CHAPTER 4: OPTIMIZED MOBILITY

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

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

4.1 Roadway System Performance

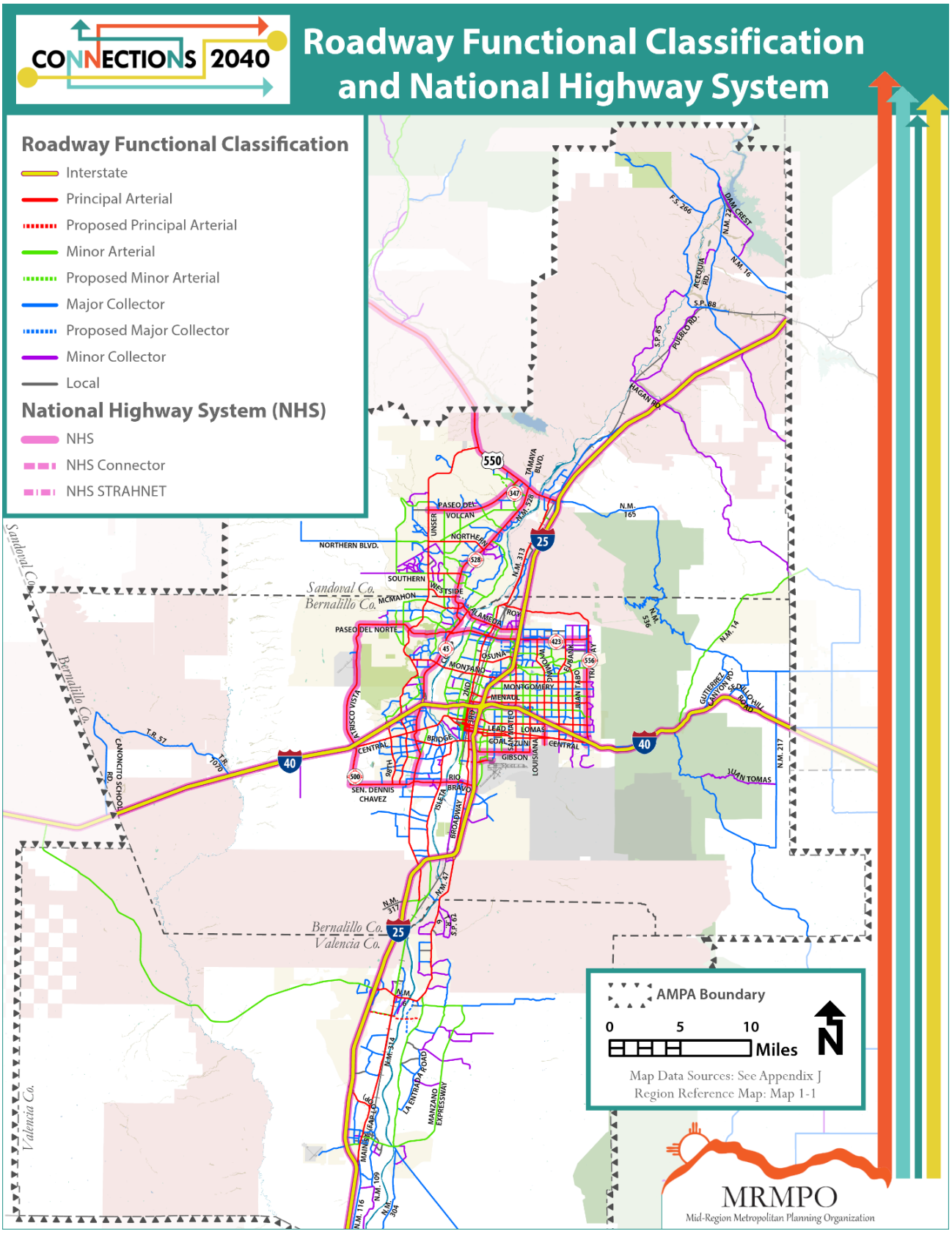
The vast majority of travel in the AMPA takes place by private vehicle. Some motorists find traversing the region fairly easy, and rarely encounter significant delays. Others, particularly during peak commute times, experience recurring and sometimes severe congestion. Whatever one's experience may be,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

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

MRCOG Traffic Counts and Monitoring Program

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

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

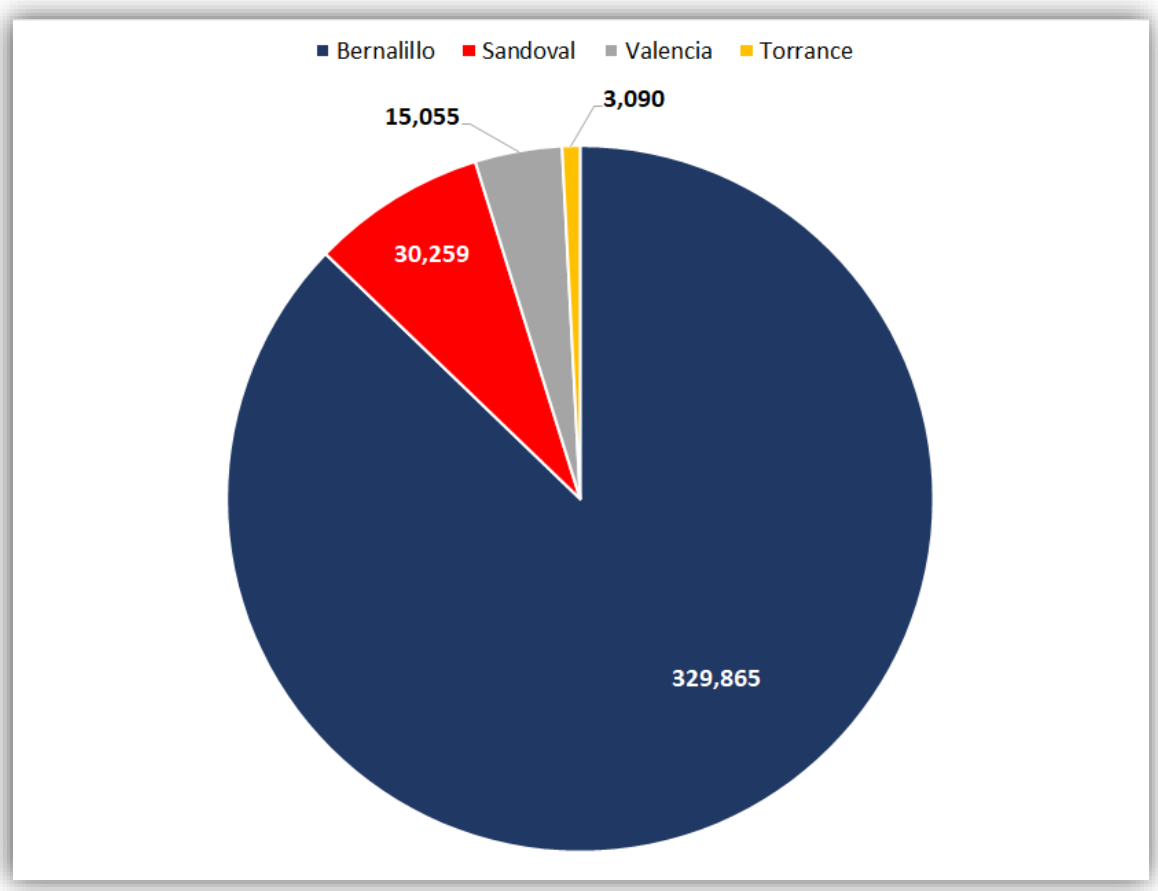


a. Current Travel Conditions

Commuter Flows

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

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



Source: Census Transportation Planning Package, US Census Bureau

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

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

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

Roadway Travel Demand

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

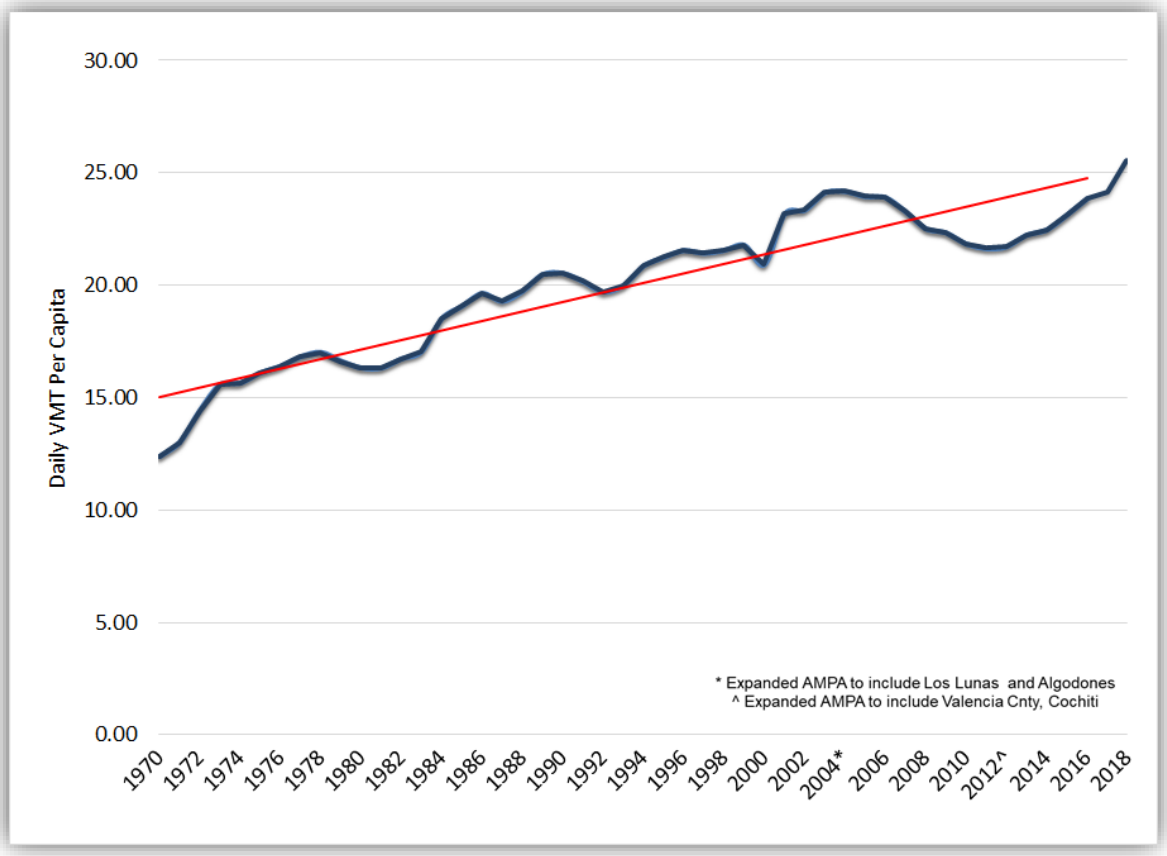
Vehicle Miles Traveled

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

Vehicle Miles Traveled (VMT)

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

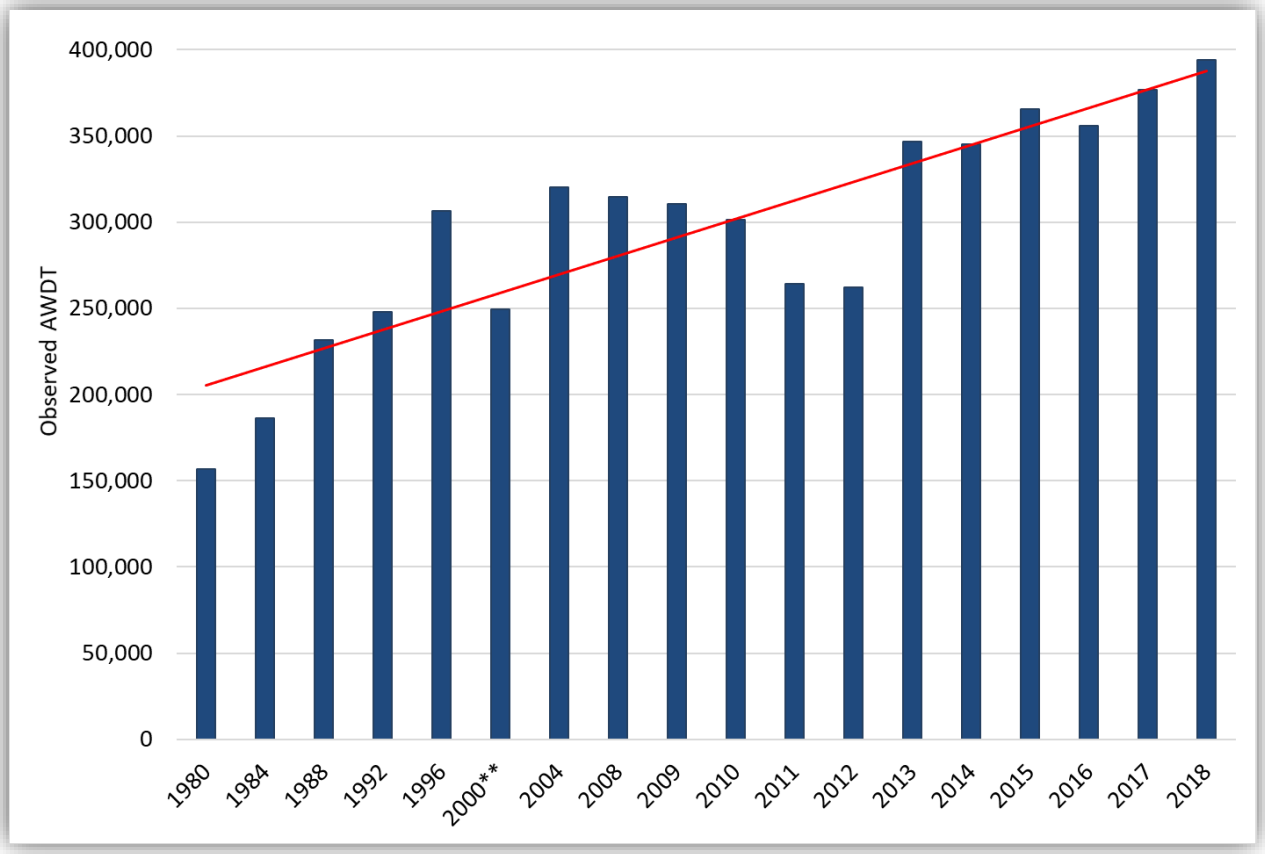
Figure 4-2: Per Capita VMT in the AMPA, 1970-2018



The Big I as a Barometer

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

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



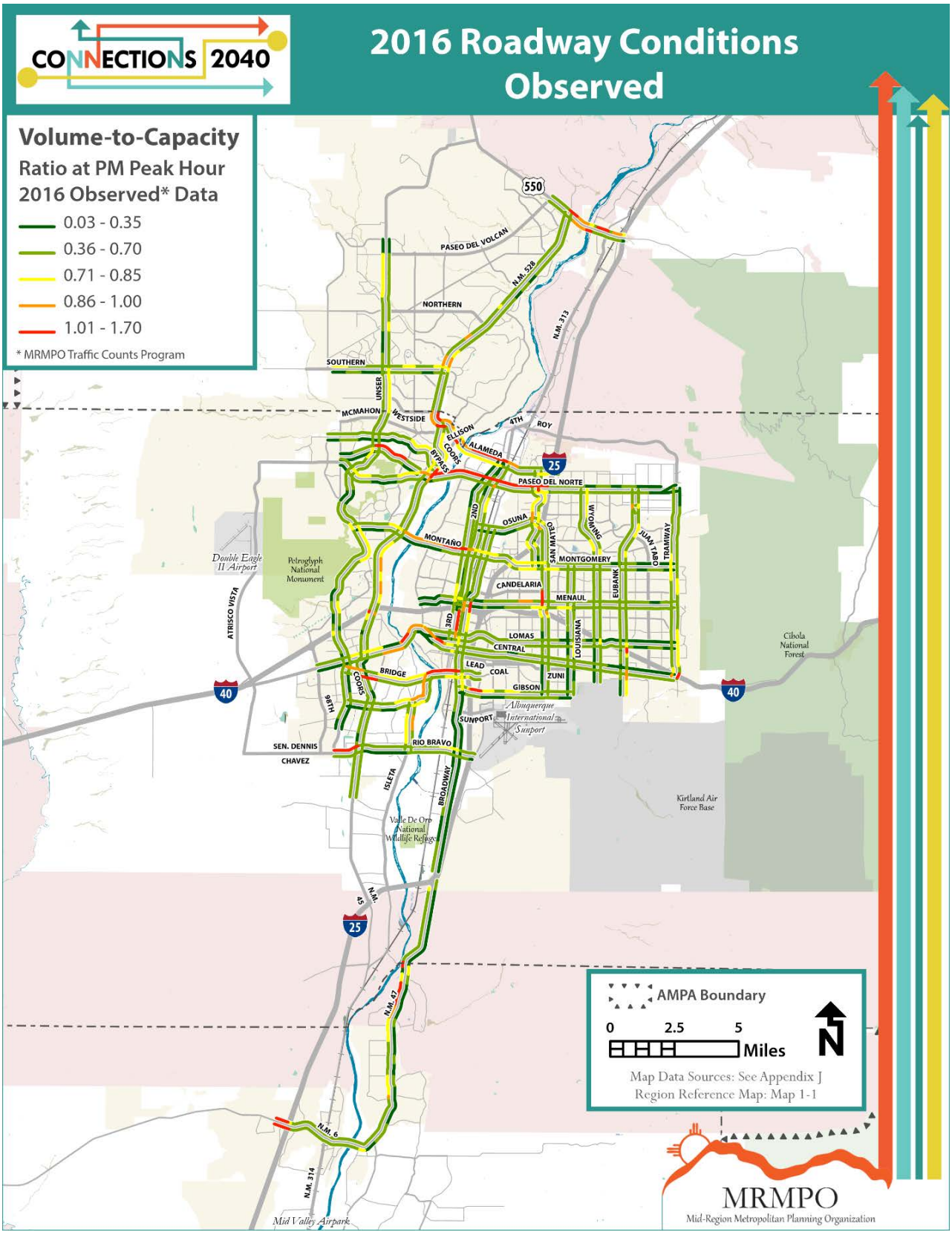
Roadway Capacity

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

Volume to Capacity Ratio (V/C Ratio)

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

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

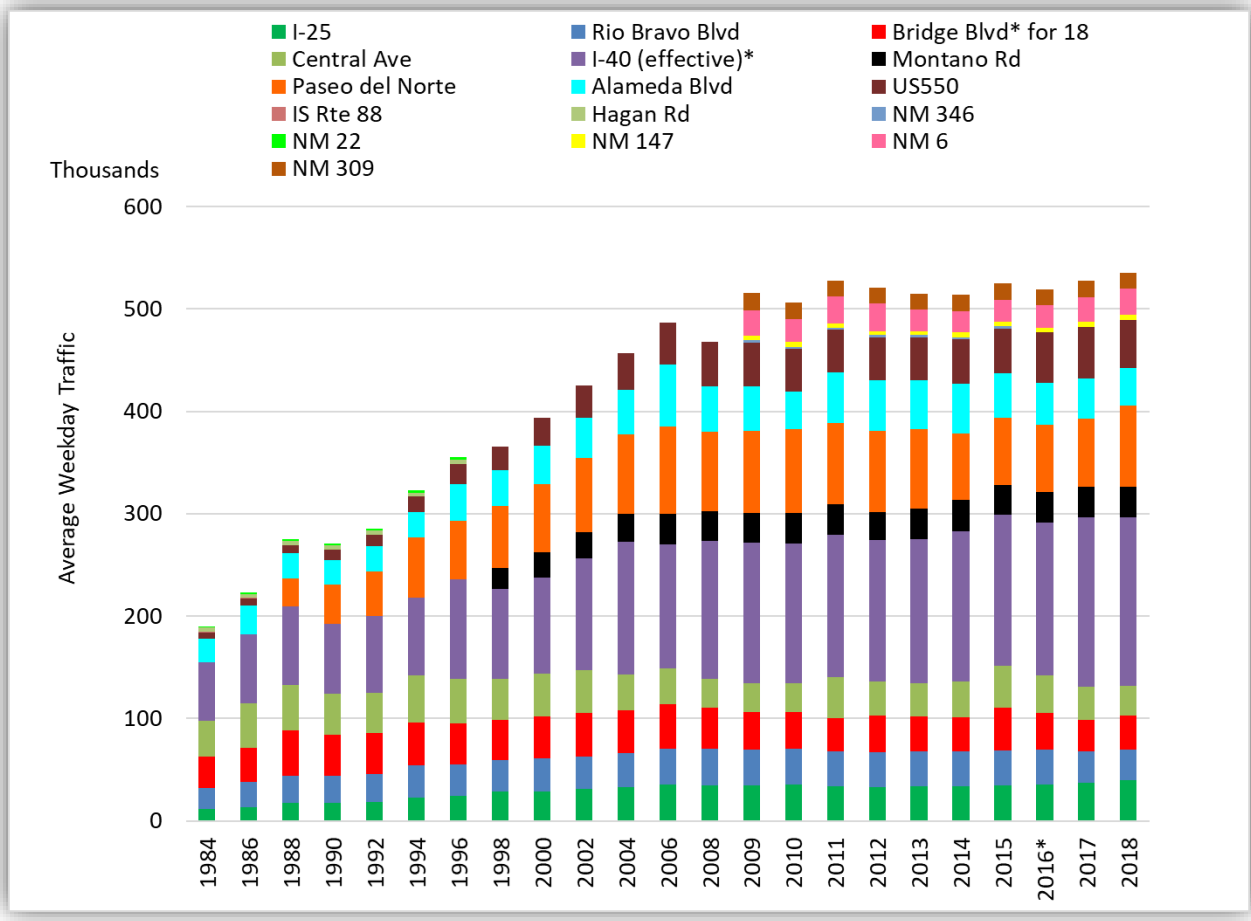


River Crossings

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

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

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



b. Challenging Safety Statistics

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

Crash Database

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

This plan contains a review of the recent crash data and a variety of action items or strategies to support changes in our education, planning, policies, and design efforts. Perhaps most disturbing, is that based on preliminary data from the Governors Highway Safety Association, New Mexico ranks number one for pedestrian fatalities per 100,000 population[1]. These challenging statistics have led the FHWA to identify Albuquerque as a "focus city" and New Mexico a "focus state" for pedestrian safety interventions. The FHWA's focus city effort has provided support for a better examination of crash data related to pedestrians and bicyclists. The table here shows the general upward trend of crashes in the AMPA.

