Carson Area Metropolitan Planning Organization
CAMPO

2021 Transportation Network Monitoring Report

November 2021

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1861
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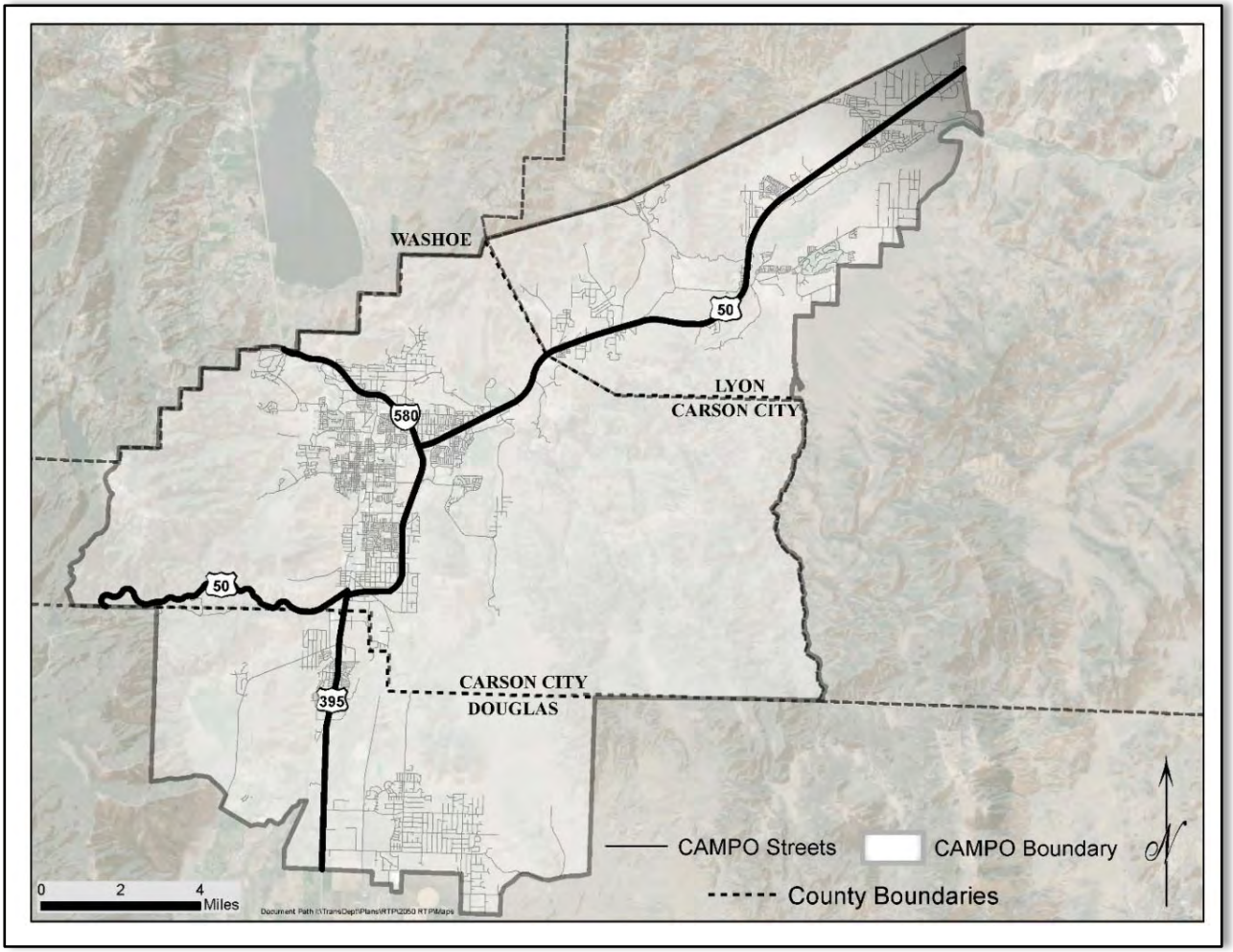
CHAPTER 1 – INTRODUCTION

The Carson Area Metropolitan Planning Organization (CAMPO) is a federally recognized metropolitan planning organization (MPO), formed on February 26, 2003. Creation of CAMPO was required once the Carson City urbanized area exceeded a population of 50,000. CAMPO is responsible for carrying out the metropolitan transportation planning process for the Carson City Metropolitan Area, also referred to as the Metropolitan Planning Area (MPA). The Metropolitan Planning Area encompasses nearly all of Carson City (with the exception of the area within the Lake Tahoe Basin) and portions of northern Douglas County and western Lyon County, including the Dayton Valley and Johnson Lane urbanized areas. The geographic scope of this report is depicted in Figure 1.1. Additional information about CAMPO is available at: www.CarsonAreaMPO.com.

Figure 1.1: CAMPO Metropolitan Planning Area (MPA) Boundary



Performance-Based Planning

Performance-based planning and programming applies performance management principles to transportation system policy and investment decisions. Performance-based planning and programming is a system-level, data-driven process to identify strategies and investments. Performance-based planning helps to define key goals and objectives, and to analyze and evaluate strategies for meeting goals. The process connects performance measures to goals and objectives through target setting.

With the passage of federal transportation legislation, the Moving Ahead for Progress in the 21st Century (MAP-21) Act and continued with the Fixing America's Surface Transportation (FAST) Act, MPOs are required to track certain performance measures, establish performance targets, and utilize performance measures to inform decision-making for investment into the multi-modal transportation system.

This 2021 Transportation Network Monitoring Report is federally funded through CAMPO's Unified Planning Work Program. The report presents transportation network information derived from transportation data collected within the CAMPO Metropolitan Planning Area. The information is presented to show regional trends and changes that influence the transportation system. This document presents information on who uses the transportation system (socio-demographic data), where they travel (trip origins, destinations), and how they travel (transit, walk, bike, drive). CAMPO Staff have continued to monitor socioeconomic factors and mobility needs of the region. Staff have continued to increase consistency and coverage of bicycle and pedestrian monitoring to better inform investment decisions. Additionally, a Jump Around Carson Fiscal Year 2020 Monitoring Report[1] was completed in February 2021. The data collected for this report is processed, organized, and analyzed to present information about the overall performance of the transportation system. This information is used to track progress toward achieving the goals and objectives established in CAMPO's Regional Transportation Plan. [2] The strategies and projects within CAMPO's Regional Transportation Plan support the following five goals:

- Increase the safety of the transportation system for all users
- Maintain a sustainable regional transportation system
- Increase the mobility and reliability of the transportation system for all users
- Maintain and develop a multi-modal transportation system that supports economic vitality
- Provide an integrated transportation system

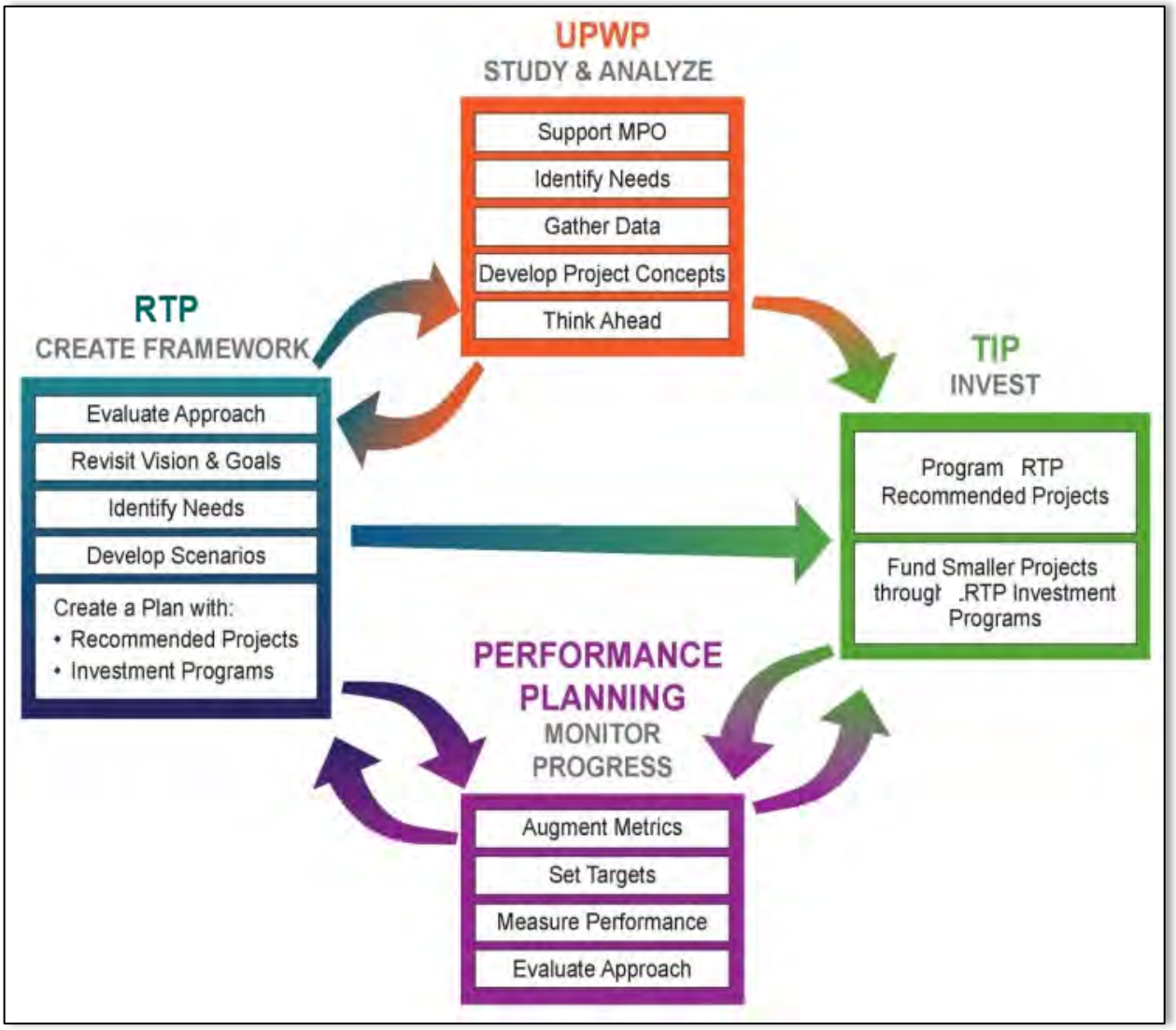
Alongside these five goals, the 2050 Regional Transportation Plan contains objectives and performance measures to track progress toward meeting these goals. The objectives and performance measures have been carefully developed through coordination with federal, state, and regional planning partners that utilize consistent and readily available data. This approach allows for statewide consistency and comparison. Together, the established goals, objectives, and performance measures form the basis of CAMPO's performance-based planning framework that informs ongoing policymaking and investment decisions.

