every three years, and when compared to the roadway segment’s ability to carry those vehicles, a volume-to-capacity value is generated. Roadway capacity is based on measures such as the number of lanes, posted speed, and the functional classification or type of roadway (i.e., collector, arterial, freeway, etc.).

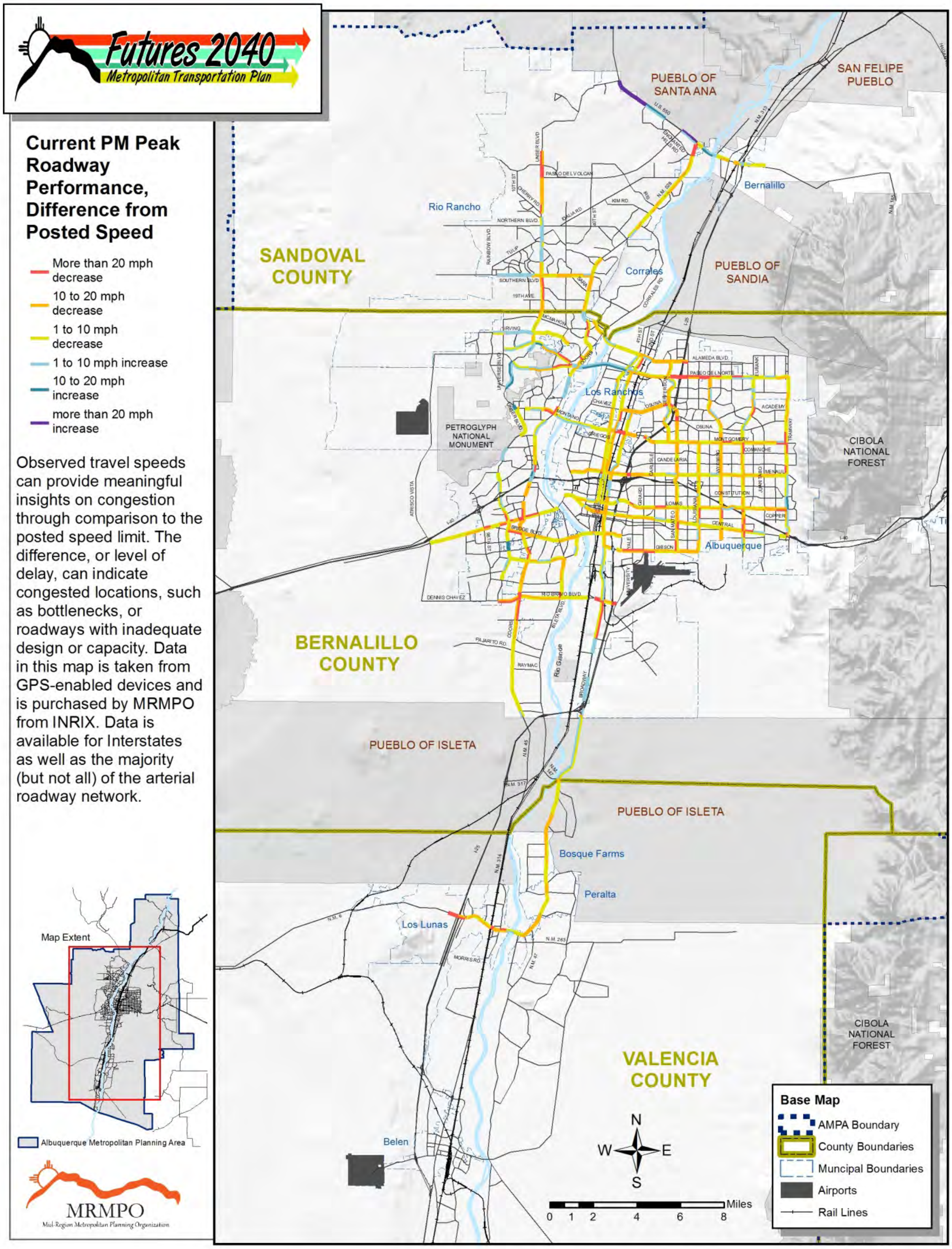
In addition, MRMPO purchases third-party travel time data from INRIX, which is comprised of GPS-enabled devices such as personal smart phones, GPS devices on vehicles, and GPS-enabled commercial-vehicle fleets. INRIX data shows the distribution of congested speeds for different times of the day and is a meaningful planning tool in the identification of problem areas on the roadway system.

[10] Note that these conditions are different than the modeled 2012 baseline scenario presented later in this section. Modeled datasets are calibrated against existing conditions, but do exactly reflect observed data. Forecasted roadway conditions from the MRMPO travel demand model should be compared to modeled base year conditions.

Map 3-2: PM Peak Period Volume-to-Capacity Ratios, 2012 Observed Data



Map 3-3: PM Peak Period Travel Speeds, 2012 Observed Data



3.2.3 Travel Demand Scenarios: 2012, 2040 No-Build, and 2040 Build

MRMPO maintains a regional travel demand model in order to best assess the impacts of growth on future travel conditions. This evaluation tool differs from the datasets shown in Maps 3-2 and 3-3 that are based on actual count and recorded speed data in that it represents *modeled* roadway travel conditions, thus allowing for the evaluation of different combinations of socioeconomic and transportation scenarios. In this manner, the land use-transportation relationship can be evaluated through future socioeconomic data distributions and roadway infrastructure scenarios to identify specific problem areas. Future year roadway scenarios inform the transportation planning process by allowing agencies to identify the 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 2040. The analysis also sheds light on whether roadway infrastructure improvements do in fact mitigate congestion and improve safety and mobility. It should be noted that the Trend Scenario represents the official forecast for the *2040 MTP*. As discussed in Chapter 2, the Preferred Scenario reflects the desire of MRMPO member governments to address regional needs through changes in land use policy and potential transit investments, but such a scenario would require further action in order to be fully realized.

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

- **2012 Baseline** reflects the modeled or simulated conditions found in the region today. This scenario forms a standard upon which future year scenarios can be compared and analyzed.
- **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 with committed funding through 2015[11]
- **2040 Trend Build** represents the same level and distribution of growth as the No-Build Scenario but with the additional roadway infrastructure implemented using funds available from 2015 to 2040
- **2040 Preferred Build** represents the alternative growth scenario, or Preferred Scenario, with programmed roadway and transit investments

[11] 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.

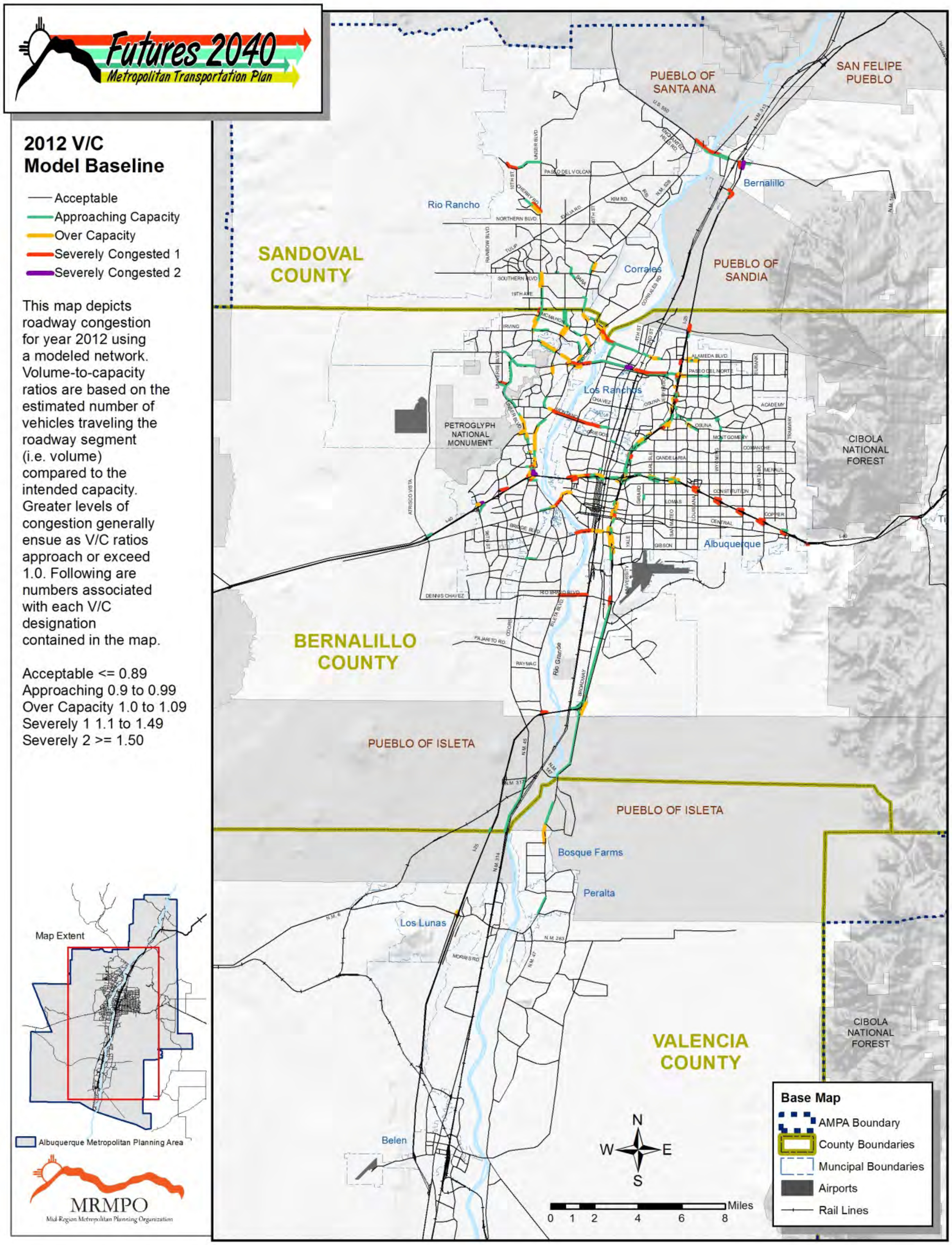
3.2.3 (a) 2012 Baseline and No-Build Scenarios

The 2012 model baseline scenario is presented in Map 3-4. Areas of congestion can clearly be seen throughout the network. Key problem areas include the river crossings, as well as other bottlenecks – particularly in northwest Albuquerque – along high demand commuter routes approaching the interstates and river crossings. Locations where recent growth is straining the roadway network can be observed where sections of roadway are approaching and exceeding capacity. The baseline scenario is used to establish the reference point from which future scenarios and mitigation strategies are evaluated and considered for programming and implementation.

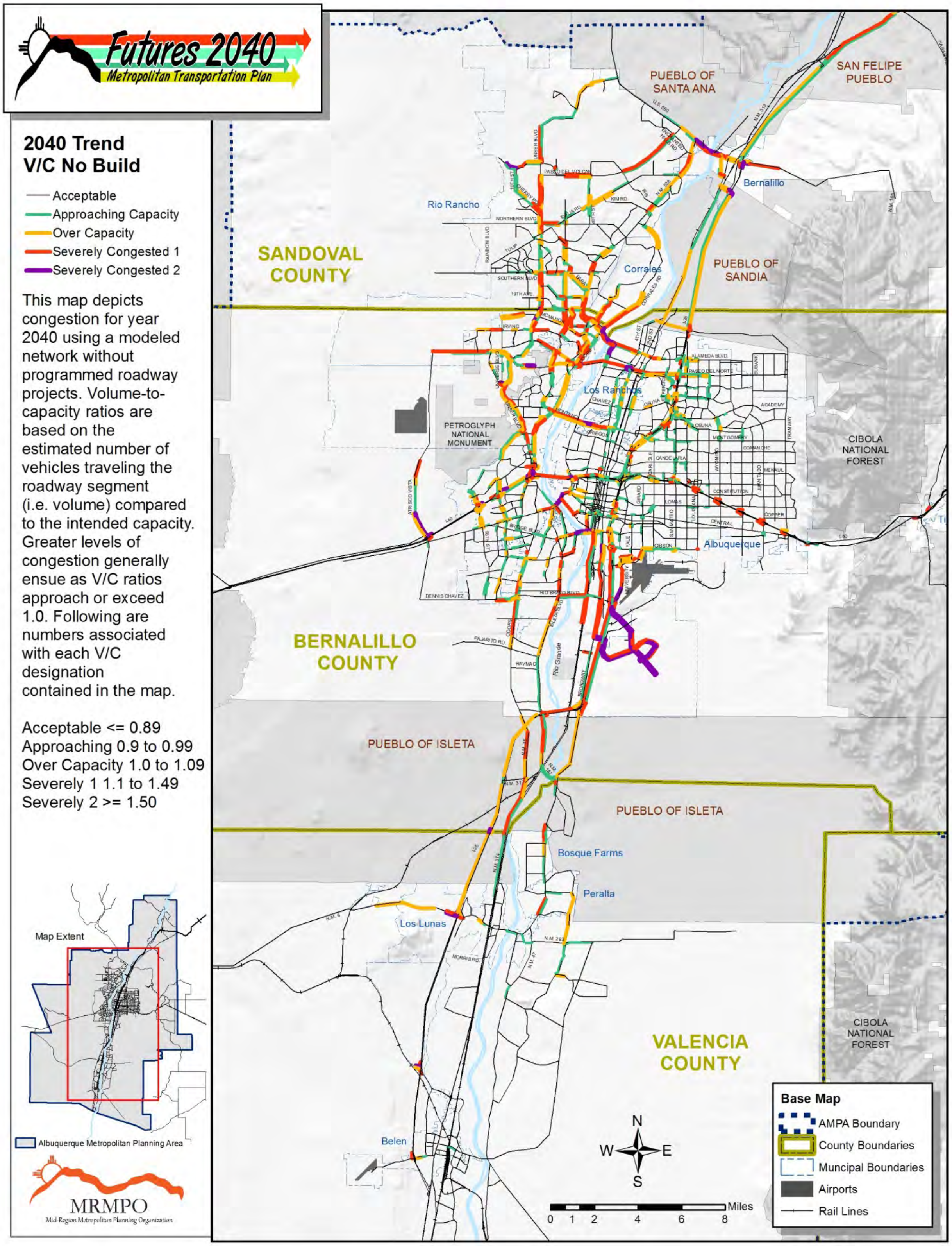
The Trend No-Build Scenario (see Map 3-5) depicts what the transportation system would look like in 2040 if no additional roadway projects were implemented after the 2015 program year, forming the basis for roadway infrastructure programming in the MTP. To be clear, the Trend No-Build is used to develop the final scenario rather than being a product unto itself; that is, it is an interim step toward developing a final scenario. Information from the Trend No-Build Scenario is used to identify roadway needs and the potential for infrastructure investments to improve regional mobility.

As the maps indicate, the patterns of congestion identified in the baseline conditions become more severe under the No-Build Scenarios, and significant levels of congestion can be observed in other areas in the 2040 timeframe. In effect, by 2040 nearly the entire Westside north of I-40 is congested, as is much of the Southwest Mesa. This is not surprising as many of these areas are expected to absorb future growth, meaning congestion issues in these areas would be compounded without the infrastructure investments identified in the MTP.

Map 3-4: PM Peak Period Volume-to-Capacity Ratios, 2012 Model Baseline



Map 3-5: PM Peak Hour Volume-to-Capacity Ratios, 2040 Trend No-Build Scenario



Performance data for the baseline and 2040 Trend No-Build scenarios are summarized in Table 3-5, 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 (i.e., over-capacity) conditions which represents the quantity of travel demand unmet by the available roadway capacity of the system (measured as the lane-miles of congested roadways), as well as peak hour average speeds by scenario. It is clear that under the No-Build Trend Scenario the region could expect significant increases in congestion not only at the river crossings, but also along north-south corridors across the metro area.

One noteworthy pattern is the fall in VMT per capita. Under the No-Build scenario, per capita VMT falls two percent by 2040, likely as a result to the shrinking percentage of the population participating in the workforce. However, other indicators reflect the severity of congestion that could be expected without investments over time. In the No-Build scenario, speeds decrease by 56 percent and VHT and VHD increase substantially above 2012 levels.

Table 3-5: Base Year and Trend No-Build Roadway Performance Summaries, PM Peak Hour

PM Peak Hour	2012 Baseline	2040 Trend No-Build	Percent Difference, 2040 No-Build vs. 2012
VMT	1,850,545	2,879,976	56%
VHT	50,778	179,454	253%
VHD	12,927	117,639	810%
VMT Over Capacity	105,926	805,869	661%
Congested Lane-Miles	85.8	558.1	550%
Average Speed	36.4	16.1	-56%
Daily VMT/Capita	23.2	22.6	-2%

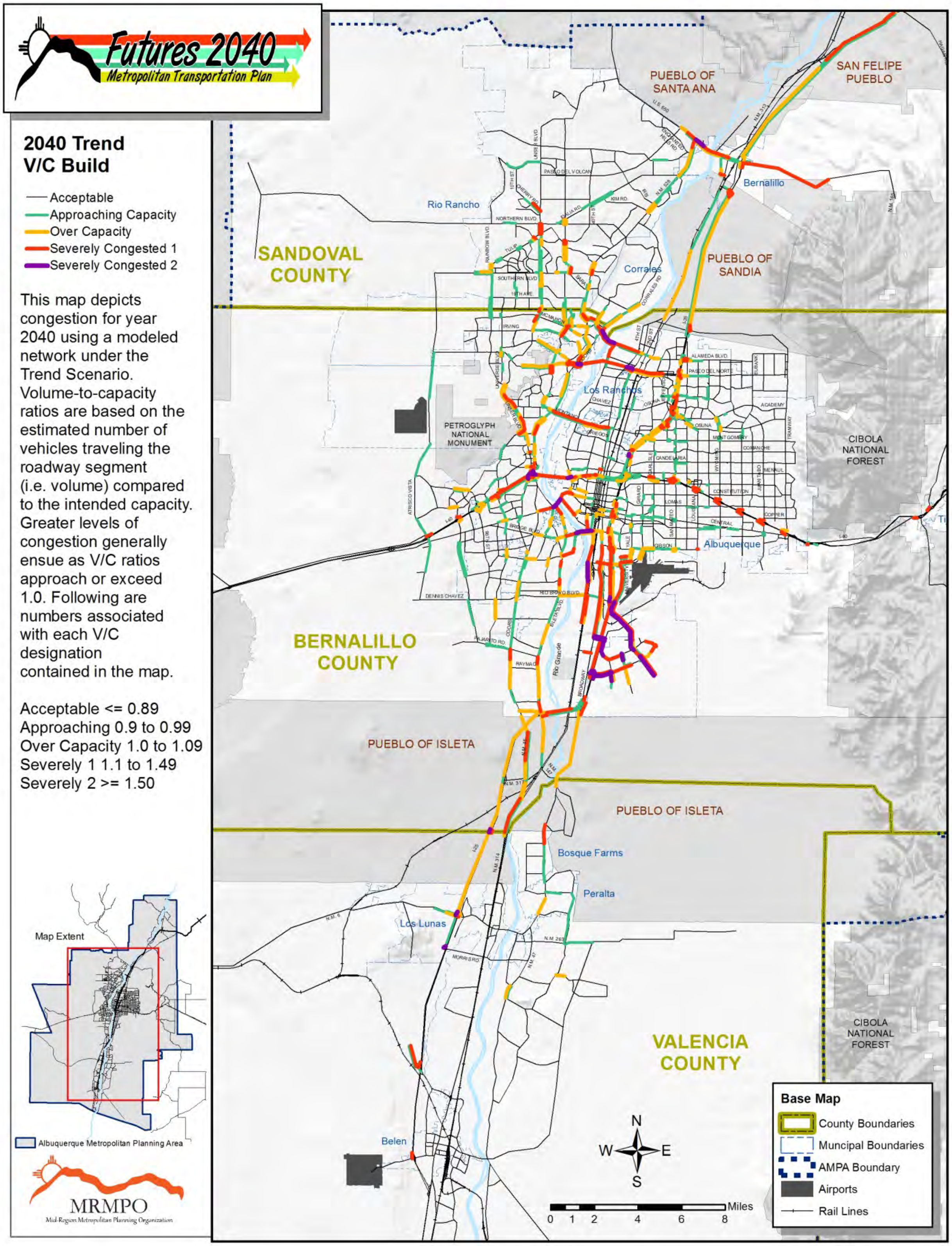
3.2.3 (b) 2040 Build Scenarios: Trend and Preferred

To address the congested travel demand conditions noted in Table 3-5, modeled roadway improvements including additional lane expansions and roadway extensions (beyond those already committed) were developed for the 2040 planning horizon.

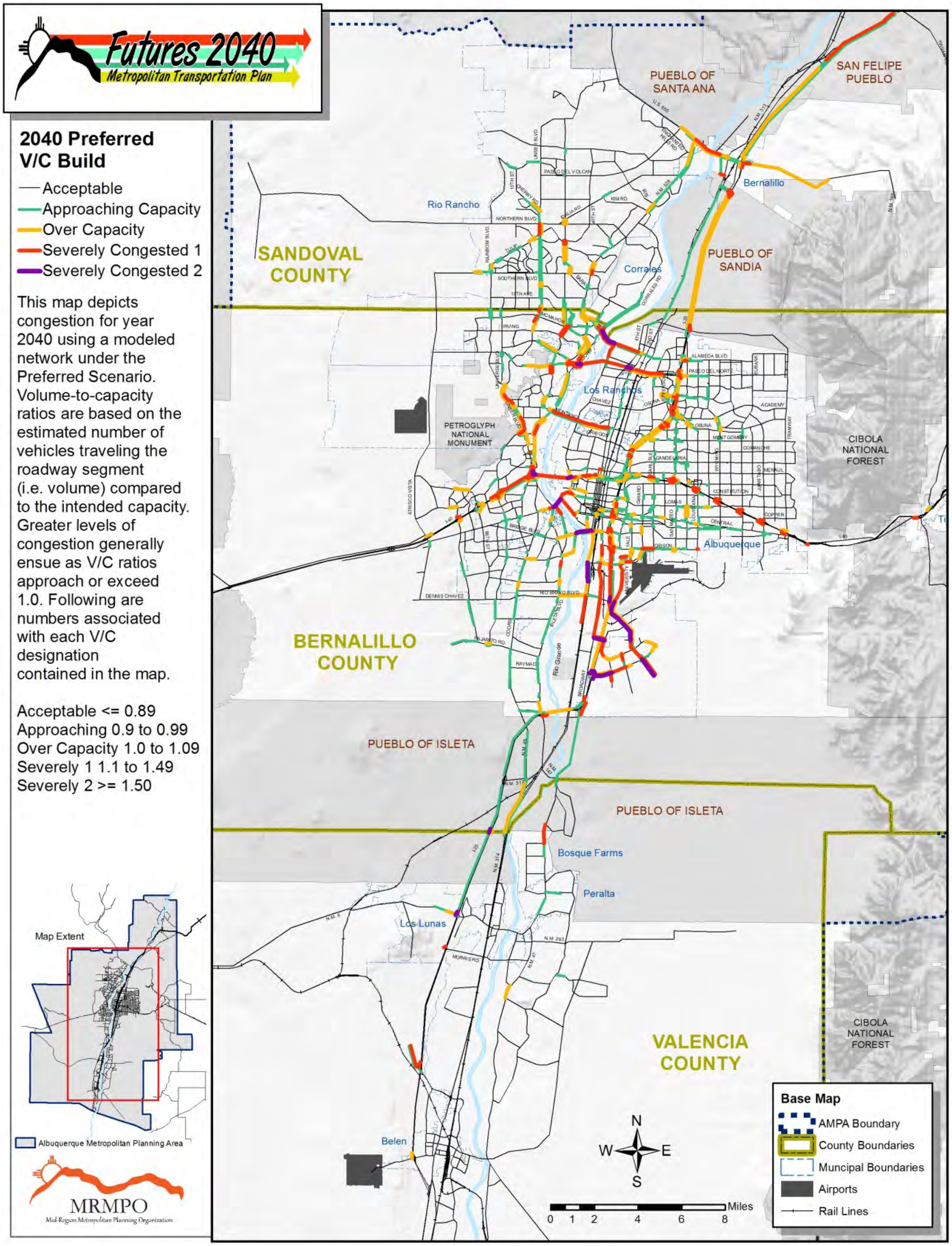
Conditions in the 2040 Build Scenario are much improved over the No-Build Scenario, demonstrating the benefits of the projects proposed by member agencies over the lifespan of the plan. In particular, areas west of the Rio Grande leading up to the river crossings see significant relief. Nevertheless, travel conditions are expected to worsen over time and compared to 2012 the level of cogestion observed in many places in the Trend Build Scenario is extremely severe. This is partiularly true across the region's 13 river crossings, as well as key corridors on the Westside such as Unser Blvd, Paseo del Norte, and Paradise Blvd become highly congested. However, additional corridors on 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. Maps 3-6 through 3-8 reflect the conditions in both the Trend and Preferred Scenarios.

While the differences in volume to capacity conditions between the Trend and Preferred Senarios may at first appear modest, the systemwide performance measures in Table 3-6 show that the Preferred Scenario performs significantly better overall in every criteria. The amount of time and distance traveled captured in VHT and VMT show major improvements over the Trend, and when one considers the magnitude of shift—the five percent difference in daily VMT represents an additional 100,000 vehicle miles in the Trend Scenario—the differences can be quite significant. Particularly noteworthy are the differences in vehicle hours of delay, where there is a 28 percent reduction in the Preferred Scenario compared to the Trend Scenario, and the amount of travel taking place under congested conditions (a 13 percent reduction in the Preferred Scenario). There is also an increase in travel speeds of 15 percent and VMT per capita reductions of four percent. In sum, the Preferred Scenario provides significant congestion reduction. One positive outcome exhibited in both of the 2040 Build Scenarios is the reduction in VMT per capita.

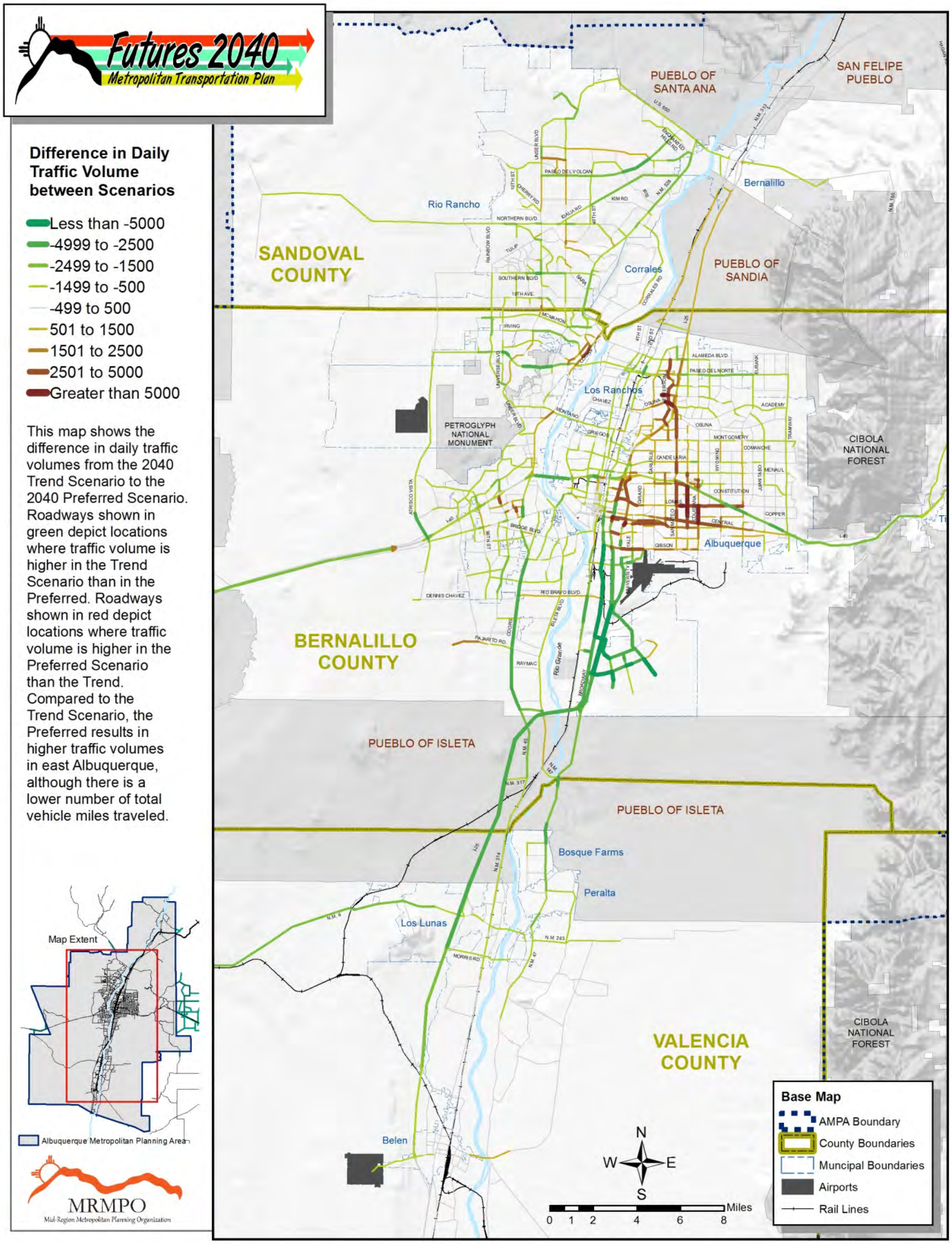
Map 3-6: PM Peak Hour Volume-to-Capacity Ratios, 2040 Trend Build Scenario



Map 3-7: PM Peak Hour Volume-to-Capacity Ratios, 2040 Preferred Build Scenario



Map 3-8: Differences in Daily Volume between 2040 Trend and Preferred Scenarios



Another important consideration is the differences in the distribution of travel between the Trend and the Preferred Scenarios. In the Preferred 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 witness the greatest gains in traffic. In particular, the Preferred Scenario generates greater traffic volume in the core urban area of Albuquerque, while lower traffic volumes and reduced congestion can be observed across Rio Rancho.

Table 3-6: Trend and Preferred Scenarios Roadway Performance Summaries, 2040 PM Peak Hour

PM Peak Hour	2012 Base Year	2040 Trend Build	2040 Preferred Build	Percent Difference, Preferred vs. Trend
VMT	1,850,545	2,894,913	2,762,426	-5%
VHT	51,876	132,932	110,133	-17%
VHD	12,927	71,293	51,108	-28%
VMT Over Capacity	105,926	644,967	562,041	-13%
Congested Lane-Miles	85.8	429	370	-14%
Average Speed	36.4	21.8	25.1	15%
Daily VMT/Capita	23.2	22.7	21.9	-4%

3.2.4 Strategies to Reduce Roadway Congestion and Improve System Reliability

As discussed throughout the *2040 MTP*, future growth in the region will place tremendous demands on the roadway network over the next 20 years, requiring a well thought-out response from MRMPO and all member agencies involved in the collaborative transportation planning and programming process. As shown in the travel demand modeling section, changes in the distribution of land use has a tremendous effect on reducing congestion; however, a wide range of supplemental roadway management strategies will be necessary to address the travel and mobility needs of the AMPA. An expanded roadway system and efforts to improve the efficiency of existing facilities, as well as a wider range of travel options, will be demanded by the traveling public, and improved management strategies will need to be developed by agencies in order to maintain or improve congestion levels over today's conditions.

MRMPO has identified a range of strategies to address roadway congestion and mobility in the region. These strategies can be corridor specific or area/system-wide and can be summarized in the following categories:

- **Additional network capacity**, including lane restriping or roadway expansion to create additional lanes, roadway extensions, and construction of new facilities

- **Maintenance of the transportation network**, including asset management systems to monitor the condition of roads and bridges
- **Transportation Systems Management and Operations (TSM&O)** strategies that offer relatively low-cost improvements to enhance the functionality of the existing roadway system. Examples of TSM&O strategies being utilized in the AMPA include access management, signal timing optimization, and Intelligent Transportation Systems.
- **Travel Demand Management** strategies that promote non-single occupancy vehicle travel and cooperation among member agencies on regional growth initiatives and land use solutions. For more details on TDM strategies, see section 3.12.

Many of these strategies are examined through the Congestion Management Process, an ongoing program facilitated by MRMPO with the participation of member agency staff. More information on the Congestion Management Process can be found in section 3.2.6.

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. A combination of network expansion, along with additional management and efficiency strategies will be necessary to serve the anticipated increase in travel demand. A multi-modal approach is therefore necessary, along with other travel demand reduction strategies, as part of a comprehensive program to reduce roadway congestion and improve system reliability. The remainder of this section will focus on roadways and efficient roadway operations.

3.2.4 (a) Roadway Capacity and Network Expansion

As the region grows, it is inevitable that new areas will need to be served with new roadway infrastructure. As such, roadway expansion will continue to be one of the region's strategies to address travel needs. Further, current bottleneck conditions on the existing system will worsen in the future growth scenarios, necessitating strategic widening within the current network coverage. It is worth noting that not all base roadway capacity expansion must be achieved with large roadway widening projects. Often times, significant traffic flow improvements can be realized with smaller scale improvements at much lower costs such as roadway restriping, the addition of turning lanes, and other smaller geometric improvements.

The extent of the roadway network over the lifespan of the MTP can be evaluated through the number of total lane miles. As shown in Table 3-7, under the current fiscal and programming constraints the roadway network increases by a total of 7.9 percent by 2040 (compared to 51.3 percent growth in population in the modeling area). Map 3-9 depicts the roadway expansion projects programmed in the MTP, including new facilities, the expansion of existing facilities, and privately-funded roadways for larger master-planned developments. A full list of projects can be found in Appendix A.

Table 3-7: Roadway Network Lane Miles

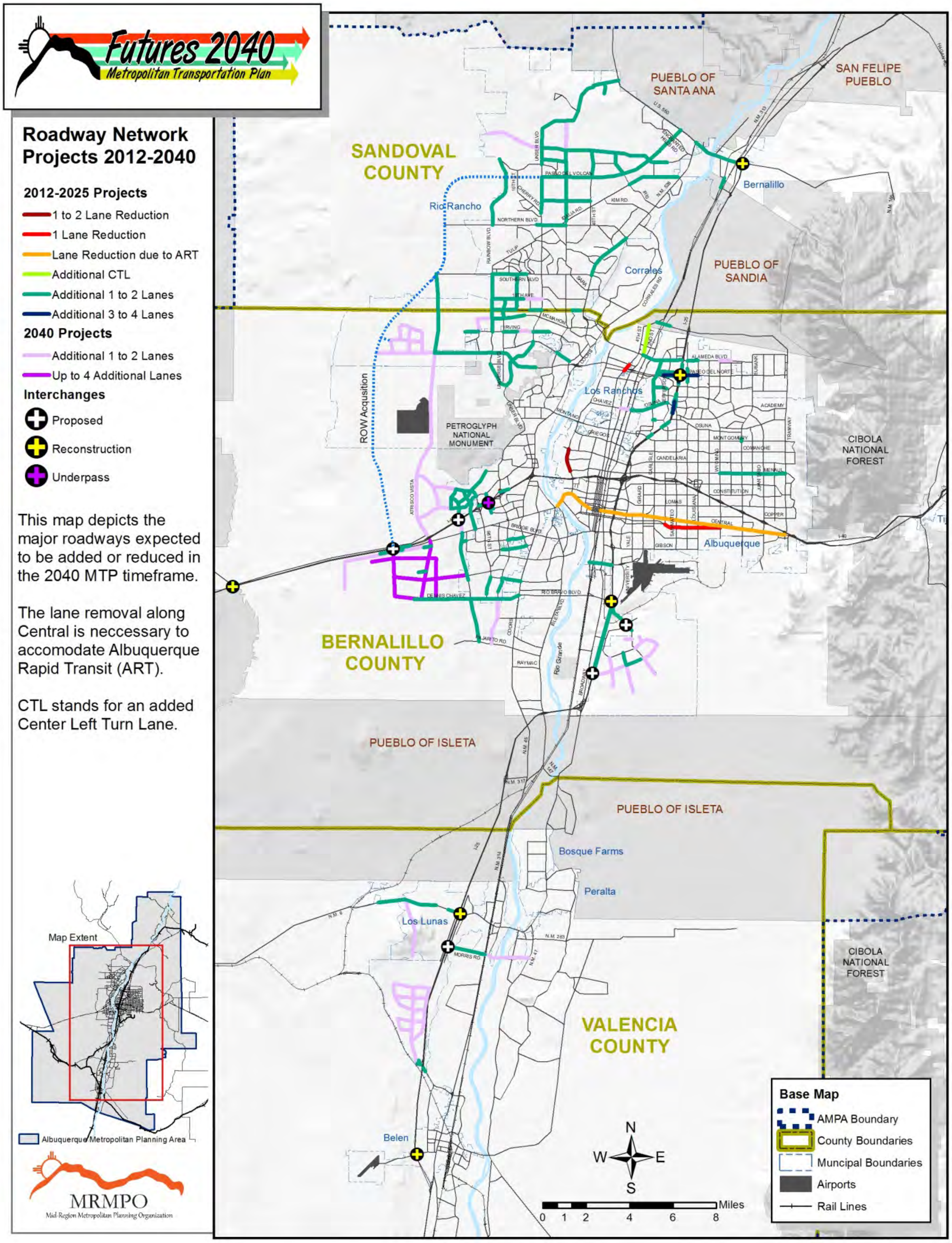
Network Expansion	2012	2040	Percent Increase (2012 - 2040)
Network Lane Miles	4,169	4,500	7.9%
Population	875,061	1,323,657	51.3%

Table 3-8: Lane Miles by FHWA Functional Classification for Urban and Rural Areas[12]

Urban Areas:	**2012**	**2040**
Interstates	547	564
Principal Arterials	1300	1575
Minor Arterials	620	666
Collectors	951	982
Rural Areas:	**2012**	**2040**
Interstates	466	457
Principal Arterials	9	9
Minor Arterials	43	43
Collector	527	659
Total Lane Miles	**4147**	**4500**

[12] Data in this table is based on discrete projects in the TIP/MTP modeling scenarios and does not reflect the privately funded roadway projects in the Santolina, Volcano Heights, and Rancho Cielo Master Plan Areas as their phasing plans may not be as certain.

Map 3-9: Roadway Network Expansion Projects included in the *2040 MTP*



Roadway projects programmed in the *2040 MTP* are generally planned for areas where growth is expected and network expansion needs are greatest. Notable projects include:

- A significant number of north/south capacity enhancement/widening and network connectivity projects including:
  - the completion of Unser Blvd between Pajarito Rd on the Southwest Mesa and US 550 in the northwest part of the metro area with a minimum four-lane facility north of Senator Dennis Chavez Blvd
  - the widening on NM 528 in Rio Rancho between Southern Blvd and Northern Blvd
  - the connection of 118th St from Pajarito Rd to the growing area north of I-40
  - the continuation of Atrisco Vista Blvd in Rio Rancho north of Paseo del Norte to Southern Blvd
- Major east/west facility expansion projects include:
  - a new river crossing along Morris Rd and interchange connection to I-25 to relieve NM 6 and serve populations in Valencia County
  - the widening of NM 6 west of I-25
  - the widening of US 550 in the Town of Bernalillo
  - improvements to Dennis Chavez Blvd, Paseo del Norte, Irving Blvd, McMahon Blvd, 19th Ave/Montezuma Rd, Progress Blvd, and portions of Idalia Rd and Northern Blvd in Rio Rancho
- Ten new or reconstructed freeway interchanges located throughout the AMPA
- Significant roadway network expansion for the following areas:
  - Mesa del Sol in southeast Albuquerque
  - lands of Westland/Atrisco Land Grant north of I-40, east of Atrisco Vista Blvd
  - Southwest and Northwest Mesa areas of Santolina in incorporated and unincorporated Bernalillo County
  - North I-25/Jefferson St corridor
- Extensive network expansion within Rio Rancho, including widening projects or new facilities north of Northern Blvd including Paseo del Volcan, Broadmoor Dr, Loma Colorado Dr, Rainbow Blvd, and connections in the vicinity of City Center. Also included is a roadway extension to serve the new Sandoval County land fill due to be constructed within the near-term of the program.

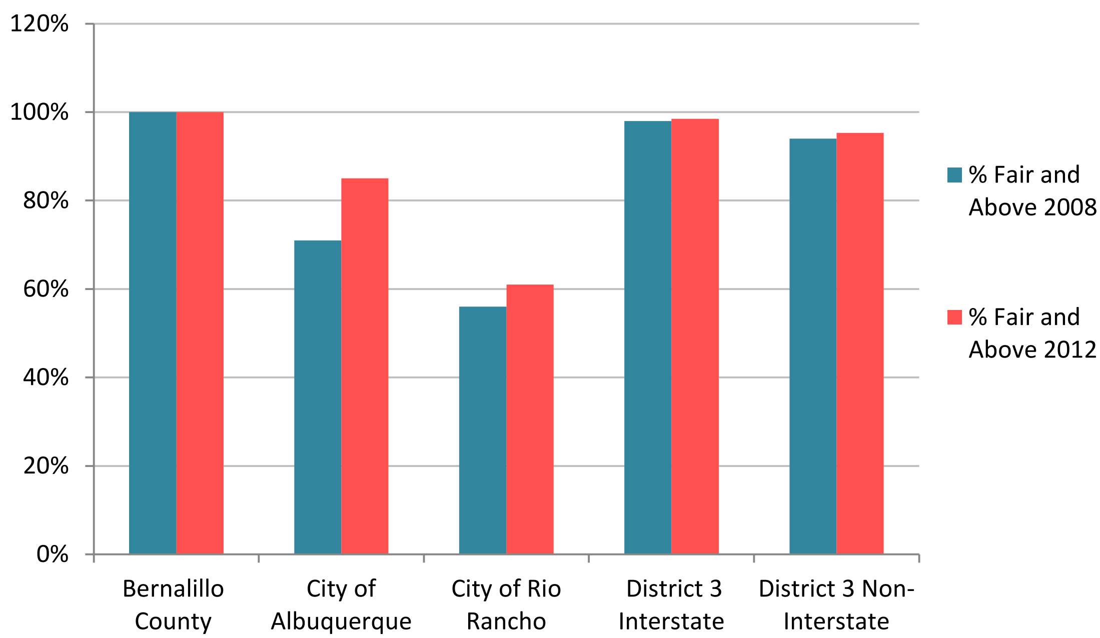
3.2.4 (b) Asset Management and Maintenance of Roadways and Bridges

Another important consideration for improving the operations and management of the transportation system involves the physical condition of existing roadways. Maintenance is important because roads in poor condition result in increased occurrences of congestion, delay and vehicle damage as well as increased fuel consumption and travel time. Further, MAP-21 includes emphasis on infrastructure maintenance cost obligations in transportation programming. Specifically, state departments of transportation are now required to produce Transportation Asset Management Plans (TAMPs) that include inventories of pavement and bridge conditions, identification of management objectives and measures, and financial and investment strategies to address deficiencies across the system to sustain a desired state of good repair. As of this writing, the NMDOT is in the process of developing such a plan as well as a standardized methodology for monitoring conditions across all agencies. Although MAP-21 specifies that TAMPs involve at a minimum the interstates and the National Highway System (NHS), MRMPO is concerned with the entire system of roadways including the remainder of non-NHS roadways (minor arterials and collectors); therefore, MRMPO will play a key coordinating role to involve all member agencies within the AMPA to ensure that all roadways are included.

Pavement and Bridge Conditions

Although roadway conditions nationwide are generally reported to be in dismal condition—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 according to the American Society of Civil Engineering's *Report Card on America's Infrastructure*—system preservation among MRMPO agencies is a high regional priority with a majority of mileage in "Fair" condition or better. According to updated pavement condition data from Bernalillo County, the City of Albuquerque, the City of Rio Rancho, and District 3 of the New Mexico Department of Transportation, pavement conditions in the region have for the most part improved in recent years, particularly in Albuquerque and Rio Rancho.

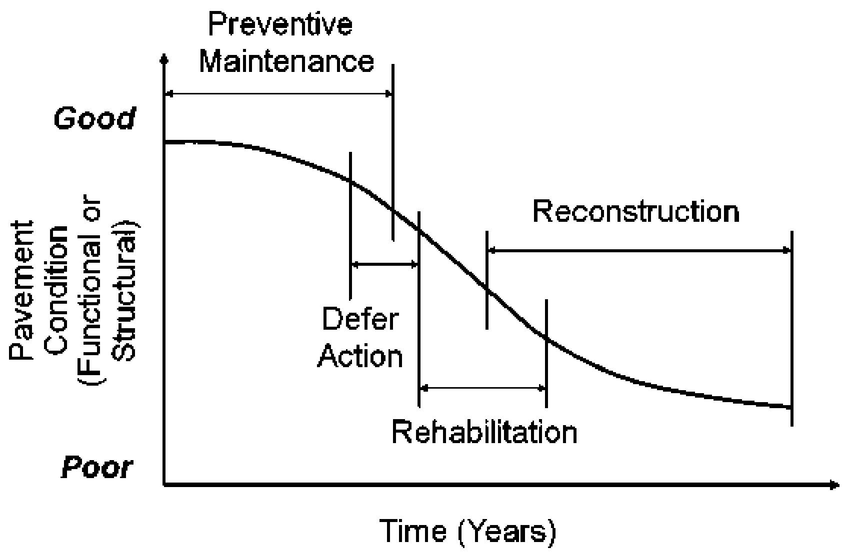
Figure 3-15: Pavement Conditions, 2008 and 2012[13]



[13] Note that Bernalillo County ranks all of its roadways as "Fair" or "Good"

Pavement management systems are established within agency 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 is shown in Figure 3-16, which shows how maintenance enhances the performance as well as lifespan of roads. Indeed, deferring roadway maintenance often leads to greater long-term costs, while preventive treatments are almost always cheaper than reconstructing a road.

Figure 3-16: Typical Pavement Preservation Curve

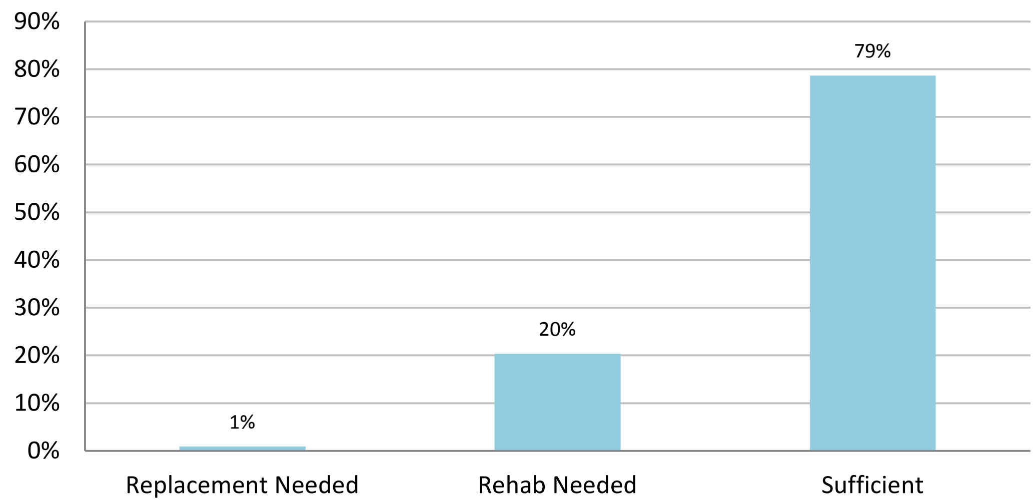


Source: Southern Slurry and Micro Surfacing Inc.

Agencies are currently in the process of refining their respective pavement management systems. Performance condition targets will be established for monitoring purposes, and although they are in development at the time of this writing, effort is currently being made by MRMPO to develop a coordinated methodology among its member agencies.

MAP-21 emphasis on asset management includes bridge infrastructure and the new legislation requires that no more than 10 percent of the total bridge deck area on NHS routes be structurally deficient. Although MAP-21 focuses exclusively on the NHS, MRMPO summarizes all bridge ratings on the roadway system within the AMPA (the NMDOT Bridge Section has the responsibility of maintaining bridges for the entire state of New Mexico). In the AMPA, 79 percent of bridges are ranked as structurally sufficient, and approximately 21 percent of bridges are rated as either needing replacement entirely (one percent) or in need of rehabilitation (20 percent).

Figure 3-17: Bridge Conditions in the AMPA, 2012



3.2.4 (c) Transportation Systems Management & Operations (TSM&O)

Despite programmed roadway projects and the increased emphasis on maintaining the existing infrastructure in good working order, there will still be areas of congestion resulting in significant reductions in mobility, safety, accessibility, and quality of life. Transportation Systems Management & Operations Strategies (TSM&O) identifies collective strategies that manage roadway system conditions to better utilize existing roadway capacity. Significant improvements to traffic flow, safety, and driver mobility can be achieved with these relatively low-cost strategies. For example, improved signage and lighting can be effective at addressing bottlenecks by improving driver awareness and decision-making.

TSM&O strategies are important because they maximize the use of existing transportation infrastructure which helps reduce the need for the far more costly option of building new infrastructure. They can be programmatic, implemented as stand-alone projects, or part of other roadway project activity as is often the case in the AMPA.

Access Management

Roadway access management is a strategy that can maximize throughput and benefit the performance of the overall transportation system by limiting conflicts from turning movements on important regional facilities. MRMPO maintains a set of Roadway Access Policies and works with member agencies to designate certain facilities as “limited access roadways” (see Map 3-10).

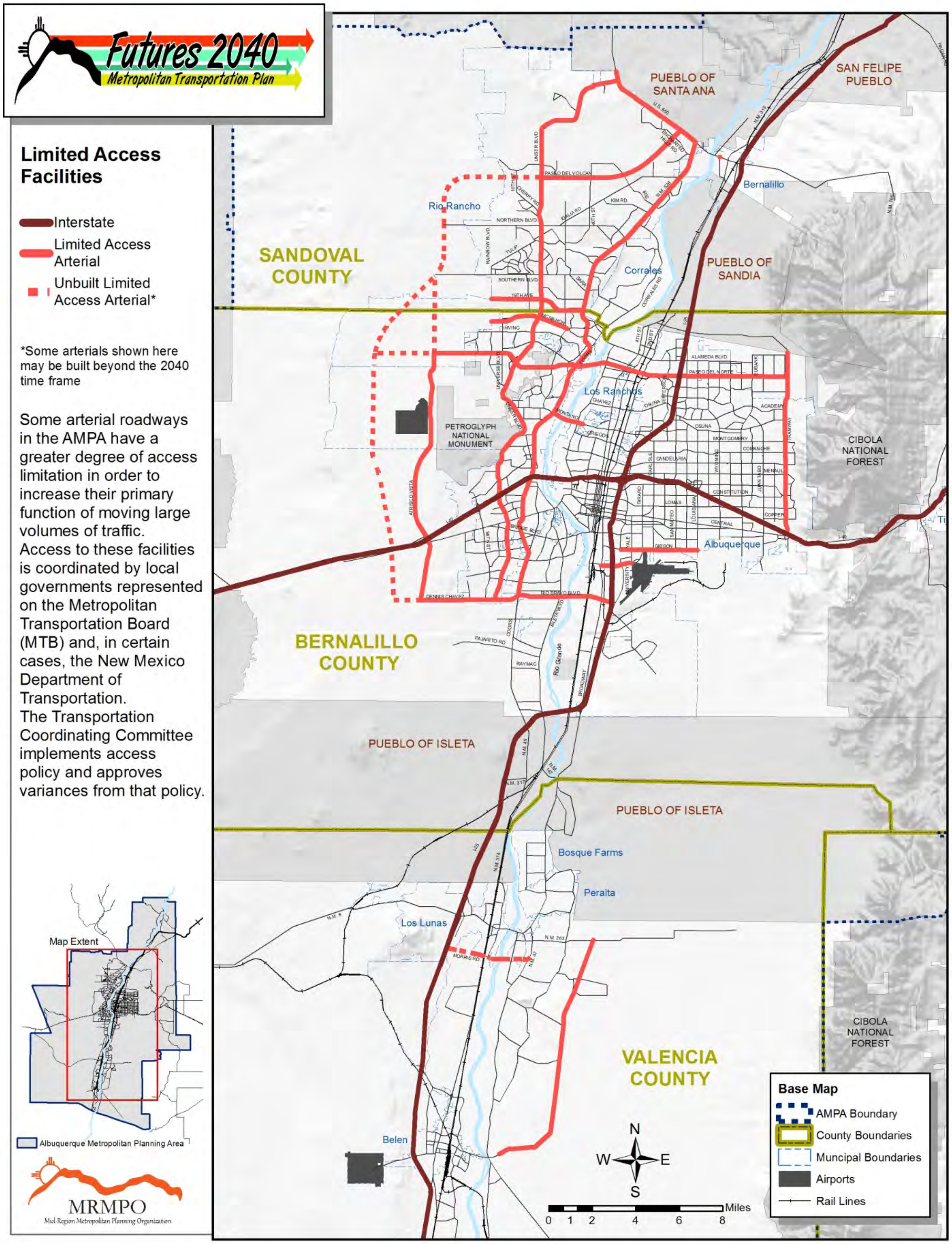
In order for any limited access designation to be effective, it is critical that local land use and access decisions be coordinated. Therefore, it is intended that each member agency with jurisdiction over these roadways should coordinate access to lands along the facility. It is important to strike a balance between the needs associated with the adjacent land uses and the overall performance of the roadway.

Specific access management strategies include medians, side/rear access points between businesses, shared access, parallel/backage roads, and local land use ordinances to regulate access and commercial design practices.

Intelligent Transportation Systems

TSM&O strategies that involve the integration of data collection, archiving, and communications using advanced electronics or centralized monitoring to manage the operations of the transportation system are referred to as Intelligent Transportation Systems (ITS). The focus of ITS is to promote the coordination and integration of monitoring and communication devices to manage congestion and improve traveler information. Individual ITS installations can improve local traffic operations greatly; however, even greater benefits are realized when ITS strategies are combined to form an "intelligent infrastructure" where travel data is shared among those managing the operations of the system. More on ITS can be found in the following section.

Map 3-10: Limited Access Facilities in the AMPA



3.2.5 Intelligent Transportation Systems

Improving the efficiency of the existing roadway network is a major component of the *2040 MTP*. Creative strategies are required given limited funding ability and the strain placed on many of the region's roadways due to land use patterns and reliance on single-occupancy vehicles. One of the most economical sets of transportation strategies is ITS. ITS strategies entail a range of technologies to improve driver decision-making and enhance the flow of travel. The primary benefits of ITS include improved traveler safety, more efficient use of existing roadway capacity, and increased speed. ITS-related efficiency improvements are particularly significant because they allow greater through travel, which effectively adds capacity to the system without building new roads or new travel lanes.

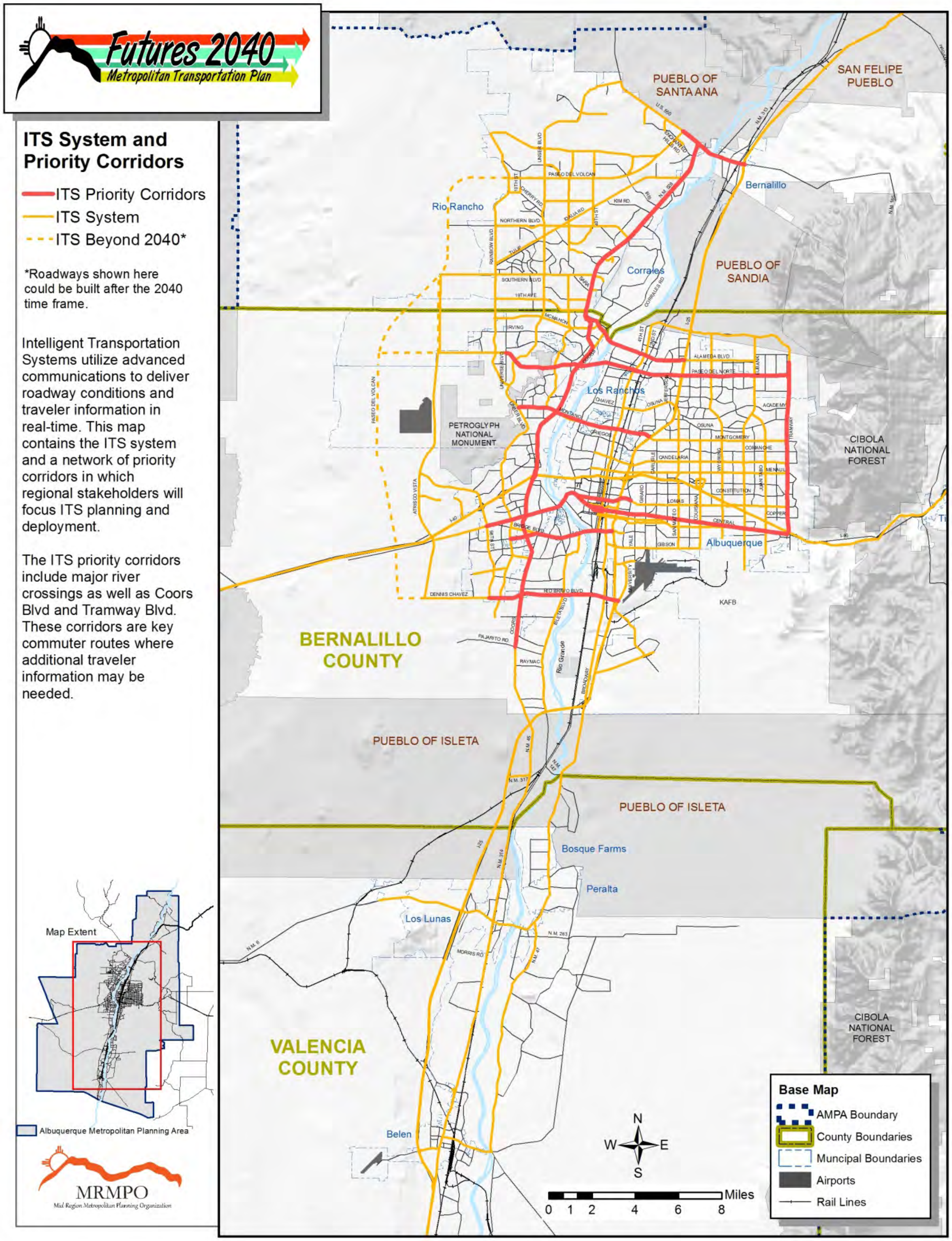
ITS Planning and Prioritization in the AMPA

While ITS is implemented by individual member agencies, travel is by nature regional and there is a strong need to coordinate activities among various stakeholders in the AMPA. The primary mission of the ITS Subcommittee, comprised of representatives from public sector agencies across the metro area, is to promote and coordinate ITS deployment in the AMPA as well as to manage and maintain the AMPA's Regional ITS Architecture. The ITS Subcommittee has established a role in the review and sometimes formulation of ITS projects included in the MTP and the TIP. Projects submitted for inclusion must meet the region's goals and be consistent with the AMPA ITS Architecture. The group continues to work closely with the Congestion Management Process Committee to apply ITS project planning on congested corridors with a strong focus on multi-agency and multi-modal operations. This approach to project programming continues to reduce hurdles that may be caused by cross-jurisdictional coordination issues and will encourage a focus on "traffic operations" for projects on congested corridors.

The Intelligent Transportation Systems Corridors map (Map 3-11) is a product of the ITS Subcommittee and is updated periodically based on agency and regional ITS priorities. The map identifies specific ITS corridors planned for deployment, making the information accessible to planning and development review communities within the AMPA. This approach has proven effective in broadening awareness of ITS planning in the AMPA by identifying implementation opportunities for a broader range of transportation projects.

New in this MTP is a subset of ITS Priority Corridors that have been identified by the ITS Subcommittee to support ITS project development. An evaluation matrix (available on the ITS page of the MRCOG website) with ITS criteria was developed by the committee using existing ITS deployment status and other suitability measures to rank each corridor based on 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 AMPA transportation system.

Map 3-11: ITS Corridors in the AMPA



Regional Transportation Management Center

The AMPA is currently developing a Transportation Management Center (TMC) that will be the first in the region to house multiple-agency transportation operations in a single co-located facility. The center will consolidate monitoring and transportation management activities across jurisdictional boundaries, including:

- Reporting of speeds and travel times during peaks
- Adaptive traffic signal control and flow enhancement systems
- 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 could be substantial. For example, roadway incidents are one of the greatest contributors to congestion in the AMPA. A Regional TMC that integrates highway response such as the NMDOT's HELP Courtesy Patrols can shorten response times by as much as 25 percent on the interstates. The coordination of traffic response is often lacking, but the Regional TMC will improve communication, reduce traveler delays, and improve safety for all users of the transportation system.

Design is currently underway and the project is funded for construction in the current TIP.

Regional ITS Architecture

The ITS applications employed in the AMPA vary in function and are designed to satisfy specific user needs identified through input from member agency stakeholders. The AMPA Regional ITS Architecture, which serves as a guiding document and is required of each region by the federal government, outlines these needs and creates the framework from which to plan, design, deploy, operate, and maintain Intelligent Transportation Systems. The *AMPA Regional ITS Architecture* is now fully integrated with MRMPO's transportation planning process. This document was recently updated to include current ITS needs and services and add new stakeholders from the 2012 AMPA boundary expansion.

Periodic updates ensure that the document remains current with regional and agency projects and priorities, as well as with national standards. This *Architecture,* or maintenance plan, is performed in-sync with the TIP two-year programming cycle and the ITS Subcommittee is involved in the TIP/MTP project review process. All projects submitted for the TIP and MTP are reviewed to determine if they include ITS elements and are then mapped to the *Architecture* accordingly. This step ensures integration between projects in the TIP and MTP and guidance set forth in the *AMPA Regional ITS Architecture*. The current version of this document is available on the MRCOG website.

ITS project implementation must also follow a systems engineering process in order to be certified by the NMDOT and Federal Highway Administration. 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 Services in the ITS Architecture

The primary components of the *ITS Architecture* are referred to as ITS services. Potential ITS services include:

- 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 critical information such as downstream congestion, incidents, travel times, next-bus arrival times, cautionary alerts from adverse weather conditions, etc. 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 a wide range of information ranging from travel conditions and alerts for travelers to system status and performance for the 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, 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 transportation and transit management/dispatch centers bring together many ITS services in one facility to coordinate responses to traffic incidents and travel emergencies through adjustments in signal timing, issuing traveler information, and communications with emergency responders. A co-location facility shared by multiple agencies promotes data sharing and the coordination of response. Such facilities also improve coordination of signal timing on corridors that involve multiple agencies. 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 detection and emergency management improves roadway operations by connecting dispatch with network surveillance and traveler information systems to reduce response times and to ensure that 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 (i.e., 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.

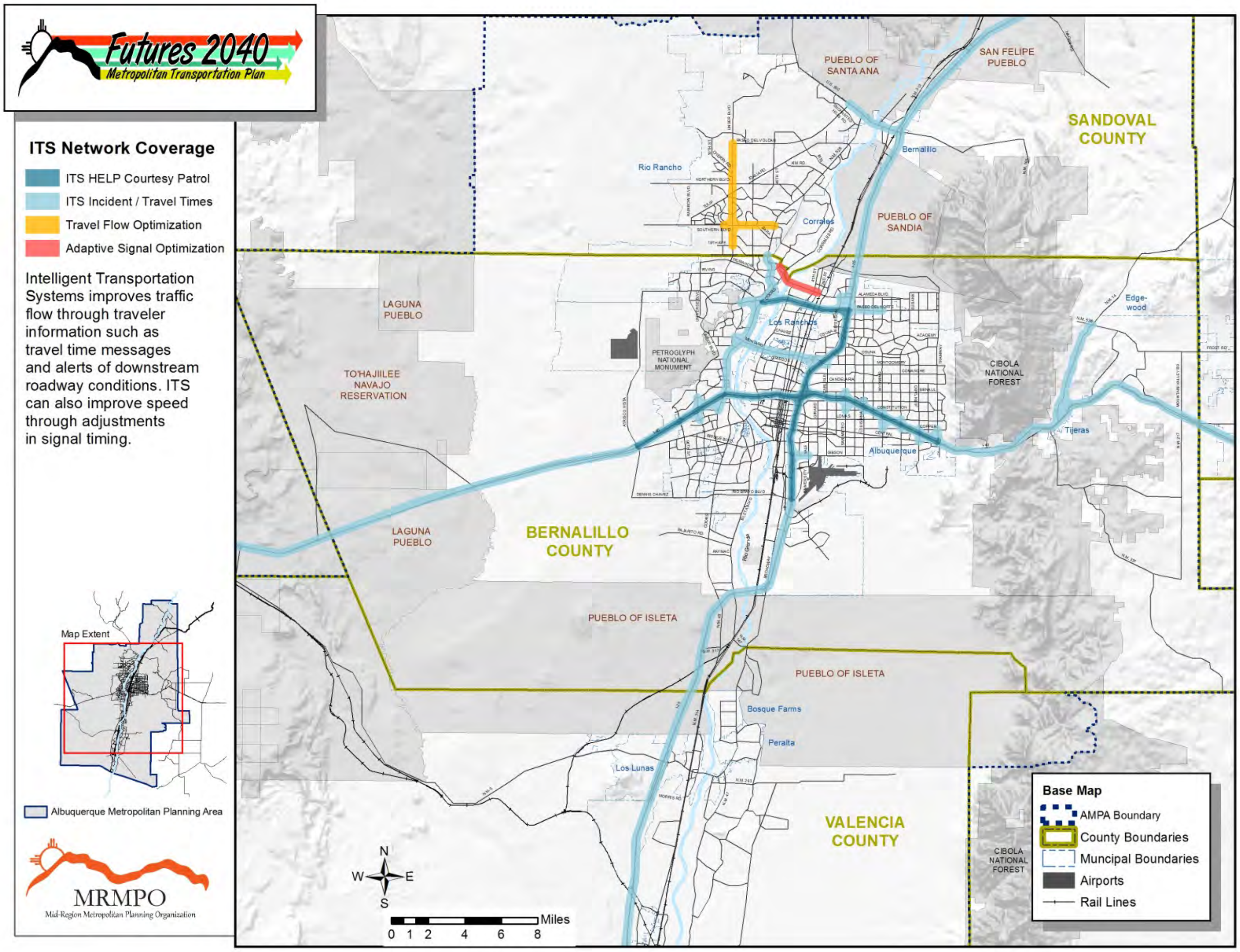
- Public transportation operations and management benefits from ITS deployment through services that provide real-time monitoring of transit vehicle operations and dispatch services, trip planning information, and real time bus location/arrival time information available immediately to the user via mobile 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 as a whole. 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.

- Workzone/construction management serves to minimize the impacts of construction zones by alerting travelers to anticipated delays, detouring, and other cautionary actions needed to avoid hazards in the construction zone.

Map 3-12 depicts the geographic coverage of current ITS real-time traveler services. In each of the corridors shown, travelers benefit from enhanced information and alerts such as travel time, hazards or hazardous conditions, or other contributors to congestion. Often times an alert is made far enough ahead so that travelers can make critical decisions to divert to a different route and avoid the congested area entirely. The map represents current deployments, although services will be extended to other corridors as agencies in the AMPA continue to implement ITS over time.

Map 3-12: Network Coverage of ITS Traveler Information Services



Future Directions in ITS

As member agencies deploy TSM&O strategies such as adaptive signal control, Bluetooth-enabled traffic operations monitoring, and real-time traveler information systems that notify drivers of downstream conditions and potential hazards, the collective result of these coordinated ITS efforts will be a network of seamless travel management that will provide wide benefits to travelers in the AMPA.

The implementation of the Regional Transportation Management Center means the AMPA is about to enter a new era in roadway operations and management. The project will integrate roadway and first responder operations and communications, allowing central management and coordination among all roadway operators in real-time. As a result, operators may optimize traffic signal timings and alert drivers to downstream conditions to improve traffic flow and driver situational awareness. The sharing of travel conditions data with the first responders community is also anticipated to result in tremendous improvements in traveler safety and improved incident response.

Federal requirements as part of the Real Time System Management Information Program (RTSMIP) will require further ITS investments and regional integration. Specifically, agencies must provide traffic monitoring and traveler alerts on roadway conditions including travel times, construction activity, weather conditions, and any other blockages that affect travelers. Interstates are subject to this rule in 2014, and select non-interstate roadways are subject to this rule once the Albuquerque Metropolitan Statistical Area (MSA) population reaches one million (the Albuquerque MSA is expected to meet this threshold within the near-term of the plan).

Emerging technologies also promise new opportunities for transportation systems management. High-technology applications involving mobile communications (2G, 3G, 4G networks), Bluetooth, WiFi, and 5.9 GHz Dedicated Short Range Communications (DSRC) are being utilized in “connected vehicles,” which are considered by the U.S. DOT as the “Next Generation ITS.”[14] Advanced communications and sensors on vehicles allow for such things as crash avoidance, real-time alerts related to hazards and/or adverse weather conditions, icy roads, and “presence detection” such as pedestrians in crosswalks or other conditions to enhance driver awareness. Over the next few years, with support from most auto manufacturers, vehicles will be equipped with sensors and advanced communications technologies, which will facilitate a new era in transportation allowing significant improvement in roadway efficiency, safety, driver convenience, and overall management of the transportation system. Transportation agencies will need to accommodate these technologies in their infrastructure and operations, especially as the state of the practice migrates to include roadside communications infrastructure.

[14] USDOT/ITS America Connected Vehicles Taskforce

3.2.6 Congestion Management Process

According to the Texas Transportation Institute, congestion cost the city of Albuquerque and its residents a total of $288 million in economic value at a rate of $658 per commuter in 2012.[15] Fortunately, congestion is not an all-day phenomenon in most of the Albuquerque metropolitan area. It is generally confined to river crossings and major corridors in the peak periods, although low speeds and long delays are increasingly common in parts of the metropolitan area where there are few transportation options other than driving and few routes to select from due to a lack of an efficient grid system.

Rather, the fact that congestion is not yet a widespread or all-day phenomenon provides the AMPA with an opportunity to ensure smart transportation decisions are made before the congested conditions projected in the 2040 Trend Scenario come to fruition. Federal regulations require that all Transportation Management Areas (TMAs), such as MRMPO, incorporate an "objectives-driven performance-based" Congestion Management Process (CMP) into regional transportation planning efforts. In practice a CMP is intended to assess the performance of the regional transportation system, identify the sources and extent of congestion, recommend appropriate strategies to manage congestion and improve mobility, and consider the benefits of proposed transportation projects and travel demand management programs. The CMP therefore fulfills an implementation role for the MTP by convening technical experts from member agencies across the region to enable better decision-making and prioritize the projects that will have the greatest regional impacts.

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 and that the cities with the highest gross domestic product (GDP) per capita also tend to have high levels of vehicle delay.[16] 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.[17] 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.[18]

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[15] Texas Transportation Institute, "Urban Mobility Report 2012"

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

[17] Matthias Sweet, "Do Firms Flee Traffic Congestions?" Journal of Transport Geography, February 2014

[18] Todd Litman, VTPI, "Congestion Costing Critique: Critical Evaluation of the 'Urban Mobility Report,'" June 13, 2014

CMP Requirements
• Identify congested locations • Determine the causes of congestion • Develop and propose mitigation strategies • Evaluate the impact of congestion management strategies on recently implemented projects

Congestion is not always associated with lack of mobility; it may simply mean that traffic is moving slower than the ideal. (The only true way to make traffic go away is to make people go away as well!) This means that congestion is something to be managed rather than eliminated. What is more, trends in vehicle miles traveled suggest that demand for roadway space is not likely to grow indefinitely, as had been previously predicted. Rather, there is less need to build new roads to accommodate future growth as driving rates decrease over time. In fact, there are parts of the Albuquerque metro area where daily traffic volume has been declining at such a steady rate that roadways in these areas may be good candidates for removing lanes and reducing capacity.

Recurring versus Non-Recurring Congestion	
Recurring congestion refers to the type of congestion that happens on a regular and even predictable basis. The main causes of recurring congestion are when there are more vehicles than a roadway was designed to handle, or inefficiencies in roadway design and signal timing that result in lower speeds than ideal. According to the FHWA, half of all congestion is recurring.	*Non-recurring congestion* results from short-term and generally unpredictable events that disrupt vehicle travel. Examples of non-recurring congestion include crashes, disabled vehicles, work zones, adverse weather, and special events.

If congestion is to be managed rather than eliminated, congestion management really means identifying the most effective transportation improvements given the existing conditions and available options. In other words, addressing congestion should really be about making the best out of a particular situation.

A wide range of congestion management strategies may be called upon to address both recurring and non-recurring congestion. For example, an operations and management approach incorporates the use of technology to maximize system performance and efficiency while ensuring safety and reliable conditions for travelers. Other strategies include properly located capacity expansion projects, incident response, access management, and travel reduction (or travel demand management) programs. The ongoing challenge for the CMP is to integrate those strategies into the regional planning process and encourage local governments to implement congestion management techniques in appropriate locations.

CMP Congested Corridor Rankings

1. Alameda Blvd
2. Coors Blvd
3. Bridge Blvd
4. Isleta Blvd
5. Wyoming Blvd
6. Montaño Rd
7. San Mateo Blvd/Osuna Rd
8. Montgomery Blvd
9. Jefferson St
10. Gibson Blvd
11. Paradise Blvd
12. Central Ave
13. Paseo del Norte
14. Eubank Blvd
15. Arenal Blvd
16. Lomas Blvd
17. Rio Bravo Blvd
18. Louisiana Blvd
19. US 550
20. 2nd St
21. 4th St
22. NM 6
23. NM 528
24. Menaul Blvd
25. Tramway Blvd
26. Southern Blvd
27. Broadway Blvd
28. NM 47
29. Unser Blvd
30. Irving Blvd

For more details on the corridors and the scoring methodology, see "A Profile in Congestion" on the CMP page on the MRCOG website.

3.2.6 (a) 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 recurring and non-recurring congestion. The three principal data elements for the CMP include:

- Volume-to-capacity (V/C) ratios – used to compare the observed traffic volume on a roadway segment to the intended roadway capacity
- 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
- Crash rates – frequency of crashes at individual intersections compared to the regional average

Travel time and traffic counts data in particular 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.

The data is collected across the metropolitan area on a recurring basis, but special attention is paid and additional analysis is performed on the 30 corridors and two Interstate facilities that comprise the CMP congested network. The data is used in the development of a CMP corridor rankings table that indicates the facilities that experience the highest overall levels of congestion. The CMP corridor rankings are also compiled into a biannual document entitled "A Profile in Congestion" and are an important criterion in the Project Prioritization Process.

MRMPO data collection efforts have expanded immensely since the *2035 MTP* was adopted to now include a wider network of corridors than previously possible, as well as data on transit and non-motorized travel modes. 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 residents of central New Mexico actually travel around the region.

Regional Transportation Surveys

A 2012 transit on-board survey undertaken by Rio Metro and MRCOG provides rider characteristics and travel patterns, while the 2013 Mid-Region Household Travel Survey observed travel patterns for residents of nearly 2,500 households, illuminating how behavior varies according to age, income, household size, and place of residence, among other factors. Regular boarding and alighting surveys shed light on how transit ridership is distributed across the network and enable calculations of regional and corridor-level transit mode share. Although these efforts were not undertaken specifically for CMP purposes, they are tremendously important for understanding how residents travel around the region. More information on the findings of these surveys can be found in section 3.1.

3.2.6 (b) Congestion Analysis and CMP Products

The various data shed light on the nature of congestion for the segments of each corridor and the way the transportation system is utilized. 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 which can 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.[19]

Alameda Travel Time Study

In fall 2013, MRMPO conducted a study on the impacts of a series of adaptive traffic signal control devices installed by Bernalillo County along a two-mile stretch of Alameda Blvd between Loretta Drive and 2nd Street. Adaptive signal control technology offers a flexible approach to traffic management by adjusting the duration of the traffic signal according to observed travel patterns. This serves to distribute signal "green time" equitably for all travelers through measures such as extending signal lengths when traffic is heavy and reducing wait times at signals when traffic is light. Ultimately these adjustments can serve to reduce congestion and create smoother traffic flows.

The MRMPO study offered a chance to test this technology locally and determine how effective such a system might be in addressing transportation challenges in the metro area. The study compared driving

[19] 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.

conditions for multiple days when the previous traffic signal timing plan was in place to multiple days one week later when the adaptive signals were activated. The study also calculated the impacts on side streets to investigate whether or not the adaptive signals had an impact on vehicles trying to cross or turn onto Alameda Blvd.