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

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

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

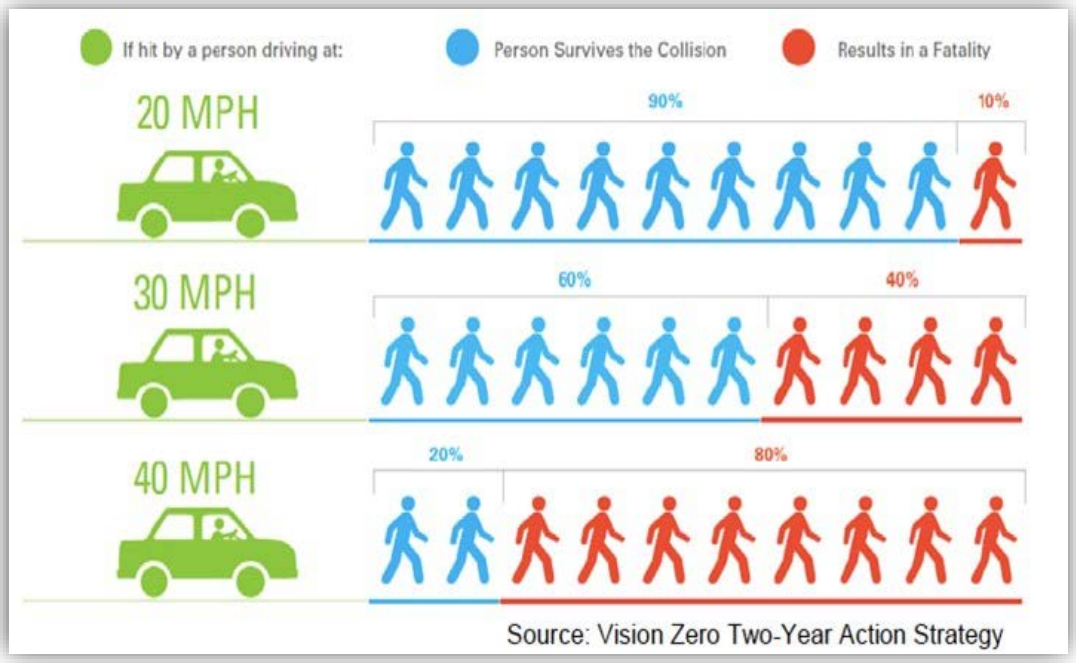
Top Contributing Factors (TCF)

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

Excessive Speed and Dangerous Driving

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

Figure 4-5: Impact of Speed on Pedestrian Fatalities



[2] National Transportation Safety Board, 2017.

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

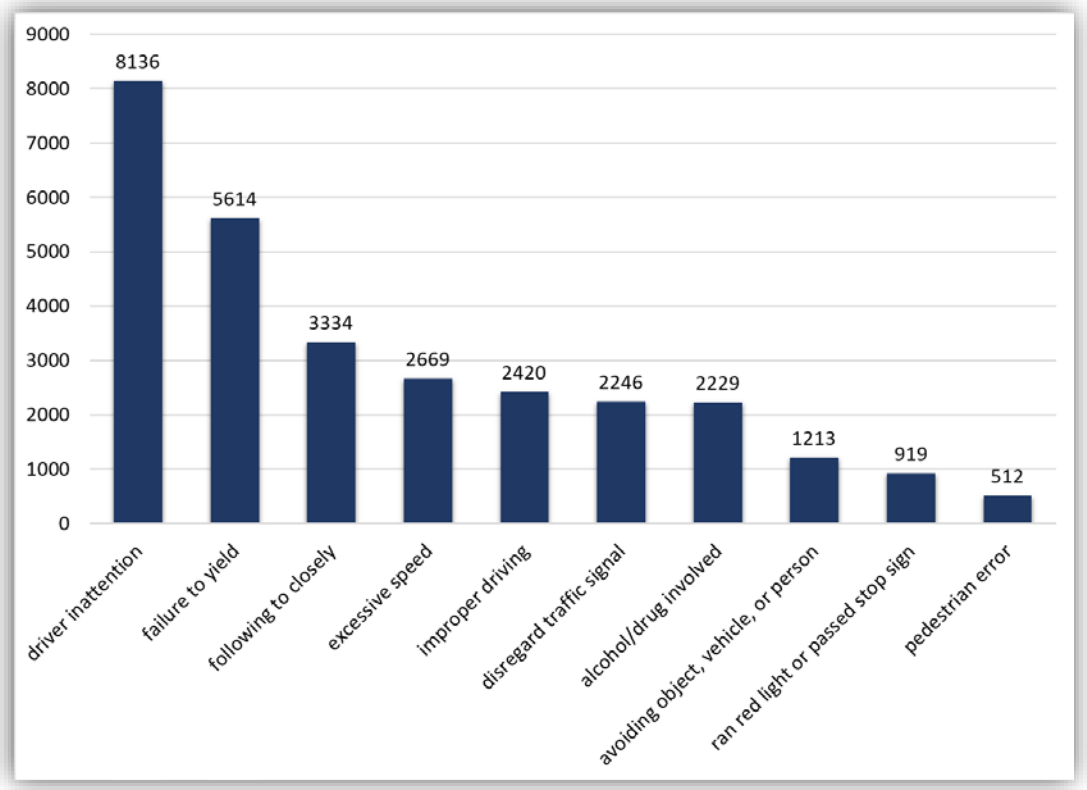
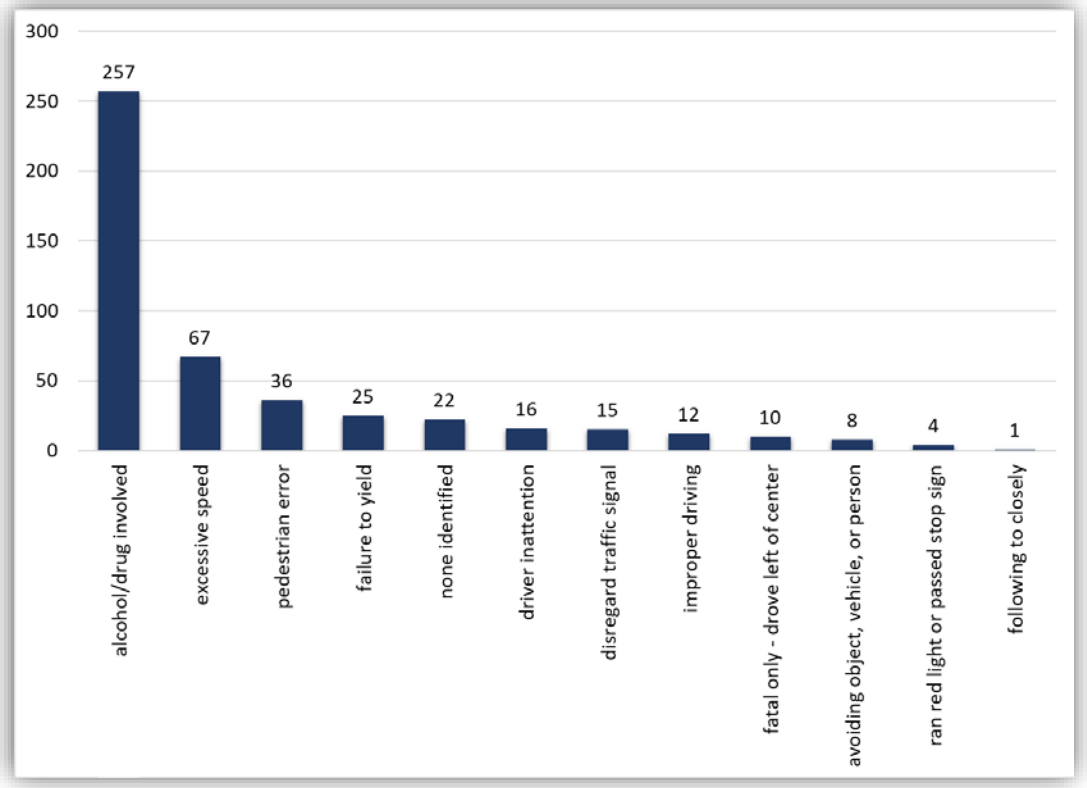


Figure 4-7: TCFs for Fatal Crashes Only in the AMPA, 2013-2017



Reporting Pedestrian Error as a TCF

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

New Mexico Law for Pedestrians and Drivers

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

Bicycle and Pedestrian Crash Reporting

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

Figure 4-8: Unmarked Crosswalks

Source: wisconsinbikefed.org

[3] http://www.eden.rutgers.edu/~ei60/crashespaper.pdf
[4] http://www.eden.rutgers.edu/~ei60/crashespaper.pdf

Regional Transportation Safety Action Plan (RTSAP)

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

RSTAP Goals and Emphasis Areas

RTSAP Goals

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

RTSAP Emphasis Areas

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

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

RTSAP Action Items

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

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

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

Rural Areas

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

Traveling by Motorcycle

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

High Fatal and Injury Network (HFIN)

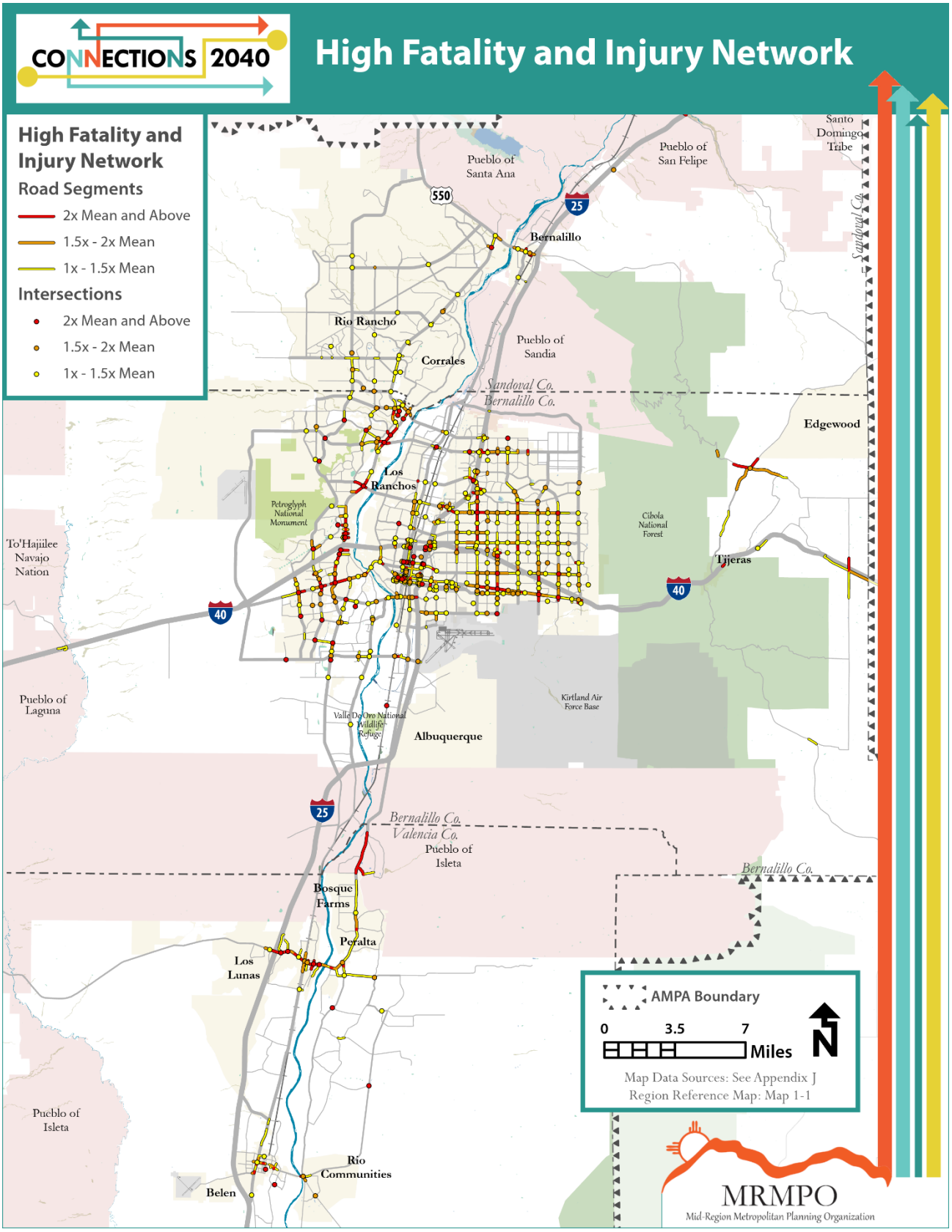
The High Fatal and Injury Network (HFIN), is a new planning tool that allows the region to target those locations that not only have the most crashes, but also the greatest impact on human lives. Using this tool, agencies can work with private institutions and organizations to implement preventative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

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

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

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

Map 4-3: High Fatal and Injury Network



Intersection Crash Rates

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

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

Wisely Targeted Funding

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

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

c. Future Travel Demand

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

Transportation Scenarios

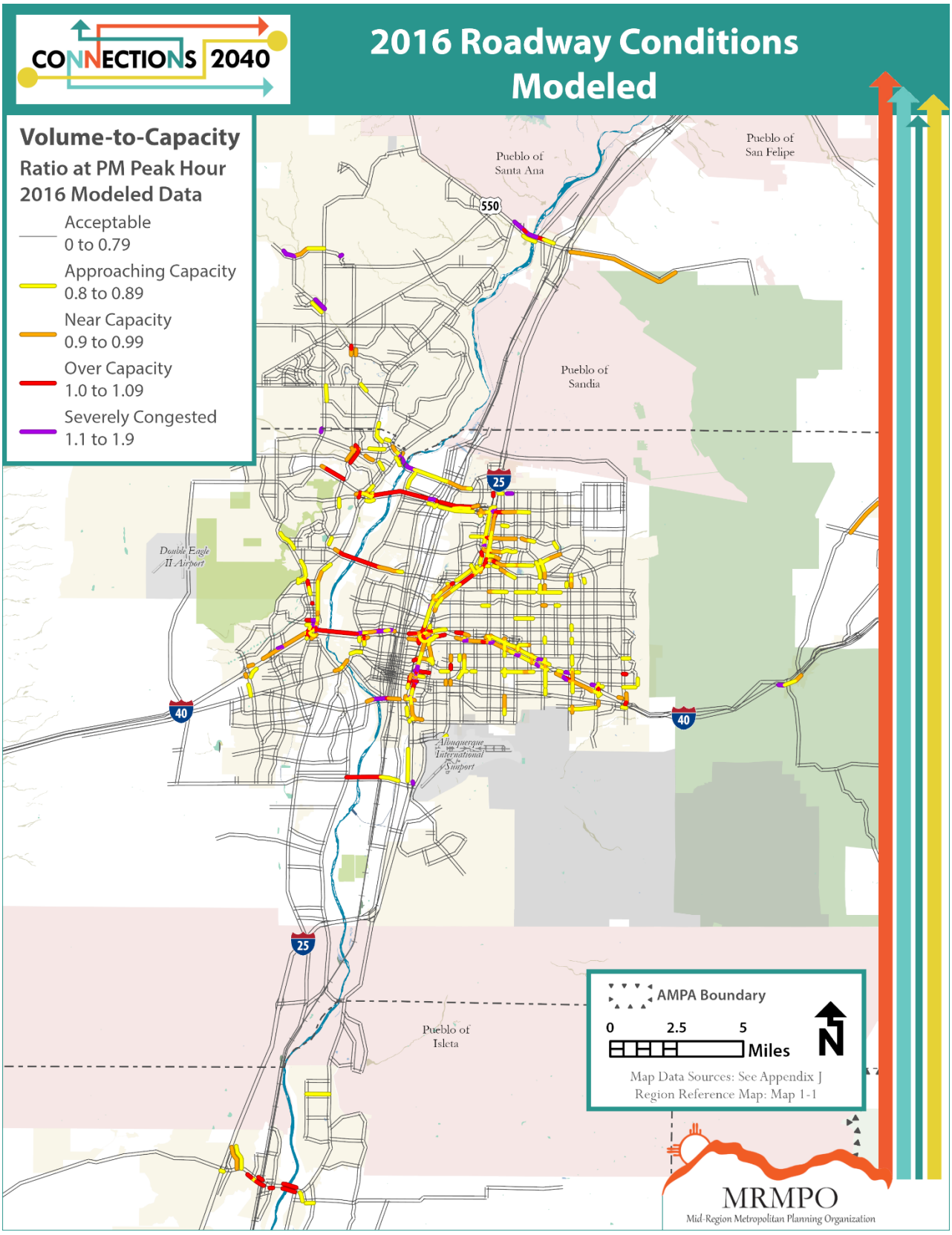
The land use-transportation relationship can be evaluated through future geographic distribution of forecasted socioeconomic data and roadway infrastructure scenarios. Future year roadway scenarios inform the transportation planning process by allowing agencies to identify infrastructure improvements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

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

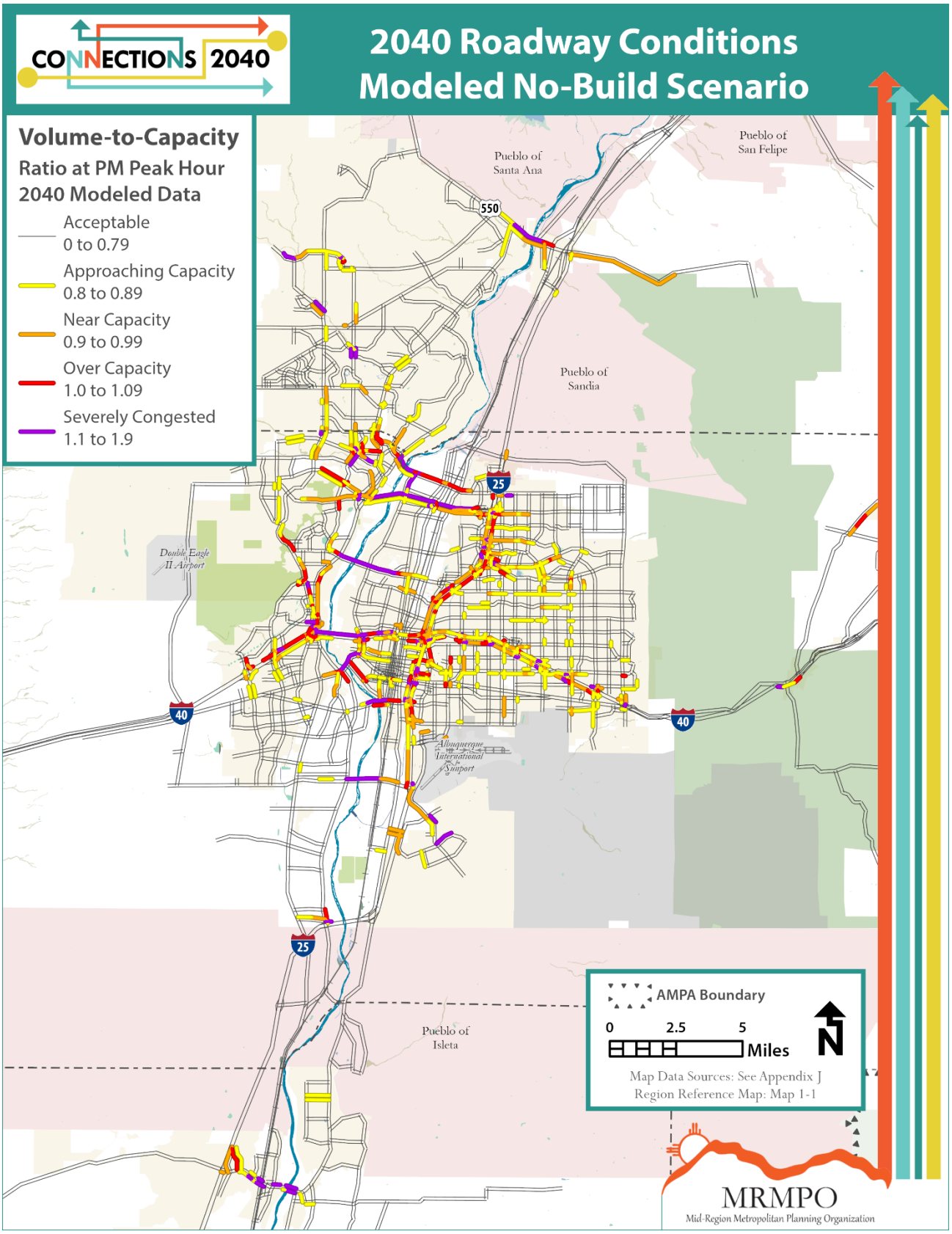
1. **2016 Baseline**
   Reflects the modeled or simulated conditions found in the region today. This scenario forms a standard upon which future year scenarios can be projected, compared, and analyzed.
2. **2040 Trend No-Build**
   Shows the impacts of anticipated socioeconomic growth on the "no build"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

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

Map 4-4: 2016 Roadway Conditions



Map 4-5: 2040 Trend No Build Roadway Conditions



Future Conditions without Transportation Infrastructure Investment

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

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

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

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

Future Conditions with Transportation Investment

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

Comparing the Trend and Target Growth Scenarios

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

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

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

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

River Crossing Delays: Reductions in Target over Trend

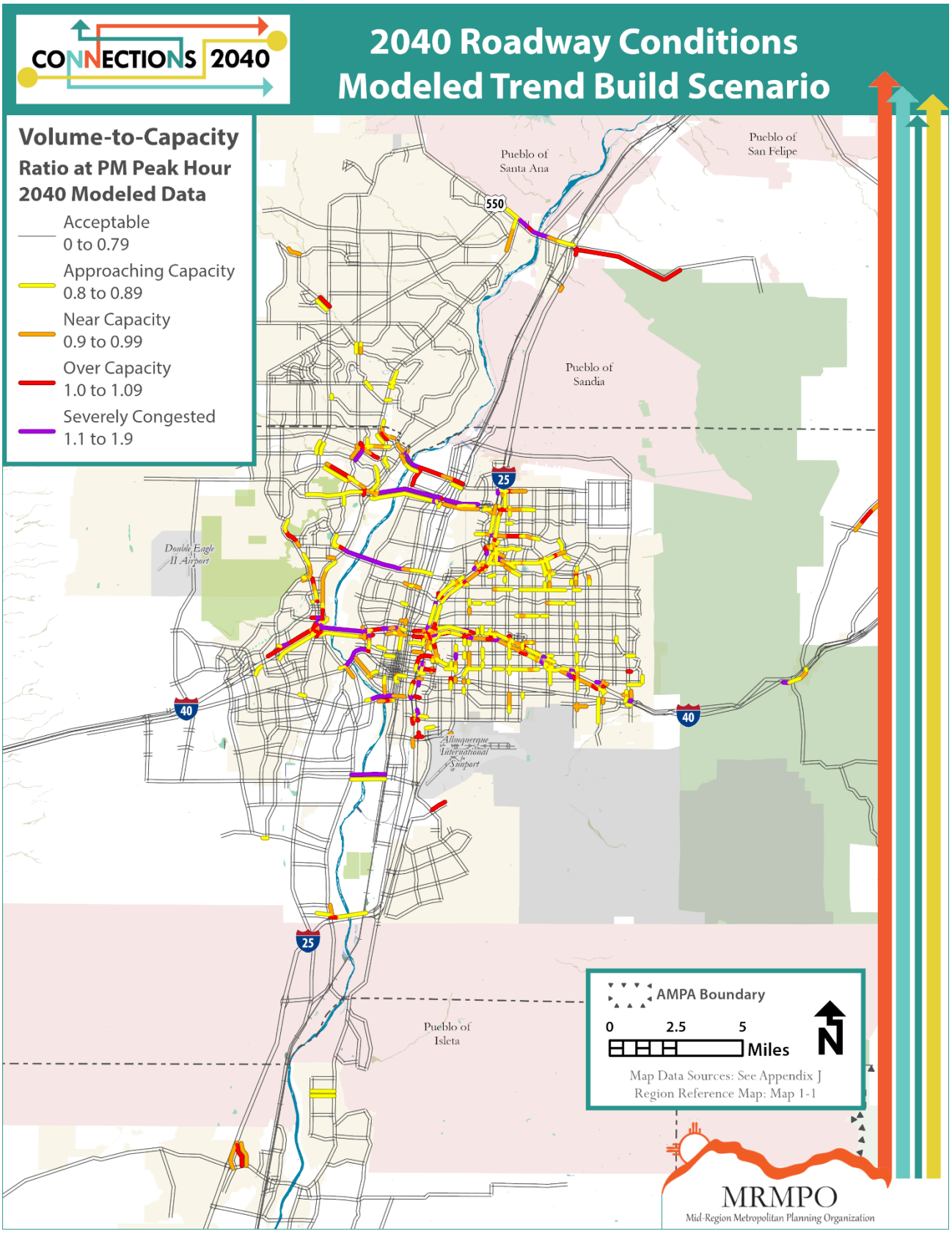
While the differences in travel conditions between the Trend and Target Scenarios may at first appear modest, there is a tremendous difference in travel delay on the river crossings. When observed on river crossings supporting major commutes, the Target Scenario provides a remarkable improvement (43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