[1] Jump Around Carson Fiscal Year 2020 Monitoring Report - https://www.carson.org/home/showpublisheddocument/74701/637502078852970000

[2] Carson Area Metropolitan Planning Organization 2050 Regional Transportation Plan - https://www.carson.org/home/showpublisheddocument/74094/637462257582430000

This framework provides the basis for project prioritization (capital improvements and maintenance) for projects contained within CAMPO's Transportation Improvement Program (TIP)[3]. The relationship between CAMPO's planning documents and performance-based planning framework is displayed graphically in Figure 1.2.

Figure 1.2: CAMPO's Primary Responsibilities



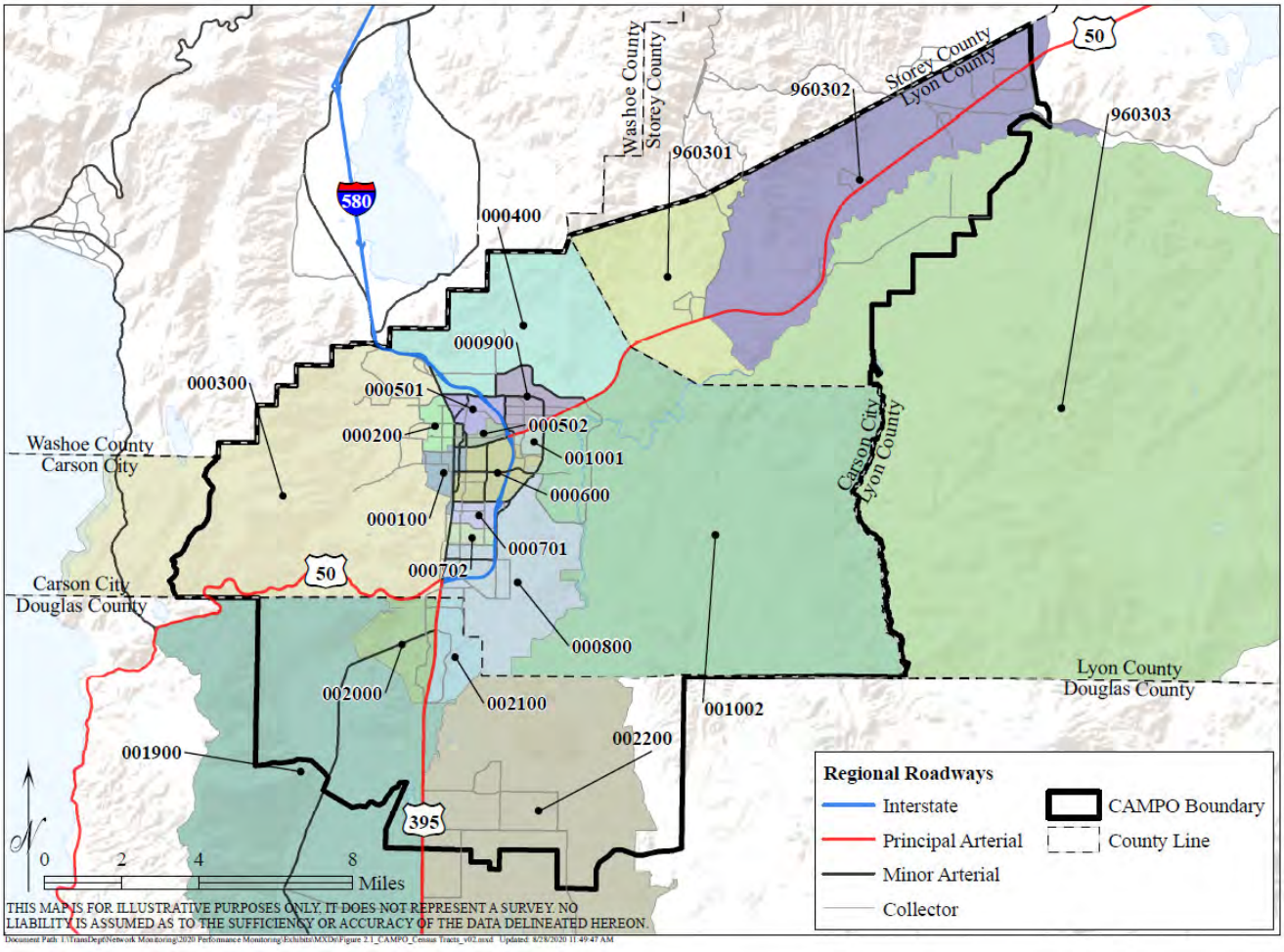
[3] Nevada Transportation Improvement Program - https://estip.nevadadot.com/

CHAPTER 2 – SOCIO-DEMOGRAPHICS

Transportation is innately personal – each of us experiences the transportation network through our own unique lens of our daily activities. Each of us has social activities, medical appointments and day-to-day errands that require travel. Young adults may have college, jobs, and flexibility after-hours for time spent with friends. Families may take children to school and after-school activities. Older residents may decide to forego driving personal automobiles and begin using the bus.

The reality is that the socio-demographic composition of neighborhoods and regions influences travel behavior: the where, when, why, and how each of us travels to where we want and need to go. By monitoring regional socio-demographic data, CAMPO is better informed and equipped to plan for and manage the region's use of regional transportation infrastructure for those that rely upon it. For the purposes of this report, all socio-demographic data comes from the American Community Survey (ACS)[4]. Figure 2.1 displays the 20 census tracts within the CAMPO Metropolitan Planning Area. The following socio-demographic data was compiled using all 20 tracts. This data was also used to create the Transportation Analysis Zones (TAZs) discussed in Chapter 3 – Land Uses.

Figure 2.1: Census Tracts within the CAMPO Boundary

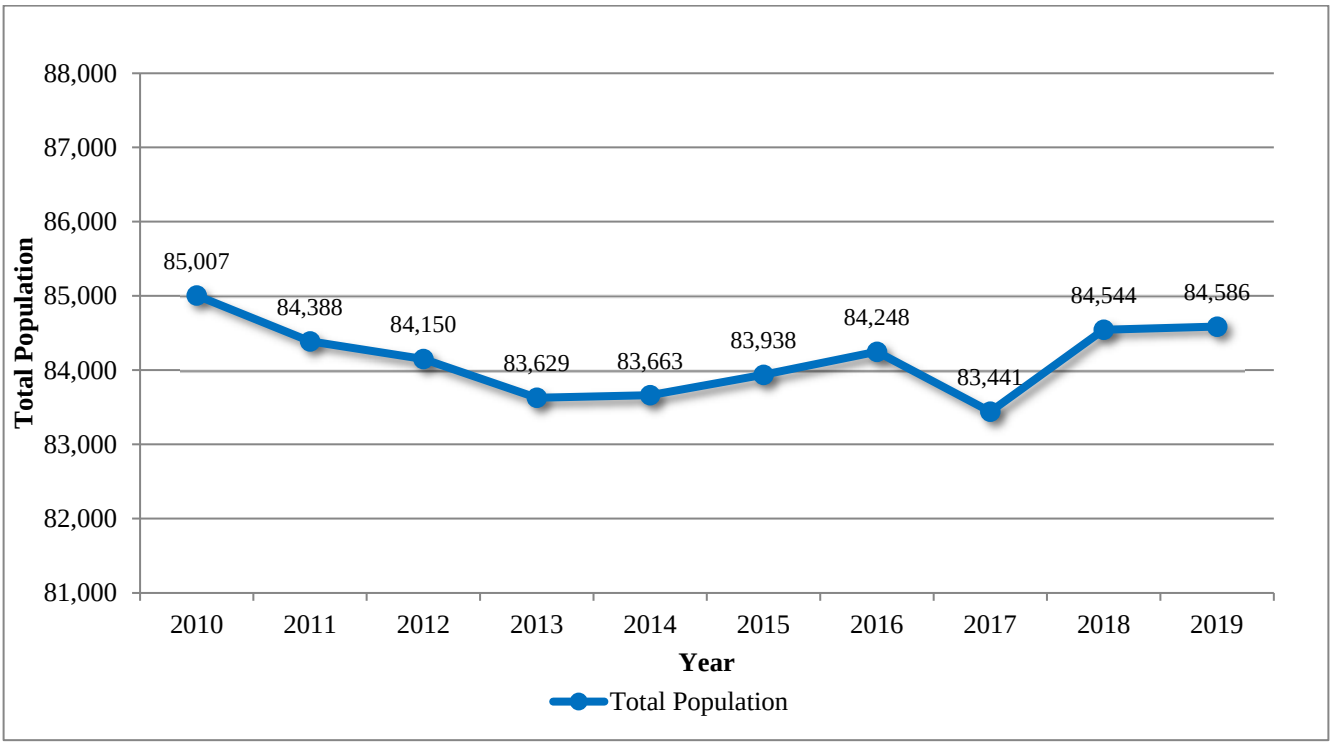


[4] American Community Survey (ACS), US Census Bureau - https://www.census.gov/programs-surveys/acs

Population

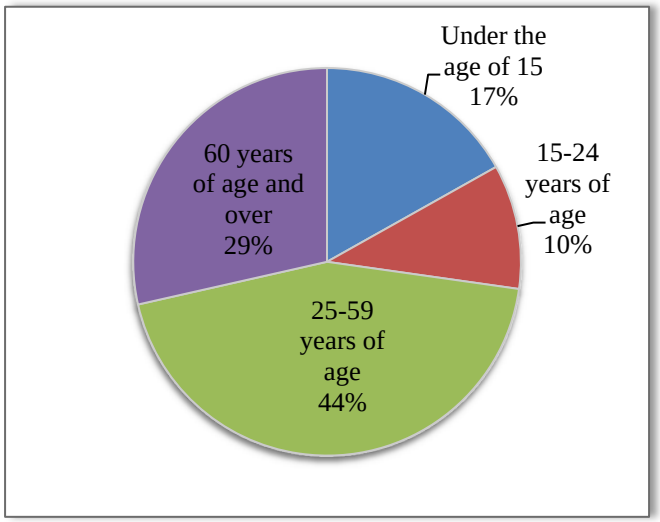
Over the next 30 years, demand on the transportation system will grow and evolve. The Carson Area is forecasted to have a low annual growth. Figure 2.2 displays population information for the CAMPO Metropolitan Planning Area from 2010 to 2019. Population has remained roughly stable, decreasing by half a percent over the eight-year reporting period. Figure 2.3 displays the percentage of the population by age group. Notably, more than a quarter of the population is 60 years of age or older.