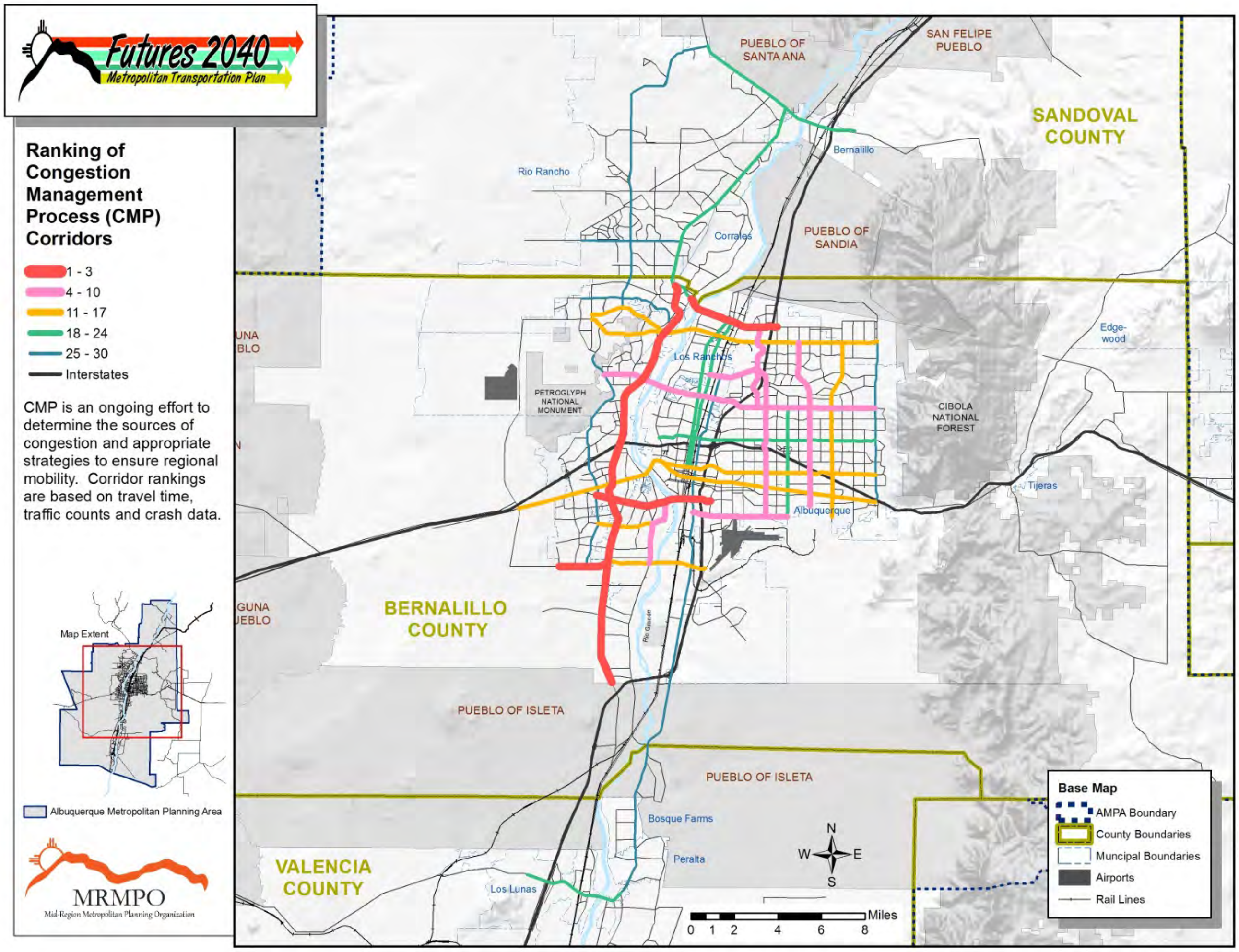
Remarkably, the study showed clear improvements for travelers on both Alameda Blvd and along the side streets analyzed (Rio Grande Blvd, 4th St, and 2nd St). The system proved most effective in the peak direction and in the peak commuting periods, the times and the direction when the greatest numbers of vehicles are on the roads. Although the system had less impact in other times of day, such as mid-day, this was generally due to the fact that average speeds were already at reasonably high levels.

Impact of adaptive traffic signals along Alameda Blvd:

- Reduction in travel time in eastbound direction (AM peak period): 25%
- Reduction in travel time in westbound direction (PM peak period): 20%
- Average reduction in travel time for all Alameda Blvd travelers: 10%

The most surprising finding was that at the same time travel times improved on Alameda Blvd, drivers on side streets in the study area spent on average 11 fewer seconds waiting to cross Alameda Blvd when the adaptive traffic signals were activated than under the previous signal timing plan. The study supports that the use of such technology is a promising and cost-effective strategy for improving travel conditions and getting the most out of the existing roadway system.

Map 3-13: CMP Network and Corridor Rankings



CMP Products[20]

An important part of the CMP is to disseminate data and related analyses to local government agencies. 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 Table
- "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 the strategies matrix was developed for use with the Project Prioritization Process (see section 4.1), it can be used as a reference by local governments in the development of all transportation projects.
- Various reports and studies completed by MRMPO through the Congestion Management Process are posted on the MRCOG website

Project Prioritization Process

Integrating the CMP into the metropolitan transportation planning process and into regional decision-making is a critical and ongoing effort. The most significant result of these efforts is the Project Prioritization Process (PPP), which grew out of the CMP Committee's desire to see federal transportation dollars allocated in ways that would have the greatest impact and best address regional transportation needs.

The Project Prioritization Process is an objective, data-driven tool for evaluating transportation projects proposed for inclusion in the short-range TIP and identifying the projects which best address the needs of the region. Many of the criteria in the PPP utilize data analyzed and collected through the CMP, and the CMP Committee oversees periodic updates to the Project Prioritization Process. In particular, the PPP highlights projects that address congested corridors and bottleneck locations. The greater the severity of congestion or safety risks in the project location – as measured through congested corridor rankings, segment level congestion (based on V/C ratios and speed differential data), and crash rates – the higher the number of points awarded to a project. Other data that are collected as part of the CMP and that have been integrated into the PPP include transit ridership data, which is added to traffic volume to comprise the People Movement criterion. For more details on the Project Prioritization Process, see section 5.1.

[20] All CMP products are available on the Congestion Management Process page of the MRCOG website.

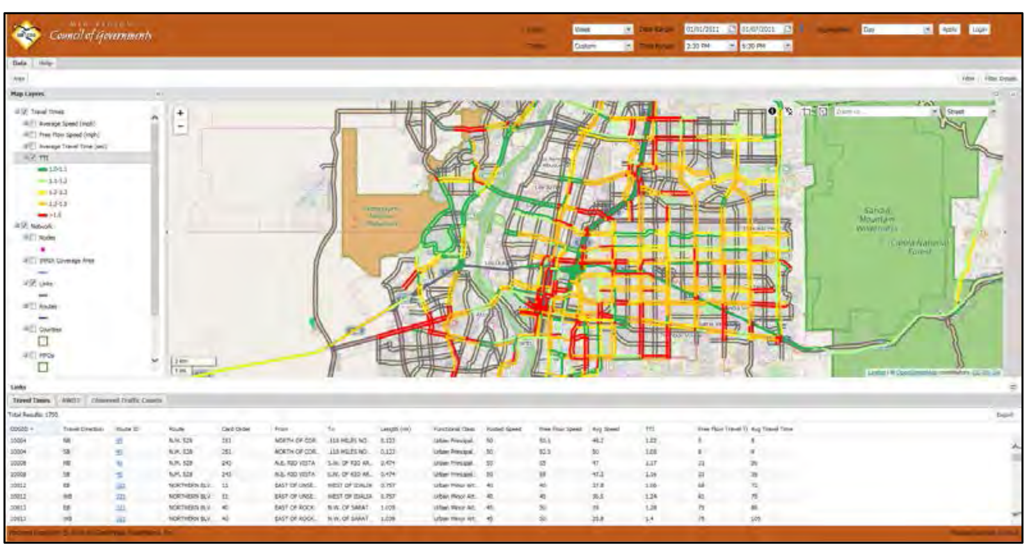
Current Efforts and Future Directions

Initial CMP efforts focused on data collection and developing systematic methods for evaluating congestion across the metropolitan area. These methods have largely been completed and put to immediate use through the Project Prioritization Process. The next phase of analysis will be to assess before and after conditions for individual projects on a recurring basis (as in the Alameda Travel Time Study) and to better track regional conditions over time. Through these efforts, MRMPO is well-positioned to comply with the requirements for performance-based planning in MAP-21 and to provide as much information as possible for member agencies during project development.

As new methodologies emerge and technology advances, there are also opportunities to expand data collection and transportation-related analysis. In particular, data collection efforts can include a range of alternative mode data, either for specific studies or as part of comprehensive efforts to understand regional bicycle travel patterns and areas of concentrated pedestrian activity. MRMPO is exploring opportunities to collect bicycle volume data now available through commercial vendors, as well origin and destination data for vehicle travel.

MRMPO recently completed the Transportation Analysis and Querying Application tool (TAQA) that makes traffic counts and travel time data publicly available and automates the calculation of regional performance measures such as vehicle hours of delay (see Figure 3-18 and http://taqa.mrcog-nm.gov). Aside from improving the accessibility of data to users, TAQA allows MRMPO to understand how roadways perform over time and the long-term impacts of infrastructure improvements. Particularly noteworthy is the scope of data available through the tool. Since it can now be collected through mobile devices, regionwide travel data is now inexpensive and comprehensive, and through TAQA can be easily archived and queried.

Figure 3-18: Transportation Analysis and Querying Application



3.3 Freight and the Movement of Goods and Services

According to the American Association of State Highway and Transportation Officials (AASHTO), the transportation sector, which includes highways, railroads, waterways, ports and airports, and 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. Therefore, the quality and functionality of a region's infrastructure are critical

The Albuquerque region's freight system delivers goods into, within, and out of the region. These functions are not only a vital concern to local and national economies, but also to residents who need basic necessities like groceries or gasoline. The freight industry is more than trucks and trains, but includes important aspects like fleet management, logistics, and warehousing that facilitate goods movement to trucks, trains and air deliveries that distribute products where they need to go.

The economic implications of delays and congestion are well-established. Ensuring that the AMPA's transportation system and infrastructure are reliable 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. Synchronizing multimodal freight movement and 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, supporting the region's freight system plays a critical role in meeting the MTP's goal of supporting the region's economic vitality.

In a Nutshell…

Takeaways: There are important implications tied to the movement of goods, including the delivery of basic necessities such as groceries. Efficient movement of freight can ensure a competitive edge and improve the region's economic outlook. At the same time freight movement both contributes to and is subject to regional congestion and related transportation challenges

Components: This section discusses both truck and rail freight and reviews existing conditions, issue areas and how newly deployed technologies are improving freight movement. A primary freight network is identified (page 3-61), as well as opportunities to improve freight movement within and across the region.

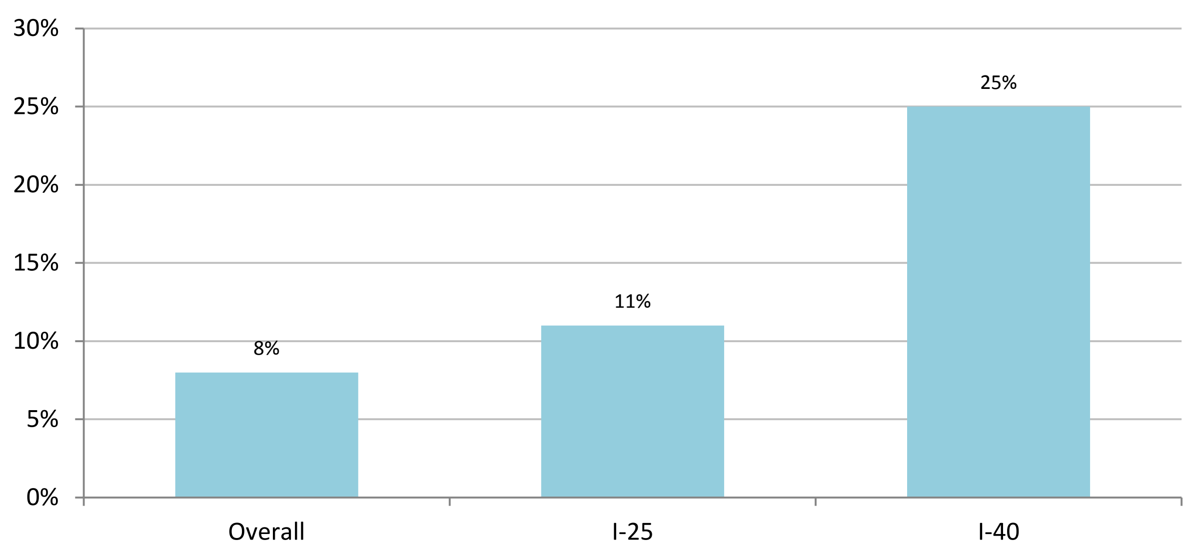
Goals and Objectives: Supporting efficient freight movement and enhancing the flow of goods and services are explicit objectives of the *Economic Vitality* goal of the *2040 MTP*.

3.3.1 Truck and Freight Roadway Operations

Albuquerque is located at the intersection of the I-40 and I-25 interstate facilities, which NMDOT identifies as the major freight-designated routes within the AMPA for truck freight. 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. Altogether, this means the AMPA plays a crucial role linking the country's freight network, and preserving and maintaining interstate facilities is of significant national and regional interest.

Vehicle count data from MRCOG's Traffic Monitoring Program shows that the overall percentage of commercial vehicles (those vehicles larger than passenger car, truck, or two-axle six-tire truck) on the AMPA transportation network is about eight percent. However, when considering the proportion of commercial vehicles on I-40 through the AMPA, the percentage jumps to nearly 25 percent, indicating the importance of interstate freight travel along the I-40 corridor (data from New Mexico Department of Public Safety, Motor Transportation Division shows that the vast majority of these trucks [85-90 percent] are crossing the state without conducting local deliveries). 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 AMPA.

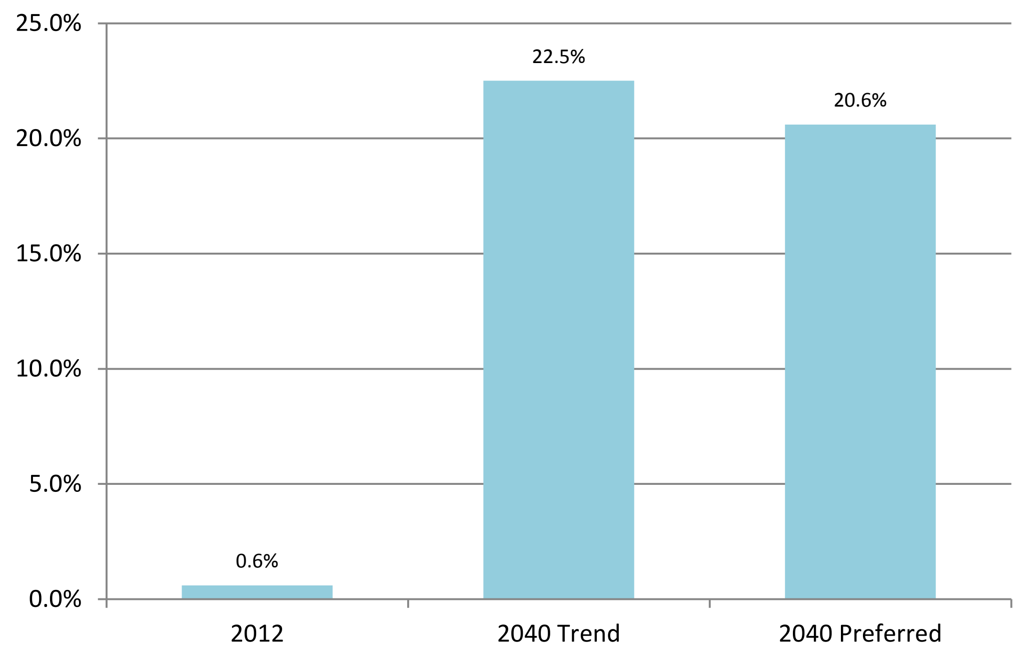
Figure 3-19: Percentage of Commercial Vehicles out of Total Traffic Volume



According to the Federal Highway Administration's Freight Analysis Framework (FAF), I-40 at the western AMPA 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 the AMPA 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 AMPA in good working order, but will place additional strain on that same infrastructure and contribute to growing congestion challenges.

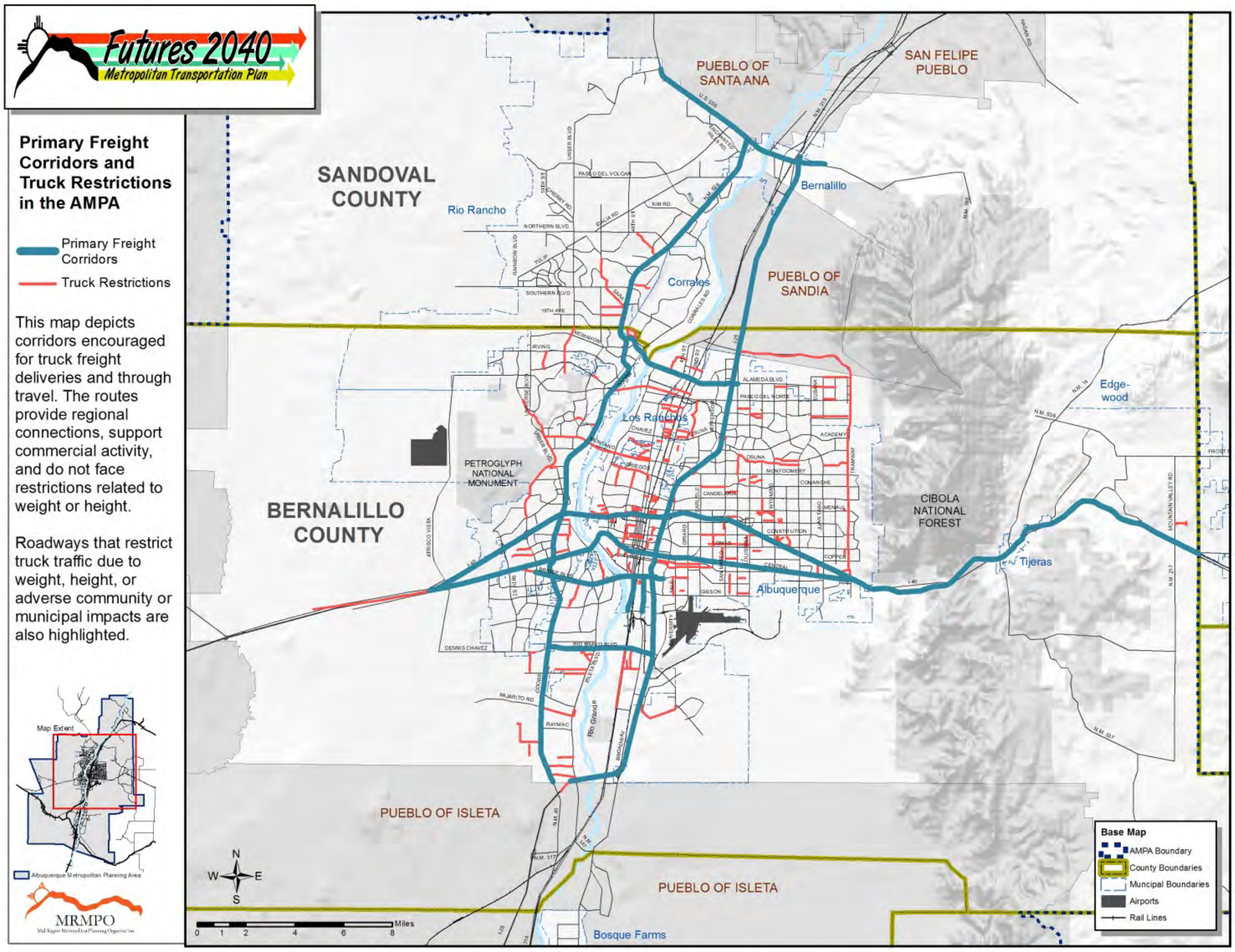
There are no exclusive truck-only lanes within the AMPA, meaning that truck traffic is not given any priority and must operate on the same roadway lanes as general purpose vehicles. With no truck lanes programmed in future years of the MTP, the amount of freight traffic operating under congested conditions (measured in lane miles of roadway) becomes a serious issue that will adversely affect trucking operations including lengthened delivery times and increased operational costs. Figure 3-20 depicts the current and anticipated growth of truck freight travel taking place under congested conditions for each scenario in the MTP.

Figure 3-20: Percentage of the Commercial Vehicle Network Operating under Congested Conditions



Several major freight companies maintain facilities in Albuquerque, often for the purpose of "breaking" full loads for local delivery and assembling them for outbound trips. UPS operates a fueling facility in Albuquerque and receives approximately 25 trailers per day at a rail-truck intermodal facility near Second St and Woodward Rd in Albuquerque's South Valley. These trailers are driven to the UPS yard at Comanche Rd and I-25 to be broken or transferred to the interstate system. Additionally, FedEx maintains separate facilities for FedEx Freight, FedEx Ground, and FedEx Air. FedEx Freight is located on the Westside near Unser Blvd and Central Avenue, FedEx Ground is located near Second St and Montano Rd, and FedEx Air is located at the Albuquerque Sunport.

Map 3-14: Primary Freight Network and Truck Restrictions



To help prioritize freight-related improvements and understand truck travel patterns, MRMPO developed a primary freight network, found in Map 3-14. The map also identifies the various locations around the AMPA 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.

An analysis of several of the primary freight corridors was performed for the 2012 Base Year and the Trend and Preferred Scenarios using the travel demand model. A summary of the basic corridor operating conditions including total volume/capacity and highest daily volumes are provided in Table 3-9. Due to the fact that there are no specific truck lanes or other preferential roadway designations for freight traffic in the AMPA, 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 Preferred, although the overall network volumes are approaching capacity in both scenarios.

Table 3-9: Performance Measures on Primary Freight Corridors, 2012, Trend, and Preferred Scenarios

Freight Corridor	PM Peak Hour V/C Ratio			Highest Daily Volume on Corridor		
	2012	2040 Trend	2040 Preferred	2012	2040 Trend	2040 Preferred
US 550	0.64	0.85	0.87	24,765	44,119	42,166
NM 528	0.69	0.9	0.88	38,446	52,382	50,473
Coors Blvd - North of Central Ave	0.74	0.89	0.89	41,215	53,188	53,447
Coors Blvd - South of Central Ave	0.4	0.79	0.71	15,523	26,011	23,108
Central Ave	0.31	0.61	0.62	12,888	26,531	24,938
Bridge Blvd	0.59	0.89	0.87	23,454	29,665	28,644
Rio Bravo Blvd	0.62	0.78	0.76	19,966	23,827	23,490
Alameda Blvd	0.86	0.78	0.76	28,178	23,827	23,490
Interstate 25	0.7	0.89	0.87	88,205	118,239	117,846
Interstate 40	0.63	0.74	0.73	95,158	119,809	118,637
Network Average	**0.62**	**0.81**	**0.8**	**38,780**	**51,760**	**50,624**

General Freight Issues

During outreach efforts with local freight stakeholders, long-haul truckers 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 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)

- 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:
  - Truck detouring – direct trucks to appropriate stops when incidents occur
  - 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 shared common concerns, often related to freight restrictions dealing with weight and river crossings:

- Weight 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 restrictions on the river crossings at Paseo del Norte and Montaño 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.

These concerns are currently being addressed by transportation officials through better outreach with the trucking industry. In particular, information related to truck restrictions is being transmitted to the New Mexico Trucking Association for dissemination to carriers.

MAP-21 Freight Requirements

In recognition of the critical role that transportation infrastructure plays in regional and national economic performance, MAP-21 places increased emphasis on assessing local freight-related needs. While the U.S. Department of Transportation has not yet released the final MAP-21 national vision, goals, or performance measures for freight,[21] early guidance has been identified for future interest areas and priorities related to freight movement, which include:

- Financing shortfalls
- Aging infrastructure
- Demographic trends, since growing population in urban areas will increase congestion and affect freight movement
- Enhancement of technology operations
- Global/domestic commercial and economic trends creating new challenges for meeting freight Demand and passenger transportation needs
- Shifting energy economies and fuel sources, which create significant disruptions as well as opportunities for innovation
- Impacts to infrastructure resulting from climate change

MRMPO has access to system-wide speed data, vehicle hours delay, percentage of the network in congested conditions, congested conditions along freight corridors and rivers crossings. This information will enable MRMPO to create baseline freight data that can be monitored and potentially integrated as freight performance measures.

Other Relevant Freight Laws

- Jason's Law (MAP-21 Section 1401): Originally passed in 2012, this law now is included in MAP and is meant to address the lack of safe rest areas. It requires the U.S. Department of Transportation, in consultation with state motor carrier safety personnel, to conduct a survey and assessment identifying available truck parking facilities to ensure there are an adequate amount of safe rest areas for truckers. Specific results of this survey as it relates to New Mexico have not yet been released. Additionally, this law enables federal funds to be utilized for these types of improvements. Federal funds eligible for truck parking projects include Highway Safety Improvement Program (HSIP), Surface Transportation Program (STP) and National Highway Performance Program (NHPP).
- Hours of Services Final Rule for Truck Drivers: This regulation is mandated by the Federal Motor Carriers Safety Administration (FMCSA) and was published in the Federal Register on December 27, 2011. The regulation requires that commercial truck drivers may not drive more than 11 hours per day and work no more than 14 hours per day. It also limits the maximum average work week for truck drivers to 70 hours and requires truck drivers to take a 30-minute break during the first eight hours of a shift. Additionally, if a truck driver reaches the maximum 70 hours of driving within a week, he or she may resume only if the driver rests for 34 consecutive hours, which includes two nights of sleep from 1:00 to 5:00 AM. The provisions took effect in July 1, 2013.

[21] MRMPO has access to system-wide speed data, vehicle hours of delay, percentage of the network in congested conditions, congested conditions along freight corridors and rivers crossings, enabling MRMPO to create baseline freight data that can be monitored and potentially integrated as freight performance measures.

3.3.2 Intelligent Transportation Systems & Freight

Utilizing 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 that alerts drivers of hazardous conditions downstream has proven essential to the efficient and safe operation of freight movement within the AMPA and the state as a whole. For example, 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 AMPA, 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.

The NMDOT and area enforcement entities continue to work with the motor carriers to identify viable options (such as the New Mexico State Fairgrounds) and thus far have had success. The dissemination of real time travel conditions via NMRoads.com, dynamic message signs, and highway advisory radio have proven invaluable to truckers en route and far-enough upstream so that, in most cases, decisions can be made to either detour or stop at a location with adequate services.

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 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, thus minimizing unnecessary stop delay. 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.

Another encouraging example of ITS utilization 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 will also enable improved data collection about freight truck routes and congested areas. Full deployment of Pro-Miles is anticipated for March 2015.

3.3.3 Rail Freight

While a majority of the AMPA's freight movement is via truck, addressing other freight modes such as rail is critical to addressing the MTP's goal of furthering economic vitality. New Mexico's rail system includes 2,055 miles of railroad right-of-way, and like truck freight, plays an integral role in connecting both the east and west coasts. In 2009, New Mexico's rail system hauled about 127 million tons of goods valued at $8.5 billion and supported numerous jobs needed to maintain rail lines and service trains.

The ability to transfer between modes will also become increasingly important, and identifying strategies to create more seamless multimodal functionality between and among freight modes should be a high priority for the region. A massive rail freight facility near the border with Chihuahua, Mexico opened in May 2014, at Santa Teresa, NM. This freight rail hub is about 2,200 acres and will serve as a significant inland port where goods will be moved between rail and truck. While this facility is not within the AMPA, it is important to note because it could eventually lead to an increase in truck freight movement on the I-25 corridor, including in the AMPA.

For now, this is the closest trans-loading facility to Albuquerque. However, a large-scale intermodal logistics center just north of Belen in the Rancho Cielo area has also been considered. This facility would have a substantial impact on freight movement in the region. Such intermodal transfer freight facilities enable more efficient freight movement when goods are transferred from rail or large, interstate semis to smaller distribution trucks. They are therefore a key ingredient in developing the local manufacturing sector. Logistics centers typically cover several thousand acres and host freight and distribution centers for a variety of shippers. According to the master plan for the site, local, national, and international rail, road, air and seaport distribution services are anticipated.

More immediately, in early December 2014, the Albuquerque area's first railroad facility broke ground with completion anticipated in early 2015. This facility will sit on 36 acres off south Broadway Blvd and will enable a more direct transfer and movement of freight goods such as fluids, building materials, and heavy equipment to BNSF's coast-to-coast lines. Understanding and anticipating the implications of each of these facilities can enable the AMPA to plan ahead and reorient freight strategies and prioritize freight investment areas.

NMDOT released the *New Mexico State Rail Plan* in September 2013, which reviewed existing conditions and identified goals and objectives for freight and passenger rail in New Mexico. The multiple uses required of rail infrastructure make it difficult to attract new or expanded passenger service within New Mexico as well as industrial development. Rail freight is further complicated by the fact that most facilities are privately owned.

The *State Rail Plan* focuses largely on maintaining existing state-owned infrastructure instead of expanding or providing new passenger rail services. However, the plan outlines a rail vision to make New Mexico competitive and further the state's economic development opportunities. Specific projects are highlighted within improvement areas and prioritized for future investment. Projects identified in the AMPA are listed in the following section.

3.3.4 Strategies and Recommendations

The *2040 MTP* calls for freight considerations to be an important part of infrastructure decision-making in the region. Freight is currently included in the Project Prioritization Process for TIP selection, where projects are evaluated on whether projects contain freight-specific strategies or will be of benefit to freight movement, and whether there is any benefit to primary freight corridors. An important opportunity to consider regional freight movement also lies in the development of the Regional Transportation Management Center (see section 3.3.2 on Intelligent Transportation Systems for more details).

The NMDOT is completing freight plan as part of its statewide long-range transportation plan. The plan could provide a starting point for identifying infrastructure and programmatic priorities specific to the AMPA. Particularly important could be establishing formal processes for monitoring freight needs and existing activity levels, as well as opportunities for maintaining and building relationships with freight stakeholders and educating and informing members about particular freight policies, programs, or projects and how they could affect freight movement in the AMPA.

Based on forecasted information, early guidance from the U.S. DOT, and regional meetings with freight providers about existing challenges, the following recommendations and preferred scenarios were identified to improve conditions and performance on the region's freight network. These recommendations will help further the region's and state's economic vitality by supporting more efficient multimodal freight movement.

Recommended Truck Freight Policies and Programs for the Region

- Size and weight restrictions: Size and weight restrictions across the region are not consistent. Creating consistency among size and weight restrictions would simplify and thereby lower the cost of large-item shipping.
- Delivery time management: Shippers and customers increasingly rely on off-peak delivery of goods to businesses which is accomplished by allowing regular vendors after-hours access. Modifying restrictions to allow weekend and after-dark travel would help keep large trucks off the roadways during peak periods of congestion when their presence disrupts traffic flows.
- Improved coordination/communication: NMDOT and other agencies should be required to consult with freight providers during early stages of roadway design projects as well as on other projects that affect the freight industry. For example, when roadways or intersections are

improved, trucking associations should be consulted since trucks have specific turning radii that need to be included in the design.

- Regional freight committee: One option to further improve coordination and communication among freight and logistics stakeholders is the creation of a regional freight committee.
- Further deployment of ITS in freight management: The Department of Public Safety Motor Transportation Division's Pro-Miles permitting system should be implemented to its highest potential possible and data from this program could be utilized to identify barriers and specific problem areas and prioritize infrastructure improvements. Additionally, expanding interstate ITS technology would enable early warning of bottlenecks before truck drivers reach New Mexico's border, allowing freight carriers to identify alternate routes to avoid costly delays.
- Improved incident management/truck staging: NMDOT District 3 is in the early stages of developing an incident management plan for I-40 from approximately 12th St to Coors Blvd. Other incident management plans should be developed to improve coordination and communication when incidents occur on I-25 and I-40 to promote uninterrupted freight movement. This plan should identify truck detour routes, staging areas and truck parking areas.
- Improved logistics: Improved synchronizing of different freight modes (rail and truck), technology and data is critical because it will enable the freight system to perform more effectively and efficiently
- Truck rest/service Stops and Hours of Service: Based on the hours of service legislation, identify zones of route completion for truck freight where new or re-opened truck stop areas could be located
- Truck climbing lanes: Designate lanes for slow-moving heavy truck freight vehicles. These lanes can help improve safety and ease congestion along congested interstate freight corridors
- Truckway corridors: Identify areas of high concentration of freight businesses/warehouses
- Truck routes: Identify commonly used routes that truckers use

State Rail Plan-Identified Projects within the AMPA

- Rail capacity improvements: Additional rail lines or parallel tracks would provide benefits to travelers on passenger rail by improving travel time and to rail freight through efficiency improvements. In particular, capacity improvements have the potential to increase train speeds and reduce delays due to passing trains.
  - Chloe Siding reconstruction mid-way between the Belen and Los Lunas Rail Runner stations. A one-mile siding is recommended to allow for more train storage and decrease delays. Trains must wait for clearance before entering the Belen yard, so this siding would provide trains a place to wait without causing delays for Rail Runner trains.
- Safety improvements
  - NMDOT's Bridge Design Bureau prioritized bridges and trestles for replacement. Bridge replacements ranked higher on the project prioritization matrix.
  - The 2008 Rail Safety Improvement Act (RSIA) requires that railroads install Positive Train Control (PTC) on all lines that carry passengers and/or certain hazardous materials by the end of December 31, 2015. PTC helps to prevent train-to-train collisions, over-speed

derailments, incursions into established work zone limits, and movement of trains through improperly-positioned switches. BNSF PTC implementation would affect the New Mexico Rail Runner Express among other services and rail carriers. This project ranked the highest in the plan's project prioritization matrix.

- Track and signal improvements
    - Rehabilitate the Albuquerque wye (or, triangular junction) which will allow trains to turn around in Albuquerque
    - Ongoing Rail Runner capital maintenance to maintain these assets in a state of good repair.
    - Los Lunas siding rehabilitation to accommodate Rail Runner and BNSF trains, which would include new turns outs and signal modifications.
    - Alameda siding reconstruction to accommodate Rail Runner, Amtrak, and BNSF trains, which would include new turnouts and signal modifications
    - Bernalillo to Herzog siding construction site to provide additional passing locations for Rail Runner and Amtrak trains and reduce train delays
- Station Improvements: Increase parking capacity at Rail Runner stations, including Sandoval County/US 550 in anticipation of increased ridership
- Proposed New Commuter Rail Services: Develop a passenger rail service that connects Gallup and Albuquerque

3.4 Transit

From 1995 to 2012, transit ridership in the United States increased 38 percent and passenger miles traveled increased 45 percent, exceeding both population and vehicle-miles-traveled growth rates. During that same period, transit ridership in the Albuquerque area exploded, vastly outpacing national averages. Passenger trips increased 120 percent (6.5 to 14.4 million) and passenger miles traveled increased 365 percent (21.5 to 100.2 million),[22] the latter representing one of the highest growth rates in the country. This increased acceptance of transit demonstrates that transit plays, and will continue to play, a vital role in helping to satisfy the region's travel needs.

Area residents already realize many of the benefits that transit can provide to communities, as highlighted 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

ABQ Ride (the City of Albuquerque's Transit Department) and the Rio Metro Regional Transit District (Rio Metro) are the two transit agencies delivering these same benefits to the AMPA and outlying rural communities. Although each agency was created under unique circumstances and for different purposes, the two agencies serve a complementary role in providing an increasingly comprehensive transit network. Today, both are exploring new services, such as Bus Rapid Transit (BRT), that will position the AMPA as a region that values innovative transportation options.

In a Nutshell…

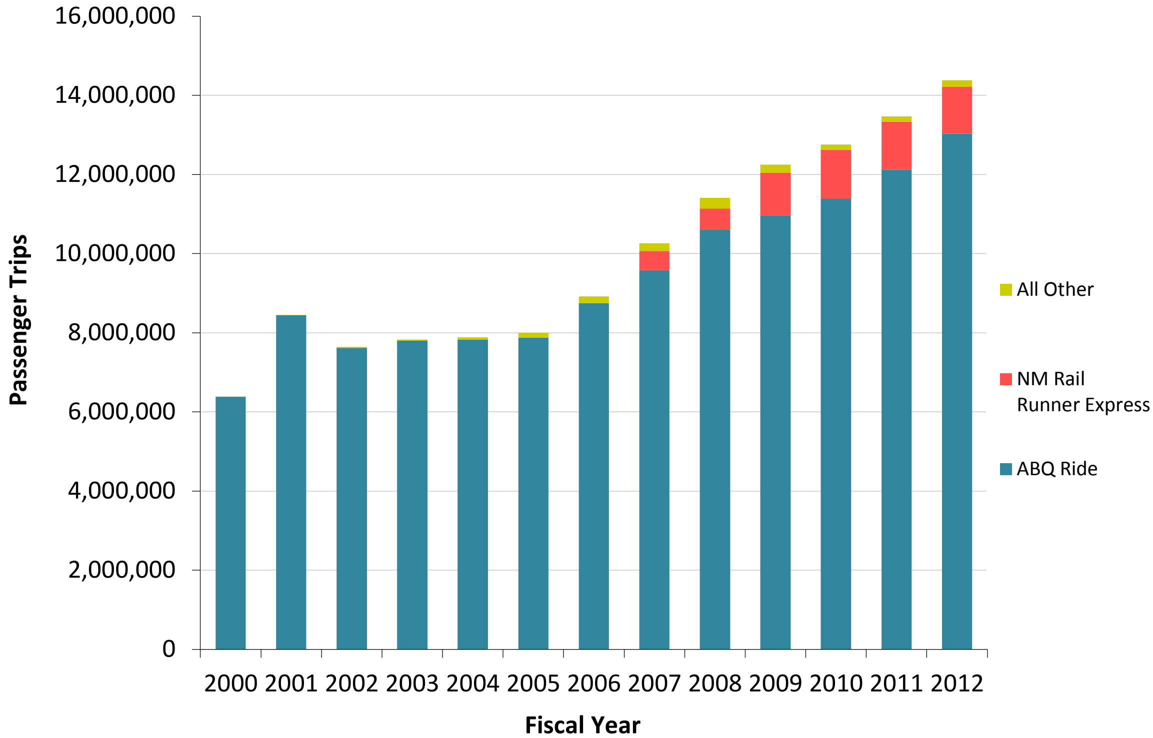
Takeaways: Transit ridership has increased dramatically in recent years, and transit can play a critical role in meeting regional mobility needs. To encourage a greater role for transit, the Metropolitan Transportation Board established mode share goals along a Priority Transit Network. Important transit investments have been identified, including the Albuquerque Rapid Transit line along Central Ave, which could begin operations in 2017.

Components: This section describes transit services in the metro area, user characteristics, the potential role that transit can play in the region, and policies to support increased investments. Important products include maps of the priority transit network (page 3-93) and the conceptual transit network (page 3-108) to support the Preferred Scenario.

Goals and Objectives: Additional transit service in the AMPA supports the MTP goals of *Mobility* by expanding multi-modal transportation options, *Economic Vitality* by promoting development in activity centers and key corridors, and *Active Places* by improving access to services and employment sites.

[22] All transit performance data reported in this section is courtesy the Federal Transit Administration's National Transit Database, Florida DOT's Integrated National Transit Database Analysis System, Rio Metro Regional Transit District, and City of Albuquerque.

Figure 3-21: Transit Ridership by Service Provider, 2000-2012



3.4.1 Regional Transit Partners: 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 bus services within the City of Albuquerque and portions of the City of Rio Rancho, Village of Los Ranchos de Albuquerque, and unincorporated Bernalillo County:

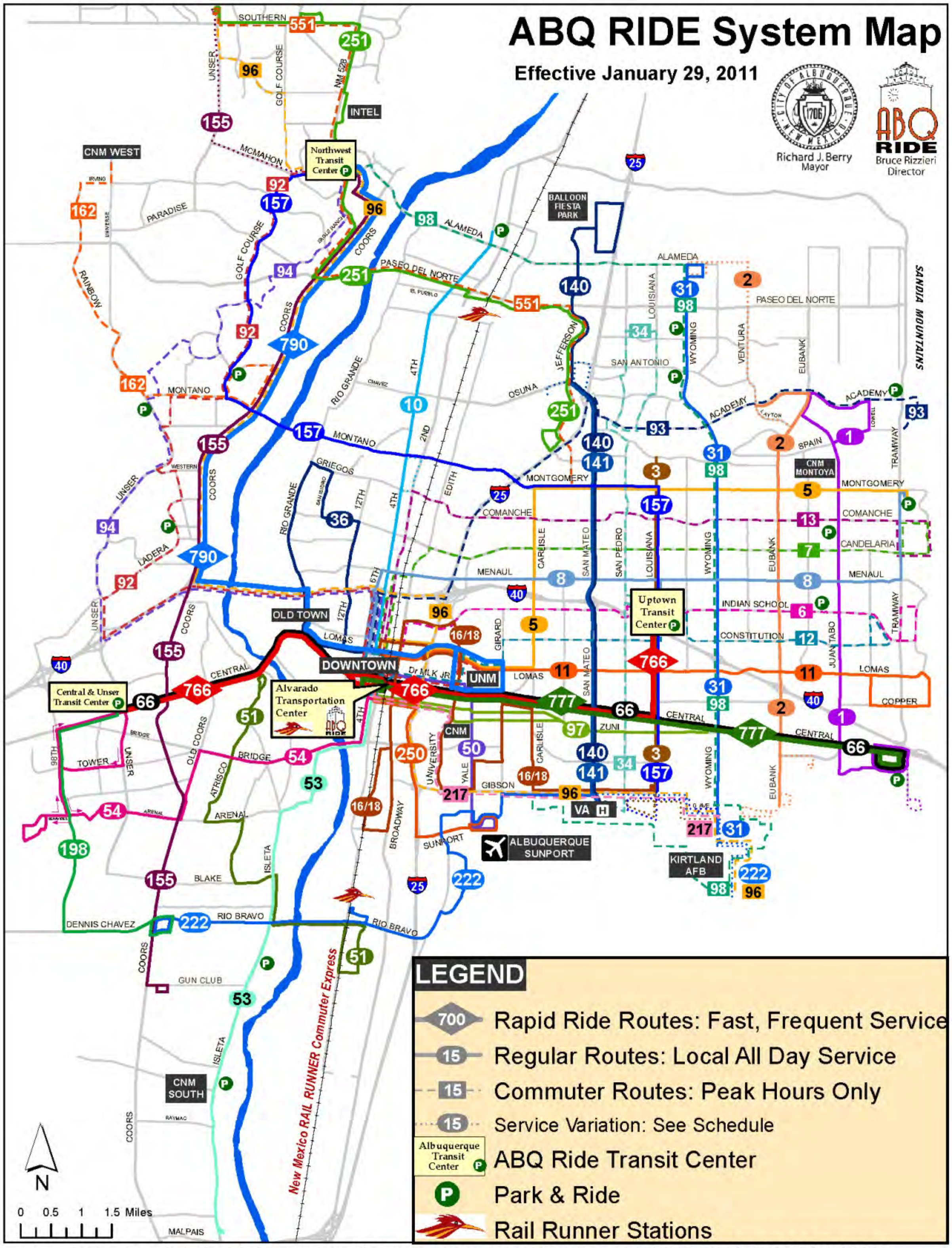
- Three Rapid Ride routes: Rapid Ride routes function as a premium service with stops placed approximately one mile apart; thus, they travel at a higher speed than the local routes that they commonly overlap. The 60-foot articulated Rapid Ride buses feature greater seating capacity than local buses, unique branding, and additional amenities such as Wi-Fi. They 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. In comparison to Rapid Ride routes, local routes provide a finer-grained service at the neighborhood level.
- 16 commuter routes: Commuter routes connect outlying residential areas with major employment centers during AM and PM peak hours only. Unlike Rapid Ride and local routes,

commuter routes are more likely to travel collector streets to better serve suburban residential neighborhoods, although they do not provide reliable all-day service.

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

The services listed above and also shown on Map 3-15 generally operate as follows. The 766 and 777 Rapid Ride routes serve the Central Ave corridor from Unser Blvd to Tramway Blvd, interlining between Downtown and Louisiana Blvd to provide less than 10 minute headways (time between buses). The 790 Rapid Ride connects the Northwest Transit Center on Albuquerque's Westside to the Downtown and UNM areas. Local fixed routes are generally concentrated within the Downtown, UNM/CNM, and Journal Center activity centers, the Northeast Heights, and to a lesser extent in the North and South Valleys. Commuter routes primarily connect Westside and far Northeast Heights neighborhoods to Downtown, UNM/CNM, Kirtland Air Force Base, and the Sandia National Laboratory campus.

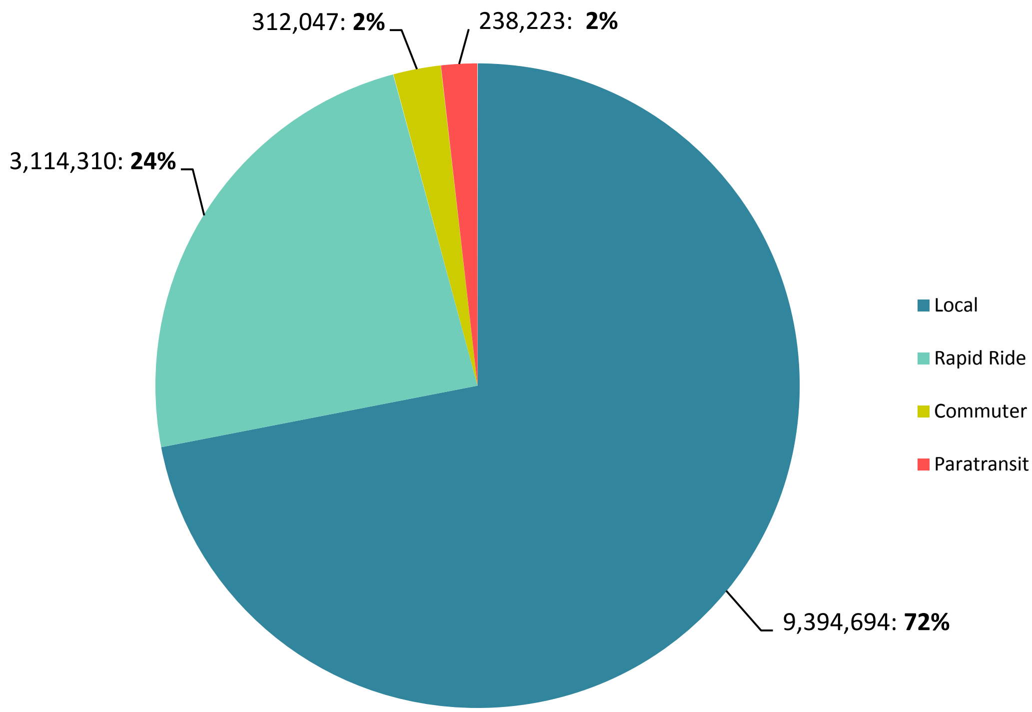
Map 3-15: ABQ Ride System Map



For more detailed information visit www.myabqride.com or call 243-7433 (TTY 724-3138)

As indicated at the outset of this section, ABQ Ride has experienced dramatic ridership gains in recent years. In the decade from FY 2002 to FY 2012, passenger trips have grown 71 percent from 7,619,093 to 13,059,274. Figure 3-22 shows the distribution of FY 2012 ABQ Ride passenger trips by mode. 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 3-22: ABQ Ride Passenger Trips by Mode, FY 2012



The breakdown in Table 3-10 further reveals that much of ABQ Ride's growth in the last decade is directly attributable to the addition of the 766, 790, and 777 Rapid Ride routes in 2004, 2007, and 2009, respectively. Furthermore, the top three routes, all of which predominately operate on Central Ave, comprise 41 percent of ABQ Ride's passenger trips. Central Ave (old Route 66) functions as the primary "spine" in ABQ Ride's system and serves many of the aforementioned employment and activity centers. In fact, 36 of 41 ABQ Ride bus routes operating in 2012 intersected or paralleled Central Ave, and most of these routes either originate from or stop at the Alvarado Transit Central located at the intersection of 1st St and Central Ave.

Table 3-10: Top Ten ABQ Ride Routes by Passenger Trips, FY 2012

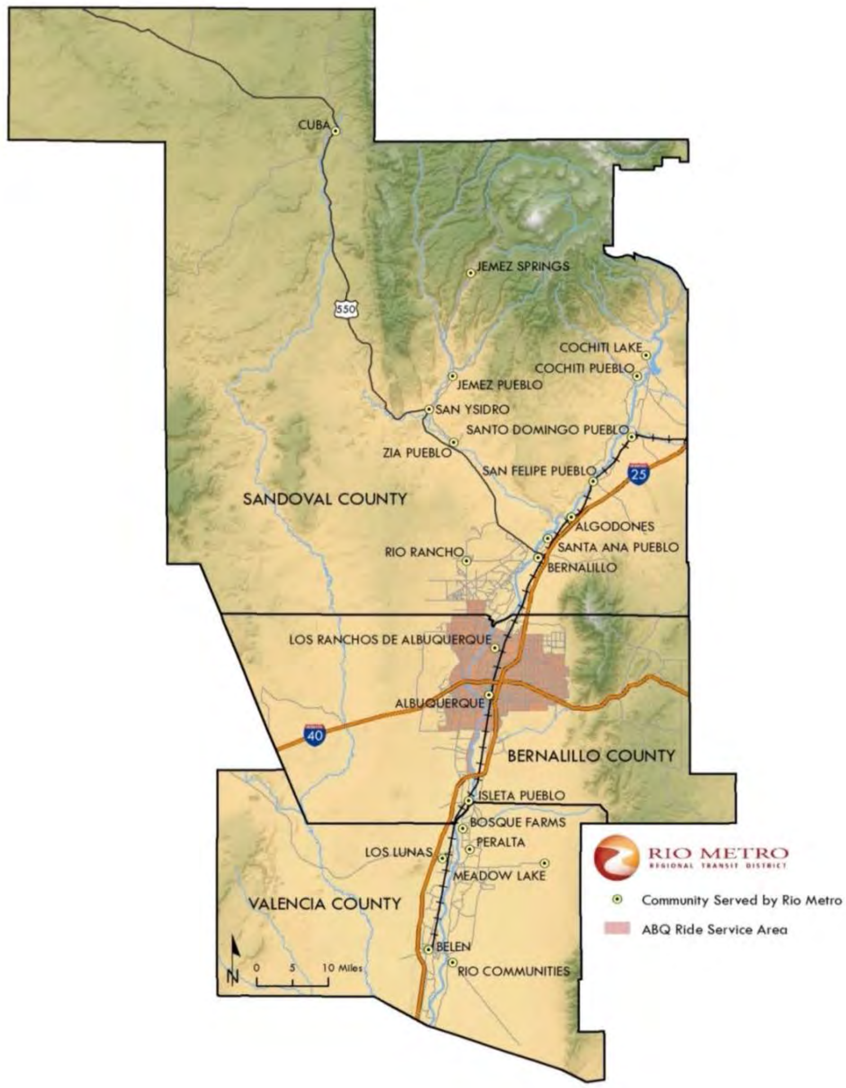
Route #	Route Name	Annual Passenger Trips	Avg. Weekday Passenger Trips
66	Central	2,792,223	8,921
766	Red Line Rapid Ride (Central/Uptown)	1,501,759	5,374
777	Green Line Rapid Ride (Central)	1,092,410	3,923
5	Montgomery/Carlisle	885,641	3,325
11	Lomas	770,213	2,781
8	Menaul	722,583	2,545
141	San Mateo	669,686	2,133
790	Blue Line Rapid Ride (Westside/UNM)	520,141	2,294
140	San Mateo	483,165	1,931
10	North Fourth	430,689	1,541

Table 3-10 (e.g., Central, Montgomery/Carlisle, Lomas, Menaul, San Mateo) demonstrates the strong ridership along the Central Ave corridor and in the near Northeast Heights. The absence of routes in Table 3-10 operating west of the Rio Grande, with the exception of portions of the 66, 766 and 790, also indicates that other factors, to be discussed later in this section, affect the viability of transit service on Albuquerque's Westside.

3.4.2 Regional Transit Partners: Rio Metro Regional Transit District

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 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.

Map 3-16: Rio Metro Service Area



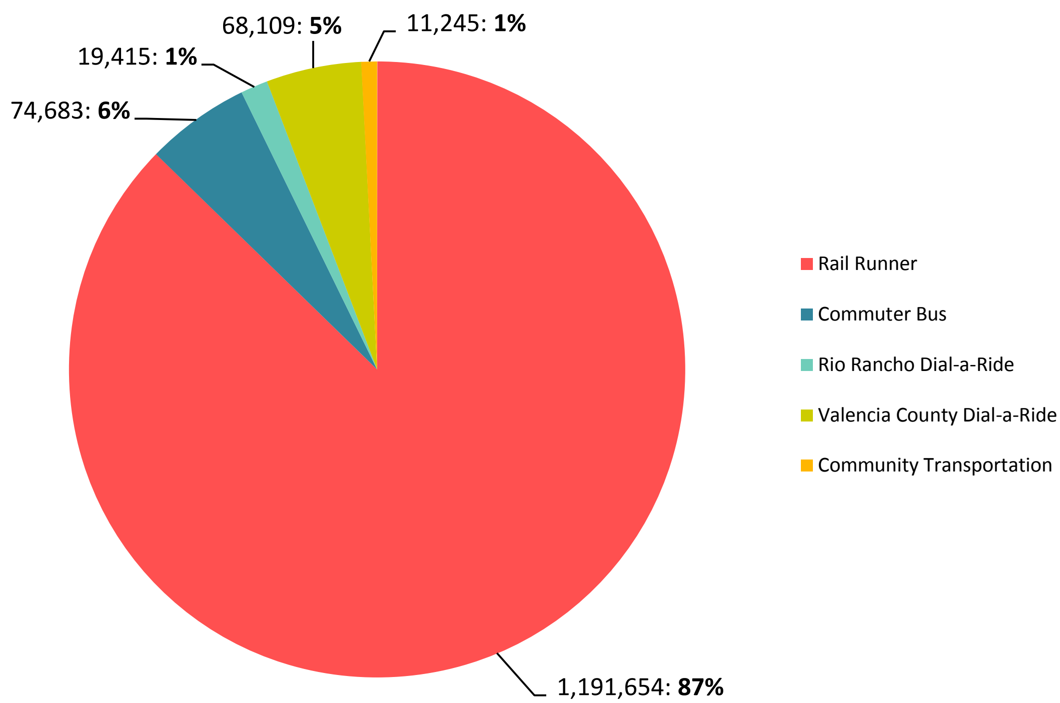
Rio Metro provides several transit services throughout the three-county region (see Map 3-16), some of which Rio Metro assumed from local agencies following passage of the gross receipts tax.[23] As such, Rio Metro's combination of intercity, urban, suburban and rural services, while uncommon to most transit providers, establishes a far-reaching and regional transit network that complements ABQ Ride. Rio Metro services include:

[23] Reflecting the jurisdictions it serves, Rio Metro is governed by a Board of Directors comprised of 19 elected officials from Albuquerque, Belen, Bernalillo, Bernalillo County, Bosque Farms, Corrales, Los Lunas, Los Ranchos de Albuquerque, 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.

- 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. Approximately 11 trains run per weekday in each direction (weekend service is also available), primarily during peak commuting hours. Service between Belen and Bernalillo started in 2006, before reaching Santa Fe in 2008. While Rio Metro is responsible for operating the Rail Runner, the vehicles and track are the property of the State of New Mexico.
- Nine commuter routes: Four commuter bus routes connect the Sandoval County communities of Cuba, Jemez Pueblo, Jemez Springs, San Ysidro, Zia Pueblo, Santa Ana Pueblo, Kewa Pueblo, Cochiti Pueblo, and Cochiti Lake with northern Rio Rancho, Bernalillo, and the U.S. 550 Rail Runner station. Two commuter routes in Valencia County serve Belen and Los Lunas, connecting single and multi-family neighborhoods to Rail Runner stations. One commuter route in Bernalillo County links the Central and Unser Transit Center in Albuquerque to the Route 66 Casino Hotel. Additionally, two other commuter bus routes spanning county lines replaced early morning Rail Runner trains that were discontinued from service in FY 2013.
- Valencia County Dial-a-Ride: Valencia County Dial-a-Ride provides curb-to-curb transit to persons traveling within most of Valencia County. Similar to paratransit, a trip must be requested one day in advance; however, there are no other qualifying requirements to use the service.
- Rio Rancho Dial-a-Ride: Rio Rancho Dial-a-Ride provides door-to-door service to any Rio Rancho resident age 62 or older and for persons with disabilities age 18 or older. Registration is required to ensure proof of residence within the City of Rio Rancho and the satisfaction of basic eligibility requirements.
- Community Transportation: The Community Transportation program (previously Job Access and Reverse Commute) 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.
- 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.

In total, Rio Metro provided 1,365,106 passenger trips in FY 2012, excluding ABQ Ride trips attributable to Rio Metro funding. As shown in Figure 3-23, the Rail Runner accounted for 87 percent of those trips, followed by commuter buses (6 percent), Valencia County Dial-a-Ride (5 percent), Rio Rancho Dial-a-Ride (1 percent), and Community Transportation (1 percent).

Figure 3-23: Rio Metro Passenger Trips by Mode, FY 2012

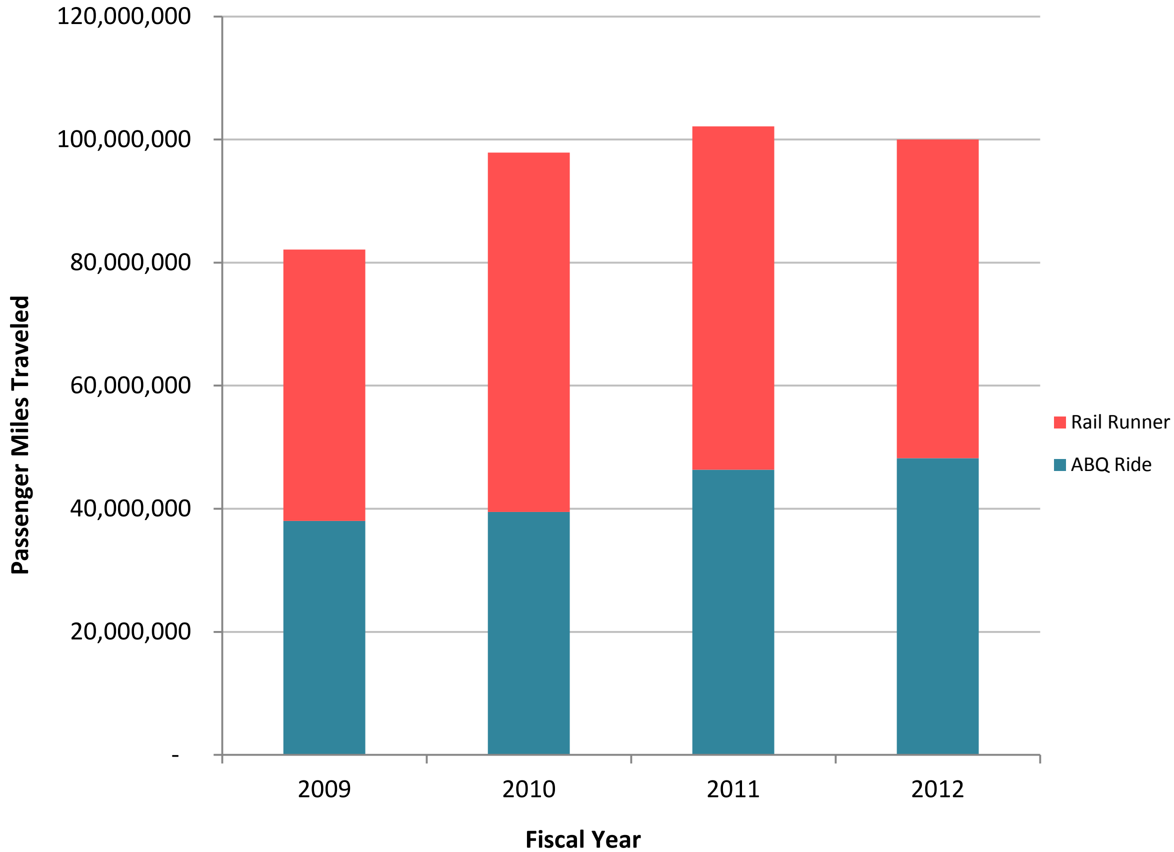


When compared to ABQ Ride, Rio Metro carried approximately one-tenth the riders in FY 2012; however, passenger trips are not the sole measure of transit use. In that same year, ABQ Ride passengers logged 48,244,579 passenger miles traveled while Rio Metro riders logged 52,000,595 passenger miles traveled, most of which were generated by the Rail Runner.[24,25]

[24] The National Transit Database defines passenger miles traveled as: "The cumulative sum of the distances ridden by each passenger." For example, a bus which takes 10 passengers 20 miles accumulates 200 passenger miles traveled.

[25] According to APTA, in 2012 the Albuquerque urbanized area ranked 39th nationwide in passenger miles traveled, while ranking 56th in population.

Figure 3-24: Passenger Miles Traveled, ABQ Ride vs. Rail Runner, FY 2009-FY 2012



The reason that Rio Metro surpasses ABQ Ride in passenger miles traveled is directly attributable to trip length—Rio Metro moves fewer people farther. In FY 2012, the average passenger trip length for ABQ Ride was 3.7 miles; the average passenger trip length for Rio Metro was 40.1 miles. This difference reflects their respective operating environments. ABQ Ride serves the urban and suburban context of Albuquerque where origins and destinations are relatively close to one another. Rio Metro, however, tends to provide longer, regional connections that link geographically separate communities and transit systems. Map 3-17 highlights this breadth of coverage and connectivity between the Rail Runner and other transit systems. ABQ Ride, the North Central Transit District, NMDOT Park-and-Ride Shuttles, Santa Fe Trails (City of Santa Fe), Socorro Transit and several casinos all provide connections to Rail Runner stations.[26]

[26] As a specific example of the Rail Runner's capacity to link distinct transit providers, it is possible for a Socorro resident visiting a relative in Taos to take Socorro Transit's 5:35 AM Rail Runner Shuttle to the Belen Rail Runner Station, board the northbound #506 Rail Runner train at 6:35 AM, transfer to the North Central Transit District's (NCTD) Santa Fe to Espanola bus at 9:00 AM, and transfer one final time to the NCTD's Espanola to Taos bus, arriving in Taos at 11:00 AM. While this hypothetical trip is likely uncommon, it demonstrates the importance of viewing neighboring transit agencies as components of one, larger, interconnected system.

Map 3-17: New Mexico Rail Runner Express System Map

3.4.3 Transit User Characteristics

In 2012, MRMPO conducted a survey of both ABQ Ride and RMRTD riders in conjunction with an update of its transportation model. The subsequent findings reveal that the AMPA's transit providers serve a diverse population and do not target or solely market to a prototypical rider. Thus, the successful provision of transit is, in part, conditioned upon the ability to satisfy various groups' needs.

With specific regard to ABQ Ride, Figure 3-25 depicts both the system's popularity with students (35 percent of all riders) and also a high percentage of unemployed non-student riders (25 percent of all riders). Furthermore, 74 percent of riders did not have access to a vehicle on the day of their trip.

Figure 3-25: Student and Employment Status, ABQ Ride

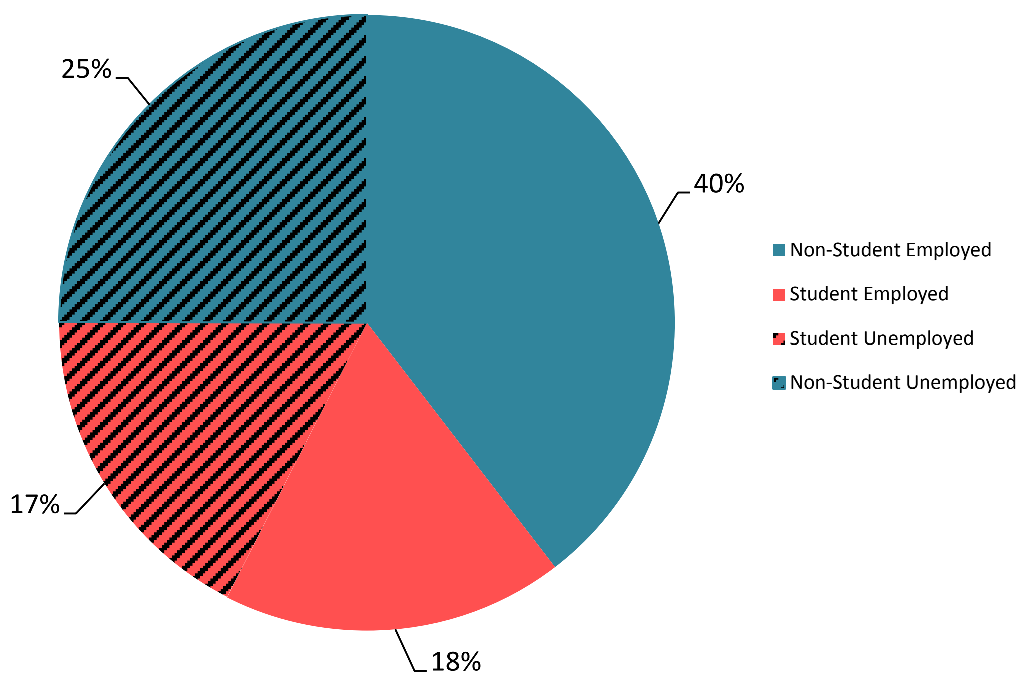
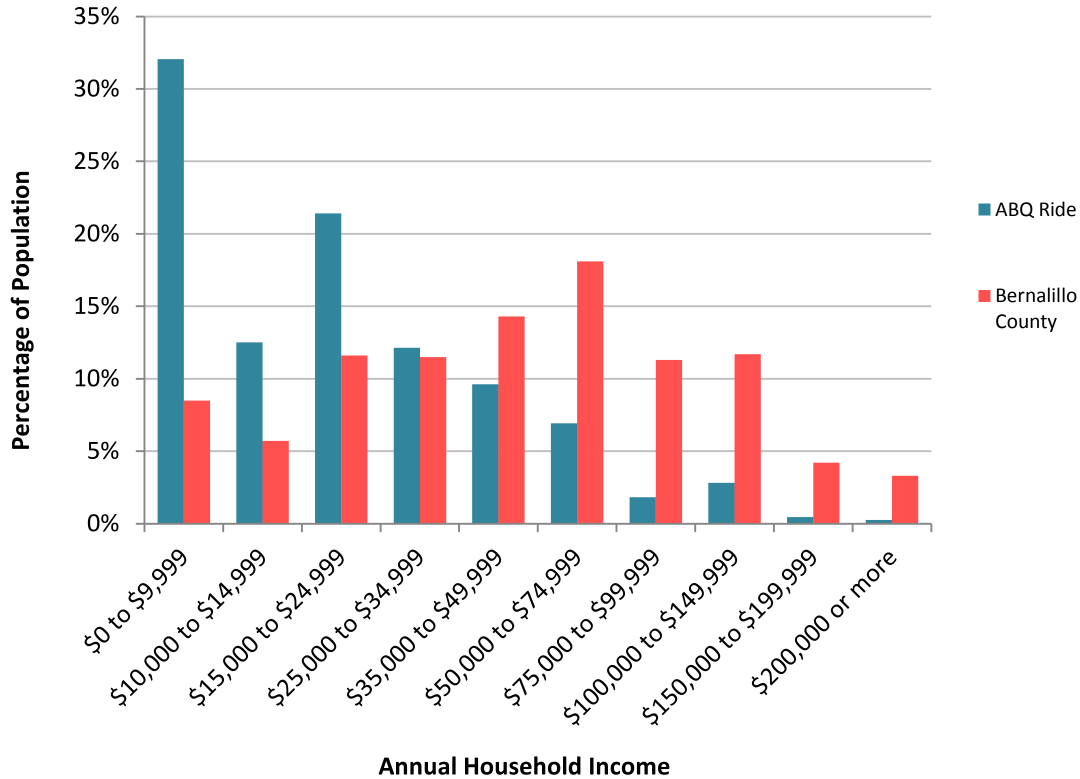


Figure 3-26 also shows the relative disparity in annual household income between ABQ Ride passengers and the annual household income in Bernalillo County as reported by the U.S. Census Bureau's American Community Survey (2008-2012). Nearly 50 percent of respondents reported annual household incomes less than $15,000. Altogether, these findings underscore ABQ Ride's vital role in meeting the needs of residents facing socioeconomic hardship that might not otherwise have reliable transportation to work, school, and other services.

Figure 3-26: Annual Household Income, ABQ Ride vs. Bernalillo County



Figures 3-27 and 3-28 highlight ABQ Ride's increasing success in attracting an altogether different market of riders who are generally more affluent and have the option to use transit or drive an automobile, especially during their commutes to and from work and school. In a simple comparison of true vehicle availability between riders on the 66, 766/777 and 790 routes, the 790 Rapid Ride, which connects northwest Albuquerque to UNM, far outpaced its peers. Approximately 65 percent of 790 Rapid Ride passengers had access to an automobile, yet opted to use public transportation—suggesting that a park-and-ride-based service, operating with limited stops and relatively fast, frequent service to popular destinations, has the potential to attract a distinct market of riders living on Albuquerque's Westside. The limited and relatively expensive parking at UNM also plays a role in attracting would-be drivers to the 790.

Figure 3-27: True Vehicle Availability, ABQ Ride Routes 66, 766/777, 790

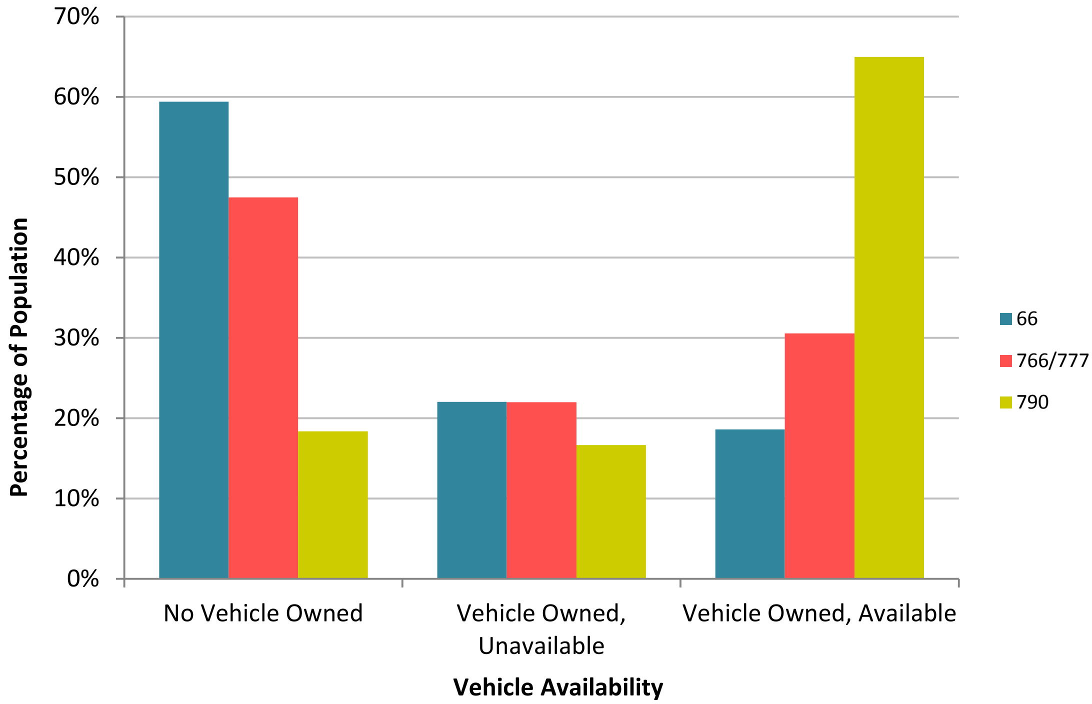
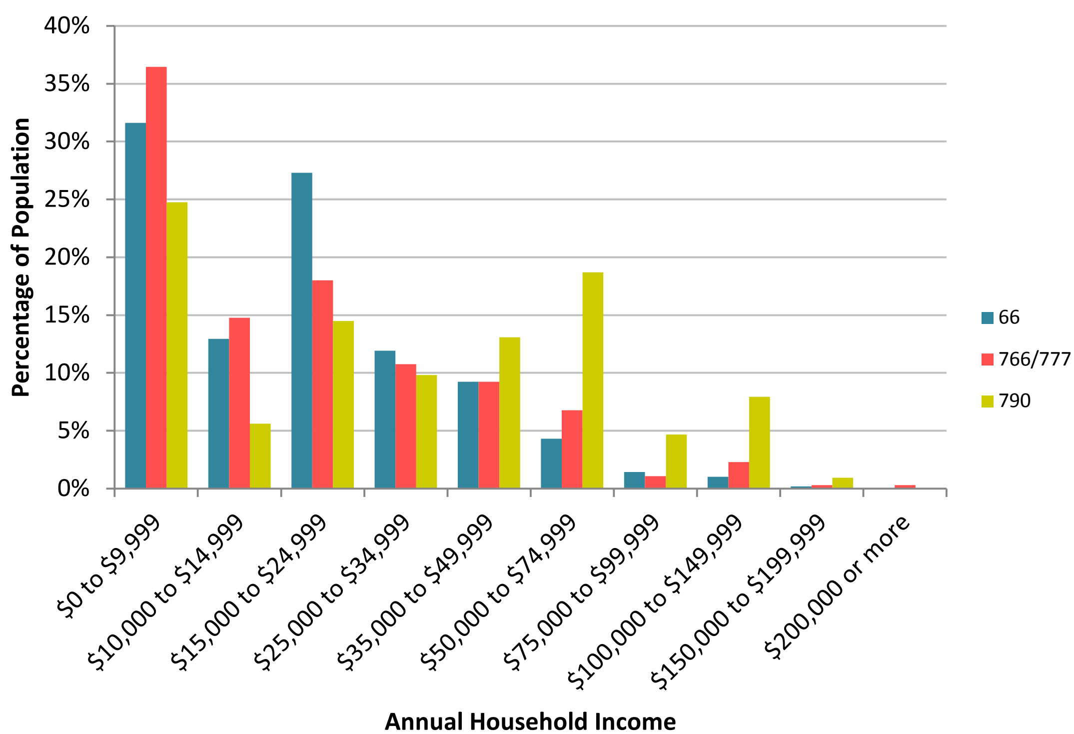
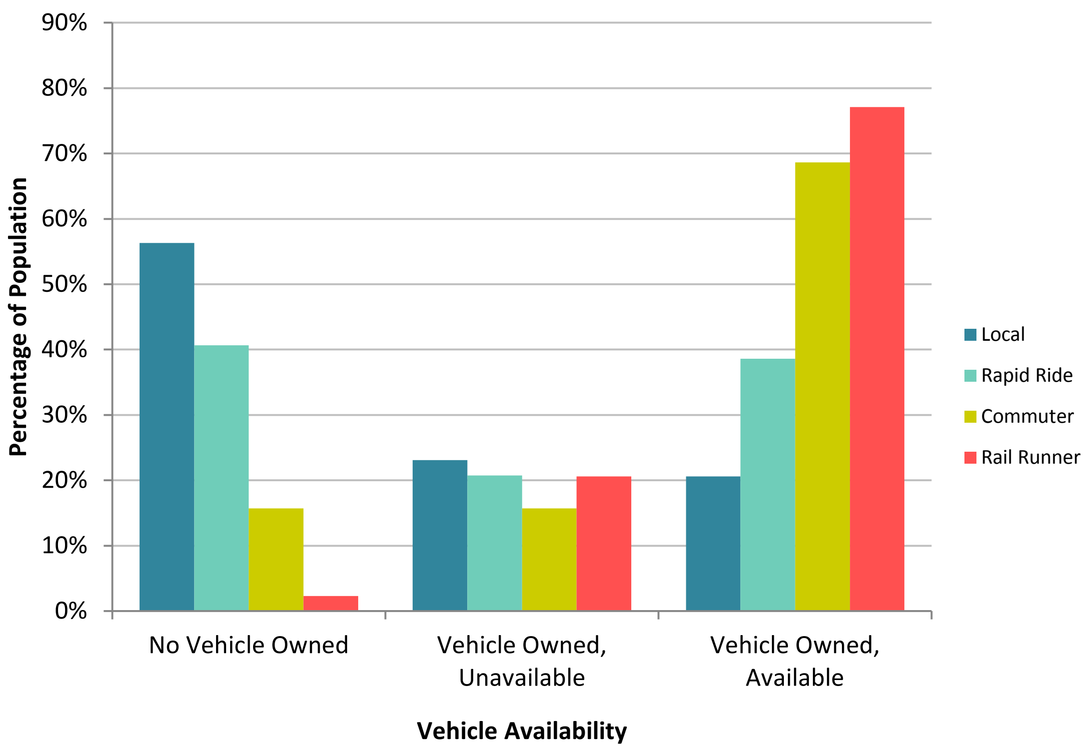


Figure 3-28: Annual Household Income, ABQ Ride Routes 66, 766/777, 790



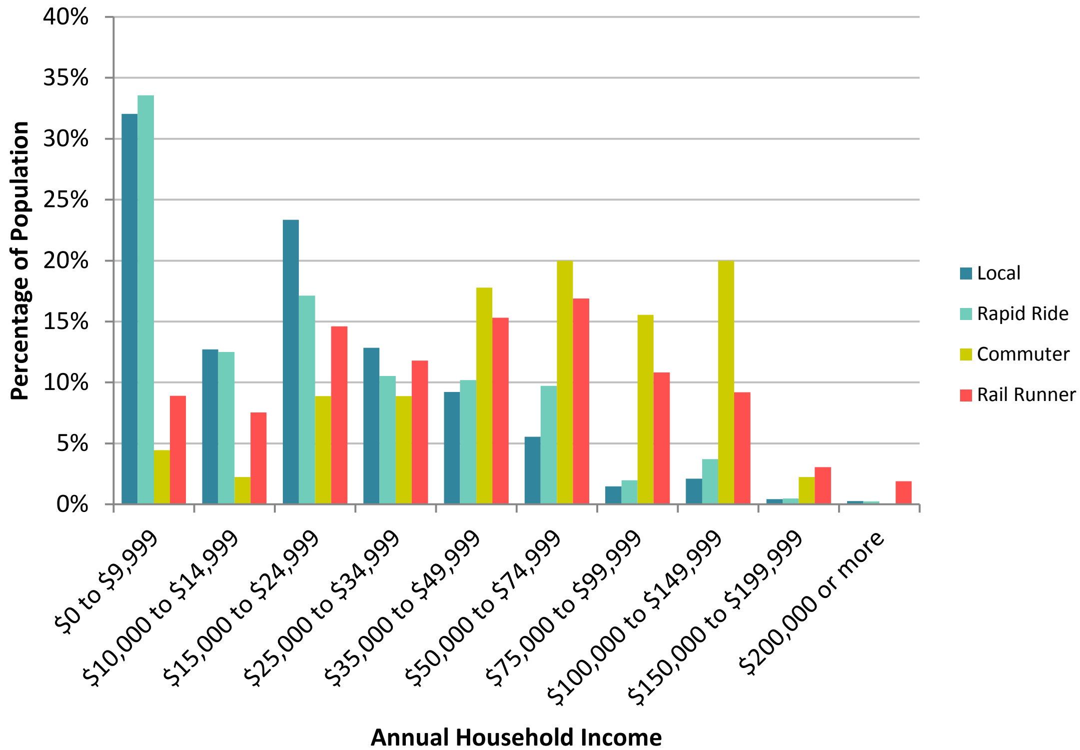
The 2012 MRMPO transit survey reveals that the Rail Runner, like the 790 Rapid Ride, generally serves a less transit-dependent and higher income population than ABQ Ride. Twenty-six percent of respondents were students, and 22 percent of all respondents were not students and unemployed. Also, as Figures 3-29 and 3-30 indicate, Rail Runner riders have vastly higher rates of vehicle availability and annual household income than most ABQ Ride passengers. These findings, unsurprisingly, reflect the Rail Runner's primary function as an intercity rail service that operates during peak hours for the benefit of commuters.