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

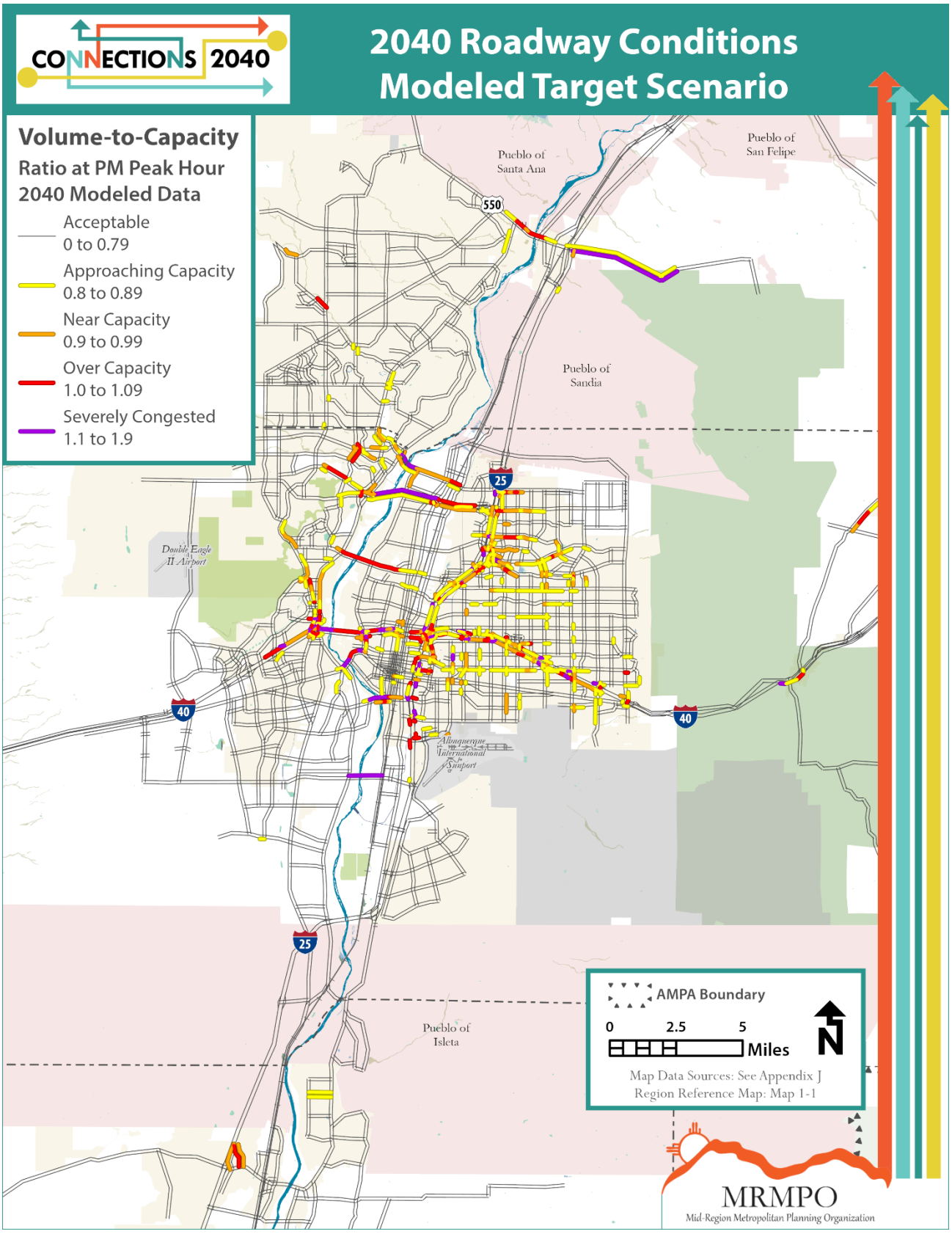
2040 Trend Westside Jobs	2040 Target Westside Jobs	Additional Westside Jobs in Target Scenario	Reductions in PM Peak Hour River Crossing Delay
109,227	122,656	13,429	1,196 Travel Hours Saved Each Day

Figure 4-9: River Crossing in the AMPA

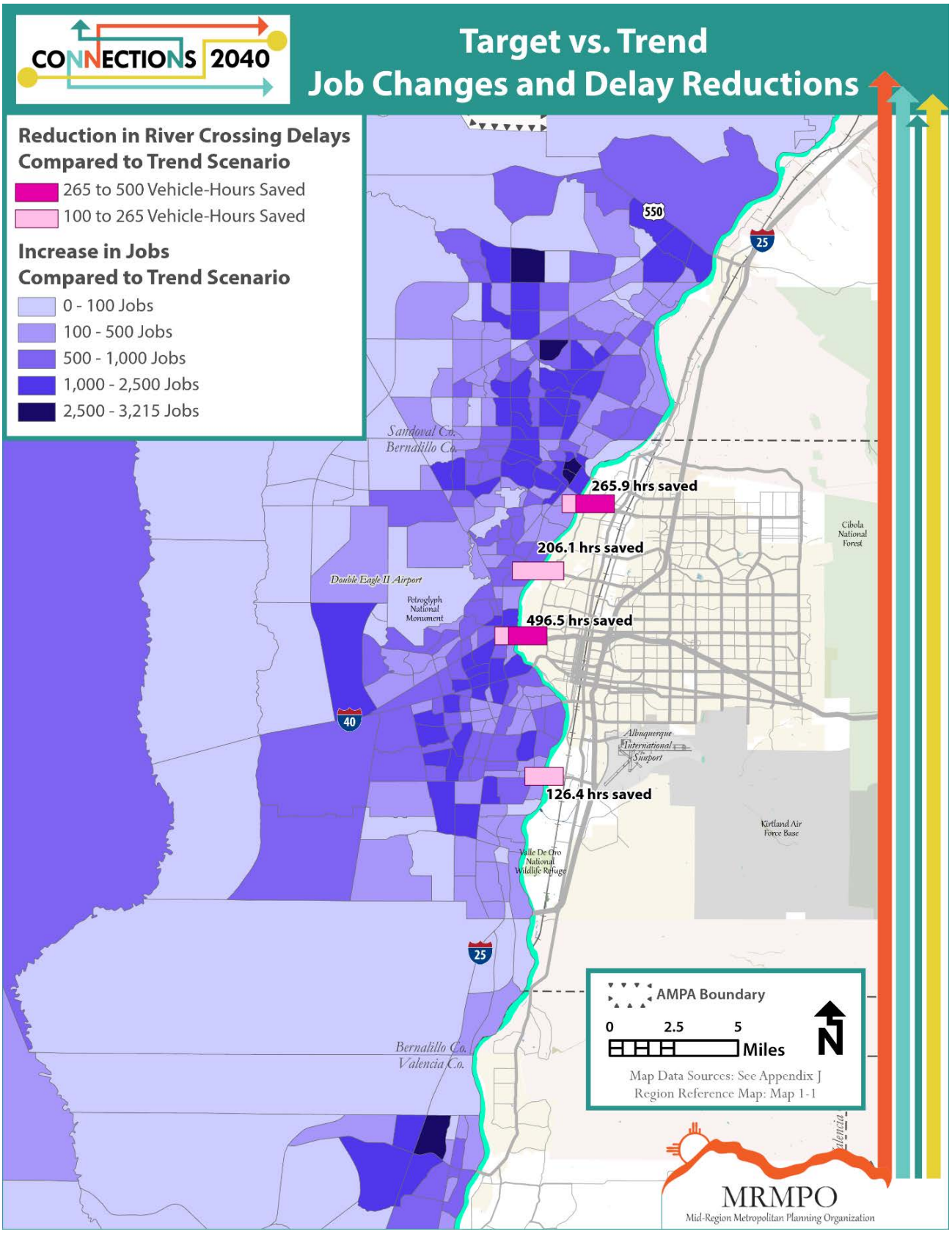
Map 4-6: 2040 Trend Roadway Conditions



Map 4-7: 2040 Target Scenario Roadway Conditions



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



d. Roadway Management and Mobility

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

Congestion Management Process (CMP)

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

Understanding the Congestion Problem

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

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

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

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

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

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

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

Data Collection and Performance-Based Planning

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

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

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

Multimodal Performance Measures

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

CMP Products[11]

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

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

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

CMP Corridor Rankings

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

Table 4-6: CMP Corridor Rankings, 2016

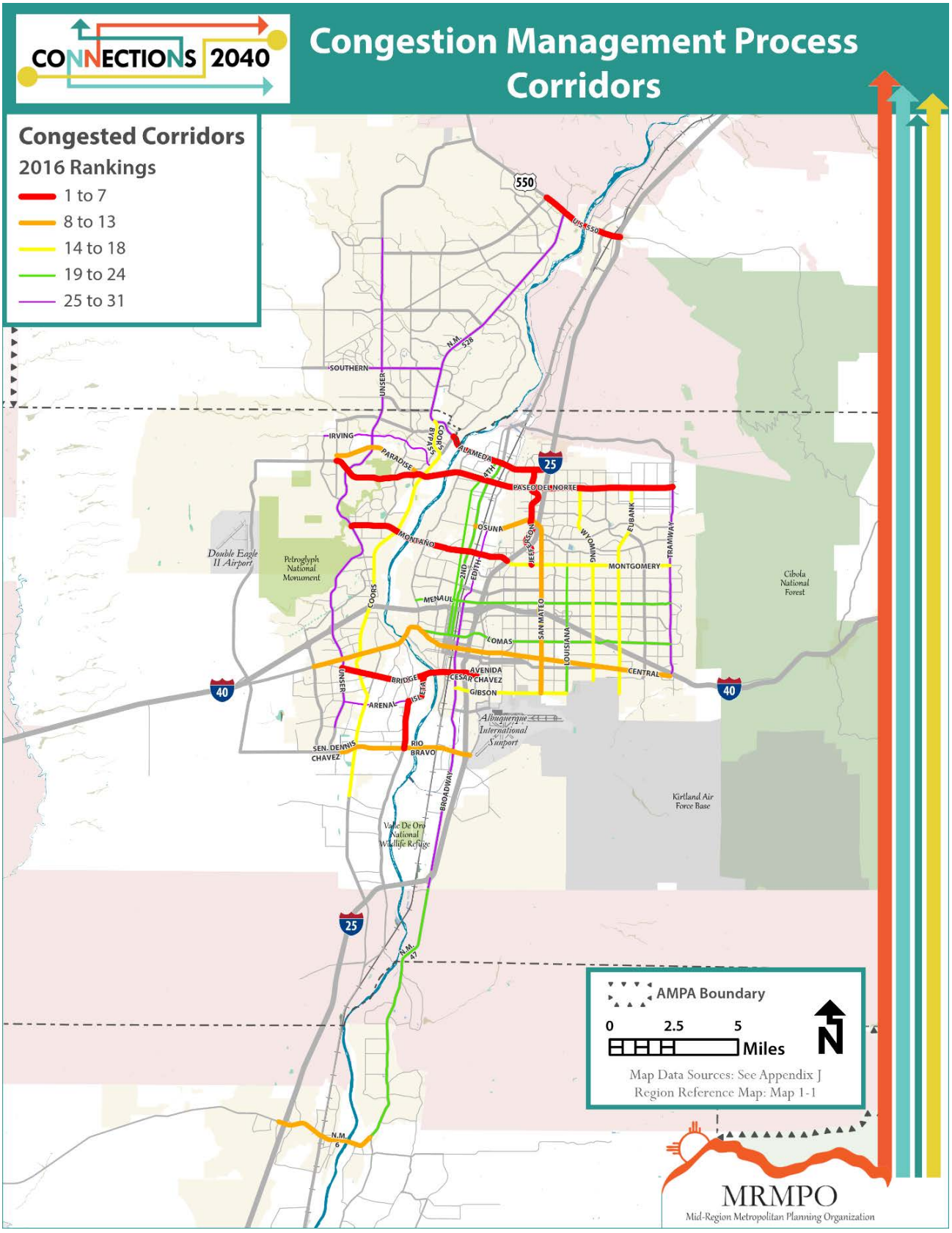
RANK	RTE	V/C Points	Speed Points	Crash Points	Total
1	ALAMEDA BLVD.	67.84	21.33	1.76	90.93
2	ISLETA BLVD.	58.37	22.07	9.40	89.83
3	BRIDGE/CESAR CHAVEZ	57.46	20.26	11.75	89.47
4	U.S. 550	53.21	20.23	6.71	80.16
5	MONTANO	40.22	23.48	11.57	75.28
6	PASEO DEL NORTE	39.02	14.07	12.86	65.95
7	JEFFERSON	24.23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

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

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

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

Map 4-9: CMP Network and Corridor Rankings



Congestion Management Approaches

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

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

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

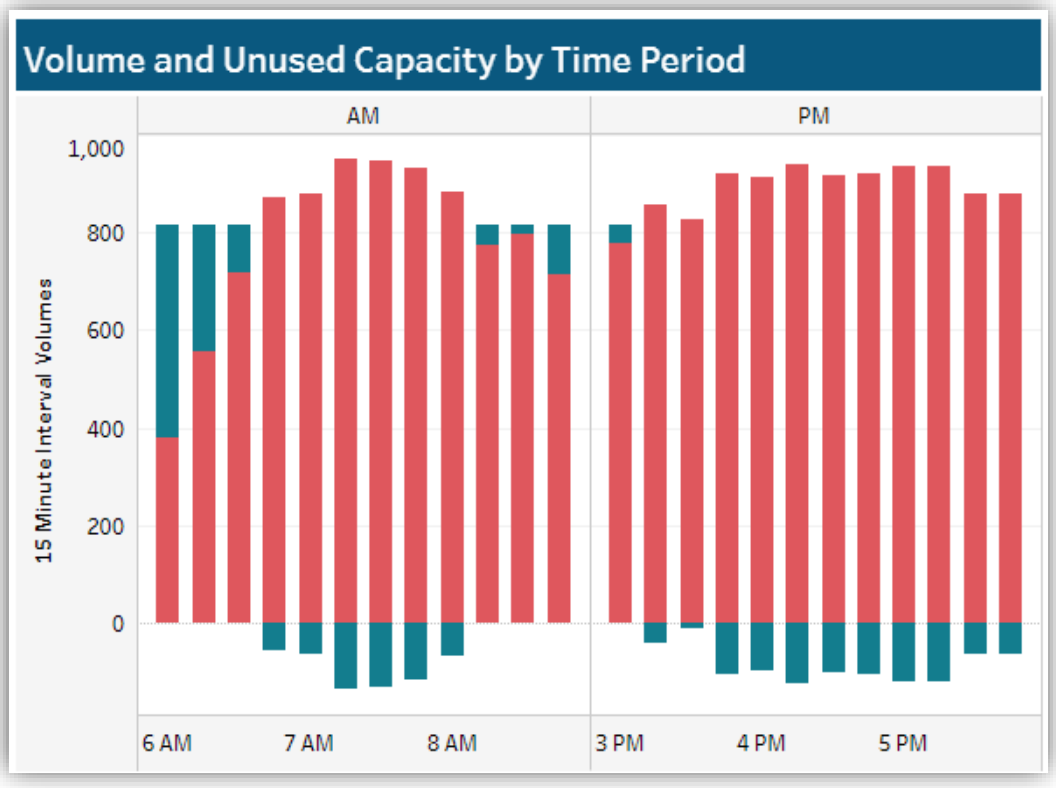
Maximizing Underutilized Capacity

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

Peak Hour Spreading and Flexible Schedules

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

Figure 4-10: Alameda Blvd River Crossing Peak Period



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

Travel Demand Management (TDM)

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

TDM Partnerships

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

The Smart Business Partnership

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

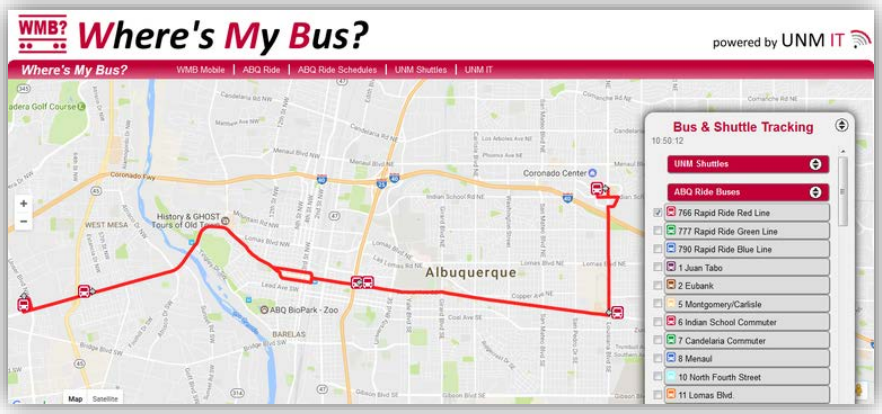
- Allowing alternative work schedules (such as telecommuting and flexible schedules)
- Subsidizing bus and rail passes
- Promoting the federal commuter tax benefits
- Installing/constructing improvements such as carpool spaces and bike racks and lockers
- Operating shuttles or vanpools or providing fleet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

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

New Technology

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

Figure 4-11: Where's My Bus?



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

Incident Management Plan (IMP)

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

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

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

Figure 4-12: NMROADS.COM Interface

Collaboration Among Stakeholders

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

New Regional Incident Management Plan

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

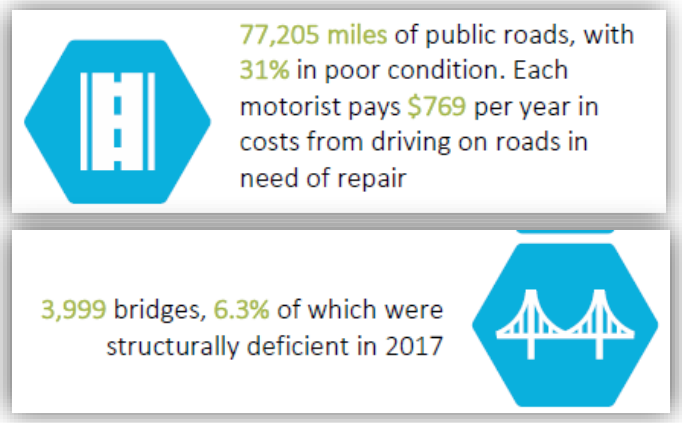
[14] USDOT FHWA Traffic Incident Management Performance Measures Final Report, FHWA-HOP-10-009

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

e. Roadway Maintenance

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

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



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

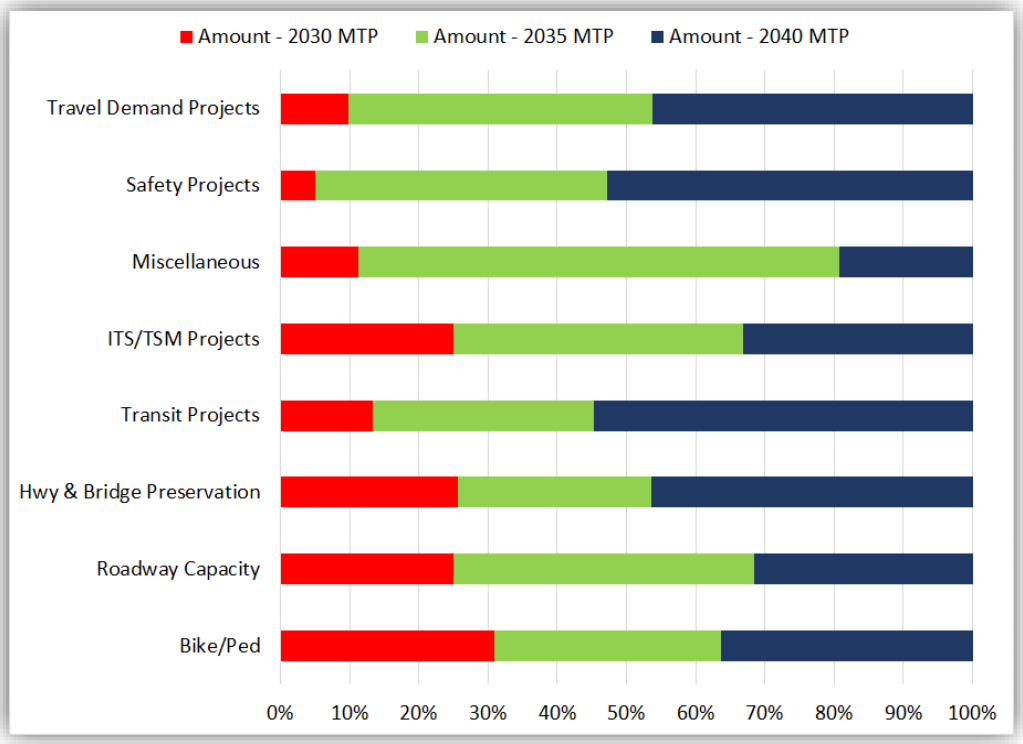
Asset Management Plans

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

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

[15] *2017 Infrastructure Report Card,* 2017, www.infrastructurereportcard.org/.