Figure 2.2: Population (2010-2019)



Source: ACS Demographic and Housing Estimates, Table DP05. Annual Estimates from American Community Survey (ACS) 5-year Estimates.

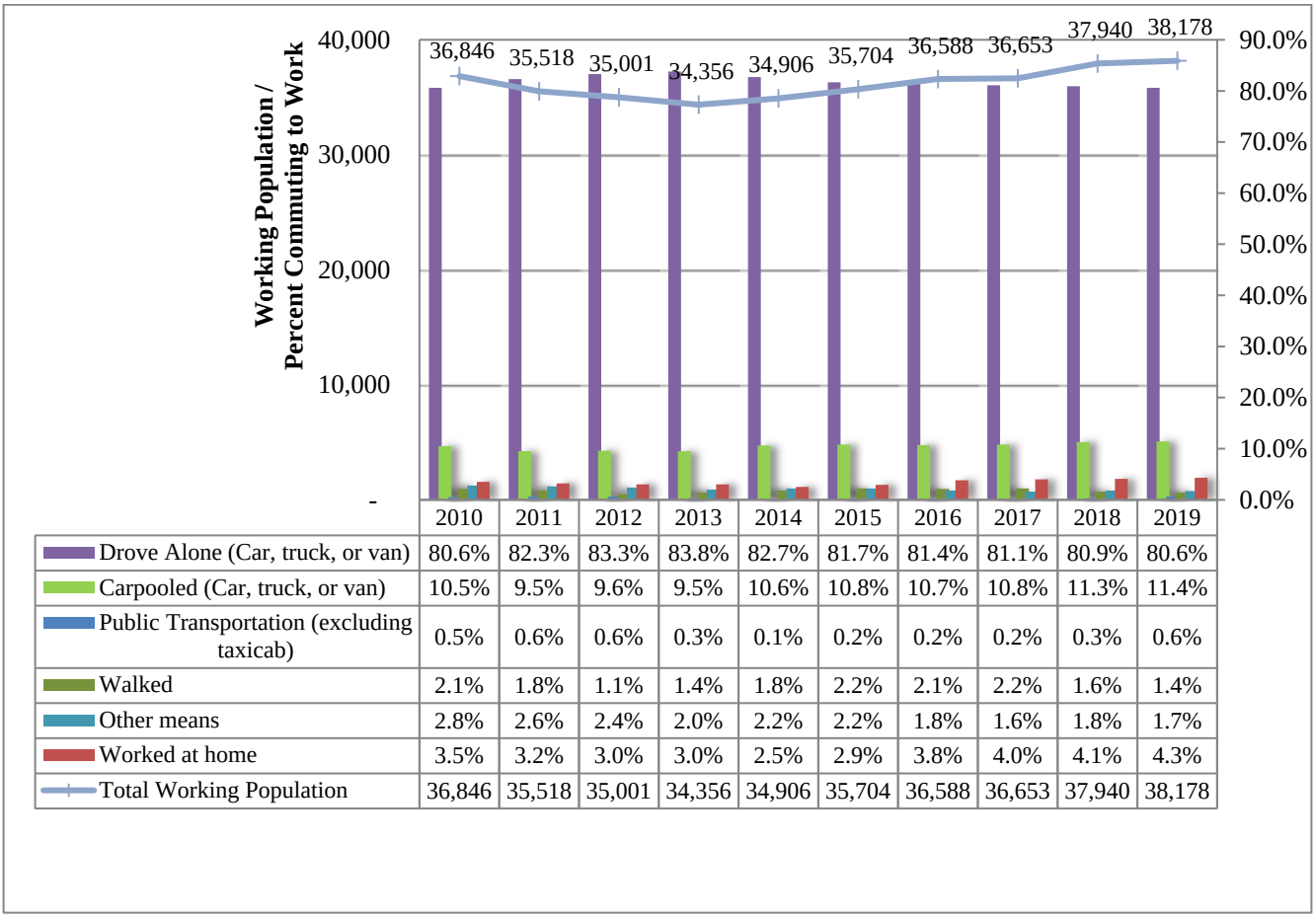
Figure 2.3: Percentage of Population by Age Group (2019)



Source: ACS Demographic and Housing Estimates, Table DP05. Annual Estimates from American Community Survey (ACS) 5-year Estimates.

Figure 2.4 displays travel mode to work for workers aged 16 years and over within the CAMPO planning area from 2010 to 2019. Overwhelmingly, CAMPO residents drive alone to work. The most significant shifts in travel mode to work over the reporting period are the percentage of workers that report Carpool, which has increased from 10.5% in 2010 to 11.4% in 2019, and the percentage of workers that report "Worked at Home," which has increased from 3.5% to 4.3%.

Figure 2.4: Mode to Work (2010-2019)

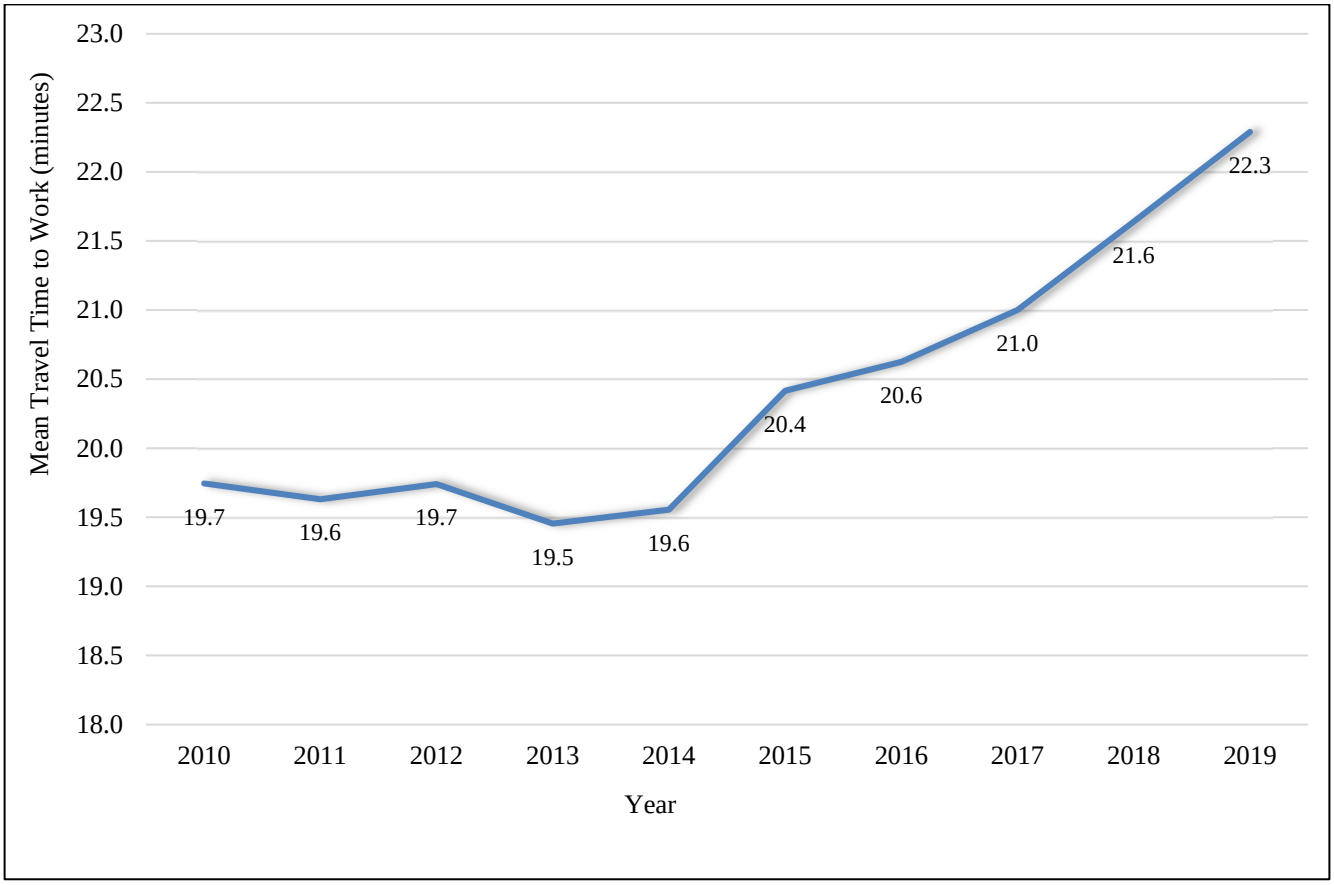


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Drove Alone (Car, truck, or van)	80.6%	82.3%	83.3%	83.8%	82.7%	81.7%	81.4%	81.1%	80.9%	80.6%
Carpooled (Car, truck, or van)	10.5%	9.5%	9.6%	9.5%	10.6%	10.8%	10.7%	10.8%	11.3%	11.4%
Public Transportation (excluding taxicab)	0.5%	0.6%	0.6%	0.3%	0.1%	0.2%	0.2%	0.2%	0.3%	0.6%
Walked	2.1%	1.8%	1.1%	1.4%	1.8%	2.2%	2.1%	2.2%	1.6%	1.4%
Other means	2.8%	2.6%	2.4%	2.0%	2.2%	2.2%	1.8%	1.6%	1.8%	1.7%
Worked at home	3.5%	3.2%	3.0%	3.0%	2.5%	2.9%	3.8%	4.0%	4.1%	4.3%
Total Working Population	36,846	35,518	35,001	34,356	34,906	35,704	36,588	36,653	37,940	38,178

Source: ACS Selected Economic Characteristics, Table DP03. Annual Estimates from American Community Survey (ACS) 5-year Estimates.

Figure 2.5 displays mean travel time to work. Between 2010 and 2019 travel time to work increased by 13 percent, from 19.7 to 22.3 minutes.