Figure 3-29: True Vehicle Availability, Rail Runner vs. ABQ Ride



In addition to these local trends, national demographic trends also have the potential to influence who uses ABQ Ride and Rio Metro services in the future. Millennials, born between approximately 1982 and 2000—the largest and most diverse generation to date—have experienced the advent of smartphones, social media, and the Great Recession. Recent surveys conducted by APTA and Transportation for America have found that Millennials prefer and would more strongly consider relocating to communities with a variety of transportation modes. Furthermore, Millennials value digital connectivity while in transit, real-time information that reduces waiting and enhances trip planning, and Wi-Fi or 3G/4G services. This suggests that value-added digital comforts, such as UNM and ABQ Ride's "Where's My Bus?" web application and ABQ Ride's smartphone app, will be valuable in attracting this burgeoning market.

Figure 3-30: Annual Household Income, ABQ Ride Services vs. Rail Runner



At the other end of the generational spectrum, aging Baby Boomers (born between 1946 and 1964) are likely to place additional demand on public transit. This continues a trend of increasing senior use of transit, notably highlighted by Transportation for America. In 2009, seniors took 328 million more trips via transit than they did in 2001. Despite this uptick, Baby Boomers grew up in the age of the automobile and are largely accustomed to this mode. After retirement, they tend to remain in their neighborhoods rather than relocating to more transit-friendly locations. As they eventually lose their ability to drive, however, many will be left dependent on friends and family with few transportation options.

In Transportation for America's ranking of metropolitan areas, Albuquerque ranked 14th best among large metro areas with only 42 percent of seniors having poor access to transit by 2015. In particular, the rural areas of Bernalillo, Sandoval and Valencia Counties fared worst, while the ABQ Ride service area generally in the heart of Bernalillo County fared better. Comparatively, 70 percent of Las Cruces seniors and 60 percent of Santa Fe seniors have poor access to transit. These findings are troubling, especially as the U.S. Census Bureau estimates that the senior population will grow by at least 76 percent between 2010 and 2030.

It remains unclear how ABQ Ride and Rio Metro may be affected by aging Baby Boomers. For example, it is plausible that paratransit demand will increase. However, paratransit is dramatically more expensive when compared to other transit services; in 2012 ABQ Ride's operating expense per passenger trip was

$2.74 for bus and $31.26 for paratransit. Furthermore, Rio Metro could be more susceptible to aging-related demand, as its Rio Rancho and Valencia County Dial-a-Ride services are offered to seniors without respect to disability and neither service is constrained by proximity to a fixed route per federal paratransit regulations. ABQ Ride, however, provides paratransit based solely on ADA eligibility. It does not offer service to residents once they reach a certain age, regardless of disability.

3.4.4 Increasing the Role of Transit in the Region

In response to the high levels of congestion projected in the *2035 MTP* 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% 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."

As a proactive step during the drafting of the *2040 MTP*, the MTB realigned the transit mode share goals to better support the principles of the Preferred Scenario, which in turn support planned BRT projects and the corridors that can support the greatest transit ridership. For example, because the previous goals focused solely on increasing mode share at river crossings in the AMPA, a project such as the UNM/CNM BRT along University Blvd (see page 3-98), 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 January 2015, similarly includes a 20 percent transit mode share goal by 2040 and requires the allocation of 25 percent of STP-U and CMAQ[27] funds for "transit projects, or portions of projects, with substantial dedicated transit infrastructure," but now more meaningfully focuses those funds on a priority transit network shown on Map 3-18. This priority network includes planned BRT projects and many of the high-capacity Rapid Ride and primary routes shown on the conceptual transit network.

[27] STP-U and CMAQ are federal funding categories programmed through the Transportation Improvement Program. For more on the TIP, see chapter 5.1.

Map 3-18: Priority Transit Network

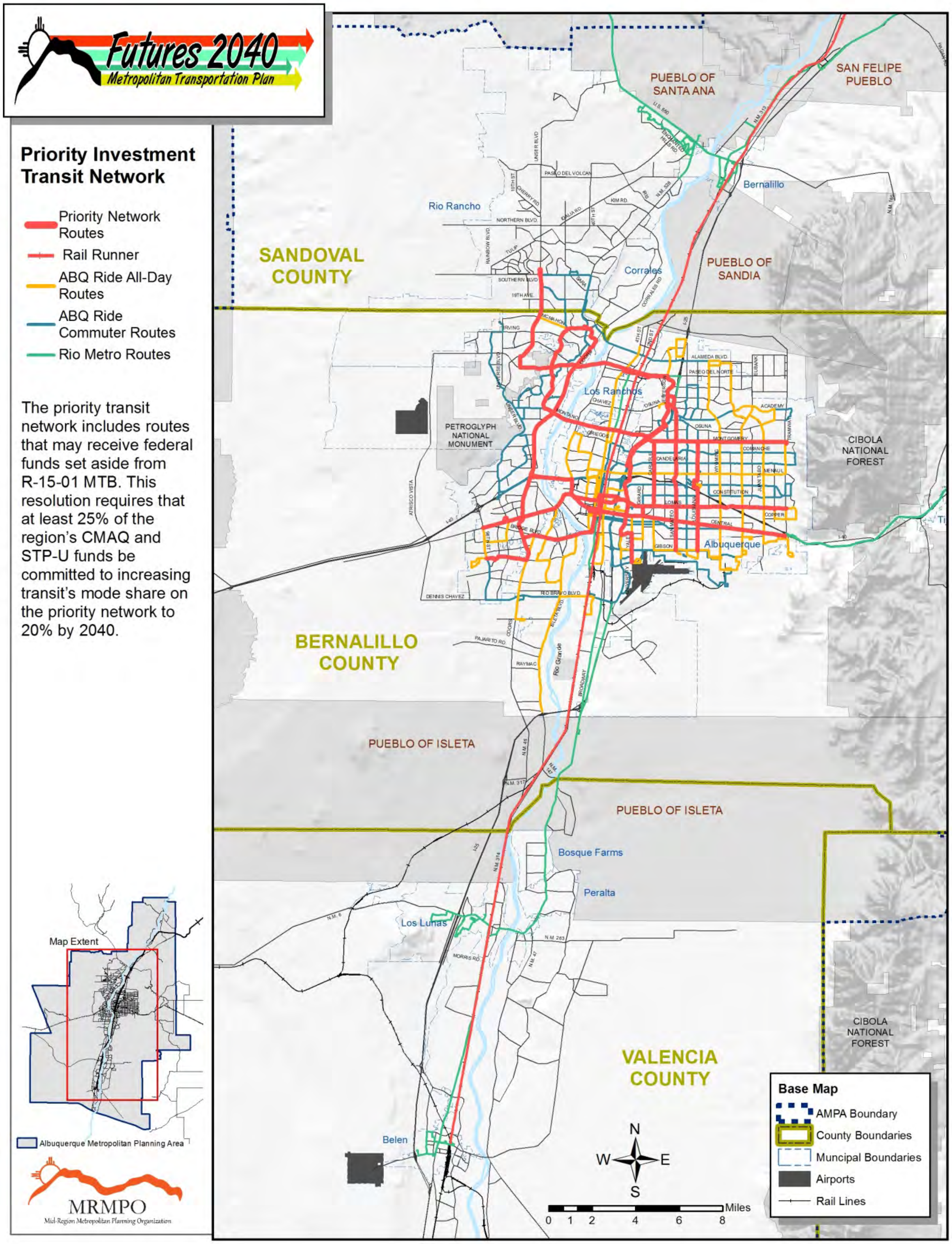
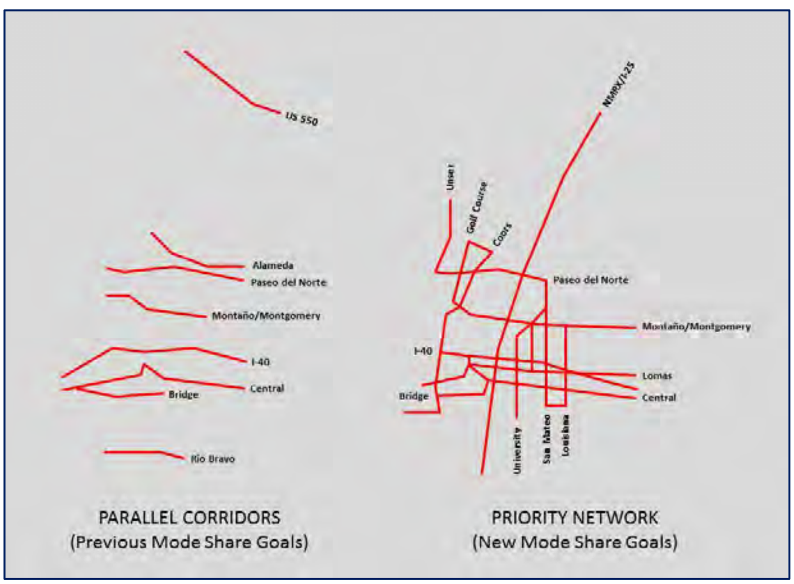


Table 3-11: Mode Share for Selected Corridors[28]

Corridor	Average Mode Share	Peak Mode Share	Peak Link Location
Bridge Blvd	1.2%	1.9%	Isleta-8th
Central Ave	13.1%	20.2% / 29.6%	Washington-San Mateo / 6th-8th
Coors Blvd	2.4%	4.6%	Paseo del Norte Interchange
Jefferson St	0.8%	1.4%	Alameda-Paseo del Norte
Lomas Blvd	6.9%	12.8%	2nd-3rd
Louisiana Blvd	4.0%	8.9%	Uptwon-America's Parkway
Montgomery Blvd	2.0%	3.2%	Carlisle-Jefferson
Montaño Rd	1.1%	1.5%	Edith-Renaissance
San Mateo Blvd	2.7%	5.5%	Kathryn-Zuni
Interstate 25 / Rail Runner	2.4%	3-4% / 7.5%	Belen-Rio Bravo / North of US 550

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 do not intersect (i.e., river crossings). However, the new mode share goal supports a potential frequent network that more closely aligns with the Preferred Scenario and facilitates connectivity between routes.

Figure 3-31: Previous and Revised Mode Share Goals, Network Comparison



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

The new mode share goal marks a subtle but fundamental shift from the previous approach. Instead of targeting east-west river crossings indiscriminately, the new mode share goal focuses on a specific network that includes key river crossings where the application of transit is most practical, congested corridors, and major activity and employment centers that attract riders. 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.

In practice, the Albuquerque Rapid Transit project along Central Ave will likely be 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 UNM/CNM BRT 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 priority network may be revised during each MTP cycle (every four years) to reflect the AMPA's evolving transit needs.

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 targeted, 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.[29]

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 (i.e., 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.

Land Development Patterns and the Viability of Transit

Through the adoption of the mode share goals, the MTB acknowledged that the AMPA will not be able to build its way out of congestion. There are a limited number of bridges spanning the Rio Grande to facilitate river-crossing trips, and congestion at these locations becomes acute during peak hours. Under the Trend Scenario, the regional average volume-to-capacity ratio for all river crossings slightly exceeds 1.0 (the average V/C ratio in the Preferred Scenario is 0.99).

While the imbalance in housing and jobs is projected to improve slightly by 2040, growth and land development patterns may exacerbate congestion at river crossings. The Westside, in particular, remains characterized by low-density residential development served by a hierarchy of streets that tend

[29] CMAQ funds may be used for startup operational costs, but must be replaced by other funds in later years.

to concentrate traffic on a few arterials, rather than a grid network that more equally distributes traffic. By 2040 many Westside arterial streets are anticipated to exceed capacity during peak hours, whereas the arterial grid network east of the river remains largely within acceptable limits.

Ultimately, this pattern of development discourages cost-effective, local transit service in much of the region. 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. Additionally, low-density residential development with poor pedestrian connectivity limits the number of individuals living within a walkable distance of a transit stop (desirably ¼-mile). 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.

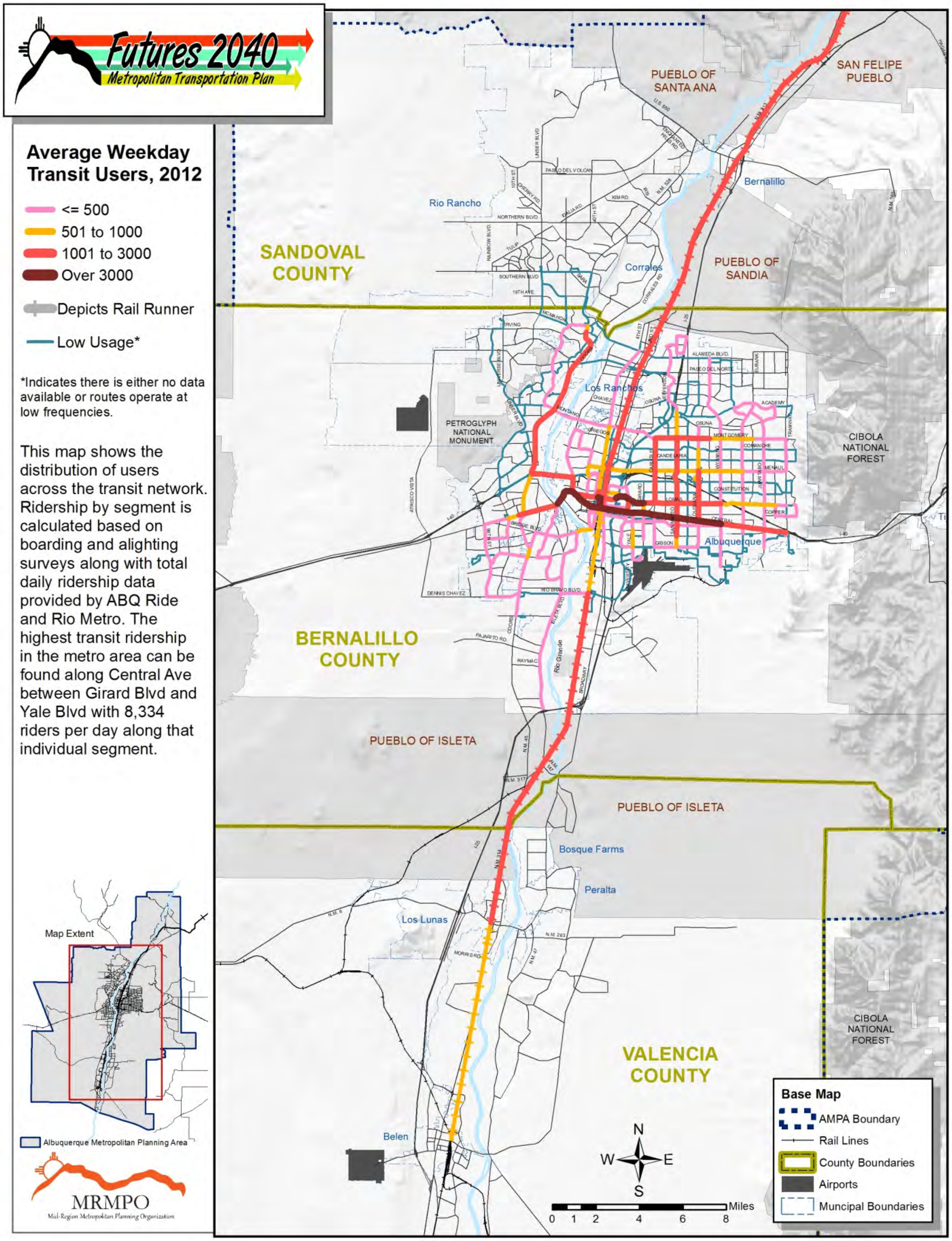
Implicit in these observations is a common theme in this MTP: land use patterns, densities and road connectivity are some of the strongest determinants of single-occupancy vehicle congestion *and* the viability and success of transit. This is evidenced by the fact that ABQ Ride's most successful local and Rapid Ride routes, located along the Central Ave and I-25 corridors and within the near Northeast Heights, serve major activity centers (e.g., Downtown, Uptown, UNM/CNM, Journal Center) with relatively high employment and population densities. This synergy is bolstered by the presence of an urban 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 locate services (i.e., 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?[30] In the case of serving Westside neighborhoods, ABQ Ride 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. In effect, this approach targets the less transit-dependent demographic that has the option to drive, while not ignoring the inherent inefficiencies of the Westside's development patterns.

Map 3-19, which depicts Albuquerque's average weekday transit ridership in 2012 (excluding commuter routes), demonstrates this reality. The Rail Runner, Central Ave, north I-25 corridor and near Northeast Heights generally reflect the highest ridership. On the Westside only Coors Blvd carries significant ridership.

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

Map 3-19: Average Weekday Transit Users, 2012



Rio Metro Visioning Process

With continued emphasis on transit's importance to the region's transportation network, there is a clear need for coordinated, long-range transit planning that encompasses both Rio Metro and ABQ Ride's services. As noted in Chapter 4.1, transit excels in the Preferred Scenario in comparison to the Trend Scenario. However, in order to realize this success, both transit agencies, and surrounding local governments must more explicitly consider the impacts to and the integration of transit in their land use and transportation plans. In addition to this MTP, there are several examples of how this is taking shape.

The Rio Metro Board of Directors embarked on a visioning process in 2014 to consider the following issues, some of which have been outlined previously in this section:

- Transit's role in economic development and regional competitiveness
- Costs and benefits associated with various transit modes and projects
- Implication of land use decisions on the cost efficiency of transit
- Influence of transit on surrounding land uses
- Funding options for implementing new transit services
- Policy and investment decisions necessary to ensure an effective regional transit system

Ultimately, the visioning process will better define Rio Metro's relationship to ABQ Ride (and vice versa). In doing so, both agencies could consider several applicable examples of western U.S. transit agencies that have positioned themselves and/or integrated with partner agencies to provide a more seamless experience for their riders.

At one end of the spectrum, the Phoenix area's Regional Public Transportation Authority adopted the Valley Metro brand, under which all of the area's distinct, municipal transit agencies operate. Today, trip planning and ticketing spanning multiple providers and modes are now consolidated on Valley Metro's website. The Tucson area's Regional Transportation Authority (RTA) also reflects a moderate level of coordination. Essentially, the RTA funds, designs, and constructs transit projects that other agencies (e.g., City of Tucson's Sun Tran) operate and also funds increases in the frequency and hours of operation to existing services. At the other extreme (which would assume full consolidation of Rio Metro and ABQ Ride), Denver's Regional Transit District and the Utah Transit Authority are the primary transit providers of numerous modes in the Denver and Salt Lake City regions. Alternatively, Sound Transit in Washington State serves as the main funder and operator of high-capacity, express, and commuter connections throughout the Puget Sound Region, largely deferring the funding of intra-city routes to municipalities.

Transit in Land Use Plans

More so than any proposed operating structure, the future success of transit in the AMPA is largely dependent upon land use policies that encourage transit-supportive development. To that effect, transit's value is gaining traction in local governments' plans and projects. Most broadly, the City of Albuquerque's August 2013 amendment to the *Albuquerque/Bernalillo County Comprehensive Plan* continues to emphasize transportation corridors "that may reflect current transit services or projected improvements, including future Bus Rapid Transit routes," and also includes an Activity Centers and Transportation Corridors Map that identifies major and enhanced transit corridors along which increased housing and employment are desired.[31]

At the corridor scale, Bernalillo County's *Bridge Boulevard Corridor Redevelopment Plan* seeks to proactively couple increases in land use densities and employment opportunities along Bridge Blvd with key pedestrian and transit improvements, such as queue jump lanes, signal prioritization, re-evaluation of route alignments and stops, and frequency increases. Likewise, the City of Albuquerque's *Coors Corridor Plan* recommends Bus Rapid Transit service traveling in new, dedicated lanes within the Coors Blvd corridor, rather than adding vehicle lanes as a means of mitigating congestion. This would essentially build upon the 790 Rapid Ride's success. Although the Coors Corridor Plan is not scheduled for final approval at the time of this writing, the emphasis on transit on a major vehicle-centric arterial such as Coors Blvd is noteworthy.

3.4.5 Bus Rapid Transit

The changing priorities in transportation investments in the metropolitan area are reflected in the surge in interest in new transit services. Agencies are increasingly seeking alternative solutions to building new general purpose lanes and are coming to view transit service as a form of capacity expansion and a means of stimulating additional investment along key corridors. In the last several years, three major BRT studies have taken place, while the Coors Corridor Plan identified major transit improvements as a more viable solution to long-term congestion than widening the roadway. One particular project, Albuquerque Rapid Transit along Central Ave, is under development and could begin operations in 2017.

In contrast to the local bus routes and in many ways different from the Rapid Ride system, BRT typically incorporates several rail-like features (although at a substantially lower cost) that improve system speed, reduce delay and also promote comfort and security:

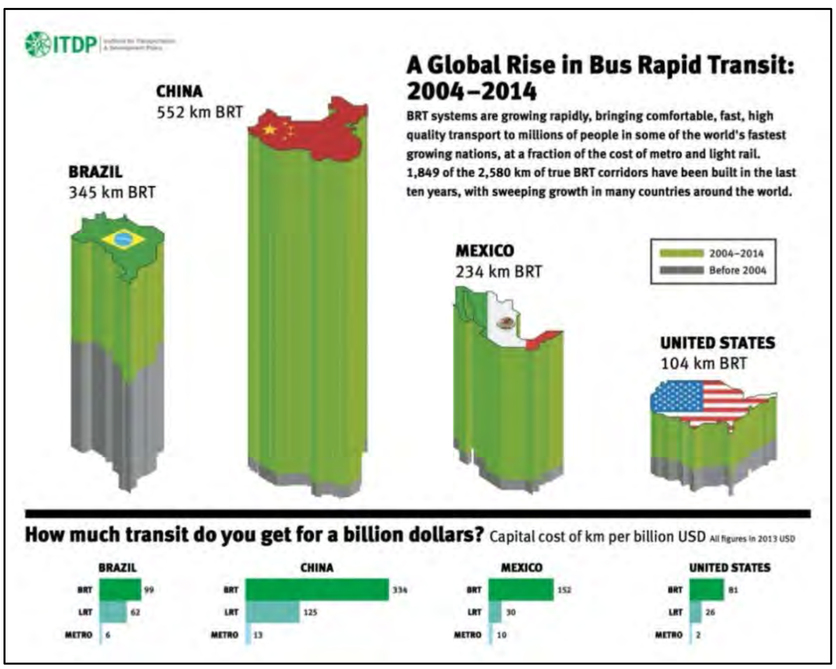
- Dedicated busways (travel lanes separate from and excluding passenger vehicles)
- Traffic signal priority and other forms of preemption
- Covered stations featuring level boarding (reduces delay of wheelchair and stroller boarding), lighting, real-time information and other amenities that improve security and comfort
- Off-vehicle fare collection
- Unique branding
- High-capacity vehicles that provide multiple points of entry and exit

[31] The City of Albuquerque and Bernalillo County are currently in the process of updating their Comprehensive Plan, and the enhanced transit corridors designations may be subject to change with the approval of the MTP and the update to the Comprehensive Plan.

Figure 3-32: Characteristics of BRT[32]

Globally, BRT has experienced dramatic growth, especially in Central and South America (home to the first BRT services), China, and to a lesser degree in the United States. As Figure 3-33 shows, the distance of BRT corridors worldwide has grown from about 450 miles to about 1,603 miles between 2004 and 2014 as countries seek to cost-effectively meet the transportation needs of their citizens.[33]

Figure 3-33: Growth in BRT Worldwide



In the United States, federal commitment to BRT continues through the most recent transportation legislation, MAP-21. When compared to its predecessor, SAFETEA-LU, MAP-21 provides greater

[32] Institute for Transportation and Development Policy. (2014). *What is BRT?* Retrieved from https://www.itdp.org/library/standards-and-guides/the-bus-rapid-transit-standard/what-is-brt/

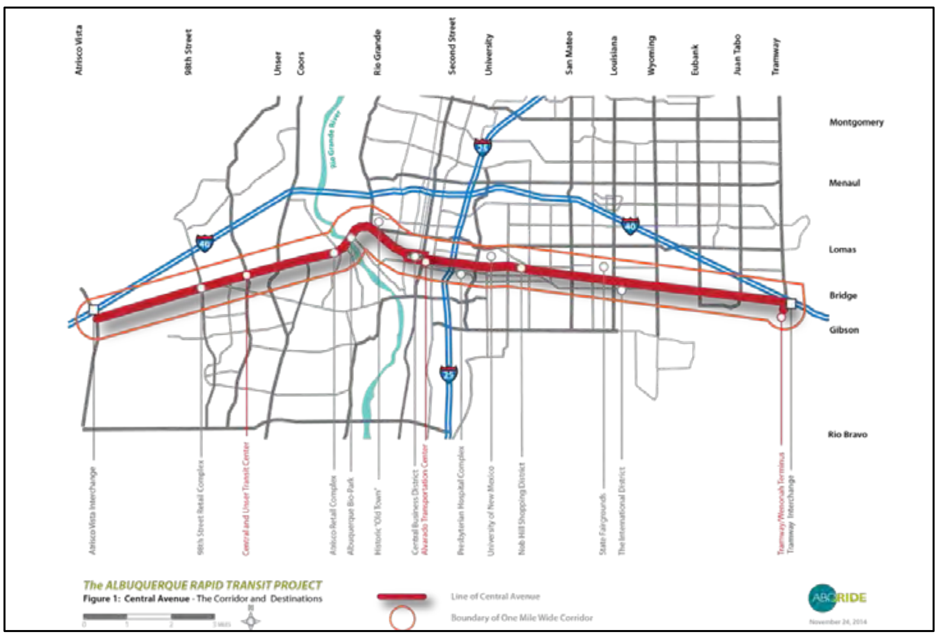
[33] Institute for Transportation and Development Policy. (2014). A global rise in bus rapid transit: 2004-2014. Retrieved from https://www.itdp.org/wp-content/uploads/2014/11/BRT-Infographic.jpg. Distances were converted to miles from kilometers by the authors of the MTP.

flexibility for BRT projects, notably by reducing the requirement for operation in a separate busway from 100 percent to 50 percent for the New Starts program. While MAP-21 does not contain a similar provision for the Small Starts program (i.e., no busway requirement), it does require that BRT projects emulate rail and also have short headways in both directions throughout the entire week.

Albuquerque Rapid Transit

Recently branded as Albuquerque Rapid Transit, or ART, the BRT line is proposed to run along Central Ave. The initial phase would run from Unser Blvd to Tramway Blvd, supplanting the 766/777 Rapid Ride routes. At its heart, the ART is not merely about capitalizing on ABQ Ride's highest ridership corridor, but also creating synergies with economic development efforts such as Innovate ABQ and redevelopment projects along Central Ave. There are precedents elsewhere that support this expectation. According to the Institute for Transportation and Development Policy, Cleveland, Ohio, for example, realized $114.54 of investment for every $1 dollar it spent on BRT, especially when coupled with widespread support among public, private and non-profit entities for development along the "HealthLine."[34]

Map 3-20: Albuquerque Rapid Transit Alignment[35]



ABQ Ride anticipates rolling out this service as early as 2017 if additional federal funding, such as a Small Starts grant, becomes available to supplement local funds. While more refined capital construction cost estimates have not been finalized, an initial assessment from the *Central Avenue Corridor BRT Feasibility Study* lists the approximate cost of the minimum operable segment at $100 million. Additionally,

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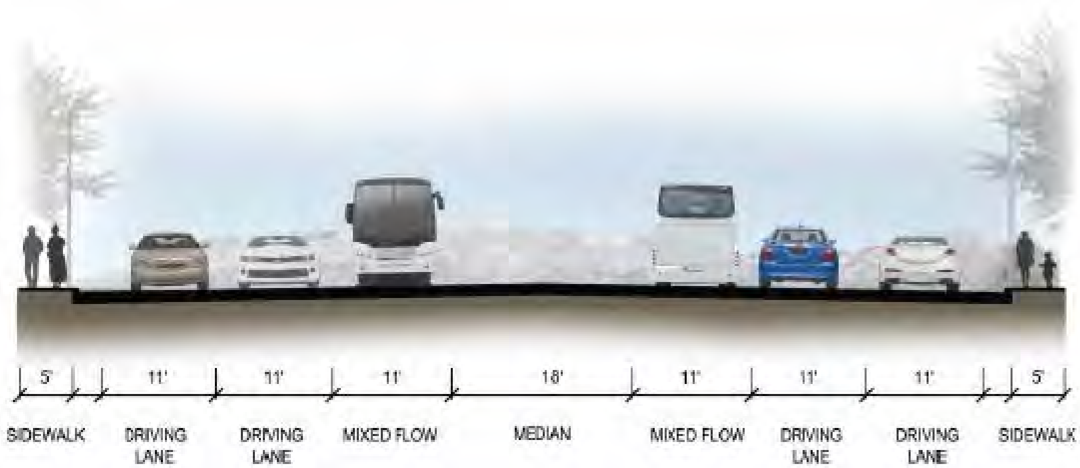
[34] Additionally, APTA reports that every $10 million invested in transit capital and operations results in $30 million and $32 million in increased business sales, respectively.
[35] Map and subsequent cross sections courtesy City of Albuquerque.

because ART is replacing the 766 and 777 Rapid Ride routes, ABQ Ride anticipates that reducing the operational costs of the latter can help offset the former.

Figure 3-34: Conceptual ART Cross Sections



UNM/CNM/Sunport Transit Study

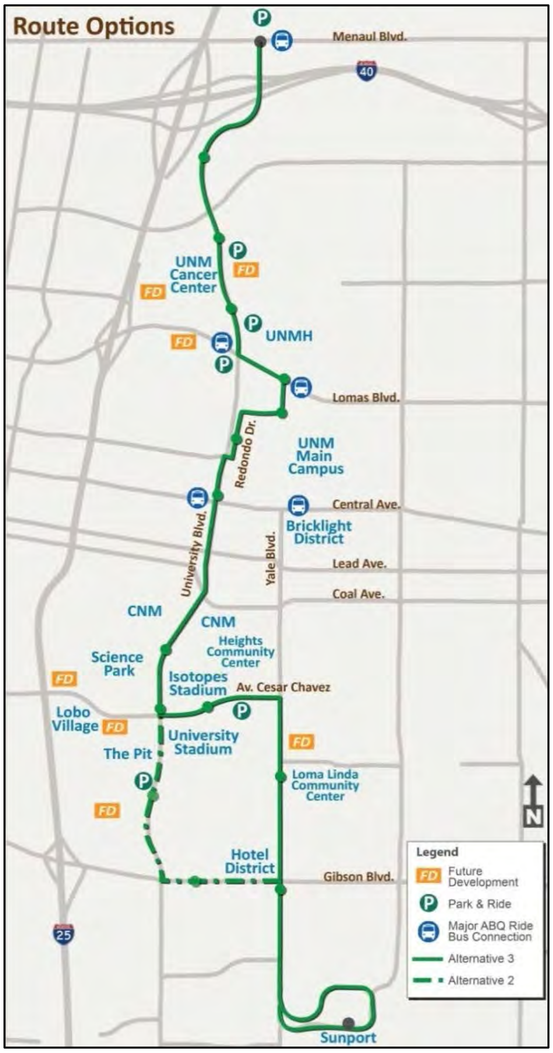
Through Resolution R-14-08, Rio Metro's Board of Directors ranked the ART as priority 1A; the UNM/CNM BRT ranked 1B. As described in the *UNM/CNM/Sunport Transit Study Alternative Alignments Identification and Assessment*, and as shown on Map 3-21, the UNM/CNM BRT will operate primarily on University Blvd and Yale Blvd from Menaul Blvd to the Sunport. Not only will it intersect the ART and improve mobility between the University of New Mexico, Central New Mexico Community College and the Sunport, the UNM/CNM BRT will also help alleviate congestion and parking demand by connecting parking lots and other transit routes to housing, employment centers and other popular destinations. The UNM/CNM BRT is anticipated to serve more than 17,000 riders per day, and weekday headways will vary between five minutes and 15 minutes depending upon the location within the 6.5-mile corridor. Capital costs are estimated to be between $62 and $65 million, and a new source of operational funding will be required.

Paseo del Norte High Capacity Transit Study

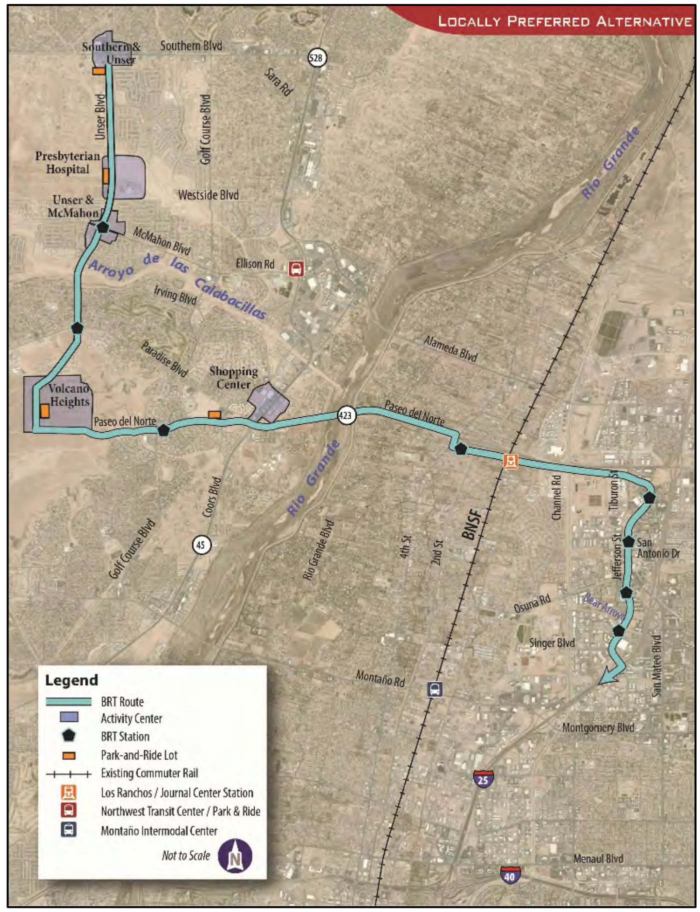
The *Paseo del Norte High Capacity Transit Study Alternatives Analysis Report* highlights the third BRT project under consideration. The Paseo del Norte project arose from the Metropolitan Transportation Board's aforementioned mode share goals for river crossings and seeks to connect housing in northwest Albuquerque and southern Rio Rancho with employment east of the Rio Grande. Notably, neither the Paseo del Norte nor UNM/CNM projects assumed that BRT would be the preferred mode from the onset. Rather, the selection of BRT in both cases was based on a variety of needs and evaluation criteria. The locally preferred alternative originates in Rio Rancho at the intersection of Southern and Unser Blvds, travels south on Unser Blvd to Paseo del Norte, and continues east on Paseo del Norte until reaching Jefferson St. The route then turns south on Jefferson St before continuing to UNM and CNM via I-25 frontage roads and University Blvd (i.e., interlining with the UNM/CNM BRT). Headways are estimated to range between 10 and 15 minutes along the 24-mile corridor but could be reduced as ridership grows. Like the UNM/CNM BRT, the Paseo del Norte BRT will require new operational funding. Capital costs are estimated at $105 million.

In the *2040 MTP*, only the ART on Central Ave is expected to be fully constructed and operational under existing financial conditions. All three BRT projects are proposed for implementation by 2025 in their respective studies; however, additional revenue sources need to be identified to implement these services. Nevertheless, premium transit service on these and other priority corridors are important for addressing regional mobility needs and realizing the benefits of the Preferred Scenario.

Map 3-21: UNM/CNM BRT Locally Preferred Alternative



Map 3-22: Paseo del Norte High Capacity Transit Study Locally Preferred Alternative



3.4.6 Transit Funding Challenges

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 2015 (excluding reserves) is $42.3 million, of which $26.9 million is allocated to the Rail Runner and $15.4 million is allocated to bus operations. An additional $8.1 million is committed to capital improvements that include maintenance of cars, locomotives and track, and bus purchases. The primary source of local funding is a 1/8-cent gross receipts tax, which is currently estimated to generate $24 million per year. Federal funds comprise the largest share of the remaining funds.

Interestingly, ABQ Ride and Rio Metro's budgets are very similar—consistent with their near-identical provision of passenger miles traveled. ABQ Ride's FY 2015 operating budget of $46.8 million depends heavily upon several local sources supplemented by federal funds, including $19.4 million from the general fund, $13.1 million from the transportation infrastructure tax, and $7.1million from intergovernmental sources including Rio Metro.

From an efficiency perspective, the cost of operating ABQ Ride buses per vehicle revenue hour has risen from $77.13 in FY 2002 to $89.61 in FY 2012.[36] However, likely because of service expansions that have targeted ridership, the operating expense per passenger mile has declined from $1.03 to $0.77 during that same period. By comparison, the Rail Runner's operating expense per vehicle revenue hour has declined from $673.65 in FY 2009 (first year of National Transit Database reporting) to $649.77 in FY 2012. However, operating expense per passenger mile has increased from $0.44 to $0.47 during that same period as ridership stabilized after the introduction of this new service.

3.4.7 Conceptual Transit Network

In support of the *2040 MTP* scenario planning efforts, and as an attempt to understand how the region's transit network could plausibly grow, a conceptual transit network was developed that 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 capacity is likely the most appropriate funding source.[37] Based on current receipts, such an increase would generate approximately $63 million annually. For the purposes of this analysis, Rio Metro's services, excluding the Rail Runner, and ABQ Ride's Sun Van paratransit service received additional funding ($8 million) proportionate to their share of the combined 2012 operating budgets of ABQ Ride and Rio Metro. This would allow operations in Valencia and northern Sandoval

[36] Fiscal year operating expenses reflect dollars for that year, meaning that some of the increase from 2002 to 2012 could be due to inflation.
[37] According to APTA, Seventy-nine percent of all 2012 transit-related ballot initiatives in the U.S. were approved by voters.

Counties to accommodate anticipated growth and assumes that paratransit demand will increase as the population both ages and ABQ Ride's fixed-route service area expands under the Preferred Scenario.

Under the conceptual transit network, the Rail Runner received less than its proportionate share ($13 million) of revenue for several reasons. First, no major extensions of the Rail Runner or similar rail projects are proposed in the AMPA. Instead, efforts to expand operations would focus on increasing frequency and capacity by adding cars to existing trains, express trains during peak commuting hours, and mid-day service. Also, much of the funds would support the construction of capital projects that emphasize efficiency, such as siding and centralized traffic control systems that would both reduce delay and allow trains to operate at higher speeds. Both of these strategies have the potential to bolster ridership.

The remaining balance of new revenue ($42 million) was provided for BRT and bus services generally aligning with ABQ Ride's existing service area. 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.[38] This allocation essentially values ridership without sacrificing coverage throughout the region. Similarly to the Rail Runner, funds were also allocated to defray the startup capital costs of BRT projects and to match approximately $10 million per year in federal funds from sources such as the TIP (via the mode share goals) and the Small Starts program.

Conceptual Network vs. Priority Network

The conceptual transit network shown on Map 3-23 is one possible outcome of how the AMPA's transit network could feasibly expand to support the Preferred Scenario. The priority transit network shown on Map 3-18 depicts a more focused network of transit corridors with high ridership potential that are eligible to receive funding set aside by Resolution 15-01 MTB, which established a 20 percent transit mode share goal for the priority network by 2040.

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. In reality, additional Federal Transit Administration formula funds would likely defray some of these costs.

Based on those cost assumptions, MRMPO and RMRTD staff created a conceptual transit network to show how BRT and bus services could be expanded within the greater Albuquerque area. At the onset, a transit network nearly identical to the ABQ Ride network depicted on Map 3-15 was modeled to determine a baseline of vehicle revenue hours.[39] In order to calculate the vehicle revenue hours generated for each of the 23 routes modeled, the route length, and an assumed average speed were

[38] For example, ABQ Ride's most efficient route, the 66 Central Ave, averaged 63.9 boardings per hour vehicle revenue hour in FY 2012. By comparison, the Rail Runner averaged 31.9 boardings per vehicle revenue hour, and Rio Metro's commuter buses averaged 4.75 boardings per vehicle revenue hour (see footnotes 6 and 12).

[39] Commuter routes were excluded to simplify the model, as they account for only two percent of ABQ Ride's ridership. However, the continuation and expansion of commuter routes may be desirable in future years.

used to determine the number of buses required to maintain a given frequency. The number of buses required were then multiplied by the span (total hours of operation along a route) to generate the total vehicle revenue hours required for a particular route. The same process was also completed for the 2040 conceptual transit network; however, the amount of additional vehicle revenue hours allowed by the 2040 network was constrained by known service costs.

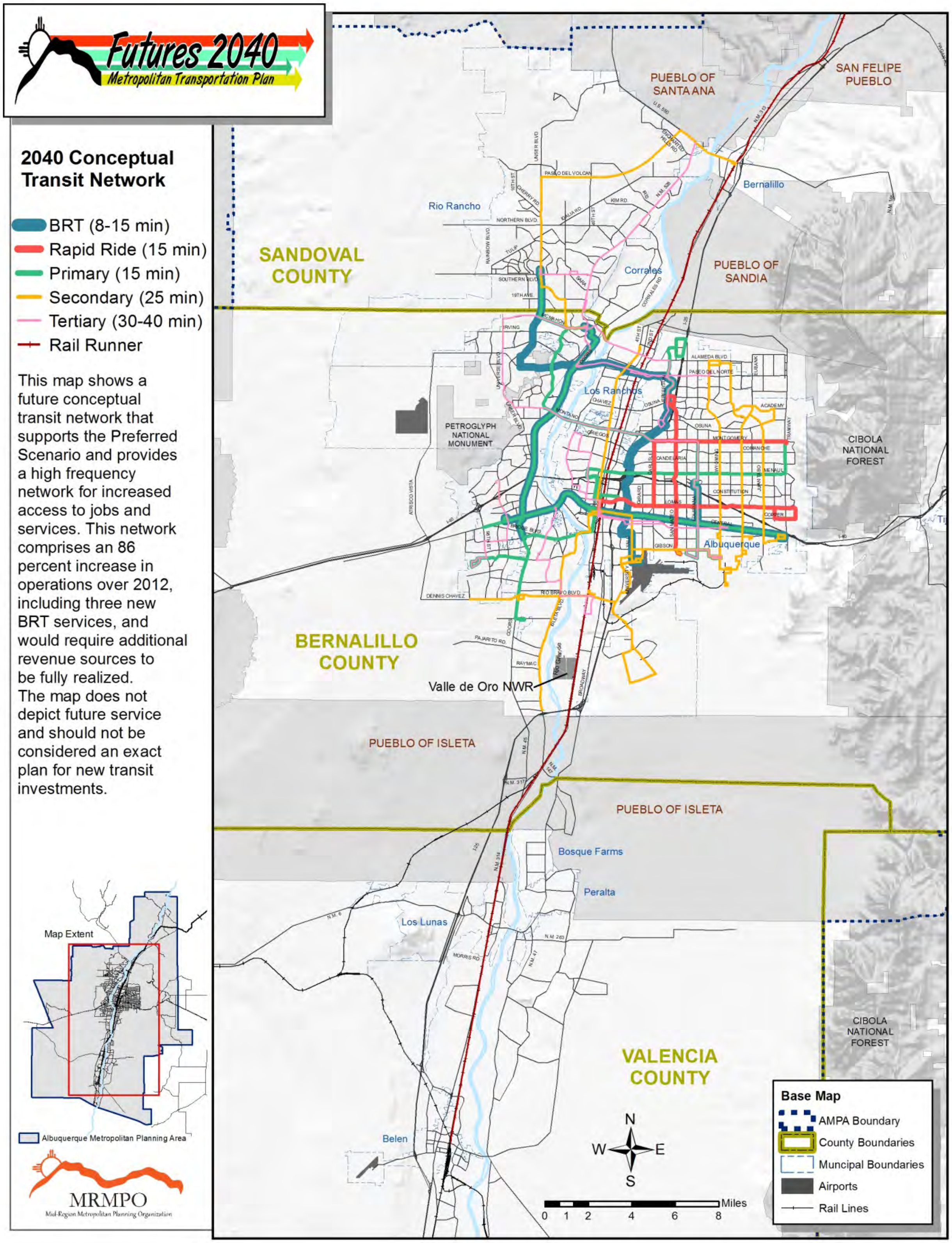
The 2040 conceptual transit network, as shown on Map 3-23, comprises an approximately 86 percent increase in vehicle revenue hours over the 2012 transit network through the provision of the following services:

- Four BRT routes operating at eight to 15 minute headways, with the Paseo del Norte BRT and UNM/CNM BRT interlining south of Menaul Boulevard
- Three new Rapid Ride routes that interline at 15 minute headways with the most popular local routes along Montgomery, Lomas and San Mateo Boulevards
- Increasing the frequency of the eight “primary” local routes (most traversing the Northeast Heights) to 15 minute headways[40]
- Increasing the frequency of 12 existing “secondary” and “tertiary” routes to between 25 and 30 minute headways, and creating four new secondary and tertiary routes that primarily serve locations outside of ABQ Ride’s existing service area
- Extending the span to between 17 and 19 hours for BRT, Rapid Ride and primary routes, and 15 hours for secondary routes

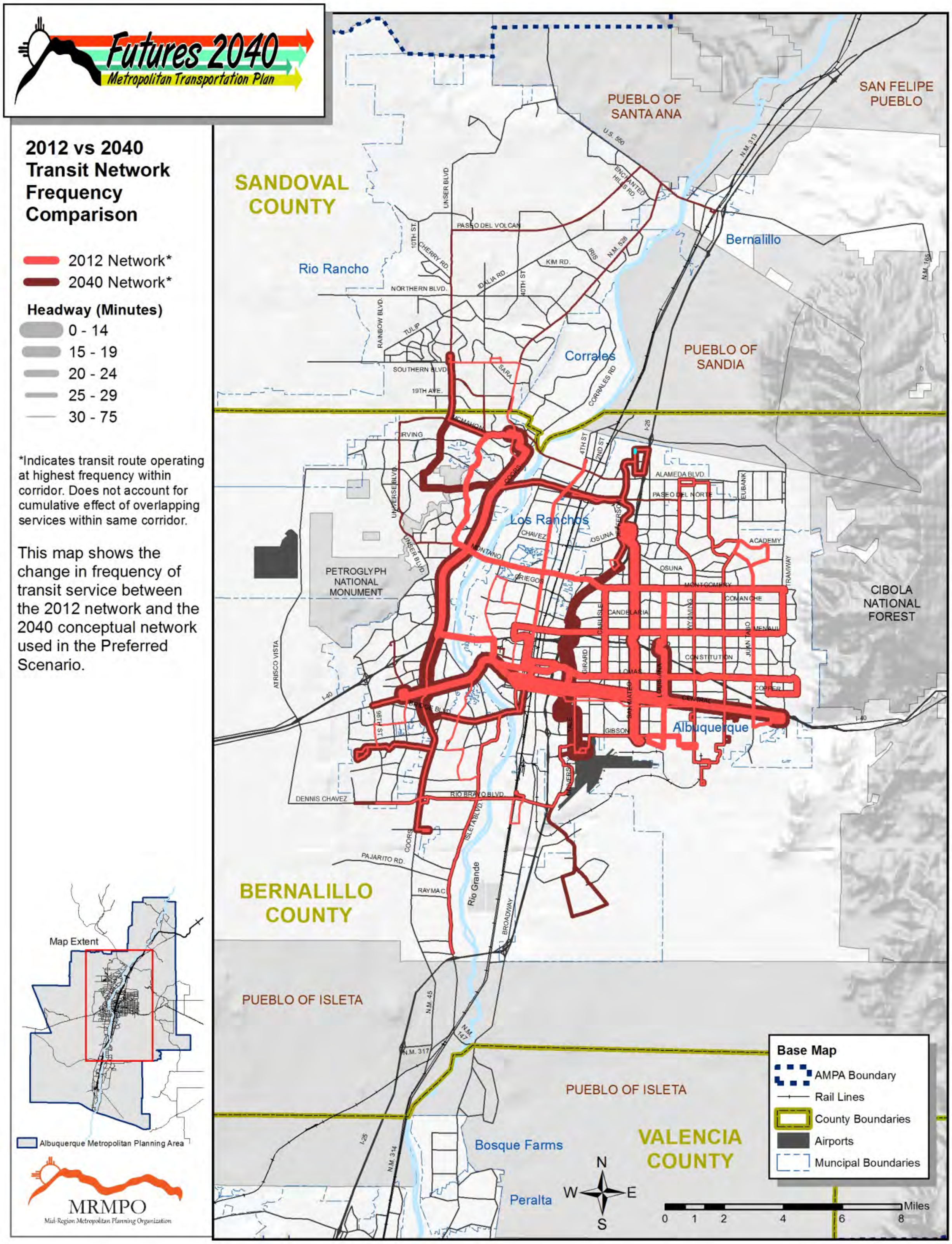
The conceptual transit network should be viewed as a rough approximation of what is possible. Were this analysis to come to fruition, a far more detailed planning and modeling exercise incorporating public input would be necessary. For example, the simple method employed to develop the 2012 baseline and 2040 future transit networks incorporated many assumptions or limitations that a more robust effort would refine.

[40] A 15-minute headway is often considered the minimum headway necessary to create the perception of a frequent network, one in which a rider can pay less regard to the schedule.

Map 3-23: Conceptual Transit Network for the Preferred Scenario



Map 3-24: Transit Network Frequency Comparison, 2012 vs. 2040



Notes on the Conceptual Transit Network

- All routes were modeled at peak frequency along their entire lengths. In reality, many routes operate at a lower frequency at midday, and others only enter certain areas, such as Kirtland Air Force Base and Sandia National Laboratory, during limited times. As such, the 2012 network overestimates the number of vehicle revenue hours ABQ Ride actually provided in 2012 by 14 percent. However, not all routes in 2040 would likewise be expected to operate at peak frequency (i.e., the 2040 conceptual transit network overestimates vehicle revenue hours as well).
- The number of buses required was likely underestimated. A route that mathematically requires 5.3 buses in the model to maintain a 15-minute headway would actually require six buses to achieve that headway (it's impossible to operate one-third of a bus).
- It was not determined how the 2040 network might affect Sun Van paratransit demand. For example, because paratransit service is required within three-quarter miles of a fixed route, an increase in frequency to an existing bus route does not necessarily expand the federally-mandated paratransit service area. However, extending an existing fixed route or adding a new fixed route to a previously unserved area would expand paratransit service.
- A greater portion of the new gross receipts tax revenue could be allocated to pay for the immediate construction of BRT and Rail Runner infrastructure and other capital needs so as to avoid additional interest through a bond or similar debt-financing mechanism. This pay-as-you-go approach could delay service enhancements to existing routes, but might otherwise reduce the 2040 conceptual transit network's long-term capital costs.
- Capital and infrastructure costs and gross receipts tax revenues were inflated at equal rates. However, for example, changes in construction material costs, a new labor agreement with transit operators, or gross receipts tax revenue fluctuations could all affect implementation.
- New revenues would not be used to offset existing funding. For example, Rio Metro gross receipts tax revenue would not replace existing City of Albuquerque general fund contributions for existing services.

3.4.8 Strategies and Recommendations

Transit passenger trips in the AMPA have doubled to over 14,000,000 between 2000 and 2012. This is due to several factors, including ABQ Ride's introduction of Rapid Ride service and the advent of the Rail Runner and other Rio Metro services. Today, each agency is serving both transit-dependent populations and attracting an emerging market of riders who are foregoing single-occupancy vehicle travel in lieu of transit. Furthermore, an increased preference for transit by both Millennials and seniors suggests that this trend will continue in coming years. Nevertheless, this growth has not come without new challenges. While the MTB is committed to dedicating funds for the capital improvement of transit, both ABQ Ride and Rio Metro are operating at budgetary capacity, with little opportunity to expand service.

Meanwhile, congestion and low-density land use patterns, particularly on Albuquerque's Westside, complicate transit's ability to operate efficiently throughout the AMPA.

Despite these challenges, the analysis and recommendations presented in this section provide a series of next steps toward realizing the Preferred Scenario. First, the conceptual transit network demonstrates how the AMPA's transit system could expand if new sources of revenue were identified that not only facilitate capital improvements, but also permanently fund operations (Rio Metro's remaining 3/8-cent gross receipts tax capacity being one possible source). Second, developing planned Bus Rapid Transit projects along Central Ave and University Blvd, and in northwest Albuquerque/southern Rio Rancho (Paseo del Norte and Coors Blvd), are critical to expanding high-capacity transit services in the AMPA that have proven to bolster ridership. This action is already supported by the MTB's recent passage of a revised transit mode share goal that sets aside funding support for bus rapid transit, Rapid Ride and other high-capacity alternatives. Finally, a greater degree of coordination between ABQ Ride and Rio Metro— a topic of discussion in Rio Metro's evolving visioning process—may result in increased service efficiencies, more integrated ticketing and scheduling, and joint travel demand management and technology initiatives designed to attract new riders.

While the 2040 conceptual transit network provides some utility as a planning exercise, it reinforces the basic premise that **additional revenue** is a necessary pre-condition to realizing the Preferred Scenario. Any significant expansion of transit service in the AMPA will require a new revenue stream for both capital improvements and the long-term sustainability of operations. While Rio Metro's remaining 3/8-cent gross receipts tax capacity may be the most obvious source, the funding could be assembled from several means, including gross receipts taxes, local agency contributions, general obligation bonds, capital outlay, and/or federal grants.

Intertwined with any effort to increase revenue in support of transit, a robust **long-range transit plan** is needed for several reasons:

- Garnering guidance and direction from constituents
- Reassessing and refining existing routes and schedules as needed (i.e., the relative success of the existing transit network should not be assumed)
- Integrating the findings of recent studies and short-range service plans
- Determining the appropriate location and type of new services
- Modeling the effectiveness of the proposed network using the MRMPO's new land use and transportation models
- Prioritizing capital improvements and operational enhancements
- Establishing systemwide and corridor-specific performance measures to better evaluate the relative success of existing and future routes
- Clarifying funding needs and specific revenue generation strategies

Even with additional revenue and a long-range transit plan in hand, the AMPA's member governments must also make a concerted effort to adopt **complementary land use plans and policies** along key transit corridors and stations such as those served by BRT, Rapid Ride, and popular local routes. Doing so will improve the cost efficiency and productivity of transit and benefit the residences and businesses that locate in these areas.

Absent implementation of the previous strategies, the AMPA's transit services will generally function "as is," with limited opportunities for expansion except where efficiencies or savings can be realized. For example, as noted earlier, ART operational costs can be partly offset by the Rapid Ride services it is supplanting; however, the UNM/CNM, Paseo del Norte or Coors BRT projects could not begin operations until additional funding is secured. Nevertheless, it should not be assumed that existing services would remain unchanged. Economic upturns or downturns that influence transit revenues could require ABQ Ride and/or Rio Metro to modify routes and schedules accordingly.

In the interim, the City of Albuquerque, with the support of Rio Metro and other AMPA member governments, should move forward on the **Albuquerque Rapid Transit**. Meanwhile planning work on other **BRT projects** should continue, as necessary, such that each, in order of priority, would be ready to enter the project development phase of the Federal Transit Administration's Small Starts program when funding commitments are secured.

Furthermore, in addition to developing new physical services, the use of existing transit services should be encouraged by **coordinated travel demand management (TDM) efforts**. For example, the ABQ Ride/UNM bus pass program provides free bus passes to all students earning at least three credit hours, and to other qualifying employees and faculty. This has undoubtedly led to the high percentage of student ridership that ABQ Ride enjoys and to the success of routes like the 790 Rapid Ride. Likewise, Rio Metro launched a pilot program in November 2014 that allows veterans to ride the Rail Runner for free. This program will run through 2015, giving time to evaluate its influence on Rail Runner ridership. As another example of how TDM can supplement physical services, Rio Metro's Smart Business Partnership has also succeeded in encouraging local business to provide incentives such as flexible schedules that accommodate transit use or reduce peak hour commuting, subsidized transit passes, and improvements/services including bike racks and lockers, preferred carpool parking spaces, and shuttles. Similar efforts will continue into the next decade, as Rio Metro and ABQ Ride will receive federal funds beginning in FY 2016 for coordinated TDM programming and marketing.

ABQ Ride and Rio Metro could also consider technological enhancements that improve a rider's capability to both understand and efficiently navigate transit services such as:

- Continued implementation of real-time technologies through smartphone apps, the internet, and displays at stops/station
- Improved on-board Wi-Fi service, especially on high-capacity and long-distance routes
- Coordinated, centralized trip-planning via one website and/or app
- "Smart" ticketing and digital payment services that span modes and providers

3.5 Pedestrian and Bicycle

Currently, trips taken by walking and bicycling make up only a modest share of the total trips taken in the region. The Mid-Region Household Travel Survey shows that seven percent of trips are made by walking and two percent of trips are made by bicycling. However, there are important benefits associated with traveling by these modes, including improved public health outcomes and reduced reliance on single-occupancy vehicles. Policies and investments are needed to create vibrant places where people want to be (and walk and bike to) and safe conditions to travel to such places without a private vehicle.

3.5.1 Challenges and Needs

Despite the general dependence on single-occupancy vehicle travel, there are indications that walking and bicycling could be a more common way to get around. For instance, of the households participating in the Mid-Region Household Travel Survey, 56 percent reported having bicycles, showing that biking as an activity is fairly widespread. In addition, people are familiar with walking and bicycling since 20 percent of households include someone who takes some form of walk or bicycle trip on a regular basis. Another indicator that walking and bicycling could be feasible for people is that 19 percent of trips done by driving are less than 2.5 miles, which is approximately a 15-minute bicycle ride. Looking at walking feasibility, 11 percent of trips taken by driving are under a mile, which is approximately a 20-minute walk. The Preferred Scenario strategy of providing more mixed-use development where homes, shopping, entertainment and work are closer together decreases distances between destinations. However, given that many vehicular trips in the AMPA are short, this shift also requires a better understanding of why people are choosing not to bicycle and walk.

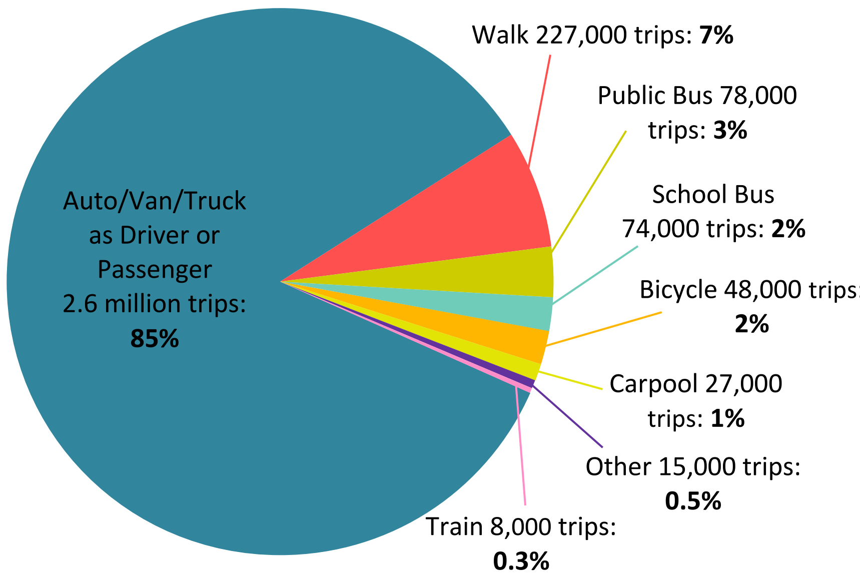
In a Nutshell…

Takeaways: Providing increased transportation options is an important strategy for increasing individual mobility and for addressing long-term congestion. Particularly important is the ability to make short trips by walking and bicycling. This involves better understanding of the obstacles to walking and biking and prioritizing efforts to support the decision to walk and bicycle.

Contents: This section describes some of the opportunities for expanding pedestrian and bicycle travel opportunities. Important products include and update to the Pedestrian Composite Index (see p. 3-109) and a ap of long range transportation system bicycle and pedestrian projects (p. 3-113).

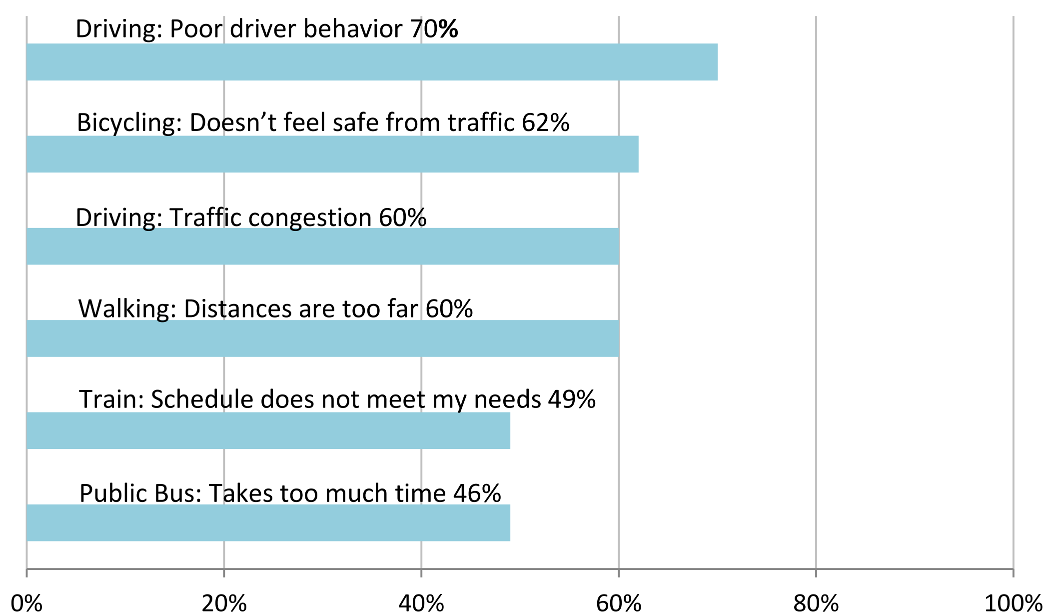
Goals and Objectives: Supporting active transportation options such as walking and biking is consistent with the MTP goals of *Mobility* and *Active Places*.

Figure 3-35: All Trips by Mode, Household Travel Study



The public questionnaire conducted as part of the development of the *2040 MTP* asked people's opinions about transportation. Safety from traffic was reported as the most common issue for bicycling. Open ended responses also revealed that discontinous bicycle facilties are a large concern. For walking, the most common issue was that distances are too far. People also cite safety from traffic and sidwalk conditions as being issues for walking.

Figure 3-36: Top Reported Issues for All Transportation Modes, *2040 MTP* Questionnaire



The region's safety data does not fully reveal what people need to feel safe from traffic. However, it does provide useful information. Overall, the data indicate that walking in New Mexico is much less safe than in other states. New Mexico frequenty ranks as one of the highest states for pedestrian fatalities per capita. (In 2012, New Mexico ranked second in the nation for pedestrian fatalites per capita, up from fifth in 2011.) This has led the Federal Highway Administration to identify Albuquerque as a "focus city" and New Mexico a "focus state" for pedestrian safety interventions. Bicyclist fatalities tend to be less common events resulting in very volatile rankings. In 2012, New Mexico's ranking for bicyclist fatalities per capita was fourth with seven bicyclist fatalities. In 2011, it was 17th with four bicyle fatalities.

The Federal Highway Administration's focus city effort has led to a better examination of crash data related to pedestrians and bicyclists. Pedestrian crashes tend to cluster around major transit lines and to some extent bicyclist crashes do as well. Often the best transit routes are on roadways that do not include bikeways. This contributes to 62 percent of bicycle crashes occuring on roadways with no bicycle infrastructure. One location is worth pointing out. The intersection of Central Ave and San Mateo Blvd is surrounded by mixed land uses and very high employment and residential densities. It is also the junction of two major transit lines. Each seven to eight lane leg of this intersection carries between 25,000 to 27,000 vehicles on an average weekday. This location has the highest number of pedestrian and bicyclist crashes in the region, and most likely the state. As the region looks to 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 by pairing land uses and services that promote walking and bicycling with high-speed, high-volume arterials.

Pedestrian Composite Index

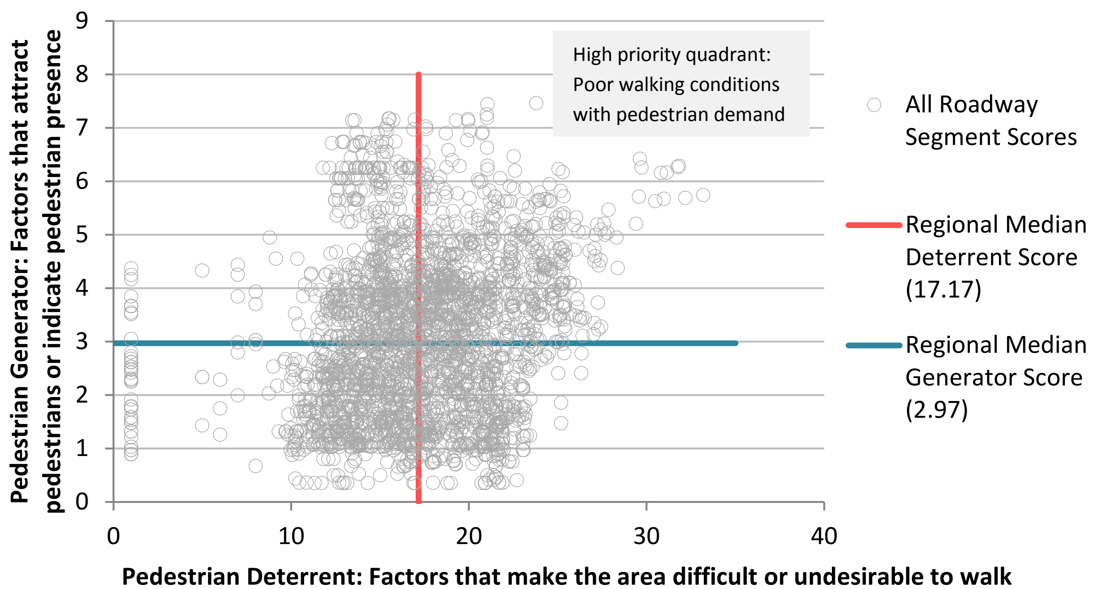
MRMPO updates and maintains the Pedestrian Composite Index, a tool to help prioritize roadways for pedestrian improvement and address the need to reduce pedestrian crashes. The Pedestrian Composite Index uses regional data to compare aspects that would deter pedestrian travel (crashes, speeds, volume, number of lanes) to aspects that generate pedestrian activity (transit, schools, retail densities, residential densities). Roadways with both high deterrent and high generator scores indictate that the location would benefit more from pedestrian improvements compared to places that either have low deterrent and/or low generator scores. This tool helps to compare roadways in the region, and it provides a wide variety of pedestrian-related data for segments of roadways. However, it does not provide details such as the presence and width of sidewalks, which is necessary to calculate pedestrian level of service. Nor does it provide information on future demand for walking.

The Pedestrian Composite Index has been updated to include the following data:

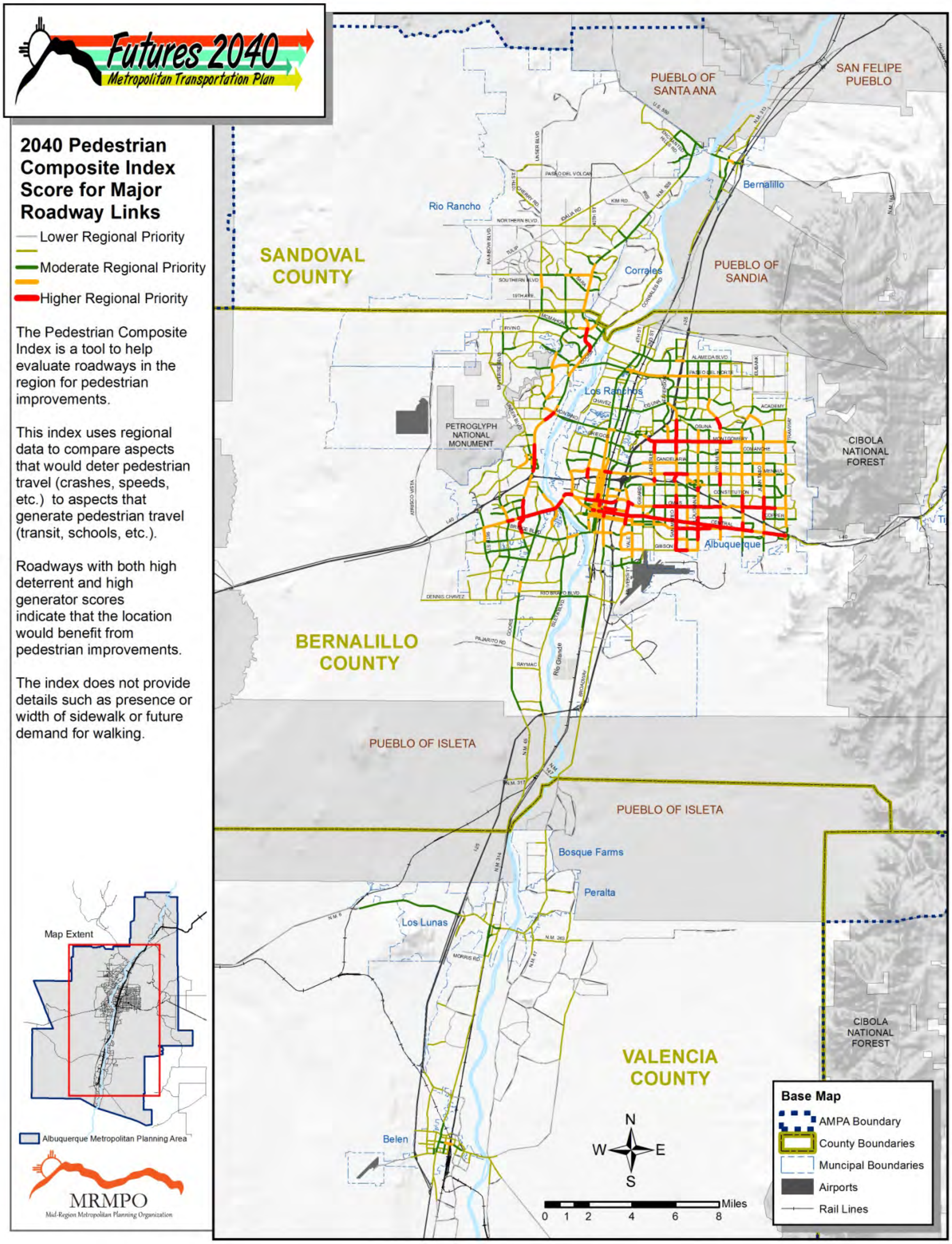
Table 3-12: Inputs to Pedestrian Composite Index

Pedestrian Deterrent Data	Pedestrian Generator Data
• Pedestrian crashes • Number of lanes • Average weekday traffic • Observed off-peak speeds	• Proximity to schools • Proximity to bus stops and high volume bus stops • Proximity to parks, recreational facilities, cultural centers, community centers, and libraries • Density of restaurants, coffee shops, grocery stores, and entertainment • Roadway connectivity – number of four-leg intersections per square mile • Percent of population 16 years+ who walk or take transit to work (ACS 2009-2013) • Percent of households with 0 vehicles or fewer vehicles than workers (ACS 2009-2013) • Transit ridership • Net residential density • Land use mix

Figure 3-37: Distribution of Pedestrian Composite Index Scores for the Region



Map 3-25: Pedestrian Composite Index Scores



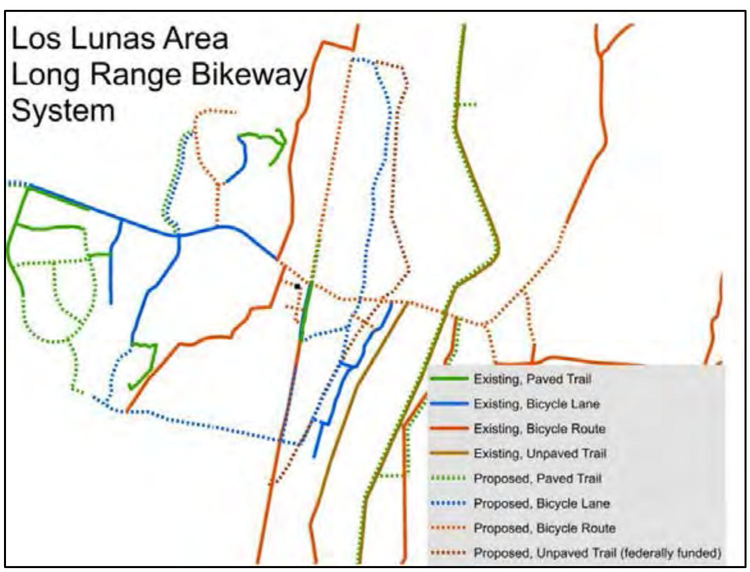
3.5.2 Strategies for Increasing Bicycle and Pedestrian Activity

Long Range Transportation Systems Guide

The main strategy developed for the *2040 MTP* to improve the safety and comfort of walking and bicycling in the AMPA is the Long Range Transportation System Guide (LRTS) Guide found in Appendix H. This guide is the region's Complete Streets design guidance document and provides recommendations on roadway connectivity and conceptual roadway design based on the surrounding context. Much of this guide is based on nationally-recognized documents including: the Institute for Transportation Engineers *Recommended Practice Designing Walkable Urban Thoroughfares*; the NACTO *Urban Design Guide*; the NACTO *Urban Bikeway Design Guide*; AASHTO's *Designing Pedestrian Facilities*; and AASHTO's *Designing Bicycling Facilities*. The purpose of the LRTS Guide is to provide guidance that goes beyond minimum roadway design standards that often do not provide a level of comfort necessary for people to walk and bicycle. As a Complete Streets guidance document, the LRTS Guide also provides recommendations on identifying opportunities and considerations for improving roadways for all users.