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



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

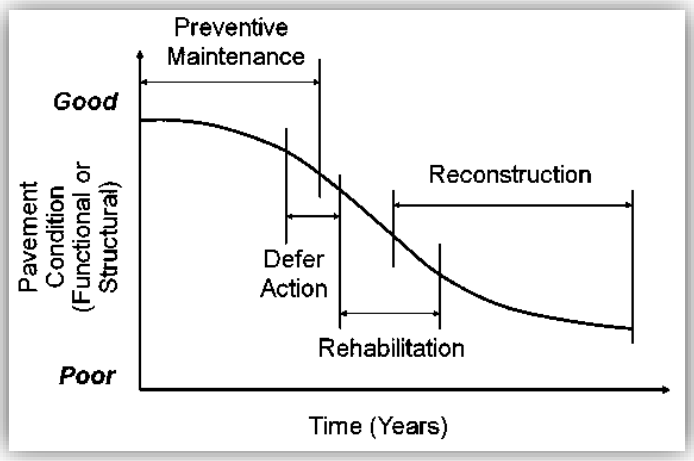
NMDOT Data Collection

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

Pavement and Bridge Conditions

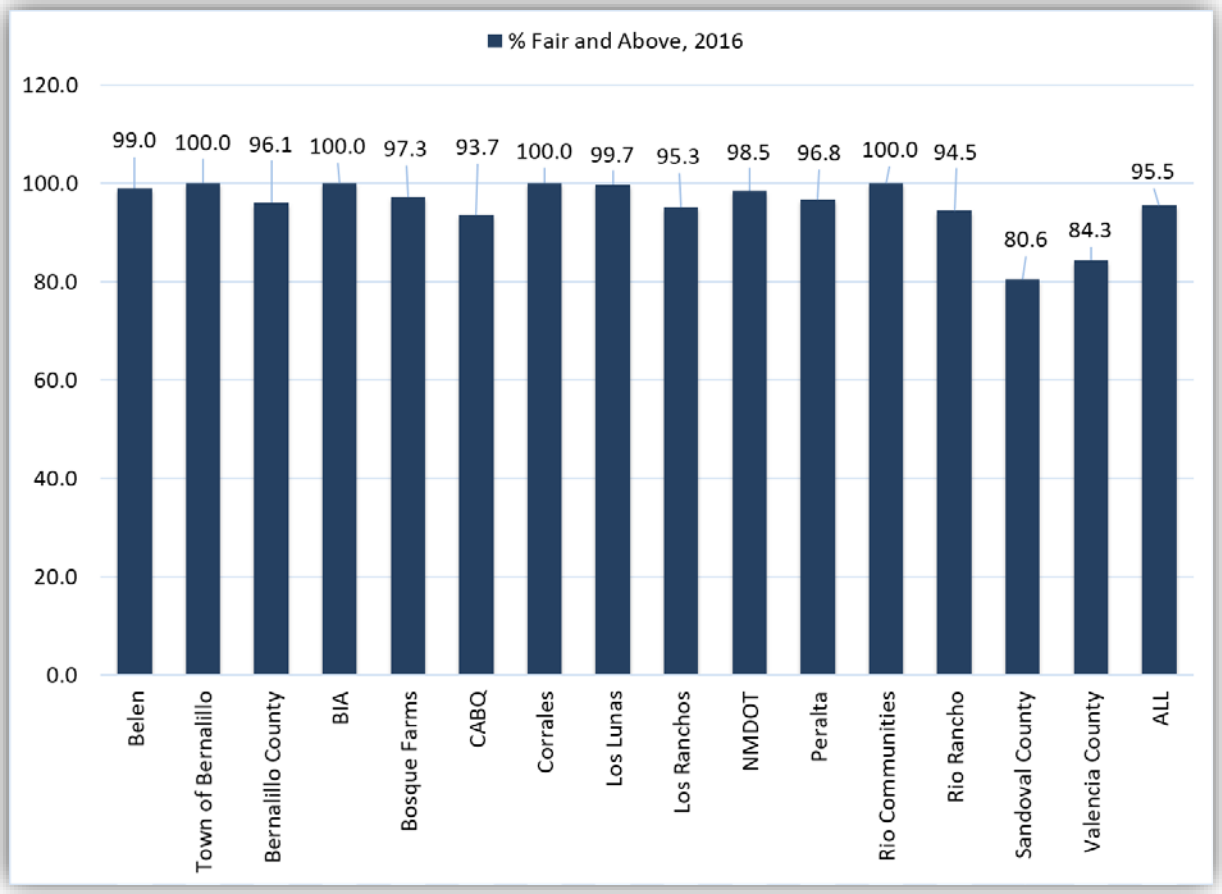
According to the American Society of Civil Engineering's *Report Card on America's Infrastructure,* one-third of all roadways in America are in poor to mediocre condition, and more than a quarter of all bridges are either structurally deficient or functionally obsolete. System preservation among MRMPO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

Figure 4-15: Typical Pavement Preservation Curve



Source: Southern Slurry and Micro Surfacing Inc.

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



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

Local Agency Management

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

f. Roadway Expansion

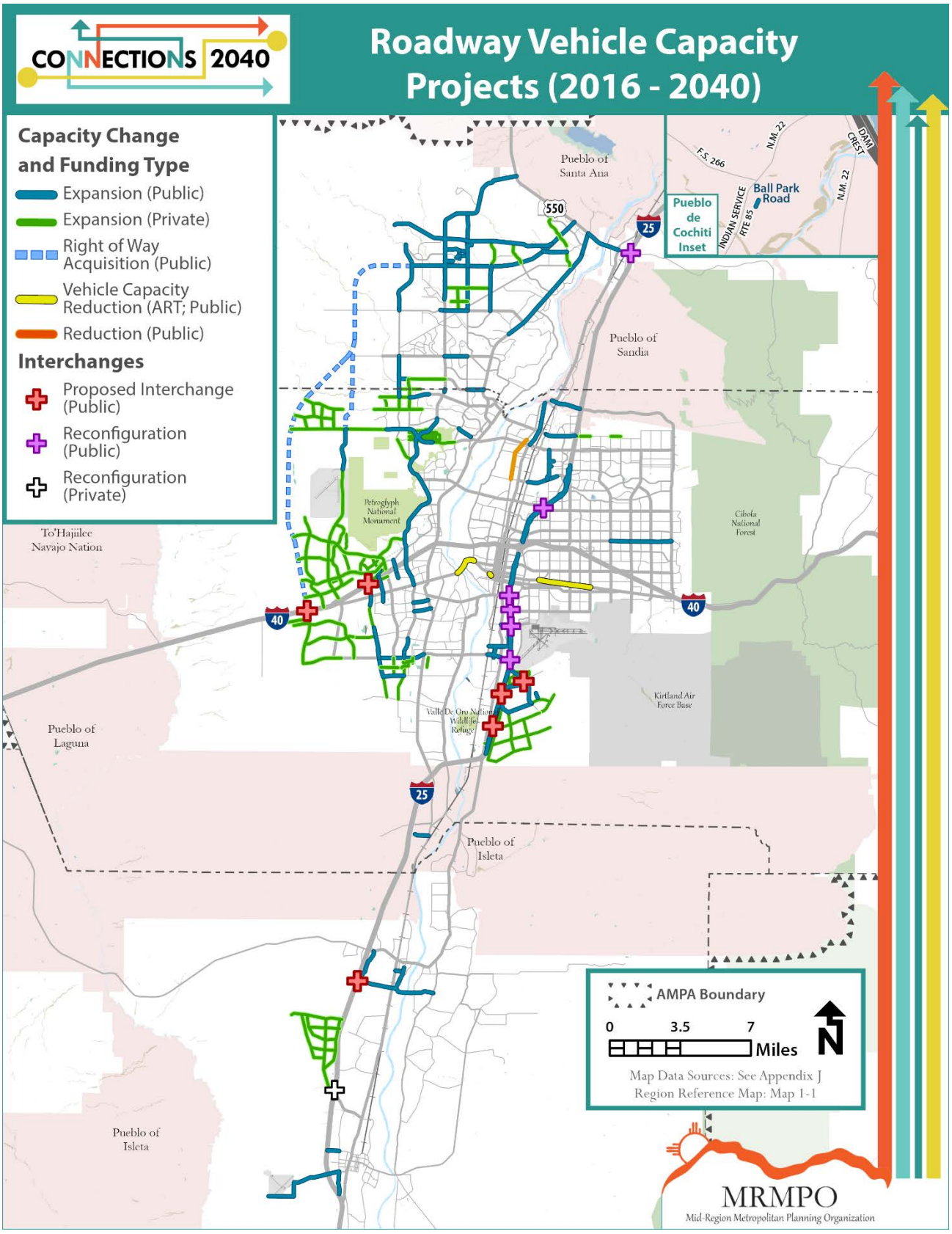
Because growth will continue to outpace the amount of roadway expansion that can be funded and built under the region's fiscally constrained transportation program, there is no practical way the region can build its way out of congestion by adding roadway network. However, adding new roadways or expanding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

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

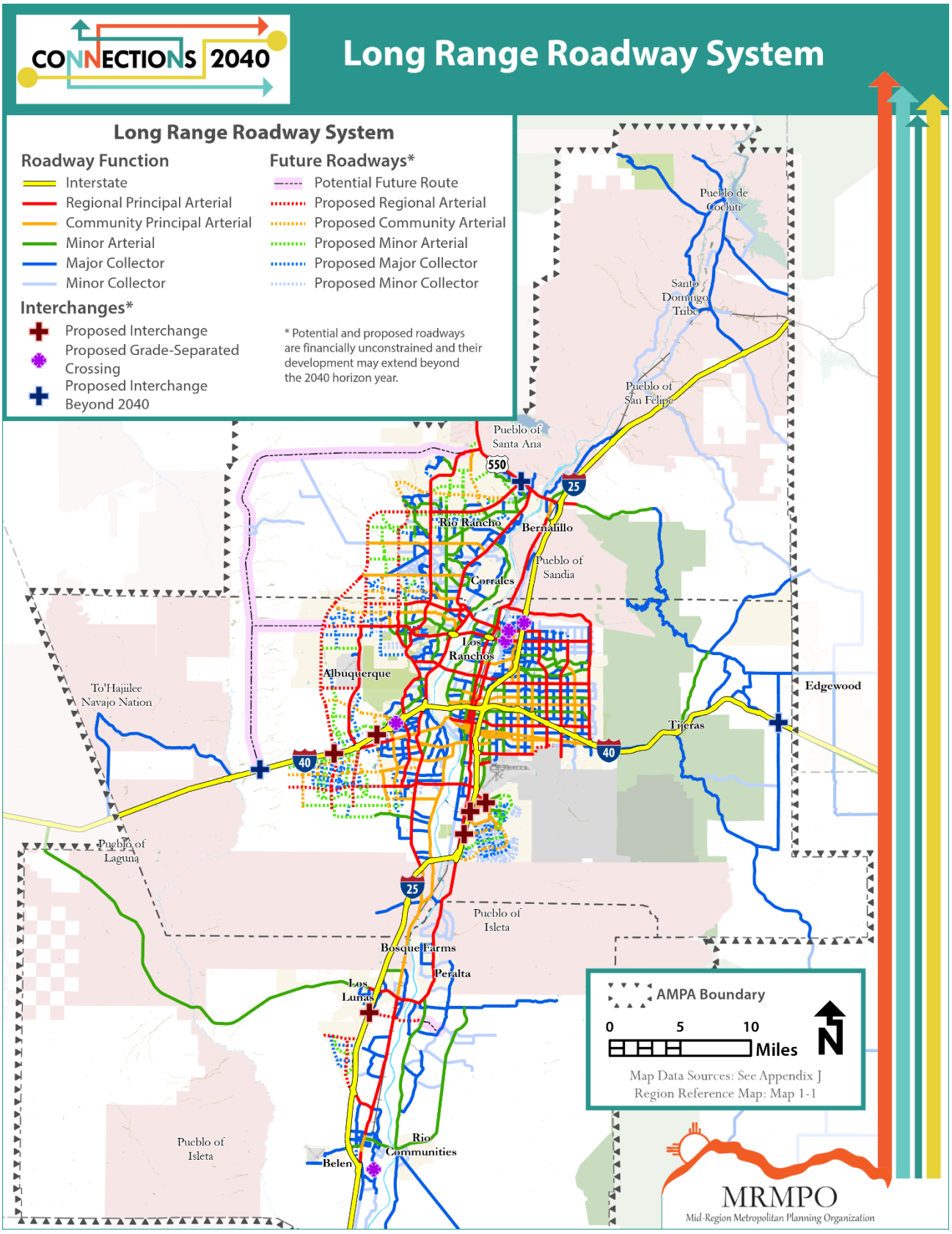
Table 4-7: Roadway Network Lane Miles

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

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



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



g. Transportation Systems Management and Operations (TSMO)

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

Intelligent Transportation Systems (ITS)

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

Integration with the TIP

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

AMPA Regional ITS Architecture

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

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

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

Regional Transportation Management Center

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

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

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

ITS Corridors

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

ITS Real-Time Services

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

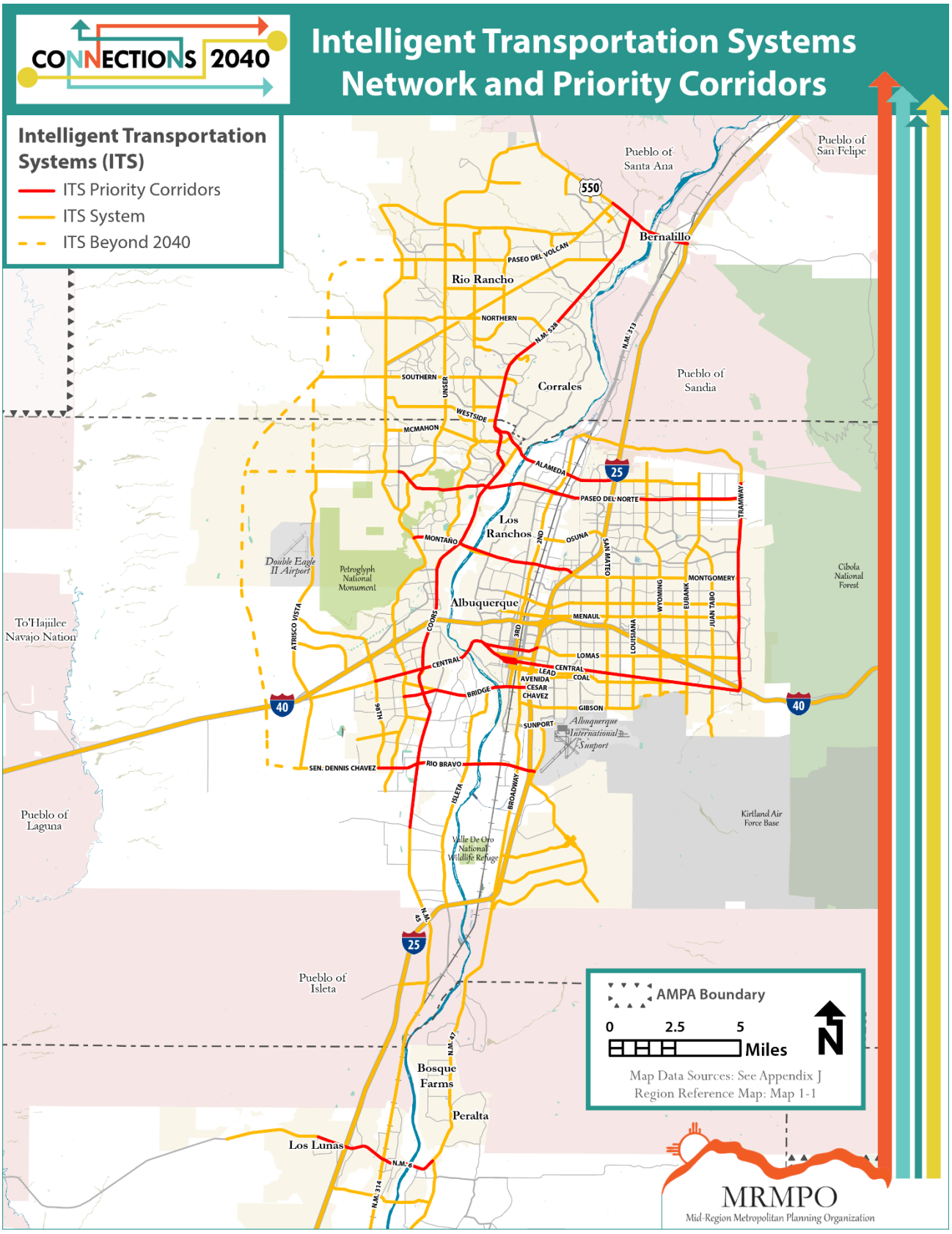
Essential ITS Services

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

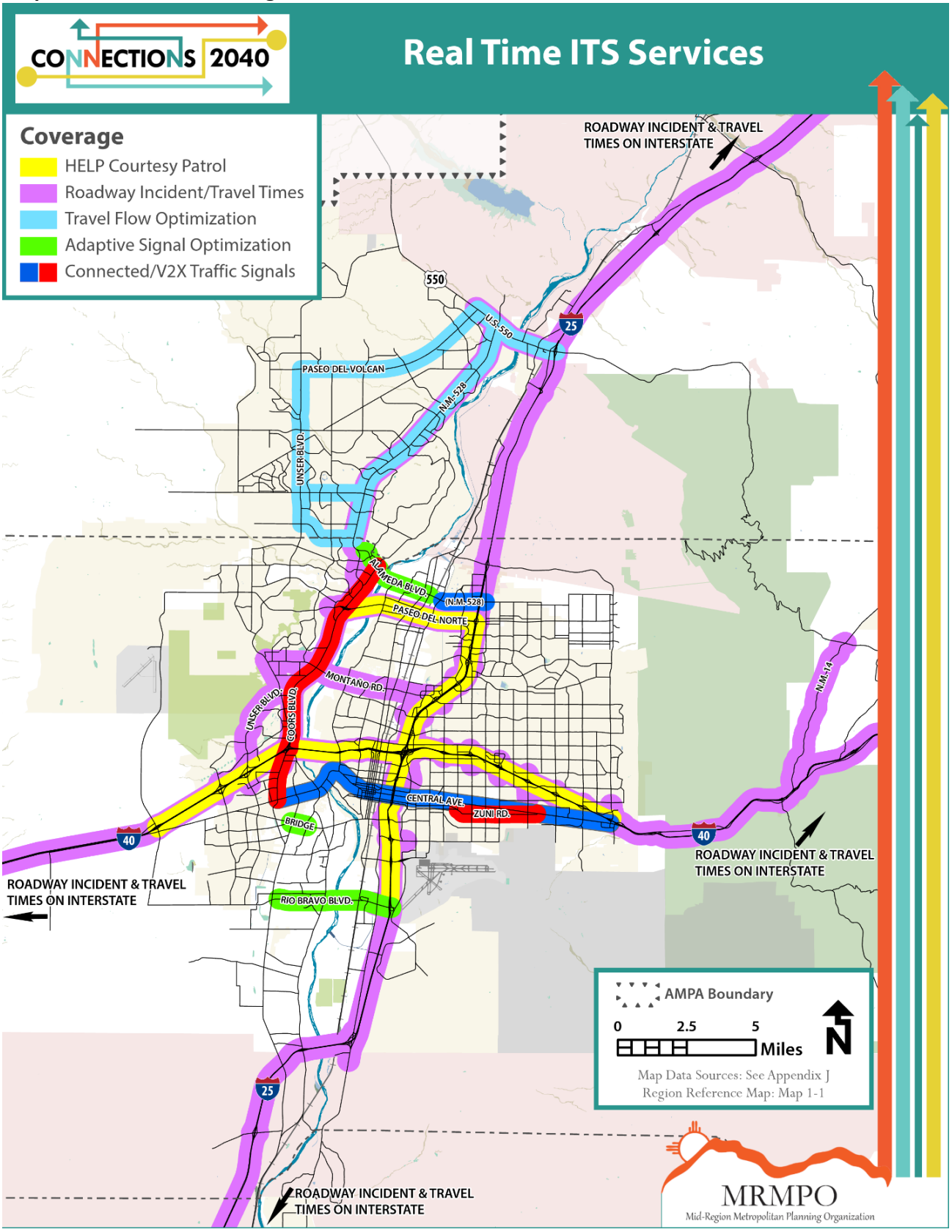
Table 4-8: Primary ITS Services

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

Map 4-12: ITS Corridors in the AMPA



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



Seamless Travel Management

Member agencies are continually expanding the deployment of crucial TSMO ITS strategies such as real-time adaptive signal control, Bluetooth and Wi-Fi enabled traffic operations monitoring, and up-to-the-minute traveler information. The collective result of these coordinated efforts are the beginnings of a network of seamless travel management that is already providing many benefits to travelers. All of these efforts are crucial to serve the needs of a growing region, and it will be imperative for local entities to continue to coordinate operational management strategies. As the previously identified ITS Services are employed by local agencies, they are laying the formative groundwork for an integrated deployment that will support advances in vehicle and infrastructure technologies as we enter an age of Connected and Automated Vehicles (explained further in the next section). Advances in communications and sensors deployed in transportation infrastructure continue to offer huge operational, safety, and quality of life enhancements to the users of the system.