Figure 2.5: Mean Travel Time to Work (2010-2019)



Source: ACS Selected Economic Characteristics, Table DP03. Annual estimates from American Community Survey (ACS) 5-year Estimates.

In total, between the years 2020 and 2050, CAMPO's population is anticipated to grow by approximately 24%, to approximately 105,000 people. Population estimates for 2020 through 2038 (Table 2.1) from the Nevada Department of Taxation anticipate a growing senior population (shown in yellow) that will necessitate investment in safety enhancements to address seniors with changing needs, related to diminishing eyesight, hearing, and slower reaction times and decision making. Investment in public transportation, pedestrian, and bicycle facilities will be important for providing an aging population with mobility options and independence, along with improved integration and mobility for all system users.

As depicted in Table 2.1, growth in young, family-age cohorts, including adults between 35-49 and children between the ages of 1 and 9 (shown in green), are also anticipated. Like seniors, young children have challenges with eyesight, reactions times, and decision making, that pose potential safety risks when interacting with the transportation network. At younger ages, children are developing their vision and depth perception and lack the ability to make good judgement when interacting with roadways and pedestrian walkways. Older children are challenged with having a sense of invulnerability and making poor judgement calls. Given these similar characteristics, CAMPO's 2050 RTP identifies the need to prioritize projects that benefit the most vulnerable users: children and seniors.

Table 2.1: 2020-2038 Population Projections by CAMPO Partner Agency

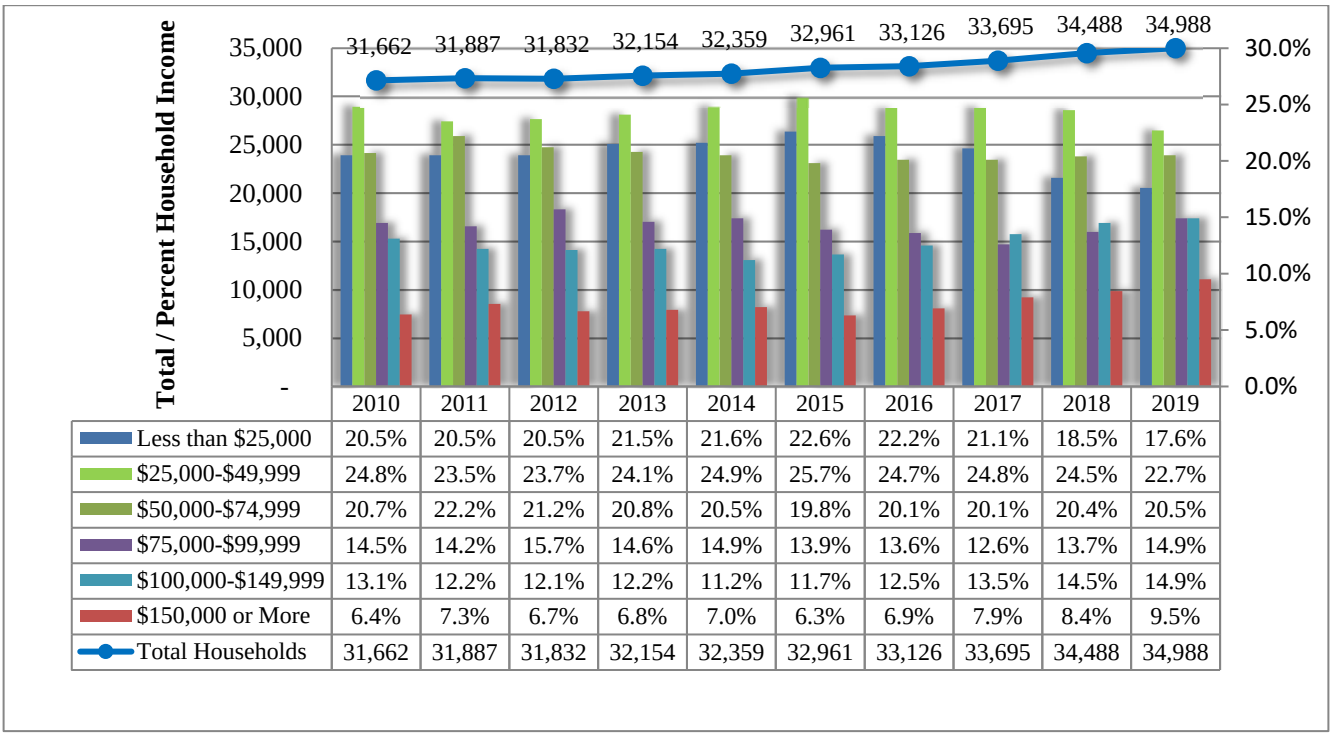
Five-Year Cohorts	Carson City			Douglas County			Lyon County		
	Year 2020	Year 2038	Percent Change 2020-2038	Year 2020	Year 2038	Percent Change 2020-2038	Year 2020	Year 2038	Percent Change 2020-2038
0-4	2,809	3,314	18%	2,051	2,008	-2%	3,138	3,748	19%
5-9	2,718	3,241	19%	2,358	2,442	4%	3,326	3,869	16%
10-14	3,450	2,993	-13%	2,608	2,676	3%	3,426	3,903	14%
15-19	3,496	3,010	-14%	2,245	2,401	7%	3,744	4,080	9%
20-24	2,842	2,995	5%	2,134	1,745	-18%	3,404	3,835	13%
25-29	3,643	2,463	-32%	2,606	2,035	-22%	4,432	3,665	-17%
30-34	4,514	3,978	-12%	2,919	2,099	-28%	3,360	3,746	11%
35-39	2,213	3,778	71%	2,369	2,462	4%	2,430	4,087	68%
40-44	2,829	3,235	14%	2,504	3,376	35%	3,615	4,708	30%
45-49	3,995	4,406	10%	2,530	3,438	36%	3,480	6,104	75%
50-54	4,557	3,694	-19%	3,263	3,231	-1%	4,107	2,787	-32%
55-59	3,171	1,947	-39%	3,705	2,873	-22%	3,729	3,581	-4%
60-64	3,442	3,518	2%	4,448	3,510	-21%	3,881	4,332	12%
65-69	4,751	4,365	-8%	4,405	3,528	-20%	3,873	4,190	8%
70-74	2,880	4,320	50%	3,535	3,722	5%	3,136	3,939	26%
75-79	2,250	1,666	-26%	2,769	3,316	20%	2,240	3,013	35%
80-84	1,301	2,296	76%	1,732	2,655	53%	1,658	2,310	39%
85 over	1,685	2,256	34%	1,516	2,615	72%	1,008	2,031	101%
Total	**56,546**	**57,475**	**2%**	**49,697**	**50,132**	**1%**	**57,987**	**67,928**	**17%**

*Highlighted areas note age cohorts with growth rates above 14% and that are concentrated around seniors and young families
** Source: Nevada Department of Taxation:
https://tax.nv.gov/uploadedFiles/taxnvgov/Content/TaxLibrary/2019%20ASRHO%20Estimates%20and%20Projections%20Final.pdf

Households

Figure 2.6 displays reported household income from 2010 to 2019. The number of households has increased by 10.5% from 2010 to 2019. The percentage of total households earning less than $25,000 has decreased by three percentage points over the reporting period, while the percentage of total households earning $150,000 or more has increase by three percentage points over the reporting period. These changes in percentage mark an historic low and high, respectively. The reasons for these changes may be found in using 2020 Census data, which will be included in the 2022 Monitoring Report.

Figure 2.6: Household Income (2010-2019)

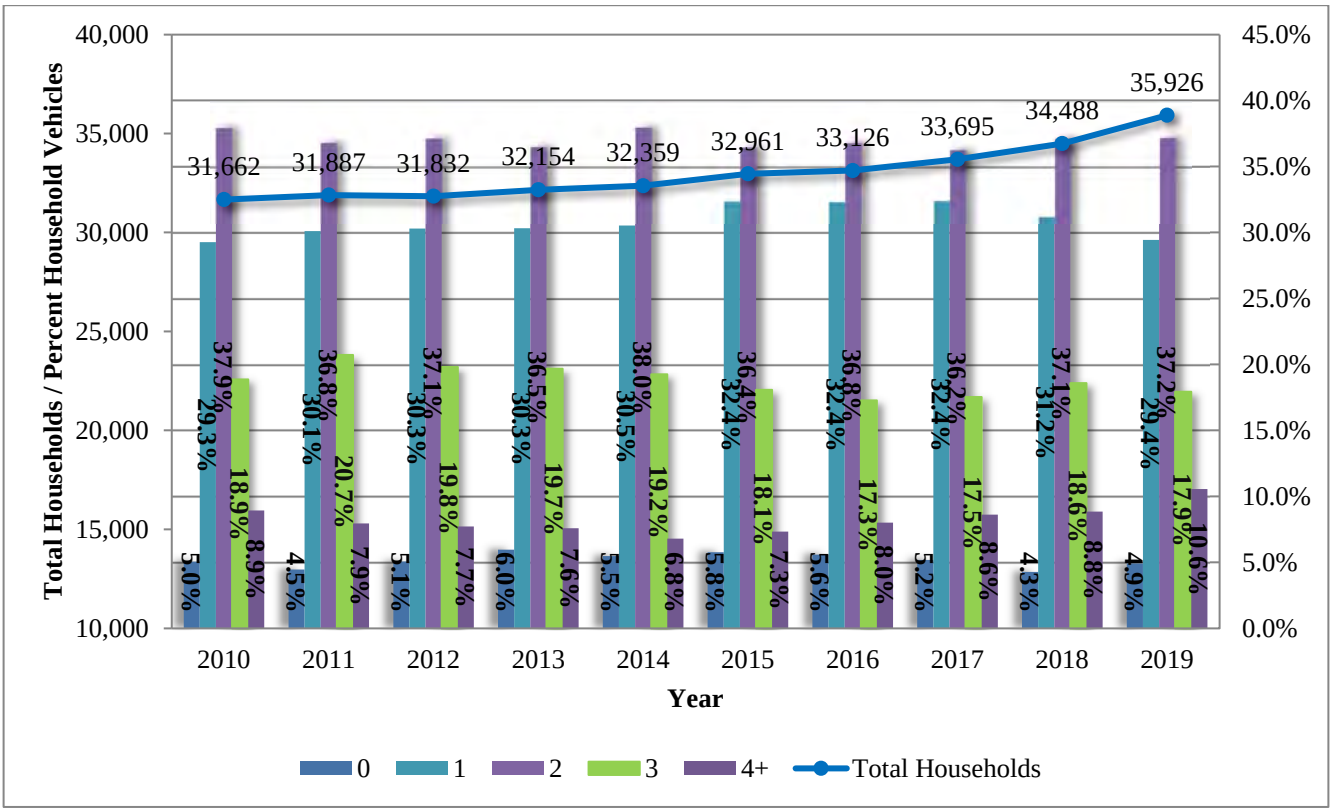


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Less than $25,000	20.5%	20.5%	20.5%	21.5%	21.6%	22.6%	22.2%	21.1%	18.5%	17.6%
$25,000-$49,999	24.8%	23.5%	23.7%	24.1%	24.9%	25.7%	24.7%	24.8%	24.5%	22.7%
$50,000-$74,999	20.7%	22.2%	21.2%	20.8%	20.5%	19.8%	20.1%	20.1%	20.4%	20.5%
$75,000-$99,999	14.5%	14.2%	15.7%	14.6%	14.9%	13.9%	13.6%	12.6%	13.7%	14.9%
$100,000-$149,999	13.1%	12.2%	12.1%	12.2%	11.2%	11.7%	12.5%	13.5%	14.5%	14.9%
$150,000 or More	6.4%	7.3%	6.7%	6.8%	7.0%	6.3%	6.9%	7.9%	8.4%	9.5%
Total Households	31,662	31,887	31,832	32,154	32,359	32,961	33,126	33,695	34,488	34,988