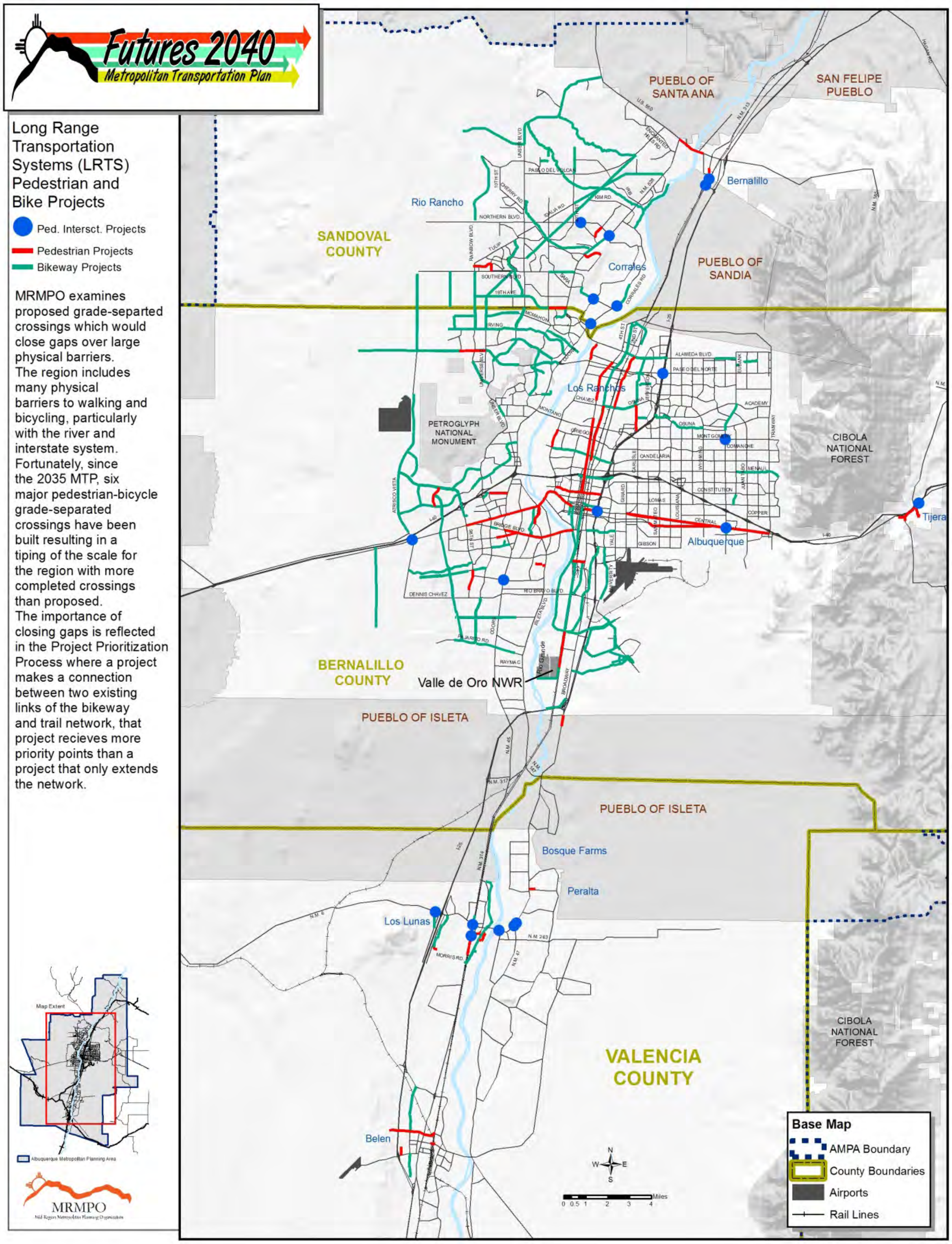
The LRTS Guide builds upon past guidance with the Long Range Bikeway System. This system map shows where future bikeways are planned in order to help preserve routes and future connections. Accomodation for bicyclists is evolving rapidly with shared lane markings, bicycle boulevards/neighborhood greenways, and barrier protected bicycle lanes/cycle tracks. Although the region has very few of these new facilities (and no cycle tracks), the LRTS Guide provides study areas for cycle tracks and futher guidance based on the NACTO *Urban Bikeway Design Guide*.

Figure 3-38: Exceprt from Long Range Bikeway System



One of the guiding principals of the LRTS Guide is to support the principles of the Preferred Scenario. With this scenario, walking takes a new, important role in regional transportation with the designation of activity centers. Activity centers prioritize pedestrian accessibility and promote a "park once" approach where people driving to these locations can park once and walk to a variety of destinations.

Map 3-26: Long Range Transportation System Pedestrian and Bike Projects



Most activity centers in the in the Preferred Scenario focus on providing higher residential and employment densities along with other land uses to allow destinations to be closer together. Being able to complete trips by walking within these centers is a key element in providing overall regional mobility and access.

The LRTS Guide also includes a checklist and performance measures, which are tools to help inform project development and understand how well design interventions work to encourage trips made by walking and bicycling. Specifically, the checklist is designed to help transportation professionals keep track of the many considerations involved when providing multiple transportation options. The performance measures help to identify current and desired roadway conditions given the surrounding context and purpose of the facility being examined. Many of the measures such as average weekday daily traffic (AWDT) and travel time are already collected by MRMPO, while MRMPO is working to provide data on non-motorized counts.

Closing Gaps in the Regional Bikeway and Trail Network

The region includes many physical barriers to walking and bicycling, particularly with the river and interstate system, and the public has consistently requested addressing gaps in the bikeway network through comments, questionnaire responses, and at outreach events.The good news is that since the adoption of the *2035 MTP*, six major pedestrian-bicycle grade-separated crossings have been built. 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 recieves more priority points than a project that only extends the network.

Through the Transportation Accessibility Model (TRAM), MRMPO measures how well a planned crossing will serve the surrounding community by looking at how many people would be served and how many jobs would be accessible if the crossing existed. This method provides a general way to examine how a proposed crossing will improve accessibility in an area. As shown in Figure 3-39, a grade-separated crossing over Coors Blvd along Paseo del Norte is the MTP crossing project that provides the best accessibility to the surrounding area using this analysis. Figure 3-39 and Table 3-13 show the area's current accessibility along with the increased accessibility if this crossing were in place.

Figure 3-39: Bicycle Accessible Areas with a Paseo del Norte Crossing over Coors Blvd

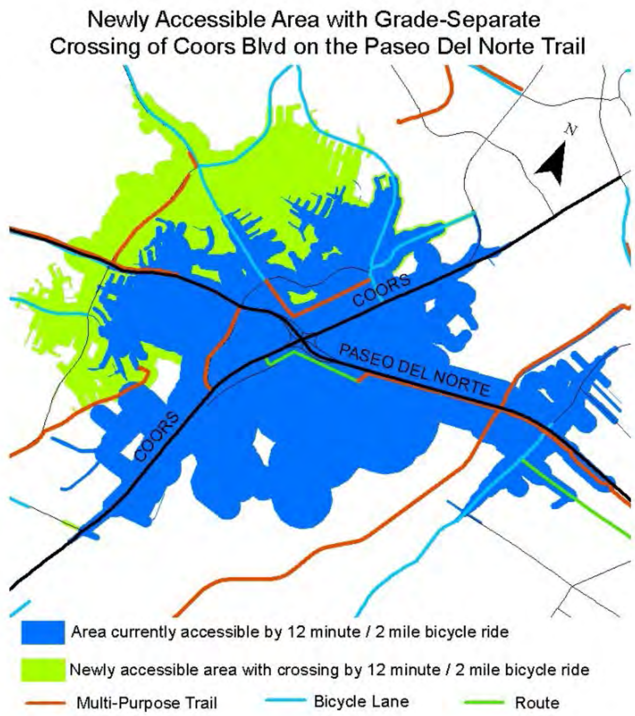


Table 3-13: Improved Accessibility with Paseo del Norte Crossing over Coors Blvd

	2012 Population	2012 Jobs	2012 Households
Current population, jobs, and housing accessible without crossing	7,033	2,229	2,703
Population, jobs, and housing accessible if crossing existed	11,980	3,082	4,552
Difference	4,947	853	1,850
% Change	70%	38%	68%

Local Efforts to Promote Walking and Bicycling

There are several local efforts to encourage and support walking and bicycling that help support the goals of the 2040 Metropolitan Transportation Plan:

- In January 2015, 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 Albuquerque's Development Process Manual, improves communication about street projects, and would require the City to consider multi-modal level of service (MMLOS), rather than just conventional vehicle (LOS), when working on larger roadway projects.

Figure 3-40: Coal Ave Before and After Reconstruction

- The City of Albuquerque's Bikeways and Trails Facility Plan (BTFP) is under consideration by City Council for final approval. The proposed BTFP will update and combine the City's two current bikeways and trails plans into one resource. Combining these plans will 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 will reflect 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 will guide future investment in Albuquerque's bikeways and trails system including facility improvements, new facilities, priority connections, maintenance, and education/outreach programs.
- 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 provides recommendations and rationale to improve walking and bicyling in the region's urban core.
- Esperanza Community Bike Shop is a non-retail community bike shop operated by the City of Albuquerque's Parks and Recreation Department. Esperanza is located on West Central Ave in one the region's environmental justice areas. The community bike shop offers a varity of safety and maintenance classes, open shop hours for the general public during which they can fix their bicycles as well as an Earn-a-Bike Program. It is a community hub where a wide variety of people

of all ages go to improve skills related to bicycling. Currently, officers from the Bernalillo County Sheriff's Department and Albuquerque Police Department go to Esperanza to maintain their bicycles, which has provided a surprisingly positive means of law enforcement interacting with the surrouding community.

- The Valle de Oro National Wildlife Refuge, the first such refuge in an urban area in the U.S. southwest, recently received a Federal Land Access Program (FLAP) grant to improve pedestrian and bicycle access to the refuge along 2nd St. The refuge fulfills a goal of President Obama's America's Great Outdoors initiative to reconnect residents across the county to the natural environment. The refuge, once fully open to the public, anticipates in excess of 250,000 visitors per year.
- As part of ABQ the Plan, 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. The 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.
- Downtown Main Street and MRCOG have partnered on a bikeshare pilot project in Downtown Albuquerque and are investigating the feasibilty of a larger, more regional bike share system. Bikeshare is a transit 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 distances and for a brief amount of time. The pilot program is expected to begin operations in May 2015.

3.6 Safety

Nationally, despite lower levels of driving per capita, better vehicles and facilities, and the integration of safety into planning processes, there was a 1.13 percent increase in the fatality rate and a 6.7 percent increase in injury rate per million vehicles of travel from 2011 to 2012.

Regionally, the data trends show mixed results. From 2011 to 2012 the number of crashes in the region decreased by almost 16 percent. Despite this decline in the number of overall crashes, the number of fatal crashes in the AMPA region rose by 42 percent in 2012 compared to 2011. In addition, New Mexico's fatality rate of 1.43 per 100 million vehicle miles traveled in 2012 is still above the national average fatality rate of 1.13 per 100 million vehicle miles traveled.

Overall, there were approximately 84,153 traffic-related crashes in the AMPA that occurred between 2008 and 2012. Of these crashes, 0.27 percent resulted in fatalities, 34.4 percent resulted in injuries and the remaining crashes resulted in property damage only (see Table 3-14).

Table 3-14: Crashes by Type in the AMPA

	2008	2009	2010	2011	2012	Total
Fatal	58	50	53	54	77	**292**
Injury	4,277	4,646	5,127	5,545	4,355	**23,950**
Property Damage	10,523	11,041	12,551	13,610	12,186	**59,911**
Total	**14,858**	**15,737**	**17,731**	**19,209**	**16,618**	**84,153**

According to the Centers for Disease Control and Prevention, traffic crashes are the leading cause of unintentional death in the United States for the age group 4 through 34. The safety of a transportation system also significantly impacts how accessible services are to the transportation system user. Transportation safety is therefore a critical public health issue and continues to be highlighted as a key planning emphasis area in federal transportation legislation.

In a Nutshell…

Takeaways: The Albuquerque metro area suffers from disproportionately high crash rates, although some progress has been made in recent years. Safety is a MAP-21-designated national goal area, and addressing high risk locations and the causes of crashes is critical in providing a transportation system that meets the needs of all users.

Components: This section explores crash data for the region for all modes, providing crash rates and other statistics, and highlighting key areas where safety issues need to be addressed (see Maps 3-27 through 3-30). Current legislation and planning efforts are described, including Complete Streets ordinances, conducting road safety audits, and pursuing a pedestrian safety action plan for the region. An analysis of potential crash rates between the Trend and the Preferred Scenarios is also included.

Goals and Objectives: The MTP goals of *Mobility* and *Active Places* are supported by improving multimodal options and by supporting health, safe and convenient travel options.

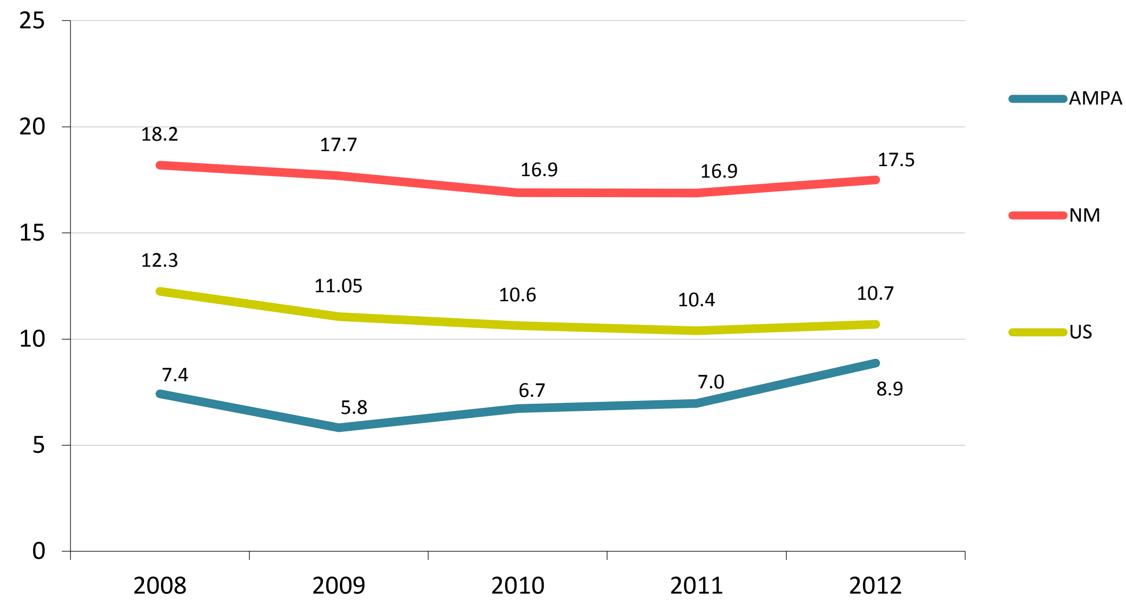
Federal legislation requires that the planning process include consideration of the safety of the transportation system for motorized and non-motorized users. The latest federal transportation legislation, MAP-21, identifies safety as a national goal area and requires states to set targets to improve safety. If targets are not met then funding allocation can change. This legislation also increases the amount of funds for the Highway Safety Improvement Program (HSIP) and requires expanded data collection and analysis as well as more stakeholders to be involved in the fund allocation process. Even though in recent years there have been traffic-related safety improvements, the overall fatality crash rates have increased in the AMPA, New Mexico and United States (see Figure 3-41). Clearly there is still much work to be done in reducing crash-related fatalities in the region.

The primary focus of safety planning includes the analysis of crash data to identify effective strategies for reducing crashes. However, safety planning may also include education and enforcement strategies, the use of ITS technology, and exploring how roadway design can improve safety for users of all ages and abilities.

Motor vehicle crashes and fatalities increased in 2012 after six consecutive years of declining fatalities on our nation's highways. The nation lost 33,561 people in crashes on roadways during 2012, compared to 32,479 in 2011. The increase in crashes, and the resulting fatalities and injuries, can be seen across many crash characteristics—vehicle type, alcohol impairment, location of crash, etc.—and does not seem to be associated with any one particular issue. In fact, crashes associated with some traditional risk factors, fell in 2012. For example, young drivers involved in fatal crashes continued to decline, as they have since 2005. Despite the general downward trend in overall fatalities in recent years, pedestrian and motorcycle fatalities have shown an upward trend. This was again the case in 2012, as motorcycle and pedestrian fatalities increased by 7 and 6 percent, respectively.

NHTSA Traffic Safety Facts – 2012 Motor Vehicle Crashes: Overview

Figure 3-41: Fatal Crash Rates per 100,000 Population: AMPA, New Mexico, and US, 2008-2012



3.6.1 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 include lack of adequate facilities for the more vulnerable non-motorized modes, roadway design that encourages speed, and sight issues.

Crash rates were calculated on thoroughfare intersections in the AMPA for the period of 2008 to 2012 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. See Maps 3-27 through 3-30.

MRMPO provides an annual report on crash data called *General Crash Data Report and Trends* in which crash data received from the University of New Mexico Geospatial and Populations Studies department are analyzed to assess trends that may be unique to the AMPA. This annual report categorizes crashes by severity, cause, crash type, age, alcohol involvement, pedestrian, bicycle, and truck involvement and provides intersection crash rates. For example, similar to national trends, the number one reported cause for crashes is “driver inattention,” followed by “failure to yield” and “following too close.” This report helps MRMPO and its regional partners identify problem areas and trends that need further investigation (this report is available on MRCOG’s website at www.mrcog-nm.gov). The following are some important findings:

- The intersections with the highest crash rates are primarily concentrated along Coors Blvd, Paseo del Norte and Central Ave
- Areas with the highest crash rates for bicyclists and pedestrians are around the UNM campus, Downtown Albuquerque, and the area in the Northeast Heights along Lomas Blvd
- Intersections that are both in the top ten for crash rates and fatal/injury crash rates include Paseo del Norte and Coors Blvd, 7 Bar Loop Rd and Coors Blvd, Central Ave and Unser Blvd and Central Ave and Coors Blvd
- One intersection, Central Ave and San Mateo Blvd, is included in the top fifteen for both pedestrian and bicycle involved crashes

Key Findings for Motor Vehicle Involved Crashes in the Region

- There were 84,153 police-reported vehicle crashes between 2008 and 2012
- On average, a traffic accident occurred every 31 minutes, a person was injured nearly every couple of hours and killed every six days
- The motor vehicle fatality rate per 100,000 population increased by nearly 20 percent from 2008 to 2012
- Crashes were highest in the afternoon on weekdays but were more evenly distributed throughout the day on the weekends
- Fatal crashes were the highest in the early to mid-afternoon on the weekdays and late night to early morning on the weekends
- Alcohol-involved crashes accounted for only 4.5 percent of all crashes, but 44 percent of all fatal crashes
- The proportion of male drivers in fatal crashes was nearly twice as high as the proportion of female drivers
- Persons 20 to 24 years-old were involved in more fatal crashes than any other age group

Pedestrian Crash Data

A particularly alarming statistic for the AMPA is that of all fatal crashes, 27 percent involved a pedestrian. Overall, pedestrian and bicycle crashes occur most frequently along Central Ave and Montgomery Blvd. In the AMPA, the percentage of fatal crashes involving pedestrians increased by 50 percent since 2011, while the percentage of fatal crashes involving a bicyclist increased by 2.7 percent since 2011.

Key Findings for Pedestrian Involved Crashes in the AMPA, 2008-2012:

- On average, a pedestrian was involved in a traffic accident every two days, injured every 2.2 days, and killed every month
- Nearly 58 percent of pedestrian fatalities occurred on Friday, Saturday or Sunday and between the hours of 9 p.m. to 12 p.m.
- Alcohol, either on the part of the driver or pedestrian, was a major factor in approximately 70 percent of pedestrian fatalities
- Twenty-five percent of pedestrian fatalities were attributed to pedestrian error
- Nearly 70 percent of pedestrians killed were male
- Pedestrians age 70 and over accounted for 10 percent of all pedestrian fatalities
- Male drivers were involved in 63 percent of pedestrian fatalities
- Drivers 20 to 24 had the highest percentage of pedestrian fatality involvement
- Sixty-nine percent of pedestrian fatalities occurred during the dark

Crash information is an important factor in assessing pedestrian transportation safety. Nationally, pedestrian fatalities comprise on average about 12 percent of all motor vehicle crash deaths. Although New Mexico's share of pedestrian fatalities of 12 percent has been close to the national average, the pedestrian fatality rate per 100,000 residents is still one of the highest in the nation (see Figure 3-42).

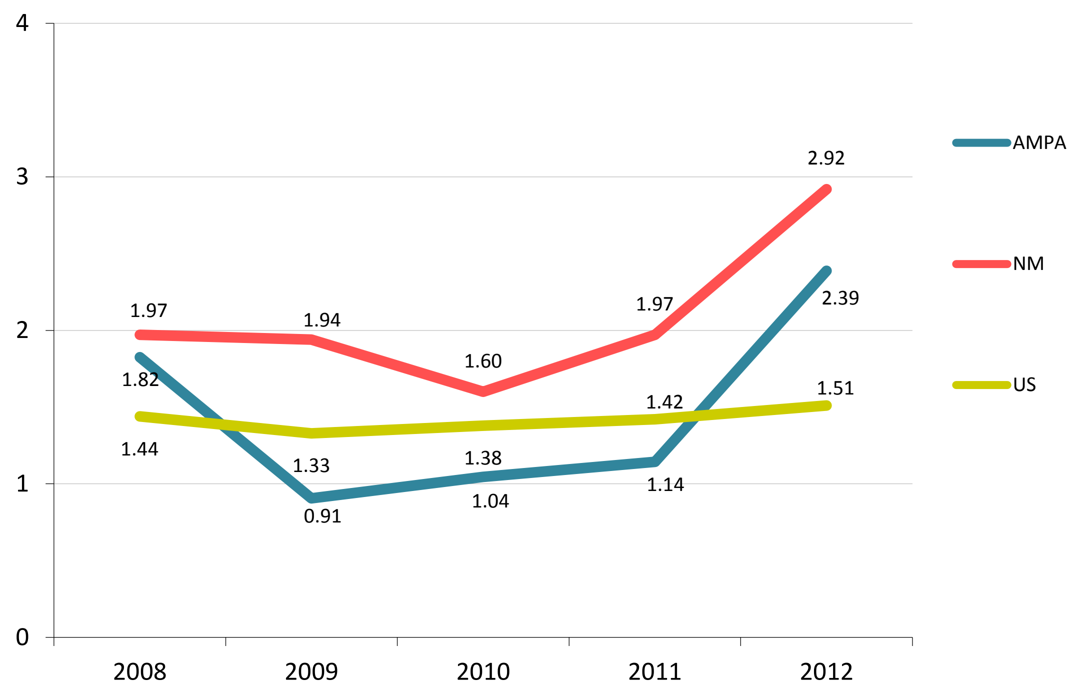
Table 3-15: AMPA Pedestrian Crash Data by Severity

	2008	2009	2010	2011	2012	Total
Fatal	14	8	11	10	21	**64**
Injury	151	139	180	196	171	**837**
Property Damage	28	20	22	16	35	**121**
Total	**193**	**167**	**213**	**222**	**227**	**1,022**

One simple strategy is to slow the speed of automobile traffic in certain locations or along roadways with high pedestrian activity. A study involving pedestrian fatality rates by vehicle speed concluded that for a pedestrian and motor-vehicle involved crash there is an 85 percent chance that the impact will be fatal to the pedestrian if the speed is 40 miles per hour (MPH) or above. By contrast, there is only a five percent chance of a pedestrian fatality if the speed is at 20 MPH and below and a 45 percent chance if the speed is between 20 and 30 MPH.

In the AMPA, a total of 64 fatal and 837 injury crashes involving pedestrians occurred between 2008 and 2012 (see Table 3-15). Collisions involving pedestrians accounted for one percent of all crashes, but they accounted for 22 percent of fatal crashes.

Figure 3-42: Pedestrian Fatality Rates per 100,000 Population: AMPA, New Mexico, and US, 2008-2012



Bicycle Crash Data

Nationally, bicycle fatalities comprise on average about 1.8 percent of all motor vehicle crash deaths in recent years. Although the proportion of bicycle fatalities in New Mexico was below the national average at 1.3 percent, the bicycle fatality rate per 100,000 residents has exceeded the national bicycle fatality rate in the past three years (see Figure 3-43).

Key Findings for Bicycle Involved Crashes in the AMPA, 2008-2102:

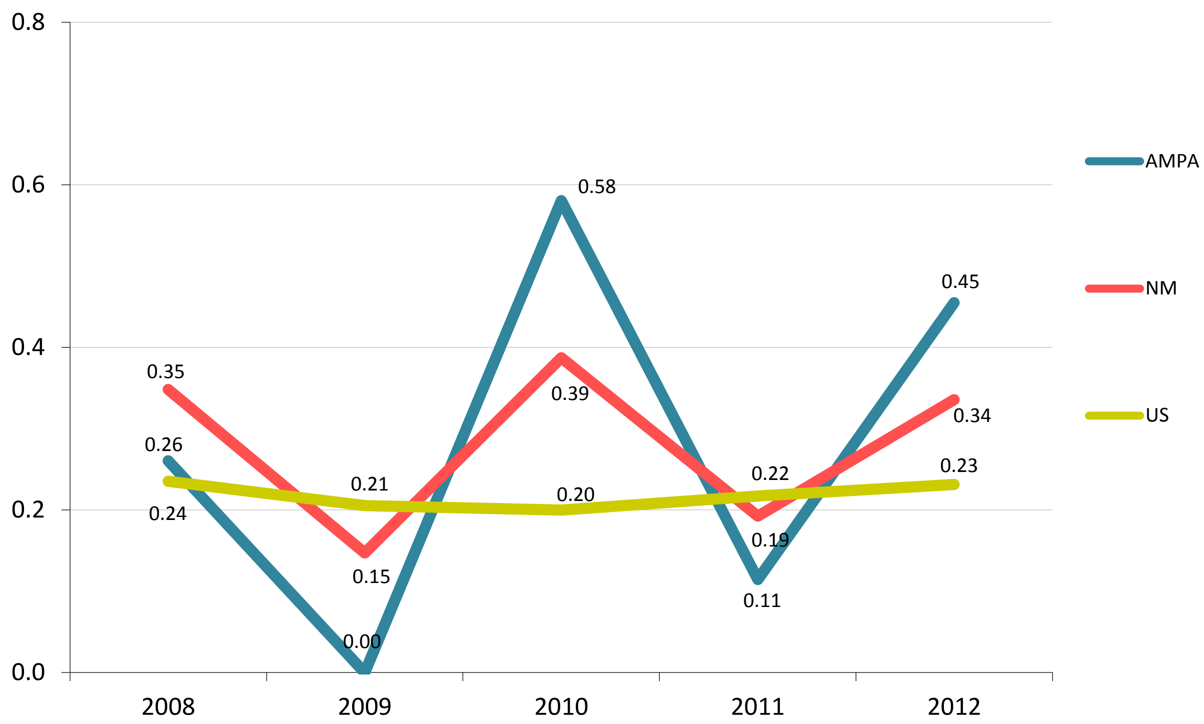
- Twenty-five percent of all fatal crashes involving bicyclists occurred during the dark
- Nearly a quarter of all motor vehicle fatalities and injuries involving bicycles occurred between the hours of 3 through 5 PM
- Alcohol was a major contributing factor in nearly seven percent of all motor vehicle fatalities and injuries involving bicycles
- Nearly 65 percent of cyclists killed or injured were male
- Sixteen percent of cyclists killed or injured in traffic accidents were under the age of 16
- Drivers 20-24 had the highest percentage of involvement in cyclist fatalities and injuries

In the AMPA (2008-2012), there were 958 motor vehicle collisions involving bicycles. Those collisions resulted in 715 injury and 12 fatal crashes (see Figure 3-43). Collisions involving bicycles accounted for one percent of all crashes but accounted for four percent of fatal crashes. In 2012 bicycle-related fatalities increased 42 percent from 2008. This figure constitutes a greater percentage of total motor vehicle crash deaths than at the state or national level.

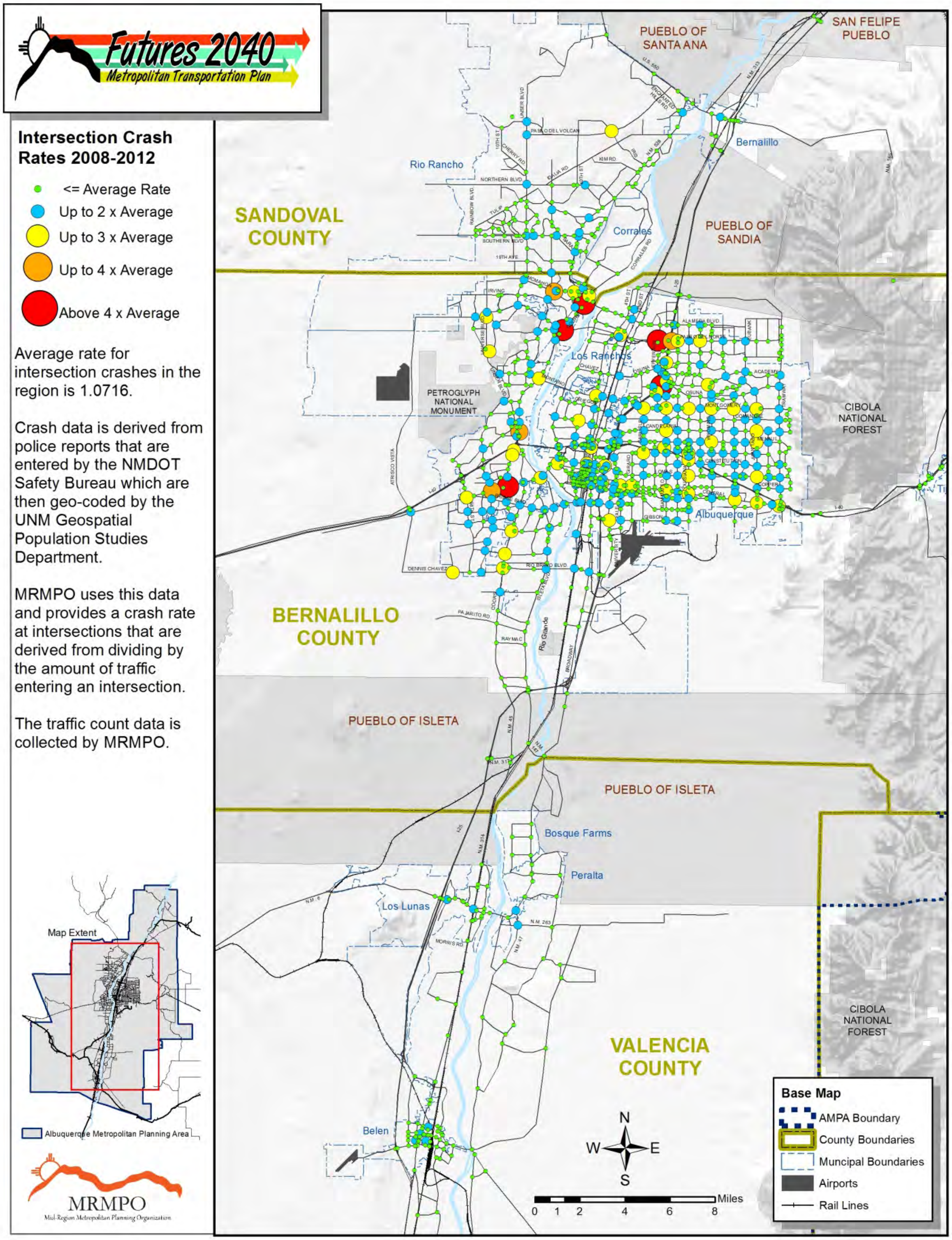
Table 3-16: Bicycle Fatality Rates per 100,000 Population

	2008	2009	2010	2011	2012	Total
Fatal	2	0	5	1	4	**12**
Injury	144	141	146	146	138	**715**
Property Damage	43	48	44	40	56	**231**
Total	**189**	**189**	**195**	**187**	**198**	**958**

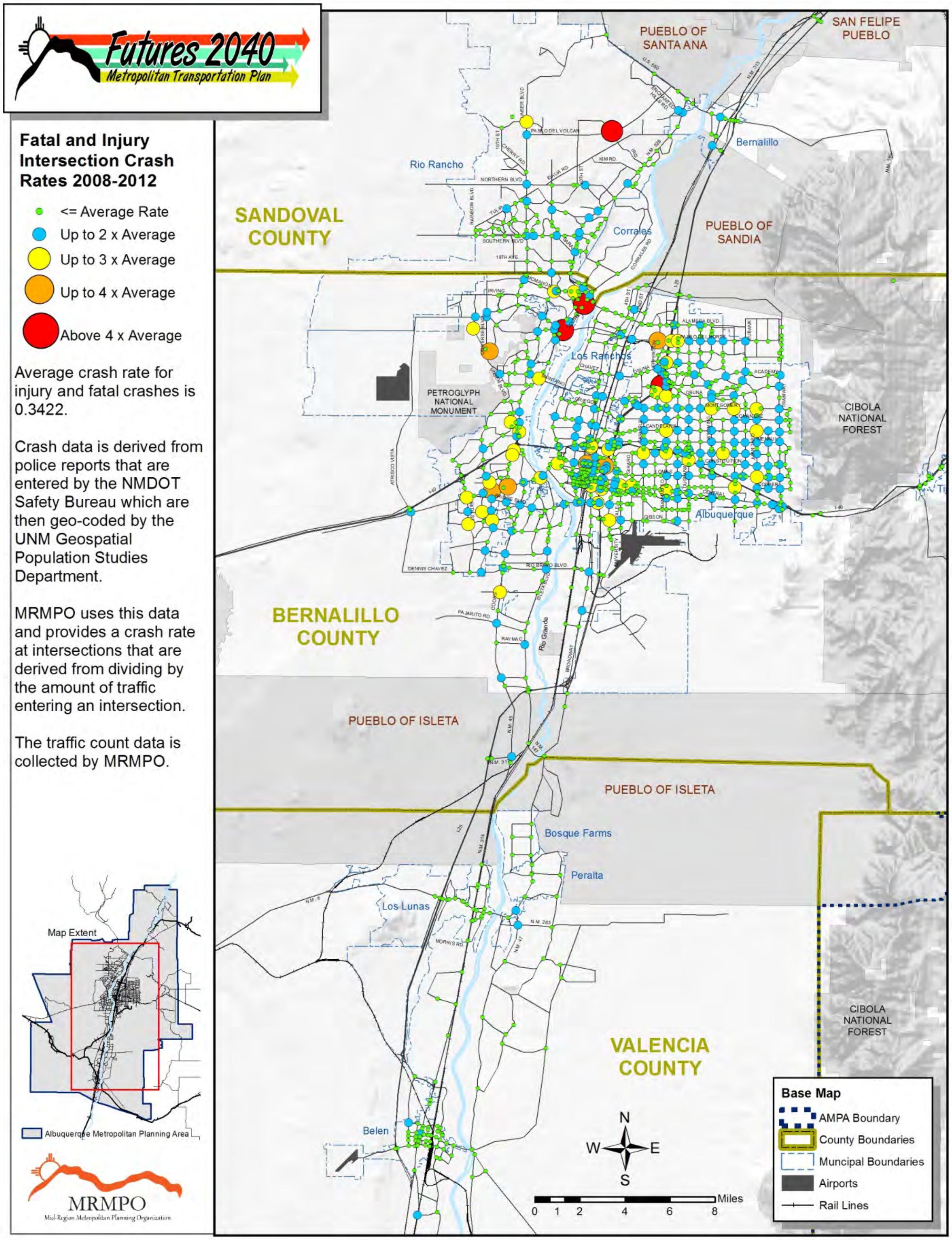
Figure 3-43: Bicycle Fatality Rates per 100,000 Population: AMPA, New Mexico, and US, 2008-2012



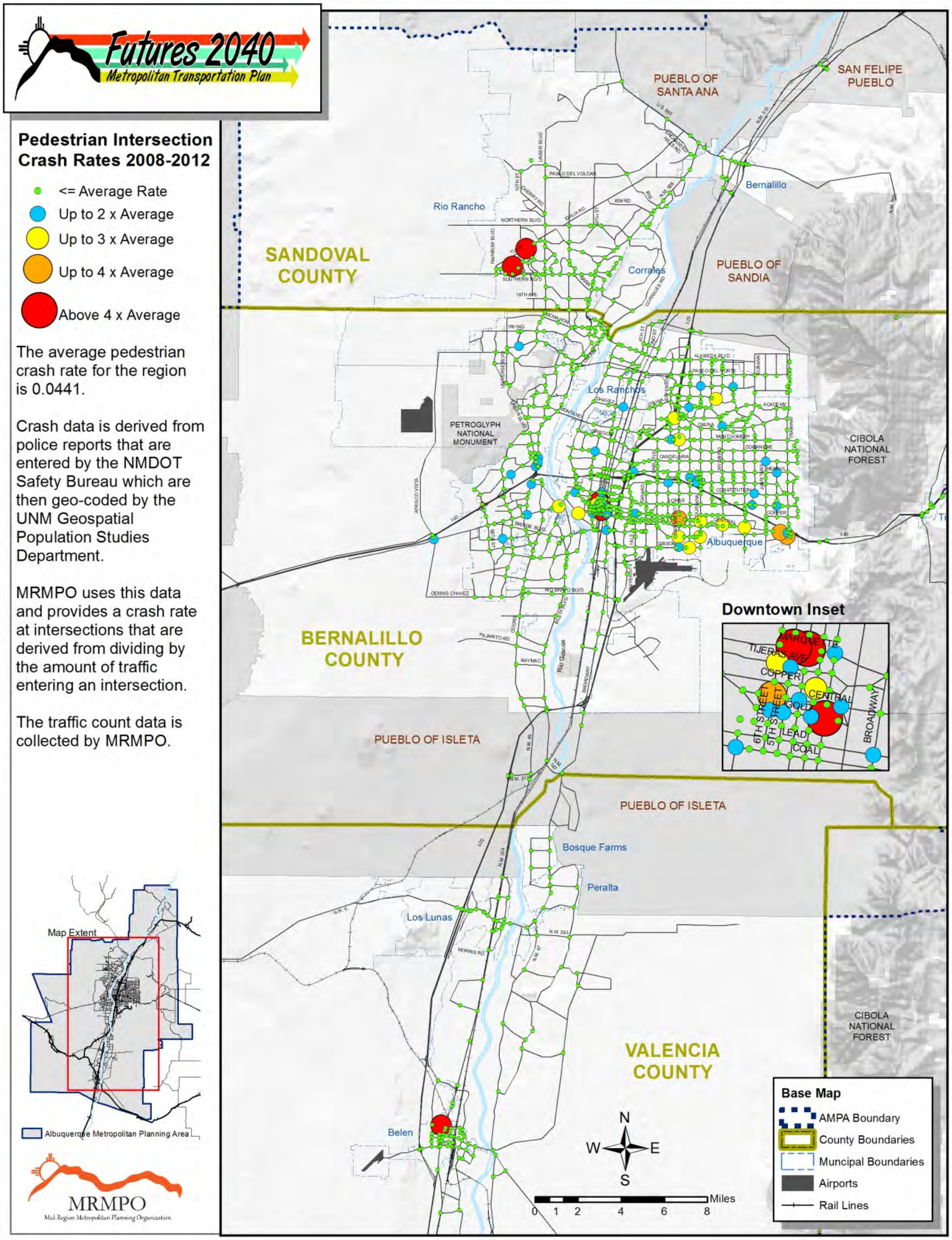
Map 3-27: Crash Rates by Intersection, 2008-2012



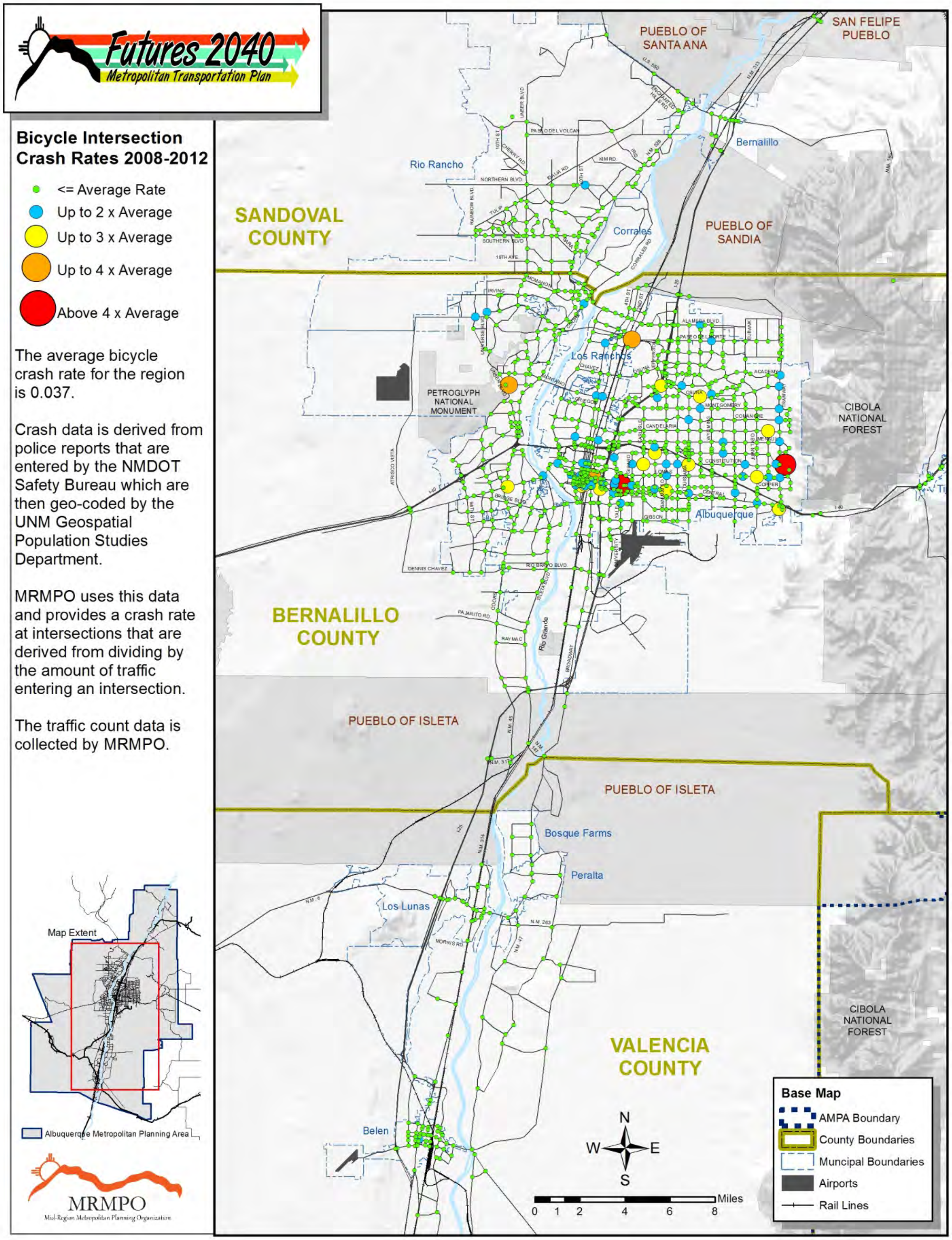
Map 3-28: Injury and Fatality Crash Rates by Intersection, 2008-2012



Map 3-29: Pedestrian Crash Rates by Intersection, 2008-2012



Map 3-30: Bicycle Crash Rates by Intersection, 2008-2012



3.6.2 Safety Issues and Trends

Alcohol Involvement

The involvement of alcohol in crashes is a challenge that continues to afflict the region. According to the National Highway Traffic Safety Administration's Fatality Analysis Reporting System (FARS) database, alcohol-impaired fatalities accounted for 31 percent of all traffic deaths in 2012 nationwide. Following are some alcohol/drug related crash statistics for the AMPA in 2012:

- 4.7 percent of all crashes involved alcohol/drug
- 50 percent of fatal crashes involved alcohol/drug
- Alcohol-involved fatal crashes occurred more often on Saturday and Sunday (43 percent of fatal crashes involving alcohol) and during the last hours of the evening through the early-morning hours
- During the week alcohol-involved crashes occurred most often during late afternoon through the early hours of the morning
- The highest percentage of alcohol-related crashes involved 20-24 year-old drivers (most of whom are male)

Youth Safety – National

Youth traffic safety is increasingly an important issue for the region and nation. Data from the National Highway Traffic Safety Administration provides the following information on young drivers from a national perspective:

- In 2012, there were 1,875 young drivers (15 to 20 years old) who died in motor vehicle crashes, a decrease of six percent from 1,993 in 2011
- 184,000 young drivers were injured in motor vehicle crashes in 2012, an increase of two percent from 180,000 in 2011
- The two-year comparison of total driver involvement in fatal crashes showed a three percent increase from 43,840 in 2011 to 45,337 in 2012. During this same period, young driver involvement decreased two percent from 4,362 in 2011 to 4,283 in 2012
- Motor vehicle crashes are the leading cause of death for all 15-to 20-year-olds, according to the most recent data available (2009) from the National Center for Health Statistics
- Young drivers accounted for six percent (12.6 million) of the total, a 0.8-percent increase from the 12.5 million young drivers in 2002. Population for this age group increased from 2003 to 2012 – by 3.8 percent

Youth Safety – Regional

2012 Recent Trends in the AMPA:

- Drivers 20-24 years old had the second highest rate of involvement in fatal crashes than any other age groups

- The proportion of 20-24 years old male drivers in fatal crashes was nearly four times as high as the proportion of female drivers in the same age group
- Drivers 20-24 years old had the highest rate of involvement in pedestrian-related crashes
- Drivers 20-24 years old had the highest rate of involvement in bike-related crashes
- Drivers 20-24 years old had the highest rate of involvement in drug/alcohol-related crashes

3.6.3 Safety Planning

Safety challenges in the AMPA include, but are not limited to, addressing major intersections and corridors that have high crash rates, alcohol-involved crashes, crashes where young drivers are involved, and the high occurrence of fatal and injury pedestrian crashes. In order to address these issues, driver behavior and roadway design need to be investigated. Improving safety for the most vulnerable users, such as pedestrians and bicyclists, will provide a safer transportation system for all modes of transportation and increase mobility options for all users.

When addressing transportation safety issues in the AMPA, there are federal, state, and regional plans and guidance to consider. The Federal Highway Administration has identified “4Es” for making roads safer: engineering, education, enforcement, and emergency medical services. The FHWA also further stresses the importance of developing data-driven systemic approaches and technologies to analyze safety issues and considering safety needs early-on and throughout the project development process.

Improving safety throughout the region not only saves lives and reduces injuries, but also helps mitigate both the direct and indirect costs of crashes including property damage, emergency services, medical bills and loss of time at work. In 2010, the Centers for Disease Control and Prevention (CDC) estimated the cost of medical care and productivity losses was over $99 billion dollars for motor vehicle-related injuries and $41 billion for crash-related deaths in a year. Improving safety can also help reduce congestion; according to a study done by AAA in 2008, 40 to 50 percent of all non-recurring congestion may be associated with traffic incidents.

Integration with Project Prioritization Process

MRMPO has integrated safety in its short-range planning process through its identification as a key factor in the Project Prioritization Process used for evaluating and selecting TIP projects for funding and implementation. Projects that are proposed at intersections with high crash rates or along corridors with high pedestrian crashes receive points in the Project Prioritization Process (the more points a project receives the more likely it is to be selected to receive federal funding. Projects are awarded additional points if the project’s primary purpose is to address safety or if a project implements safety strategies. Currently, there are projects in the TIP that specifically address safety issues. These projects address a variety of safety needs such as street lighting, crosswalk markings, roundabouts, median barriers, railroad crossing improvements, and signal timing.

NMDOT Comprehensive Transportation Safety Plan

The NMDOT's *Comprehensive Transportation Safety Plan* (CTSP), a federally-required effort to reduce traffic crashes, presents 12 emphasis areas and 94 strategies. For the years following 2010, the goal of the CTSP is to continue to reduce fatalities proportional to the American Association of Highway Transportation Officials (AASHTO) goal of an annual reduction of 1,000 fatalities nationally, or 2.3 percent per year. This type of reduction would result in 218 fewer fatalities by the year 2025 in New Mexico. The efforts to address safety as a result of the CTSP have made a significant contribution to achieving this goal. Unfortunately, even though considerable progress has been made in reducing the number of deaths and serious injuries on the roads in New Mexico, the fatality rate continues to remain above the national average.

Intelligent Transportation Systems

Using ITS technology to increase knowledge of roadway conditions for the users (such as real time traffic delay information) has proven to reduce travel delays and increase safety on the roadway. In addition, managed lanes and facilities dedicated to high occupancy vehicles or truck traffic can be effective in mitigating congestion, increasing traffic safety, and encouraging increased carpooling and transit use. Additional ITS applications that can help improve safety include incident detection and quick response times from emergency and safety crews, dissemination of real-time incident information to motorists, and minimizing construction zone periods.

Policy and Regulations

A state law passed in 2014 that restricts cell phone use so that drivers are prohibited from sending or viewing text messages while driving. There has also been discussion at the state level about requiring seniors to renew their licenses more frequently, including taking a test of physical reaction time. For younger drivers discussion has begun on extending permit duration and increasing penalties for any kind of cell phone use while driving.

Educational Initiatives

MRMPO has undertaken educational initiatives over the years including multi-modal level of service presentations, road safety audits, and webinars about safe street design. This type of initiative plays a critical role in ensuring that people, especially engineers and planners, have access to the latest information and design regulations. Education is needed particularly in relation to how to design better for pedestrians, reduce alcohol involved crashes, and reduce distracted driving for youth drivers.

Safety Action Plan

The creation of a regional safety plan and/or task force would support the development of a prioritization process for spending Highway Safety Improvement Program (HSIP) funds and other safety-related funding sources in the AMPA. A safety task force could also review best practices and respond to new federal and state legislation and funding opportunities that become available.

An AMPA safety plan would continue to support crash data collection and analysis, but would also encourage collaboration among stakeholders such as law enforcement agencies, health institutions, schools, and engineering departments. This process could help establish and strengthen working relationships, identify safety programs and coordinate activities that already exist in the region, and ascertain if data improvements are needed.

Comprehensive safety planning requires training on effective safety measures, involvement in regional incident management plans, and education for decision makers and the public. Safety measures should include human factors research, safe street design, and the use of technology to effectively reduce crashes. Some of these issues are expanded upon below.

Multimodal Travel and Complete Streets

Improving the connectivity and design of the transportation system, across and between modes, through intersections and railroad crossings, is integral to maintaining a safe transportation system. Promoting the development of street patterns and designs that support pedestrian and bicycle comfort, convenience, and safety and providing route options for drivers—particularly for travel to public transit stops, schools, colleges, universities, jobs, stores, parks and other destinations—is key to a safe roadway system.

Walking can be an important part of someone's route to work or school. Yet, as road traffic increases so do the hazards confronting pedestrians. Identifying and alleviating these hazards reduces pedestrian injuries and fatalities and encourages more people to walk, ultimately improving the health and well-being of the region's communities.

Bicycling also provides an active, environmentally-friendly mode of travel. As with motor vehicle travel, without proper education on the rules of the road for both bicyclists and drivers there is an increased risk of death and injury. Expanding education and safety training and programs for safe cycling skills is fundamental.

As a large portion of the population continues to age, and the younger generation continues to demand better public transportation, the need for safer access to transit will increase. Improving the safety and convenience of park and ride lots, pedestrian facilities and bicycle infrastructure are an important part of improving access to transit stops. Specific steps taken by transit providers and operators in the region to address safety include the development of an emergency preparedness plan, raising awareness about highway and rail at-grade crossings, and tracking incidents.

An effective way to introduce design changes is to begin with pilot projects that include "before and after" studies that focus on safety improvements, such as installing roundabouts instead of signalized intersections, or implementing road diets (the removal of traffic lanes often for the purpose of improving safety and adding other amenities such as wider sidewalks, bike lanes and/or center turning lanes). Conducting "before and after" studies will show the benefits of these types of road design changes to the transportation system.

According to the summary report, *Evaluation for Lane Reduction Road Diet Measures on Crashes* (2010) by the Federal Highway Administration, a road diet application can provide a 29 percent reduction in crashes. There are many studies that provide guidelines on when and where road diets are best applied.

Implementing Complete Streets principles as part of local policy and design standards is one example of how the region can support the development of multi-modal facilities that are safe for all users. Complete streets can be required with new infrastructure and also when redevelopment or pavement resurfacing projects occur. Designing streets with a safety first approach by emphasizing elements such as appropriate speeds, sight distances, and curve radii is essential. A Complete Streets ordinance was passed by the Albuquerque City Council in January 2015.

Long Range Transportation Systems Guide

MRMPO has produced a Long Range Transportation System Guide to provide direction on appropriate roadway design given the surrounding context. LRTS incorporates guidance from several national best practices guidance documents including Designing Walkable Urban Thoroughfares: A Context Sensitive Approach (Institute of Transportation Engineers, 2010). The ITE's recommended practice document provides guidance on the planning and design of major urban thoroughfares for walkable communities based on context sensitive solutions (CSS). CSS is essentially a different way to approach the planning and design of transportation projects that balance the competing needs of many stakeholders by offering flexibility in the application of design controls, guidelines and standards to design a facility that is safe for all users regardless of the mode of their travel. LRTS is a resource that provides potential countermeasure techniques that may be adopted to address any adverse safety effects in the upcoming years. Recommendations are grounded in the latest research of best practices, but are adapted to the AMPA's unique context.

Road Safety Audits and an Example from West Central Ave

With assistance from the Federal Highway Administration, MRCOG and member agencies performed a road safety audit (RSA) in March 2013 on West Central Avenue. The difference between a traditional safety review and road safety audit are provided in Table 3-17. The reason this assessment was done is because the FHWA has identified Albuquerque as a "Pedestrian Safety Focus City" based on pedestrian fatality rates that are well above the national average. In an effort to reverse this trend, FHWA provides free training and technical assistance. MRCOG and member agencies identified the West Central Avenue corridor between Coors Boulevard and Sunset Drive as a good candidate for a road safety audit. The process and results are worth mentioning here because duplicating the road safety audit practices learned on Central Avenue on other corridors and intersections is an important part of improving safety in the region.

Table 3-17: Comparing Road Safety Audits and Traditional Safety Reviews

Road Safety Audit	Traditional Safety Review
Performed by a team independent of the project	The safety review team is usually not completely independent of the design team.
Performed by a multi-disciplinary team	Typically performed by a team with only design and/or safety expertise.
Considers all potential road users	Often concentrates on motorized traffic.
Accounting for road user capabilities and limitations is an essential element of an RSA	Safety Reviews do not normally consider human factor issues.
Always generates a formal RSA report	Often does not generate a formal report.
A formal response report is an essential element of an RSA	Often does not generate a formal response report.

The Road Safety Audit team included participants from NMDOT, Bernalillo County, Albuquerque Police Department, City of Albuquerque, Parks and Recreation, and bicycle and health advocates. The recommendations were identified through thorough crash data analysis and field observations. The final recommendations were for all road users.

Following is a list of safety issues identified along the corridor:

- Midblock crossings
- Pedestrian crossings at intersections (with particular focus on intersections at Coors Blvd and at Atrisco Dr)
- Bicyclist infrastructure and bicyclists riding against traffic (with particular infrastructure focus on intersections at Coors Blvd and at Atrisco Dr, Yucca Dr and Old Coors Rd and the missing bicycle lanes on the segment of Central Ave between Atrisco Dr and Sunset Rd)
- Transit stop locations and transit rider crossings
- Access management
- Accessibility
- Lighting/visibility

Following is a list of improvements and countermeasures recommended along the corridor:

- Undertaking education and enforcement initiatives targeting pedestrians (including transit users), bicyclists, and motorists
- Increasing and prioritizing the number of marked crossings
- Providing median refuges at marked and unmarked crosswalks
- Improving and/or extending bicycle facilities and bicycle signage
- Optimizing signal phasing for all users
- Redesigning intersections to reduce corner radii
- Modifying bus stop locations
- Improving sidewalk landing areas at corners, installing or realigning accessible ramps, relocating traffic signal push buttons, and removing sidewalk obstructions to improve accessibility
- Conducting an access management study
- Increasing lighting throughout the corridor
- Installing median fencing to discourage midblock crossings at select locations

An excerpt from the West Central Ave Road Safety Audit Report:

The portion of West Central Ave studied had 35 reported crashes involving pedestrians or bicyclists over the four year period between 2008 and 2011, with 19 of the crashes involving pedestrians and 16 involving bicyclists. Crash data indicate that 27 of the 35 (77 percent) crashes resulted in injury. Mid-block crossing – particularly in the vicinity of Coors Blvd and Central Ave, in which pedestrians crossed at locations away from intersections and without a marked crosswalk – were identified as a contributing factor in a majority of pedestrian crashes. Of the 19 pedestrian crashes between 2008 and 2011, 14 involved midblock crossings. Based on reported crashes and observations, there appears to be a correlation between mid-block crossings, pedestrian crashes and the location of transit stops.

Bicycling against traffic also was identified as a contributing factor for bicycle crashes. Nearly half of the bicycle crash (43 percent) involved the cyclist riding against traffic. This was particularly valuable information since a review of crash reports was needed to identify these types of crashes. There were a couple of general factors that would not have been discovered without the review of crash reports: many of the pedestrian crashes involve transit riders and many of bicycle crashes involve cyclists riding against traffic.

3.6.4 Scenario Analysis of Crash Rates

Crashes can be considered as discrete events that take place in the roadway network. As part of its scenario analysis, MRMPO attempted to forecast changes of total and severe crashes rates for the different growth scenarios. Crash rates were forecasted based on projected land use characteristics. Data analysis subzones (DASZs) were used as the units of analysis to make the modeling effort as consistent as possible with other MTP forecasts.

For both total and severe crashes, the total number of signalized intersections, population count, and employment types (basic, retail, and service) were found to be positively associated, meaning that as the number of each goes up, so do crash rates (per DASZ). By contrast, the number of single family dwelling units was negatively associated with total and severe crashes, meaning that increased rates of single family dwelling units are associated with lower crash rates (per DASZ).

When considering the percent increase of crashes over the planning horizon, the Trend Scenario was found to be safer for both total and severe crash types. According to the various models, the total number of crashes in the Trend Scenario may increase by 26 to 44 percent by 2040, while the number of crashes in the Preferred Scenario may increase from 27 to 60 percent. These findings are consistent with the greater increase in multi-family housing and concentrated employment in the Preferred Scenario than the Trend.

Figure 3-44: Percent Increase in Crashes by Type for Trend and Preferred Scenarios by Modeling Approach[41]

Total Crashes	Trend	Preferred
Negative Binomial Model	37%	45%
Spatial Bayesian Model	26%	27%
Non-spatial Bayesian Model	44%	60%

Severe Crashes	Trend	Preferred
Negative Binomial Model	34%	42%
Spatial Bayesian Model	21%	23%
Non-spatial Bayesian Model	35%	48%

To further investigate the impacts on crash rates in the future scenarios, analysis was also conducted on a county-specific level. The forecasts for Bernalillo County were similar to the overall safety forecast. This is not surprising since the majority of crashes in the region occur in Bernalillo County. However, conditions in the Preferred Scenario are safer in Sandoval County for both total and severe crashes. Although severe crashes in Sandoval County did not increase at the same rate as the total regional crash rate, the County still experienced considerably higher percentages of severe crashes compared to neighboring Bernalillo County.

[41] Since the comparisons are performed based on five-year intervals, the percent increases reflect the change from the average number of crashes for 2006-2010 to the average crashes for 2036-2040.

Figure 3-45: Percent Increase in Crashes by Type for 2040 in Bernalillo and Sandoval Counties using the Spatial Bayesian Model

Total Crashes	Trend	Preferred
Bernalillo County	22%	25%
Sandoval County	54%	46%

Severe Crashes	Trend	Preferred
Bernalillo County	18%	21%
Sandoval County	41%	35%

Safety Countermeasures

The results indicate that for both the Trend and Preferred Scenarios the safety of traffic deteriorates for the forecasted years. However, the Preferred Scenario seems to cause the worse conditions of the two. While analysis of crashes reflects "one slice of the pie," it is important to have a system-wide perspective of these scenarios and how they would interact with the transportation network. Some of the inherent properties in the Preferred Scenario include mixed land uses, a range of housing products and living closer to work, higher transit usage, emphasizing development in major activity centers and transit nodes, and creating compact and walkable centers. To accommodate these land use changes and to encourage individual behaviors to be directed in the above mentioned ways, a compatible transportation network must be developed. In other words, the transportation network must meet the needs of a more urban environment and a range of transportation users (i.e., not just motorists). However, the 2040 transportation network does not include the design changes that would be required to complement the Preferred Scenario. Therefore these findings must be considered proactively when implementing the principles of the Preferred Scenario in the region.

Lee et al. (2013) reported that walkable neighborhood-scale planning and design interventions that seek to improve walkability can unintentionally increase overall exposure to traffic hazards. They highlight the micro-scale designs (e.g., better pedestrian crossings) and speed regulations at activity centers, which may often be hot spots for crashes, as countermeasures needed to complement neighborhood-level planning strategies. The result would be improved walkability and pedestrian safety simultaneously. Dumbaugh and Li (2011) found that pedestrian-scale retail usage is associated with significant reductions in crashes involving multiple vehicles, parked cars, fixed objects, and pedestrians. They attribute lower speeds, which is common in pedestrian-oriented retail areas, to this reduction. An important finding from their study was that the majority of driver error in urban environments does not appear to be random; rather, the characteristics of the built environment plays a significant role in producing the error, generally worsening safety conditions and increasing the propensity of crashes.

To summarize, it would be unrealistic and inappropriate to rank scenarios solely based on future crash propensity, although the crash analyses provide important findings and reflect the need to proactively plan for a transportation system that offsets safety risks. Ultimately, all the components of a Metropolitan Transportation Plan should complement each other to ensure an enhanced, safe, and accommodating multi-modal transportation network. Implementing the Preferred Scenario is therefore about more than achieving the right land use mixes; it is also about providing safe transportation infrastructure and making the right investments in the right locations.

3.7 Transportation and Security

Going beyond safety, transportation security includes preparations and plans to prevent, manage, and respond to potential regional threats that would require an emergency response. Federal regulations require that the MTP includes a transportation security element that incorporates emergency relief disaster plans as well as strategies and policies that support homeland security and safeguard the personal security of all motorized and non-motorized users. Although special attention needs to be paid specifically to transportation security concerns, it is overwhelmingly the case that measures to improve the general performance of the regional transportation system, such as those stated in the *2040 MTP* goals and objectives, are complementary if not exactly the same as those needed to improve the performance of the region during an emergency situation. For example, 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 *2040 MTP* goals and objectives.

Several stakeholders at the state and federal levels are involved in transportation security issues. The New Mexico Federal Executive Board serves as the hub for coordination between federal agencies, improving continuity of government operations and providing timely and accurate information during an emergency. The New Mexico Department of Homeland Security and Emergency Management (DHSEM) leads the state in preparing for, preventing, responding to, and recovering from emergency events that may occur, regardless of cause. The DHSEM maintains the state's emergency operations plan, which focuses on emergency situations in the case that local communities need state or federal assistance. MRMPO coordinates as appropriate with other state departments concerned with various aspects of transportation security including the New Mexico Department of Health and the New Mexico Energy, Minerals and Natural Resources Department.

Other local stakeholders focus on issues of security and emergency response. The Environmental Protection Agency requires that Local Emergency Management Committees develop an emergency response plan and track the storage and transport of hazardous chemicals for designated local emergency planning districts. In New Mexico, each

In a Nutshell…

Takeaways: Transportation security planning is the product of coordination between local, state, and federal agencies. The key to security planning is allowing for adaptive responses to ensure the resiliency of the transportation system during emergency events.

Components: This section explains regional security concerns, how transportation plays a role in emergency situations, and how aspects of the transportation system can be improved for resiliency and better performance during an emergency. The improvements named in this section can create a more resilient and adaptive transportation system during an emergency, be it caused by nature, technical failure, human accident, or intention.

Goals and Objectives: Strategies to improve the transportation system performance in an emergency situation support the *2040 MTP* goals of *Mobility* by maintaining existing infrastructure and expanding transportation options and *Economic Vitality* by supporting freight and the movement of goods.

county is an emergency planning district with its own Local Emergency Planning Committee (LEPC). The Office of Emergency Management (OEM) also maintains a local emergency operations plan. MRMPO coordinates with these respective agencies as appropriate.

3.7.1 Regional Security Concerns and the Transportation System

All emergency operations plans in the region, whether at the municipal, county, or state level, follow an all-hazards approach to emergency preparedness, meaning that preparations are made for all types of threats be they caused by nature, technical failure, human accident, or human intention. Hazards commonly identified in existing plans as well as recent correspondence with stakeholders include:

- Natural events such as drought, wildfire, flooding, high winds, or severe winter weather
- Release of hazardous material
- Nuclear incident
- Utility outage
- Energy or fuel shortage
- Pipeline accident
- Disease outbreak
- Terrorist attack
- Civil disturbance/mass gathering with imminent threats of violence

The transportation system has a unique connection to the threat posed by the possible release of hazardous material. In most aspects of security in the region, the transportation system serves to alleviate harm caused by an emergency event (discussed in the next section). However, hazardous material is also transported through the region daily. In effect this makes certain parts of the transportation network, namely routes for transporting hazardous material, potential threats to the region. In order to address this issue, the recent Bernalillo County Hazardous Materials Flow Commodity Study details how and where hazardous materials are being transported and stored in the county as well as emergency preparedness recommendations.

Transportation System Performance in Emergency Operations

The region's transportation system would play a central role in responding to a security incident or natural disaster in the area. In an emergency situation a well-functioning transportation system is needed for transporting responders and resources, accessing affected areas and critical services such as hospitals and shelters, serving as evacuation routes, and transporting debris to disposal sites. Moreover, in such an emergency event it is likely that the typical functioning of the transportation system would be altered in some way. The transportation system could be affected directly and indirectly. Critical components of the region's transportation infrastructure could be 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 situation could create atypical transportation patterns that overwhelm the carrying capacity of critical roadways or otherwise compromise the functionality of the transportation system.

One important role the transportation system may play in an emergency situation is in the movement or evacuation of large numbers of people from affected parts of the region. In the case that large populations would need to be evacuated outside 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 used for primary evacuation routes. State and local plans also 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, which would involve local transportation agencies gathering residents into specific sites, from where they would depart to outside the region. The state's All-Hazards Emergency Operations Plan estimates that the metro area could be evacuated in a 48-hour timeframe.

There are many local stakeholders who are concerned about the lack of alternative routes within and leading out of the region, as well as the limited access points to these routes. It would be an exceedingly rare and extreme event that would require a full evacuation of the region, and the ability to address this issue is limited by the region's topography. During an emergency event it is more plausible that an evacuation would be required only for specific areas of the region. Improving the ability to respond to these kinds of situations is most easily addressed through the design and layout of internal roadways rather than roadways leading out of the region. While an emergency situation might require moving residents away from affected areas, it will also require the movement of responders and resources to affected areas. Stakeholders are concerned that the layout of road networks in certain neighborhoods in the region makes them more vulnerable. In these neighborhoods, too few roadways and lack of connectivity provide insufficient points of access should there be a need for large numbers of vehicles to simultaneously enter and exit communities. This setup could exacerbate transportation challenges during an emergency.

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 2012, 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.[42] 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.

[42] Burcham and Associates, "State of New Mexico Energy Assurance Plan," Prepared for the State of New Mexico, Energy and Minerals Department, 2012, p 63

Improving Transportation System Performance for Security

Because different types of incidents would 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, keeping with an all-hazards approach, focus primarily on establishing a framework for coordinating responsibilities among various departments and agencies as well as how to assemble and mobilize responders. Plans focusing on these more organizational elements of an emergency response allow for more flexibility and adaptability to unknown and changing circumstances.

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.

- Increasing connectivity: 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 alternative routes for evacuations.
- Promoting alternative fuels: 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.
- Promoting alternative modes of transportation: 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.[43] 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.
- Promoting a mix of land uses and complete neighborhoods: 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.

[43] Dornan, D. L., Maier P.M. "Incorporating security into the transportation planning process." *NCHRP report 525: Volume 3*, 2005

- Maintaining a state of good repair: 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.
- Increasing Intelligent Transportation Systems and traveler information services: ITS can be used to collect and analyze real-time roadway conditions during an emergency. Traveler information services are important for ensuring communication with the traveling public about roadway conditions and alternative routes that may be utilized.

3.7.2 Emergency Operations and Preparedness Planning Opportunities

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 the 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 can be requested. The State Emergency Operations Plan calls on the New Mexico Department of Transportation to be a supporting agency. While MRMPO is not named specifically in these plans, the data and tools available through MRMPO could be valuable resources in emergency preparedness planning.

Additional security planning efforts in the region could involve the following:

- A transportation security working group or committee comprised of local and state stakeholders to review transportation security issues of regional concern.
- Use of existing modeling tools to study roadway performance under security scenarios. For example, the MRMPO travel demand model could be utilized to assess the impacts and consequences if critical pieces of the transportation system are altered, such as a closed bridge crossing. Studies such as this might show more specifically the detriments and benefits of certain network characteristics, such as connectivity and redundancy.
- Implement greater infrastructure for alternative fuels. Some early efforts are taking place around the region, including PNM’s installation of a growing number of electric vehicle charging stations. Similarly, the Land of Enchantment Clean Cities (New Mexico) Coalition is a government-industry partnership sponsored by the U.S. Department of Energy’s Vehicle Technologies Program that supports expanded use of alternative fuels and technologies.

3.8 Public Health

Accommodating active modes of transportation is a crucial ingredient for a healthy community. A sedentary lifestyle has been consistently cited as a major contributing factor for obesity and related diseases such as heart disease and high blood pressure. It has been estimated that obesity and its related health problems rival tobacco use in negative health impacts.[44] While there is substantial evidence that sedentary lifestyles negatively impact mental and physical health, it is now a widely accepted fact that physical activity positively affects health. 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.[45] [46] Since a majority of trips happen within walking or cycling distance from the 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.

Moreover, there is a growing understanding of the connection between the use of active transportation modes and positive health outcomes. 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.[47] Figure 3-46 shows the inverse relationship between the percentage of workers who commute by biking or walking and the percentage of people diagnosed with diabetes. There are other benefits when applying physical activity to transportation; in particular, switching from driving to more active modes can measurably reduce emissions and improve air quality.[48]

In a Nutshell…

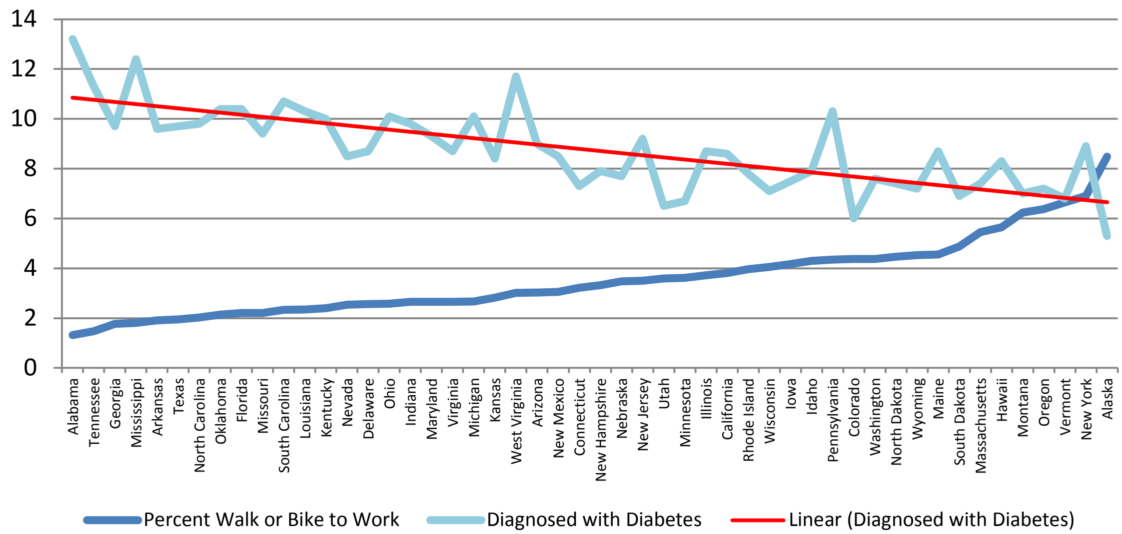
Takeaways: Active transportation systems and roadway connectivity can help address regional health issues related to physical inactivity. The *2040 MTP* encourages agencies to take a more "holistic" approach by including health in the transportation planning processes.

Components: This section explains how local and national health challenges are related to transportation planning, investigates transit access to hospitals in the region, and names future strategies for collaborating with the field of public health.

Goals and Objectives: The consideration of public health in transportation planning and the strategies appropriate for improving health outcomes through active transportation are consistent with the *2040 MTP* goal of promoting *Active Places*.

[44] Simcoe Muskoka District Health Unit, "The Impact of the Built Environment on the Health of the Population: A Review of the Review Literature," 2007
[45] Killingsworth, R., De Nazelle, A., & Bell, "Building a new paradigm, improving public health through transportation," *Ite Journal-Institute of Transportation Engineers*
[46] Dill, J., "Bicycling for Transportation and Health: The Role of Infrastructure." *Journal of Public Health Policy*, 2009
[47] 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
[48] Litman, T., "Transportation and Public Health." *Annual Review of Public Health*, 2013

Figure 3-46: Percentage of People Diagnosed with Diabetes and Percentage of Workers who Bicycle or Walk to Work by State[49]



An active transportation system is more than sidewalks, bike lanes, and transit services; it is also affected 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.[50]

It is important to note that the collaboration between public health and planning professionals is nothing new. In fact, the fields have shared beginnings. In the early 20th century, the emerging field of planning sought to address public health through land use zoning to separate harmful uses from residential uses. But the two fields diverged later in the century as the planning field's primary purpose became less about protecting health and more about other issues such as economic development, urban design and revitalization, and transportation. Yet the fields of planning and public health are coming back together, increasingly converging to address significant public health challenges related to the built environment, as the connection between the built environment and health are becoming better understood and documented through research and studies.

Today, transportation planners find themselves as part of a wider community of health promoters and are responding by increasingly incorporating public health more thoroughly into planning processes. MRMPO 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 not merely connected to pressing

[49] CDC BRFSS, 2011

[50] Marshall, W. E., Piatkowski, D. P., & Garrick, N.W., "Community design, street networks, and public health." *Journal of Transport & Health*, 2014

health concerns, but that transportation planning will be a key strategy in addressing these concerns in their totality.

Thus MRMPO encourages 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 urban design decisions required to make such active modes of transportation more attractive. Recognizing the role of transportation in addressing health challenges in the region, the *Futures 2040 MTP* includes as one of its four goals (see Chapter 1) the promotion of active places, which are places where active transportation options, such as walking, bicycling and taking transit, are accessible, viable and attractive choices.

3.8.1 Local Public Health Challenges

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.[51] 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.[52] 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.[53] 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."[54]

The *Futures 2040 MTP* builds on public health issues raised in past MTPs. As part of the scenario planning process, regional challenges were identified through an extensive outreach process that also included a focus group formed specifically of public health professionals to gather their opinions on challenges faced in the region. Among the challenges identified through the outreach process which relate to health, the following were named and are grouped by common theme:

- <u>Multi-modal safety improvements</u>: improve streets so that they are safe and convenient for walking, bicycling and public transit; the need for healthy alternatives to automobile travel; more transit options and multi-modal access; poor and unsafe bicycle networks/sidewalks; lack of sidewalks and gaps in walking paths; street crossing issues
- <u>Improved access to health facilities</u> ensure adequate transportation options to medical facilities, particularly for seniors and for those in rural areas

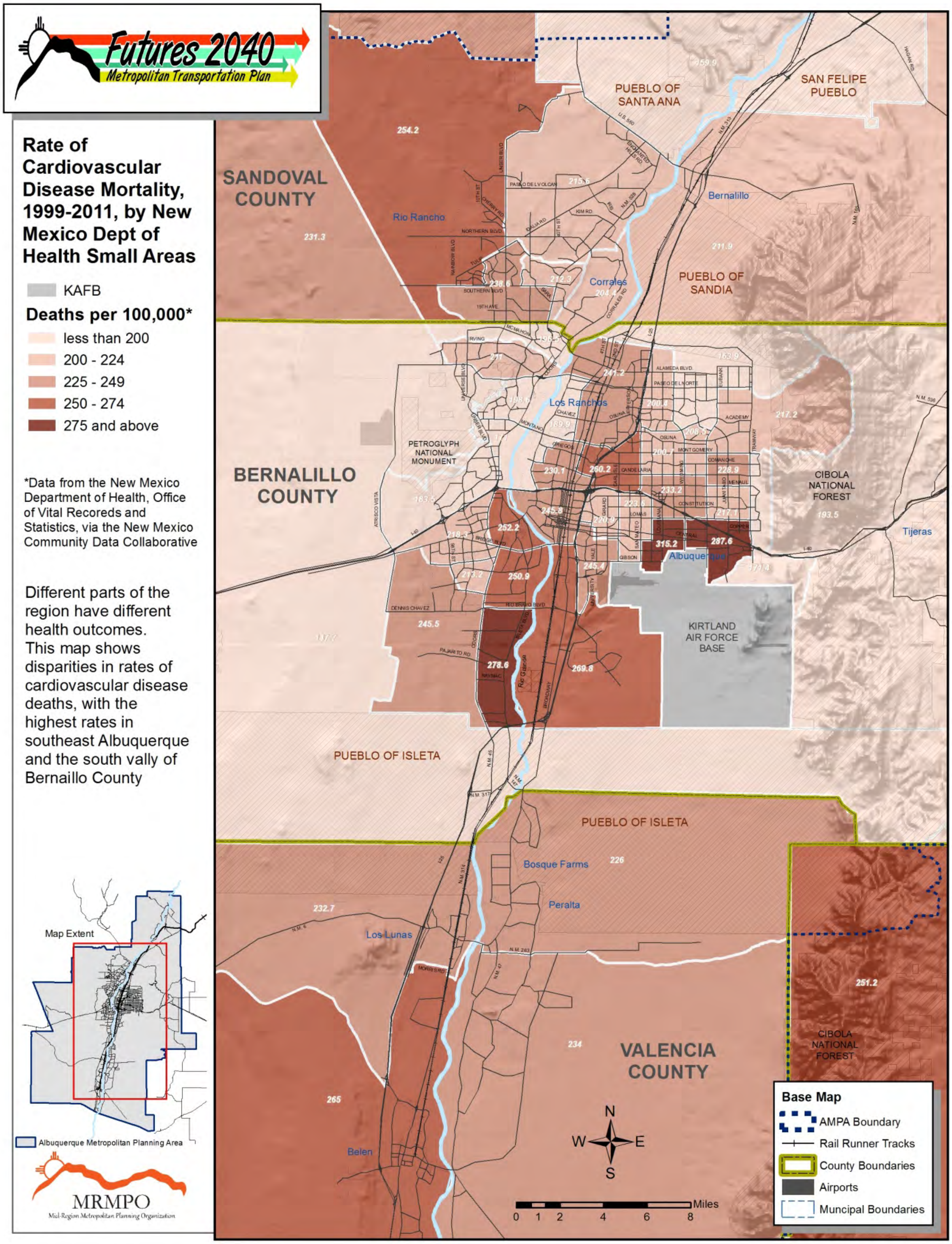
[51] Finkelstein, E. A., Fiebelkorn, I. C., Wang G. "National medical spending attributable to overweight and obesity: how much, and who's paying?" *Health Affairs Web Exclusive*. 2003
[52] New Mexico Department of Health, Chronic Disease Prevention and Control Bureau, "Complete indicator profile of obesity: adult prevalence," 2013
[53] New Mexico Department of Health, Public Relations, "Exercise shouldn't be a chore." *Healthy Living,* 2014
[54] New Mexico Department of Health, Public Relations. "Half of New Mexico adults meeting aerobic exercise guidelines," *Healthy Living.* 2014

- Aging population livability and issues: address the transportation challenges of an aging population

Another health-related challenge that was raised through public outreach efforts was the issue of health inequity in the AMPA. The CDC defines health inequity as "a difference or disparity in health outcomes that is systematic, avoidable, and unjust."[55] Health disparities are often analyzed by categories of race, ethnicity, and income, and health inequities clearly exist by these groupings in the region (for more on how MRMPO and the region address transportation-related disparities for low-income and minority populations, see the Environmental Justice section of this document in Chapter 3.10). 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. When mapped, data from the New Mexico Department of Health Bureau of Vital Records shows clear disparities in the geographic distribution of the mortality from chronic diseases such as cardiovascular disease (see Map 3-31). While there are many factors at play, this gives some idea of which communities might be most impacted by improving active transportation options. MRMPO is set to further investigate the issues of health disparities in the region by partnering with Presbyterian Health Care Services and the Bernalillo County Community Health Council in the Centers for Disease Control's Racial and Ethnic Approaches to Community Health (REACH) initiative, which will address risk factors of poor nutrition, physical inactivity, and prevention, access to health care, and disease management related to chronic disease.