ITS Corridors

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

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

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

Federal Initiatives and Local Agency Implementation

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

The Strategic Highway Research Program (SHRP2)

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

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

Everyday Counts (EDC)

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

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

Real Time System Management Information Program (RTSMIP)

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

National Operations Center of Excellence, NOCoE

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

Signal Phasing and Timing (SPaT) Challenge

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

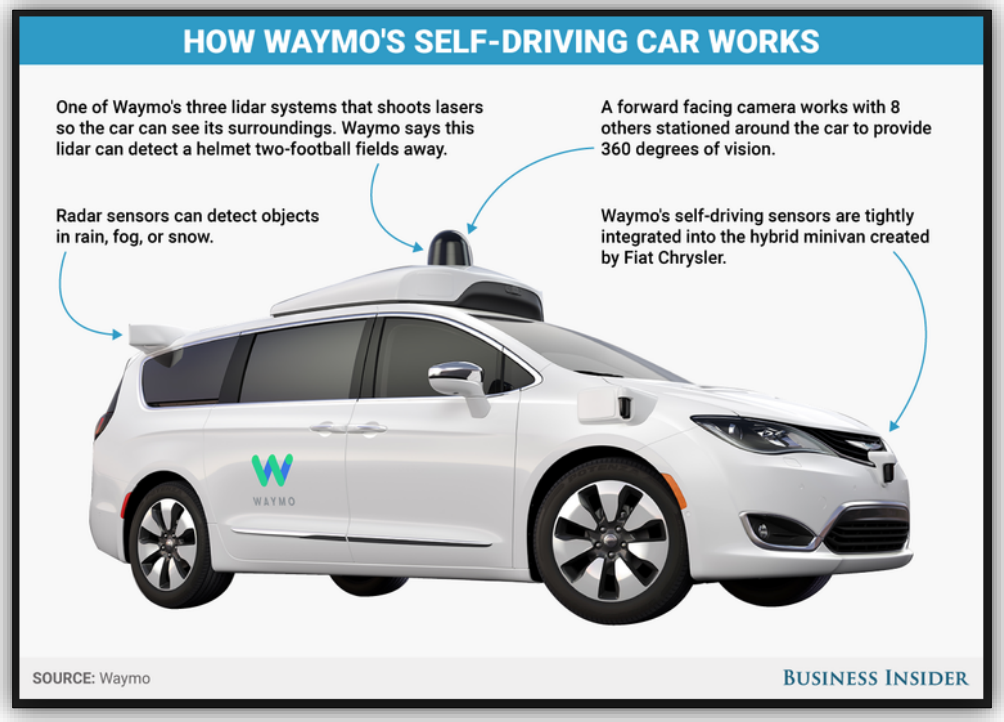
Local SPaT Undertaking along NM 528 and Lead/Coal/Zuni

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

h. Connected and Automated Vehicles Technology (CAV)

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

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



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

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

[17] USDOT/ITS America Connected Vehicles Taskforce
[17] USDOT/ITS America Connected Vehicles Taskforce

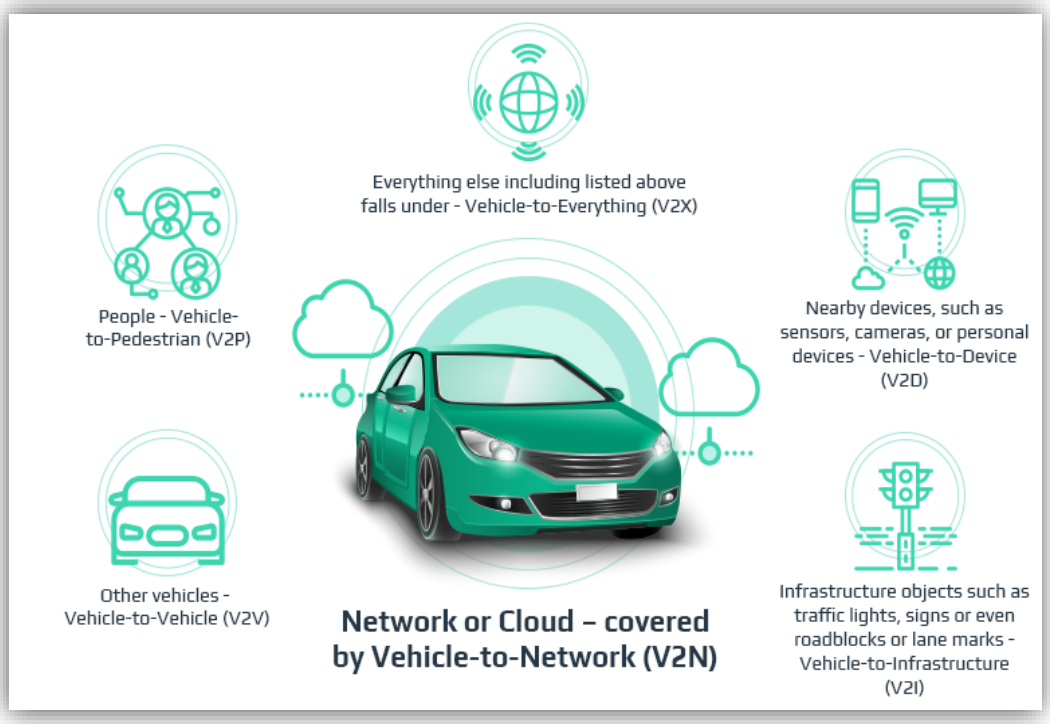
Recent pilot projects have identified that a combination of cellular and DSRC communications prove to offer a more effective approach since mobile communications are more widely adopted and offer a higher level of market penetration. This approach will help resource strapped local agencies more easily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

Vehicle to Everything Technology (V2X)

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

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

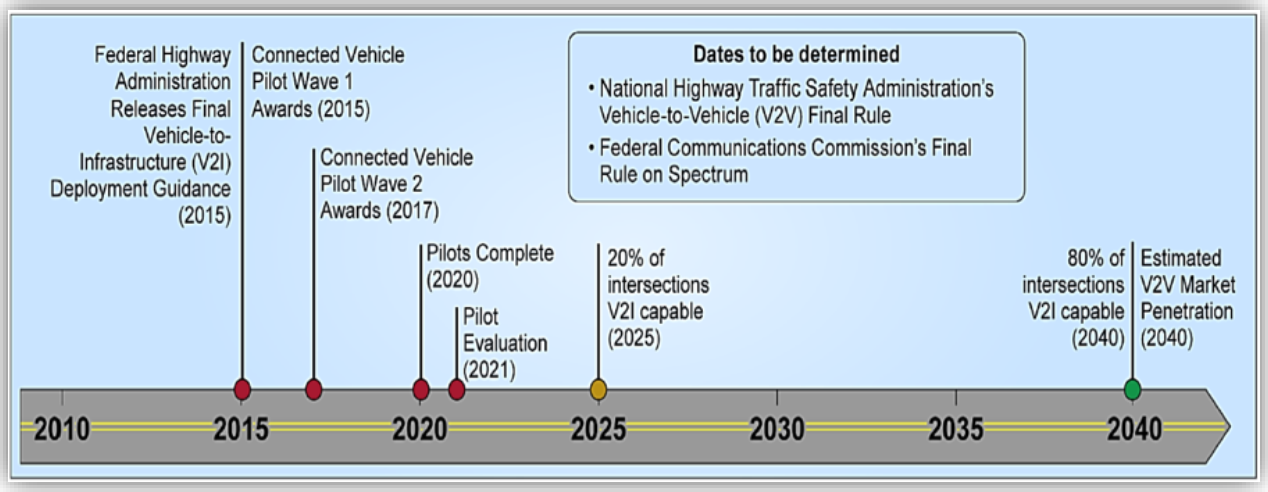
Figure 4-18: Connected Vehicle Communication



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

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

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



Integration with Public Agency Infrastructure

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

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

Federal Policy and State Efforts on AVs

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

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

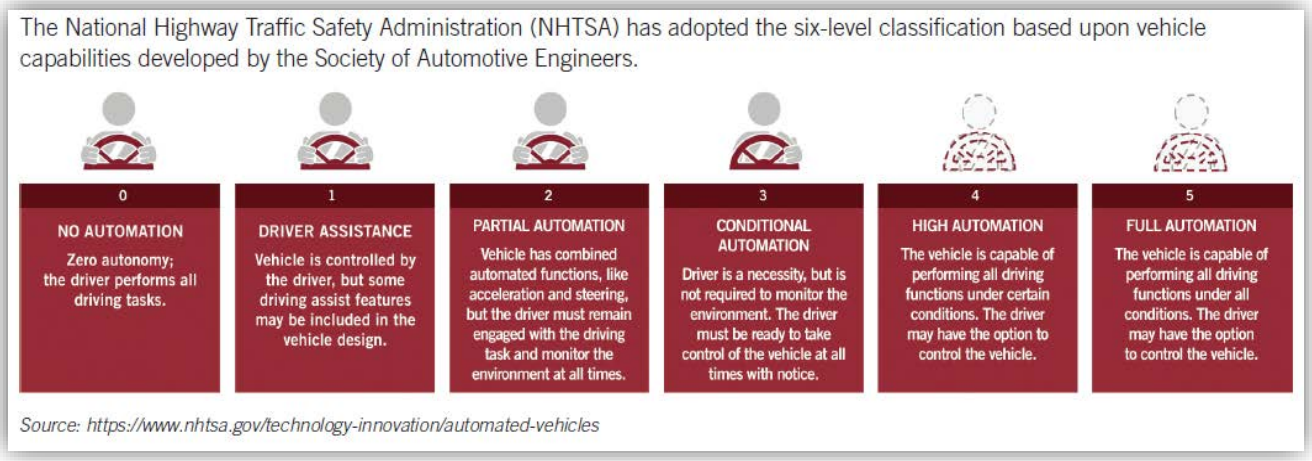
- Advancing multimodal safety
- Reducing policy uncertainty
- Outlining a process of working with the USDOT for the developers of AVs and states

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

Automation Levels

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

Figure 4-20: NHTSA Established Automation Levels



AV Use in US Cities

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

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

AV Progress in New Mexico

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

Autonomous Vehicle Committee

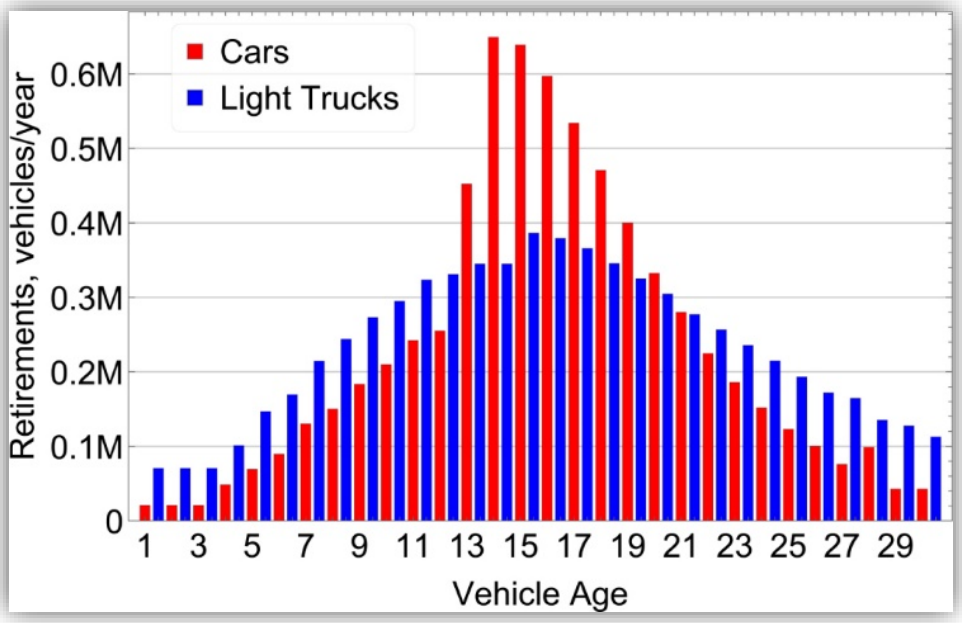
The 53rd Legislature for the state approved Senate Joint Memorial 3, *Autonomous Vehicle Use in New Mexico* which sets forth the process of identifying and addressing issues to ensure the safe and legal operation of AVs on our roadways. The memorial establishes an Autonomous Vehicle Committee, led by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

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

Transitioning to CAVs

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

Figure 4-21: Distribution by age of Vehicle Replacement



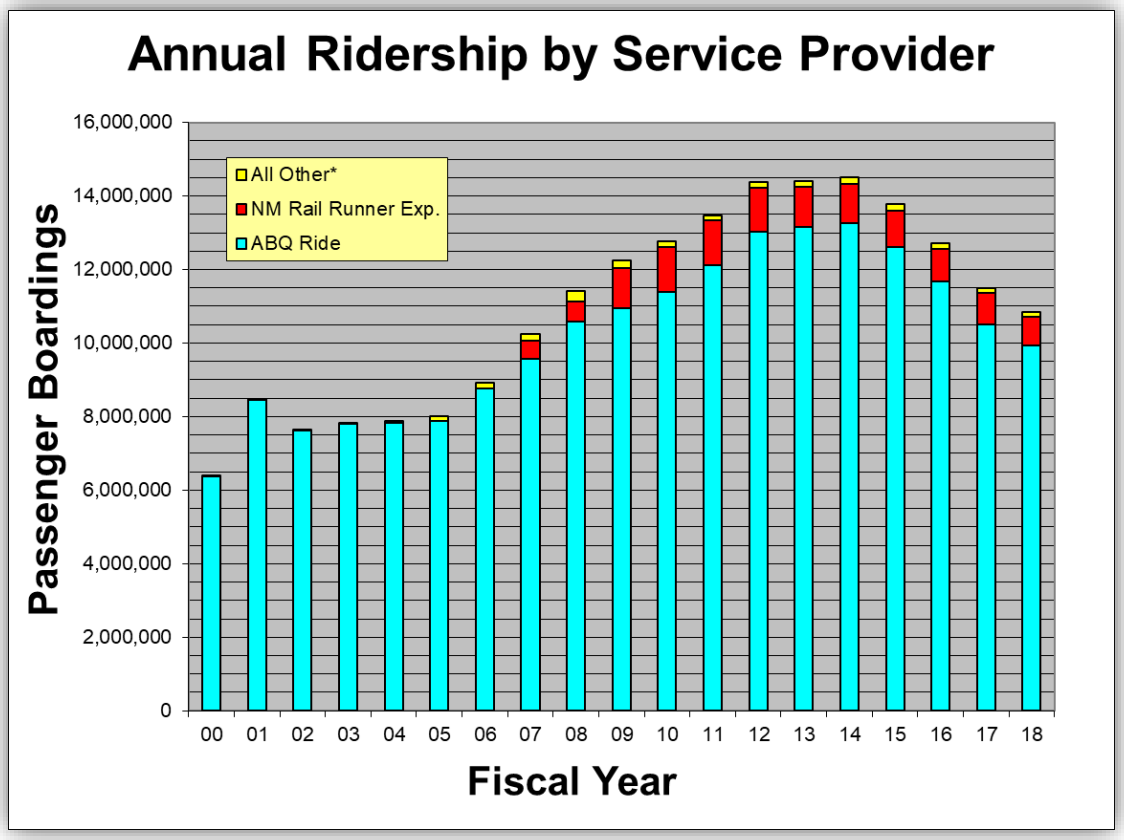
[19] Massachusetts Institute of Technology

4.2 Transit System Performance

a. Rise and Fall of Transit Ridership

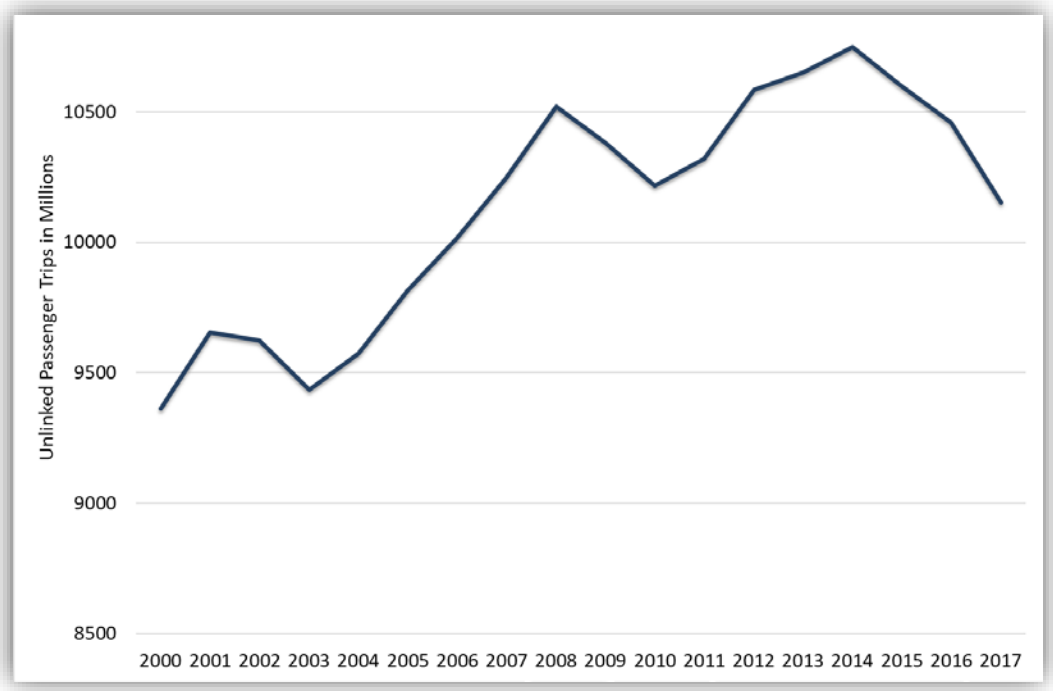
Transit ridership in the Albuquerque metro area was on the rise for much of the past 20 years. Annual transit ridership leveled off in the region between 2012 and 2014 before it began declining in 2015. When the previous MTP was written, transit was growing explosively in the region, outpacing the national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

Figure 4-22: Annual Transit Ridership in the Region



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

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



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

Benefits of Transit

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

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

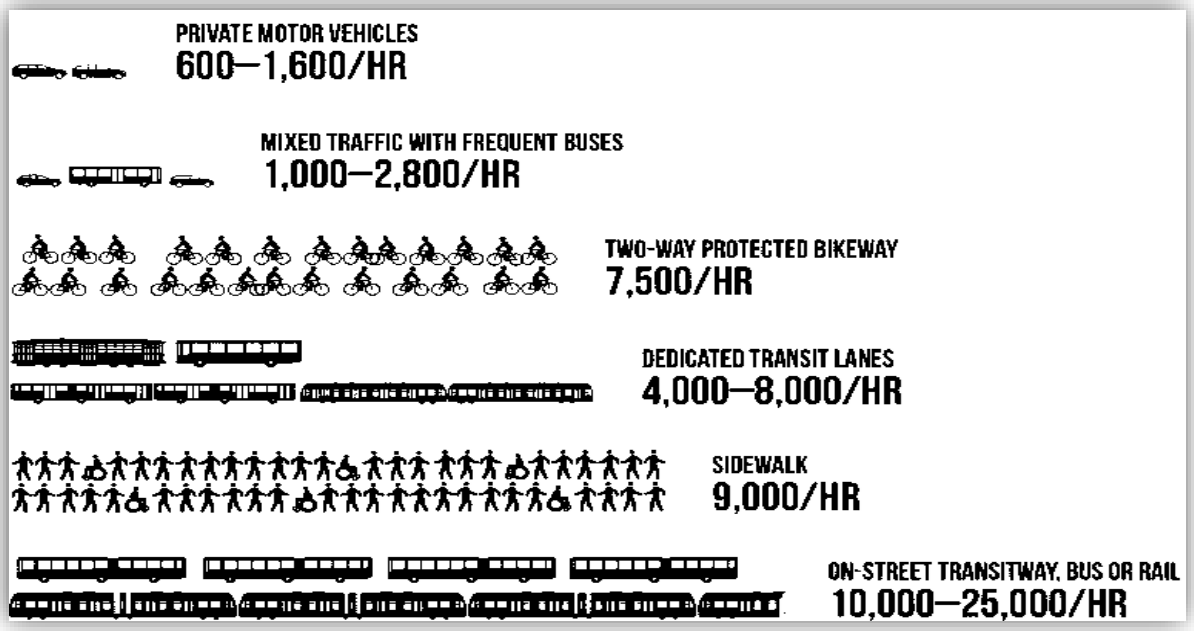
[20] https://www.nytimes.com/2015/05/07/upshot/transportation-emerges-as-crucial-to-escaping-poverty.html?_r=1&abt=0002&abg=0

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

Efficient People Movement

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

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



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

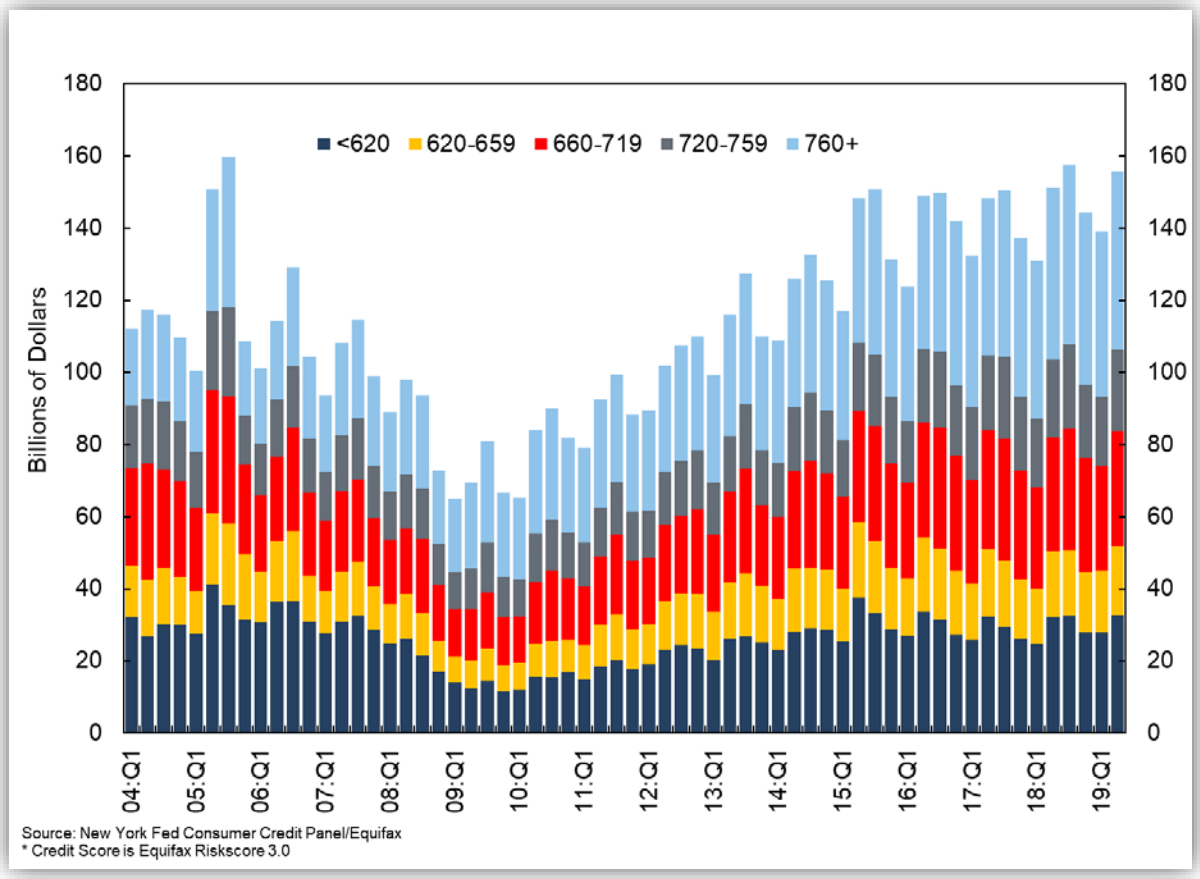
b. Factors Behind Declining Ridership

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

Erosion of Cost Competitiveness

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

Figure 4-25: Auto Loan by Credit Score



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

The Rise of Ride Sharing and Micro-mobility

Ride hailing apps like Uber and Lyft offer an interesting alternative to using a private automobile that many consumers find slightly cheaper and more convenient than using a traditional taxi service. Proponents of ride hailing apps argue that they enable people to live car-free by giving them access to cars on the occasions they need them. Recent studies have suggested that ride hailing apps may be reducing people's use of transit service. A study conducted by the University of California-Davis Institute of Transportation Studies surveyed ride sharing service users in several major American cities and found that their subjects' transit use declined by six percent[22].