Source: ACS Selected Economic Characteristics, Table DP03. Annual Estimates from American Community Survey (ACS) 5-year Estimates.

Figure 2.7 displays information on the number of vehicles per household. The amount and availability of vehicles in a household can be an indicator of reliance on public transit or non-motorized modes, as well as an indicator of an individual household's ability to make discretionary trips. In the CAMPO Area, the distribution of household vehicle ownership has remained roughly steady from 2010 to 2019. The data show a 20% increase in households with 4+ cars, from 8.8% in 2018 to 10.6% in 2019. This increase could be linked to the rising household income level shown in Figure 2.6, and could also be symptomatic of a public transportation system that does adequately fulfill the needs of its users.

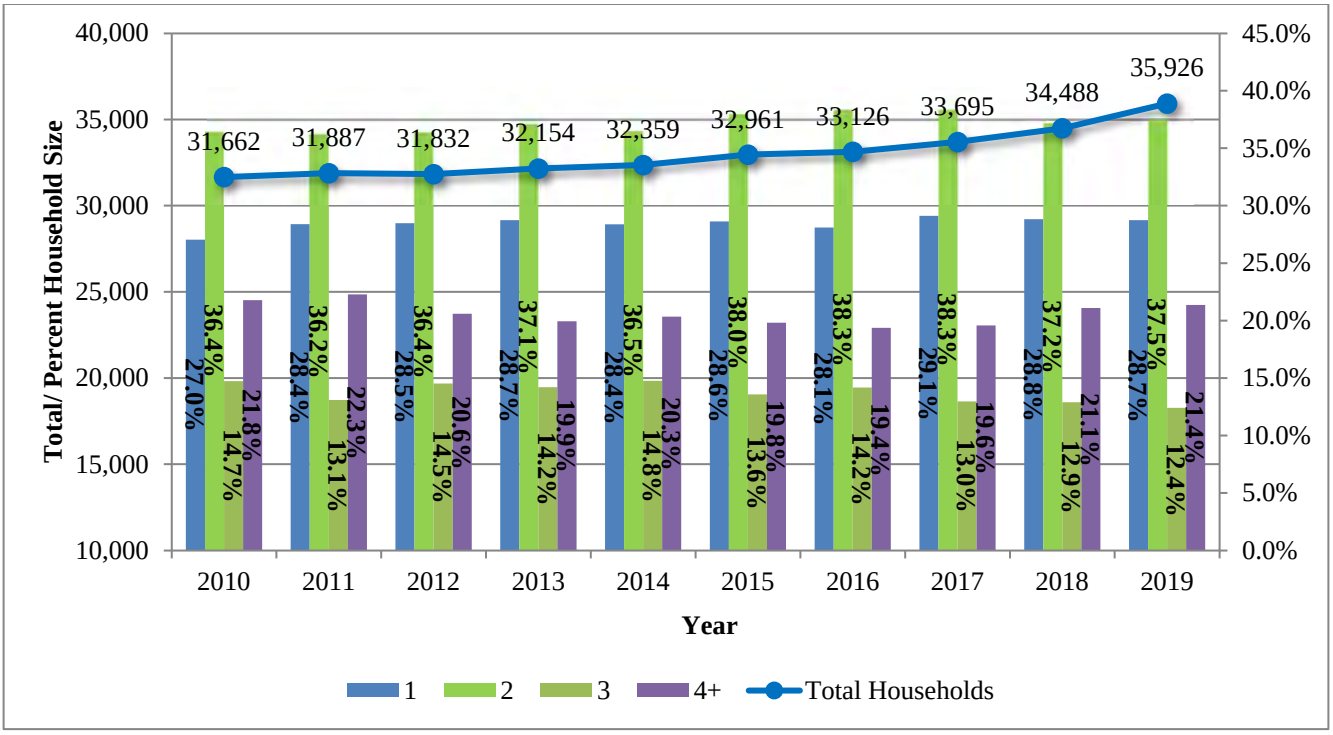
Figure 2.7: Household Vehicles (2010-2019)



Source: ACS Household Size by Vehicles Available, Table B08201. Annual Estimates from American Community Survey (ACS) 5-year Estimates.

A community's distribution of household size has implications on the number and types of daily trips. Larger households tend to be comprised of families with children, which may generate travel for school and after-school activities, while smaller households may generate fewer trips overall, but may have more flexibility in their schedules to generate longer, inter-regional or interstate trips. Figure 2.8 displays the distribution of household size from 2010 to 2019. Over the nine-year reporting period, households in the CAMPO area are becoming smaller. The proportion of large households (3- or 4+ person) has lost 2.7 percentage points to 1- or 2- person households over the course of the decade. This trend is anticipated to continue as a greater percentage of the population ages.

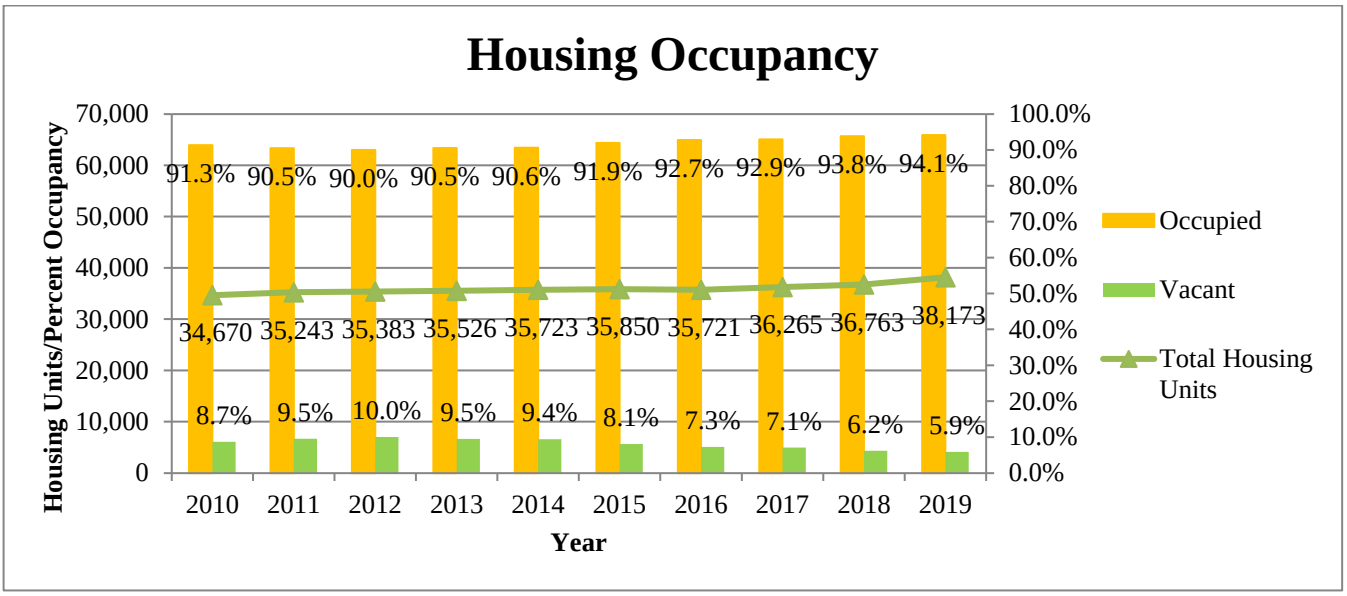
Figure 2.8: Household Size (2010-2019)



Source: ACS Household Size by Vehicles Available, Table B08201. Annual Estimates from American Community Survey (ACS) 5-year Estimates.

Housing unit occupancy is an indicator of population growth and economic activity, which results in an additional demand on the transportation system. Long-term increases in housing unit occupancy can result in local zoning ordinance policy changes to encourage higher densities, which over time, can lead to more pedestrian, bicycle, and transit trips in place of traditional automobile trips. Housing occupancy rates are also correlated with housing affordability, with higher occupancy rates being tied to more expensive housing stock. Figure 2.9 displays vacancy/occupancy status of housing units between 2010 to 2019. Over the nine-year reporting period the occupancy rate has constantly increased, and is now at its highest point of 94.1%, 2.8% higher than 2010.

Figure 2.9: Housing Unit Occupancy Status (2010-2019)



Source: ACS Occupancy Status, Table B25002. All Annual Estimates Represent American Community Survey (ACS) 5-year Estimates.

CHAPTER 3 – LAND USES

Where people travel is determined by a complex interrelationship of land uses. The location of residences, jobs, industrial complexes, and schools, all influence routine daily trip-making from home, to school, and to work. The location of post offices, grocery stores, restaurants, recreational facilities, entertainment centers, shopping malls, and other destinations, all influence additional, discretionary trip-making. On a bigger scale, a community's proximity to regional destinations (Lake Tahoe, for example) influences weekend interregional travel or seasonal influx of visitor travel.