[55] 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

Map 3-31: Distribution of Cardiovascular Disease Mortality in the AMPA, 1999-2011



3.8.2 Accessibility to Health-Related Sites and Facilities

An important intersection between public health and transportation planning is the issue of accessibility of locations and services that are critical for maintaining health. As previously mentioned, the challenge of reaching medical appointments and clinics was raised as an issue by the public, especially for those living in rural areas and for those who are transit-dependent.

In order to investigate this issue further MRMPO analyzed accessibility to health services by mapping transit travel time contours from term hospitals in the region. Short-term hospitals are those where patients receive short-term care for acute illness or injury, or recovery from surgery. All of these facilities provide Medicare services. Socio-demographic information was also incorporated to analyze access for those more likely to need transit service: seniors (over age 65), families in poverty, and occupied housing units without a car. MRMPO conducted this analysis by using its Transportation Accessibility Model (TRAM). For more on the TRAM methodology see section 3.13 on Livable Communities. An important consideration is that this analysis assumes all the mapped hospitals are available to the transit user. This needs to be considered when viewing the results because many in the region have limited hospital choices depending on their health care provider. Despite this limitation, the analysis gives a reasonable view of general accessibility patterns in the region.

The TRAM analysis shows that the best transit access to hospitals in the region is on Albuquerque's Eastside, particularly along and in between the Central Avenue and Montgomery Blvd corridors, as well as areas near northern I-25 (see Map 3-32). Areas near the Bernalillo and Sandoval County line have the best access on the Westside, and to a lesser degree areas along Coors Blvd north of I-40. In Valencia County, the best access is found in the City of Belen.

Using socio-demographic data to gather travel contour statistics allows for comparison of access between certain segments of the population and the region as a whole. The graph seen in Figure 3-47 shows that there is little difference in transit access to hospitals for residents who are over 65 compared to the total population in the AMPA. However, a higher percentage of families in poverty live within the transit contours compared to total families in the region. Likewise, the contour statistics show that occupied housing units with no vehicle or only one vehicle have better access than total occupied housing units in the region, meaning that populations most likely to depend on public transit are better served in terms of access to medical facilities. These findings are consistent with studies showing relatively good access to transit among seniors and low-income residents in the AMPA (see the section on Transit User Characteristics in Chapter 3.4).

Map 3-32: Transit Access to Short-Term Hospitals

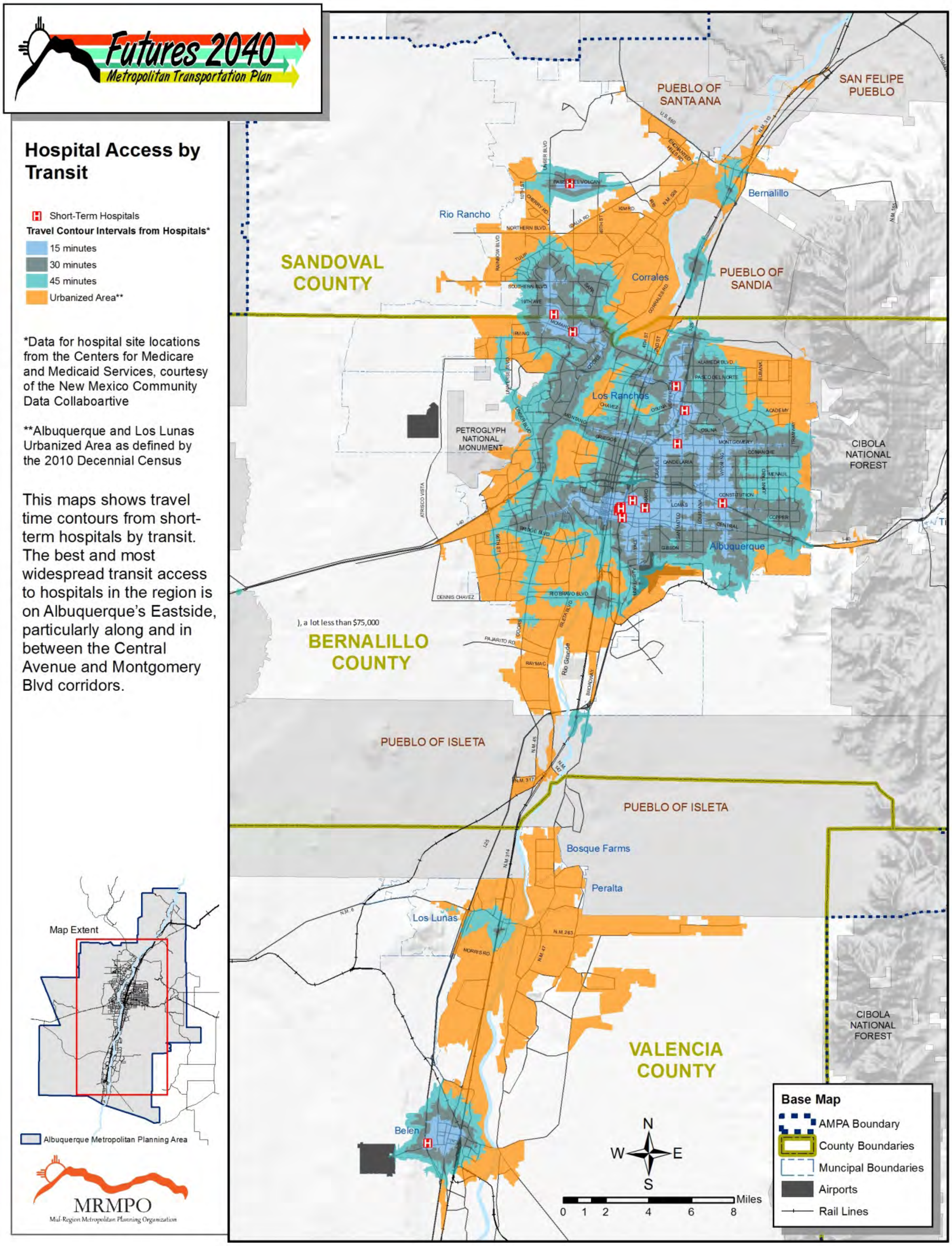
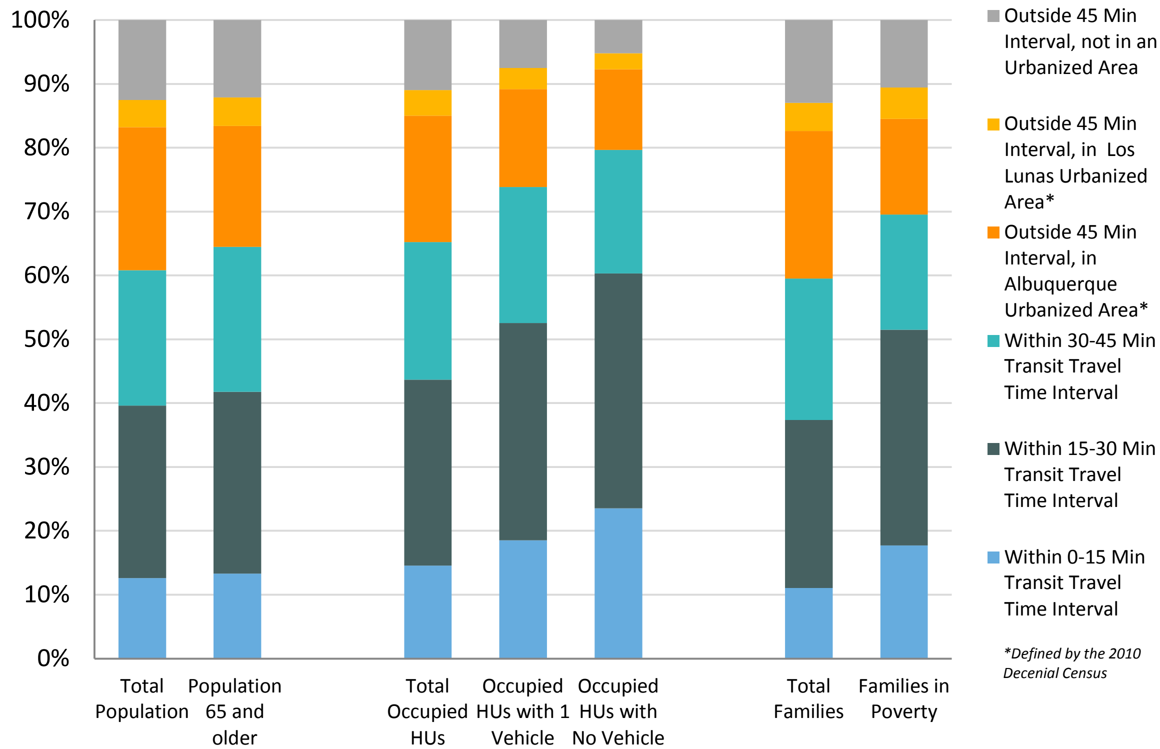


Figure 3-47: Transit Access to Short-Term Hospitals[56] (2012 ACS 5-Year Estimates)



In this first iteration of analysis, the accessibility is presented for informational purposes only, and to provide an example of how regional transportation analysis can contribute to public health studies in the future. Going forward, this research may help to inform decisions in the region regarding topics such as transit service improvements, hospital site selection, and senior care facility site selection, among others. Access can be further studied by mapping other kinds of health services such as clinics or sites that offer specific procedures. TRAM analysis may also be used in the future to analyze access to other critical resources to health, such as access to grocery stores and access to recreational opportunities like parks and trails, as well as access to schools since walking and bicycling to school are healthy behaviors to promote in light of childhood obesity rates. MRMPO may eventually use these accessibility considerations to influence the types of projects which are selected to receive funding through the Transportation Improvement Program's Project Prioritization Process or they may be integrated into the planning process through other mechanisms.

[56] Socio-demographic data from American Community Survey, 2008-2012 5-Year Estimate.

3.8.3 Strategies to Improve Public Health Outcomes through Transportation Planning

The *Futures 2040 MTP* establishes the connection between transportation conditions and health outcomes and identifies analytical tools to make more this connection more evident. Further integrating health considerations into regional planning will require a range of efforts, including: building coalitions with local public health professionals; collaboration between planning agencies and health organizations when funding opportunities become available from either field; improved technical analysis; and engaging and educating community members about issues related to public health and transportation.

Fortunately, a range of efforts are taking place across the Albuquerque metropolitan area that do take a more holistic approach to transportation planning. Following are a collection of ongoing efforts and potential strategies to improve public health outcomes through transportation planning.

Recent Public Health-Related Transportation Efforts

- Various Health Impact Assessments (HIAs) have taken place in the region
- Albuquerque's first open streets event, or "CiQlovia," temporarily closed down two miles of city streets to promote issues of bicycling, walking, and public health
- Bernalillo County has been awarded a Community Transformation Grant (CTG) by the Centers for Disease Control. The CTG is designed to help improve health, reduce health disparities, and control health care spending.

Near to Medium-Term Strategies

- Expand bicycle and pedestrian advisory groups and planning efforts to include an additional focus on health, collaboration with health professionals, and integration of health into transportation planning processes and products
- Creation of a regional Travel Demand Management (TDM) program that would focus on TDM activities not covered by other agencies such as ridesharing, support for regional Safe Routes to School efforts, and active transportation-supportive events (e.g., open streets events)
- Siting health clinic locations near transit service and improving public transit service to existing health clinic locations where possible
- Improve transportation options between areas of need and major medical service sites
- Utilize health indicators in transportation project evaluation
- Update school siting policies to include access via active modes of transportation and community-centered school models that are easily accessible to surrounding neighborhoods. When possible, share tools, technical expertise, and existing datasets among public health agencies, advocacy groups, and land use and transportation planners and further collaborate to produce and process relevant datasets of interest to both fields

3.9 Air Quality

Due to rising population and employment in the region, total vehicle miles traveled in the AMPA is expected to increase by 48 percent from 20,335,265 miles per day in the year 2012 to 30,105,932 miles per day by 2040. Such an increase in VMT leads directly to an increase in on-road vehicle emissions. These concerns are amplified by the possibility that ground level ozone concentrations may one day exceed newly proposed 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.

In order for transportation to continue to conform to federal and state air quality policies and standards, it will be important that transportation planning in the region carefully considers these forthcoming air quality concerns. In particular, agencies across the AMPA must consider the modes of transportation used, means of improving efficiency and reducing traffic delays, as well as land use patterns, and how each of these can positively impact air quality. While land use configurations that increase dependence on single-occupancy vehicles pose challenges for maintaining air quality in the region, they can also serve as air quality mitigation strategies. Therefore, transportation investments that complement smart growth strategies have the added benefit of addressing air quality issues and can help avoid non-compliance with national air quality standards, as well as positively impact regional health issues.

Takeaways: Bernalillo County is currently in a limited maintenance period for carbon monoxide. Although the AMPA is not in violation of any other National Ambient Air Quality Standards (NAAQS), the County and parts of the AMPA may fall into nonattainment with ground level ozone standards in the coming years depending on how much the standards are lowered by the EPA. On-road vehicle emissions are sources of both precursors (volatile organic compounds and oxides of nitrogen). Nonattainment status can limit the types of transportation investments that can be made in the region.

Components: This section explains air quality monitoring practices, State Implementation Plans, and the conformity determination process. Current practices related to air quality and the distribution of federal funds are also discussed.

Goals and Objectives: Improving air quality is an objective that supports the MTP goal of *Environmental Resiliency*.

3.9.1 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. In Albuquerque/Bernalillo County, all six criteria pollutants are monitored to ensure compliance with NAAQS. The six criteria pollutants are:

- Ozone (O_3)
- Nitrogen Dioxide (NO_2)
- Carbon Monoxide (CO)
- Particulate Matter ($PM_{2.5}$ & PM_{10})
- Lead (Pb)
- Sulfur Dioxide ($S0_2$)

Since Bernalillo County was found in violation of the carbon monoxide (CO) standard in the early 1990s, no subsequent violations of federal air quality standards for any of the six criteria pollutants regulated by the U.S. Environmental Protection Agency (EPA) have occurred within the AMPA. With respect to CO, the Joint City and County Air Quality Control Board 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 has been a great success. Not only did the area reach attainment but in fact CO levels are now well below the standard.

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 areas must conform to SIPs for air quality and ensure that they will not inhibit progress toward attainment. The decision about whether a transportation plan, program, or federally-funded project meets these criteria rests with the City of Albuquerque Air Quality Program, the MPO, EPA, FHWA and FTA. This decision is referred to as a conformity determination. It 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. This process currently takes place in the AMPA under the carbon monoxide Limited Maintenance Plan.

The 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 need to comply with the transportation conformity process means that if the AMPA and Bernalillo County remain in nonattainment (for CO, for example) after their SIP is in place, federal transportation dollars for general purpose lane additions to the roadway network could be jeopardized. There may also be additional pressure to reduce dependency on auto travel, and additional requirements stated under transportation conformity may be required to reduce mobile source emissions.

Upon the likely scenario that the federal ozone standard is be lowered, air quality agencies in consultation with partner MRMPO will need to develop a revised SIP to achieve needed levels of emissions reduction. Different pollution control measures may require consultation with and concurrence among appropriate levels of government. The New Mexico Department of Transportation, MPOs, air quality agencies, transit agencies, and local governing bodies cannot individually create or implement control measures. Therefore, the SIP will be considered a collaborative process to achieve desired air quality standards. The MTP and the TIP would then have to demonstrate conformity to the ozone SIP.

3.9.2 Pollutants in the Region

Carbon Monoxide

In the past, parts of the metro area exceeded the federal standard for CO. Through a collaborative process various agencies developed transportation control measures (TCMs) to achieve attainment with the carbon monoxide standard under an EPA-mandated maintenance plan. TCMs are specific programs designated to reduce emissions from transportation sources and are included in the approved SIP or maintenance plan. In 1996, Albuquerque and Bernalillo County were designated as a maintenance area. The 20-year interval for Bernalillo County to have this maintenance plan in place began in 1996 and runs through 2016. The initial mandated Maintenance Plan (which covered ten years) then transformed into a ten-year Limited Maintenance Plan which was proposed and accepted by the Air Quality Control Board (AQCB) and ultimately approved by the EPA when Albuquerque/Bernalillo County demonstrated monitored levels of carbon monoxide at less than 85 percent of the relevant NAAQS. Bernalillo County received local and federal approvals for its Limited Maintenance Plan in 2005-2006. Whereas previous conformity determinations relied on modeling, MRMPO must now comply with the Limited Maintenance Plan by demonstrating to the Federal Highway Administration and EPA that carbon monoxide levels remain within the levels called for in the plan (i.e., conformity determination).

Current CO levels are in fact well below allowable thresholds, and MRMPO is not required to conduct any further emissions analysis. The current design value[57] for CO, based on the latest quality-assured data available at this time, is 1.6 parts per million (ppm) for the 8-hour CO NAAQS and 2.4 ppm for the 1-hour CO NAAQS.[58] These values represent 18 percent and seven percent of the relevant standards,

[57] "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.
[58] These design values have been confirmed by the U.S. Environmental Protection Agency, as stated in a letter addressed to the FHWA Division Administrator and dated December 01, 2014

respectively. Therefore, the design value for Albuquerque/Bernalillo County is well below the standard and in accordance with this criterion of the conformity rule. The EPA has confirmed the design values and all indications are that Bernalillo County will not exceed the CO thresholds in the near future.

Upcoming Ozone and Transportation Conformity Issues

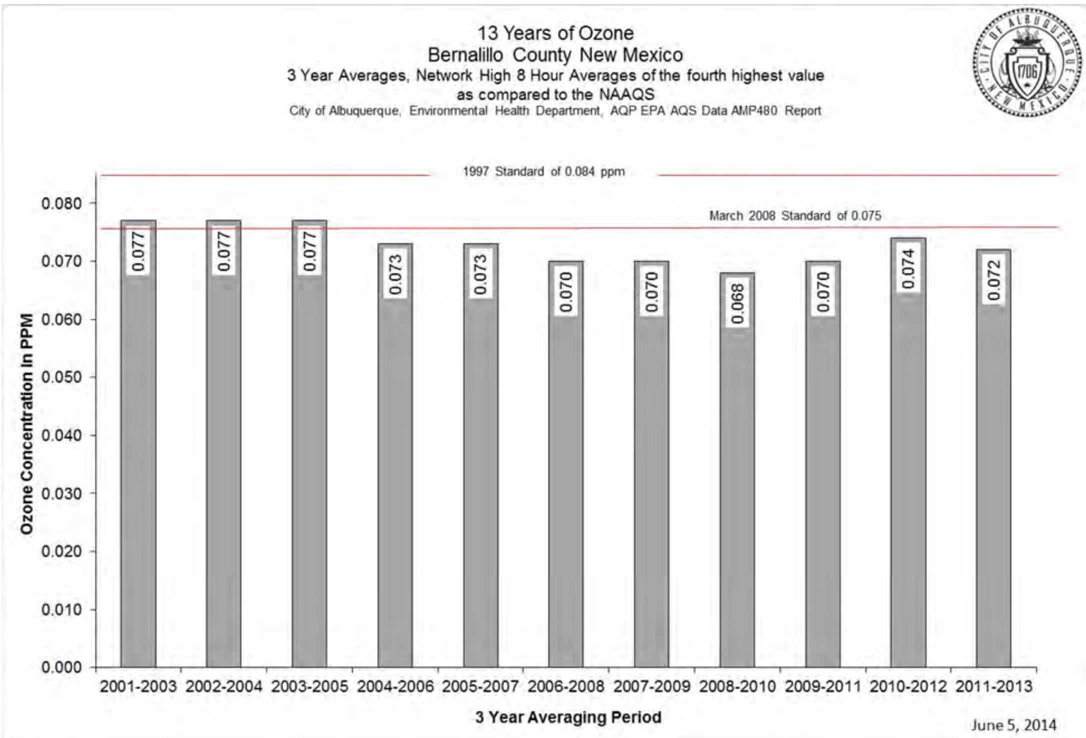
The next concern on the horizon is ground level ozone. Ozone near the Earth's surface is a type of pollutant not directly emitted, but instead produced by a complex chemical reaction between ozone precursors in the presence of sunlight and heat. Principal among the ozone precursors are volatile organic compounds (VOCs) such as raw fuel vapors and oxides of nitrogen (NOx) formed primarily during the combustion of fossil fuels. Therefore, the control of ozone formation is based on regulating emissions of volatile organic compounds and oxides of nitrogen. On-road vehicle emissions are sources of both precursors. 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.

While the area is in attainment at this time, the EPA has proposed that the standard be lowered to a level that is more protective of public health, but that could result in Bernalillo County and other parts of the AMPA exceeding the standard. This would mean a nonattainment area designation, 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 will 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.

The current EPA ozone standard is .075 ppm. On November 25, 2014, the EPA proposed to strengthen the NAAQS for ground-level ozone based on scientific evidence about ozone's effects on human health. The proposed updates will improve public health protection, particularly for children, the elderly, and people of all ages who have lung diseases such as asthma. By court order as a result of litigation, the EPA must finalize the proposed standard by October 1, 2015. Following the establishment of a new standard, data will be collected and verified in order for the EPA to determine by October 1, 2017 whether the region will be designated as in attainment or non-attainment. An initial State Implementation Plan would then be due to EPA by October 1, 2018, with additional elements to the plan due by October of 2020 or 2021. According to the proposed EPA rule, the new standard will be in the range of .065 to .070 parts per million,[59] which may place the area at 100 percent or more of the standard and therefore in nonattainment status. Figure 3-48 demonstrates ozone levels in Bernalillo County compared to the current NAAQS for ozone (it does not show the proposed new standard).

[59] http://www.epa.gov/airquality/ozonepollution/pdfs/20141125proposal.pdf

Figure 3-48: Ozone Levels in Bernalillo County as Compared to the National Ambient Air Quality Standards, 2001-2013



Source: City of Albuquerque, Environmental Health Department, Air Quality Program

3.9.3 Reducing Emissions: Current Strategies in Place

Congestion Mitigation Air Quality Funding

The Congestion Mitigation and Air Quality (CMAQ) program provides funds to regions for transportation projects designed to improve air quality and reduce traffic congestion in areas that do not meet NAAQS or in maintenance areas that have had previous air quality problems. CMAQ was created by transportation legislation in the early 1990s and has been reauthorized over the years to assist in transportation investments that reduce emissions. Because Bernalillo County is still classified as a Limited Maintenance area for CO, the County is eligible to receive CMAQ funding for air quality and congestion enhancements. CMAQ projects reduce motor vehicle emissions in three ways:

1. By encouraging changes in travel behavior that reduce vehicle miles traveled (VMT), such as shifts to ridesharing, transit, bicycling, or walking
2. By improving traffic flow, which reduces vehicle idling and stop-and–start driving conditions that are associated with higher levels of emissions
3. By implementing technologies to reduce the rate of emissions, such as conversion to alternative fuels for buses, or retrofits of diesel vehicles

Projects being implemented must serve as alternatives to added roadway capacity and must mitigate air quality and congestion. Recently implemented projects in the region include new park and ride facilities, bicycle and pedestrian paths/programs, improved public transit and service expansion and traffic signalization improvements.

MRMPO must calculate the impact of transportation projects that receive CMAQ funds. CMAQ analysis involves both “on-model” and “off-model” methodologies using the MRMPO travel demand model, the Environmental Protection Agency’s MOVES air quality model, and MRMPO designed “off-model” calculations. These tools are essential tools for calculating emissions factors for various pollutants, vehicle miles traveled (VMT), and average trip lengths. The analysis also includes evaluation of annual emissions (kg/year) and cost effectiveness (annual value of reduction/kg) for three different types of pollutants: carbon monoxide (CO), nitrogen oxides (NOx), and volatile organic compounds (VOCs).

Project Prioritization Process

The Project Prioritization Process serves as an important tool for evaluating and incentivizing projects that address air quality. The air quality criterion measures the effects individual transportation projects have on the AMPA through the same rigorous model analysis used for CMAQ evaluation. Emissions factors with and without the projects as well as cost-benefit analyses are calculated. The PPP will help improve air quality by prioritizing projects that result in reduced VMT and reduced emissions. Presently, MRMPO and the AMPA are not required to perform project-level air quality analysis. The inclusion of an air quality criterion as a performance measure under the MTP’s environmental resiliency goal recognizes its importance and contribution to regional quality of life. The air quality criterion is therefore a proactive measure that prepares the region for future non-attainment status in ozone or other pollutants.

3.10 Environmental Justice

Environmental justice 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.”[60] In particular, environmental justice addresses how low-income and minority populations are affected by government actions, including transportation decisions made as part of the metropolitan transportation planning process. The *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:

- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority and low-income populations
- Ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
- Prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations

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. 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 decisions 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.

In a Nutshell…

Takeaways: In transportation planning, environmental justice addresses how low-income and minority populations are affected by transportation decisions. MRMPO considers environmental justice primarily through its Project Prioritization Process and analyzing transit accessibility for those populations.

Components: This section discusses how MRMPO incorporates environmental justice considerations in its planning process. Important products include maps showing of environmental justice communities (see page 3-161) around the region as well communities in relation to proposed MTP projects (see page 3-164) in an effort to help assess if investments are being made in an equitable manner.

Goals and Objectives: Environmental justice considerations address the *Mobility* goal and the objective of expand[ing] transportation options by supporting multimodal options in disadvantaged communities.

[60] Environmental Protection Agency, http://www.epa.gov/environmentaljustice/

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 minority populations so that those populations' needs can be identified and addressed and the benefits and burdens of transportation investments can be fairly distributed
- Evaluating and improving MRMPO's public involvement processes where necessary to eliminate participation barriers and to engage minority and low-income populations in transportation decision-making

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.

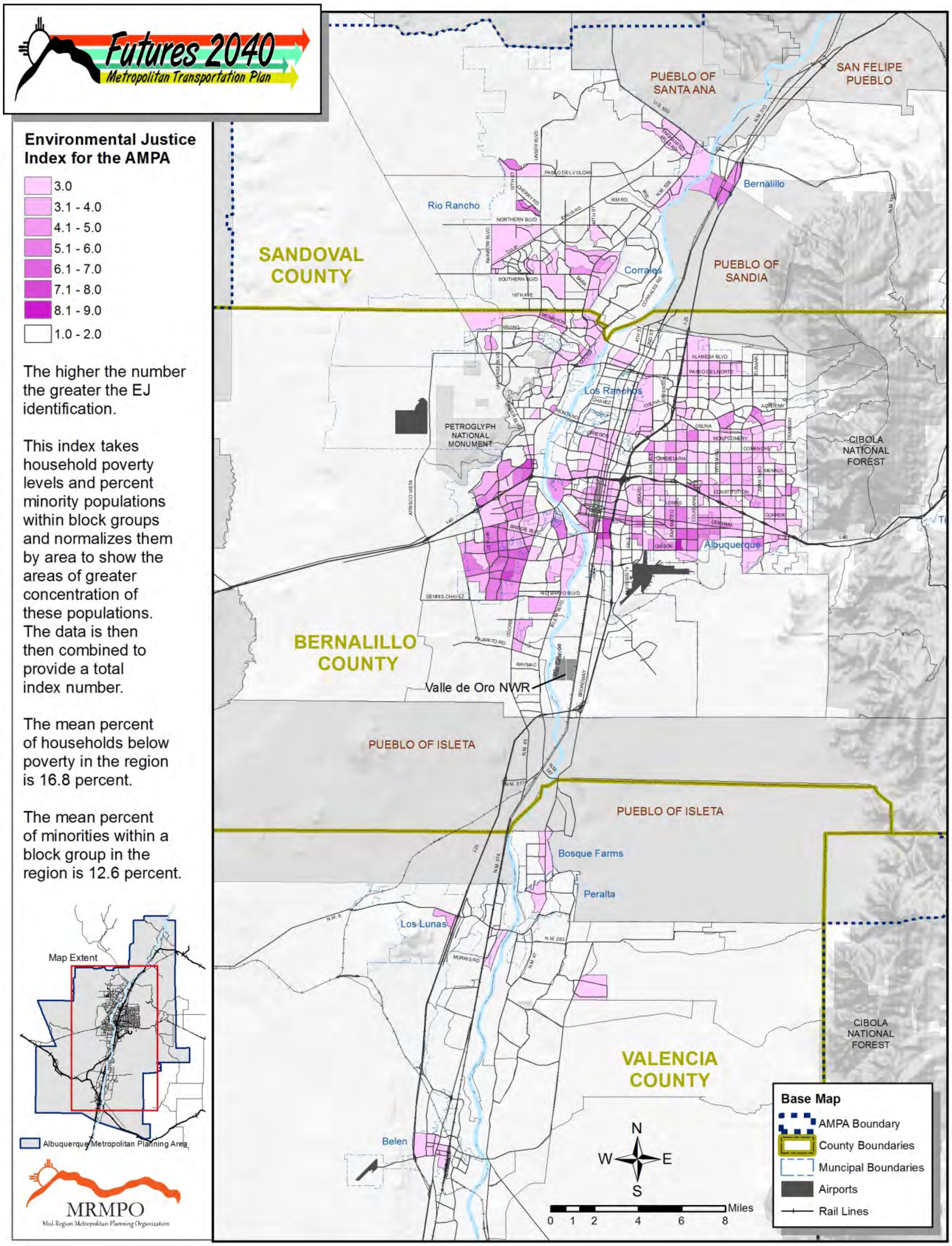
3.10.1 Environmental Justice Assessments

The *2040 MTP* primarily addresses environmental justice by assessing where low-income and minority populations reside and how those populations are served by the transportation network, particularly the transit network, within the AMPA. MRMPO analyzed locations with relatively high concentrations of environmental justice populations based on minority status and household poverty level using 2009-2013 American Community Survey data. Map 3-33 broadly shows the locations where there are a higher than average (compared to the regional mean) concentration of both household poverty and minority status; the darker the color, the greater the concentration of low-income and minority households. The results of the index analysis give an idea of where in the AMPA there might be environmental justice concerns. The highest concentrations in the AMPA are in areas within the City of Albuquerque including the Southeast Heights, the South Valley, and the Southwest Mesa.

While household income and minority status are the traditional measures of environmental justice, affordability is increasingly understood to be part of the transportation planning process. In recent years, federal agencies and research groups have placed an emphasis on analyzing combined housing and transportation costs.[61] Such analysis reveals locations within the AMPA that, while not necessarily considered environmental justice communities, are subject to affordability concerns as median household income in many neighborhoods is insufficient to meet the housing and transportation costs in the area. For more on housing and transportation affordability, see the Livable Communities section in Chapter 3.13.

[61] See the Department of Housing and Urban Development Location Affordability Index and the Housing and Transportation Affordability Index developed by the Center for Neighborhood Technologies.

Map 3-33: Environmental Justice Populations in the AMPA, 2010



Transit Accessibility

MRMPO's Transportation Accessibility Model was used to assess whether environmental justice communities have greater or lesser access to public transportation than the AMPA as a whole. Transit accessibility is particularly important for low-income populations as it is a more economical form of travel and improves access to jobs and job opportunities and is often necessary for getting to work. The following table shows results from an analysis conducted using the 2012 roadway network and transit services and demographic data from the 2009-2013 American Community Survey in order to determine whether public transportation investments are being equitably distributed across the region. As the analysis shows, the region is doing a relatively good job providing environmental justice communities access to transit services, as compared to the general population. In particular, access to transit for households below the poverty level is greater than for all households in the AMPA. Nevertheless, it is important for future transit investments to consider factors such as income status. Additional transit services have been proposed along Bridge Blvd, while the Albuquerque Rapid Transit will have a major impact on improving overall mobility for large environmental justice communities.

Table 3-18: Accessibility of Transit for Populations in the AMPA, 2012

Accessibility of Transit for Populations in the AMPA, 2012			
Minority Population		**AMPA Population**	
Within 1/4 mile of transit service	23.9%	Within 1/4 mile of transit service	24.8%
Within 1/2-mile of transit service	53.0%	Within 1/2-mile of transit service	54.0%
Within 1/4-mile of high frequency transit service	2.1%	Within 1/4-mile of high frequency transit service	2.1%
Within 1/2-mile of high frequency transit service	9.3%	Within 1/2-mile of high frequency transit service	9.3%
Households Below Poverty Level		**AMPA Households**	
Within 1/4-mile of transit service	31.4%	Within 1/4-mile of transit service	26.9%
Within 1/2-mile of transit service	62.3%	Within 1/2-mile of transit service	57.0%
Within 1/4-mile of high frequency transit service	3.6%	Within 1/4-mile of high frequency transit service	2.5%
Within 1/2-mile of high frequency transit service	11.8%	Within 1/2-mile of high frequency transit service	8.1%

3.10.2 Incorporating Environmental Justice Considerations into the Planning Process

Environmental justice considerations have been incorporated into important products used in regional transportation decision-making. These include the Project Prioritization Process, which helps prioritize which projects will be selected to receive federal funding, and the *MTP Monitoring Report* (see Appendix O), which tracks progress toward improving access to transit service in environmental justice communities compared to the AMPA at-large.

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 a full environmental justice evaluation as part of the NEPA process is usually required to determine whether or not a federally-funded project has substantial adverse effects on a community, and 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.

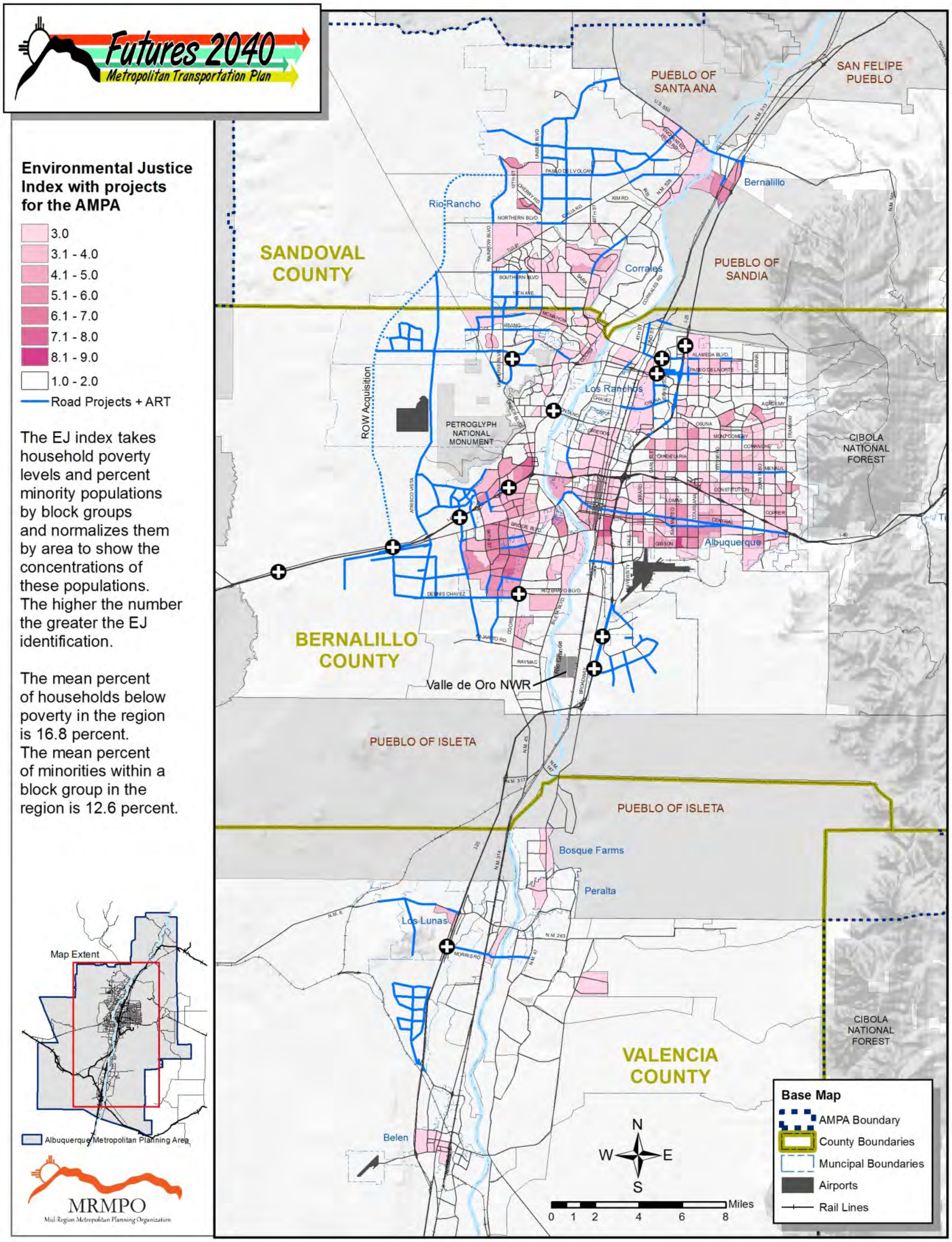
For the *2040 MTP*, a map was developed to show the location of roadway capacity expansion projects in relation to the environmental justice communities (see Map 3-34). Further analysis could be conducted by examining concentrations of elderly, children, seniors, the disabled and similar population groups that are subject to potential adverse impacts.

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 many of its 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 still 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 will continue its efforts and try different strategies for engaging environmental justice and other disadvantaged, special needs, and underrepresented populations. 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.

Map 3-34: Environmental Justice Populations and Roadway Network Expansion Projects



3.11 Economic Impacts

There is a strong relationship between transportation, land use, and the regional economy. Economic development, in general, refers to the creation and promotion of institutions, infrastructure, and policy which increase quality of life and foster conditions conducive to economic activity and innovation. Economic development activities are associated with growth in gross domestic product and employment, personal well-being and wealth, business growth and entrepreneurship, and fiscal health. When it comes to transportation roadway design, the level of activity observed on major corridors and in regional centers, and network efficiency all have a role to play in the economic health of the region. In short, transportation infrastructure plays a critical role in making a region competitive in terms of both supporting industry and the ability to attract and retain new businesses and a talented workforce. The economic impacts discussed as part of the MTP apply to three specific aspects: transportation network efficiency, municipal cost savings, and creating vibrant places.

In a Nutshell…

Takeaways: The projects contained in the *2040 MTP* are expected to return $16 billion into the economy over the next 28 years in network efficiency gains. Maximizing the region's existing infrastructure could yield additional cost savings for municipal budgets. Bolstering efforts to attract and retain young professionals will be vital to the region's overall economic health.

Components: This section investigates some of the ties between the economy and transportation. The economic implications of increased network efficiency, providing public services, and an aging population are discussed.

Goals and Objectives: *Economic Vitality* is a core goal of the MTP. Strategic transportation infrastructure choices can promote development, enhance the flow of people and goods, and ensure affordable transportation options.

3.11.1 Network Efficiency

Proper provision of transportation opportunities and infrastructure can be a valuable tool for fostering economic development and can result in a number of benefits. In particular, economic benefits may be realized through increases in the mobility, accessibility, and reliability of a roadway network, which can reduce the effective distances between locations and reduce overall transportation costs.[62] MRMPO can calculate the benefits associated with network efficiency through its modeling tools; however, it is important to note that analysis at this time is limited to roadway projects only. MRMPO would like to build further capacity in project evaluation given that improvements to bicycle, pedestrian, and transit networks also generate important economic benefits.

[62] 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

Roadway network efficiency improvements can be realized from a number of strategies including expansion of the network, safety improvements, and Intelligent Transportation Systems implementation, which helps manage congestion and improve efficiency. Several factors are commonly used to calculate economic benefits for roadway expansion or efficiency improvements. These are (1) time savings; (2) changes in fuel consumption and vehicle operating expenses; and (3) reduced number of vehicle accidents and other health benefits.

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.

If roadway improvements reduce congestion, there may be fuel and vehicle operation savings for individuals and businesses. Although evidence is mixed, reduced congestion generally reduces the number of vehicle accidents but (increases accident severity).[63, 64] 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. Congestion is also associated with more air pollution and other detrimental environmental impacts which negatively affect community welfare.

MRMPO employs the Regional Economic Model, Inc. (REMI) TranSight model to evaluate the impact of improvements and additions to the roadway network on the regional economy. The TranSight model is calibrated specifically to the MRMPO region and based on the most recent data available. REMI models, including TranSight, are well respected and used by organizations throughout the world to analyze regional economies. TranSight operates by importing data from MRMPO's travel demand model related to trips, vehicle miles traveled, and vehicle hours traveled and calculating the economic benefits of transportation improvements. Economic gains 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 E.

The TranSight analysis presented in this section only measures the impacts of roadway capacity and expansion projects associated with the *2040 MTP*. Impacts to alternative modes of transportation are not considered, nor are network efficiency improvements 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 cannot be accurately simulated within the travel demand model environment.

[63] Ibid.

[64] Cambridge Systematics, "Crashes vs. Congestion - What's the Cost to Society?" AAA, 2011

Economic Indicators

Hundreds of variables are simulated and produced by the TranSight model. When examining the economic impact of building the long-term roadway network, several indicators are of particular interest. Results demonstrate the impact on the larger economy in terms of output and employment as well as the well-being of those employees. These indicators, provided in Table 3-19, are defined as follows:

- Employment: Employment is the estimate for number of jobs. This includes both part time and full time jobs as well as those that are self-employed. Employment figures presented here do not include unpaid family workers or volunteers. In the TranSight 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 spent on goods and services by individuals. Higher wages lead to higher disposable income and generally higher levels of consumption.

Results

Table 3-19 shows the economic impacts to the MRMPO region of building out the projects proposed in the *2040 MTP* (see page 3-36 in the Roadways section for a map of capacity expansion projects used in this analysis). This analysis *does not* include the infusion of construction and maintenance dollars associated with the projects into the economy, which would realize additional benefits, particularly in the short-term. The figures presented in this table indicate increases over a baseline where the proposed long-term roadway network was not built.

The table indicates that improvements to the transportation network will result in approximately 13,350 new jobs by 2040 that would not otherwise have been created. The 25-year cumulative impact of the MTP projects results in an increase in GDP of $16 billion. Personal Incomes are projected to rise by $12.4 billion, the majority which will re-enter the economy in the form of increased expenditures on goods and services. These results demonstrate the role of transportation projects as an important aspect of the regional economy and a huge driver of economic activity.

Table 3-19: Projected Economic Impact of Network Efficiency Improvements

Cumulative Impact of MTP Roadway Expansion Projects between 2015 and 2040 (2014 Dollars)	
Total Increase in Employment	13,350
Gross Domestic Product (GDP)	$16,028,667,450
Real Personal Income	$12,397,056,580
Personal Consumption Expenditures	$11,777,385,712

3.11.2 Municipal Cost Savings

Financing transportation projects and providing maintenance and upkeep of transportation and transit systems is a challenge for local governments. Jurisdictions in the AMPA are reliant on federal transportation spending to fund most projects. However, reliance on federal and state discretionary funding to build and maintain a transportation network introduces uncertainty and makes planning future roadway projects difficult. This is particularly true at a time when a decline in federal spending has been particularly devastating to New Mexico, a state that relies heavily on federal dollars. To help alleviate some of the financial burden on local governments, metropolitan areas are increasingly pursuing projects and development patterns that are fiscally sustainable and which minimize infrastructure expansion and maintenance costs.

The idea that municipal financial benefits are achievable through compact development has existed in planning since the 1970s. In recent years, compact development in targeted locations has been suggested as a solution to promote fiscally responsible development, serve larger populations with transit, decrease municipal maintenance costs, and increase per acre tax revenues. Further, promoting compact development may result in significant cost savings for municipalities by reducing the cost of providing emergency services and physical infrastructure.[65]

The Preferred Scenario, which emphasizes higher densities in key locations and better transportation connections, may result in significant cost savings for municipalities in service provision. For instance, fire stations and police substations are services that rely on fast incident response times; compact development may reduce the need for as many facilities. Likewise, compact development closer to urban centers keeps the population nearer to ambulatory and medical services. Because these services are often subsidized or provided through public dollars, municipalities may realize large cost savings

[65] 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"

from compact development. A recent report documenting the fiscal impacts of growth found that compact development saves municipalities an average of ten percent for providing public services compared to more traditional development patterns.[66]

Infrastructure development (e.g., new roadways, utilities, water and sewer) and maintenance represent significant costs to municipalities. Because the Preferred Scenario consumes 13,000 acres less than the Trend, the demand for new infrastructure is likely to be lower. Similarly, maintenance and repair costs are likely to be lower. In addition, the Preferred Scenario also represents a more cost-effective way to connect growing centers with transit service, while low-density development can be difficult and costly to adequately serve by public transit. 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.[67]

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 significant cost savings while providing comparable services.

Economic development also includes recognizing opportunities for public/private partnerships and leveraging alternative funding sources. It has been demonstrated that in places like Raleigh, NC; El Paso, TX; and Cleveland, OH that public investment in key catalytic projects can help to spur private investment, and vice versa. This is particularly true as it relates to transit-oriented development. In 2013, the Urban Land Institute assisted MRCOG and RMRTD with a series of well-attended workshops that convened business leaders, developers, planners, bankers and public officials to discuss the future of transit in the region. Some of the mutually agreed upon findings of the workshops were:

1) The need to design communities for the healthier movement of people
2) Transit-rich communities attract and retain highly skilled workforce
3) Shared and public places are great assets

Future development that builds upon these shared public and private interests holds the best potential for sparking collaboration and garnering investment. Not only does this contribute to a healthy economy, but it also fuels innovative approaches towards creating and revitalizing vibrant places.

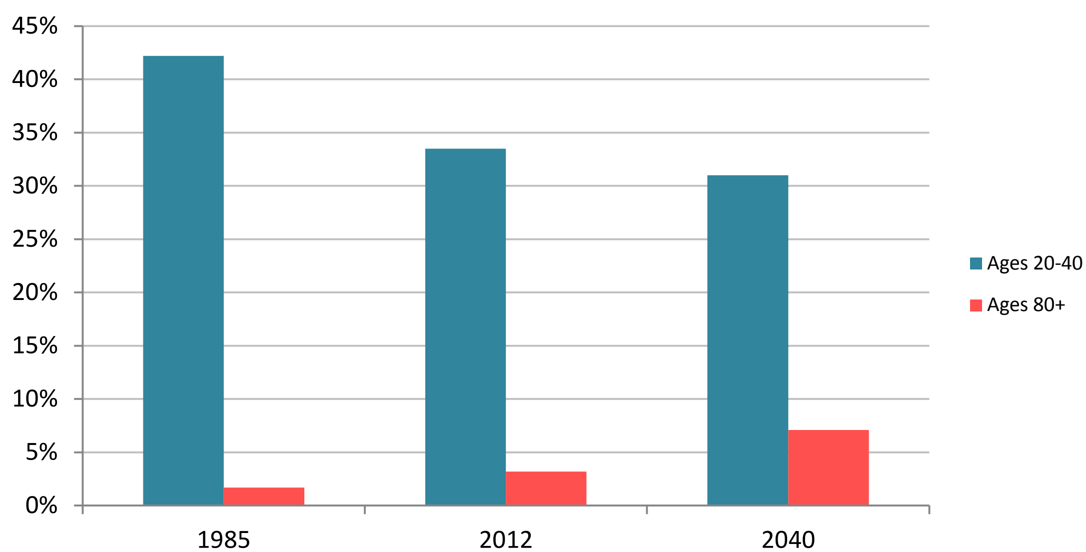
[66] Fulton, W., I. Preuss, A. Dodds, S. Absetz, and P. Hirsch. 2013. “Building Better Budgets: a national examination of the fiscal benefits of smart growth development,” 2013
[67] Ibid.

3.11.3 Changing Demographics, Economic Migration, and Vibrant Places

Perhaps the biggest source of economic uncertainty facing central New Mexico is changing population demographics and economic migration. High temperatures and a dry climate have long made cities in New Mexico a destination for retirement-age individuals and those seeking climate-associated health benefits. These trends have strengthened the health care and social assistance industry in recent years; however, an aging population raises uncertainty about the strength of the future workforce.

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 and an aging population.

Figure 3-49: Shifting Age Composition in the Region: Past, Present and Future



In 1985, 42.2 percent of the population was between the ages of 20 and 40 and 1.7 percent were over the age of 80. Today 33.5 percent are between 20 and 40 and 3.2 percent are over the age of 80. By 2040, 31 percent of the population is expected to be between the ages of 20 and 40 and 7.1 percent are expected to be over the age of 80.[68] The trend in Albuquerque seems to be towards fewer young professionals and an aging population.

More recent trends demonstrate declining birth rates and increases in out-migration. Altogether, 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 as well as the local economy.

[68] 2040 Population figures are based on population projections by BBER

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. 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 at higher rates than other age groups (see Chapter 3.1 and Appendix J). 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.

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. 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 transportation projects that connect key destinations and improve the users’ experience by offering multiple modes that are both safe and accessible.

The Preferred 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 Preferred 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.

3.12 Travel Demand Management

Rather than addressing the functionality of the region's roadways and improving the movement of vehicles, as with transportation systems management (TSM), travel demand management (TDM) is about reducing the demand for vehicle travel in the first place. More specifically, TDM focuses on changing travel behavior through a range of strategies and incentive programs to take trips off the roads, reduce the length of trips, shift trips to times of day when there are fewer vehicles on the road,[69] or shift those trips to alternative modes.

With congestion expected to increase over time, there is a need to complement roadway infrastructure improvements with other efforts to reduce vehicle miles traveled. Travel demand management represents a suite of strategies that can help maintain a viable transportation system and address long-term needs. Under the right circumstances, and particularly when implemented as a set of strategies as opposed to standalone efforts, TDM strategies can help reduce transportation costs for individuals, increase transportation options, reduce peak period congestion and overall travel demand, improve air quality by reducing vehicle emissions, and improve public health by promoting active modes of transportation (i.e., walking, bicycling, and public transit).

Regions across the country are creating innovative public and private sector partnerships, introducing incentives, and taking advantage of changing travel preferences to impact transportation patterns. While there are some modest efforts already in place in the region, there is much more that can be done. What follows is a description of TDM strategies, existing activities in the AMPA, and discussion of opportunities to expand the implementation of TDM programs.

In a Nutshell…

Takeaways: Travel demand management (TDM) addresses transportation challenges by reducing demand for single-occupancy vehicle trips, particularly during the most congested times of day. TDM strategies can also reduce transportation costs for individuals, increase travel options, improve air quality by reducing vehicle emissions, and improve public health by promoting active modes of transportation.

Components: This section describes general TDM strategies, existing activities in the AMPA, and discusses opportunities to expand the implementation of TDM programs.

Goals and Objectives: TDM programs and strategies support several MTP goals and objectives: *Mobility* through expand multi-modal transportation options; *Economic Vitality* through ensuring affordable transportation options; and *Environmental Resiliency* through improving air quality.

[69] Center for Urban Transportation Research, University of South Florida, http://www.cutr.usf.edu/programs-1/transportation-demand-management-2/

3.12.1 General TDM Strategies

TDM can be thought of as a suite of strategies that are to be applied in different situations and contexts, but when taken together can have an important impact on travel behavior and the region. TDM strategies can be divided into three general categories:

- Transportation: At its core, TDM is about reducing vehicle miles traveled by encouraging non-motorized travel and altering driving habits. The more viable transportation choices that are offered the more likely people will choose alternatives to driving alone. The challenge lies in creating and ensuring such options exist, in part through investments in transit, bicycle, and pedestrian infrastructure. Other physical infrastructure strategies include the provision of High Occupancy Vehicle (HOV) or High Occupancy Toll (HOT) lanes, or parking management strategies that reduce excess parking in some cases and maximize parking efficiency in others.
- Programs and policies: In addition to changes in physical infrastructure, TDM includes organized efforts to change individual travel modes or travel schedules. While 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.[70] Often, private sector participation is accomplished through partnership with a government agency or by government requirement. 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 can reduce the number of peak-hour commuters. Many of these efforts tout the universally-beneficial premise of improving employee health and lowering healthcare costs, as well as lower parking costs on behalf of employers (and sometimes employees, too). TDM efforts can be aided by the use of technology to make alternative modes easier to use and reduce unnecessary driving. For example, mobile apps are being increasingly deployed to help users identify when the next bus will arrive or find ride-sharing opportunities.
- Land use: Unlike policies or programs that address day-to-day behavior or infrastructure investments that provide additional transportation options, land use changes are structural in nature and address the built environment of a region. Low density, single-use land use patterns often make single-occupancy vehicle travel the only available mode since distances between uses and activities are great and transit cannot be easily supported in these areas. By contrast, more compact land uses result in shorter distances between destinations, allow for more walkable neighborhoods, and make transit usage more viable due to higher densities. Research shows that higher-density mixed-use neighborhoods generate vehicle trips at a lower rate than traditional developments with separated uses.[71] These strategies can also address the existing jobs-housing imbalance, which has contributed to greater rates of vehicle miles traveled. Land

[70] Washington state law requires urban areas with traffic congestion to reduce single-occupancy vehicle travel and regional VMT by developing travel demand management programs.
[71] The 2009 Urban Land Institute report, *Moving Cooler*, found that compact development reduces driving approximately 20 to 40 percent; EPA Trip Generation Tool for Mixed-Use Developments http://www.epa.gov/smartgrowth/mxd_tripgeneration.html

use strategies are therefore highly complementary to other TDM efforts and can have a great impact on travel behavior. Although they are worthwhile to pursue because of their effectiveness, it usually takes many years for land use changes to have their intended impacts.

Figure 3-50: TDM Strategies Matrix

	Strategy	Definition
Transportation	HOV/HOT Lanes	Traffic management approach that dedicates lanes to vehicles with multiple occupants or to travelers willing to pay a toll.
	Public Transit Investments	Improving frequency or extent of service to encourage travel by public transportation.
	Alternative Mode Investments	Improving bicycle and pedestrian infrastructure to encourage non-motorized travel.
	Parking Management	Strategies to address excessive parking in some locations and increase parking efficiency in others. Strategies include elimination of excess parking, shared parking agreements, increased parking costs, structured parking, etc.
	Bicycle/Transit Integration	Investments in bicycle infrastructure near transit station areas or programs such as bikeshare that make bicycles available for shared use to extend the reach of public transit.
Programs and Policies	Road Pricing	Tolls or congestion pricing that charge users for the access to certains roads or locations. Pricing strategies are considered the most effective means of reducing congestion but are extremely difficult to implement.
	Carshare	Generally private sector programs in which individual businesses or housing developments offer a fleet of shared vehicles to reduce need for vehicle use and ownership.
	Ridesharing/Carpooling	Regional or employer-based programs to pair commuters traveling to and from similar origins and destinations to reduce single-occupancy vehicle travel.
	Telework/Telecommuting	The use of telecommunications and technology to substitute for physical travel, allowing some workers to work remotely and refrain from vehicle travel.
	Flexible Schedules	Allowing employees flexibility in their work schedules to facilitate transit usage or traveling outside of the peak periods.
	Transit Incentives	Fare reductions or transit promotions to encourage transit usage among particular populations or for travel to certain locations.
	Guaranteed Ride Home	Programs that provide taxi services or access company vehicles so that employees that traveled to work by transit, carpool, or bicycle can get home or to an appointment in the case of an emergency.
	Transportation Management Associations/Organizations	Associations of employers in an area that has congestion and/or limited parking that offer incentives to collectively encourage ridesharing and the use of transit and other commuting alternatives.
Land Use	Infill Incentives	Policies to encourage development of vacant land in urban areas. In contrast to sprawl, infill can reduce the distances individual must travel to access services or job sites.
	Mix of Land Uses	Any development that includes a combination of related uses - residential, commercial, cultural, institutional, or even industrial - in one place (or one building). Uses should be complementary and connected to surrounding environment.
	Transit-Oriented Development	High or medium-density development in the immediate vicinty of transit stations.

Sources: VTPI and MRMPO

3.12.2 Existing TDM Efforts

Two agencies, the City of Albuquerque's ABQ Ride and the Rio Metro Regional Transit District, are primarily engaged in TDM efforts in the AMPA. Over the years, these TDM efforts have evolved in ways that lend themselves to greater cooperation, particularly as Rio Metro's visioning process may recommend opportunities for integration between Rio Metro and ABQ Ride.

The Smart Business Partnership is one of the primary TDM programs that both ABQ Ride and Rio Metro employ to engage public agencies and institutions and private-sector business. Essentially, partners are encouraged to provide alternatives to single-occupancy vehicle travel by:

- Allowing alternative work schedules (e.g., telecommuting and flex 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

In exchange for their participation, Smart Business Partners receive recognition on transit vehicle displays, and on agency websites and promotional materials. They are also eligible for discounted passes and advertising. Rio Metro has, for example, 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 while it is championed by transit agencies, 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) in the event that an unscheduled meeting or emergency leaves them unable to use their regular means of alternative transportation to get to their destination.

However, there are other ways in which Rio Metro and ABQ Ride directly promote transit. Both are actively involved in efforts such as providing bike lockers at Rail Runner and park-and-ride stations, hosting special events and contests, speaking to school-aged children about how to use transit, conducting safety outreach campaigns, and advertising and marketing existing and new services to various markets.

Technology initiatives are also an important aspect of TDM. Rio Metro is introducing a new system in 2015 that will incorporate smartphones as a means of ticketing, scheduling, contacting Rio Metro, and distributing important notifications. 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.

In addition to ABQ Ride, the City of Albuquerque also carries out several bicycle-related TDM efforts. Actions range from a bike locker program and the publication and distribution of an area-wide bicycle map to bicycle safety and maintenance education courses for both children and adults. One of the most recent successes is the Parks and Recreation Department's opening of the Esperanza Community Bike Shop, which was supplemented by regional financial support through the TIP. From this new facility, the department provides an open shop featuring work stations, tools and used bicycle parts, build-a-bike and earn-a-bike programs, classes, and work study/volunteer opportunities.

The Downtown ABQ Main Street Initiative and MRCOG are in the process of implementing a pilot bikeshare program in Downtown Albuquerque. The program is a public private-partnership in which Downtown employers contribute to the capital and operating costs of the program, while public agencies offer technical support, planning, and coordination services. One goal of the project is to encourage greater use of alternative mode travel for commuting purposes by decreasing reliance for single-occupancy vehicle travel with the Downtown area. Additional federal funds are expected in FY 2016 and 2017 to help expand the program to other parts of the metro area.

3.12.3 Expanding TDM in the Region

TDM efforts are consistent with and support the goals of the *2040 MTP* for several important reasons: 1) they help manage congestion; 2) they reduce vehicle emissions; 3) they improve public health by encouraging more trips to be accomplished through active transportation modes. To further promote TDM in the region, the following actions could be taken. Note that some could be implemented immediately, but others require consultation and further investigation before pursuing.

Regional TDM program

An important opportunity lies in consolidating the disparate TDM activities in the region and creating a regional TDM program. This could be pursued in multiple ways. An inexpensive and easy-to-implement first step could be to create a clearinghouse of information on regional efforts. Preliminary efforts could begin by simply bringing together TDM-related organizations and discussing ways to leverage different activities. A more comprehensive approach could entail consolidating TDM efforts under one agency that either administers TDM programs or serves as a resource center for raising and distributing funds to eligible activities across the region. This structure could ensure the strategic implementation of programs that would be most effective at addressing regional transportation needs.

Transportation Management Associations

Public agencies and private sector businesses may create partnerships to bring together resources and reach a broad range of participants. A common structure for these partnerships is transportation management associations (TMA). TMAs are associations of employers in an area that has congestion and/or limited parking. These organizations promote TDM strategies to encourage ridesharing, the use of transit and other alternatives to single-occupancy vehicle travel through incentives such as free or reduced-cost parking for carpools, incentives for buying transit passes, and other programs aimed at easing the transition to commuting by alternative modes. Some states, such as Washington, require large employers to enact a commute trip reduction program using these kinds of incentives.

Individual Employer Programs

An advantage of TDM as a general strategy is that efforts can be made at a small-scale and do not require formal programs. Simple measures that may be pursued at the employer-level include offering flexible schedules, preferred parking for carpools, shower facilities for bicycle commuters, and guaranteed ride home programs. MRMPO is not aware of location or employer-based TDM programs in the region, other than the University of New Mexico. Cities or counties could play a role by requiring large employers or building developers to institute commute trip reduction programs to maintain a certain level of vehicle trips as a condition for development approval.

Other Potential Programs

- Utilize ride-sharing or ride-matching software that could help people across the region find carpools for their commute trips
- Develop a regional Safe Routes to School program that would provide relevant data and analysis to school districts, develop contacts throughout the region, provide information about funding opportunities, work with the New Mexico DOT to disseminate information to school districts and individual schools, and create a regional committee to work on various strategies for implementing Safe Routes to Schools[72]
- Financial support of selected events and programs that encourage alternative modes of transportation

[72] Safe Routes to Schools promotes safer conditions to allow students to walk or bike to school which helps reduce transportation demand and also supports improved health outcomes for students. Changing student behavior can also be seen as a long-term strategy in changing the public's perception of and familiarity with active modes of transportation.

3.13 Livable Communities: Access and Connectivity

Our ability to easily access the things we need affects our daily quality of life. In the transportation world, accessing goods and services is often seen as a function of mobility, which refers to the speed and distance traveled. An example of a transportation strategy that targets mobility is reconfiguring signal timing to maximize the efficiency of the system and allow vehicles to flow more freely. In recent years, however, there has been a shift in thinking from striving purely for mobility (i.e., moving farther faster) to focusing more on *accessibility,* which refers to how well individuals can access goods and services. Lessening the need to travel great distances (or lengths of time) by bringing amenities, residences, and job centers closer together can be accomplished in a variety of ways. These include encouraging a mix of land uses, increasing the connectivity of the roadway network, and targeting job-dense areas with affordable housing. In particular, connectivity refers to the ability to reduce travel distances and offer multiple routes to reach the same destination. Although maintaining and improving regional mobility for all modes of transportation remains important, taking a more multifaceted approach to addressing accessibility allows agencies to augment mobility strategies and ultimately improve the daily experiences and quality of living for AMPA residents.

The *2040 MTP* in general, and the Preferred Scenario in particular, places an emphasis on creating more livable communities. According to the U.S. Department of Transportation, these are "places where coordinated transportation, housing, and commercial development gives people access to affordable and environmentally sustainable transportation."[73] This section focuses on two specific factors related to livability: accessibility and connectivity.

In a Nutshell…

Takeaways: Livability in a community depends in part on how easily one can access amenities. Improving connectivity helps facilitate traffic flow and allows for more transportation options. Improving access also affects affordability by reducing transportation costs.

Components: This section discusses the concept of *location affordability* to analyze the combined housing and transportation costs in the AMPA and describes the role roadway connectivity plays in access. Access to activity centers and Rail Runner stations is evaluated with the TRAM tool, which can evaluate existing transportation needs and the benefits of potential projects or policy changes.

Goals and Objectives: Improving access and expanding transportation choices are objectives that support the respective MTP goals of *Mobility* and *Active Places*.

3.13.1 Accessibility and Affordability

Many variables impact accessibility, including the separation or mix of land uses, and the design, condition, and continuity of facilities such as sidewalks, bike lanes, and roadways. Mixing land uses provides the opportunity for more activities closer together and results in lower

[73] http://www.dot.gov/livability/101

vehicle emissions, and makes it more likely that amenities are within walking or biking distance from residences. Making distances shorter also helps reduce vehicle emissions, fuel consumption, and travel time. Increased density can also support accessibility goals, though density by itself does not place people closer to the things they need. Transportation investments and land use policy must work together in order to increase access to destinations, amenities, goods, and services. For example, targeting density near key locations such as transit corridors and activity centers can link non-motorized users with amenities, reducing the need for driving.

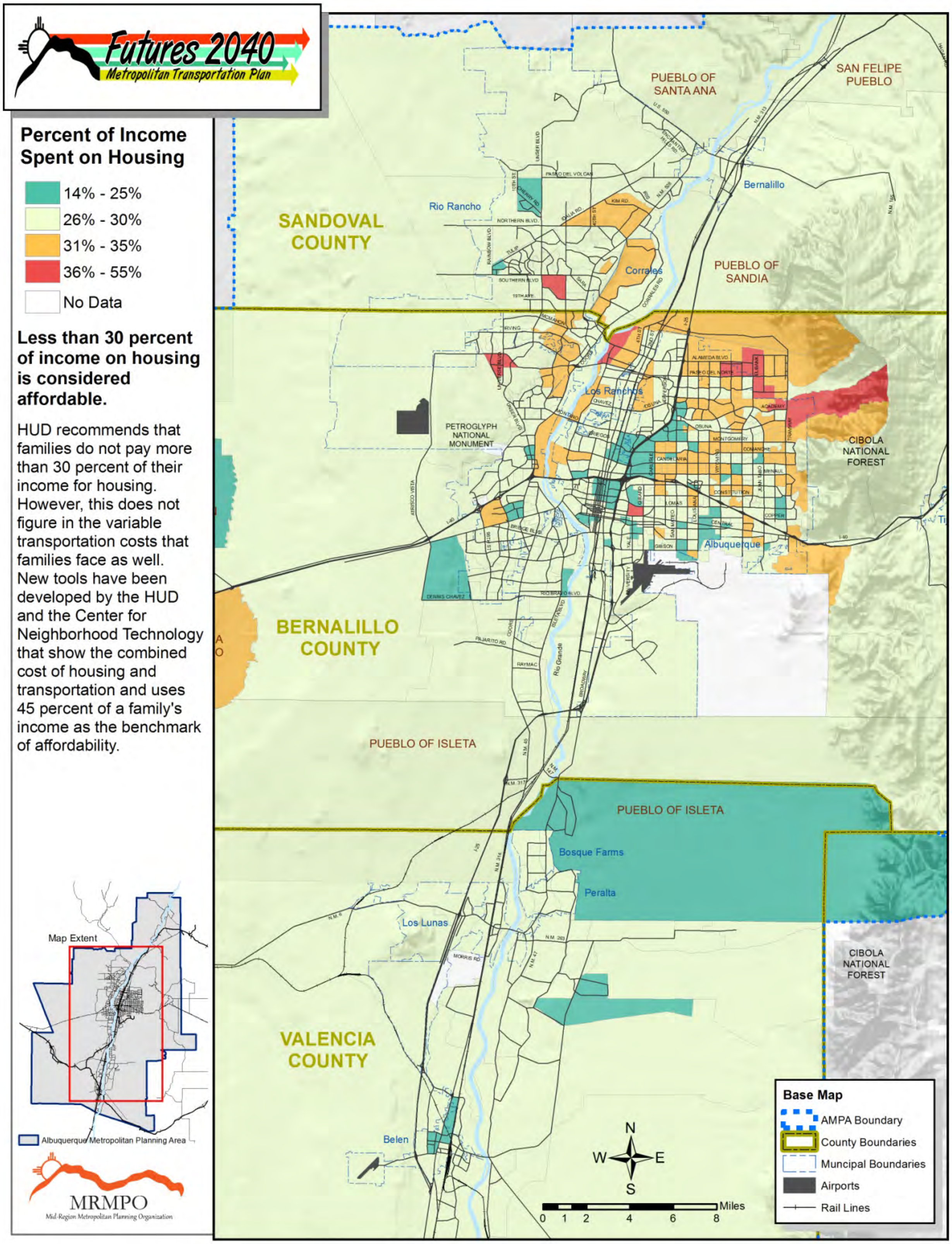
Housing and Transportation Affordability

Affordability is an important component to the issue of accessibility and is vital to ensuring that the region is livable for current and future residents. According to the Department for Housing and Urban Development (HUD), "(f)amilies 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."[74] Transportation is typically a household's second largest cost, and a family that lives far away from their places of work in order to find affordable housing may be losing those savings due to higher spending on transportation.[75] That is why the Center for Neighborhood Technology (CNT) and HUD have recently developed tools that integrate both costs in order to show how truly affordable, or not, an area is for a variety of household types. CNT's tool is called the *Housing + Transportation Affordability Index* and HUD's is the *Location Affordability Index.* CNT has found 15 percent of income to be an attainable goal for transportation affordability, and considers 45 percent of a family's income as the benchmark of affordability when adding the two estimated costs.

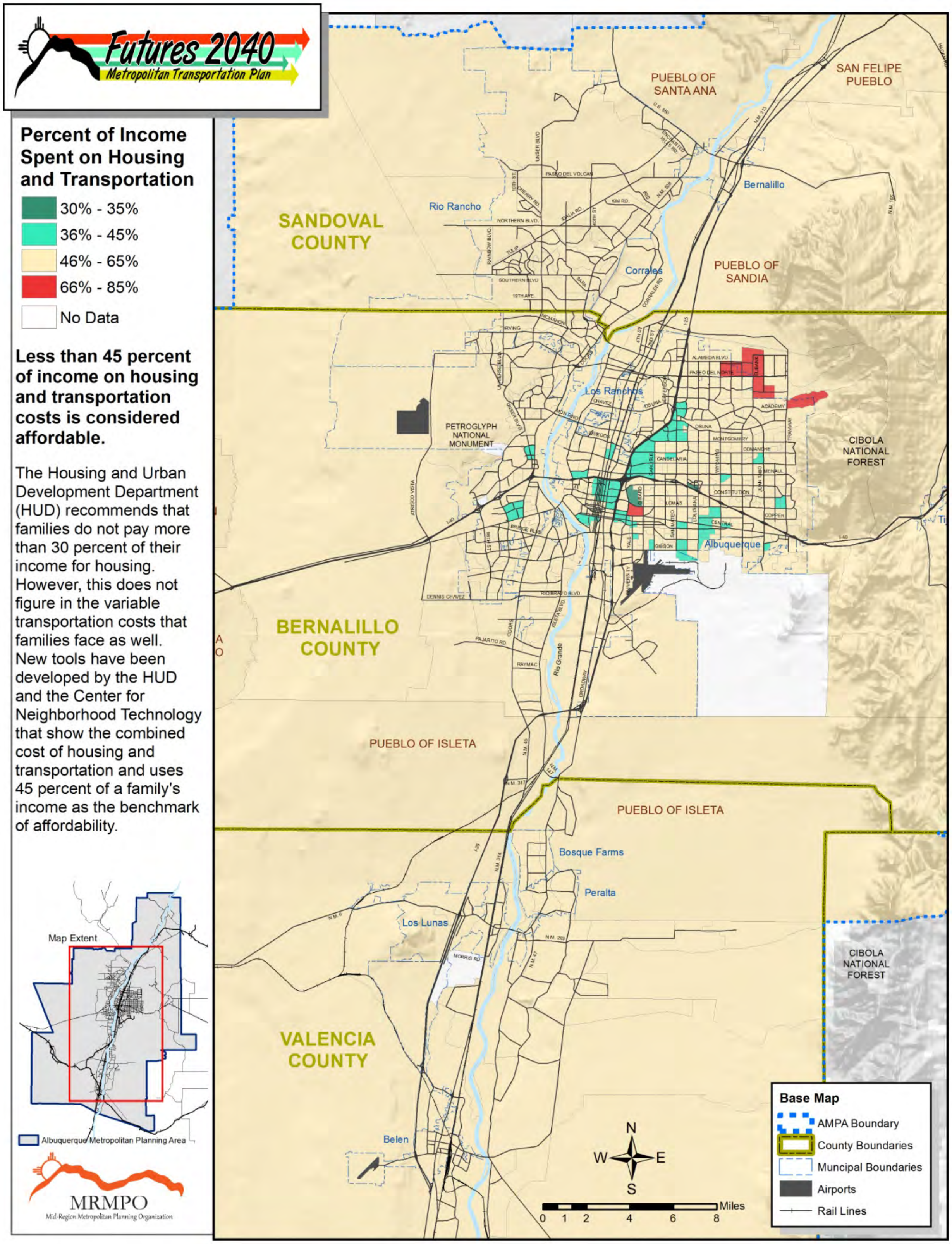
Maps 3-35 and 3-36 below were produced using HUD's Location Affordability Index data and demonstrate how geographic areas that may seem affordable when looking only at housing or transportation costs are revealed as unaffordable when the costs are combined. Although this analysis can be performed using HUD's data for eight household types, for demonstrational purposes, the following maps measure affordability for a household of four earning the area's median income (AMI) of $48,990. The transportation costs are calculated assuming two commuters.

[74] Department of Housing and Urban Development, http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/affordablehousing
[75] Center for Neighborhood Technology, http://htaindex.cnt.org/about.php

Map 3-35: Housing Affordability in the AMPA for a Median Income Family of Four



Map 3-36: Combined Housing and Transportation Affordability in the AMPA



Looking only at housing affordability, 89 percent of block groups in the AMPA are considered affordable for this household type 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 this household type are considered affordable and fall within the 45 percent combined cost guideline. This underscores the importance of both reducing transportation costs that are exacerbated by lengthy trips as well as reducing the need for vehicle ownership.

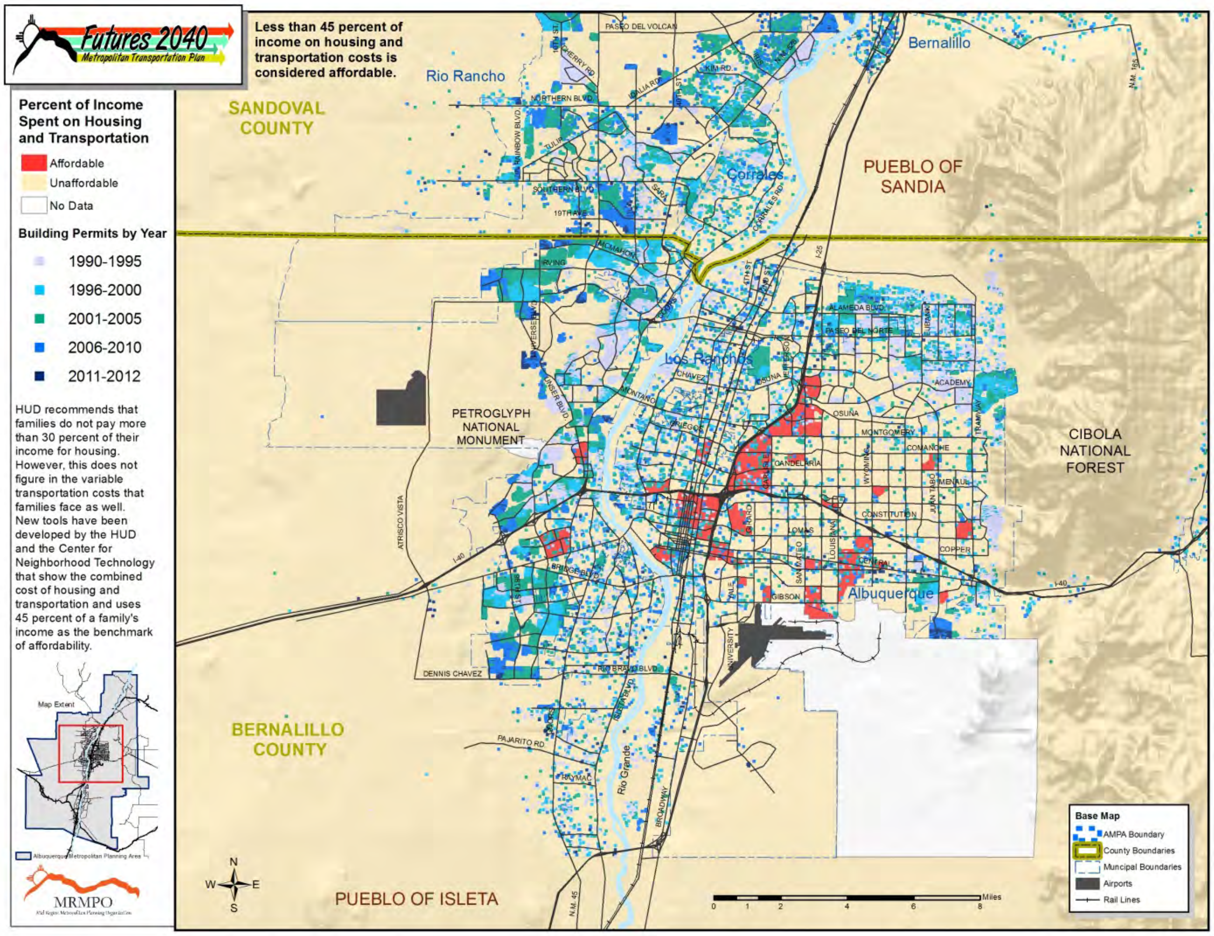
According to AAA, the total cost of owning and operating a small sedan in 2012 was approximately $7,684 per year.[76] If a two-car commuter household were to spend this much of their income on transportation, assuming the Location Affordability Index's AMI for this area of $48,990, they would spend 31.4 percent of their annual pre-tax income on transportation. For one-car households with two commuters this cost would drop dramatically to 15.7 percent plus any additional cost for the non-car commuter such as an annual bus pass or the cost of maintaining a bicycle.