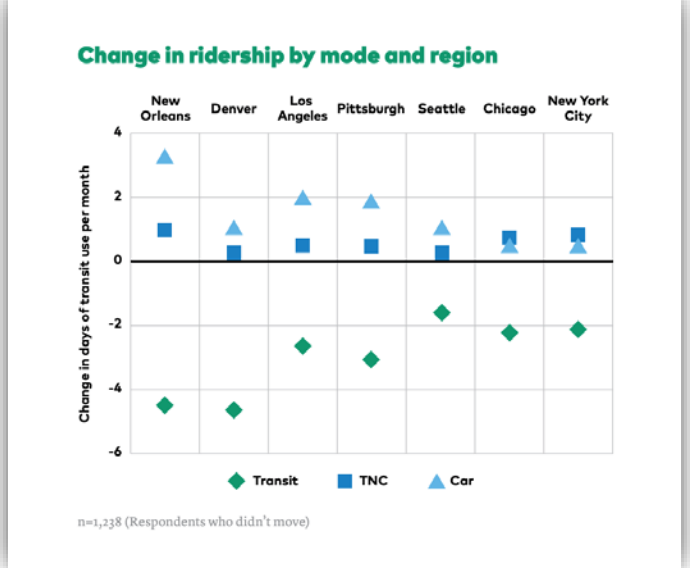
The introduction of shared micro-mobility into the region offers a new way of making short trips. Micro-mobility refers to very light vehicles such as electric scooters, bicycles, and electric bicycles that can be used as a means of transportation. Many companies and cities are introducing fleets of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

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

Between May and September of 2019, Spin Scooters, the name of the current e-scooter service in the AMPA, were used for more than 40,000 trips while the region's bike share program (called Pace Bike Share) logged just under 10,000 in the same period.[23] Nationwide shared micro-mobility use has exploded, with 84 million trips being made in 2018.[24] This way of getting around is new and not well understood, but some believe micro-mobility may be competing with transit for some short trips. However, most experts believe the two modes may be more symbiotic than competitive. Researchers at the TransitCenter, a foundation in New York City, have found that shared micro-mobility may help connect more people to transit and overcome the first and last mile problem.[25]Micro-mobility may make transit more viable in low density areas where frequent transit cannot be provided within a short walk. Micro-mobility also enables potential transit users to easily travel one or two miles to a transit stop meaning frequent transit can be consolidated on major roads.

Figure 4-26: Pace Bike Share in Albuquerque

Figure 4-27: Comparison of Change in Transit Ridership



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

Single Occupancy Vehicle Convenience

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

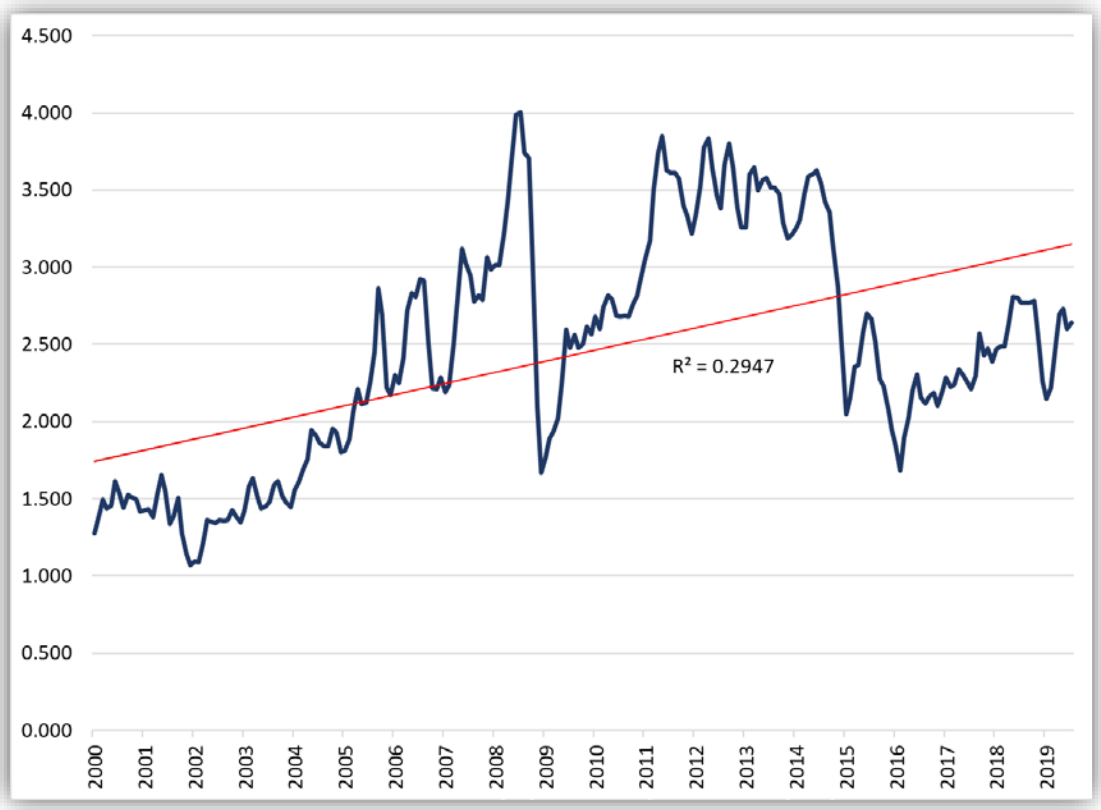
> **"An uptick in driving dominates changes in the transportation market, as car trips unambiguously replace trips on transit and other modes of travel. As buying a car gets easier in a car-friendly world and demanded trips increase and disperse geographically, more people are driving, and more often[26]."**

[23] https://www.abqjournal.com/1366980/e-scooters-log-more-than-40000-trips-so-far.html
[24] https://nacto.org/shared-micromobility-2018/
[25] https://www.govtech.com/fs/transportation/Micro-Mobility-Is-Here-to-Stay-Cities-Should-Act-Accordingly.html
[26] https://transitcenter.org/publication/whos-on-board-2019/ "Who's on Board?" 2019

Reliance on Easy Credit and Low Gas Prices

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

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



Bus Service Investment

The American Public Transportation Association (APTA) found through data analysis and focus groups that bus service across the country is worsening (likely because of factors such as the reduced speed of buses in service and the rising costs of monthly bus passes), and customers are leaving as a result[27]. Between 2000-2017, bus ridership fell nearly 16 percent, but rail ridership grew by 43 percent during the same period.[28] This demonstrates that investments made in recent years in rail transportation have attracted new riders, while a lack of investment in bus service is responsible for the worsening service and falling ridership.

[27] https://www.apta.com/wp-content/uploads/Resources/resources/reportsandpublications/Documents/APTA-Understanding-Recent-Ridership-Changes.pdf
[28] Ibid

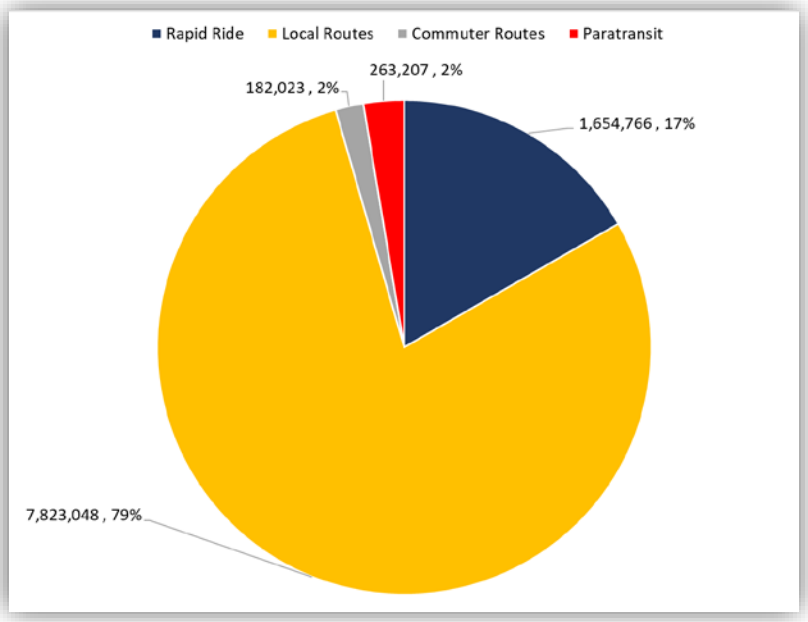
In the Albuquerque metropolitan area, few investments have been made in transit since the creation of ABQ RIDE's Rapid Ride services until the recent inception of the Albuquerque Rapid Transit service along Central Avenue which began in November 2019. It is possible that more transit riders can be attracted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

c. Regional Transit Partners

City of Albuquerque Transit Services (ABQ RIDE)

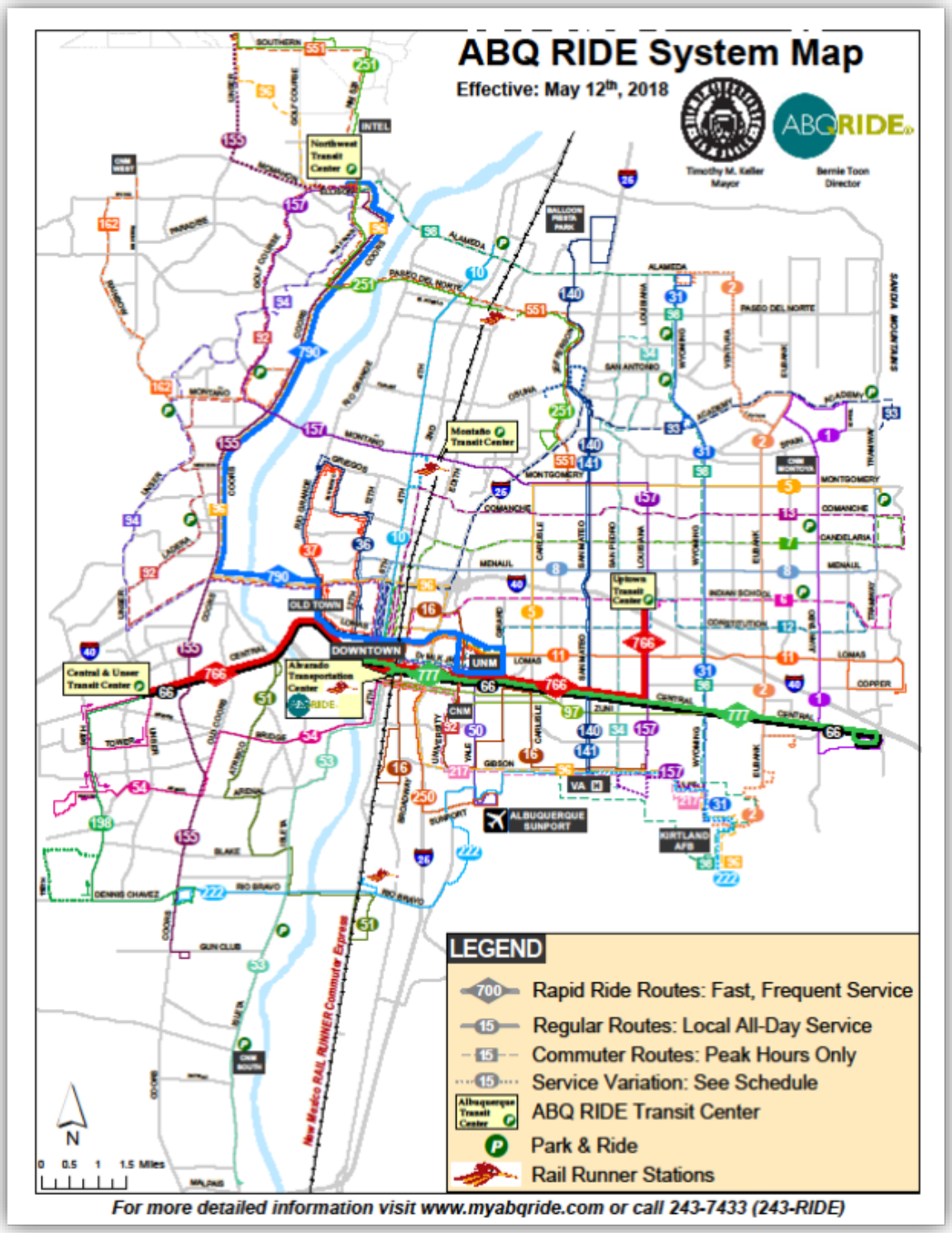
ABQ RIDE was founded with the City of Albuquerque's acquisition of the struggling, privately-operated Albuquerque Bus Co. and Suburban Lines in 1965. ABQ RIDE currently operates the following types of bus services (shown in the chart here and described in the bulleted list below) within the City of Albuquerque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

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



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

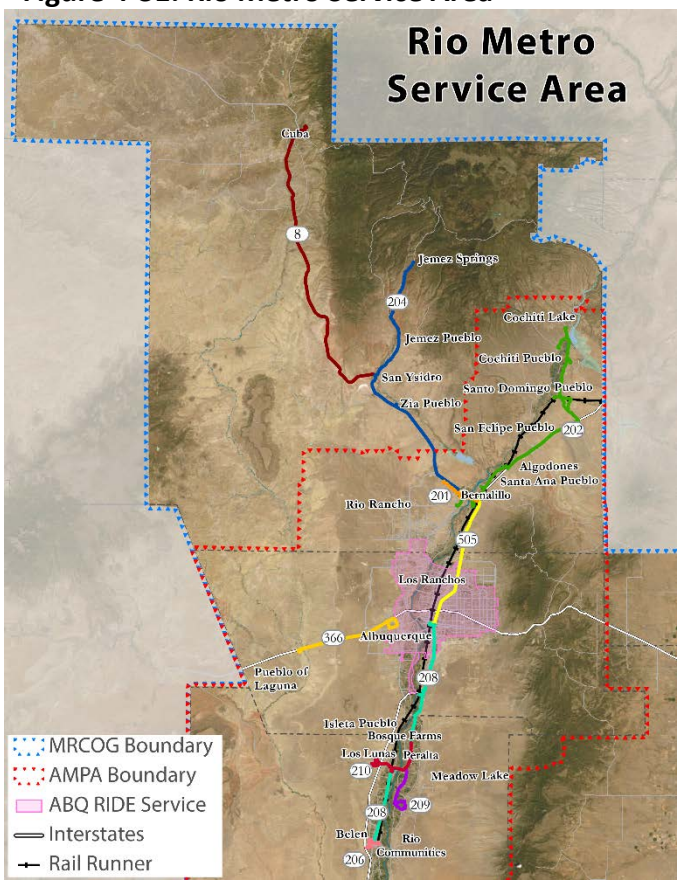
Figure 4-30: ABQ RIDE Service Locations and Operations



Rio Metro Regional Transit District (RMRTD)

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

Figure 4-31: Rio Metro Service Area



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

Rio Metro services include:

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

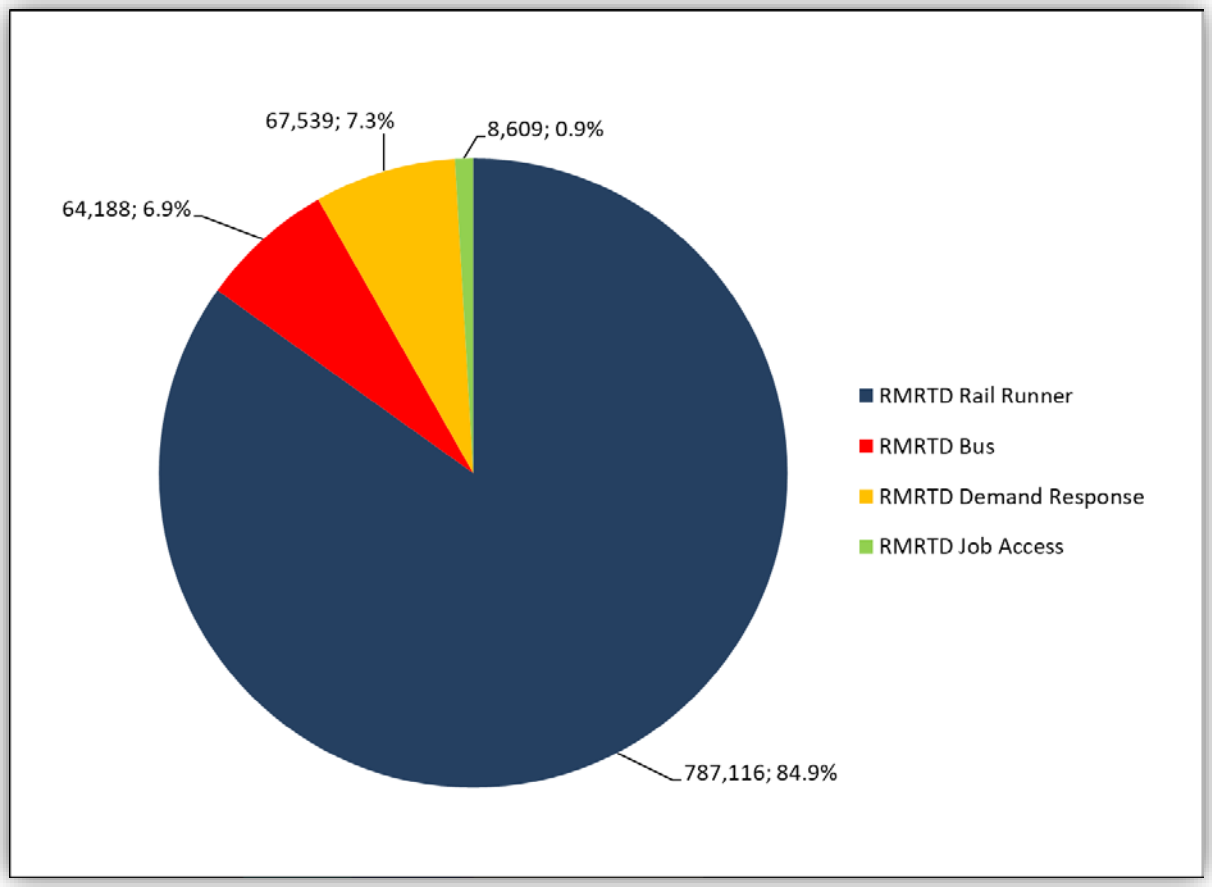
[29] Reflecting the jurisdictions it serves, Rio Metro is governed by a Board of Directors comprised of 20 elected officials from Albuquerque, Belen, Bernalillo, Bernalillo County, Bosque Farms, Corrales, Los Lunas, Los Ranchos de Albuquerque, Rio Communities, Rio Rancho, Sandoval County and Valencia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

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

Passenger Trips and Miles Traveled

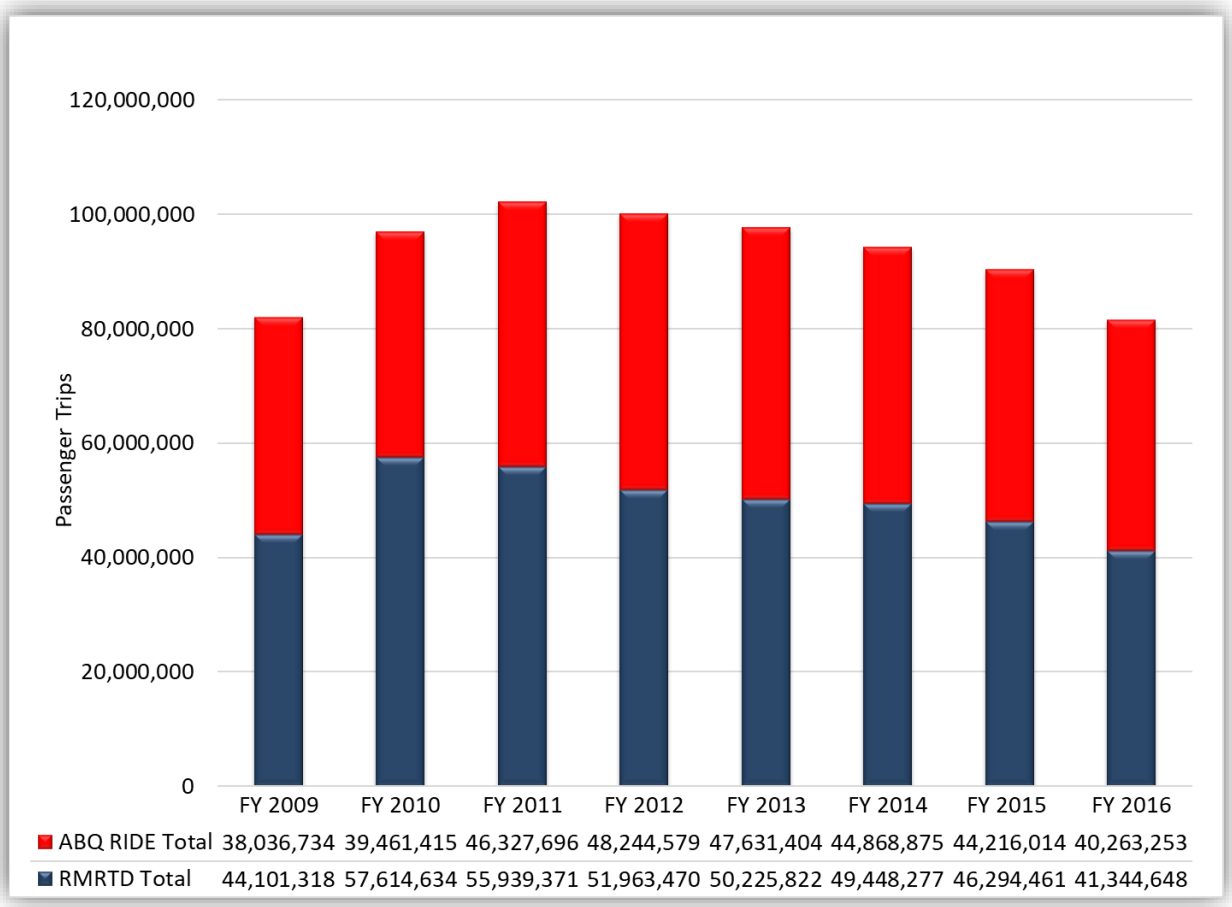
In total, Rio Metro provided 927,452 passenger trips in FY 2018, excluding ABQ RIDE trips attributable to Rio Metro funding. The Rail Runner accounted for 85 percent of those trips, followed by Dial-a-Ride services (7.3 percent), commuter buses (6.9 percent), and Job Access (one percent). When compared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