The proximity or distance between differing land uses also influences travel. The distance between home and work, or the convenience of destinations ("trip generators"), determines the occurrence, length, and mode of trips, or in some cases, can make the difference between whether a trip is made or not. For example, someone with a 30-minute lunch break during the workday will be unable to travel 20 minutes each direction to purchase their lunch from a favorite local business.

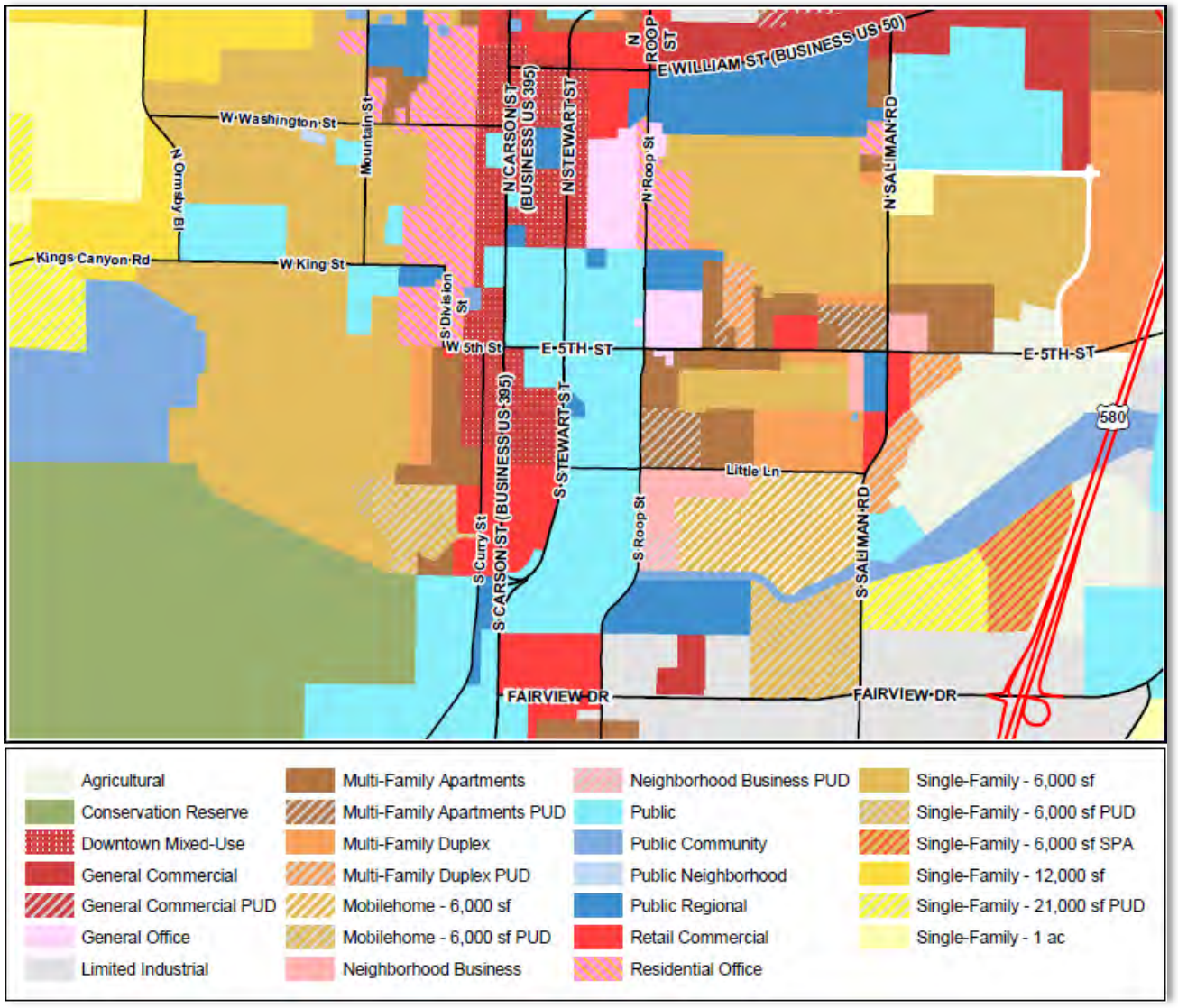
In addition, the type of residential and commercial land uses in a community influences trip-making. A 1-bedroom apartment that houses one or two adults typically generates fewer and a different mix of daily trips than a single-family home with a 4+ person household. Likewise, an administrative office complex will generate fewer and a different mix of daily trips than a high-turnover restaurant or a manufacturing/shipping facility.

By monitoring land uses, CAMPO is better informed and equipped to plan for and manage the region's use of, and demand for, regional transportation infrastructure that connects these land uses.

CAMPO's Travel Demand Model (TDM) is the primary tool used to help understand and forecast usage of the transportation network. A critical input to the travel demand model is current and future land use information. CAMPO's travel demand model is regularly updated with known changes to land uses and approved projects that can influence travel behavior in the area. Figure 3.1 provides an example of zoning districts within a CAMPO sub-area (central Carson City). The land use information is grouped into geospatial areas called Transportation Analysis Zones (TAZ's). The size and spatial extent of a TAZ varies, but they typically range from very large in rural areas to very small in urban areas and business districts.

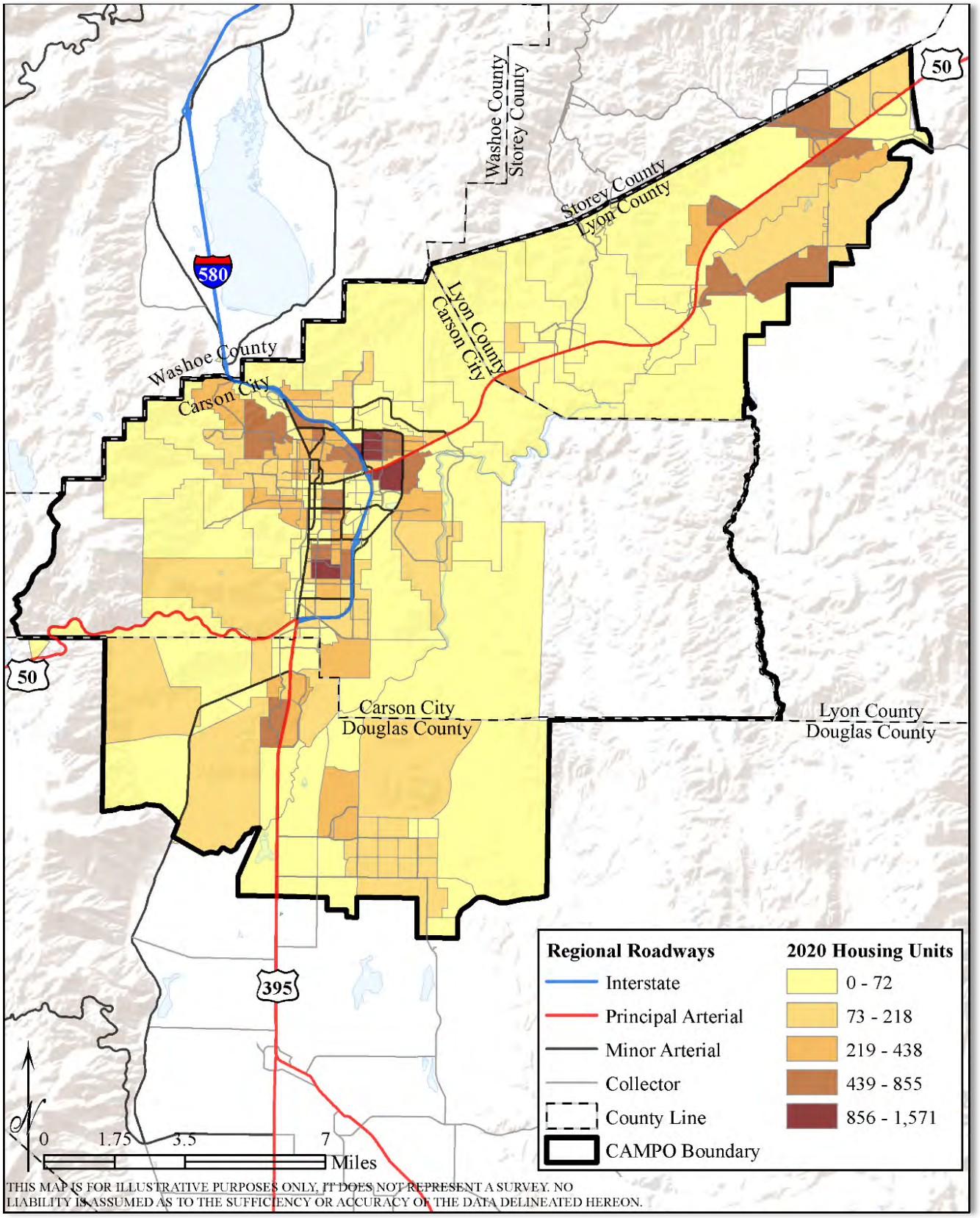
Carson City has 27 different zoning districts that permit and prohibit certain land uses. City zoning regulations consist of both a zoning map and a written ordinance that divides the City into zoning districts, including various residential, commercial, and industrial districts. The zoning regulations describe what type of land use and specific activities are permitted in each district.