Building permit data show that over the last 20 years growth has occured in peripheral parts of the metro area that are great distances from transit hubs, major activity centers and job-dense areas. The development patterns typical in these areas make it challenging to offer viable transit services there. These factors contribute to longer trip lengths as well as the increased necessity of personal vehicles to carry out everyday activities.

The relationship between trip lengths and affordability is clear: costs are a funciton of vehicle ownership and operating expenses. Operating costs are higher if more travel is required, while 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, operating expenses can be reduced if those trips are shorter. Hence, reducing trip lengths can improve affordability by either reducing vehicle ownership rates (increasingly observed in households with more adults than vehicles) or by reducing vehicle operating costs.

[76] AAA, "Your Driving Costs," 2012

Map 3-37: Combined Housing and Transportation Affordability and Recent Building Permits



Maps 3-35 through 3-37 highlight the importance of lessening the cost burden of transportation in the AMPA and emphasizing future growth in areas that are closer to job sites and existing amenities and services. It is also crucial to target growth in areas that are easily serviceable by transit, as well as to fill in gaps in the bicycle and pedestrian networks to expand transportation options.

Another way to help alleviate congestion and shorten trip length is to improve roadway connectivity. The benefits of connectivity for improving access, methods to evaluate roadway connectivity, and analysis on access to major activity centers and Rail Runner stations.

3.13.2 Connectivity

The form and function of the roadway network affects the efficiency of every mode of transportation, including private vehicle travel. When this network is not well connected, or is disjointed, transportation issues such as congestion become more severe as there is little redundancy in the network to provide alternative route options. The Victoria Transport Policy Institute defines connectivity as “the density of connections in path or road network and the directness of links. A well-connected road or path network has many short links, numerous intersections, and minimal dead-ends (cul-de-sacs).”[77]

For drivers, poor roadway connectivity also increases travel times and affects travel choices as it makes taking alternative modes of transportation more challenging and often dangerous. With fewer route options, traffic accidents, stopped vehicles, and construction can generate major roadway backups. Stopped traffic means vehicles idling longer, which produces additional pollution and negatively impacts air quality. More time spent in the car due to circuitous routes and roadway congestion also means lost hours of productivity.

The effects of a poorly connected roadway system can be observed in roadway conditions across the AMPA, where the dense grid network of east Albuquerque is able to withstand increases in vehicle travel, while conditions in west Albuquerque are expected to deterioriate over time due in large part to the more limited roadway network. One jurisdiction that is proactivly addressing long-term connectivity needs is the City of Rio Rancho, which is constructing a large-scale grid system over time within the city limits (see the network expansion map in Chapter 3.2).

Disjointed road networks impact non-drivers as well by discouraging pedestrian and bicycle travel due to the circuity of potential routes that necessitate a lengthy journey even though the origin and destination may lie close together. In addition to route options, well-connected local roads provide safer biking and walking conditions than the major roadways that frame them. Local roads are less heavily trafficked and the cars that do use them are traveling more slowly. This lowers the fatality risk for bicyclists and pedestrians if an accident does occur that involves a vehicle.

Poorly connected areas are also difficult to serve with public transit as potential riders in these areas would have to travel long distances by foot or bicycle in order to catch the bus, which is a major deterrent. Park and ride lots can serve as collection points for riders in these areas; however, if the transit service is uncompetitive with the time it would take to drive to a destination, or if the rider’s destination does not have expensive parking fees or other parking restrictions, these riders may still prefer to drive. In these areas, employer incentives to take transit or parking restrictions at the destination could help provide a more viable ridership base.

Measuring Connectivity

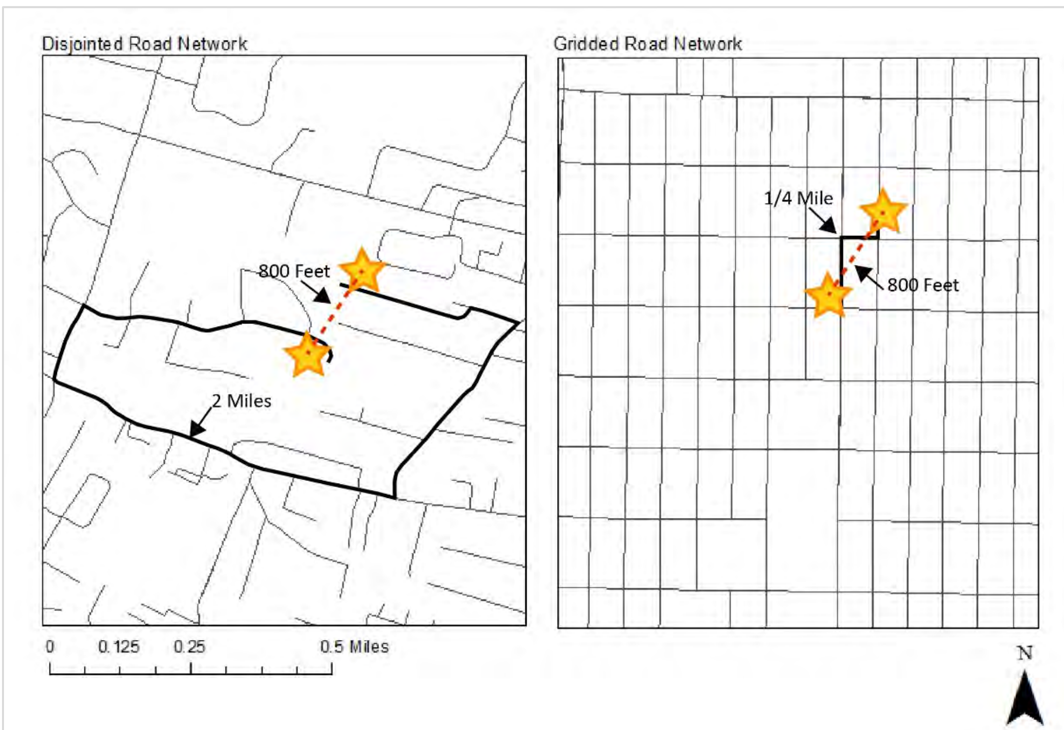
Common methods for measuring connectivity include finding the average block length or the number of four-way intersections in a given area, determining the percentage of an area with a gridded street

[77] VTPI, “TDM Encyclopedia,” www.vtpi.org

network, or measuring the ratio of links (streets) to nodes (intersections) in a network.[78] Examples of two of these methods, route directness and intersection density, are shown in Figures 3-51 and 3-52. All approaches point to the gridded street network as the type that provides the highest level of connectivity.

Two local examples of different road networks are compared in Figures 3-51 and 3-52. The disjointed network with poor connectivity in the first map provides few route options, and requires lengthy trips even where destinations are physically close together. The well-connected grid in the second map provides all road users a variety of route options. In order to quantify the differences in connectivity in these different areas, the route directness method divides the necessary travel path distance by the shortest distance between the origin and destination; the lower the route directness ratio, the better the connectivity in the given area.

Figure 3-51: Route Directness: A Measure of Roadway Connectivity



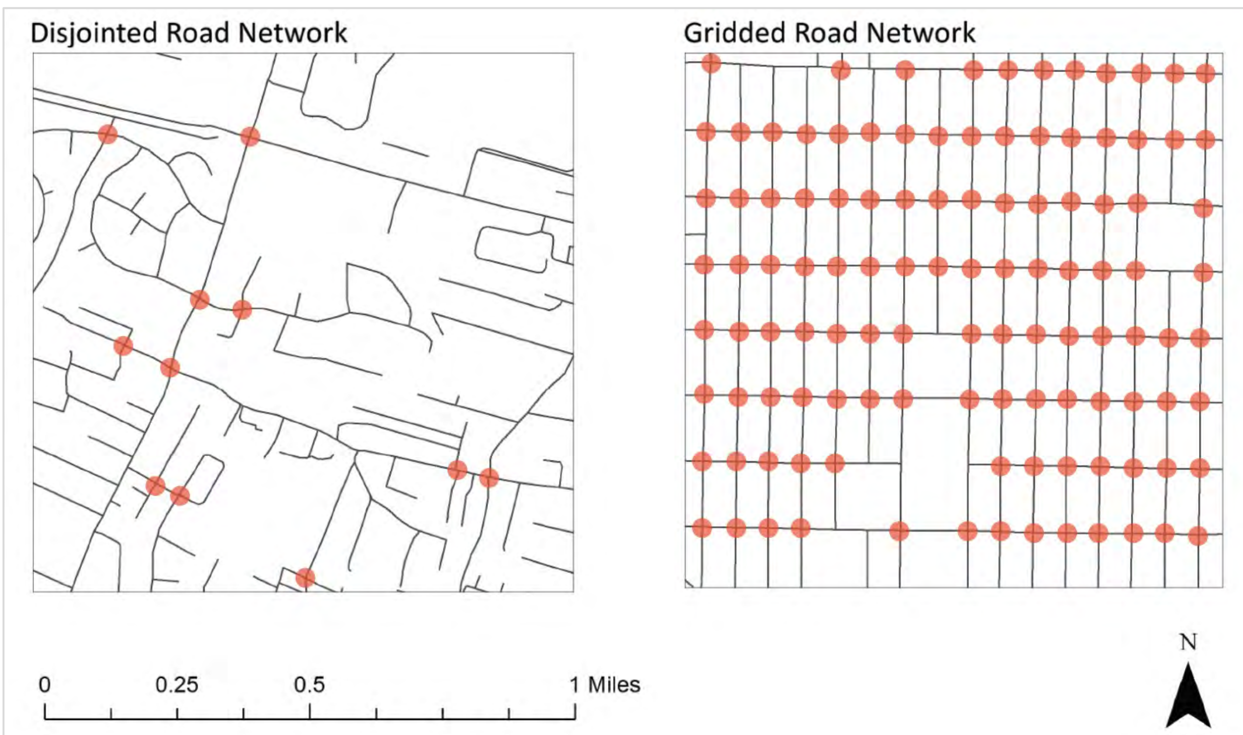
[78] Dill, Jennifer, "Measuring Network Connectivity for Bicycling and Walking," Transportation Research Board, 2004

Route Directness Ratio = $\frac{Walking\ distance}{Shortest\ distance}$

- Disjointed road network example: $\frac{10{,}560\ ft}{800\ ft}$ = 13.2 (just over thirteen times farther than the shortest distance between points)
- Gridded road network example: $\frac{1{,}320\ ft}{800\ ft}$ = 1.65 (just over one and a half times farther than the shortest distance between points)

The intersection density method, shown in Figure 3-52, counts the number of four-way intersections per square mile. In this case the higher the intersection density the better the connectivity.

Figure 3-52: Intersection Density: A Measure of Roadway Connectivity



Intersection Density = Number of four-legged intersections/square mile

- Disjointed road network example: 11 intersections/square mile
- Gridded road network example: 112 intersections/square mile

3.13.3 Relationship between Accessibility and Connectivity

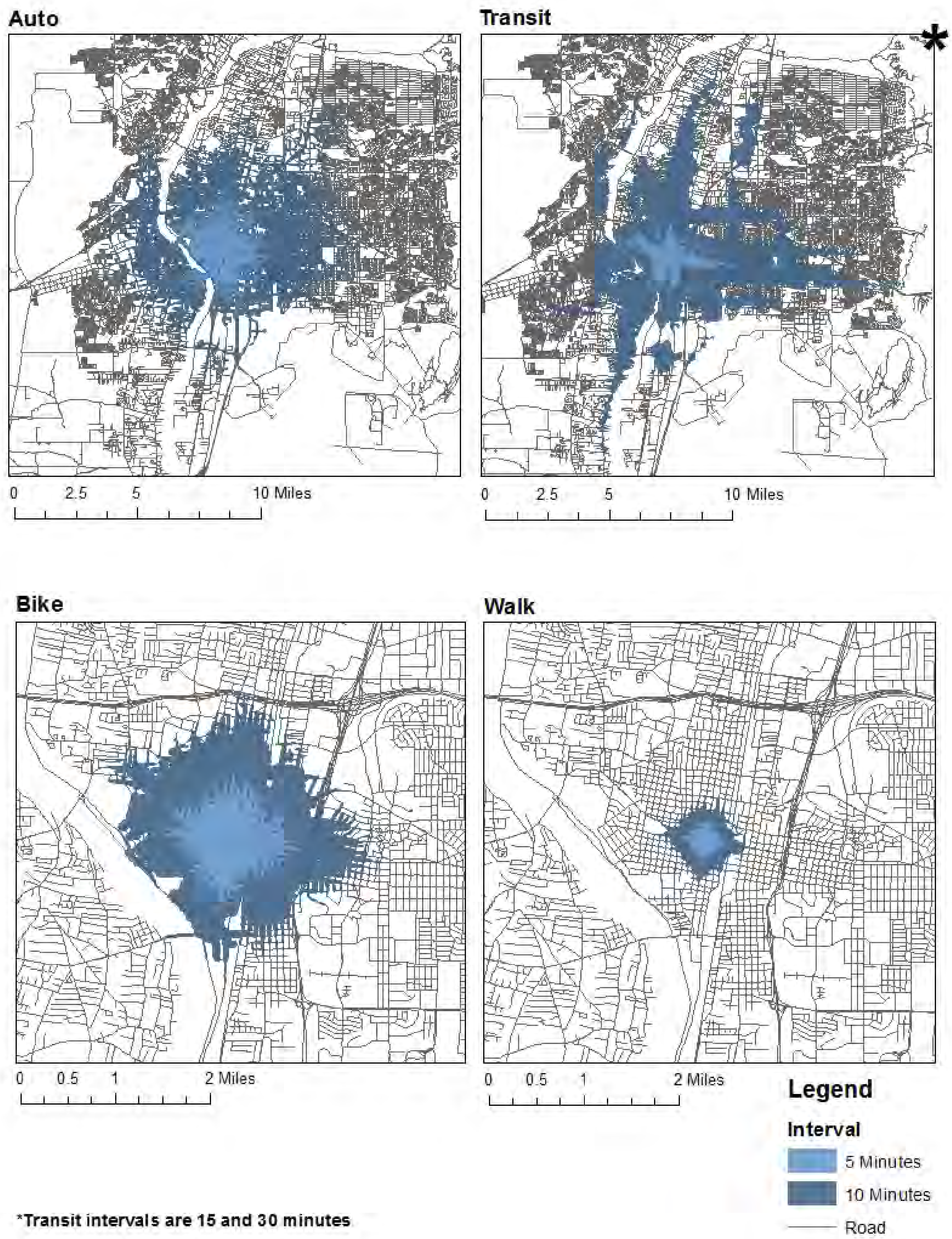
The tool used in this section to visualize roadway connectivity and quantify access to certain amenities is called the Transportation Accessibility Model (TRAM). This program can map the area that can be reached by walking, bicycling, driving, and taking transit in a given time period. What it reveals about accessibility is dependent on the underlying connectivity of the road networks. For example, the TRAM model can be used to find the areas – as well as the population and number of households or businesses within these areas – that can be reached in five minutes from the Alvarado Transportation Center in the Central Business District (Downtown Albuquerque) by various modes. These “transportation sheds” (shown on the maps in Figure 3-53 in dark blue) allows one to quantify how many people can access certain services, how many services fall within a certain transportation shed, or how much ground a person could cover in a given time using various modes. Figure 3-53 compares how much ground can be covered using different modes in five and ten minutes (transit contours are fifteen and thirty minutes to allow time for the possibility of a route transfer).

On a perfectly gridded network, the contour would take the shape of a diamond because the network’s redundancy maximizes a person’s possible travel distance on foot, by bike, or car. As the distance from the traveler’s origin increases on a somewhat gridded network the shape dilutes. Transit contours also reveal the shape and efficiency of the transit network. TRAM assumes that a transit trip begins when the traveler boards a bus and accounts for each route’s headway, meaning how many minutes there are between buses on that route. Each trip begins at the center of the light blue contours.

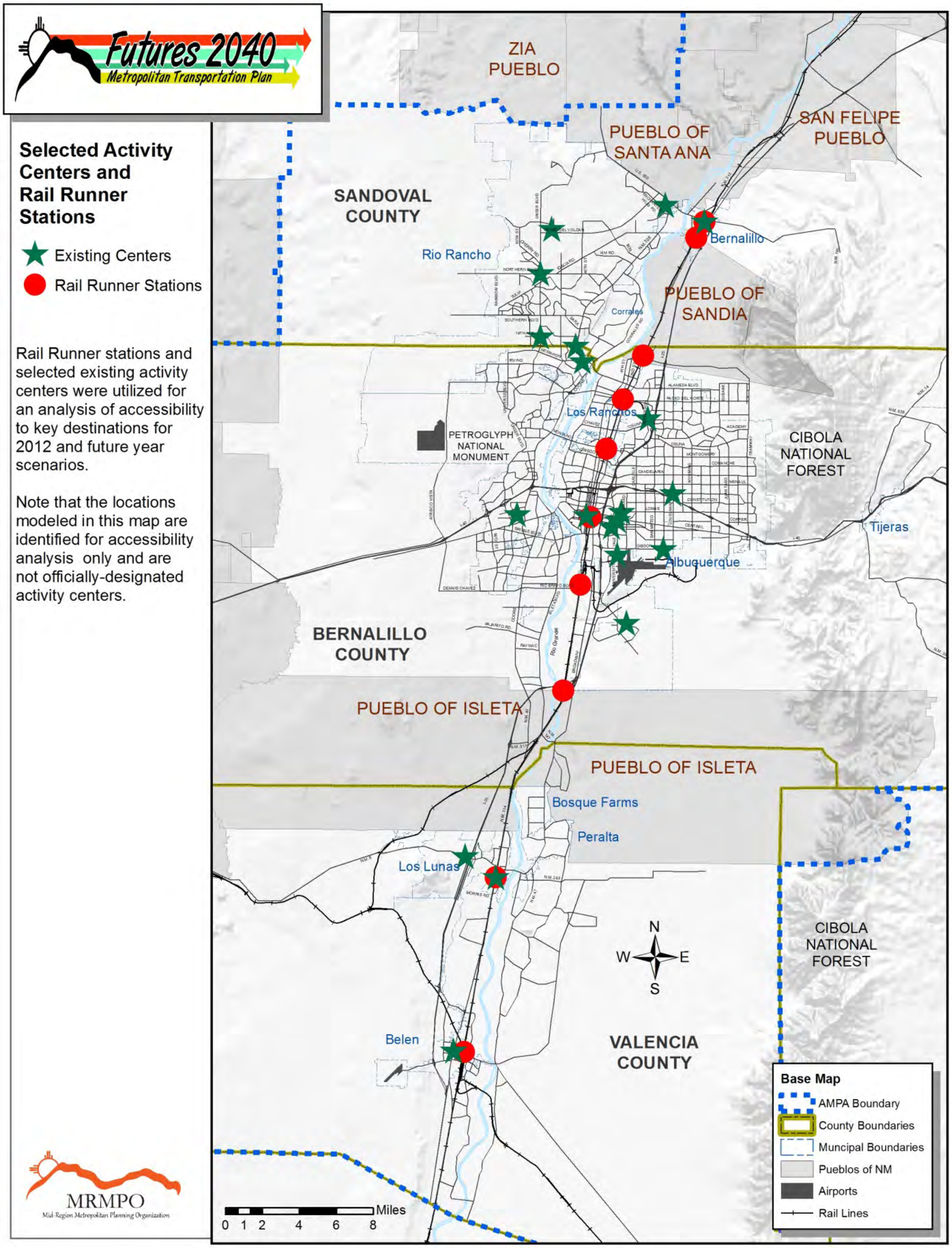
TRAM analysis can be performed at a regional, neighborhood, or site-specific scale. In addition to mapping accessible areas for various modes at different time increments, TRAM can be used to contrast current and proposed road networks to identify alignments and network configurations that provide the most access to users for different modes. TRAM can also be utilized to understand the improvements in access that can be gained from a new transportation investment, such as additional roadway capacity, filling in a gap in the bicycle network, or increasing frequency of a transit service. In this way, transportation improvements can be thought of as more than a means of increasing vehicle speed; these improvements can also be evaluated for their impact on accessibility. MRMPO encourages agencies to utilize the tool during project development.

In this section, TRAM is used to map accessibility to select activity centers and Rail Runner stations in the AMPA (see Map 3-38). Activity centers and major transit hubs are areas where improvements in connectivity and targeted land use changes could increase access to amenities, such as goods, services, and transportation. Establishing a base level of access to these sites will enable future comparison as conditions change. It also allows for the comparison of network performance in different potential growth scenarios. Tables 3-20 and 3-21 estimate the current population, number of dwelling units and employed persons within five and ten minute trip lengths from major activity centers and Rail Runner stations on various modes.

Figure 3-53: Central Business District Travel Time Contours by Mode



Map 3-38: Select Activity Centers and Rail Runner Stations in the AMPA



Analysis: Access to Activity Centers and Transit

Currently, 75 percent of the AMPA's population resides within a ten minute drive of an activity center, and 40 percent live within a ten minute drive of a Rail Runner station. When looking at biking or walking, both activity centers and Rail Runner stations are accessible to much fewer people, with less than two percent of the population within a ten minute walk of an activity center, and 0.4 percent of the population living within a ten minute walk of a Rail Runner station. As conditions in these areas change, with the addition of trail connections or transit oriented development for example, access to these areas may expand to a greater percentage of the AMPA population. Measuring access to major activity centers and premium transit services provides a benchmark to compare against future conditions.

Table 3-20: Access by Mode to Select Activity Centers by Mode, 2012

Minutes by Mode		Population		Employed Persons	
Auto	5 Minutes	236,752	26.9%	173,633	44.6%
	10 Minutes	663,015	75.4%	328,215	84.4%
Bike	5 Minutes	284,049	3.2%	60,422	15.5%
	10 Minutes	139,542	15.9%	140,407	36.1%
Walk	5 Minutes	32,636	0.4%	12,212	3.1%
	10 Minutes	16,158	1.8%	43,615	11.2%
Transit	15 Minutes	142,551	16.2%	156,511	40.2%
	30 Minutes	467,621	53.2%	296,311	76.2%

Table 3-21: Access by Mode to Rail Runner Stations, 2012

Minutes by Mode		Population		Employed Persons	
Auto	5 Minutes	68,034	7.7%	78,299	20.1%
	10 Minutes	354,881	40.4%	235,076	60.4%
Bike	5 Minutes	7,537	0.9%	19,267	5.0%
	10 Minutes	43,957	5.0%	53,121	13.7%
Walk	5 Minutes	665	0.1%	2,070	0.5%
	10 Minutes	3,559	0.4%	10,637	2.7%
Transit	15 Minutes	49279	5.6%	58,792	15.1%
	30 Minutes	267240	30.4%	212,619	54.7%

Figures 3-54 and 3-55 show changes in access to activity centers, employment sites and transit from the base year (2012) to the forecast year (2040) in the Trend and the Preferred Scenarios. The intervals represent driving times during PM peak hour conditions. In the Preferred Scenario, access to activity centers in under ten minutes increases by 51,382 people, 7,932 employed persons, and 25,409 dwelling units compared to the Trend Scenario. The population and number of dwelling units near Rail Runner stations show positive growth compared to the Trend in all time increments. Although the number of employees within ten minutes of a Rail Runner station is slightly lower in the Preferred Scenario than the Trend, there is a substantial increase in employment near transit in both future scenarios. Overall, the increased concentrations of population, employed persons, and dwelling units within ten minutes of activity centers is representative of the Preferred Scenario's emphasis on increasing density in key nodes in order to expand access to transit, jobs, goods, and services.

Figure 3-54: Activity Center Access: 2012, Trend, and Preferred Scenarios

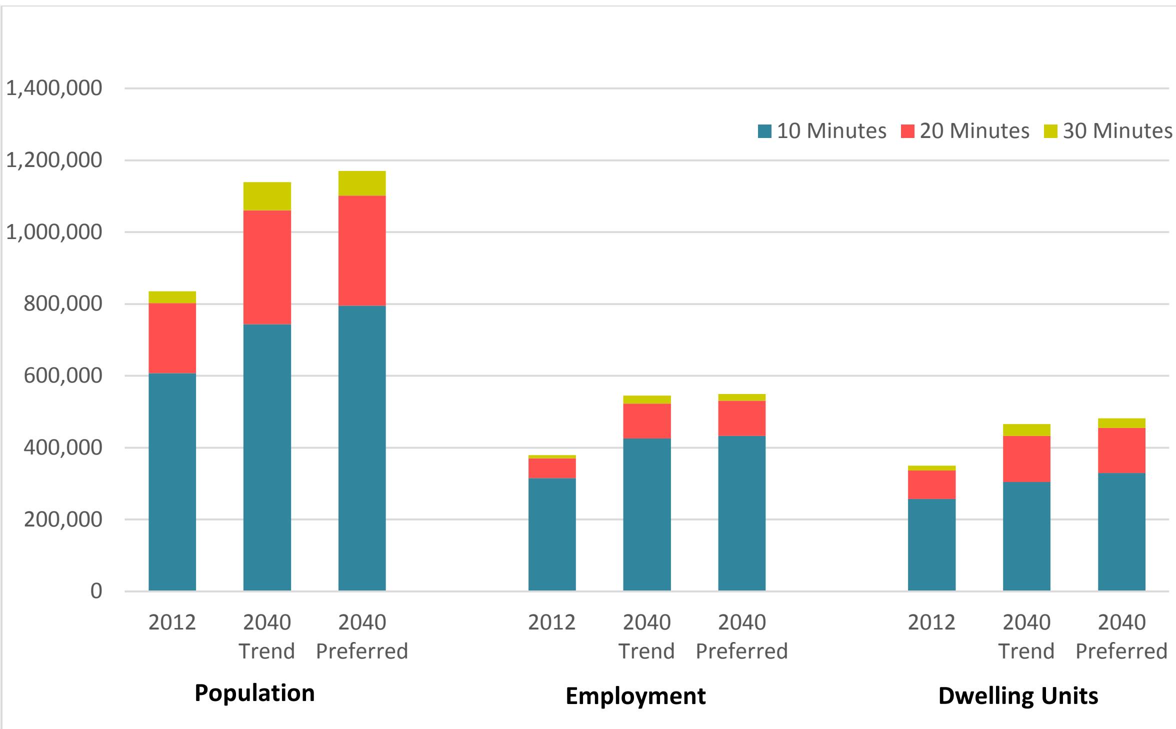
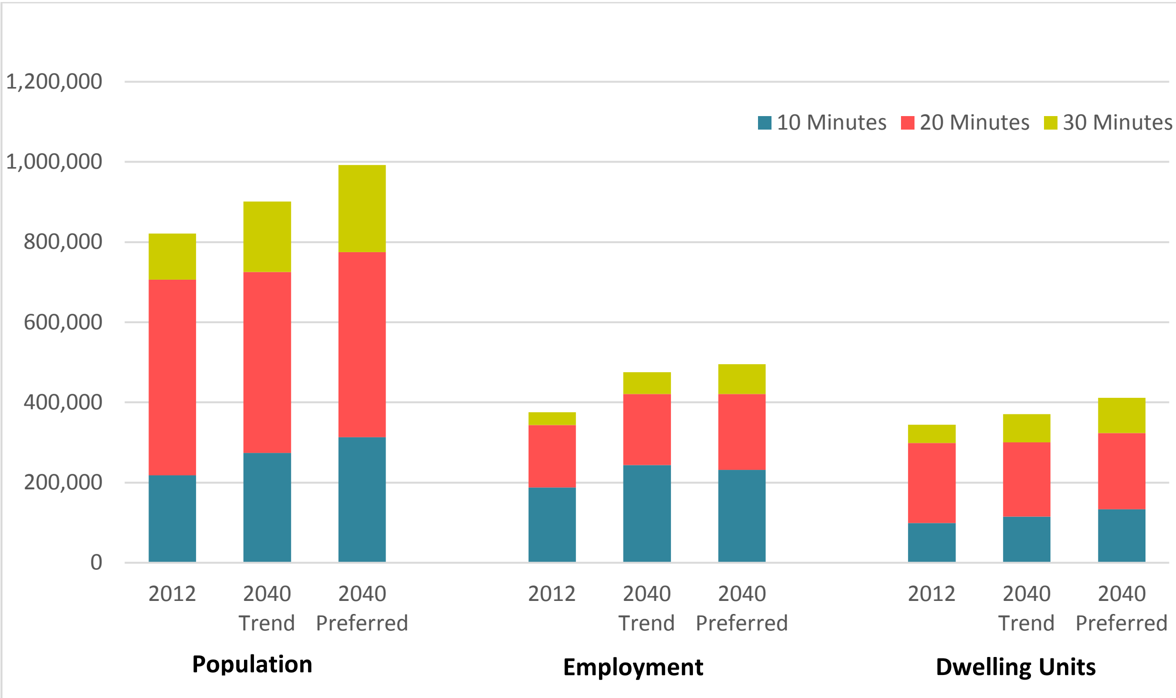


Figure 3-55: Rail Runner Station Access: 2012, Trend, and Preferred Scenarios



3.13.4 Shifting Age Dynamics and Accessibility for Senior Citizens

The AMPA is expected to experience important shifts in the composition of the population as seniors (ages 65 and older) form a greater share of the population while the labor force participation rate is expected to decline. In particular, the percentage of seniors will increase from 12 percent of the total AMPA population in 2012 to 21 percent in 2040; this represents an increase of 160,000 people. Changing age dynamics will impact the types of trips that seniors make (e.g., fewer commuting trips), as well as the types of services and transportation and housing options that need to be provided. Given the increased need for healthcare services among seniors, transportation to and from these facilities is an important consideration. This is addressed in the public health section (see Chapter 3.8) through the accessibility of medical facilities via public transit. However, the general mobility needs of a population that may not rely as widely on driving is a larger and more general issue.

As seniors account for a greater portion of the population, they will also form a greater share of the nation's drivers. Baby Boomers are a generation that have become accustomed to the individual mobility and convenience of car ownership, and expect to remain active and mobile well into retirement. The National Association of Area Agencies on Aging reports that by 2030, 25 percent of licensed drivers in the U.S. will be over the age of 65.[79] Auto dependency among seniors occurs most acutely in single–use residential communities, where services are spread far apart and the low population density is not conducive to robust transit services. A 2010 American Association of Retired Persons (AARP) survey finds that "nearly 90 percent of those over age 65 want to stay in their residence for as long as possible, and 80 percent believe their current residence is where they will always live."[80] This "greying" of residential communities is a phenomenon that will continue to intensify in the U.S. due to the greater proportion of seniors in the population and the fact that many of those people will age in place.[81]

The increase of senior drivers has implications for driver as well as pedestrian safety. A 2002 study found that "(o)lder drivers are not only more likely to have crashes on an exposure basis (per trip or mile driven), they are also generally more likely to be at fault in a multicar crash, and more likely to be killed or injured than are younger people in a crash of comparable magnitude."[82] Older drivers are also vulnerable as pedestrians, both to auto-pedestrian crashes and to falls. Tailoring pedestrian improvements to older individuals, such as ADA-accessible sidewalks and traffic calming measures in areas with frequent foot traffic, will make conditions safer for all users.

This increase in the percentage of seniors also impacts commuting patterns. Older drivers make fewer work trips that contribute to morning and evening peak congestion. Rather, they tend to make most of their trips between 9 AM and 1 PM, avoiding freeways and favoring local roads.[83] While these driving behaviors have a beneficial impact on peak hour traffic, they can contribute to mid-day congestion. Other impacts may be felt by those providing support for senior citizens, leading to additional trips for caretakers or home health providers.

Although the cost of car ownership can be a transportation barrier for seniors, especially those on a fixed income, driving is often the most convenient form of transportation for seniors. This is especially true for those who are somewhat less mobile. Cars enable door-to-door transportation, whereas taking public transit or walking can be much more physically challenging. It is not necessarily true that seniors who take alternative modes of transportation cannot drive. One international study of travel patterns among older populations found that, "(w)hen given a reasonable set of transportation options, older people…appear to choose the best or most convenient mode for each trip."[84] Providing a host of viable transportation options, including ADA-accessible pedestrian facilities and public transit near amenities and services may not only increase transportation options for older residents who cannot drive, it would also be a resource for those who can.

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[79] Vital Aging Network, "Maintaining mobility in an aging population"
[80] Transportation for America, "Aging in Place, stuck without options: Fixing the mobility crisis threatening the baby boom generation," 2011, p.1
[81] Center on Urban and Metropolitan Policy, "The mobility needs of older Americans: Implications for transportation reauthorization," 2003, p.3
[82] Ibid, p. 10
[83] Ibid, p.9
[84] Ibid, p.12

Strategies to Improve Access for an Aging Population

The desire to age in place is not likely to change in the near future; therefore, addressing the transportation needs of seniors by improving accessibility is a critical part of creating "lifelong communities," meaning places for persons of every age and ability. The goals of a lifelong community are to provide housing and transportation options, encourage healthy lifestyles, and expand access to services.[85] This necessitates improving roadway connectivity, improving pedestrian and transit access, along with implementing certain land use changes including providing services in or near neighborhoods.

Improving transit access necessitates increasing density in targeted locations as well as creating a greater mix of land uses. When both of these changes are made in infill locations throughout already established areas, providing transit services becomes more viable. Augmenting transit services with pedestrian amenities around transit stops such as shaded places to rest and redesigning streets as complete streets for all users helps facilitate walkable communities, where walking is "pleasant, safe, and secure."[86] The opportunity to provide services closer to established suburbs also increases. Encouraging multi-use developments that allow residents to access many of the services they need without driving may allow senior citizens to remain in their communities if not their previous homes.

In addition to improving transit services closer to residences, providing alternatives to traditional transit services will also enhance mobility for seniors. These services can include volunteer drivers that provide on-demand transportation or ride sharing programs.

3.13.5 Strategies to Improve Access and Connectivity

Improving connectivity is one way to increase access to goods, services, and job sites. Various strategies that improve connectivity include gridded street networks, expanding transit services, and filling in gaps in the bicycle and pedestrian networks. For maximum impact, connectivity improvements can be targeted in and around major activity centers such as community centers, schools, transit stations, and job-dense areas, increasing access from and to these sites.

MRMPO's Long Range Transportation System (LRTS) Guide (see Chapter 5.2 and Appendix H), which is included as part of the *Futures 2040 MTP*, offers guiding principles to increase roadway connectivity. The Guide recommends that proposed roadways and trail systems in developing areas contribute to the surrounding transportation network by facilitating travel through the development to adjacent neighborhoods. It is important to establish roadway and trail access between arterials and neighborhoods prior to development to avoid conflict with residents after build-out. In general, shorter block lengths and a gridded street pattern should be encouraged and dead-end or cul-de-sac roads should be discouraged. Access should be provided to multi-purpose trails that border neighborhoods

[85] Atlanta Regional Commission, "Lifelong communities handbook: Creating opportunities for lifelong living," p.1
[86] Center on Urban and Metropolitan Policy, "The mobility needs of older Americans: Implications for transportation reauthorization," 2003 p. 13

but are inaccessible due to subdivision walls or drainage facilities. Removing a section of wall or providing a bridge across drainage barriers can create this access. In both developing and developed areas, drainage and utility easements can be assessed as possible trails or local roads.[87] Providing multiple route and mode options lessens the impact of road work, vehicle crashes or special event closures on the performance of the transportation network and should be considered as a component of all future developments in the AMPA.

The LRTS Guide promotes the concept of creating complete networks for different users.[88] For example, trips on regional principal arterials prioritize passenger vehicles and freight due to their high speeds and limited access to local roads. Creating a complete network would ensure that there are route options for every type of transportation user: bicyclists, drivers, freight carriers, pedestrians, and transit users. Not every road will be appropriate for every user all of the time, but ensuring that individuals have access to various transportation options will benefit individual residents as well as the performance of the overall network. The LRTS Guide's chapter on Complete Networks outlines the roles and intended users for each class of road. Information on performance measures that can help monitor project performance and improve the transportation system, including multi-modal level of service, walkability, connectivity, and safety, can be found in Chapter 8 of the LRTS Guide.

Increasing location affordability options for AMPA residents will also improve access to daily necessities. Increasing the housing stock in job-dense areas could provide people with more housing options close to job sites. Targeting these areas with mixed use zoning and higher density requirements could also reduce per capita vehicle miles traveled by bringing many residents closer to goods and services. Dovetailing these density increases with transit investments would concentrate more potential riders near transit services and provide people with more transportation options. Two ways to increase density without much or any vertical structure increase involve residential infill on properties that are currently vacant and allowing accessory dwelling units to be built on private properties. While expanding transportation options, increasing density, or enhancing connectivity by themselves do not necessarily lead to increased access, implementing a host of strategies together in key locations can help achieve greater accessibility and ultimately livability.

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[87] LRTS guide chapter 4.4, "Strategies to Improve Connectivity"
[88] LRTS Guide chapter 4, "Complete Networks"

3.14 Climate Change Impacts

In 2013 the Mid-Region Council of Governments was awarded a federal grant to incorporate climate change considerations into its transportation planning process. In particular, the study examined the relationship between growth patterns, development pressures, and climate change impacts on an inland region. It is through the expanded scope made possible by the Central New Mexico Climate Change Scenario Planning Project and the resulting partnerships that climate change issues are discussed in the *2040 MTP*.[89]

The climate change project and related analysis is timely, in part because of the feedback MRMPO received as part of its public outreach and plan development processes. Water resource availability, a function of climate conditions, was the number one regional challenge identified. And it is the same factors that influence water resources, specifically changing temperature and precipitation levels, that also lead to increased risk of droughts, wildfires, and flooding. The climate change project ultimately determined that how the region grows and its ability to adapt to climate change impacts are inter-related. Minimizing growth in at-risk locations entails development forms that also lead to better transportation outcomes, a smaller regional footprint, and lower levels of water consumed for residential purposes.

This chapter considers some of the ways climate change may impact the region, with particular emphasis on the effects of natural phenomena on the built environment. Subsequent chapters consider water resources, environmental considerations, and strategies to reduce greenhouse gas emissions.

In a Nutshell…

Takeaways: Annual average temperature levels are expected to rise by 2-3^{o}F by 2040, while precipitation levels become more variable. Taken together, these changes may lead to increased frequencies of drought, wildfires, and flooding.

Components: This section examines projected climate conditions in the region and some of the effects of climate change on central New Mexico. The relationship between the built environment and locations that are at increased risk due to the effects of climate change are considered.

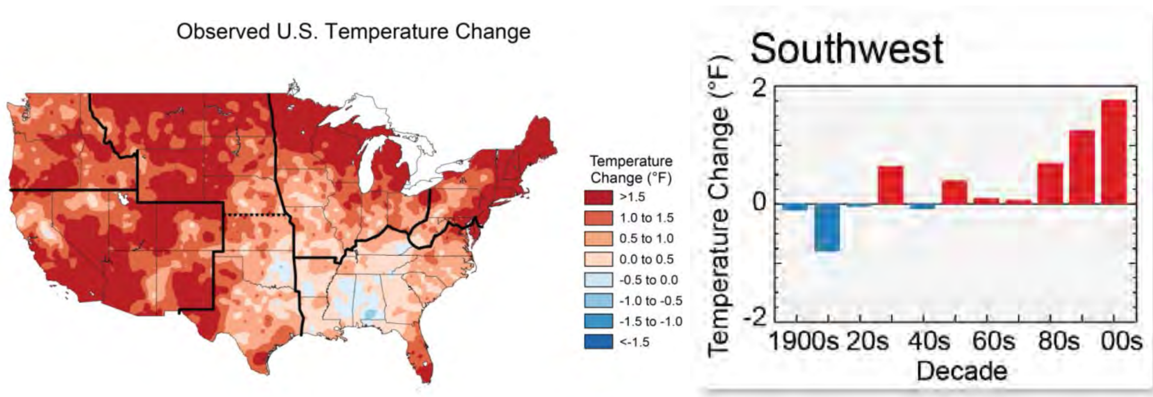
Goals and Objectives: Addressing the MTP goal of *Environmental Resiliency* begins with an understanding of the effects of climate change on the region. Preparing for climate uncertainties and minimizing the footprint of new development are supporting objectives.

[89] 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. For more information, please see the “Climate Change Project” link on the MRCOG website.

3.14.1 Impacts on Temperature and Precipitation Levels

In 2009, the U.S. Global Change Research Program (USGCRP) concluded that "human-caused emissions of heat-trapping gases will cause further warming in the future… [and] global average temperature is projected to rise by 2 to 11.5 °F by the end of this century." Even more concerning, the USGCRP finds that by 2100, the average U.S. temperature is projected to increase by approximately 4 to 6.5 °F under a forecasted lower-emissions scenario and by approximately 7 to 11 °F under the higher-emissions scenario. The effects of climate change of 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.[90]

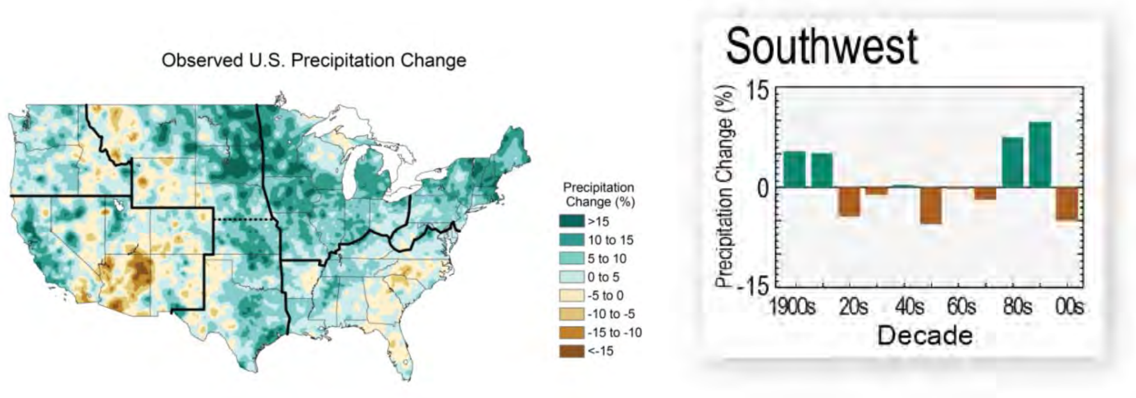
Figure 3-56: Observed U.S. Temperature Change, 1901-2012; Observed Temperature Change Decadal Bar Graph, 1900s-2000s, U.S. Southwest[91]



Precipitation is also highly subject to climate change. Since 1900, average annual precipitation over the U.S. has increased by roughly five percent; however there are important regional differences. As the global average temperature increases, some areas of the United States will receive more precipitation while others will receive less. While the central plains and the northeast have observed increases in precipitation over the previous century, the desert southwest has witnessed general decreases. The changes are far from linear; the southwest region experienced an unusually wet period in the 1980s and 1990s, followed by extended period of below average rainfall. The uncertainty and unpredictability of precipitation events is only expected to increase over time.

[90] Bureau of Reclamation, *Upper Rio Grande Impact Assessment*, Executive Summary, S-iii
[91] U.S. Global Change Research Program www.globalchange.gov

Figures 3-57: Observed U.S. Precipitation Change, 1901-2012; Observed Precipitation Change Decadal Bar Graph, 1900s-2000s, U.S. Southwest[92]



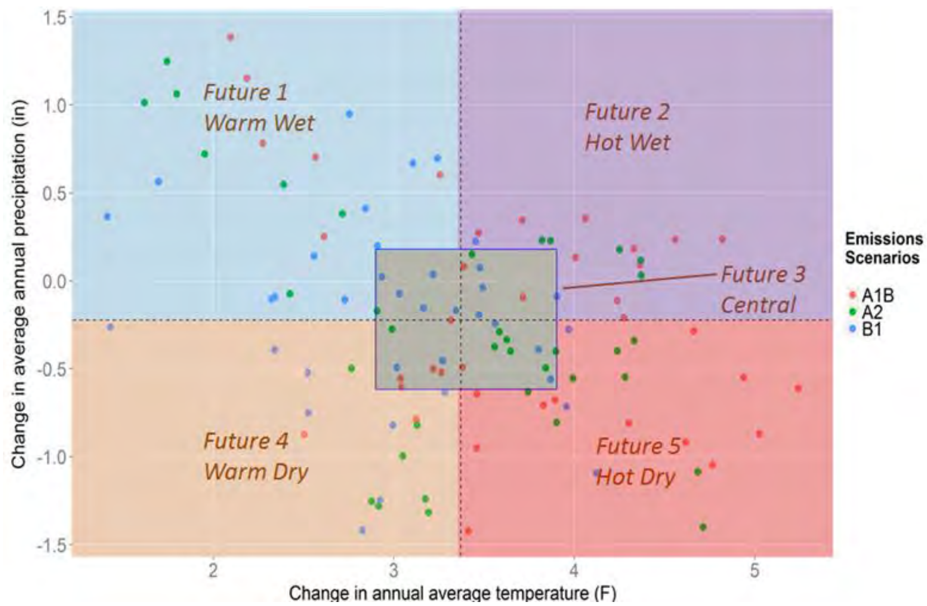
3.14.2 Projected Climate Conditions in Central New Mexico

Detailed analysis on expected climate change impacts in the Albuquerque metropolitan area were conducted as part of the Central New Mexico Climate Change Scenario Planning Project. Figure 3-58 represents potential changes in temperature and precipitation, as identified by general circulation models using three emissions scenarios.[93] 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 3-4ºF by the year 2040. In addition to greater overall average temperatures, the number of days with temperatures over 100ºF is also expected to increase.

Annual precipitation is slightly 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.

[92] U.S. Global Change Research Program www.globalchange.gov
[93] 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.

Figure 3-58: Change in Annual Temperature and Precipitation Levels, Summary of Global Circulation Model Runs for Albuquerque Area, 2010 – 2040



3.14.3 Effects of Climate Change on Central New Mexico

The combined impacts of warmer average temperatures and variable precipitation levels have important implications for central New Mexico. Many of these effects have been outlined by the Bureau of Reclamation in the *West-Wide Climate Risk Assessment: Upper Rio Grande Impact Assessment.* The study focused in particular on impacts to the region's hydrology and found there to be likely decreases in overall water availability, changes in the timing of flows, and increases in the variability of flows. Higher average temperatures and higher freezing altitudes mean that the form of precipitation will shift from snow to rain and result in earlier melting of snowpack. This will ultimately lead to delays in the arrival of the snow season, decreases in the size of snowpack, and earlier runoff in areas where seasonal cycles of runoff have historically been dominated by snowmelt.

Ultimately, supplies of all native sources to the Rio Grande are projected to decrease on average by about one third by 2100, while flows in the tributaries that supply the imported water to the San Juan-Chama Project are projected to decrease on average by about one quarter. The seasonality of flows is projected to change due to the anticipated changes in snowmelt and runoff. This increased variability in the amount, timing, and distribution of streamflow and other hydrologic variables indicate that the Upper Rio Grande Basin will experience a decrease in summertime flows, the time when agricultural and residential demands are greatest. More discussion on the implications of water resource availability on future development can be found in Chapter 3.15.

Impacts to the built environment were discussed in a report produced for the climate change project by Ecosystem Management, Inc. (EMI).[94] The report found that higher temperatures lead to increased energy demands needed for cooling buildings and can also have negative air quality impacts by facilitating the formation of ozone and fine particular matter ($PM_{2.5}$). Some of the report's findings are summarized below:

- **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.

- 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. Such events are likely to continue, with impacts on the health of forest lands and greater threats to the built environment.

- Extreme precipitation events that follow periods of prolonged drought also create the conditions for **flooding** events, which may become more extreme with climate change. Flood control infrastructure will be needed more often in the future, even as overall water supplies decrease. Runoff from flooding events in conjunction with forest degradation due to increased forest fires will be increasingly problematic. Concentrations of nitrogen, phosphorus, suspended solids, and salt may increase as soil qualities degrade in response to increased 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.

[94] EMI, "Climate Changes Effects on Central New Mexico's Land Use, Transportation System and Key Natural Resources," 2014, available on the MRCOG website.

3.14.4 Development Patterns and Adaptation to Climate Change

The Central New Mexico Climate Change Scenario Planning Project allowed MRMPO and regional stakeholders to incorporate these aforementioned impacts into long-term regional-scale analyses. Of particular interest was the relationship between future development patterns and vulnerabilities to the effects of climate change. Five climate change-related components were considered through the scenario planning process and evaluated using performance measures. These include:

- 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 (see Chapter 3.16 for details)
- Water consumption: number of gallons of water consumed by residential users per year (see Chapter 3.15 for details)
- Emissions levels: CO_2 tonnes per day (see Chapter 3.17 for details)

Two of these factors are considered in this section: flood-risk areas and forest fire risk areas. 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. In this way the Trend and Preferred Scenarios can be evaluated for their relative resiliency to climate change impacts. Of particular 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.

Flood Risk Areas

FEMA designates 100-year floodplains based on the extent of impact likely from a 24-hour 100-year precipitation event (see Map 3-39). In the AMPA, floodplains are generally located along the Rio Grande and arroyos that flow into the river system. Although the frequency and intensity of extreme events (i.e. the 100-year design storm) may increase and some individual floodplains may become enlarged, FEMA-designated floodplains are the official tool for assessing the risks associated with extreme precipitation events across the region.[95] The *2040 MTP* therefore uses the floodplains for spatial analysis and considers the number of housing units plus employees located in existing floodplains for the 2012 base year, Trend, and Preferred Scenarios.

An important difference between the Trend and the Preferred Scenarios is that the zoning capacity in 100-year floodplains in the Preferred Scenario is reduced by 20 percent. Nevertheless, the differences in

[95] 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 particular 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.

development levels are modest. The Trend Scenario projects a 56 percent increase in housing and jobs in floodplains, while the Preferred Scenario projects a 52 percent increase in these areas. The minor reduction in growth in the Preferred Scenario reflects the fact that many floodplains are home to existing communities and high levels of development. Fortunately, many floodplains have been highly engineered to ensure extreme precipitation events can be properly managed. The most important consideration, therefore, is the concentration of development in floodplains, and whether growth takes place in floodplains that already have flood control infrastructure, or whether that growth occurs in locations where no such improvements have been made. In both scenarios, the majority of growth in floodplains occurs in the already developed Rio Grande Valley in Valencia County.

Table 3-22: Employment plus Households in Vulnerable Locations

Location	2012	Trend	Preferred
FEMA 100-Year Floodplains	34,242	53,285	52,042
Wildland-Urban Intermix areas	52,073	102,262	92,128

Forest Fire Risk Areas

According to the University of Wisconsin's SILVIS Lab, wildland-urban interface (WUI) 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 poses 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."[96]

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.

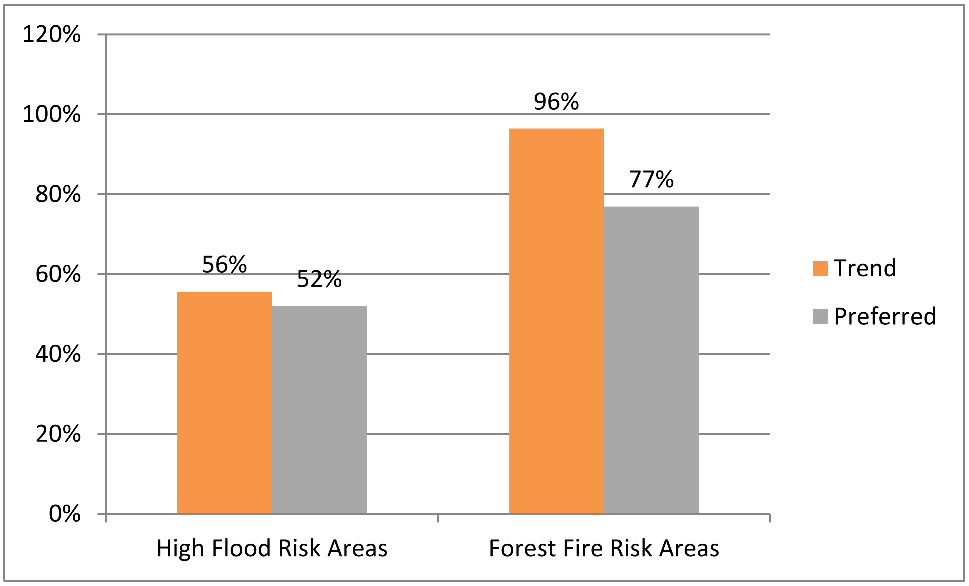
Interface communities are areas with housing in the vicinity of contiguous vegetation. These areas have more than 1 house per 40 acres, have less than 50 percent vegetation, and are within 1.5 mi of an area that is highly vegetated.

MRMPO evaluated the number of housing units plus employees located in "intermix" areas in the AMPA (see Map 3-40). In contrast to the floodplains analysis, there is a greater difference in development outcomes between the Trend and the Preferred Scenarios: the Trend Scenario projects a 96 percent

[96] V.C Radeloff, et al. "The Wildland-Urban Interface in the United States," *Ecological Applications*, 2005, p. 799

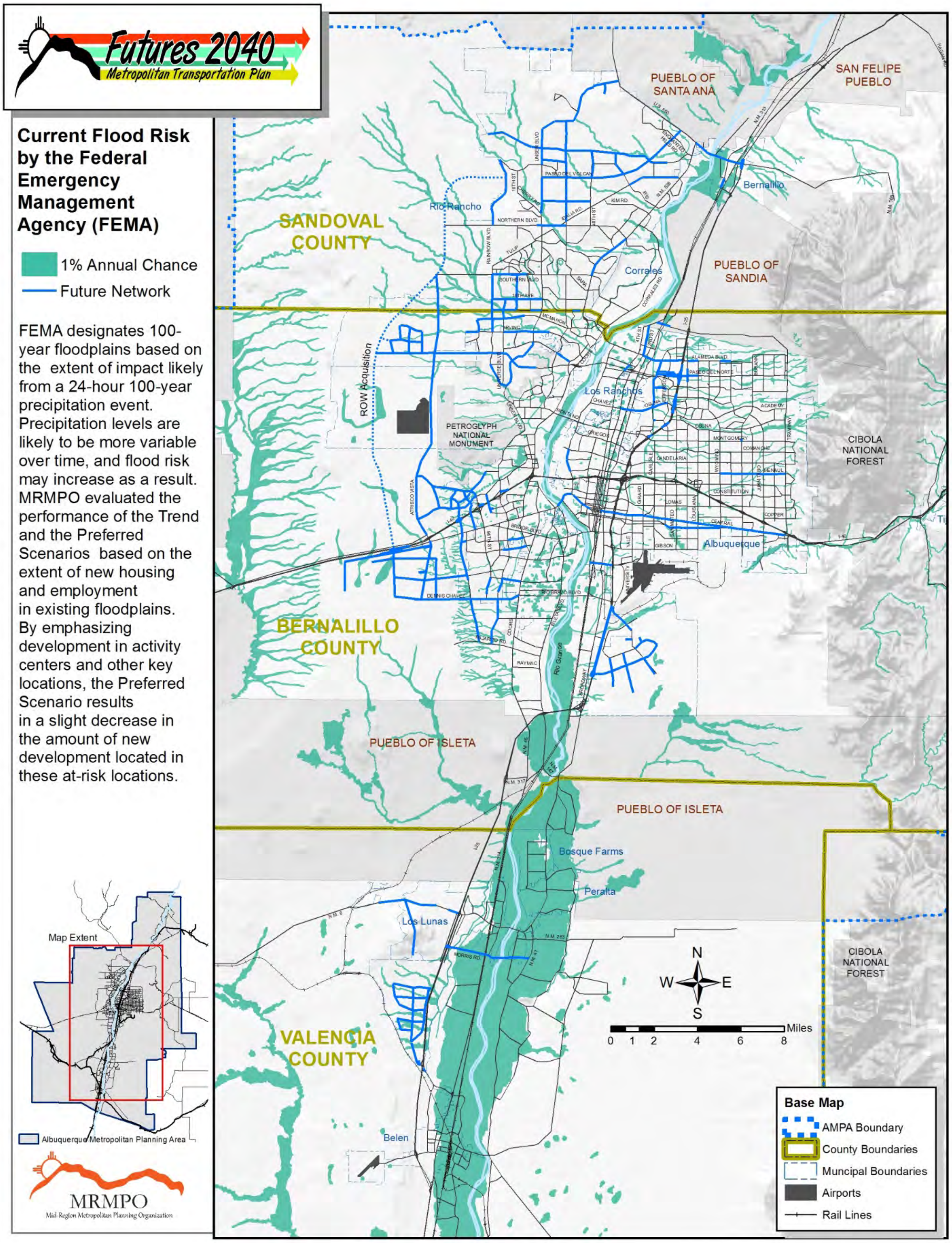
increase in households and jobs in floodplains, while the Preferred Scenario projects a 77 percent increase in these areas. When compared directly, there are 10 percent fewer households and jobs in WUI intermix areas in the Preferred Scenario than in the Trend.

Figure 3-59: Change in Employment plus Households in Vulnerable Locations

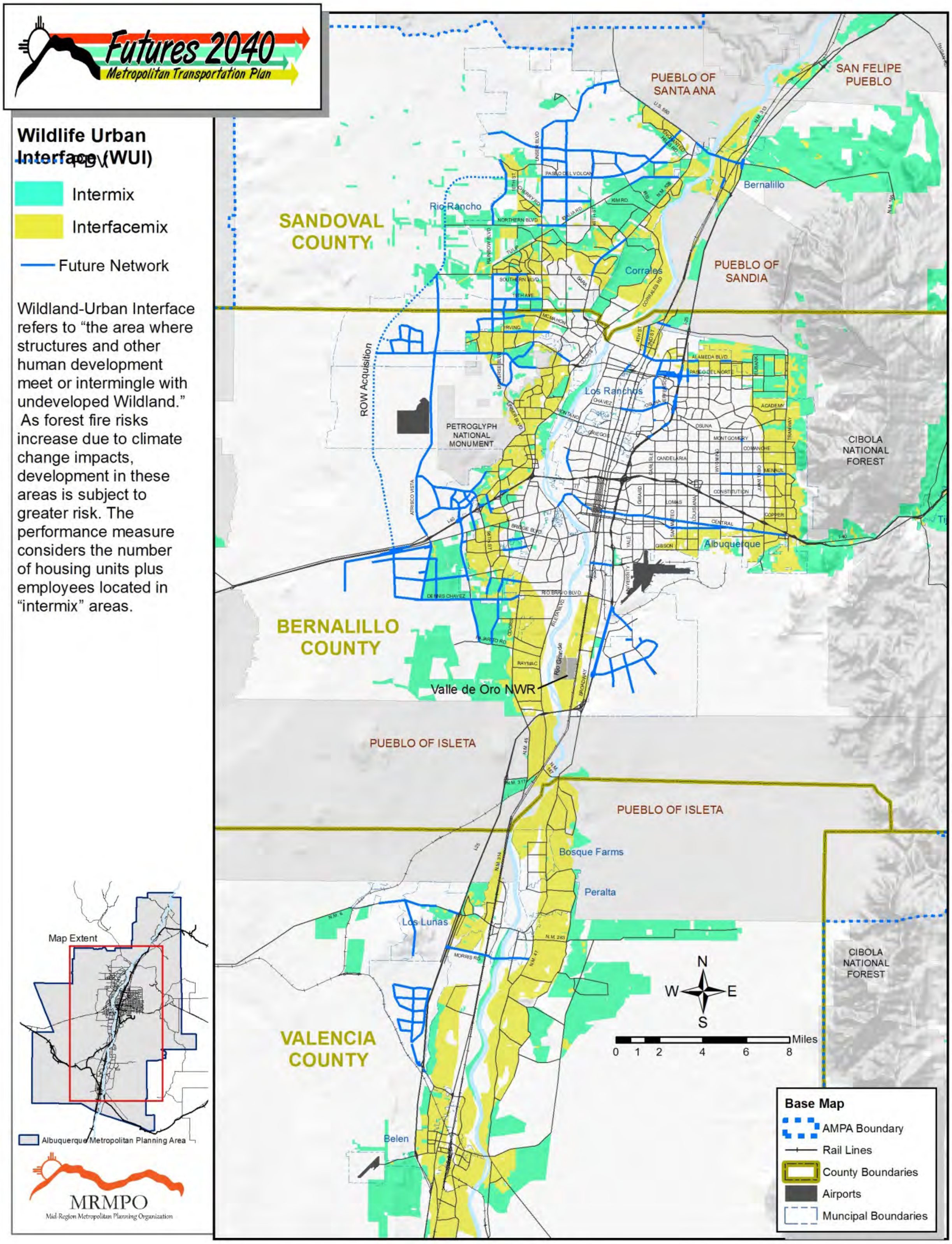


The results indicate the benefits associated with of emphasizing development in low-risk locations as a means of mitigating concerns surrounding development in high-risk locations. Further flood risk and forest fire risk mitigation strategies are identified in the C*entral New Mexico Climate Change Scenario Planning Project Final Report*, which is now available on the MRCOG website.

Map 3-39: FEMA-Designated 100-Year Floodplains



Map 3-40: Wildland-Urban Interface Areas



3.15 Water Resources

Discussions surrounding growth and development within a drought-stricken, arid region of the United States inevitably develop into a debate, and frequently an argument, around the availability of water and how prepared or unprepared central New Mexico 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 demands plays in overall future development. The emphasis on water was an important component of the Central New Mexico Climate Change Scenario Planning Project and merits discussion within the MTP.

The inclusion of water analysis is a logical one in that it involves the same set of projections used for land use and transportation planning. Moreover, how the region grows impacts demand through the types and density of development and the resulting landscaping and irrigation needs. The climate change project helped establish that, in addition to population growth distribution, land use practices influence how much water is needed for general consumption.

This section discusses overarching global, national, and local trends regarding drought, climate change, water availability, and water conservation. During the public outreach process undertaken for the *Futures 2040 MTP*, water resource availability was the number one regional challenge identified. While the scope of this plan cannot address water availability at a comprehensive level, this section helps establish the long-term links between land use and transportation planning and water resources. It also takes a look at the differences in projected water use for different growth scenarios as land uses require water at different rates.

The purpose of this section is not to justify or argue for or against new development on any type of scale or within any particular area of the region. This information is provided specifically to frame the discussion and address the link between water, land use, growth and development, and transportation within the region. Rather than engaging in an argument about whether the region *should* grow, such knowledge can help inform how the region *can* grow most sustainably.

In a Nutshell…

Takeaways: While water resources are expected to decline over time due to the effects of climate change, demand is likely to increase due to projected growth and the effects of higher temperatures.

The same projections used for land use and transportation planning purposes can aid in a wide range of policy decisions, including water resource planning.

Components: This section examines potential changes to long-term surface water supply, conservation and management strategies, and assesses the relationship between growth patterns and water consumption needs.

Goals and Objectives: Conserving water resources and preparing for climate uncertainties are explicit objectives under the MTP goal of *Environmental Resiliency*.

3.15.1 Water Supply

Following research that the region's aquifer was being diminished at unsustainable rates, stakeholders began to increase reliance on surface water through the San Juan-Chama project.[97] Over the last three years the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) has generated 48 percent of its supply from surface water, allowing for valuable aquifer recharge and ensuring a more varied and therefore more sustainable means of meeting regional water demands. However, water resources are at long-term risk, primarily due to the effects of climate change.

Surface water resources for the Albuquerque metro area include both the "native" flows from the Rio Grande basin, and the "imported" water that arrives in the metro area via the San Juan-Chama project, which transports New Mexico's rights to surface water from the Colorado River system to the Rio Grande through a series of pipelines and diversion dams. The long-term fate of these systems was assessed in a 2013 study by the Bureau of Reclamation, *West-Wide Climate Risk Assessment: Upper Rio Grande Impact Assessment*, that considered the "potential impacts associated with climate change on streamflow, water demand, and water operations in the basin."[98]

The study utilized global climate model data as an input to a land surface model and a local river operations model to shed light on management strategies and quantify potential impacts on water availability. The Bureau of Reclamation concluded that the Upper Rio Grande Basin is likely to face decreases in overall water availability, changes in the timing of flows, and increases in the variability of flows. Specifically, supplies of all native sources to the Rio Grande are projected to decrease on average by about one third by 2100, while flows in the tributaries that supply the imported water to the San Juan-Chama Project are projected to decrease on average by about one quarter. Along with declines in average volume, the seasonality of flows is projected to change due to the anticipated changes in snowmelt and runoff. This increased variability in the amount, timing, and distribution of streamflow and other hydrologic variables indicate that this basin will experience a decrease in summertime flows, the time when agricultural and residential demands are greatest. All simulations conducted by the Bureau of Reclamation project show an increase in the month-to-month and year-to-year variability of flows. The frequency, intensity, and duration of both droughts and floods are also projected to increase.[99]

Climate data is marked by high degrees of uncertainty and variability. However, there are consistent trends that emerge within the data. The *Upper Rio Grande Impact Assessment* addressed this variability by analyzing the full range of climate model impacts on river flows. The datasets were grouped based on the temperature and precipitation levels projected by the global circulation models (GCM). Figure 3-60 contrasts average changes in water availability through the native Rio Grande flow and water imported

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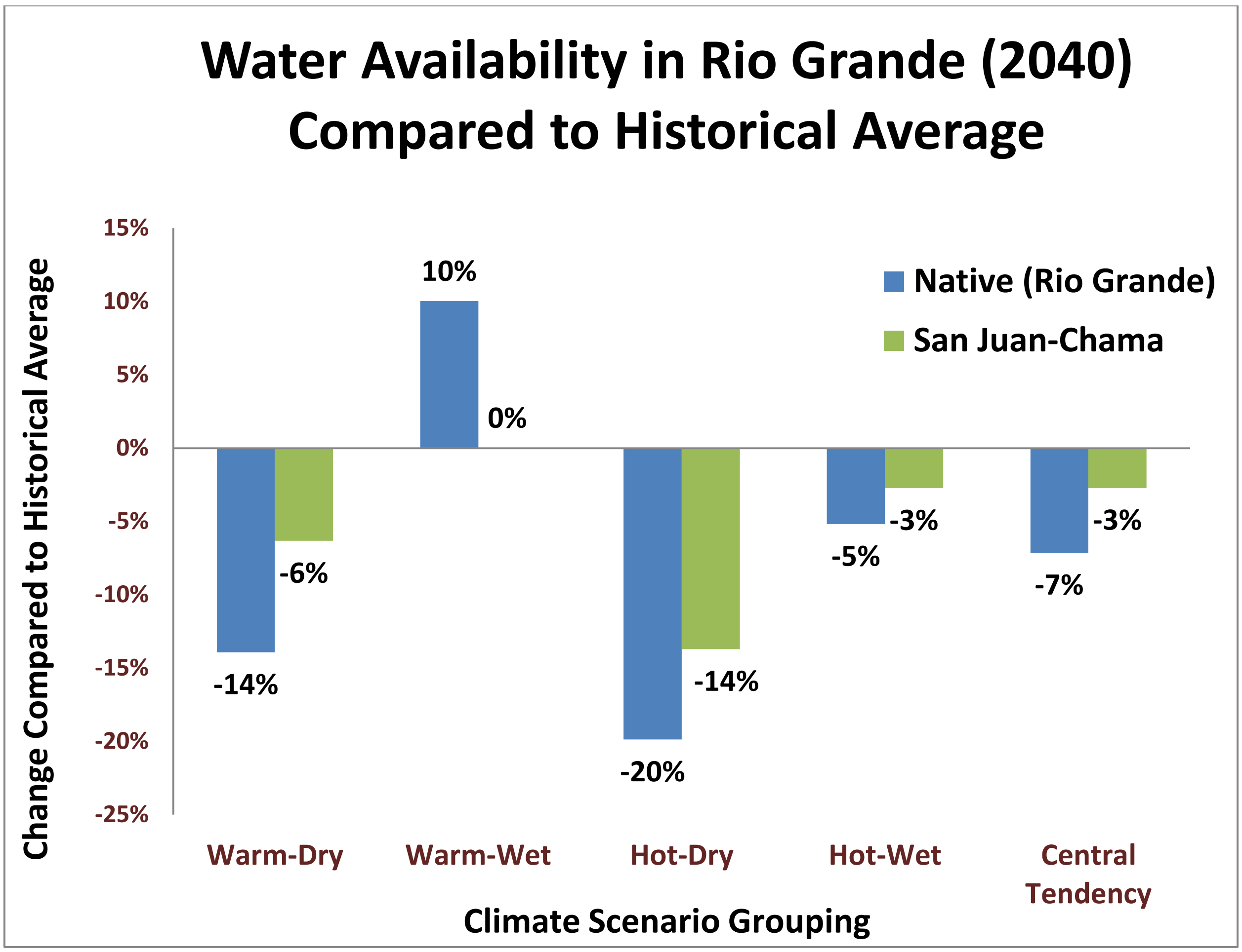
[97] According to the ABCWUA website, "Officials first proposed use of the water for drinking after scientific studies in the early 1990s showed that Albuquerque's aquifer – once thought to be virtually limitless – was smaller than originally believed, and being pumped twice as fast as nature could replenish it."

[98] Bureau of Reclamation, *West-Wide Climate Risk Assessment: Upper Rio Grande Impact Assessment,* December 2013, S-i. The study covered the headwaters of the Rio Grande and Rio Chama.

[99] Ibid. Executive Summary, S-iii-iv

from the San Juan-Chama system into the Rio Grande using the various GCM-based climate scenarios. Modeled river flows are measured at the Otowi gage and compared to historical data.[100] This information, a product of the climate change project, reflects the pressures that will shape and impact development within the region. The graphs indicate there is a significant range in potential flows along the Rio Grande by 2040, although in most scenarios the result is a decrease in water availability (only in the warm-wet climate scenario does the native flow increase). The most likely conditions, as measured by the average of *central* tendency data points, reflect a three percent reduction in the San Juan-Chama allocation and a seven percent reduction in native flows along the Rio Grande.

Figure 3-60: Native Rio Grande and San Juan Chama Water Availability, 2040



[100] Analysis performed by Jesse Roach, formerly of Sandia National Labs, for the Central New Mexico Climate Change Scenario Planning Project. The work was originally performed for the *Upper Rio Grande Impact Assessment*, but was adapted to the 2040 timeframe and to the central New Mexico region. It is important to note that the comparisons are between modeled future year data and modeled (or simulated) historical data. Historical data is calibrated in the development of the URGSim model used for river flow analysis. As with transportation data, direct comparison is only available through comparisons of modeled historical/current conditions to projected conditions.

3.15.2 Water Management Programs

There are many implications to climate change on water availability within the southwest. First, usable, manageable water supply is projected to decline. Due to the anticipated (and continued) loss of winter snowpack, supply of water as well as its ability to store water in the U.S. southwest will decrease. Second, there will a simultaneous increase in water demand for landscaping, irrigation, and agriculture due to the projected increases in temperature, as well as increased commercial and residential demand due to population growth. The decrease in water supply will be intensified by this increase in demand, and the gap between supply and demand will continue to grow.

While the information presented in this section is not to be interpreted as a rationale for opposing development or growth in central New Mexico; it does, however, demand that growth be undertaken in a responsible manner. While water management and climate change adaptation plans will be necessary to lessen the impacts discussed in this section, they cannot be expected to counter the effects of climate change. If temperature increases continue at the expected rates, risks of water shortages will increase with it.

The New Mexico Public Regulation Commission lists roughly 28 water companies providing service throughout the state. This list however does not contain municipally-owned and operated water utilities or mutual domestics operating throughout the state. Due to the autonomy of each independent water utility and the diversity of operating standards for each, the focus of this section will consist of the Albuquerque Bernalillo County Water Utility Authority (ABCWUA). There are two specific reasons for doing this: 1) the comprehensiveness of the data available; and 2) the ABCWUA serves roughly 75 percent of the metro area.

Water Resources Management Strategy

In October 2007, the ABCWUA published their *Water Resources Management Strategy* with the purpose of providing a safe and sustainable water supply for the metropolitan area. Specifically, this was to be achieved by determining and utilizing the existing water resources owned by the ABCWUA and planning and making the best choices for future supplies and management.

The key to this strategy is that it is designed to ensure ABCWUA customers have a safe and sustainable water supply until at least 2060. It is important to note that while the authority does not have planning and platting jurisdiction, land use decisions and water resources management are linked and water availability is taken into consideration for all future developments.

The *Water Resources Management Strategy* provides policies and recommendations for continuing to shift from sole reliance on the aquifer to renewable supplies including the San Juan-Chama Drinking Water Project. In addition to the San Juan-Chama project, conceptual projects include:

- Implementation of a full-scale aquifer storage and recovery program
- Building and operating additional water reuse and recycling projects to provide irrigation and industrial water to larger areas in the southeast and western part of metro Albuquerque

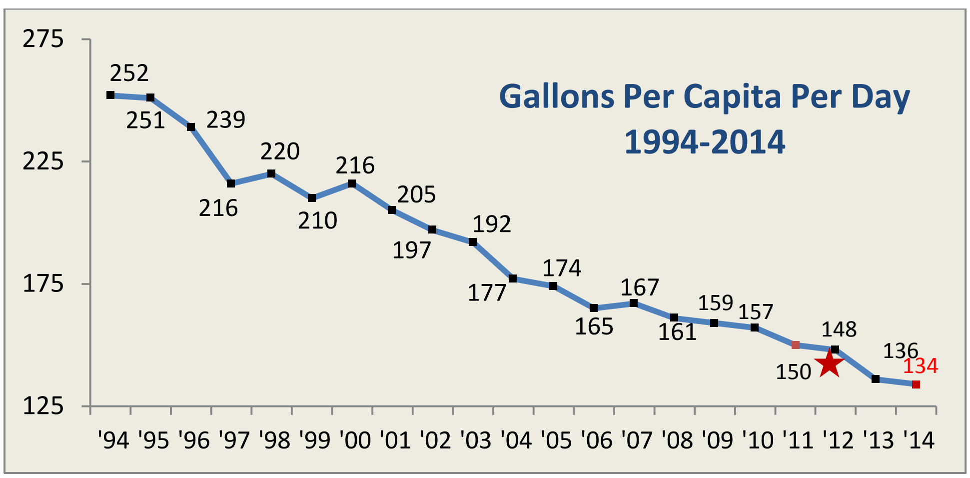
- Investigating the feasibility of desalination as a future water source
- Evaluating and examining the use of the very deep aquifer

As for the ABCWUA's strategy for use of existing supplies, the aquifer will no longer be the primary source of supply except during droughts and peak times during the summer. Ultimately, aquifer use will be limited to provide for the opportunity for natural and man-made recharge to create and maintain a groundwater drought reserve. As population increases over time, groundwater use will increase but will be limited to ensure a drought reserve. In 2007 one of the primary components of the strategy was the implementation of the San Juan-Chama Drinking Water Project. The San Juan-Chama water project is now the primary source of supply for the ABCWUA customers with groundwater, reuse, and recycling supplementing the surface water to meet demand.