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



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

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



Paratransit Services

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

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

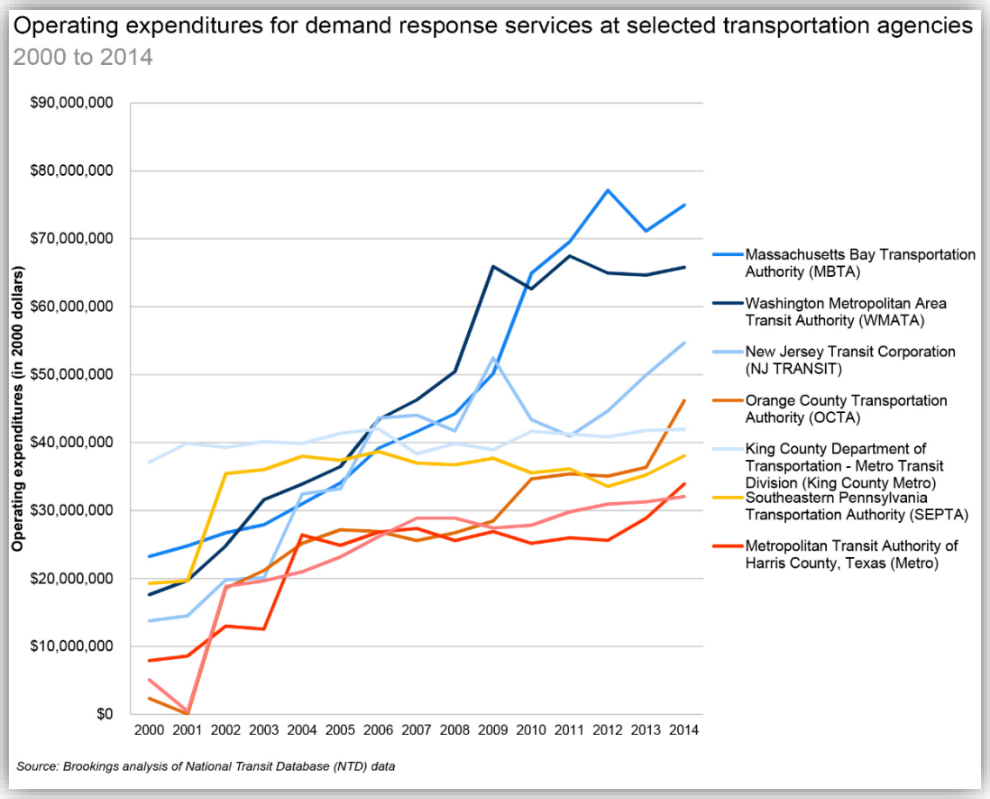
Access for Elderly and People with Disabilities

Paratransit provides crucial access to the elderly and people with disabilities. The importance of paratransit is likely to grow considering Americans aged 65 or older are set to increase from 15 to 20 percent of the nation's population by 2030.[30] The popularity of paratransit service has grown steadily since the passage of the ADA paratransit mandate, with transit agencies spending a collective $5.2 billion in 2013, or 12.2 percent of transit costs nationwide.[31] In 1998, paratransit service accounted for only 3.2 percent of total transit expenditure. **The passage of the ADA Act of 1990 did not provide additional funding to transit agencies to help them comply with this mandate.**

Cost of Paratransit

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

Figure 4-34: Operation Expenditures for Demand Response Services



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

[30] https://wagner.nyu.edu/rudincenter/2016/09/new-report-intelligent-paratransit#
[31] https://www.brookings.edu/research/how-lyft-and-uber-can-improve-transit-agency-budgets/
[32] https://wagner.nyu.edu/files/rudincenter/2016/09/INTELLIGENT_PARATRANSIT.pdf

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

d. Transit Supportive Development

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

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

Figure 4-35: Impacts of Poor Connectivity

[33] https://www.fhwa.dot.gov/fastact/factsheets/metropolitanplanningfs.cfm

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

What does Successful Transit Look Like?

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

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

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

Transit Oriented Development (TOD)

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

Target Scenario and Transit

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

[34] A more in-depth analysis of this issue is presented in Jarrett Walker's *Human Transit*, published in 2012 by Island Press.
[35] https://www.transit.dot.gov/TOD
[36] http://www.tod.org/

e. Transit Service Expansion

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

Priority Investment Transit Network and Mode Share Goals

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

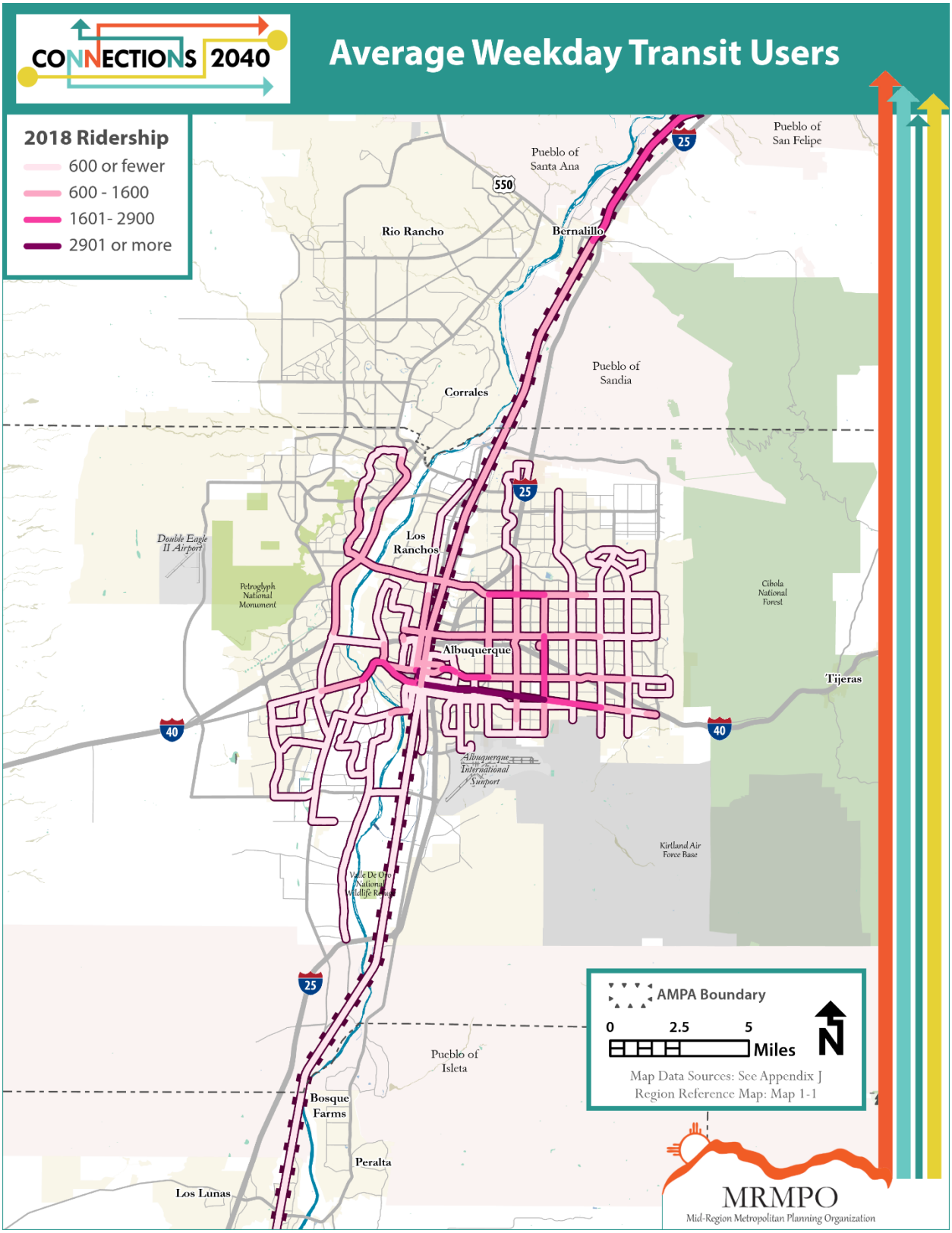
The MTB Resolution 15-01 passed in January 2015 still includes a 20 percent transit mode share goal by 2040 and the allocation of 25 percent of STP-U and CMAQ[37] funds but now more meaningfully focuses those funds on an expanded priority investment transit network shown below. Current mode shares are also provided in the table.

Table 4-10: Mode Share for Selected Corridors[38]

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

[37] STP-U and CMAQ are federal funding categories programmed through the Transportation Improvement Program (TIP).
[38] Some of the corridors included in the priority network are not listed in the table because service on those corridors does not currently exist.

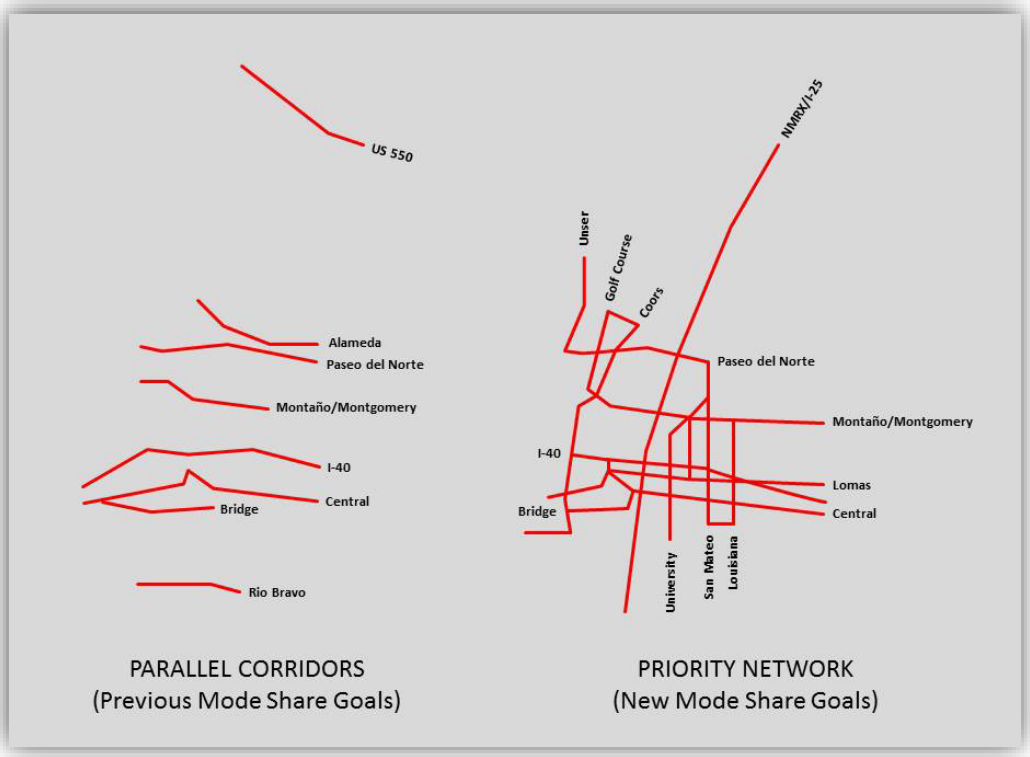
Map 4-14: Average Weekday Transit Users, 2018



Priority Investment Network Connectivity

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

Figure 4-36: Previous and Revised Network Comparison



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

Operational Funding Challenges and CMAQ Funds

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

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

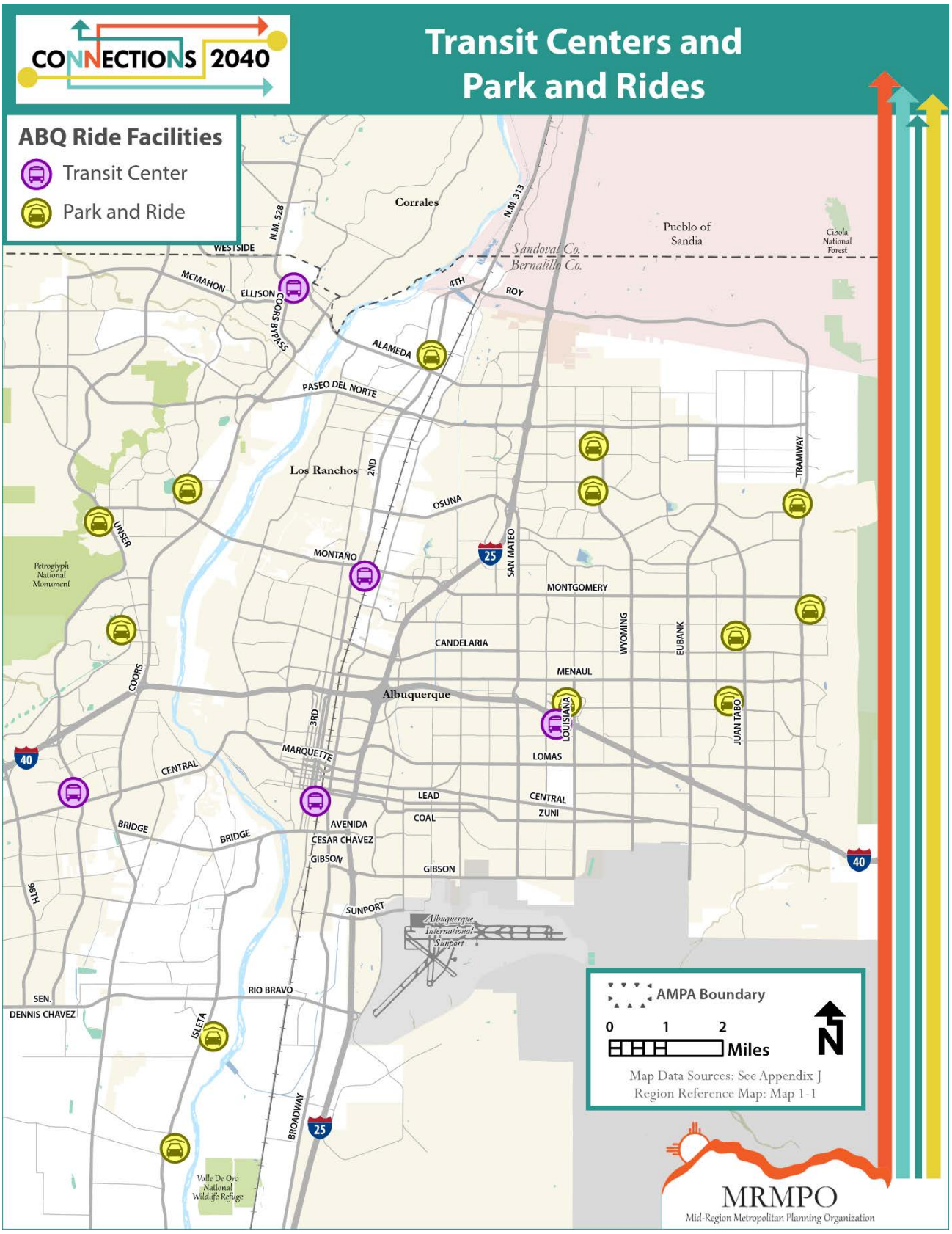
Presently, both ABQ RIDE and Rio Metro are utilizing all available revenue sources to operate existing services. Any new service such as a new route, or increasing the frequency of an existing route, would require either the elimination or restructuring of existing services, or an additional sustainable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

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

Park and Ride Opportunities

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

Map 4-15: ABQ RIDE Park and Ride Locations



f. Future Transit Network and Services

Priority Investment Transit Network

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

Long Range Transit Network (LRTN)

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

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

- Rio Metro's bus services and ABQ RIDE's Sun Van paratransit receive additional funding ($14.8 million) proportionate to their share of the combined 2018 operating budgets of ABQ RIDE and Rio Metro. The Long Range Transit Network assumes that Rio Metro's existing bus services will continue, while also allowing expansion commensurate with population growth. ABQ RIDE paratransit service would likewise grow to meet the increased demand of an aging population and the expansion of the fixed-route network by the 2040 horizon.
- The Rail Runner receives less than its proportionate share ($15.8 million) of revenue because no major extensions of the Rail Runner or similar rail projects are proposed in the AMPA. Instead, efforts to expand operations focus on increasing frequency. Also, much of the funds would support the construction of capital projects that emphasize efficiency, such as sidings and second main tracks that would reduce delay.
- The remaining balance of revenue ($46 million) is provided for expanded bus service and an additional BRT line generally aligning with ABQ RIDE's existing service area[40]. The rationale for this distribution is not so much based on this area's disproportionate share of the population (and, consequently, tax revenue generation); rather, the Albuquerque area has the proven potential to provide the greatest return in terms of both ridership and service efficiency. This allocation essentially values ridership without sacrificing coverage throughout the region.

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

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

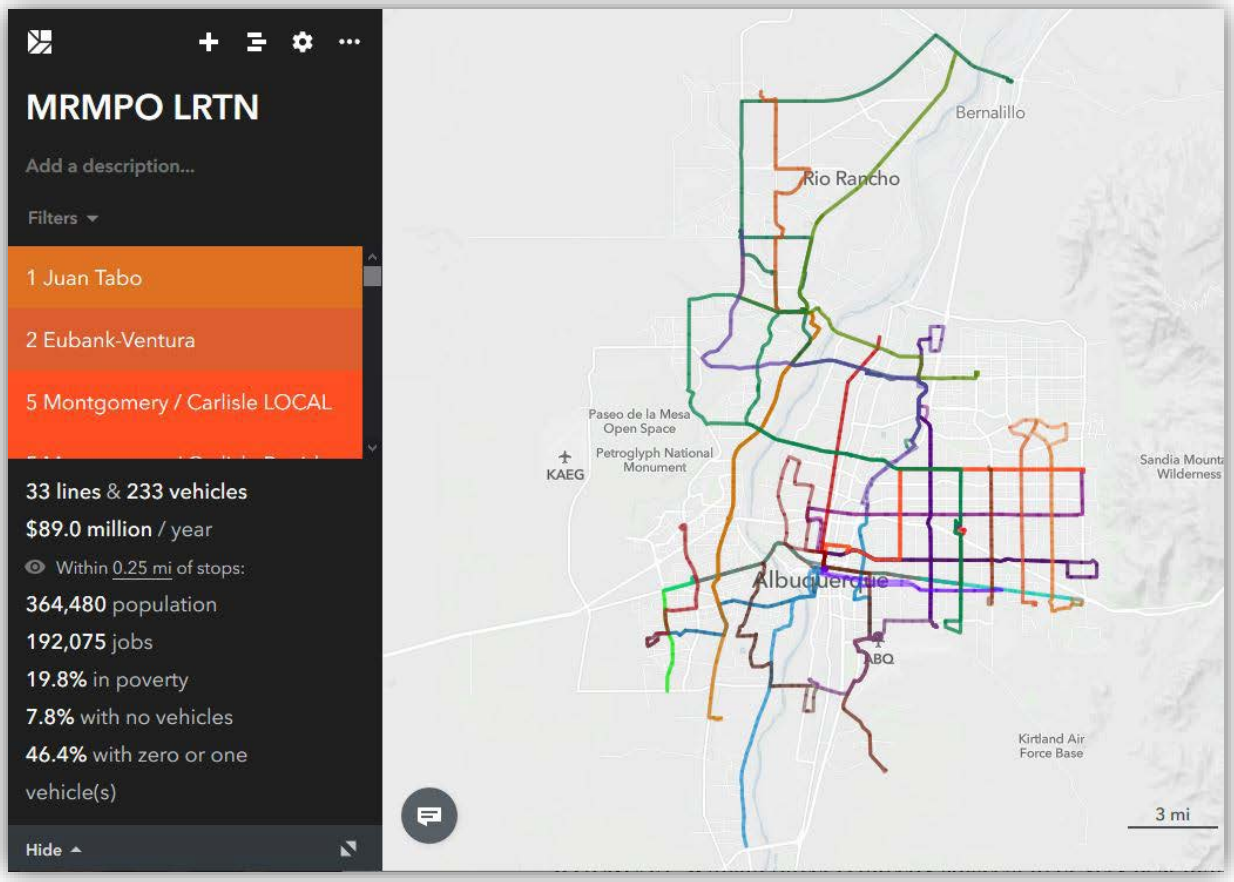
Potential Costs and Access to Future Transit

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

Target Scenario Transit Network

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

Figure 4-37: Screenshot of Remix LRTN



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

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

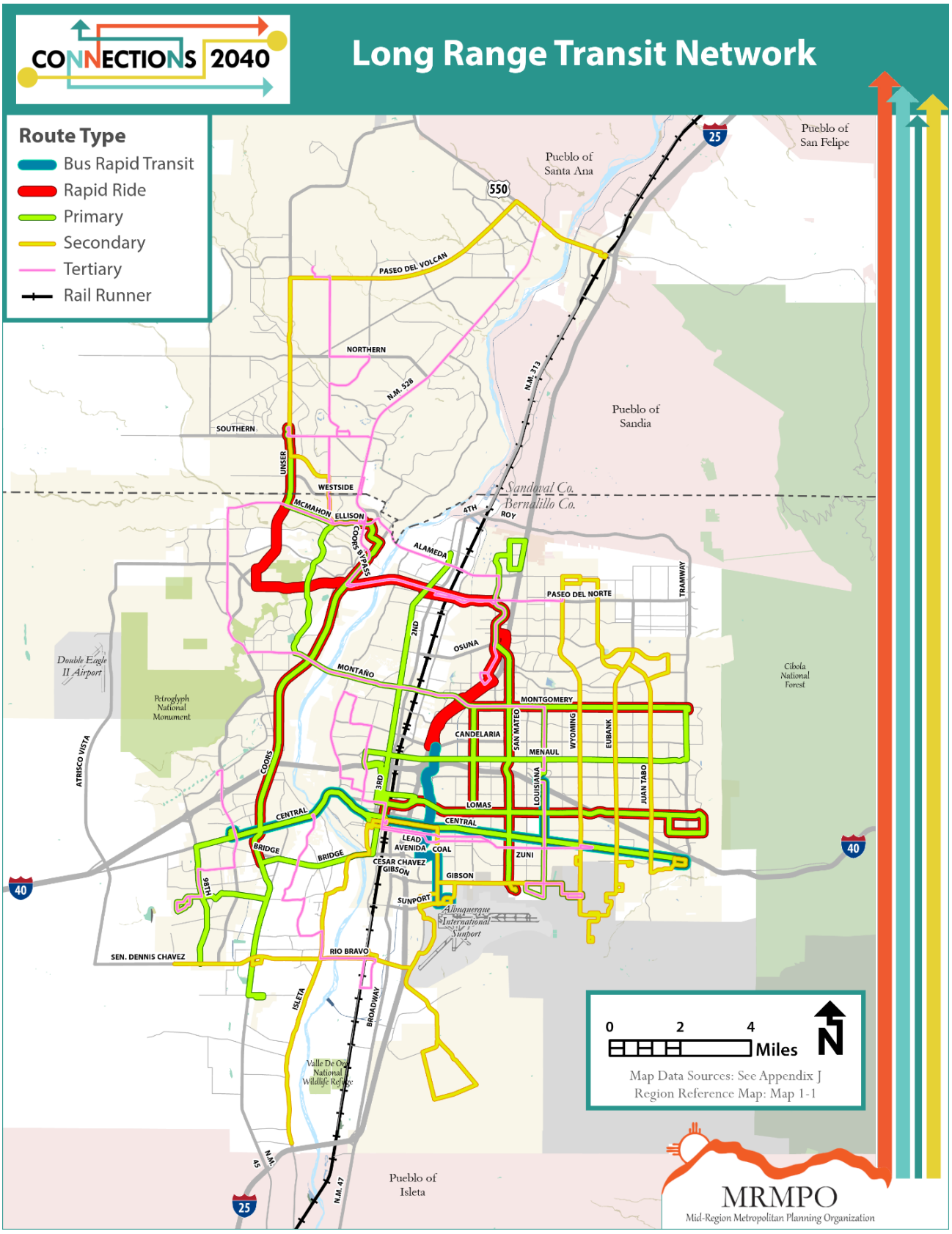
Demographic Data for Potential Transit Lines

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

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

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

Map 4-16: Long Range Transit Network



Opportunities to Increase Transit Ridership

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

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

Seattle's Success Story

In 2014, Seattle voters approved the Seattle Transportation Benefit District Proposition 1 (STBD) to fund an expansion in transit service as well as programs to increase ridership throughout the city. This proposition is funded with a 0.1 percent sales tax increase and a $60 license fee (see footnote below). These revenue sources generate roughly $50 million a year for six years between 2014 and 2020. Since 2015, 6,780 weekly bus trips have been added in Seattle. The Seattle Transportation Benefit District investment in service expansion and increased bus frequency has Seattle close to reaching a key transit goal of the city, which is to have high frequency bus service (10-minute or less headways) within a 10-minute walk of 72 percent of the city's households by 2025[1]. The Seattle Transportation Benefit District also devotes money to subsidizing transit passes for youth and low-income families and improving on time service. Clearly, Seattle has proven that investing in transit service provision leads to gains in ridership.