Figure 3.1: Example of Zoning Districts, CAMPO Sub-area (Central Carson City)



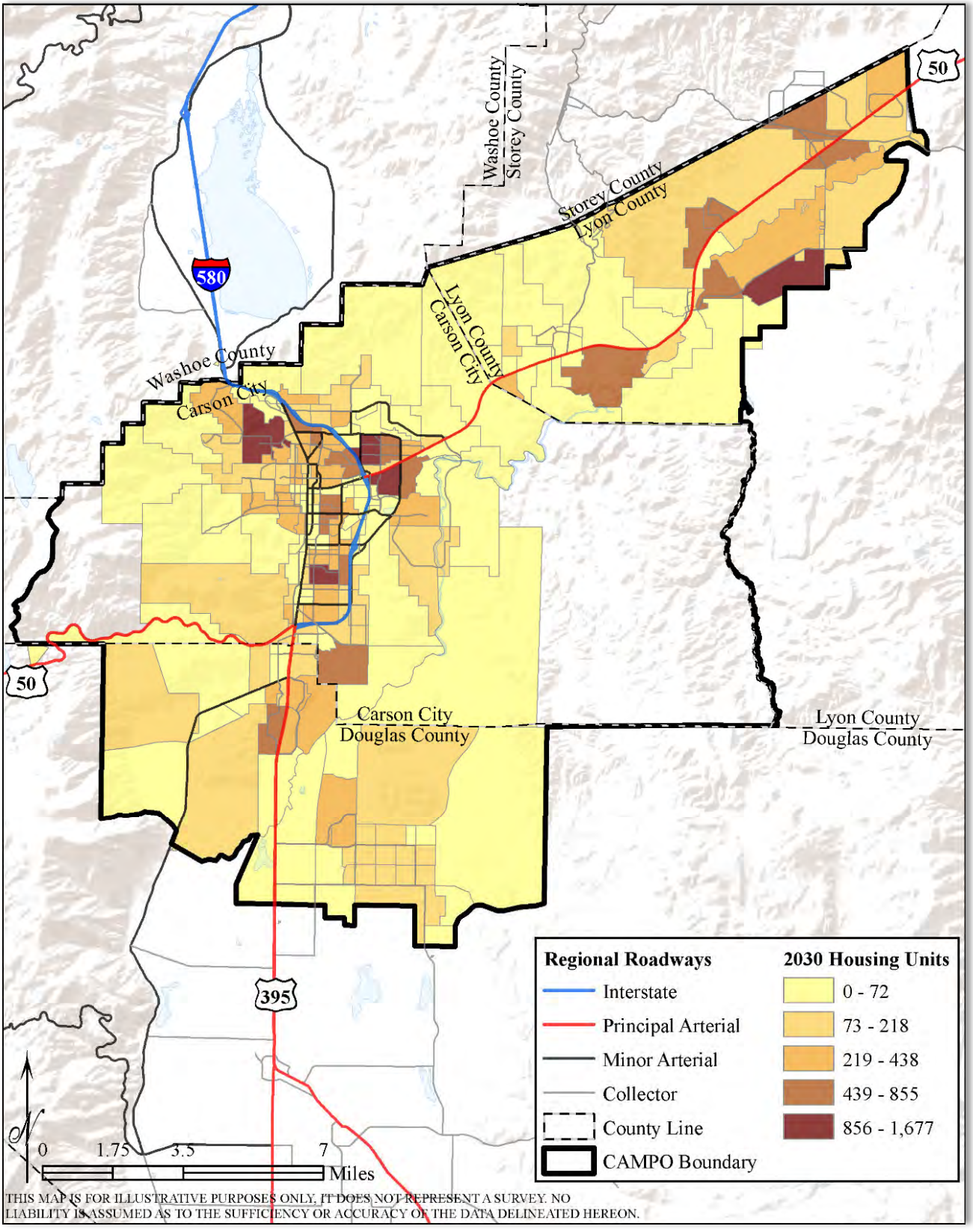
A travel demand model uses TAZs to pair land use and socio-economic data (Chapter 2), such as the number of household or employment units, to assign current and future trips to the transportation network. This information helps to identify travel and traffic trends. Figures 3.2 through 3.7 display the density of housing units and commerical employment by TAZ that is assumed in CAMPO's travel demand model for a base model year of 2020, and two forecast years of 2030 and 2050.

Figure 3.2: 2020 Housing Units by Transportation Analysis Zone (TAZ)



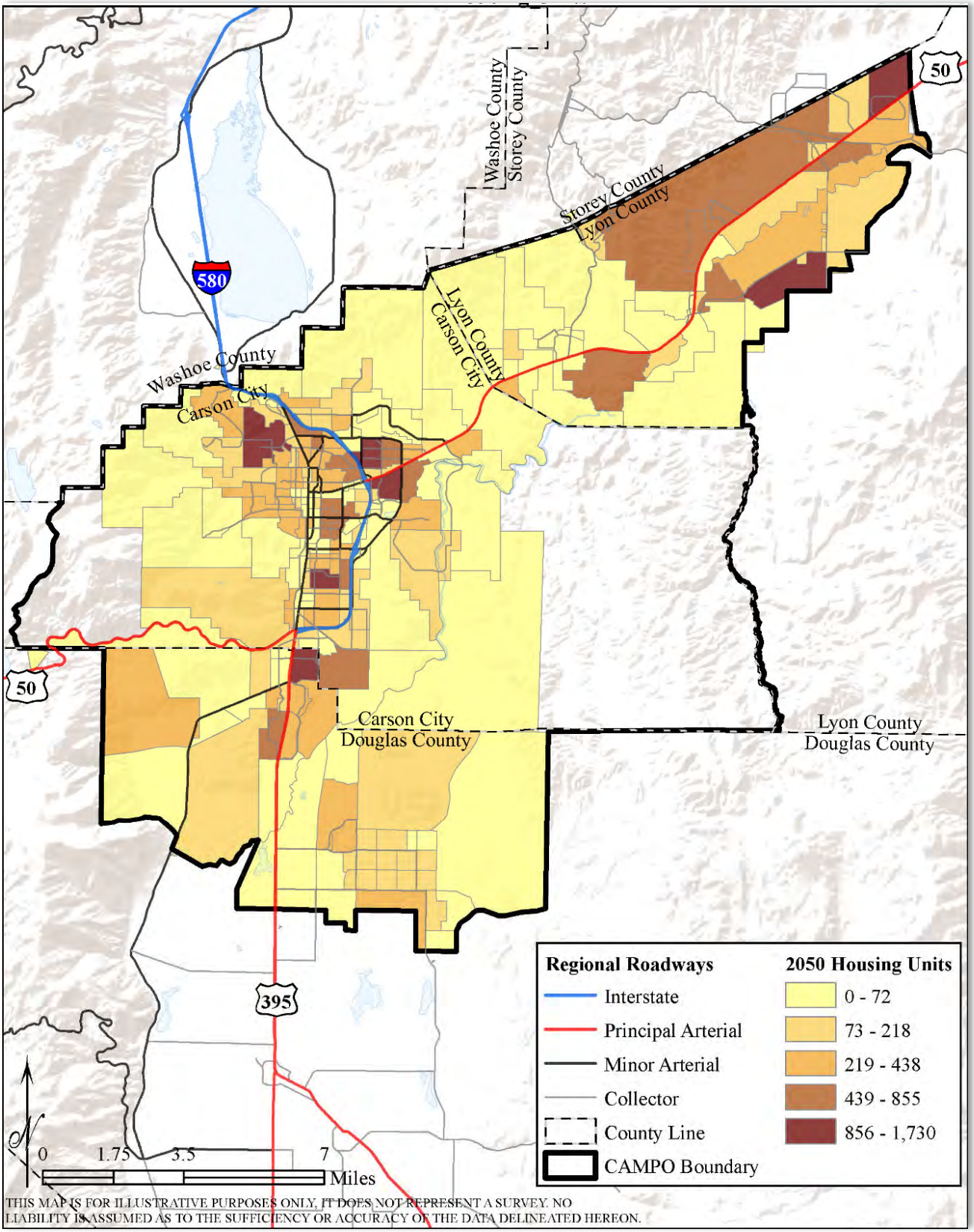
Source: CAMPO 2050 Travel Demand Model, September 2020.

Figure 3.3: 2030 Housing Units by Transportation Analysis Zone (TAZ)



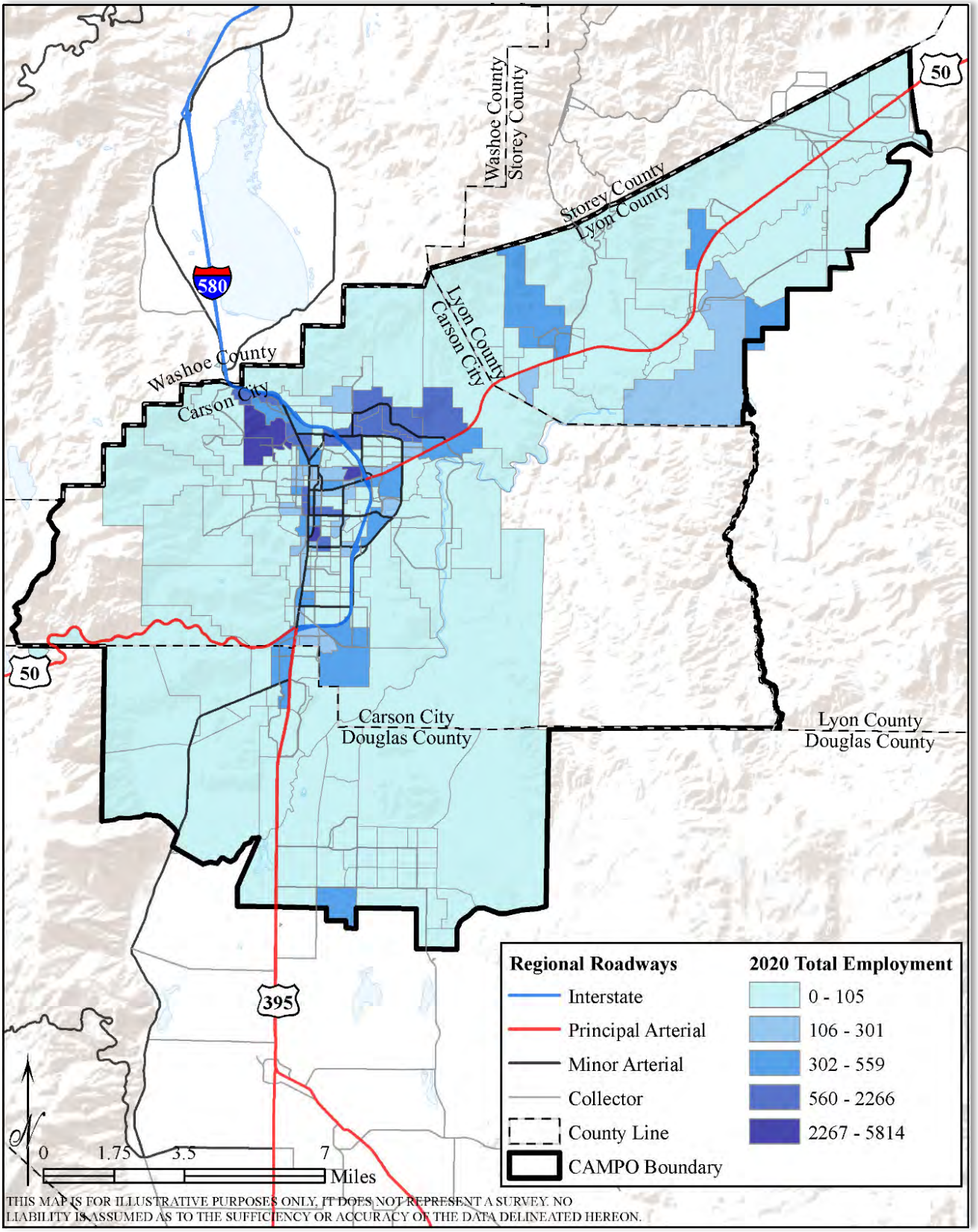
Source: CAMPO 2050 Travel Demand Model, September 2020.