Conservation Program

In 1995, when the ABCWUA service area was managed by the City of Albuquerque, a water conservation program was created with the goal of reducing per capita water use by 30 percent to 175 gallons per capita daily (GPCD) by 2004. This goal was achieved, and the ABCWUA later established goals of reducing water use to 150 GPCD by 2014 and 135 GPCD by 2024. This latter goal has also been met and the average Albuquerque resident used only 134 GPCD in 2014.[101]

Figure 3-61: ABCWUA Gallons per Capita per Day, 1994-2014

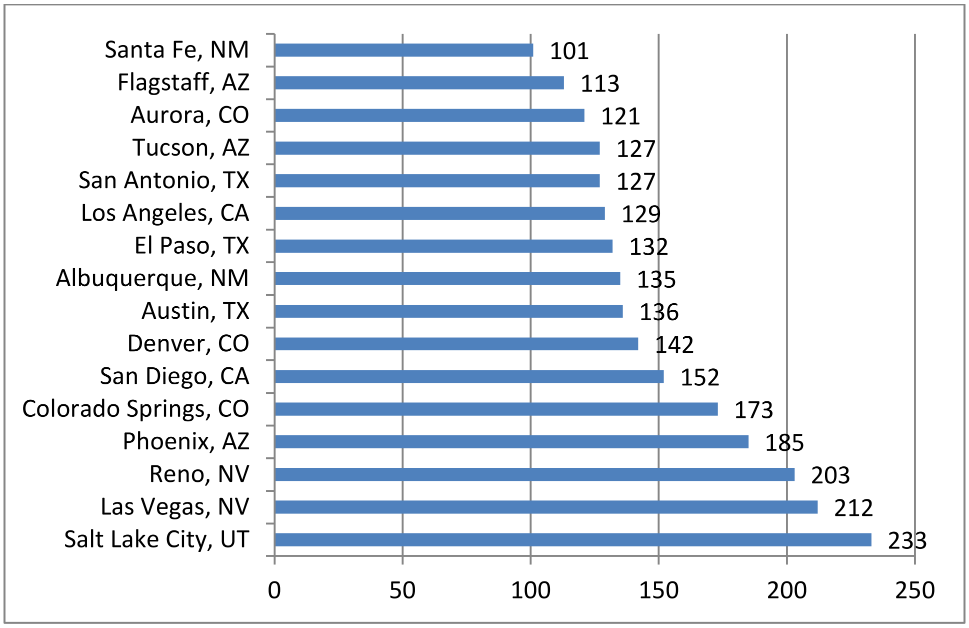


The ABCWUA and the City of Albuquerque have made significant progress in the first 17 years of the water conservation program. This program has helped move the City from among the highest municipal water users in the U.S. southwest to among the lowest. When the conservation program began in 1995, it took approximately 40 billion gallons of water annually to serve 143,000 accounts. In 2012, approximately 205,000 accounts were served with only 34 billion gallons of water. The accelerated pace of reduction has meant an increase in drought reserves: at 150 GPCD the metro area would have added

[101] Data provided by ABCWUA.

144,730 acre-feet annually, but at 135 GPCD the ABCWUA adds 187,629 acre-feet to the drought reserve annually.[102]

Figure 3-62: Gallons per Capita Daily in Selected Western Cities, 2013[103]



Water conservation goals for the next ten years are less than in previous years because the ABCWUA has already made significant reductions, primarily among residential customers, in water usage over the last nineteen years. Further reductions of this amount cannot reasonably be expected to continue for the next ten years without significant mandatory restrictions. Thus, much of the savings will need to come from the other customer classes that are using a smaller percentage of the total supply (and with lower savings opportunities).

Over the ten-year period from 2013 to 2023, each customer class is expected to reduce their use by the following percentages:[104]

- Residential – 7.5%
- Commercial – 17.7%
- Multi-Family – 12.6%
- Industrial – 10%
- Institutional – 10%
- Non-revenue – 13%
- Other – 6.4%

[102] ABCWUA, "Water Resources Management Strategy Implementation, 2024 Water Conservation Plan Goal and Program Update," July 2013, p. 12
[103] http://savewatersantafe.com/wp-content/uploads/2015/04/Western_Cities_GPCD_comparision-2013_data.jpg
[104] ABCWUA, "Water Resources Management Strategy Implementation," 2024 Water Conservation Plan Goal and Program Update, July 2013, p. 9

Middle Rio Grande Regional Water Plan

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 the 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 update for this region. Throughout 2015, the steering committees will work with the ISC and the general public to update the plans for scheduled adoption by the state at the close of 2015.

Based on the inherent link between transportation, land development and the availability of water, it is important for future MTPs to include and reference information within the regional water plans and for the regional water plans to reference the projections contained in the MTP.

3.15.3 Water Consumption & Scenario Planning

Given that the region faces less precipitation, or precipitation occurring in major events, and 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. Unlike the *Upper Rio Grande Impact Assessment* which considered effects on water supply, the Central New Mexico Climate Change Scenario Planning Project evaluated the impacts of the built environment on water use. In particular, future land-use scenarios were evaluated for their effect on residential water consumption.[105]

As stated in *the Central New Mexico Climate Change Scenario Planning Project Report* prepared by the University of New Mexico and Ecosystem Management, Inc., 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 rain water to

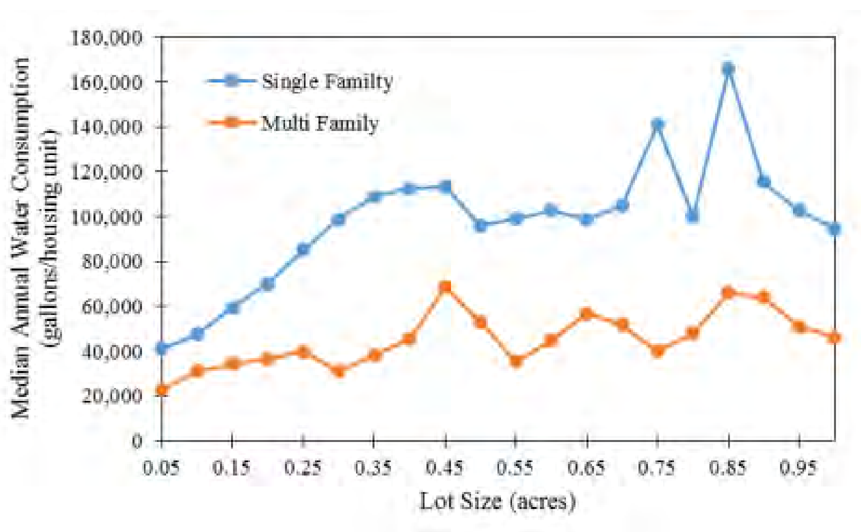
[105] Scenario analysis related to water demand was performed by the University of New Mexico as part of the Climate Change Scenario Planning Project. Much of the work in this section is taken directly from the final report developed for that project.

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.

At the same time, the main factor affecting water consumption is land use. The project team for the *Central New Mexico Climate Change Scenario Planning Project Report* evaluated water consumption data from the Albuquerque Bernalillo County Water Utility Authority 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.

Water use accounts were provided by the ABCWUA and were linked to parcel-level land use data to determine how water consumption varied by land use, lot size, and year of construction. Figure 3-63 shows that 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). Figure 3-63 also indicates that single family housing units use far more water than multi-family housing units. Also important to note is that there is a sharp drop in water consumption rates for homes built after 2009. This is due to the fact that lot sizes are getting smaller and tend to have less irrigated landscaping. Efficiency improvements may also play a role.

Figure 3-63: Residential Water Consumption Rates by Lot Size, Bernalillo County



Source: ABCWUA, UNM

Due to the fairly strong correlation between lot size and water consumption rates, a per-acre water consumption rate was created to calculate overall residential consumption levels. These estimates are expected to provide a reasonable method for comparing the relative water consumption of each scenario. Scenarios that have lower land consumption rates are therefore expected to be more resilient to drought driven by climate change. Since the Preferred Scenario results in 12,600 fewer acres required to meet residential housing needs than the Trend, the Preferred Scenario leads to significantly lower annual water demands (see Table 3-23).

Table 3-23: Residential Acres and Total Water Consumed by Residential Users[106]

Residential Water Consumption by Scenario		
Scenario	*Acres*	*Million Gallons per Year*
2012	134,431	56,607
Trend	194,914	82,075
Preferred	182,275	76,753

Forecasting shows water consumption increasing significantly from today as the region's population grows over time; however, the Preferred Scenario performs notably better than the Trend when it comes to residential water consumption. The *Central New Mexico Climate Change Scenario Planning Project Report* concludes that since multi-family and small lot residential land uses consume less water than larger-lot single-family housing, denser residential development may be an effective strategy for slowing the region's growing water consumption even as population increases. The study finds further that agriculture consumes a significant amount of water and that improving irrigation efficiency or growing drought tolerant crops could significantly reduce the region's water consumption. If the region is interested in preserving open space and agricultural land, the principles of the Preferred Scenario may be applied to reduce demand in other areas to allow agricultural uses to continue.

[106] The residential water consumption rate (gallons/acre/year) is calculated at 421,085.

3.16 Environmental Considerations

The transportation planning process requires that potentially-affected environmental resources are identified and potential environmental mitigation activities are developed to protect those resources. The intent of identifying natural resources that could be impacted by new infrastructure or new development is to encourage better coordination and stronger linkages between land use, transportation, and natural resource planning. Although project-specific mitigation measures are developed during the National Environmental Policy Act (NEPA) process, environmental concerns are regional in nature and benefit from many of the same comprehensive analyses as transportation and land use planning. Resource mapping is an important first step and analysis of environmental conditions should occur early in the transportation planning process with the participation of broad regional stakeholders. Spatial data for environmental resources was collected from various agencies and are shown in Maps 3-41 and 3-42.

As part of the Central New Mexico Climate Change Scenario Planning Project, MRMPO consulted with federal, state and local wildlife, land management, and regulatory agencies to identify natural resources at risk due to changing temperature and precipitation levels. Mitigation measures are contained in the project's *Final Report*.[107] The project also enabled broader analysis of the relationship between development patterns and sensitive habitat areas. It is appropriate to include these considerations in the MTP as they have direct implications for long-range land use and transportation decision-making.

Environmental resources and issues identified by MRMPO that could potentially be impacted by transportation projects include:

- Stormwater runoff associated with roadways
- Roadway and construction activity impacts to trails
- Open space reserves and parks
- Arroyo resources
- Bosque habitat
- Federal and state endangered species critical habitat areas
- Habitat loss and fragmentation from human developments such as highways
- Maintaining or reestablishing habitat connectivity
- Cultural (historic and archaeological) resources

In a Nutshell…

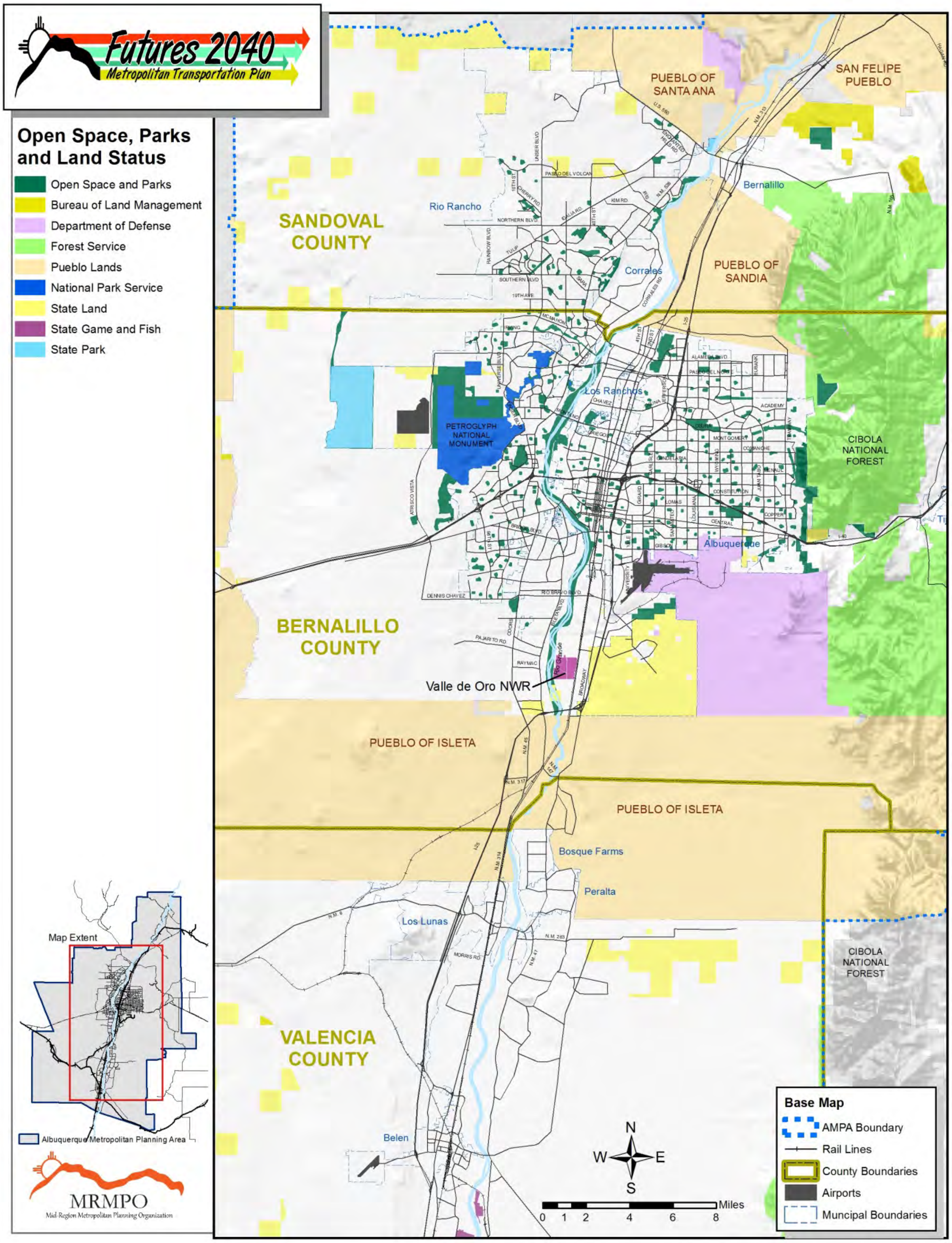
Takeaways: Climate change is putting many of natural resources and crucial habitat areas under increased stress. These threats can be exacerbated by the built environment.

Components: This section outlines some of the environmental considerations that must be made during project development. The relationship between development patterns and crucial habitat assessment areas are analyzed.

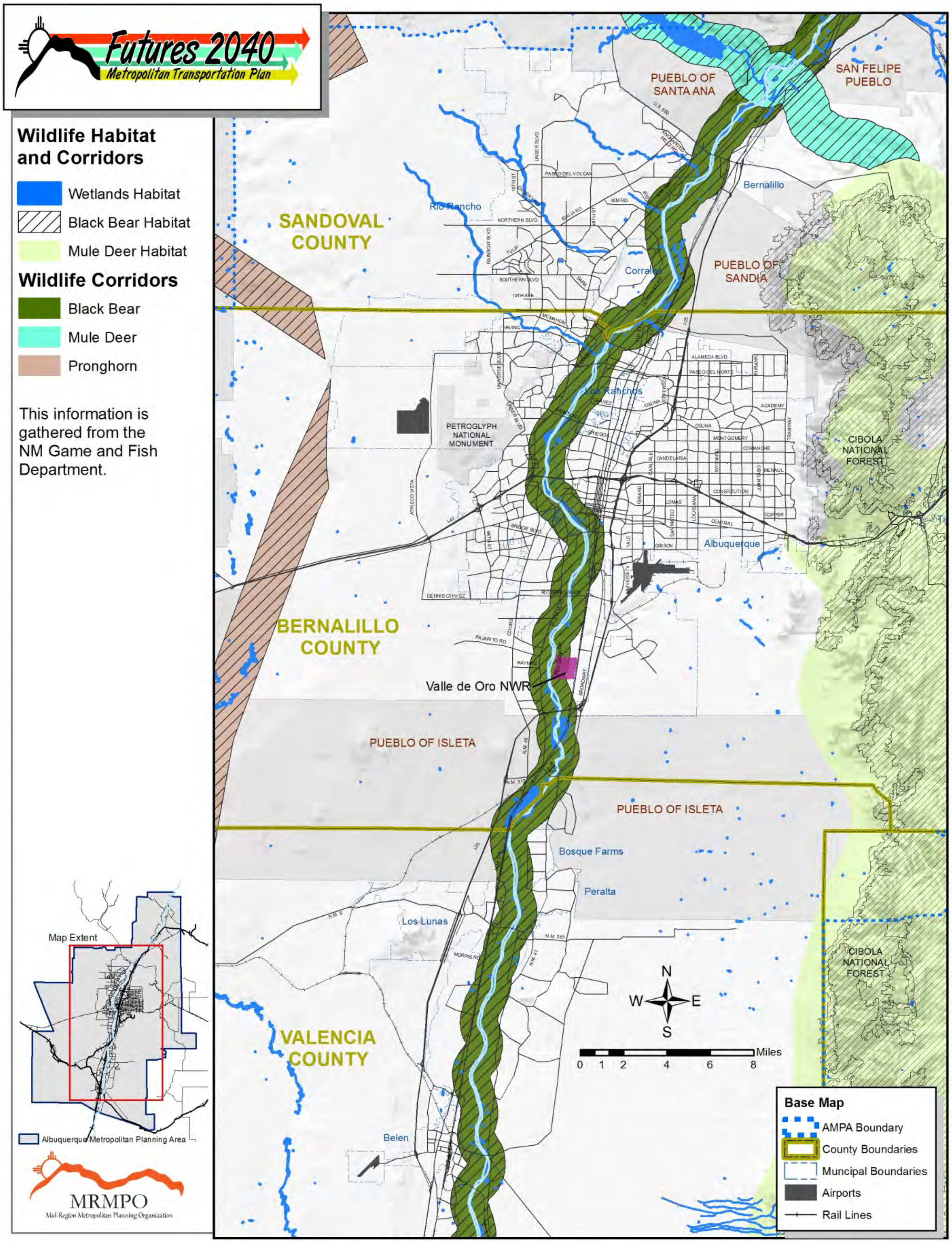
Goals and Objectives: Minimizing the footprint of new development, which can preserve crucial habitat areas, is an objective of the MTP goal of *Environmental Resiliency*.

[107] The report is available on the MRCOG website under "Climate Change Project."

Map 3-41: Parks, Open Space, and Land Status



Map 3-42: Wildlife Corridors and Habitats



Resources were mapped to reveal how they might be impacted by proposed transportation projects and to assist in the development of appropriate mitigation measures. Some resources, such as archaeological resources and certain species occurrences, are not included on the map as that information is not released to the general public. Descipriptions of various resources subject to environmental review and consultation can be found in Table 3-24.

Table 3-24: Natural Resource Considerations

Resource	Notes	Areas of Significance
Wildlife Habitat Ranges	Wildlife corridor mapping is an important step in preserving natural habitats and preventing wildlife/vehicle collisions. Consultation with the New Mexico Department of Game and Fish occurs during project development.	Wildlife/vehicle incidents are concentrated in the East Mountains and Tijeras Canyon portions of Bernalillo County and along US 550 in southern Sandoval County.
Flood Control Infrastructure	The Rio Grande is fed by other rivers and a system of arroyos throughout the AMPA. Flood control infrastructure is critical for protecting existing infrastructure. Projects that may impact arroyos, arroyo drainage functions or arroyo recreational trails must be developed in coordination with the appropriate agencies.	The Albuquerque Metropolitan Arroyo Flood Control Authority and the Southern Sandoval County Arroyo Flood Control Authority manage flood risks within portions of the AMPA.
Parks and Open Spaces	Recreational sites must be served by transportation infrastructure, but can be subject to adverse impacts depending on the design of that same infrastructure. Impacts to parks and open spaces, both existing and planned, should be considered during project development.	Large open space facilities can be found in the East Mountains and along the Bosque. Urban parks and federal land management areas are found throughout the AMPA.
Cultural Resources	Cultural resources, which include both archaeological and historic resources, are frequently impacted by transportation projects. Consultation with the State Historic Preservation Office and tribal governments should occur early in the project development process to avoid, minimize and mitigate any project impacts to these resources.	In general, the density of archaeological sites is higher on Albuquerque's West Mesa and along the Rio Puerco than in the more urbanized portions of the AMPA. Archaeological sites are not published for protection purposes.

Crucial Habitat Areas

The climate change project established that increased temperature and variable precipitation levels place greater strain on native plant and wildlife species. Beyond basic resource mapping, scenario planning efforts allowed MRMPO and regional stakeholders to further examine the relationship between development patterns and crucial wildlife and vegetated areas.

The principal tool used for this analysis is the Western Governors' Association Crucial Habitat Assessment Tool (CHAT). CHAT considers a range of criteria, such as species of concern, freshwater integrity, and natural vegetation areas of concern, and applies a ranking to one-square mile hexagons based on the type and magnitude of risks placed upon the native species, as well as the vulnerability of the local habitat.

The purpose of the CHAT tool is to inform regional planning across multiple jurisdictions and to "improve analysis of landscape-scale energy, land use and transportation projects as well as land conservation and climate adaptation strategies."[108] Crucial habitats are "places containing the resources, including food, water, cover, shelter and 'important wildlife corridors,' that are necessary for the survival and reproduction of aquatic and terrestrial wildlife."[109]

The most crucial habitat areas, and therefore the locations most vulnerable to development impacts, can be found in locations along and near the Bosque (see Map 3-43). This means that many of the most crucial locations for native wildlife and aquatic species are in the region's urban core and historically-settled areas. Other high ranking locations include portions of the East Mountains and areas around Santa Ana Pueblo and the community of Algodones. Relatively undeveloped areas are frequently lower in the CHAT rankings.

Crucial Habitat Assessment Tool ranking criteria:

- Species of concern (animals and plants)
- Wildlife corridors
- Terrestrial species of economic and recreational importance
- Aquatic species of economic and recreational importance
- Freshwater integrity (watershed status)
- Large natural areas
- Natural vegetation communities of concern

CHAT ranking levels

<u>Category 1</u> – Rare or fragile habitat that are considered "irreplaceable" in that the environmental conditions are unique and only found in limited areas

<u>Category 2</u> – Habitat locations are considered "essential" and without which species could be subject to serious population decline

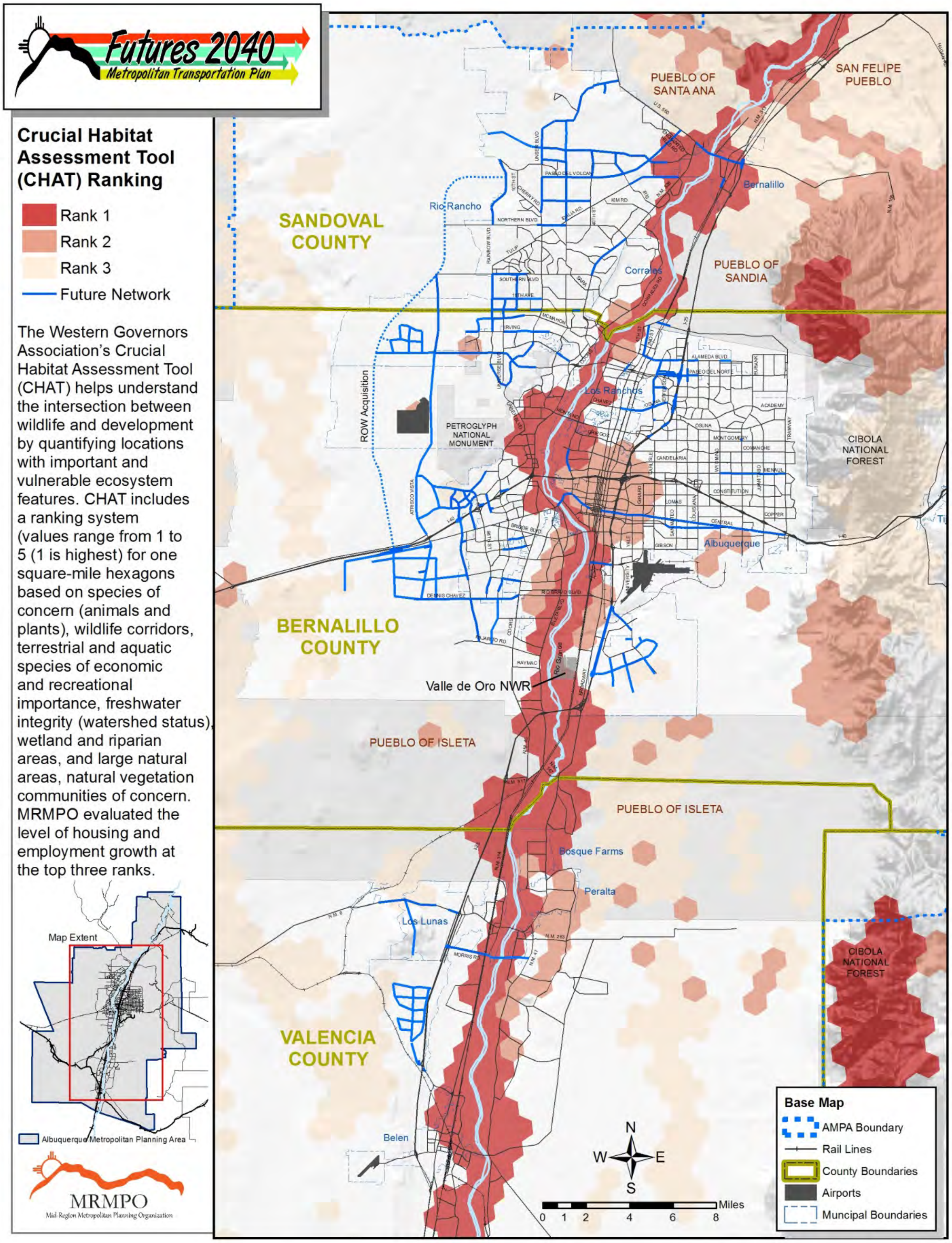
<u>Category 3</u> – Important for the maintenance of aquatic or wildlife populations, though impacts could be managed and habitats can be restored over time

<u>Categories 4-6</u> – Less crucial habitat areas or locations with no available data

108 Western Governors' Wildlife Council, "Western Governors' Crucial Habitat Assessment Tool (CHAT): Vision, Definitions and Guidance for State Systems and Regional Viewer," July 2013, p. 3

109 Ibid.

Map 3-43: Crucial Habitat Areas



To evaluate how the MTP scenarios would affect crucial habitat areas, a weighted score was created by taking the sum of the households and population in each category for ranks 1 to 3 and multiplying the sum by a value (3x for rank 1; 2x for rank 2; 1x for rank 3). In this way a composite score was developed to evaluate overall performance of the Trend and the Preferred Scenarios.

Unlike most performance measures, the Preferred Scenario produces no significant benefits compared to the Trend Scenario (there is a 40 percent increase in the Trend Scenario in the total number of households and jobs in rank 1 CHAT areas compared to a 38 percent increase in the Preferred Scenario).

Table 3-25 also reveals that a large portion of new households and employment are located in areas with a high CHAT ranking but that were already subject to high levels of development. This is due to the fact that growth is more concentrated in the urban core (areas near the Rio Grande have higher CHAT scores). This pattern raises the question of whether the impact of new development is greater in locations with a lower CHAT score but no existing development, or in existing locations with high CHAT scores and more intense development.

Table 3-25: Development in Crucial Habitat Areas

CHAT Area	All Zones			Existing Development		
	2012	Trend	Preferred	2012	Trend	Preferred
Rank 1	84,879	118,912	117,153	82,229	113,697	112,355
Rank 2	152,884	201,862	201,402	148,520	195,591	195,667
Rank 3	7,406	29,289	28,421	3,229	5,047	5,396
Total 1-3	245,169	350,063	346,976	233,978	314,335	313,418
Rank 4-6	491,484	750,696	756,109	502,675	786,424	789,667
Total	736,653	1,100,759	1,103,085	736,653	1,100,759	1,103,085

CHAT rankings do not identify instances where wildlife species are threatened by human impacts, but the locations that are most critical to preserve, according to a range of criteria. It is therefore important to distinguish between the impacts of existing versus new development since many impacts are already felt. In fact, over 95 percent of the new growth in Rank 1 crucial habitat areas in the Preferred Scenario occurs in locations with existing development (the amount is 92 percent in the Trend Scenario).

The *Central New Mexico Climate Change Scenario Planning Project Final Report* concludes that it is generally preferable to allow additional growth in places that have already been developed since the species that inhabit these areas are 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 Preferred Scenario emphasizes additional housing and employment in locations with existing development that are high-ranked CHAT areas, it is important to reconcile development and habitat needs. Some strategies include:

- Minimizing new development in crucial habitat areas
- Providing green space in the form of urban parks and open space

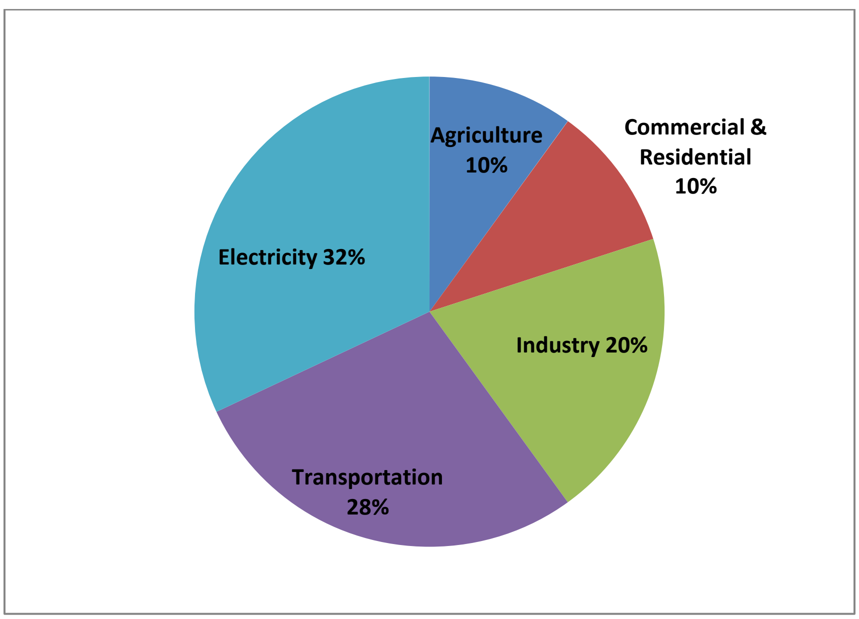
- Maintaining urban forests, which have the added benefit of reducing the heat island effect and making pedestrian and other outdoor activities more enjoyable
- Maintaining wildlife corridors and buffers between built environment and crucial habitat areas

Other mitigation measures to reduce the impacts of new development and protect crucial habitat areas can be found in the *Central New Mexico Climate Change Scenario Planning Project Final Report*.

3.17 Emissions Reduction and Responding to Climate Change

Like all other places across the world, the Albuquerque metropolitan area must consider ways to reduce global carbon dioxide (CO_2) emissions, which is the primary greenhouse gas created through human activity. Greenhouse gases (GHGs) enter the atmosphere through the burning of fossil fuels, but they differ from other emissions in that GHGs also trap heat in the atmosphere. Trailing only the energy sector in contributions, transportation produces 28 percent of the nation's CO_2 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 CO, PM2.5, and ozone precursors. Therefore, for the region to play its role in reducing GHG emissions also means addressing local air quality.

Figure 3-64: Total U.S. Greenhouse Gas Emissions by Sector in 2012[110]



In a Nutshell…

Takeaways: Transportation and land use strategies can play a key role in reducing GHG emissions through decreased reliance on single-occupancy vehicle travel and more efficient transportation systems. The same strategies that are critical in reducing emissions and improving air quality also support the principles of the Preferred Scenario.

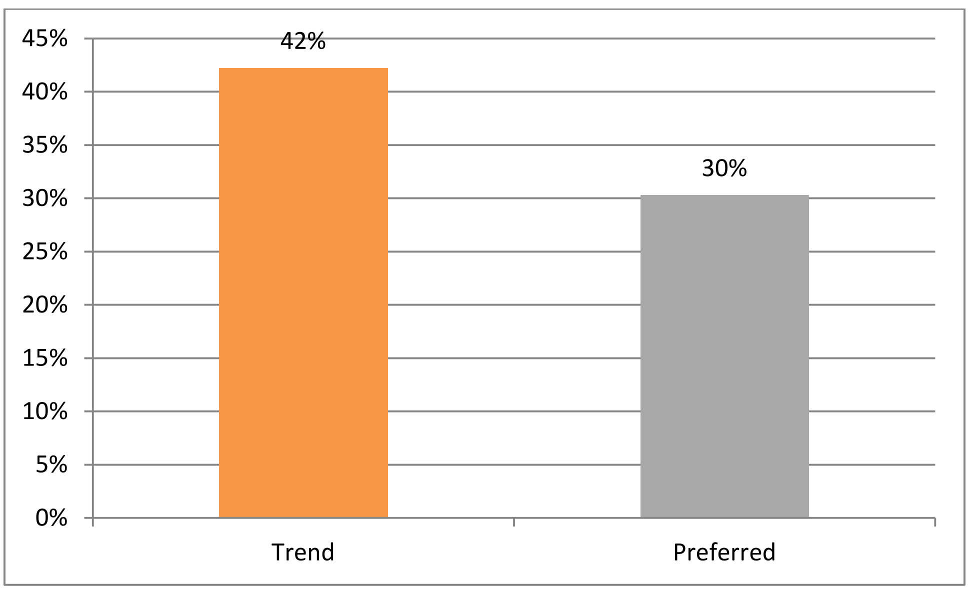
Components: This section provides a brief outline of emission reduction strategies. More thorough analysis can be found in Appendix F (Transportation-Related GHG Mitigation Strategies and Potential Application in Central New Mexico) and Appendix G (Potential Impacts of GHG Emissions Reduction Strategies), produced as part of the Central New Mexico Climate Change Scenario Planning Project.

Goals and Objectives: Reducing emissions and improving air quality supports the MTP goal of *Environmental Resiliency*.

[110] Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2012, http://www.epa.gov/climatechange/ghgemissions/sources/transportation.html

Future scenarios for transportation use in the AMPA show large increase in GHGs from current levels (see Figure 3-65; the Trend Scenario results in a 42 percent increase in CO_2 emissions while the Preferred Scenario results in a 30 percent increase). When compared directly, however, the Preferred Scenario results in an eight percent reduction in overall CO_2 emissions. While the total quantity of GHGs increase, GHGs per capita decline in each scenario. The decline in per capita GHG emissions is driven in part by the expected increase in average vehicle fleet fuel efficiency nationwide over the next 28 years (Corporate Average Fuel Economy [CAFE] standards rise to 35.5 MPG by 2016 and 54.4 MPG by 2025).[111] Also driving the per capita GHG emissions decline is the reduction in VMT per capita. These factors can be reinforced by changes in land use configurations that result in shorter travel distances, as well as an emphasis on alternative modes of transportation that produce either zero emissions or relatively small amounts of emissions per capita (i.e., 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."[112]

Figure 3-65: Change in Emissions by Scenario, CO_2 tonnes per day

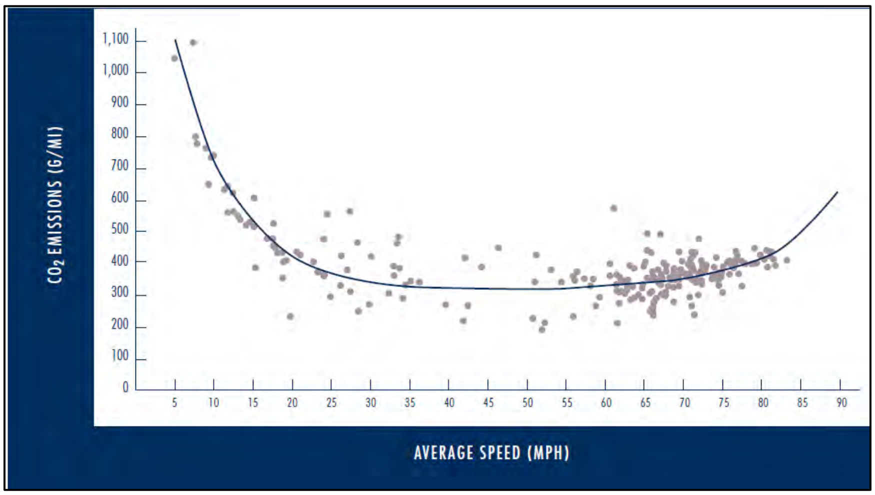


[111] Fleet average fuel efficiency is calculated by dividing each scenario's estimated daily CO2-equivalent emissions by daily VMT. CO2-equivalent was estimated by MOVES and considers changes in the vehicle fleet, distribution of VMT by roadway type, and traffic speed. VMT was estimated by MRCOG's travel demand model.
[112] Transportation Research Board, *Driving and the Built Environment*, Special Report 29, Washington DC, 2009

Emissions Reduction Strategies

Considerable work was performed through the Central New Mexico Climate Change Scenario Planning Project to identify potential transportation and land use strategies that could result in GHG emissions reductions, as well as the magnitude of that impact. What follows are brief descriptions of some of those strategies. These strategies, especially when used in combination, could have meaningful impacts on congestion management outcomes, as well as reductions in per-capita vehicle emissions in the region.

Figure 3-66: Vehicle Emissions Curve[113]



In general, the strategies fall into two categories: 1) efforts to reduce emissions by improving speeds and the efficiency of vehicle travel (as show in Figure 3-66, up to a certain level increases in vehicle speeds result in lower emissions rates); 2) reducing emissions by eliminating trips or reducing trip lengths. More details can be found in the complete reports, which are included as Appendices F and G.

- Expanded transit service: Transit can be an efficient means of moving travelers and utilizing roadway space efficient use of the road. Adding transit services where possible can take more drivers out of their cars
- Targeted land use mix and increases in density: Infill development and transit-oriented development are policies aimed at reducing trip lengths and encouraging travel by alternative modes. There are two general mechanisms for implementing these strategies: (1) lowering the cost of infill development by lowering fees (e.g., impact fees) or providing development subsidies, and (2) changing zoning classifications or creating new zoning classifications.[114]
- Intersection and signal timing improvements: Roadway investments can move traffic more efficiently and reduce idling times and high emissions rates resulting from lower speeds

[113] Barth, Matthew and Boriboonsmonsin, Kanok, "Traffic Congestion and Greenhouse Gases," *Access* Magazine, Fall 2009

- Incident management: Addressing non-recurring congestion can be effective at reducing vehicle emissions due to delays and low travel speeds
- Multi-modal infrastructure: Improved travel options and greater pedestrian and bicycle network connectivity can
- Roadway connectivity standards: Provide multiple routes to a destination to alleviate overall congestion and provide relief in the event of construction or a vehicle crash
- Travel demand management**:** Regional or employer-based commuter programs that educate employees, incentivize carpooling, or provide discount transit fares could reduce the amount of single-occupancy vehicles (SOVs) on the road during peak hours. Carpooling and ride sharing website tools and/or programs such as these could also reduce the number of SOVs on the road thereby reducing congestion.
- Parking management: Strategies and pricing policies to either increase the efficiency of existing parking facilities and reduce excess driving or encourage alternatives to single-occupancy vehicle travel

Chapter 4: PLAN ANALYSIS AND EVALUATION

4.1 Performance Measures

The *2040 MTP* considers two types of performance measures. One set of measures relates to MAP-21 national performance goals and planning factors, which gauge the effectiveness of the overall transportation planning process and content and structure of the long-range plan itself (see Chapter 4.3 for more details on MAP-21 planning areas). The second set of measures form a critical part of the MRMPO scenario planning process. In particular, these performance measures serve as a means of testing scenarios against each other to determine the effectiveness of different development patterns and infrastructure investments in addressing regional needs. The performance measures described in this section intentionally extend beyond typical measures of roadway conditions and respond to other topics identified during the regional challenges portion of this process (see Chapter 2 for more details on regional challenges).

To evaluate the scenarios, MRMPO identified more than two dozen performance measures in eight categories: access, land use, roadway system performance, transit system performance, river crossing conditions, economic competitiveness, safety, and sustainability and resiliency. These measures reflect the goals and objectives of the plan, where possible, but were also shaped by the practical considerations of what can be measured through MRMPO's modeling environment.

Table 4-1 contains the performance measures utilized for evaluating the Trend and Preferred Scenarios for the *Futures 2040 MTP*. Measures were calculated based on the results of land use and travel demand modeling results; comparisons of each scenario were made against the base year (i.e., the 2040 Trend Scenario versus the 2012 base year; and the 2040 Preferred Scenario versus the 2012 base year) as well as direct comparisons between the Preferred Scenario versus the Trend Scenario.

Scenario planning is an iterative process in which certain approaches are tested, analyzed, and then adjusted as necessary in response to the results. Performance measure calculations and scenario evaluation took place during each step of the scenario planning process. In this way, performance measures guided the discussion on the effectiveness of various policy options, and played an integral part in shaping the Preferred Scenario and determining the extent to which the scenario deviates from the Trend.

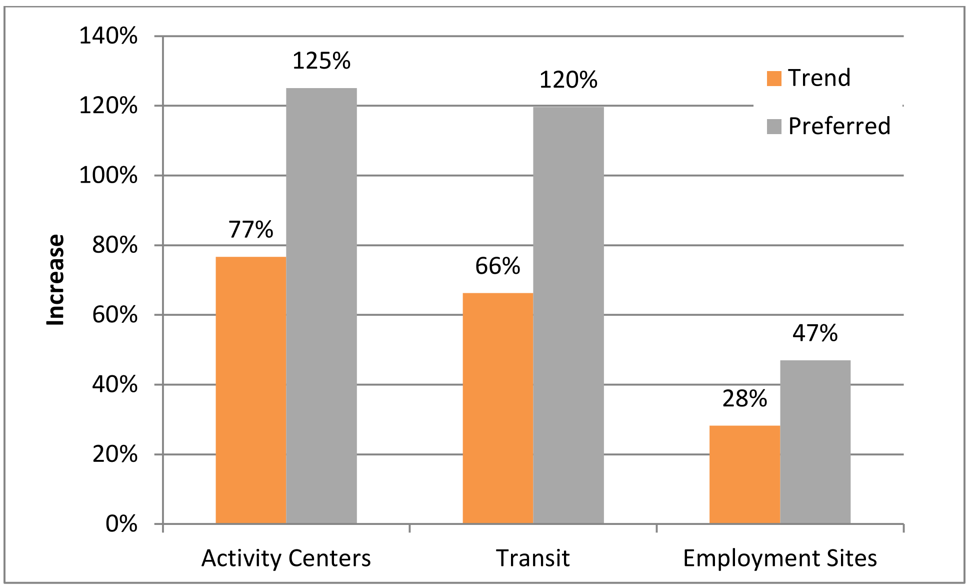
Table 4-1: MTP Performance Measures

Cluster		Performance Measure	Unit of Analysis	2012 Base Year	2040 Scenarios		Scenario Comparison		
					Trend	Preferred	Trend vs 2012	Preferred vs 2012	Preferred vs Trend
Access	1	**Proximity to Activity Centers**	Households within 1 mile	51,840	91,578	116,695	77%	125%	27.4%
	2	**Proximity to Transit**	Households within 1/4-mile	19,646	32,658	43,151	66%	120%	32.1%
	3	**Proximity to Bicycle Facilities**	Households within 1/4-mile	219,151	273,350	288,546	25%	32%	5.6%
	4	**Proximity to Schools**	Households within 1/4-mile	38,062	45,030	46,602	18%	22%	3.5%
Land Use	5	**Jobs/Housing Mix in Activity Centers**	Employment divided by households in Activity Centers	2.95	2.43	2.15	-17%	-27%	-11.9%
	6	**Proximity to Key Corridors**	Employment within 1000 feet	96,500	135,719	150,075	41%	56%	10.6%
	7	**New Land Developed**	Total acres of developed land	215,660	261,054	247,695	21%	15%	-5.1%
Roadway System Performance	8	**Systemwide Speed**	PM peak hour average speeds (miles per hour)	36.4	21.8	25.1	-40%	-31%	15.1%
	9	**VHD - Vehicle Hours of Delay**	PM peak hour delay (model speed vs. posted speed)	12,927	71,293	51,108	452%	295%	-28.3%
	10	**VHT - Vehicle Hours Traveled**	PM peak hour total driving time for all roadway users	50,778	132,932	110,133	162%	117%	-17.2%
	11	**VMT - Vehicle Miles Traveled**	Daily value for all roadway vehicle travel	20,335,265	30,105,932	28,938,420	48%	42%	-3.9%
	12	**VMT per Capita**	Average vehicle miles traveled per person	23.2	22.7	21.9	-2%	-6%	-3.5%
	13	**Roadway Network Congestion**	Percentage of VMT with V/C > 1.0, PM peak hour	5.7%	22.3%	20.4%	291%	258%	-8.5%
	14	**Freight Corridor Congestion**	Percentage of freight network VMT with V/C > 1.0, PM peak hour	0.7%	22.3%	20.7%	3086%	2857%	-7.2%
Transit System Performance	15	**Transit Ridership**	Percent increase over base year	41,033	55,025	97,748	34%	138%	77.6%
	16	**Transit Passenger Miles Traveled**	Percent increase over base year	147,369	189,502	297,104	29%	102%	56.8%
River Crossing Conditions	17	**River Crossing Congestion**	PM peak hour volumes relative to lane capacity	0.76	1.03	0.99	35%	30%	-3.9%
	18	**River Crossing Trips**	Daily roadway vehicle travel across the Rio Grande	592,609	843,217	819,891	42%	38%	-2.8%
Economic Competitiveness	19	**Proximity to Employment Sites**	Households within 1 mile	138,138	177,095	203,007	28%	47%	14.6%
	20	**Average Commute Time**	Travel time for work trips from home to work (minutes)	17.48	26.28	21.69	50%	24%	-17.5%
Safety	21	**Safety - High Crash Risk Locations**	Modeled crashes per 100 million vehicle miles traveled	265.7	197.0	206.7	-26%	-22%	4.9%
Sustainability & Resiliency	22	**Emissions Levels**	CO_2 tonnes per day	1,997	2,840	2,602	42%	30%	-8.4%
	23	**Water Consumption**	Annual residential water demand (millions of gallons)	56,607	82,075	76,753	45%	36%	-6.5%
	24	**Development in High Flood Risk Areas**	Emp + Housing in FEMA 100-Year Floodplains	34,242	53,285	52,042	56%	52%	-2.3%
	25	**Development in Forest Fire Risk Areas**	Emp + housing in wildland-urban intermix areas	52,073	102,262	92,128	96%	77%	-9.9%
	26	**Develoment in Crucial Habitat Areas**	Weighted value based on emp + housing in priority ranking areas	5.68	7.90	7.83	39%	38%	-0.9%

Access and Jobs-Housing Mix

The Preferred Scenario emphasizes development in activity centers, transit nodes, and along important commercial corridors with the intent of reducing the distances required to access goods, services, jobs, and multi-modal transportation options. The performance measures indicate that the Preferred Scenario is indeed successful at improving access to key locations and infrastructure above and beyond the Trend Scenario (see Figure 4-1). The Preferred Scenario is particularly successful in improving the number of households within proximity of activity centers and key transit nodes, with increases at nearly twice the rate of the Trend Scenario.[1]

Figure 4-1: Access-Related Performance Measures, Growth in Households by 2040



In addition to access, the Preferred Scenario emphasizes a combination of housing in existing activity centers and employment growth in key job centers, particularly west of the Rio Grande. Bringing housing and jobs and the services closer together is a key ingredient in reducing trip lengths and providing travelers greater opportunities to make trips without relying exclusively on private vehicles. The result is an improved mix of housing and jobs; where there are nearly three jobs for every housing unit in activity centers in 2012, there are 2.1 jobs per housing unit in these areas in the Preferred Scenario (versus 2.4 in the Trend Scenario).

Roadway System Performance

Overall roadway transportation conditions worsen in both scenarios, although the Preferred demonstrates less deterioration. These outcomes reflect a lack of sufficient long-term funding to address transportation needs, a continued reliance on single-occupancy vehicles, and a built environment that precludes a true multi-modal transportation system in large portions of the

[1] The distances used to calculate proximity vary by measure. Refer to the units of analysis in Table 4-1 for definitions.

metropolitan area. One noteworthy finding is that vehicle miles traveled is projected to increase at a rate below that of population growth, and per capita VMT declines in both scenarios.

The Preferred Scenario represents a marked improvement over the Trend Scenario. While the Preferred Scenario witnesses an increase in overall vehicle miles traveled (VMT), hours traveled (VHT) and hours of delay (VHD), the rate of increase is much lower than in the Trend Scenario (see Table 4-2). When compared directly, average speeds during the PM peak period are more than 15 percent greater and the amount of time spent traveling (VHT) is 17 percent lower in the Preferred Scenario. The average person travels four percent fewer miles per day in the Preferred Scenario than in the Trend.

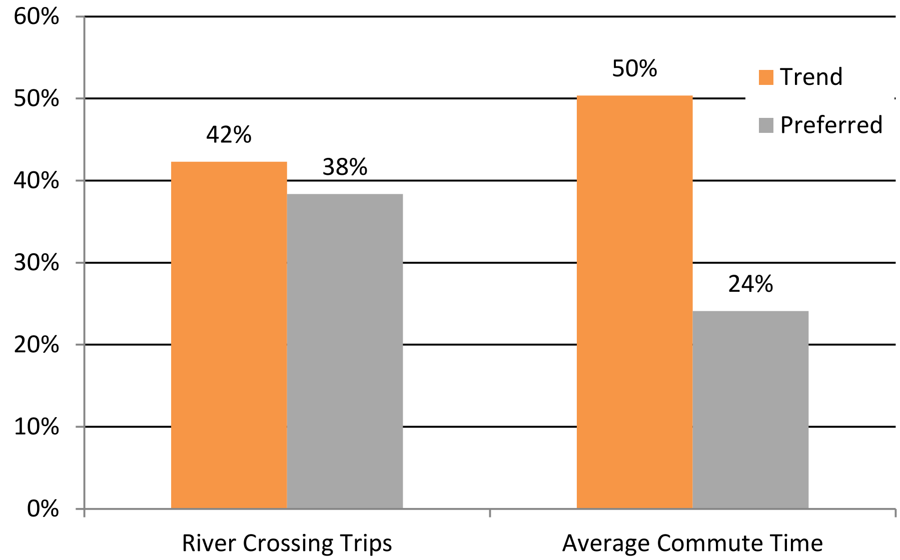
Table 4-2: Regional Transportation Measures

	Measure	Trend vs. 2012	Preferred vs 2012	Preferred vs. Trend
PM Peak Period	Systemwide Speed	-40%	-31%	15%
	VHD - Vehicle Hours of Delay	452%	295%	-28%
	VHT - Vehicle Hours Traveled	162%	117%	-17%
Daily	VMT - Vehicle Miles Traveled	48%	42%	-4%
	VMT per Capita	-2%	-6%	-4%

There is also a large spike in the amount of vehicle travel that takes place under congested conditions in both scenarios. Currently, only a small portion of peak period travel (5.7 percent) encounters congested conditions (defined as vehicle miles traveled along roadway segments where the volume-to-capacity ratio exceeds 1.0). However, 22.3 percent of peak period travel in the Trend Scenario takes places under congested conditions, while the figure is 20.4 percent in the Preferred Scenario.

Transportation benefits associated with the Preferred Scenario are also evident when one considers the commuting conditions and the demand along the river crossings. The Preferred Scenario succeeds in reducing the future demand for long-distance and trans-regional trips through a combination of improved transit opportunities and a greater concentration of jobs in key locations across the region, including the Westside. As seen in Figure 4-2, the result is a relatively small increase (24 percent) in average commuting time compared to the 2012 baseline (and a dramatically lower increase compared to the Trend), and a more modest increase in river crossing trips. The impact on the region’s river crossings is particularly important because apart from the Morris Rd alignment in Valencia County no new bridges have been proposed in the AMPA.

Figure 4-2: Commuting Measures, Growth Rates by 2040



Transit Performance

Transit is an integral part of the Preferred Scenario. The scenario includes a greatly expanded transit system with the introduction of multiple BRT lines and increased frequency across much of the network. Activity centers and transit corridors are also emphasized for additional development. Not surprisingly, the Preferred Scenario performs significantly better in transit usage than the Trend, which anticipates few improvements beyond the proposed Albuquerque Rapid Transit on Central Ave.

The increase in ridership should be viewed as a reflection of the potential role transit can play in the region in the coming decades. As vehicle travel times deteriorate and as accessibility improves, transit can provide additional transportation options and help mitigate the growth of congestion.[2]

[2] It is important to reiterate is that this potential is dependant on increased funding opportunities being successfully pursued.

Figure 4-3: Transit-Related Measures, Growth Rates by 2040

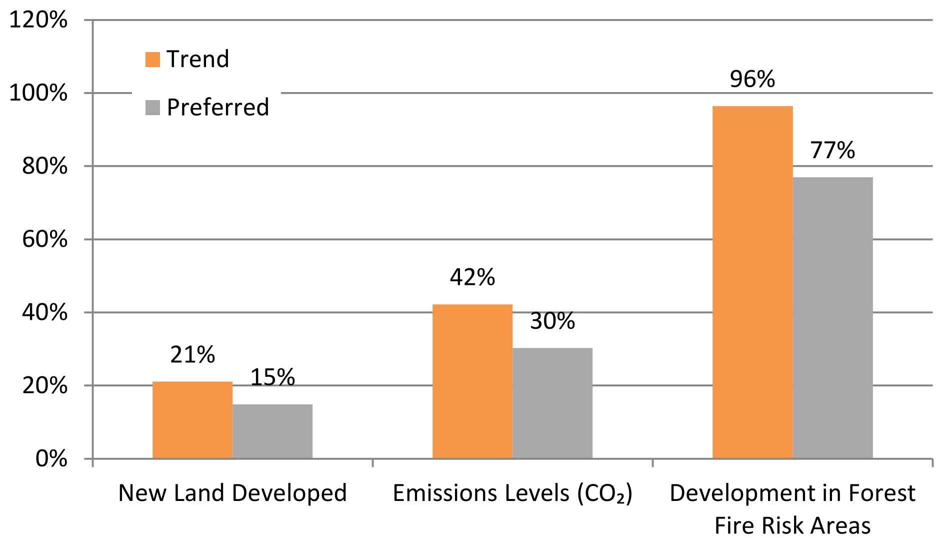
Sustainability and Resiliency to Climate Change Impacts

The Central New Mexico Climate Change Scenario Planning Project enabled MRMPO to introduce additional analyses related to greenhouse gas emissions and the extent to which development occurs in locations which may be at increased risk due to climate change impacts (e.g. floodplains or wildfire prone locations). These measures provide important insights on the sustainability of growth patterns in the region. In particular, they consider the extent to which emphasizing development in certain locations can minimize the amount of growth in locations subject to greater risks. This is most clearly observed in the assessment of high forest-fire risk locations, as measured by the intermix areas in the Wildland-Urban Interface (WUI) tool. Whereas the Trend Scenario projects a 96 percent increase in the combined number of jobs and households in intermix areas, the Preferred Scenario contains only 77 percent growth. Put another way, emphasizing development in activity centers and other key locations results in 10 percent fewer households and jobs in these at-risk locations.

Other more conventional sustainability performance measures include transportation-related CO_2 emissions and new land consumed. Similar analyses have been conducted by MRMPO in past MTPs but these measures took on new relevance as part of the climate change project and MRMPO's scenario planning efforts. Although CO_2 emissions levels increase in both scenarios, due largely to the high levels of population growth, per capita emissions are projected to fall as fuel efficiency improves, and total emissions levels increase by a smaller amount in the Preferred Scenario compared to the Trend (30 percent versus 42 percent). When compared directly to the Trend, the Preferred Scenario results in an eight percent reduction in CO_2 emissions. The results demonstrate that important reductions in GHG emissions are possible through alternative land use configurations and investments in mass transit.

Similarly, the rate of new land consumed is much smaller in the Preferred Scenario (15 percent) compared to the Trend (21 percent). The 13,000 fewer acres developed carries with it a range of potential benefits. These include fewer paved surfaces, less new road construction and utility infrastructure, and smaller service areas for emergency responders. Based on a consumption rate per residential acre, the Preferred Scenario results in six percent fewer gallons of water required to meet annual residential demands. A smaller footprint can also reduce the urban heat island effect, which is particularly important as temperatures are expected to rise in the coming decades.

Figure 4-4: Sustainability Measures, Growth Rates by 2040



Summary

The Preferred Scenario demonstrates that targeted growth can have a range of benefits, including better transportation conditions, greater access to amenities and employment opportunities, and improved air quality and reduce emissions. What is more, such development can actually ease water demands and threats to agricultural land by minimizing new land consumed and reducing the amount of new growth in wildfire-risk areas.

4.2 Monitoring the Progress of the Plan

In addition to performance measures that were developed for the *2040 MTP* scenario planning process, MRMPO monitors the performance of the MTP over time. Monitoring the performance of the plan considers near-term trends in transportation conditions and is different than scenario evaluation, which measures *projected* impacts of the different growth scenarios. The progress of the plan is assessed through the use of performance targets and action items that were developed for the *2035 MTP*, the results of which were presented in the report, *Monitoring the Progress of the 2035 MTP* (MRMPO 2013). In that document, progress toward the 2035 MTP's three goals—"Quality of Life," "Mobility of Goods and People," and "Economic Activity and Growth"—were analyzed. The idea behind this effort was to gauge any progress the MTP is making (or not making) in the region, and to rethink strategies for improvements as necessary.

The next iteration of the monitoring report was produced at the same time as the *2040 MTP*, and the full report is included in Appendix O. Monitoring elements were updated for certain performance targets and the new *2040 MTP* goal of Active Places, with associated performance targets and action items to track progress toward that goal. Other updates to the monitoring element include the revision of the regional transit mode share goal to focus on strategic corridors in the region and tracking spending to assess compliance with the transit set aside. In 2011, the Metropolitan Transportation Board passed mode share goals for river crossings that aimed for 10 percent of all peak period river crossing trips to be achieved by transit by 2025 and 20 percent by 2035. The Board also established a policy of setting aside 25 percent of certain federal funds (STP-U and CMAQ) for transit projects that would specifically address the mode share goals. Following multiple studies that established priority investments in the region, and given the fact that not all river crossing corridors are appropriate locations for transit, the *2040 MTP* establishes revised mode share goals designed to target transit investments in appropriate locations and in ways that are consistent with the Preferred Scenario. The updated mode share goals for the region are included in the update to the *Monitoring the Progress of the 2035 MTP*.

In addition to the performance measures that were developed to assess the different potential growth scenarios and the performance targets and action items used to monitor the progress of the MTP, the federal government is also emphasizing the importance of performance-based planning in its surface transportation legislation, MAP-21. In line with this emphasis, the Federal Highway Administration is releasing performance measures that state transportation departments and metropolitan transportation planning organizations must work toward in their planning efforts. At the time of this writing, the full list of performance measures has not been released (the effective date for all measures is approximately spring 2015).

Between this plan and the next, MRMPO's performance measures will be reconciled with those under MAP-21 and will be integrated into one performance-based process. This work will involve coordination with NMDOT on setting performance targets. In the meantime, MRMPO will continue to assess performance using its own measures and targets.

The following table summarizes the various ways in which performance is being assessed as part of MRMPO's planning process:

Table 4-3: MRMPO Performance Assessment

Various Assessment Types			
Name	Scenario planning performance measures	MRMPO MTP performance targets, goals, and action items	MAP-21 performance measures, standards, and performance targets (note: these are forthcoming)
Applies to	Scenarios developed and modeled as part of the *2040 MTP* scenario planning process	Metropolitan Transportation Plans (2035 and beyond) for the AMPA	Metropolitan transportation planning decision-making (in regard to safety, pavement conditions, operational performance of the Interstate and non-Interstate National Highway System, freight movement, mobile source emissions, and congestion). MTPs must include performance targets.
Purpose	Used to compare scenarios against each other	Monitors progress toward MTP goals and conditions in the region	To develop plans and invest in projects that make progress toward the achievement of national goals.

4.3 MAP-21 National Performance Goals, Planning Factors, MRMPO Integration, and Project Development

MAP-21 identifies seven national performance goals and related performance measures as well as eight planning factors that govern the transportation planning process. At the time of this writing, final guidance from the Federal Highway Administration is still being issued. However, MRMPO is anticipating these requirements and is addressing them in various ways. Table 4-4 defines the seven national target areas and indicates how MRMPO efforts are consistent with national performance goals.

Many of the MAP-21 National Performance Goals are reflected in the Project Prioritization Process for TIP selection, as well as the procedures employed by MRMPO. Following are the specific ways in which each MAP-21 goal is currently accounted for in the project selection and project management process. MRMPO expects to take further steps to incorporate these goals as guidance is issued from the Federal Highway Administration.

National Performance Goal – Safety: Achieve a significant reduction in traffic fatalities and serious injuries on all public roads

- Projects are awarded points under MRMPO's Project Prioritization Process for the following:
  - A project addresses a high crash rate location
  - A project contains a proven safety strategy (taken from the FHWA list of proven safety countermeasures and the Iowa Comprehensive Highway Safety Plan)
- MAP-21 priorities shared by MRMPO:
  - Projects should address a systemic safety concern as identified in a governmental agency report or a government mandated measure
  - Projects should maintains or improves the security of the transportation system
  - Study and analyze safety concerns to determine the preferred mitigation measure(s) to be implemented

National Performance Goal-Infrastructure Condition: Maintain the highway infrastructure asset system in a state of good repair

- Projects are awarded points under MRMPO's Project Prioritization Process for the following:
  - Percentage of the project dedicated to maintaining the existing infrastructure
- MAP-21 priorities shared by MRMPO:
  - Projects should contains strategies identified in the performance based asset management plan for the state's National Highway System
  - Projects should address one or more deficiencies of a facility on the Deficient Bridge List
  - Projects should provide for the collection of data to monitor the transportation system and/or develop and maintain an asset management plan

<u>National Performance Goa l – Congestion Reduction:</u> Achieve a significant reduction in congestion on the National Highway System

- Projects are awarded points under MRMPO's Project Prioritization Process for the following:
  - o A project addresses a congested location as identified through the Congestion Management Process
  - o Project includes a recognized congestion management strategy
- MAP-21 priorities shared by MRMPO:
  - o Projects should provide or enhances alternate modes of transportation other than single occupancy vehicle (SOV) travel
  - o Study and analyze an identified congested corridor to determine various strategies to reduce congestion

<u>National Performance Goal – System Reliability:</u> Improve the efficiency of the surface transportation system

- MRMPO Priorities:
  - o A project includes or features a strategy identified in the Congestion Management Process
  - o A project increases the volume and/or speed of people moved on a facility without adding additional through traffic lanes or adversely affecting the other six goals

<u>National Performance Goal – Freight Movement and Economic Vitality:</u> Improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development

- Projects are awarded points under MRMPO's Project Prioritization Process for the following:
  - o A project maintains or improves movement of freight along the primary freight network
  - o A project explicitly aims to improve freight movement
- MAP-21 priorities shared by MRMPO:
  - o Study and analyze an identified freight movement issue in order to determine various strategies to improve freight movement
  - o Projects should provide additional infrastructure to promote economic development
  - o Projects should serve areas with high employment and population density
  - o Projects should address a primary freight corridor as identified in the MTP

Table 4-4: National Performance Goals and MRMPO Efforts

MAP-21 Goal Area	National Performance Goal	National Performance Measure	MRMPO Integration
Safety	To achieve a significant reduction in traffic fatalities and serious injuries on all public roads	Fatalities and serious injuries—both number and rate per vehicle mile traveled--on all public roads	Data collection, analysis and crash reports; Crash rates are criterion in the Project Prioritization Process for TIP selection; support of Complete Streets and other policies that enhance multi-modal safety
Infrastructure Condition	To maintain the highway infrastructure asset system in a state of good repair	Pavement condition on the Interstate System and on remainder of the National Highway System (NHS); Bridge condition on the NHS	MRMPO is working with member governments to determine existing pavement inventory systems; MRMPO is awaiting delivery of on an Asset Management Plan from NMDOT; MRMPO relies upon NMDOT and BIA for bridge inventory and inspection systems
Congestion Reduction	To achieve a significant reduction in congestion on the National Highway System	Traffic congestion	Data collection, analysis, and travel demand modeling; Congestion levels is a criterion in the Project Prioritization Process for TIP selection
System Reliability	To improve the efficiency of the surface transportation system	Performance of the Interstate System and the remainder of the NHS	Data collection - analysis of travel time, delay, and reliability Interstates and arterials in the AMPA
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	Freight movement on the Interstate System	Data collection; Identification of priority freight corridors; Freight movement is a criterion in the Project Prioritization Process for TIP selection; Economic Vitality is a goal of the 2040 MTP
Environmental Sustainability	To enhance the performance of the transportation system while protecting and enhancing the natural environment	On-road mobile source emissions	Emissions analysis and consideration of GHG emissions reduction strategies in Futures 2040 MTP; Consideration of extent of development in floodplains and Wildland-Urban Interface areas through Central NM Climate Change Scenario Planning Project; Multi-modal planning efforts
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	None provided	TIP management includes monthly status reports and technical assistance to jurisdictions during project development; Federal funds obligation report is issued annually, with obligations rates exceeding 95% in recent years

National Performance Goal – Environmental Sustainability: Enhance the performance of the transportation system while protecting and enhancing the natural environment.

- Projects are awarded points under MRMPO's Project Prioritization Process for the following:
  - Reduces mobile emissions as an effort to maintain or improve air quality
- MAP-21 priorities shared by MRMPO:
  - Projects should mitigate adverse environmental effects of the transportation system. (Examples are: erosion, diminished water quality, adverse effects to wildlife, etc.)

    - Projects should maintain or improve the availability of transportation services to a disadvantaged population
    - Projects should implement a strategy identified in an approved planning document (comprehensive plan, sector plan, etc.) to improve the quality of life in a community, the region, or the state

<u>National Performance Goal – Reduce Project Delivery Delays:</u> Reduce the 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.

- MRMPO TIP Management Strategies:
    - MRMPO shall, to the extent of its ability, work with lead agencies, the NMDOT, the Federal Highway Administration, Federal Transit Administration, and other agencies to obligate funds in a timely manner and assist lead agencies in meeting project development milestones
    - MRMPO shall periodically assess projects as to their status
    - The TIP shall be managed to maximize the amount of funds obligated or used for projects each fiscal year in order to utilize 100 percent of the funds available (or as close to 100 percent as practical). Projects will be advanced or switched among the first four federal fiscal years of the TIP based on a project's readiness to complete the development phase for which its funds are programmed. By utilizing all funding available to the region in a fiscal year, it maximizes the amount of money flowing to the construction industry, design services, etc.

Table 4-5 lists the eight federally required planning factors and shows where in the *2040 MTP* the factors are primarily discussed:

Table 4-5: Addressing Federal Planning Factors in the *2040 MTP*

Planning Factor	Where Addressed in the *2040 MTP*
(1) Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency	Chapter 1.1 Introduction to the *Futures 2040 MTP;* Chapter 3.11 Economic Impacts
(2) Increase the safety of the transportation system for motorized and non-motorized users	Chapter 3.6 Safety; Appendix H: Long-Range Transportation Systems Guide
3) Increase the security of the transportation system for motorized and non-motorized users	Chapter 3.7 Transportation and Security
4) Increase the accessibility and mobility of people and freight	Chapter 3.2 Roadways; Chapter 3.3 Freight; Chapter 3.13 Livability
5) Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic patterns	Chapter 3.15 Water Resources; Chapter 3.17 Emissions Reductions and Responses to Climate Change
6) Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight	Chapter 3.13 Livability; Appendix H: Long-Range Transportation Systems Guide
7) Promote efficient system management and operation	Chapter 3.2 Roadways (3.2.4 (c) Transportation Systems Management & Operations)
8) Emphasize the preservation of the existing transportation system	Chapter 3.2 Roadways; Chapter 4.4 Financial Analysis

4.4 Financial Analysis

Financial analysis of the metropolitan transportation plan 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 metropolitan transportation plan, 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 providing greater long-term transportation and economic benefits. In particular, the *2040 MTP* shifts funding to preservation of existing infrastructure whereas previous plans underestimated the long-term amount of funding needed for this purpose. For example, NMDOT District 3's funding needs for preservation in the late-term (2026-2040), where specific projects are more difficult to identify, have been increased to $0.5 billion, which is a more realistic figure for preservation costs at an annual average of over $33 million in that fifteen year period. In addition, this plan includes specific funding for major bridge rehabilitations such as those over the Rio Grande.

4.4.1 Financial Legislation and Requirements

Federal Legislation

In 2012 Congress enacted a transportation spending bill known as MAP-21 (Moving Ahead for Progress in the 21st Century). MAP-21 authorized funds for Federal Fiscal Years (FFY) 2013 and 2014.[3] In 2014 Congress reauthorized MAP-21, extending the legislation and providing funds for only the first eight months of FFY 2015 (the current reauthorization expires May 31, 2015). In order to fund all projects programmed in current FFY 2015 in the Transportation Improvement Program (TIP), Congress will have to enact an extension of MAP-21 or enact a new transportation bill (continuing resolutions to reauthorize, or extend, MAP-21 are expected). However, if Congress does not enact a multi-year extension of MAP-21 (or a new bill) by the beginning of FFY 2016 (October 1, 2015), MRMPO will need to review the projects programmed in FFY 2016 and compare those amounts to the federal transportation dollars made available in the continuing resolution in effect at that time. Based on that review, adjustments to the FFY 2016-2021 TIP may be necessary. Without the passage of a multi-year transportation bill, this would need to be done at the beginning of each fiscal year and again, federal regulations would require that the TIP reflect the changed revenue situation if funds are reduced. Although the risk of lowered revenue has its greatest impact on the TIP, the MTP is also subject to

[3] The Federal Fiscal Year (FFY) begins each October 1st and ends the following September 30th thus, FFY 2015 runs October 1, 2014 through September 30, 2015. FFY 2016 will begin October 1, 2015 and so on.

revision if federal funding is substantially reduced from estimated levels. Federal regulations would require the MTP to reflect the changed revenue situation before it could be amended or updated.

Transportation Funding History

Historically, federal transportation spending has largely been financed by user fees—primarily taxes on gasoline and diesel fuel that have financed the Highway Trust Fund since it was established in 1956. The past few years, however, have marked a significant departure from this trend, with a greater share of the federal funding source being supported by general revenues. MAP-21 set program spending levels significantly above dedicated revenues, continuing the funding gap between spending and revenues. State and local governments are also experiencing 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 value has steadily diminished since it was last raised in 1993 at the federal level and in New Mexico.[4] Moreover, gas tax revenues are likely to be further eroded by future improvements in fuel efficiency and the average American driving fewer miles than previously anticipated resulting in less fuel being purchased, thus less fuel tax collected. 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 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 in this chapter are reasonable 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.

Fiscal Constraint

Metropolitan transportation plans are also 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 projected financial resources available.

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[4] The federal tax on gasoline established in 1993 is 18.4₵ per gallon; the New Mexico tax on gasoline was also established in 1993 is 18.875₵ per gallon (including the Petroleum Products Loading Fee). It is the eight lowest in the nation. Neither is indexed for inflation.

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. Thus, the remaining funding can be programmed for future transportation projects. Table 4-6 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 N 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 4-6: Summary of Fiscal Constraint

Anticipated Funds Available for Transportation 2012-2040	Amount (in $1,000s)
Federal Funds for Transportation Projects	$4,201,826
State Funds Available	$630,154
Local Funds Available	$5,905,378
Total Public Revenue Available	**$10,737,358**
Private Developer Funding for Transportation Projects	$1,207,800
Total of All Funds Available for Transportation	**$11,945,159**
Projected Cost of Maintenance & Operations for All Agencies	$5,649,590
Remaining Funds Available for Transportation Projects	**$6,295,569**
Cost of Publicly Funded Transportation Projects in this MTP	$5,087,266
Cost of Privately Funded Transportation Project in this MTP	$1,207,800
Difference (Funding Available minus Costs)	**$503**

Note 1: Estimates of federal funds use the FFY 2015 obligation rate for all fiscal years.
Note 2: One percent growth is assumed for all federal highway categories from FFY 2022 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, M and N for more information.

4.4.2 Revenues and Expenditures

As noted previously, in order 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. Appendices L and M provide more detailed summaries of federal, state, and local revenue projections.

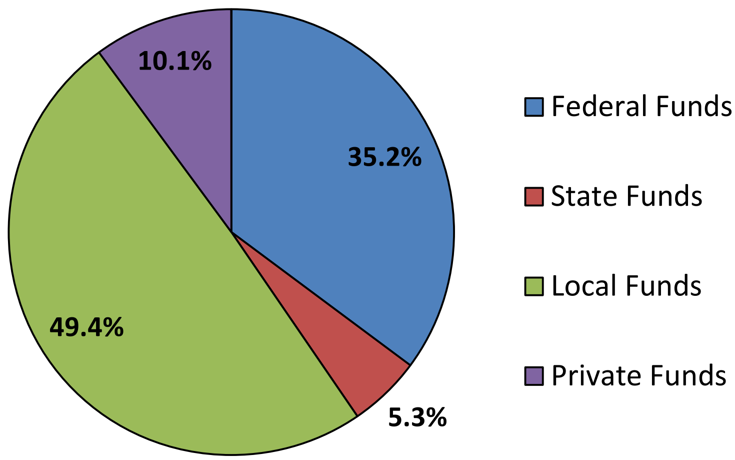
Table 4-7: Projected Funding Available from Public Sources

Transportation Revenue (Public Sources)	Total FFY 2012-2040 (in $1,000s)
Federal Highway Program	$2,632,982
Federal Tribal Transportation Program (TTP)	$108,672
Federal Lands Program (non-TTP)	$11,400
Federal High Priority Projects	$40,218
Federal Special Programs (safety, railroad crossing, etc.)	$96,322
Federal Transit Administration	$1,312,233
Total Federal (includes required matching funds)	**$4,201,827**
State Funds	$630,154
Local Funds	$5,905,378
Total Public Revenues Available for Transportation Purposes	**$10,737,359**

Table 4-8: Projected Funding Available from Public and Private Sources

Transportation Revenue (Public and Private Sources)	Total FFY 2012-2040 (in $1,000s)
Public Funds Available for Transportation Purposes	$10,737,359
Private Developer Funds for Transportation Purposes	$1,207,800
Total Funding Available for Transportation Purposes	**$11,945,159**

Figure 4-5: Projected Funding Available from Public and Private Sources, 2012-2040



Comparison of 2040 *and* 2035 MTP *Revenue Projections*

One of the significant differences in revenue projections in this MTP compared to the previous plan is the projected funding from the Federal Transit Administration. This is primarily due to increases in "formula funds" (i.e., funding distributed nationwide, based on formulas using various criteria). In the Albuquerque area, transit funding increased primarily due to higher transit ridership and the operation of the New Mexico Rail Runner Express commuter trains which, under federal formula distribution criteria, results in significant increases in federal transit funding allocated to New Mexico. In 2015 alone, that amount was approximately $12.5 million and will increase in 2016 when additional formula criteria become available.

Revenue projections in the federal highway category increased over 49 percent. Although this seems significant, there are two valid reasons.

- Funding was projected in the *2035 MTP* in each category for the years 2017-2035 by maintaining 2017 levels and not accounting for any increase in the entire period. The *2040 MTP* provides for a one percent increase per year from 2022-2040.
- The boundary of the AMPA significantly expanded in 2013 as a result of the 2010 U.S. Census. Prior to February 2013, most of Valencia County and Sandoval County northeast of Algodones were not part of the AMPA. Therefore, federal funds utilized in those areas were not accounted for in the *2035 MTP* but are accounted for in this plan.
- In addition to the increase noted above, there is a significant increase in Tribal Transportation Program (TTP) funding in this MTP. This is due to the expansion of the AMPA and the increase in the number of tribal governments within the metro area.

State funding projections show a 35 percent increase. This is due to the following:

- State funding listed in the *2035 MTP* was primarily special program funding (GRIP) and, per NMDOT, no additional state funding for capital projects was listed beyond 2011. This proved unrealistic because the state actually programmed over $39 million for projects in period 2012-2015. For this plan NMDOT and MRMPO agreed to project state funding levels.
- As previously noted the boundary of the AMPA significantly expanded in 2013 as a result of the 2010 U.S. Census. The expansion essentially established the AMPA boundary to be coterminous with NMDOT District 3. Thus, the estimates of state funds used for District 3 maintenance and operations now reflects the entire District 3 amount. Prior to the expansion, MRMPO and District 3 pro-rated those estimates to cover only the area within the old AMPA boundary.

Local funding projections show a 48 percent increase. This is due to the following:

- The boundary of the AMPA significantly expanded in 2013 as a result of the 2010 U.S. Census. The expansion added to the AMPA the remainder of Valencia County, four municipalities and new tribal governments, therefore increasing the amount of local revenue to be accounted for in this plan.
- 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.

Revenue Projections Methodology and Assumptions

NMDOT held several meetings with the state's MPOs and public transit operators to discuss and develop revenue projections and project inflation rates to be used for estimating future expenditures. Additional revenue information is available in the NMDOT's statewide long range plan.

<u>Federal funds</u>**:** The following assumptions were agreed upon for estimating federal funding.

- For all FHWA funding categories for FFY 2016 through FFY 2021 the Transportation Improvement Program (TIP) will use funding targets at FFY 2015 levels in each federal funding category with no increase from year to year
- For all FHWA funding categories programmed in FFY 2022 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 2016 through FFY 2040, an obligation rate of 91.0 percent is used
- Funds required to match federal funds shall be calculated and included in the overall funding projections. Currently, under MAP-21, 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
- CMAQ-Mandatory (Congestion Mitigation-Air Quality) funds are provided to metropolitan areas which are in air quality non-attainment or air quality maintenance status. Currently, Bernalillo

County is in air quality maintenance status for carbon monoxide (CO) which is due to expire in June 2016 when full attainment status is achieved. However, sections of the AMPA may fall into non-attainment status for ozone (O_3) very soon, particularly if the ozone standard is reduced by the federal government. If ozone non-attainment occurs, the level of CMAQ funding the metro area would receive is unknown at this time. For the purposes of projecting revenue for this MTP, it was agreed to maintain CMAQ-Mandatory funds for the AMPA under the same formula currently utilized.