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

Figure 4-38: Commute Seattle Drive Alone Percentages

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

4.3 Roadway, Rail, and Air Freight Assets

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

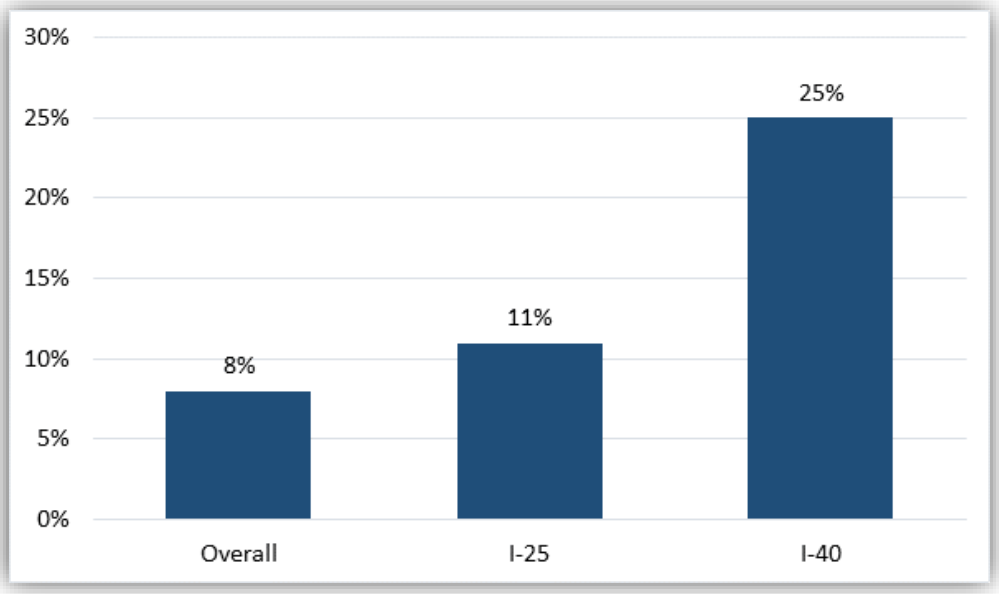
> **This makes New Mexico a logical stop for trucks driving east from California. In addition, Albuquerque is about 12 to 14 hours from Houston, TX, another major port. According to a recent report by the Brookings Institute and JP Morgan Chase, Albuquerque falls within the top quintile of interstate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

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

Freight Vehicle Counts

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

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



Source: NMDOT 2040 Long Range Multimodal Plan, 2015

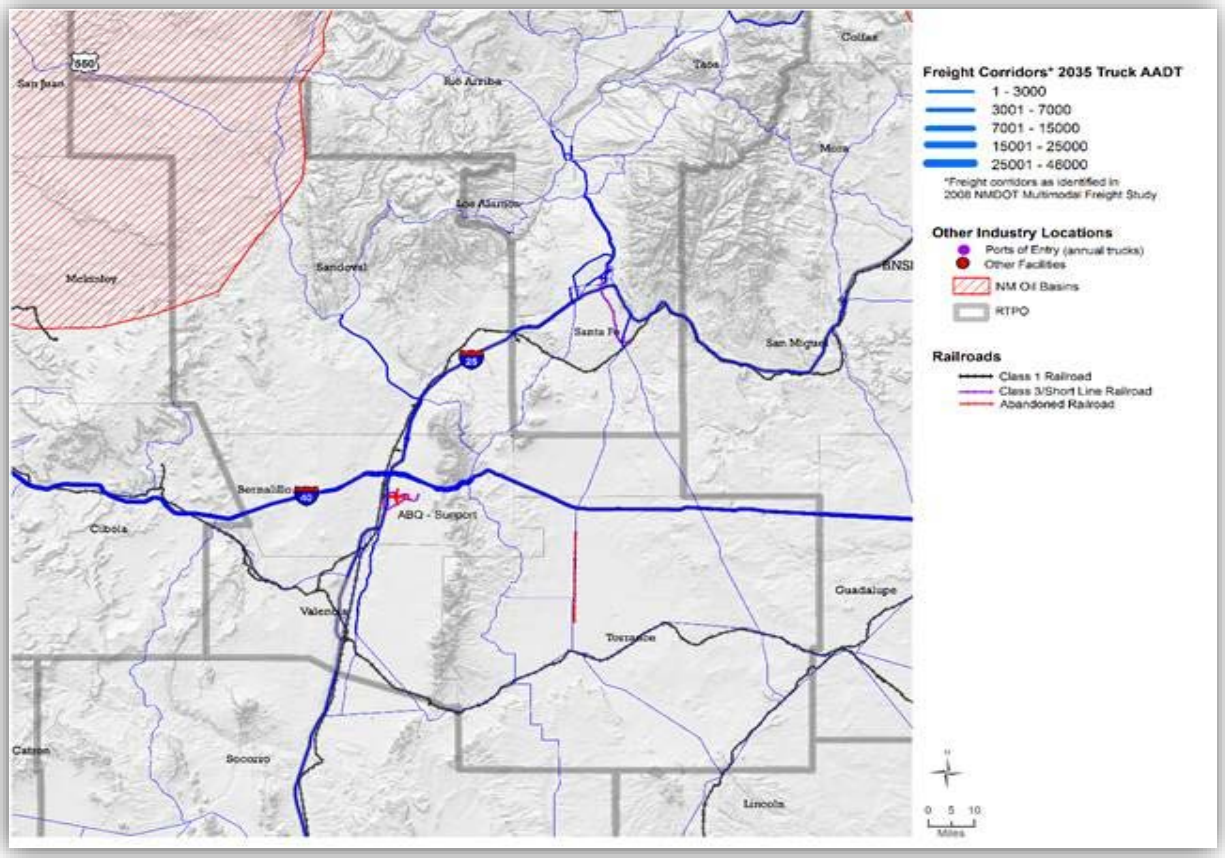
Commercial vehicle counts on I-25 are not nearly as high, with 11 percent of all traffic volume classified as commercial vehicles at the southern boundary of the region. Roadway performance on the Freight Network is sourced from the NMDOT as well as the National Performance Management Research Data Set (NPMRDS) for volumes and speeds on the National Highway System[42]

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

a. Future Truck Traffic

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

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



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

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

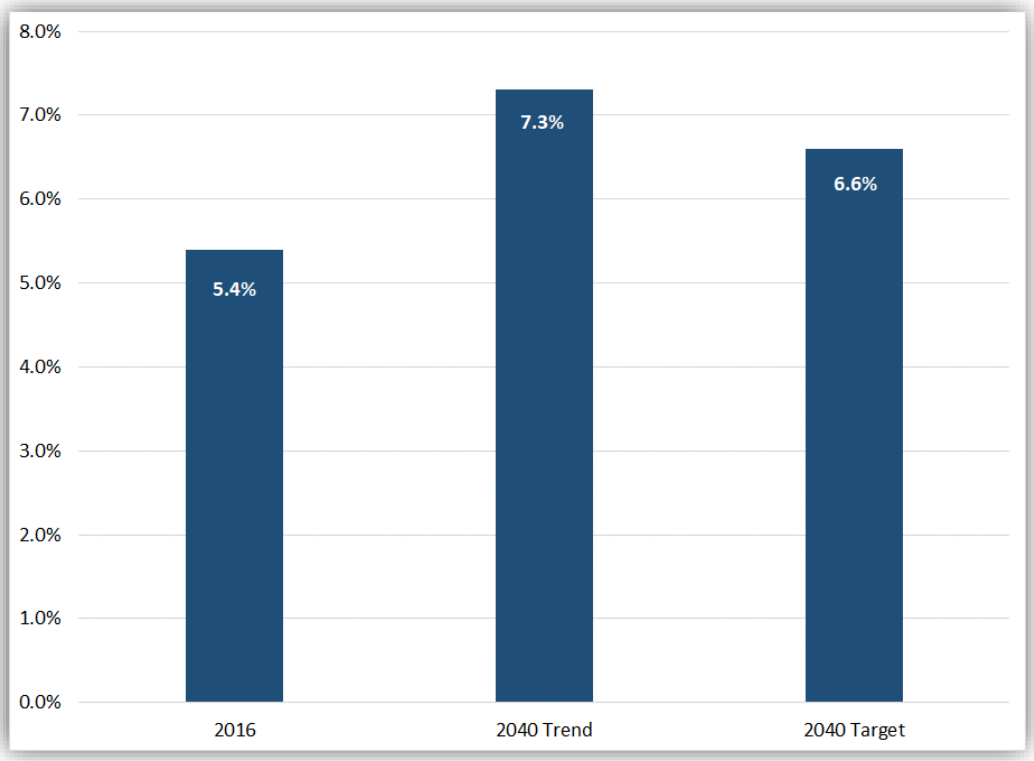
Trend versus Target Scenarios

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

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

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

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



Primary Freight Network

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

General Freight Concerns

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

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

- Incident management – lack of information during weather or other closures results in costly delays and could be mitigated through the following actions:
  - 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 also shared common concerns related to freight restrictions dealing with weight and river crossings:

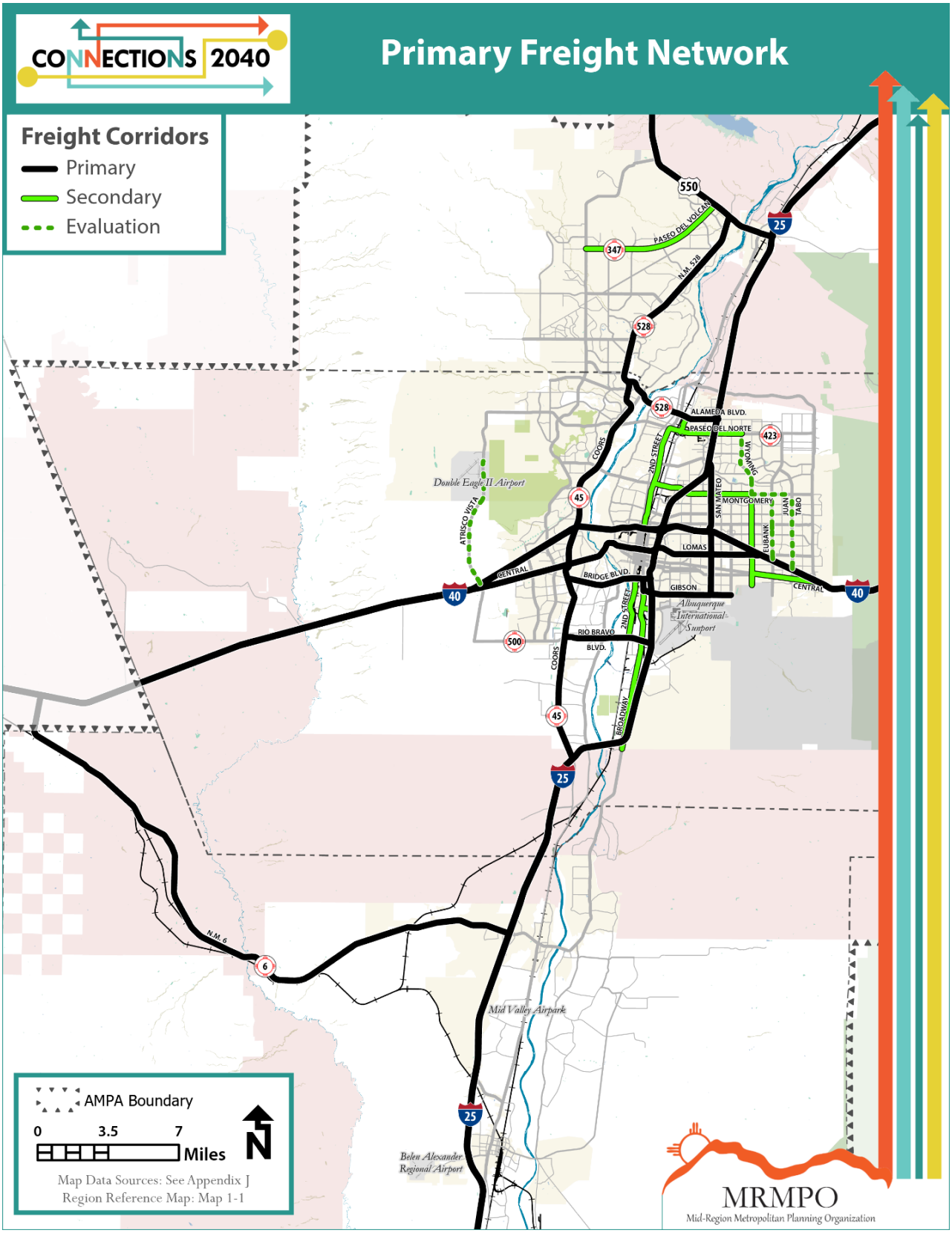
- Weight and bridge height restrictions: There are truck restrictions on facilities that make local trips longer and more costly than they need to be. Additionally, time of day/day of week restrictions further hamper the movement of goods and compound congestion at critical times. Weight and bridge height restrictions on the river crossings at Paseo del Norte and 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.

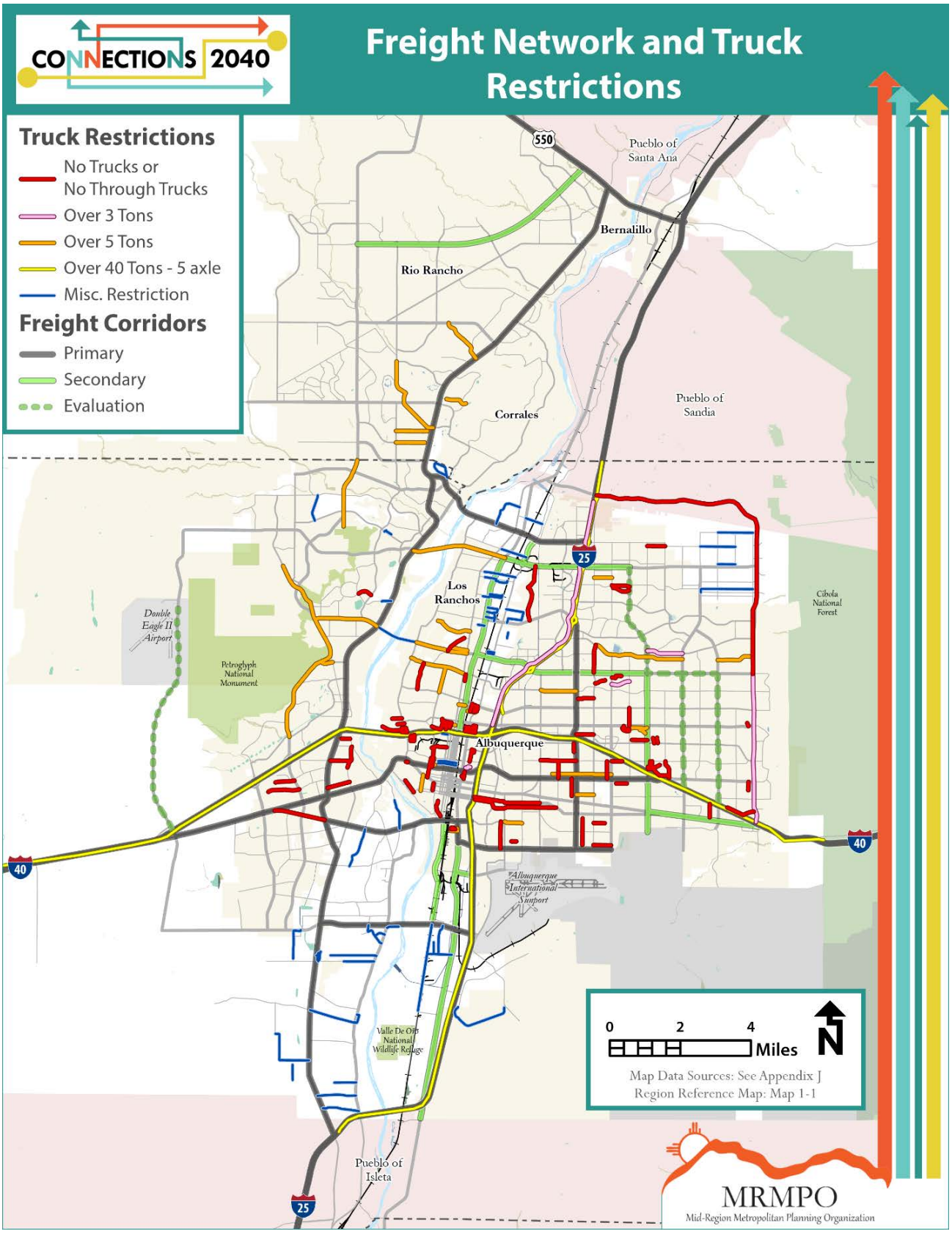
Freight Network Speeds

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

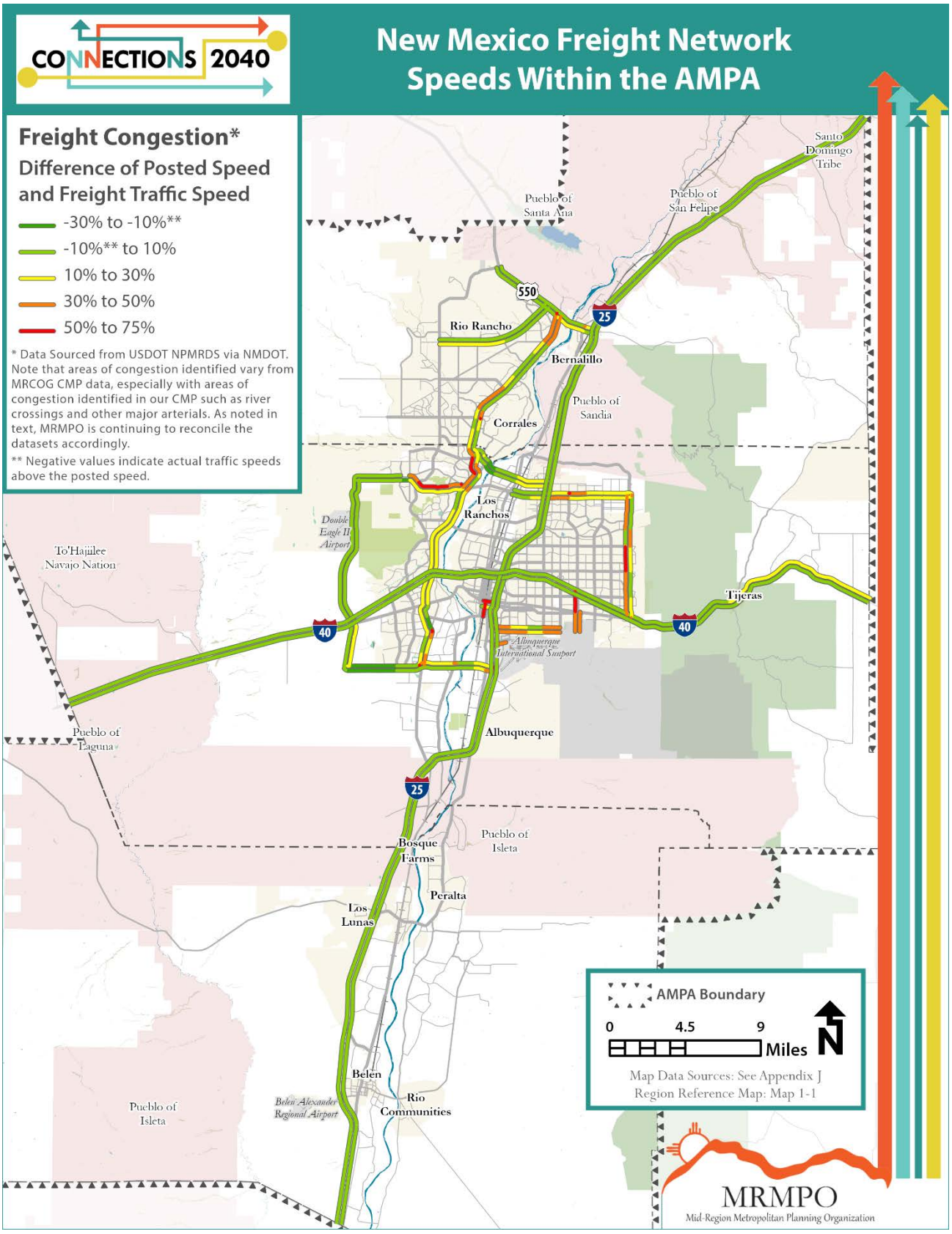
Map 4-17: Primary Freight Network



Map 4-18: Freight and Truck Restrictions



Map 4-19: Freight Speeds



b. ITS and Commercial Vehicle Operations (CVO)

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

Transportation Sector Industry

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

Parking and Lay in Wait Facilities

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

Penalties and Levies

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

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

Inspection Stations

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

Pro-Miles Software

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

Freight and Logistics Committee (FLC)

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

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

c. Regional Rail and Air Assets

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

Rail System

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

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

New Mexico Rail Runner Express

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

Airport Services

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

Rail Activity and Intermodal Connections

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

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

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

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

Airport Freight Activities

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