- 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 MRMPO 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).
- 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. Also, it was agreed to program FTA 5337 funds in FFY 2015 at $5,500,000 to reflect the projected additional funding due to the New Mexico Rail Runner Express service expansion to Santa Fe (this category of federal funding "kicks-in" seven years after the expansion of service). FTA 5339 funding is apportioned to the state for distribution to each small urbanized area transit operator; therefore, Rio Metro received $69,907 for the Los Lunas Urbanized Area in FFY 2014.
- Tribal Transportation Program (TTP) funding estimates were developed using 2016 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 2016 estimates through 2021, then a one percent annual increase was applied through 2040.
- All revenues from public sources are summarized in Table 4-7. For a more detailed summary see Appendices L and M.

<u>Future federal funding sources</u>**:** 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.

State funds: 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. It was agreed to project state funding for capital projects by calculating the annual average of all state capital funding (excluding GRIP) from 2007 through 2015. This amount, $5,888,000, is held steady through 2021 then a one percent annual increase is 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 the nine year 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 funds: Estimates of local revenue used for transportation was 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 ⅛-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 ⅜-cent GRT taxing capacity which is projected to commence in 2022. 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 on Central Ave remains funded.

Private funds: 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 of 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.

Table 4-9: Private Capital Revenue and Expenditures

Transportation Revenue (Private Sources)	Total FFY 2012-2040 (in $1,000s)
Private Revenue for Transportation Purposes	$1,207,800
Private Project Expenditures	$1,207,800
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.

- *New Starts/Small Starts discretionary grant program***:** New Starts and Small Starts have 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.
- *Transportation Investment Generating Economic Recovery (TIGER)*: TIGER grants are awarded periodically to state, local, and tribal governments on a nationally-competitive basis to build and repair critical pieces of freight and passenger transportation networks. Applicants must detail the benefits their project would deliver for five long-term outcomes: safety, economic competitiveness, state of good repair, livability and environmental sustainability. The U.S. DOT also evaluates projects on their expected contributions to economic recovery, as well as their

ability to facilitate innovation and new partnerships. Since 2009, Congress has dedicated more than $4.1 billion for six rounds to fund projects that have a significant impact on the nation, a region or a metropolitan area. In FFY 2012, Bernalillo County was awarded $262,500 for the Bridge Boulevard Reconstruction project (A300501).

- *Transit Investments for Greenhouse Gas and Energy Reduction (TIGGER) Program*: TIGGER grants are awarded to public transit agencies for the implementation of new strategies for reducing greenhouse gas emissions or reducing energy usage from their operations. These strategies can be implemented through operational or technological enhancements or innovations. Thus far, no TIGGER grants have been awarded in New Mexico.

- *Sustainable Communities*: This 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"*: This 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.

- *Focusing Resources, Economic Investment and Guidance to Help Transportation (FREIGHT) Act of 2010*: The intent of this act is to transform the nation's transportation policy and guide investments by focusing on the freight network. The FREIGHT Act provides a comprehensive, systemic approach to infrastructure investment that addresses the nation's commerce needs while providing a solid foundation to help the nation meet its energy, environmental, and safety goals. The bill also calls for the creation of a new National Freight Infrastructure Grants Initiative—a competitive, merit-based program with broad eligibility for multi-modal freight investment designed to focus funds where they will provide the most public benefit.

- *Federal loans and credit programs*: 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 map). 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. A number of other innovative federal financing programs are available but may require state authorization and approval.

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 the 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) includes 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. 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 N provides more detailed summaries of projected maintenance and operations expenditures.

Projections of New Mexico's state revenue for transportation purposes include $415.7 million allocated to the metro area through 2040. This includes funding for NMDOT District 3 maintenance and operations. Please refer to NMDOT's statewide long range plan for further analysis of New Mexico highway funding.

Table 4-10: Projected State and Local Maintenance & Operations Expenditures

Jurisdiction	Total FFY 2012-2040 (in $1,000s)
Local Jurisdictions	$5,233,835
NMDOT District 3	$415,755
Total Projected M&O Expenditures	**$5,649,590**

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 4-10).

Table 4-11: Funds Available for Capital Transportation Projects

Anticipated Funds Available for Transportation 2012-2040	Amount (in $1,000s)
Federal Funds for Transportation Projects	$4,201,826
State Funds Available	$630,154
Local Funds Available	$5,905,378
Total Public Revenue Available	$10,737,358
Private Developer Funding for Transportation Projects	$1,207,800
Total of All Funds Available for Transportation	$11,945,159
Projected Cost of Maintenance & Operations for All Agencies	$5,649,590
Remaining Funds Available for Transportation Projects	$6,295,569

Note 1: Estimates of federal funds use the FFY 2015 obligation rate for all fiscal years.
Note 2: One percent growth is assumed for all federal highway categories from FFY 2022 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

About $2.2 billion, or approximately 35 percent, of all capital funds will be used to expand highway capacity, compared to one half in the *2035 MTP*. However, over 53 percent less public funding is identified for capacity expansion than the *2035 MTP*, with funds being shifted to preserving the current highway and bridge infrastructure. Overall, public expenditures for preservation increased by 66 percent compared to the previous MTP. Approximately 29 percent of all funding will be spent on transit, compared to 18 percent in the *2035 MTP*. This is a significant increase over the *2035 MTP*, and much of it is attributed to additional federal transit funds allocated to the region and discussed earlier in this chapter. This has the potential to greatly expand transit services and will be an important step in achieving the transit mode share goal of 20 percent of trips by transit on priority corridors by 2040. Pedestrian/bicycle and safety projects are also expected to receive higher levels of funding compared to the projects proposed in the previous MTP. Together, these trends in funding reflect a shift in transportation investment priorities across the AMPA, particularly from capacity expansion to infrastructure preservation. Table 4-12 provides a comparison of project funding between the *2035* and *2040 MTP*s.

Figure 4-6: *2040 MTP* Projects by Type

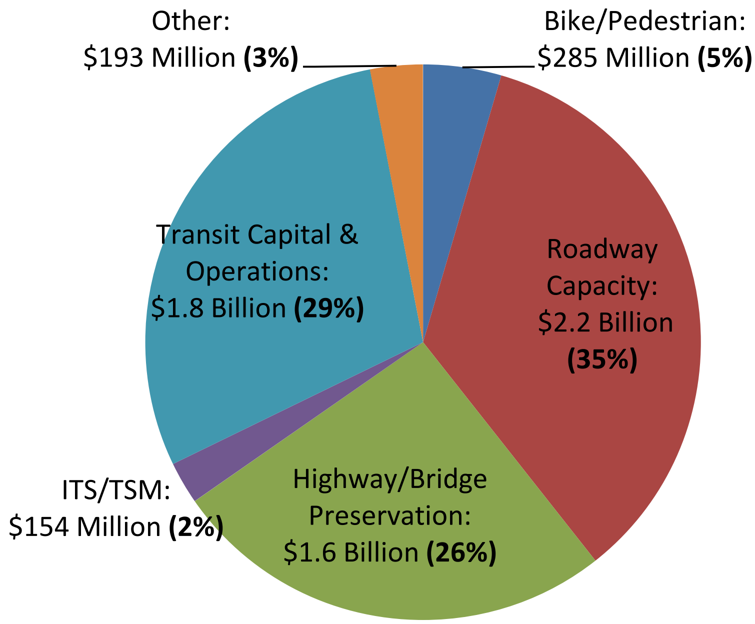


Table 4-12: Project Expenditures by Type of Project, Comparison of *2035* and *2040 MTP*s

Project Type	Amount - *2035 MTP*	Amount - *2040 MTP*	Difference *2040* vs *2035 MTP*	Numerical Difference
Bike/Ped Projects (Public)	$241,302,104	$263,944,607	9%	$22,642,503
Bike/Ped Projects (Private)	$15,859,250	$21,193,000	34%	$5,333,750
Roadway Capacity (Public)	$2,248,608,711	$1,036,980,106	-54%	-$1,211,628,605
Roadway Capacity (Private)	$770,129,498	$1,155,881,922	50%	$385,752,424
Highway & Bridge Preservation	$987,183,864	$1,633,985,094	66%	$646,801,230
ITS/TSM Projects	$194,534,713	$154,255,556	-21%	-$40,279,157
Miscellaneous	$271,608,555	$75,131,684	-72%	-$196,476,871
Safety Projects	$64,389,139	$80,858,290	26%	$16,469,151
Travel Demand Management	$35,340,413	$37,164,786	5%	$1,824,373
Transit Projects	$1,077,503,135	$1,834,671,248	70%	$757,168,113
Total	**$5,906,459,382**	**$6,294,066,293**	**7%**	**$387,606,911**

Note: See following section for definitions of project type**.**

4.4.3 MTP Projects Summary

All proposed MTP projects are listed in Appendix A. Listed below are some significant and noteworthy projects. In the past, MTPs have included very long-range projects and new roadways which were included in the previous *Future Albuquerque Area Bikeways and Streets (FAABS)* 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 *2040 MTP* and are therefore not included in this plan. They will, however, remain in the Long Range Roadway System*,* an element of the LRTS Guide. Appendix B contains a summary listing of these special projects and their status in the *2040 MTP*.

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., NM Rail Runner), 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 Bosque Trail) and those facilities which are part of the regional bikeway network.

Project Type Categories

Projects in the *2040 MTP* are categorized by one of eight project types: Bike/Pedestrian, Capacity Projects, Highway & Bridge Preservation, ITS-TSM, Safety, 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 self-explanatory for bicycle trails, bike lanes, and sidewalks, but they 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. Projects such as 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 transit 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, 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. Some project costs are derived from engineers' estimates, environmental documents or initial project scoping reports. This applies primarily to projects in the MTP and included in the TIP through 2021. Unit costs for various project elements derived cooperatively among the major agencies have been used to estimate capital project costs for those projects that have no other documented cost estimates. 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 is considered "private capital revenue." As noted before, these revenues are cancelled-out by the costs of the privately-funded projects. Generally, privately-funded projects have no direct impact on fiscal constraint.

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 2025 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 compatible between this MTP and the previous *2035 MTP*. The *2035 MTP* used "Early" = 2008-2015, "Mid" = 2016–2025, and "Late" = 2026–2035. This plan uses two timeframes: "Near Term" = 2012–2025 and "Late" = 2026–2040. As a result, since the proposed timing of most projects included in both MTPs are unchanged, the cost estimates for most projects are usually the same between the two MTPs, particularly those in the "Late" time frame. Some costs were revised based on review from the project's lead agency, particularly those in the "near" time frame. To be clear, all projects in Appendix A noted as "Funded" are in the "near-term."

Major Roadway Projects

- Unser Blvd Corridor Improvements: complete Unser Blvd as a four lane north-south arterial
- I-25 & Paseo del Norte Interchange Reconstruction: project is under construction and is expected to be completed in 2015
- I-25 Improvements between Jefferson St and San Antonio Dr: improve safety and access at the I-25 interchanges
- I-25 Widening between Broadway Blvd and Rio Bravo Blvd: widen the freeway from four to six lanes
- I-25 & Rio Bravo Interchange Reconstruction: redesign the interchange and improve traffic flow through the intersections
- I-25 & Cesar Chavez Interchange Reconstruction: rebuild and possibly reconfigure the interchange
- I-25 & Montgomery Blvd Interchange Reconstruction: rebuild/reconfigure the interchange
- I-25 & US 550 Interchange Reconstruction: project is under construction and includes a reconfiguration of the interchange

- 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
- Central Ave Improvements: address vehicular traffic, pedestrians and transit along various segments
- NM 528 Widening: widen the highway between Southern Blvd and Northern Blvd from four to six lanes
- Northern Blvd Expansion: design and right-of-way acquisition to widen the roadway
- 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 Morris Rd and build a new road and bridge over the Rio Grande. Purchase of right-of-way is underway
- NM 6 Bridge Replacement over the Rio Grande
- NM 337 Bridge Replacement in Chilili
- SP 85 Bridge in Cochiti Pueblo: build a bridge to restore the roadway damaged as a result of the severe rain, thus providing residents a safe crossing of an arroyo
- Bridge Blvd Reconstruction: address vehicular traffic, pedestrian, and transit conditions between Old Coors Blvd and the Rio Grande
- 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 transit network (see Chapter 3.4). Other transit projects will maintain and expand existing service levels.

- Albuquerque Rapid Transit (ART): implement Bus Rapid Transit along Central Ave. The project is currently under development and service could begin operations in 2017. Some features of this service will be 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.
- 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).
- Metro Area Enhanced Transit Improvements: provide higher level transit service to possible areas such as the northwest metro/Rio Rancho area and others to be determined
- Commuter Rail: Alameda Siding Improvements will improve Rail Runner operations and shorten time schedules by providing locations for trains to pass each other. Other projects will consider 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.
- Park and Ride Development: park and ride facilities will be developed as the metropolitan area expands in order to meet growing demand

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
- Santo Domingo Multi-Use Trail: provide a safe connection from the village to the NM Rail Runner Station and 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: provide 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): 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

Chapter 5: PLAN IMPLEMENTATION

The *Futures 2040 MTP* features several implementation mechanisms that help ensure progress is made toward addressing the regional goals and objectives that guide the transportation planning process. As it is first and foremost a transportation plan, these initiatives focus specifically on transportation strategies, project development, and the programming of transportation dollars. Principal strategies that are integrated into the regional transportation planning process include:

1) The **Transportation Improvement Program (TIP)**, which utilizes the Project Prioritization Process and identifies projects that will receive federal transportation funds. Only projects that are included in or consistent with the MTP can be funded through the TIP, making the TIP the near-term implementation program for the long-range plan.
2) **Transit policy measures** including mode share goals and a funding set-aside. 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 has been adopted that requires a minimum of 25 percent of certain federal funds that are programmed through the TIP be directed toward transit projects that expand service along the priority network. Discussion on the transit policy measures can be found in Chapter 3.4.
3) The **Congestion Management Process (CMP)**, an ongoing mechanism for discussing regional transportation challenges and identifying strategies by location. A primary function of the CMP is to evaluate the effectiveness of transportation strategies and coordinate regional transportation decision-making.
4) The **Long Range Transportation System (LRTS) Guide**, which provides design guidance for new and reconstructed roadways to work toward a more complete, connected, and safe transportation system. The LRTS Guide serves to implement the Complete Streets resolution (R-11-09) the Metropolitan Transportation Board passed in 2011, which called for updating documents and policy as it relates to Complete Streets as well as the production of a guidance document. The LRTS Guide is meant to ensure that roadway design is consistent with the surrounding context and adequately serves all potential users.

Through the scenario planning process the *2040 MTP* also established that addressing regional challenges goes beyond the identification of transportation projects. While MRMPO can play a facilitating role and lead certain efforts, the realization of the plan is the work of all regional partners, and critical policy decisions that extend beyond transportation will need to be considered. Other agencies in the region must incorporate the principles of this plan into internal processes, policies, and plans as appropriate in order to fully realize its benefits. In particular, several key strategies recommended for realizing the Preferred Scenario require land use jurisdiction. Land use falls outside the purview of a regional transportation planning agency such as MRMPO, but local land use decisions have significant implications for the larger region. Coordination across jurisdictions is critical to achieve the best outcomes.

This chapter considers two of the transportation-related measures listed above that are critical for the implementation of the MTP: the Transportation Improvement Program and the Long-Range Transportation Systems Guide (a complete version of which can be found in Appendix H). While the mode share goals and TIP set-aside are important initiatives, they must be complemented by a integrated vision for land use and infrastructure investments in order for them to truly succeed. As such, this chapter also contains implementation strategies and recommendations associated with achieving the vision established by the Preferred Scenario.

The chapter concludes with an examination of the potential next steps for MRMPO and regional partners in expanding analytical capabilities and integrating scenario planning efforts into other local and regional plans and projects.

5.1 Transportation Improvement Program

The Transportation Improvement Program (TIP) is a federally-mandated short-term plan that programs funding for transportation projects in a metropolitan region. In order for a project in the Albuquerque Metropolitan Planning Area (AMPA) to receive federal highway or transit funding, it must first be included in the TIP (and before that must be included in or be consistent with the MTP). 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 year. Also, adoption of the TIP must be accompanied by a determination of air quality conformity by the Albuquerque-Bernalillo County Air Quality Control Board and other agencies to ensure projects programmed in the current TIP will not negatively impact current air quality standards.

5.1.1 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 Public Involvement 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.

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 (in this case, the FFY 2016-2021 TIP). The *2040 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 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.

MAP-21 TIP Requirements

The current federal transportation authorization bill, MAP-21, lists requirements for a TIP:

- A TIP shall contain projects consistent with the current metropolitan transportation plan
- A TIP shall reflect the investment priorities established in 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

MAP-21, which became effective October 1, 2012, also established a series of performance measures and targets that are meant to guide the programming of federal funds. However, performance measures and targets are not expected to be established and finalized by the U.S. DOT and NMDOT before the *Futures 2040 MTP* and the FFY 2016-2021 TIP are both formally adopted. Nevertheless, MRMPO has taken proactive steps in anticipation of this upcoming guidance; more information can be found on how the region is addressing MAP-21 performance goals in Chapter 4.3.

Project Prioritization Process and Project Selection

In developing a new TIP, agencies submit project proposals to MRMPO staff to be scored and ranked through the Project Prioritization Process (PPP), which is an objective, quantitative-based method for evaluating and comparing proposals for inclusion in the TIP. Each project is evaluated and receives a prioritization score depending on how well the proposed project supports the goals and regional directions outlined in the *2040 MTP*. Multifaceted projects that address a number of regional needs 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) and to help determine which projects should be ultimately programmed into the TIP.

Overall, the PPP helps transportation stakeholders establish a short-range TIP that implements the long-range transportation plan's goals and objectives while adhering to and linking investment priorities to forthcoming national performance goals.

5.1.2 FFY 2016–2021 TIP Development Summary Statistics

Per MAP-21 requirements for a TIP, the projects contained in the TIP must be consistent with the *Futures 2040 MTP*; the FFY 2016-2021 TIP also reflects investment priorities established in this document. Summary statistics for the FFY 2016-2021 TIP as approved by the MTB on April 17, 2015 are included in this section. The diagrams and charts depict summaries of total funds programmed by project type, along with total funds programmed by core funding categories, and total funds programed by lead agency.

It is important to keep in mind that this TIP is a living program and will look rather different in the coming years due to standard revisions that take place during its two-year lifecycle. In addition, all numbers and figures listed here are subject to change due to the fact that a long-term federal transportation bill is not in place. Current figures were developed and programmed based on a continuing resolution to the current MAP-21 transportation law. Please refer to the TIP page on the MRCOG website for a detailed listing of current projects.

Table 5-1: FFY 2016-2021 TIP, Total Federal Funds by Project Type

Project Type	Total Federal Amounts	Percentage
Bicycle/Pedestrian	$14,028,223	3%
Capacity Projects	$74,097,200	13%
Highway & Bridge Preservation	$223,258,542	41%
ITS-Transportation Systems Management	$21,760,727	4%
Miscellaneous	$14,218,304	3%
Safety	$3,513,653	1%
Travel Demand Management	$6,260,250	1%
Transit	$192,489,579	35%
Total	**$549,626,478**	**100%**

Note: project type totals reflect all federal funding categories

Table 5-2: FFY 2016-2021 TIP, Total Funds Programmed by Funding Category

Funding Category	Total Federal Amounts	Percentage
Federal Highway Funds (FHWA)	$347,879,278	55%
Federal Lands Highway Program Funds	$33,468,570	5%
Federal Special Programs Funds	$3,709,717	1%
Federal Transit Funds (FTA)	$168,278,630	27%
Local Non-Matching Funds	$48,440,875	8%
State Non-Matching Funds	$28,785,000	5%
Total	**$630,562,070**	**101%**

Table 5-3: FFY 2016-2021 TIP, Total Federal Funds Programmed by Lead Agency

Lead Agency	Total Federal Amounts	Percentage
Bernalillo County	$42,019,485	12.1%
City of Albuquerque - ABQ Ride	$24,635,930	7.1%
City of Albuquerque -DMD	$45,140,264	13.0%
City of Albuquerque -P&R	$748,444	0.2%
City of Belen	$2,018,093	0.6%
City of Rio Rancho	$11,632,312	3.3%
MRMPO/MRCOG	$2,076,707	0.6%
NMDOT	$192,922,214	55.5%
Pueblo of Cochiti	$2,158,346	0.6%
Rio Metro RTD and NMRX	$5,835,269	1.7%
SSCAFCA	$1,597,885	0.5%
Town of Bernalillo	$713,424	0.2%
Town of Peralta	$318,960	0.1%
Valencia County	$5,848,368	1.7%
Village of Corrales	$287,933	0.1%
Village of Los Lunas	$9,925,644	2.9%
Total	**$347,879,278**	**100%**

Note: This tables is comprised only of core FHWA fund sources.

Table 5-4: FFY 2016-2021 TIP, Total Federal Transit Funds Programmed by Lead Agency

Lead Agency	Total Federal Amounts	Federal Percentage by Lead Agency
City of Albuquerque-ABQ Ride	$62,732,000	37%
Rio Metro NM Rail Runner Express	$90,174,130	54%
Rio Metro Regional Transit District	$15,372,500	9%
Total	**$168,278,630**	**100%**

Note: total federal funds programmed by lead agency only comprise of FTA fund sources.

5.1.3 Project Prioritization Process

Since 2010, MRMPO has utilized a Project Prioritization Process (PPP) for selecting projects to be included in the TIP. The PPP is a unique, MRMPO-developed tool for making informed decisions and allocating resources based on technical data. It utilizes MRMPO resources and established regional goals and objectives to encourage sound transportation decisions. The PPP is designed to be an adaptable tool since conditions vary across the region and projects in different parts of the region are eligible for different funding sources. As a result, MRMPO has introduced two separate evaluation processes depending on whether projects are located inside or outside of the Albuquerque Urbanized Area.

The Project Prioritization Process defines specific evaluation criteria in order to measure the extent to which a proposed project provides quality of life, mobility or economic benefits. (The PPP currently uses performance measures based on the goals of the *2035 MTP*. See below for more information on updates to the process as new MTPs are approved.) In particular, it provides a quantitative assessment of whether the goals of the MTP are met by individual transportation projects. This integration ensures that the goals reflected in the long-range planning document are also fully assessed when developing the short-range TIP.

The idea of developing a PPP emerged from the Congestion Management Process Committee's desire to see federal transportation dollars allocated to the corridors in the AMPA that experience the most congestion and poorest transportation conditions. The need for a PPP is compounded by the level of growth expected in the region, placing a premium on transportation decisions that lead to the long-term sustainability and continued functionality of the transportation network.

Table 5-5: Criteria Used for Different Geographic Areas in the Project Prioritization Process[1]

Evaluation Criteria	Large Urban Areas	Small Urban and Rural Areas
Air Quality	✓	✗
Safety	✓	✓
Environmental Justice	✓	✓
Preservation of Existing Infrastructure	✓	✓
Geographic Need	✓	✓
People Movement	✓	✓
Intelligent Transportation Systems	✓	✓
Intermodal Connectivity	✓	✓
Alternative Modes	✓	✓
Performance Measures	✓	✓
High Activity Areas	✓	✓
Private Sector (Freight)	✓	✗
Local Priorities	✓	✓

[1] The number of points per measure varies by mode. The ITS measure is not included in the evaluation of bicycle/pedestrian projects in the Large Urban Areas Project Prioritization Process.

Feedback from the technical committees indicated the process for distributing federal transportation dollars needed to evolve beyond the previously employed evaluation system, which asked member agencies to subjectively assess whether proposed projects met the seven goals of the *2030 MTP*. To improve upon this process required a meaningful and objective methodology that could incorporate all facets of the transportation planning process and comprehensively evaluate the benefits individual projects would provide to the region.

The PPP now employed by MRMPO allows for quantitative and objective assessment of the benefits and impacts of individual transportation projects. Each project submitted for inclusion in the TIP is evaluated according to a series of performance measures and receives a prioritization score. Projects are also evaluated with criteria specific to different mode types, meaning that roadway, transit, and pedestrian/bicycle projects are judged on criteria which more accurately reflect the needs of those modes.

The performance measures are intended to identify projects which provide a number of contributions to the transportation network. The criteria are varied and wide-ranging, meaning a high score in an individual criterion does not necessarily indicate a beneficial project overall. As a result, even the highest scoring projects may not address all criteria well, while projects with a low overall score may excel in certain criteria. Therefore multifaceted projects which address a number of regional needs and target key locations generally receive the highest prioritization score.

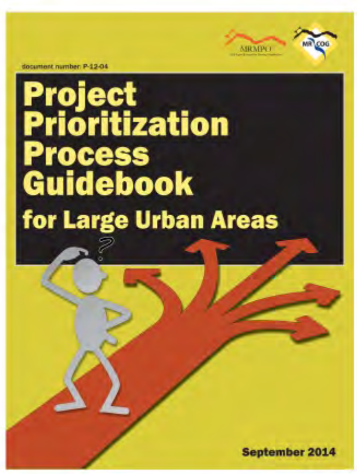
Guidebooks

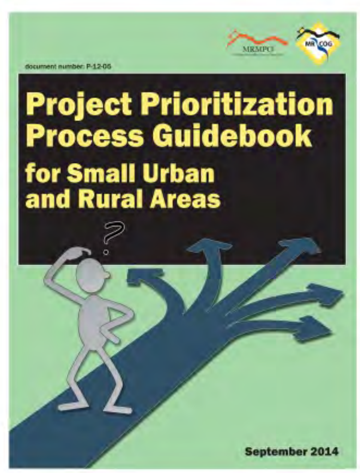
To ensure a transparent process, MRMPO develops guidebooks that outline the evaluation criteria and methods for scoring projects. The *Guidebook for Large Urban Areas* is applied to projects located within the Albuquerque Urbanized Area. Any project located within Bernalillo County that is eligible for Congestion Mitigation Air Quality (CMAQ) funds is also evaluated using the *Guidebook Large Urban Areas*.

Due to differences in data availability and the fact that the scale of congestion and development are very different outside of the Albuquerque Urbanized Area, a simplified version was created for Small Urban and Rural areas. This version highlights accessibility and project intent in particular, and is applied to projects in the Los Lunas Urbanized Area that are eligible for STP-Small Urban funds, as well as projects eligible for STP-Rural or other funds that may be applied outside of the urbanized areas.

It is important to point out that the PPP is meant as a tool and is not intended to serve as the sole input in determining projects for inclusion in the TIP. Regional priorities may emerge that had not previously been considered, and not all projects can be effectively evaluated in the PPP. Similarly, the PPP was not intended to replace the debate and dialogue associated with the TIP process. Rather, the prioritization process is meant to guide the discussion around common evaluation criteria and to bring attention to projects which most effectively address the needs of the region. 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 projects.

Figure 5-1: Project Prioritization Process Guidebooks





Updating the Project Prioritization Process

After the PPP was first introduced in 2010, minor revisions were made in 2012 and 2014. After each TIP cycle the performance of the PPP is analyzed and updates are made to address any issues that may have arisen, such as criteria scoring thresholds that do not result in a dispersed set of project scores. These revisions are developed through consultation with the Congestion Management Process Committee. A more comprehensive update will be required in 2016 to ensure the PPP is consistent with the structure of the *2040 MTP* (the goals and objectives of the *2035 MTP* inform the criteria and organizational structure of the current PPP). MRMPO does not expect any criteria to be eliminated, although new criteria may be introduced to reflect emphasis areas that were added to the *Futures 2040 MTP*.

Regardless of whether or not revisions are required, 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 in project evaluation 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.

MTP Implementation and Use of the Preferred Scenario

The PPP is a critical means of putting the MTP into practice by linking regionally-developed strategies and policy recommendations with evaluation criteria and highlighting projects that best address the regional needs identified in the plan. The *2040 MTP* differs from past efforts in that it does not just identify regional needs that emerge as a consequence of future growth, but identifies an alternative growth scenario and high priority locations for future development and investment of regional transportation dollars.

One particularly important criterion in the PPP is “activity density,” which measures the composite level of population and employment density in the proposed project area. Since the *2040 MTP* identifies two scenarios, how projects are prioritized depends on which scenario data is utilized in the PPP. As a means of directly putting scenario planning efforts into practice, the forecasted conditions from the Preferred Scenario are now used to determine the 2040 activity levels in the proposed project area. In this way, projects that help realize the Preferred Scenario will be prioritized for federal funding. In future PPP updates, MRMPO will identify ways to further prioritize projects that support the Preferred Scenario.

5.2 Long Range Transportation System Guide

The Mid-Region Metropolitan Planning Organization has developed the Long Range Transportation System Guide (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. 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 alternative strategies that not only address congestion but that also have economic and health benefits. These strategies involve creating Complete Streets by integrating land use and transportation planning to improve conditions for all users.

In particular, the LRTS Guide builds upon the past right-of-way guidance from the Future Albuquerque Area Bikeways and Streets (FAABS) document and 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. Foundational to the LRTS Guide are a series of system maps: the Long Range Roadway System, the Long Range Bikeway System, and the Long Range High Capacity Transit System. By showing where future roadways, bikeways, and transit lines are planned, the region can better assess connectivity needs and ensure complete and efficient networks.

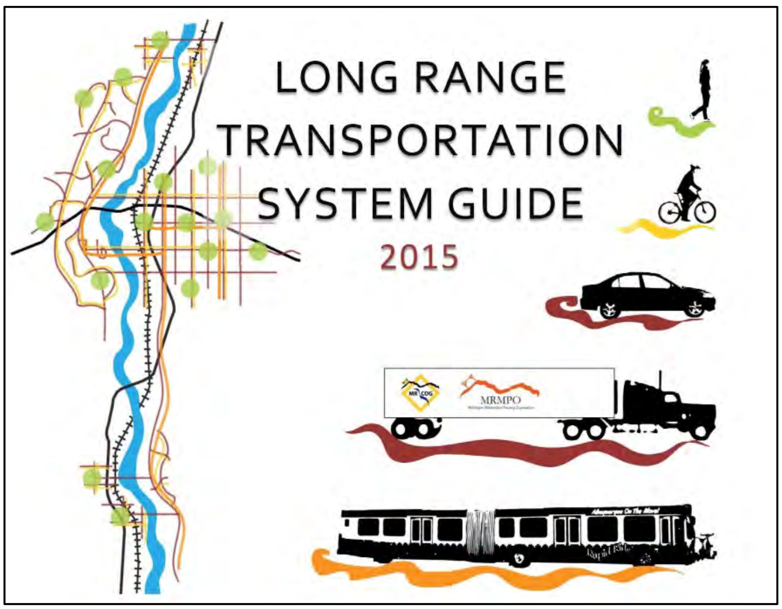
The LRTS Guide supports the *2040 MTP* and the principles of the Preferred Scenario by providing a means to look at transportation and land use together while also integrating Complete Streets principles, particularly for activity centers where trips taken by transit, walking, and bicycling are encouraged. The Preferred Scenario is supported by 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. However, the LRTS Guide goes beyond both the Preferred Scenario and the *2040 MTP* by providing recommendations for connections past the 2040 timeframe (see the Long-Range Roadway System).

Instead of creating a parallel effort, the LRTS Guide identifies a range of opportunities and provides considerations that support the *2040 MTP*; many of these considerations also support the principles of the Preferred Scenario. The LRTS Guide provides recommendations for network connectivity, multi-modal accommodation, and 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 Preferred Scenario into current planning efforts.

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 in an effort 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.

All transportation efforts should involve data collection and monitoring, and this is particularly true with new, developing efforts. The LRTS Guide recommends performance measures and provides a checklist for this purpose. These tools help to communicate a roadway's role in the regional picture in terms of both transportation and the existing and planned land use it should support. Performance measures also help communicate the data that can help inform decisions and help monitor projects before, during and after development. Currently MRMPO provides much of this data, such as travel demand, and in other areas such as non-motorized counts MRMPO is building capacity to provide this information as well.

Figure 5-2: Long Range Transportation Systems Guide Cover Page



By taking advantage of current processes, the LRTS Guide seeks to provide a more efficient means of integrating regional considerations into local efforts. Finally, the Guide provides a framework to monitor and evaluate how well individual efforts achieve their intended outcomes. These components are the main mechanisms that the LRTS Guide uses to implement the principles of the Preferred Scenario as well as integrate land use and transportation planning and provide multi-modal accommodation. The LRTS Guide will be updated over times and requires feedback from member agencies on ways to make the process more efficient and its guidance more effective in the future. The Guide is part of the *2040 MTP* but will also be a standalone document that can inform regional transportation practices beyond the life of the *2040 MTP*.

5.3 Implementing the Preferred Scenario

This section describes the key products of the *Futures 2040 MTP* designed to guide regional decisions and to help realize the Preferred Scenario. These include: 1) **guiding principles** of the Preferred Scenario that complement the goals and objectives of the MTP; 2) **key locations map** depicting regionally-agreed upon locations suitable for additional development; and 3) **recommendations and action steps** that were identified by local stakeholders to help close the gap between the Trend and the Preferred Scenario. A fourth product, the **Long-Range Transportation Systems Guide** is intended to link roadway design to the surrounding context in order to meet the needs of all users and more broadly addresses the goals and objectives of the MTP by explicitly linking transportation infrastructure to land use decisions. Taken together, these products provide guidance on general strategies and locations in which additional investment and policy changes could have the greatest regional impact. It is up to individual jurisdictions to identify which strategies are most appropriate for them and pursue implementation at the local level.

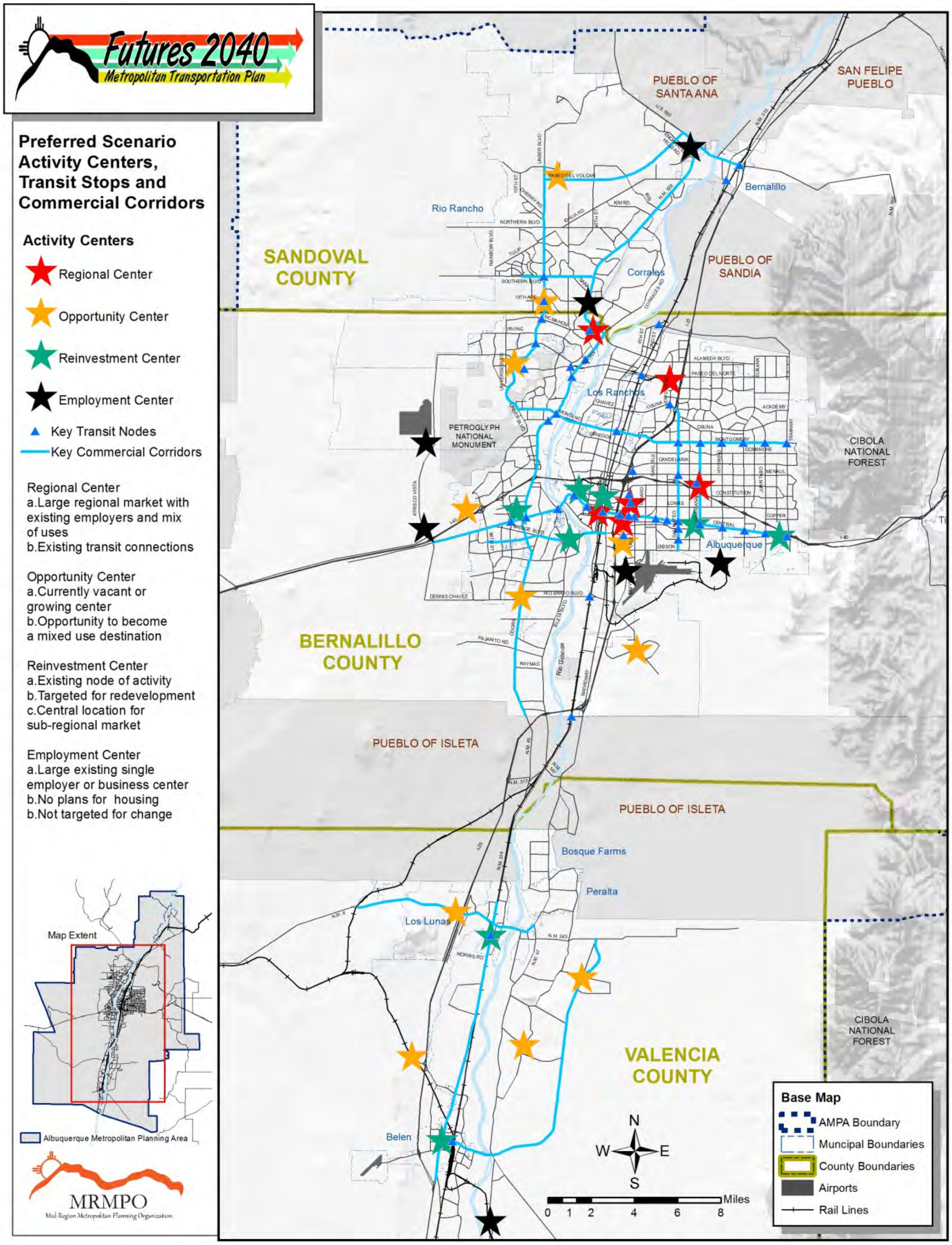
5.3.1 Principles of the Preferred Scenario

The Preferred Scenario is based on several guiding principles that were developed and refined through the collaborative scenario planning process. They are as follows:

1) Local land use policy decisions impact the larger region, particularly as they relate to transportation; therefore it is critical to link land use and transportation decision-making to effectively address regional mobility.
2) Future population growth and increased traffic congestion will contribute to a continued increase in transit ridership and a demand for service expansion.
3) Concentrated development within key centers and transit nodes create the mix of activity and connections that enable transit to succeed.
4) A diverse mix of uses coupled with appropriate design standards within key centers and transit nodes increase the potential for shorter trips and enhance the propensity for bicycle and pedestrian trips.
5) A greater emphasis on growing employment centers west of the Rio Grande will allow for more work, shopping and medical trips to occur locally, thereby alleviating congestion on river crossings.
6) A greater emphasis on affordable and diverse housing options in closer proximity to jobs, shopping, and medical facilities east of the Rio Grande will increase household location choices while reducing travel demand.
7) Changing demographic composition and preferences increase the likelihood that the guiding principles behind the Preferred Scenario will coalesce with consumer demand.
8) Development patterns that maximize the utility of existing infrastructure have the potential to equate to significant cost savings for local jurisdictions as it relates to service delivery and infrastructure costs.

5.3.2 Key Locations Supporting the Preferred Scenario

Map 5-1: Preferred Scenario Activity Centers, Transit Nodes, and Commercial Corridors



5.3.3 Recommendations and Potential Action Items

The implementation strategies contained in this section are the result of brainstorming exercises conducted during the workshops that accompanied MTP development and the Climate Change Scenario Planning Project. They have been edited for clarity and practicality. Though the recommendations are intended to move the region toward the Preferred Scenario, they are not envisioned as a comprehensive plan for implementation. Rather, these items provide regional stakeholders with guidance regarding ways to achieve some of benefits of the Preferred Scenario. The compilation of these recommendations and action items was the final step in the scenario planning process that supports the *Futures 2040 MTP*, and should be considered a starting point following the adoption of the MTP. The action items are not prioritized and they are not feasible or appropriate in all locations. Rather, they represent a suite of potential strategies and a foundation for identifying policies to best address long-term regional needs.

The following recommendations and action items require initiative not just by MRMPO (and the larger Mid-Region Council of Governments, of which the metropolitan planning organization is one part), but also member agencies responsible for land use regulations and non-member agencies responsible for the stability of environmental systems in the region. They are organized around five core areas that address regionalism, transportation conditions, land use, economic development, and environmental needs and concerns. Note that “key locations” in this section refers to the activity centers, transit nodes, and commercial corridors supporting the Preferred Scenario as shown in Map 5-1.

Regional Collaboration and Leadership

The scenario planning process reinforced the need for leadership in supporting regional integration of land use and transportation plans and strategies. While MRMPO is seen as a champion for regionalism, strong leadership is required by regional decision-making bodies and active involvement is required from agencies across the AMPA.

<u>Recommendations</u>

- Increase mode share by transportation modes other than private vehicle
- Develop regional guidelines and projects that improve the health and safety of travelers for all modes
- Encourage higher-density development patterns in key locations to better support transit, economic activity, walkability, and vibrant places
- Encourage regional integration of land use and transportation plans and strategies
- Encourage regional dialogue about infrastructure life cycle costs and financing needs
- Actively pursue infill development and the redevelopment of major regional activity centers
- Support partnerships that enable creative funding strategies as they apply to regional-scale projects in key locations

- Align regional transportation and land use investments to leverage private investment and transit-oriented development
- Coordinate regional economic development activities to position the region to compete against neighboring metropolitan areas (El Paso, Tucson, Denver, etc.)

Potential Action Items	Lead Agency	Coordination
• Coordinate regional water plans and the *2040 MTP*	MRCOG/Water Utilities/ISC	MRCOG/Water Utilities/ISC
• Facilitate regional dialogue about balancing agricultural and residential/commercial water consumption	MRCOG/Water Resources Board	Local/County/MRMPO
• Establish mode share goals that target alternatives to single-occupancy vehicle travel	MRMPO/Region	Local/County
• Provide information to policy makers, planning commissions, and agency staff on scenario planning efforts and the impact of growth patterns on the natural and built environment	MRMPO	Local/County
• Incorporate the Preferred Scenario into agency development review processes and information items among committees convened by MRMPO (e.g., TPTG, TCC, MTB, etc.)	MRMPO	Local/County
• Provide an assessment of the region's progress toward implementing the Preferred Scenario	MRMPO	Local/County
• Develop a regional safety action plan that improves upon emergency response communications and roadway design standards for all modes	MRMPO	Local/County
• Provide economic information and return on investment (ROI) related to major public investments for regionally significant transportation and/or land use projects	MRMPO/Local jurisdictions	Local/County

Transportation Strategies

Given funding constraints and the magnitude of infrastructure needs, it is critical that the region proceed thoughtfully when it comes to funding infrastructure projects. The Preferred Scenario is organized in part around expanding multi-modalism and improving access to public transit. Transportation strategies must also utilize innovative technologies and strategies to ensure the movement of people and goods while supporting surrounding land uses.

Recommendations

- Establish a network of high frequency transit corridors and implement a BRT system
- Improve the safety and connectivity of bicycle and pedestrian infrastructure
- Expand travel demand management (TDM) programs and new technologies that encourage alternatives to commuting by single-occupancy vehicles
- Increase mode share among non-motorized travel options
- Develop a more coordinated regional freight network that establishes agreed upon guidelines for truck restricted roadways and rail crossings
- Prioritize public infrastructure investments in key locations
- Optimize existing infrastructure through ITS and other transportation systems management strategies
- Support context sensitive design standards

Potential Action Items	Lead Agency	Coordination
• Develop a long-range regional transit plan and prioritize transit investments	MRMPO/Transit providers	Local/County
• Establish mode share goals along key transit corridors and identify levels of service required to achieve those goals	MRMPO/Region	Local/County
• Generate additional revenue to support transit investments (e.g., raise GRT from 1/8 to 1/2-cent)	RMRTD/ABQ Ride	Local/County/MRMPO
• Create and implement a regional ITS System Plan that includes signal optimization and other efficiency improvement measures	MRMPO/NMDOT	Local/County
• Fully implement a Regional Traffic Management Center	NMDOT/MRMPO	Local/County
• Develop and adopt the Long Range Transportation System Guide	MRMPO	Local/County
• Adopt policies and standards that support Complete Streets and context sensitive design solutions for new and retrofitted infrastructure	Local/County	MRMPO
• Develop a parking management plan; identify locations for on-street parking, parking reduction requirements, and other strategies	Local/County	MRMPO
• Implement bikeshare programs in and among key activity centers and transit stations	Local/County	MRMPO
• Develop regional TDM program or policies	MRMPO/Transit Providers	Local/County
• Prioritize roadways for different modes, including	Local/County	MRMPO

priority transit and bicycle facilities, as a part of local planning efforts and capital improvement programs		
• Improve connectivity through new and/or updated network standards, subdivision retrofits, utilization of parallel back streets/alleys to improve accessibility to sites along major arterials	Local/County	MRMPO
• Provide a more comprehensive analysis of congestion that includes level of service for all modes of travel and trip generation rates for mixed-use areas	MRMPO	Local/County

Land Use Strategies

Travel and congestion depends as much on land use decisions as infrastructure investments. The MTP scenario planning process relied upon strong member agency involvement to propose land use strategies ranging from regulatory to design measures. Implementation of the land use strategies is the responsibility of member agencies with authority over land use decisions. MRMPO has a role to play through its development review process and can evaluate land use decisions and local plans for their consistency with the principles of the Preferred Scenario.

Recommendations

- Improve the balance of jobs and housing east and west of the Rio Grande
- Encourage low-impact development and sustainable development strategies in critical and sensitive natural and cultural areas and rural areas
- Incentivize a compact mix of uses and transit-oriented development in key locations
- Prioritize development where existing or planned infrastructure investment can be leveraged
- Support land uses that are pedestrian-oriented and decrease the need for parking infrastructure
- Ensure that growth in large undeveloped areas is master planned to include well connected street networks, a mix of uses, a range of densities and a balance of jobs and housing

Potential Action Items	Lead Agency	Coordination
• Adopt and/or update building design and site development standards that provide a high-quality built environment and access and connectivity for pedestrians and cyclists	Local/County	MRMPO
• Streamline development review and permitting processes in key locations as appropriate	Local/County	MRMPO
• Adopt mixed-use and higher-density zoning in key	Local/County	MRMPO

locations where appropriate		
• Provide incentives for density and mixed use in key locations when appropriate (e.g., density bonuses, reduced parking requirements, TIFs, etc.)	Local/County	MRMPO
• Allow and facilitate the permitting of accessory dwelling units	Local/County	MRMPO
• Adopt parking management strategies to decrease parking requirements in activity centers and redevelopment areas and increase parking costs in high demand locations	Local/County	MRMPO
• Incentivize development on underutilized parking lots and properties where appropriate	Local/County	MRMPO
• Incentivize shared parking agreements to maximize use of existing parking supply	Local/County	MRMPO

Economic Strategies

Investing in key centers, key transit nodes and along key corridors not only leads to better transportation options, but also has the potential to spur more economic activity. The scenario planning process revealed that development in these locations may require development incentives. Stakeholders also identified the need to support alternative energy sources and other innovative technologies that businesses increasingly require.

Recommendations

- Explore the use of creative financing tools and special tax assessment options to encourage development in key locations
- Link transportation investments to key economic development projects and objectives
- Cultivate places where locally-run businesses and entrepreneurs thrive
- Develop a more comprehensive approach to quantifying the costs associated with different types of development and infrastructure than the traditional impact analysis techniques
- Support projects utilizing alternative energy sources and innovative technologies to improve regional competitiveness and sustainability

Potential Action Items	Lead Agency	Coordination
• Coordinate with the Metropolitan Redevelopment Agency (MRA) and other public sector agencies on development in targeted locations	MRMPO/Transit providers	Local/County
• Provide economic analyses, including potential return on investment, based on certain growth	MRMPO	Local/County

futures		
• Provide incentives for locally-run businesses and entrepreneurs	Local/County	MRMPO
• Provide incentives for businesses that support alternative modes	Local/County	MRMPO
• Develop streetscape funds for major centers	Local/County	MRMPO
• Develop place-making neighborhood programs	Local/County	MRMPO
• Encourage Public Private Partnerships to share costs of new development in activity centers and along transit corridors	Local / County	MRMPO
• Develop a better understand of the public costs (e.g. infrastructure and services) associated with suburban, urban, redevelopment and infill development	MRMPO	Local/County
• Develop a better understand of the private sector and consumer costs associated with suburban, urban, redevelopment and infill development	MRMPO	Local/County

Natural Resources and Environmental Strategies

The conservation and re-use of water are particularly important strategies for preserving natural resources in the AMPA. Other concerns include maintaining connected open space networks and preserving sensitive lands, as well as mitigating flood and wildfire risks due to climate change impacts. These strategies are in their initial stages of development since this is the first time many of these issues have been addressed in an MTP.

Recommendations

- Support agencies that are implementing water conservation strategies
- Facilitate a regional dialogue about the link between land use patterns and water consumption
- Bring more awareness to the impacts and risks associated with development in floodplains, the wildland-urban interface, and in critical and sensitive areas such as crucial animal habitats
- Expand walking and biking opportunities in and along green corridors and in open spaces
- Promote access to and awareness of existing open spaces

Potential Action Items	Lead Agency	Coordination
• Integrate the consideration of cultural and historical places into decision-making rather than the review process	MRCOG/Region	Local/County/Cultural Resource Agencies

• Increase coordination with water utility organizations on regional planning efforts	MRCOG	Water Utilities/ISC
• Analyze water infrastructure costs associated with different growth patterns	MRCOG/Water Utilities	Local/County
• Support the use of grey or recycled water in parks, golf courses, and other open spaces	Local /County	MRMPO
• Investigate the most efficient methods to conserve and reuse water in the region	MRMPO/Water Utilities	Local/County
• Support trails connecting parks, open spaces, and recreational areas	Region	MRMPO
• Support funding to stabilize natural eco-systems	Region/State	Local/County
• Support opportunities for transfer of development rights and land purchases to conserve and create new open spaces	Local/County	MRMPO
• Provide conservation easements and cluster subdivision opportunities	Local/County	MRMPO

5.4 Next Steps

The role of the MTP and the metropolitan transportation planning process is to identify regional needs and assist member agencies in the development of transportation infrastructure decision-making. Each plan is another step towards a more complete and coherent understanding of the overarching challenges – transportation and otherwise – facing the region and the strategies that best address them. In this way the MTP is a living document; it is updated regularly to ensure it remains a relevant and meaningful resource for member agencies and the general public. The process and methodologies are themselves being constantly revised as new information and ideas emerge. While the *2035 MTP* explored the critical link between land use and transportation, the *2040 MTP* takes the next step to investigate the relationship between development patterns and transportation, economic, and environmental outcomes. In addition to scenario planning and the LRTS Guide, other new elements incorporated into this plan include climate change considerations, analysis of changing travel preferences, and the relationship between transportation and housing affordability. In short, the plan has become more comprehensive and sophisticated over time.

The MTP will be updated again in four years and will contain new projections and analysis. In the time in between the approval of the *2040 MTP* and the next update, MRMPO has identified several opportunities to advance its tools and analytical capabilities in order to better inform transportation investment and land use policy decisions. As always, these are regional efforts and will require participation from member agencies throughout the AMPA. These next steps may include:

- The development of additional scenarios to explore and analyze transportation and land use questions
- Building place profiles to identify small area characteristics, needs, and opportunities throughout the AMPA
- Technical assistance to member governments in incorporating the principles of the Preferred Scenario into local planning efforts
- Conducting transportation studies and analyses that build off the *2040 MTP* including needs assessments and plans surrounding key topics such as freight, transit, and safety
- More-in depth economic analyses that address the economic impacts associated with transportation infrastructure investments and assess public and private sector costs associated with different development patterns

Transportation Scenarios

The policy changes explored in the scenario planning process in the *2040 MTP* primarily involved land use, rather than transportation. The Preferred Scenario did contain an expanded transit network in order to test the impact of additional revenue, but constrained the network to the level of service that could be funded assuming an increase in GRT from 1/8 to ½-cent. However, roadway projects were held constant between the Trend and Preferred Scenarios to ensure fiscal constraint and to respect the member agency-developed MTP project list. Additional scenarios could be conducted in order to investigate the costs and benefits associated with alternative roadway networks. This analysis would not necessarily be fiscally constrained or consistent with the MTP, but would be for purposes of asking questions and testing assumptions in order to better understand the potential consequences of transportation investments. The following scenarios ideas are hypothetical and for testing purposes only:

- A full build-out scenario of the long-range roadway system which includes projects (and relies on funding) beyond the 2040 horizon
- Additional river crossings
- A major build-out of the transit network and service with limited roadway investments

Land Use Scenarios

The scenario planning process for the *2040 MTP* focused on crafting reasonable alternatives to the Trend Scenario. However, additional scenarios that are intended to be less constrained and more exploratory in nature could be developed outside of the MTP development process in order to test assumptions and gauge impacts. Hypothetical land use scenarios include:

- A land use build-out of the AMPA or of specific sub-areas
- A jobs-housing balance scenario that structurally addresses the imbalance east and west of the Rio Grande
- A scenario in which no infill development occurs
- A scenario in which no development occurs outside of the existing built environment

In addition to alternative transportation and land use scenarios, MRMPO could also test various growth scenarios that test the impact of alternative population and employment projections on the region.

Place Profiles

In the process of identifying key locations for development, the scenario planning process revealed a need to better understand the composition and character of different communities, activity centers, and corridors. A logical next step is the creation of place or sub-area profiles that examine the existing conditions and development potential of areas throughout the AMPA. This information could inform future scenario planning and serve as a tool for member agencies in local planning. Place profiles could include:

- Socio-economic conditions
- Characteristics of the existing housing stock
- Mix of employment by industry

- Vacant and underutilized land
- Commuting patterns, accessibility of different transportation options, and Pedestrian Composite Index scores

Local Planning Assistance and Collaboration

The LUTI committee has created a forum for land use and transportation discussions among experts in both fields throughout the region. LUTI serves as the steering committee for the scenario planning process and has a vital ongoing role to play in determining appropriate avenues for forwarding this effort after the approval of the *2040 MTP*. It cannot be understated that the extent to which the region is able to realize the benefits of the Preferred Scenario depends on the commitment and dedication of local agencies and member jurisdictions, those which serve on the regional committees, and others who serve to advance the region’s interests be they related to water, wildlife, industry or equity. While clearly there are differences in agency missions, scenario planning helps to emphasize the interconnectedness and shared impacts felt throughout the region. MRMPO is committed to working with these regional entities to promote and further the guiding principles that underlie the Preferred Scenario.

One area where MRMPO can take an active role in reinforcing the connection between the scenario planning process and local planning efforts is through input into comprehensive and sector plan updates and the development review process. MRMPO regularly participates in inter-agency planning teams to address the regional transportation implications of major developments and plans. With the adoption of the *2040 MTP*, MRMPO anticipates providing agency feedback and development review comments with respect to the guiding principles of the Preferred Scenario.

Transportation Planning

MRMPO and partner agencies could further explore and quantify the connections between local transportation conditions and public health outcomes, or the integration of travel demand management efforts into a regional TDM program. The region could benefit from formal planning efforts that build upon the *2040 MTP* and develop more detailed issue or mode-specific implementation strategies. Specific transportation planning efforts of regional benefit may include:

- Long-range transit plan, including future service plan and revenue generation options
- ITS implementation plan that outlines priorities, funding options, and coordinated ITS deployment strategies
- Regional safety action plan that identifies priorities, countermeasures, and design standards
- Regional freight analysis that addresses challenges for local truck movements and provides concrete strategies for balancing long-term trans-regional freight travel with demands of local vehicle travel

- A connectivity study specifying steps for improving multi-modal connections given the existing built environment
- Investigate the impacts of transportation projects using before and after studies and other project level analyses
- Improve data collection to better understand current conditions for non-motorized travelers; improve modeling techniques and develop a methodology to better analyze multi-modal investments in order and consider the potential benefits of expanding access to alternative modes

Economic Analysis

MRMPO has existing capability to analyze the economic impacts of significant roadway expansion projects or major economic or policy changes in the region. However, the methodology used does not currently extend to analyzing the financial costs and benefits related to land use decisions or investments in alternative modes. Complementary methods must be developed in order to appropriately address and quantify these complex relationships. This type of information would be of great benefit to decision-makers anytime; however, the need is especially great now, during a time when public budgets are being stretched further than ever.

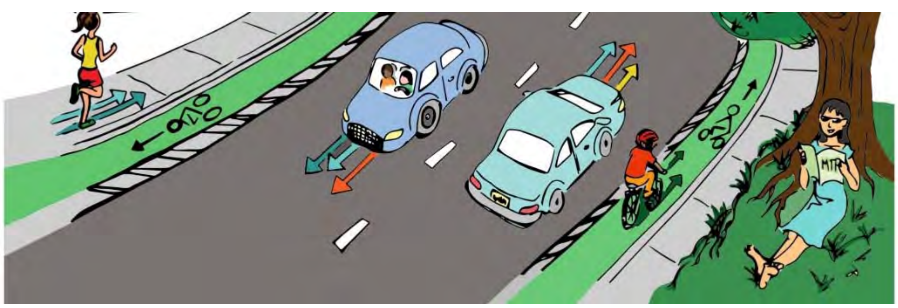
Providing sophisticated return on investment analyses (ROI) to municipal governments is an area of emphasis for MPO's around the county and is an evolving field. MRMPO is interested in investigating best practices in this area, and developing tools and methods that will expand capabilities towards a more comprehensive approach to performing economic analyses.

Administrative Modification

to

Futures 2040 Metropolitan Transportation Plan

September 2017



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Mid-Region Council of Governments
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Futures 2040 Metropolitan Transportation Plan's
2040 Revised Forecast:
Interim use of a modified Socioeconomic and Travel Demand Forecast

September, 2017

Summary

MRMPO is implementing an administrative modification to the 2040 Metropolitan Transportation Plan to approve the use of the 2040 Revised Forecast for socioeconomic and travel demand projections throughout the Albuquerque Metropolitan Planning Area for the purpose of transportation project planning. The Revised Forecast integrates a reduction in future growth assumptions per updated population projections from the University of New Mexico's Geospatial Population Studies Group, which is the primary source for MTP Forecast.

Introduction

The Metropolitan Transportation Plan (MTP) is developed by the Mid-Region Metropolitan Planning Organization (MRMPO) in collaboration with local agencies and jurisdictions for the purposes of improving mobility, supporting economic growth, promoting active places, and fostering environmental resiliency. The Futures 2040 MTP programs more than 6 billion dollars over the next 25 years to a variety of multi-modal projects that preserve, rehabilitate, and expand transportation infrastructure in key locations. The Futures 2040 MTP was approved by the Metropolitan Transportation Board in April of 2015 and will stand as the official plan to guide regionally-significant transportation projects, planning and decision-making in the Albuquerque Metropolitan Planning Area (AMPA) until the next MTP is approved in 2020.

Federal regulations require that MTPs are updated every 4-5 years to incorporate new assumptions that reflect current transportation conditions, land use patterns, and demographic trends. This schedule has served the region well given that New Mexico and the AMPA have historically been fairly consistent in terms of the direction and pace of growth. However, precipitated by the Great Recession, the AMPA has experienced unprecedented volatility over the past 10 years leading to significant economic decline and stagnant population levels. While neighboring states have since recovered to pre-recessionary employment levels, New Mexico continues to experience high unemployment, low job growth, low birth rates, and most recently, negative net migration. These factors are anticipated to have a deep and lasting impact on future growth.

Population assumptions that underlie the MTP are based on projections developed at the University of New Mexico's Geospatial Population Studies (GPS). Following the approval of the Futures 2040 MTP, GPS revised their population projections downward to reflect reduced growth expectations. Table 1 compares the most recent GPS population projection (released in 2016) with the population projection that the Futures 2040 was based on (released in 2012) for the 4 county area of Bernalillo, Sandoval, Torrance, and Valencia.

Table 1: GPS Population Projections, MRCOG's Four County Area

	GPS Projection (2012 release)	*GPS Projection (2016 release)*	*Numeric Difference*	*Percentage Difference*
2015	974,772	910,781	-63,991	-7%
2020	1,062,489	957,975	-104,514	-10%
2025	1,146,267	999,264	-147,003	-13%
2030	1,225,662	1,041,885	-183,777	-15%
2035	1,298,281	1,077,648	-220,633	-17%
2040	1,362,609	1,108,733	-253,876	-19%

The population projections released by GPS in 2016 anticipate 253,876 fewer people in the MRCOG counties by 2040 than was initially projected in 2012. This difference is likely to have an impact on our infrastructure demands as well as the timing of necessary transportation improvements. As such, MRMPO is implementing an administrative modification to allow the regional population, employment, and travel demand forecasts to reflect this change. The purpose of this administrative modification to the 2040 MTP is to allow transportation professionals a more current set of forecasts for use in project development, design, and financial estimates during this interim timeframe until the next MTP is approved in 2020.

This administrative modification also includes the omission of the privately-funded Mesa del Sol interchange from the travel demand network and the MTP project listing. The pace of growth at the 12,000 acre planned community of Mesa del Sol has been far below expectations, and current ownership and financial challenges make future growth uncertain. Because construction of the currently programmed Mesa del Sol interchange will be determined by actual need, and because that need is not expected to occur prior to 2040, MRMPO will remove it from the 2040 transportation modeling network. All other growth inputs, zoning and land uses, and transportation conditions, will be exactly the same as those used in the development of the 2040 MTP.

2040 Revised Forecast

MRMPO has developed a 2040 Revised Forecast that is based on the updated population projections. The 2040 Revised Forecast consists of an updated socioeconomic forecast and travel demand forecast that incorporates a lower growth assumption. The socioeconomic forecast was created using an interim forecast year produced by MRMPO's land use model that came closest to the most recent 2040 population projection by GPS.

Chart 1 compares the approved 2040 MTP population forecast with the 2040 MTP Revised Forecast population for the 4 county area.

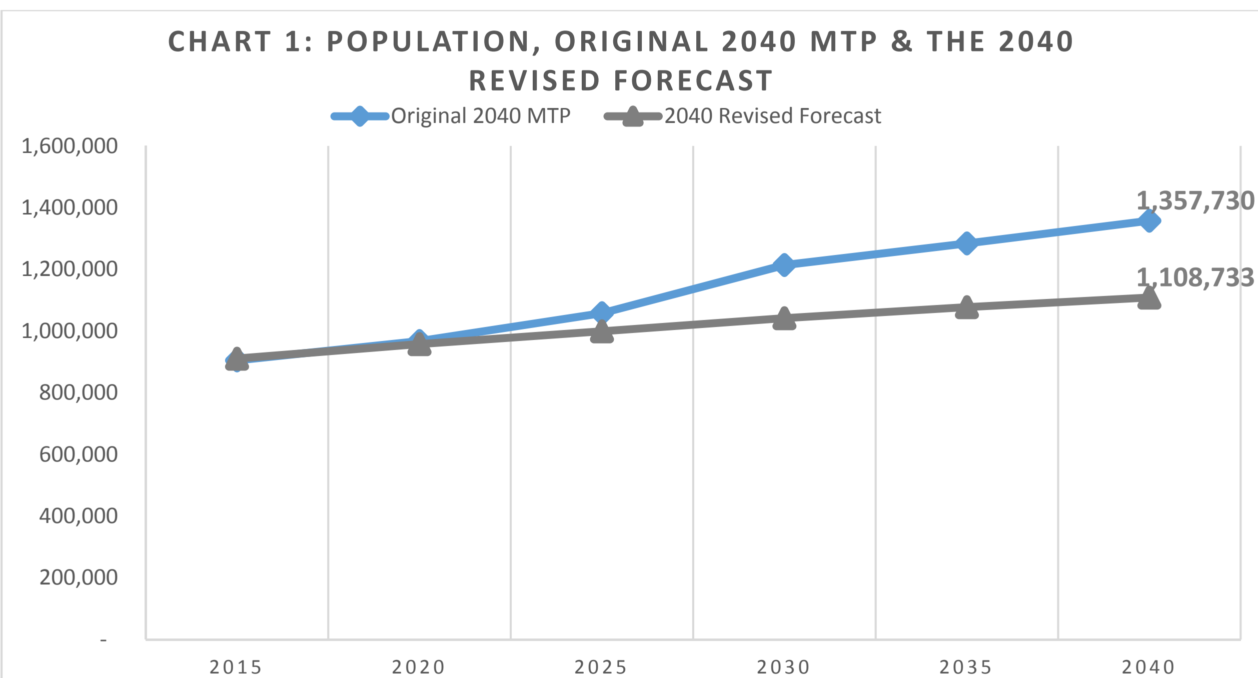
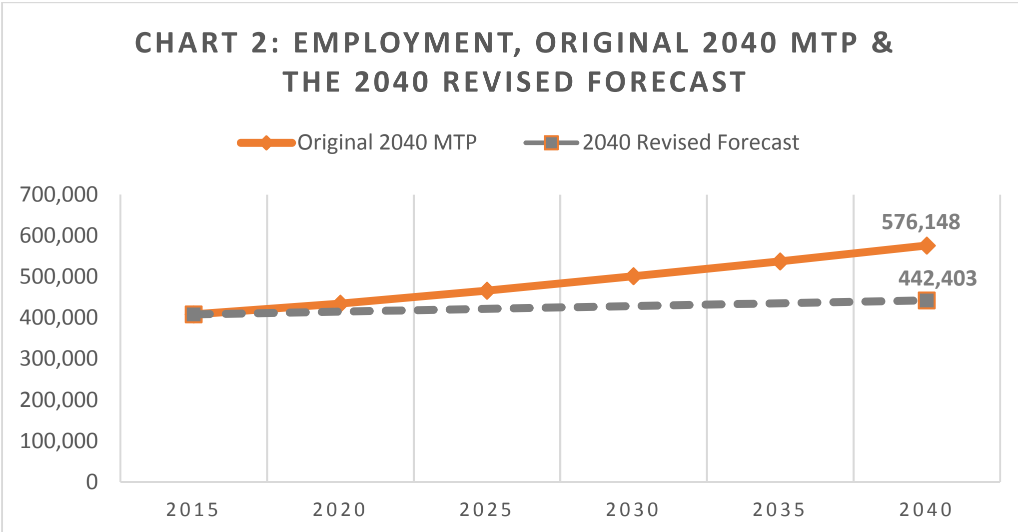


Chart 2 compares the 2040 MTP employment forecast with the 2040 Revised Forecast employment to demonstrate the reduced employment expectations.



The new socioeconomic forecast was input to the travel demand model to generate the revised travel demand forecast. The future network used by the travel demand model was the currently approved 2040 MTP transportation network without the Mesa del Sol interchange. Table 2 illustrates the comparison between the regional travel demand statistics from the 2040 MTP and the 2040 Revised Forecast.

Table 2: Travel Demand Model Summary Statistics, AMPA

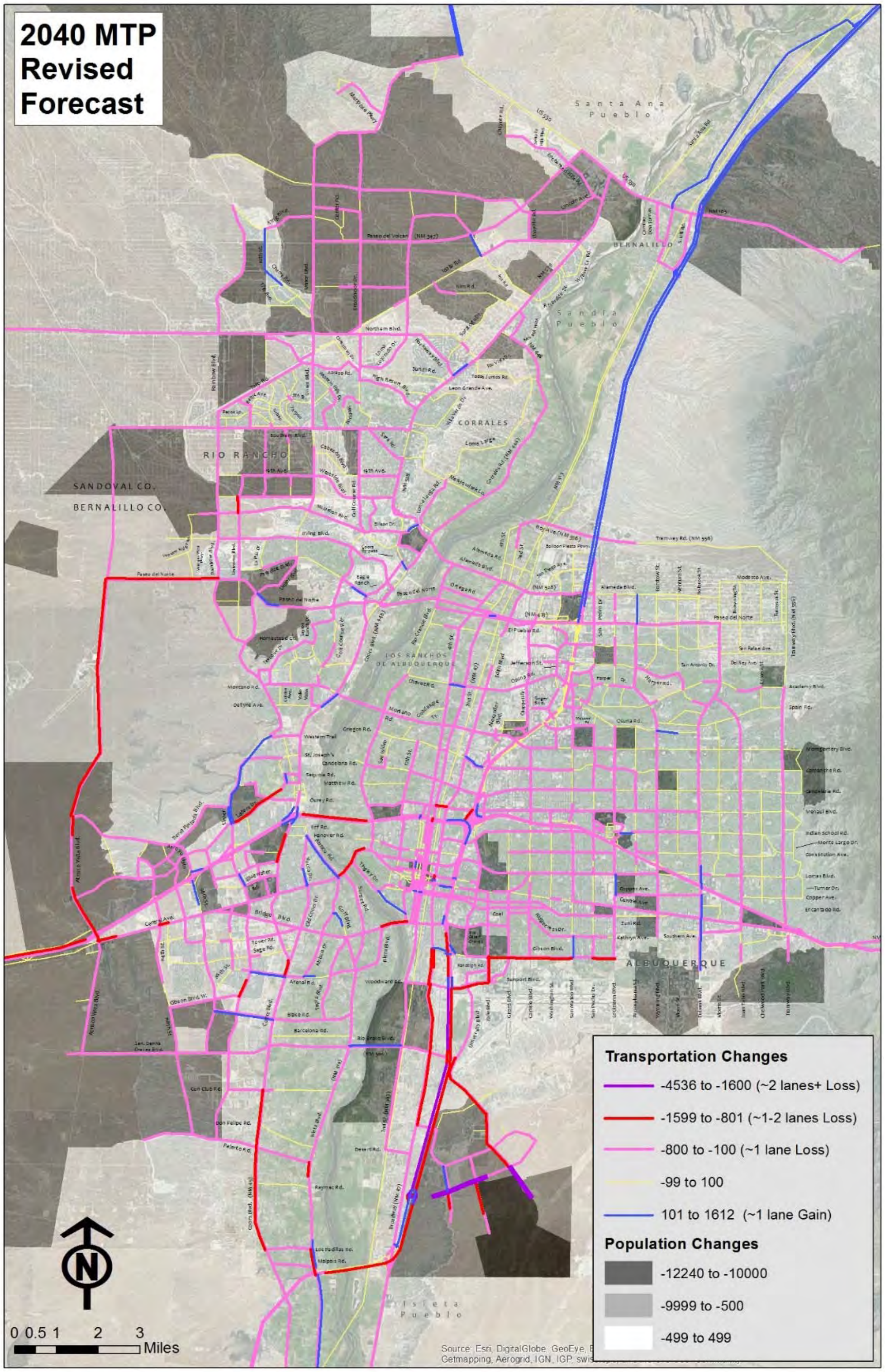
	Original 2040 MTP	2040 Revised Forecast	2040 Differences (#)	2040 Differences (%)
Daily Vehicle Hours Traveled	950,803	679,700	-271,103	-28.5%
Daily Vehicle Miles Traveled	28,671,051	24,927,665	-3,743,386	-13.1%
Average Speed	30.2	36.7	6.5	21.5%
PM Peak Hour Hours of Delay	61,079	25,588	-35,491	-58.1%
PM Peak Hour Hours of Travel	120,472	75,566	-44,906	-37.3%
PM Peak Hr. Miles of Travel	2,758,888	2,368,433	-390,455	-14.2%
Avg. PM Peak Hour Speed	22.9	31.3	8.4	36.7%

The travel demand model results demonstrates a sizable impact between the 2040 MTP and the Revised Forecast which is consistent with the reduction in population and jobs expectations. Region-wide, congestion will be considerably less by 2040 under the Revised Forecast than the original 2040 MTP forecast. These differences are most pronounced during the pm peak hour, when congestion is typically at its worst.

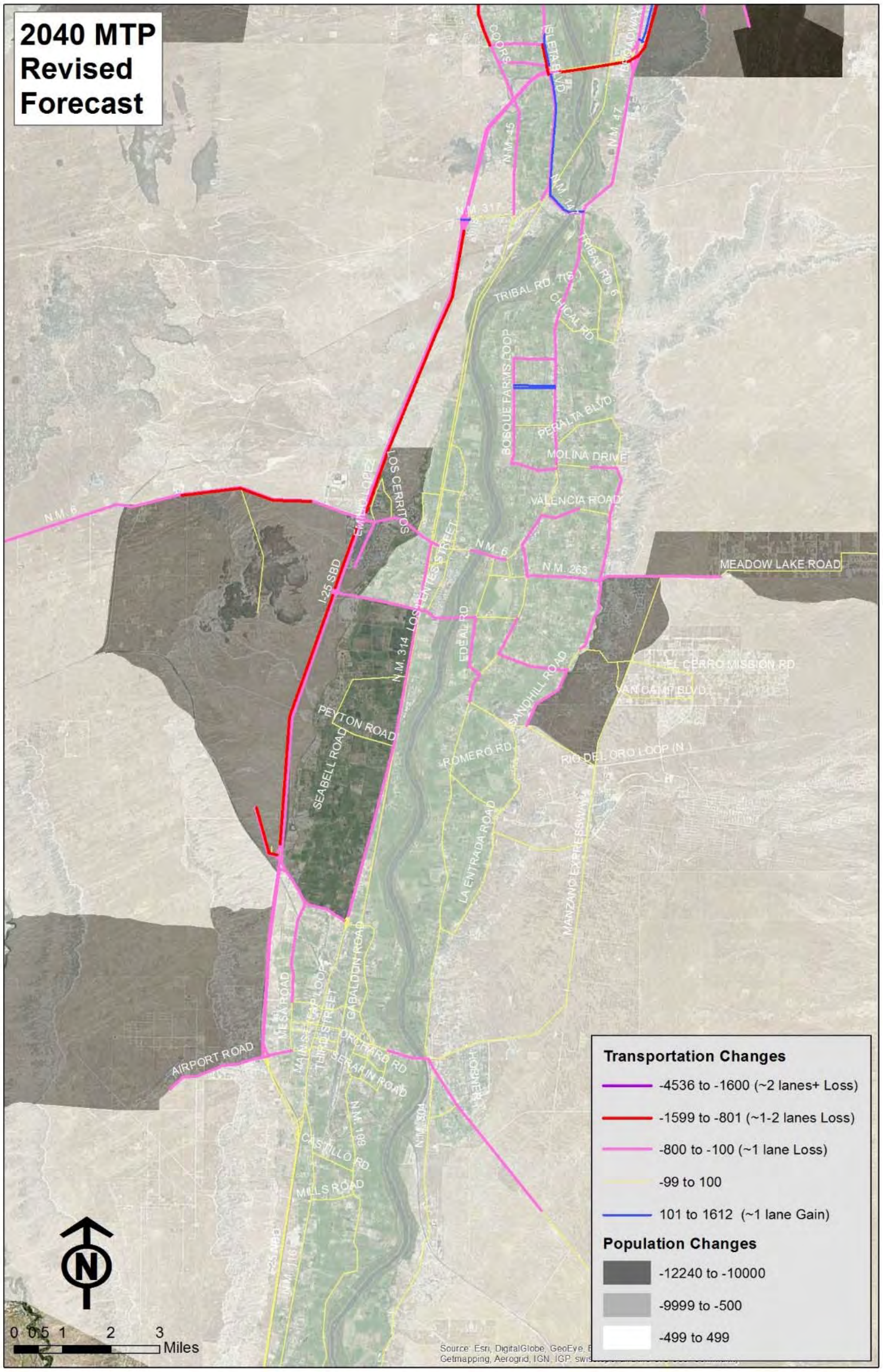
Small Area Impacts

While regional impacts of using the 2040 Revised Forecast show a substantial improvement over the original 2040 MTP, the differences at a small area level are not uniform. Map 1 shows the differences in traffic volume on the network and the differences in population levels by data analysis subzone (DASZ) between both forecasts.

Map 1: Difference in Network Volumes and DASZ Population Growth in Albuquerque Area, 2040 Revised Forecast v. Original 2040 MTP



Map 2: Difference in Network Volumes and DASZ Population Growth in Valencia County, 2040 Revised Forecast v. Original 2040 MTP



Conclusions

MRMPO proposes use of the 2040 Revised Forecast for transportation planning purposes until the next MTP update for the following reasons:

- The 2040 Revised Forecast was built using the same land use and travel demand modeling environment as the original 2040 MTP forecast, which maintains consistency and comparability among the technical tools used to construct the forecasts.
- Aside from the revised population and employment forecasts and the removal of the Mesa del Sol interchange, all other data assumptions of the 2040 Revised Forecast are consistent with the original 2040 MTP forecast, which preserves consistency in the underlying information that supports the forecasts.
- The development of a 2040 Revised Forecast allows transportation professionals in the region the latitude to adapt to new and impactful changes regarding growth expectations, while upholding the integrity of the MTP planning process.

Local officials, planners, and engineers rely on MRMPO's long range population, employment and travel demand forecasts that underlie the Metropolitan Transportation Plan when determining future needs and prioritizing investments as they relate to land use, transportation, and infrastructure. Given the newly available and considerably lower population projections available from GPS, local agencies would benefit from an MTP-consistent alternative so that they can account for this difference in their planning processes. **MRMPO supports the approval of an administrative modification to the 2040 MTP that allows for the use of the 2040 Revised Forecast in place of the original 2040 MTP Forecast.**

Administrative Modification to Appendix A - 2040 MTP Project Listing

2040 MTP Project Listing by Project Type, then Project Title - PRIVATE-DEVELOPER FUNDED PROJECTS

MPO #	Project Title	From	To	Project Description	Project Type	Lead Agency	MTP Project Cost	Time Frame
	Time Frame: "Funded" = programmed with federal, state or local funding between 2012-2021; "Near Term" = project completion anticipated 2015-2025; "Late Term" = project completion anticipated 2025-2040							
454.0	I-25 & Mesa del Sol Interchange Project DELETED from 2040 MTP time frame under Admin. Mod. #1 2017 Sept	I-25 New Exit	Mesa del Sol Interchange	Construct New Interchange. (Previous obligations FY 2006=$371,756 STP-D & $464,696 Borders&Corr.) Demo ID NM043 with $5,039,440 remaining per June 22, 2012 HPP reconcilliation.	Capacity Proj	NMDOT D-3 (Private Funding with some public funds possible)	26,000,000	~~Late Term~~ Beyond 2040
				Total Est. Cost of All Private Developer Funded Projects			1,207,799,922	
				Removal of Project ID 454.0 Mesa del Sol Interchange			(26,000,000)	
				Revised Total Est. Cost of All Private Developer Funded Projects			1,181,799,922	
		REVISED Projected Private Revenue for Projects (amount assumed pledged equals cost of projects)					1,181,799,922	
				Difference (Private Revenue Projected - Total Projects' Cost)			0	

There is no change to the fiscal constraint of the MTP since this project was privately funded in this listing.