Figure 3.4: 2050 Housing Units by Transportation Analysis Zone (TAZ)



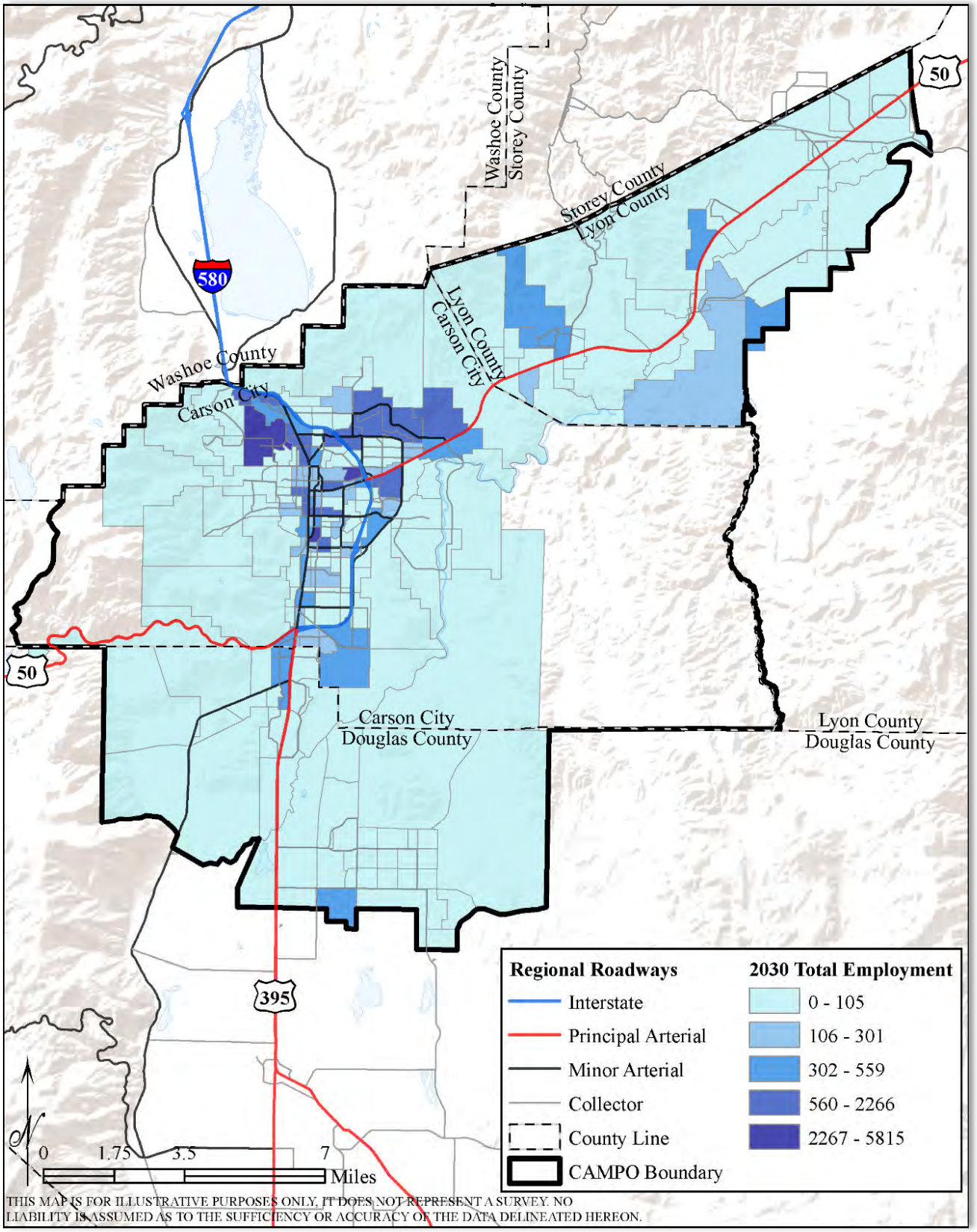
Source: CAMPO 2050 Travel Demand Model, September 2020.

Figure 3.5: 2020 Commercial Employment by Transportation Analysis Zone (TAZ)



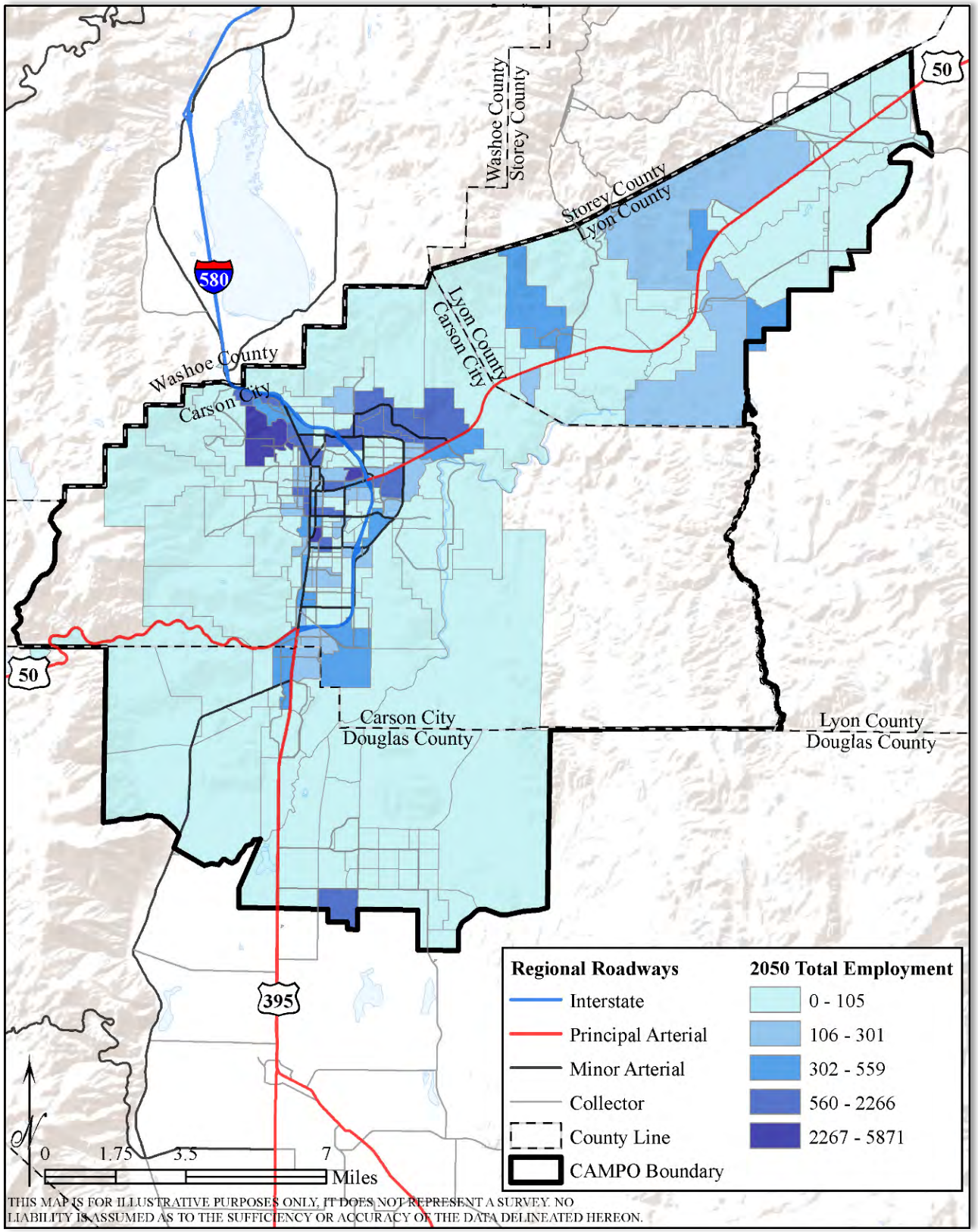
Source: CAMPO 2050 Travel Demand Model, September 2020.

Figure 3.6: 2030 Commercial Employment by Transportation Analysis Zone (TAZ)



Source: CAMPO 2050 Travel Demand Model, September 2020.

Figure 3.7: 2050 Commercial Employment by Transportation Analysis Zone (TAZ)



Source: CAMPO 2050 Travel Demand Model, September 2020.

CHAPTER 4 – MOBILITY NETWORK

The accessibility, availability, connectivity, efficiency, and safety of traveling within the mobility network, all influence how people travel between destinations. Road design, pavement condition, and travel time all influence the viability of vehicle trips. Connectivity and level of safety influence the viability of short- or long-distance bicycle travel. Connectivity, accessibility (e.g. presence of Americans with Disabilities (ADA) compliant curb ramps), and convenience influence whether someone chooses to walk to their destination. Locations of bus stops and the frequency that a bus will arrive at a stop will determine whether someone chooses to take transit.

How and where each of the mobility modes connects with other modes further determines viability of those modes. For example, the ability of someone to leave their house, safely bicycle to the bus stop, load their bicycle onto the bus, take the bus to a location in proximity to their employment, and secure their bicycle once they arrive directly influences which mode of transportation someone will utilize. In the winter months when it gets dark early, the presence of street lighting along sidewalks and bicycle lanes further influences mode choice decisions. When a mode of transportation is not efficient, easy-to-use, or safe, travelers may choose not to make the trip at all or choose a transportation mode that they perceive to be easier or quicker. By monitoring the location and characteristics of all modes in the mobility network, CAMPO is better informed and equipped to plan for and manage the region's use of, and demand for, regional transportation infrastructure connecting travelers with their destinations. Chapter 4 is comprised of three sections: Roadways, Complete Streets, and Transit.

4.1 - ROADWAYS

Roadway Condition and Performance Monitoring

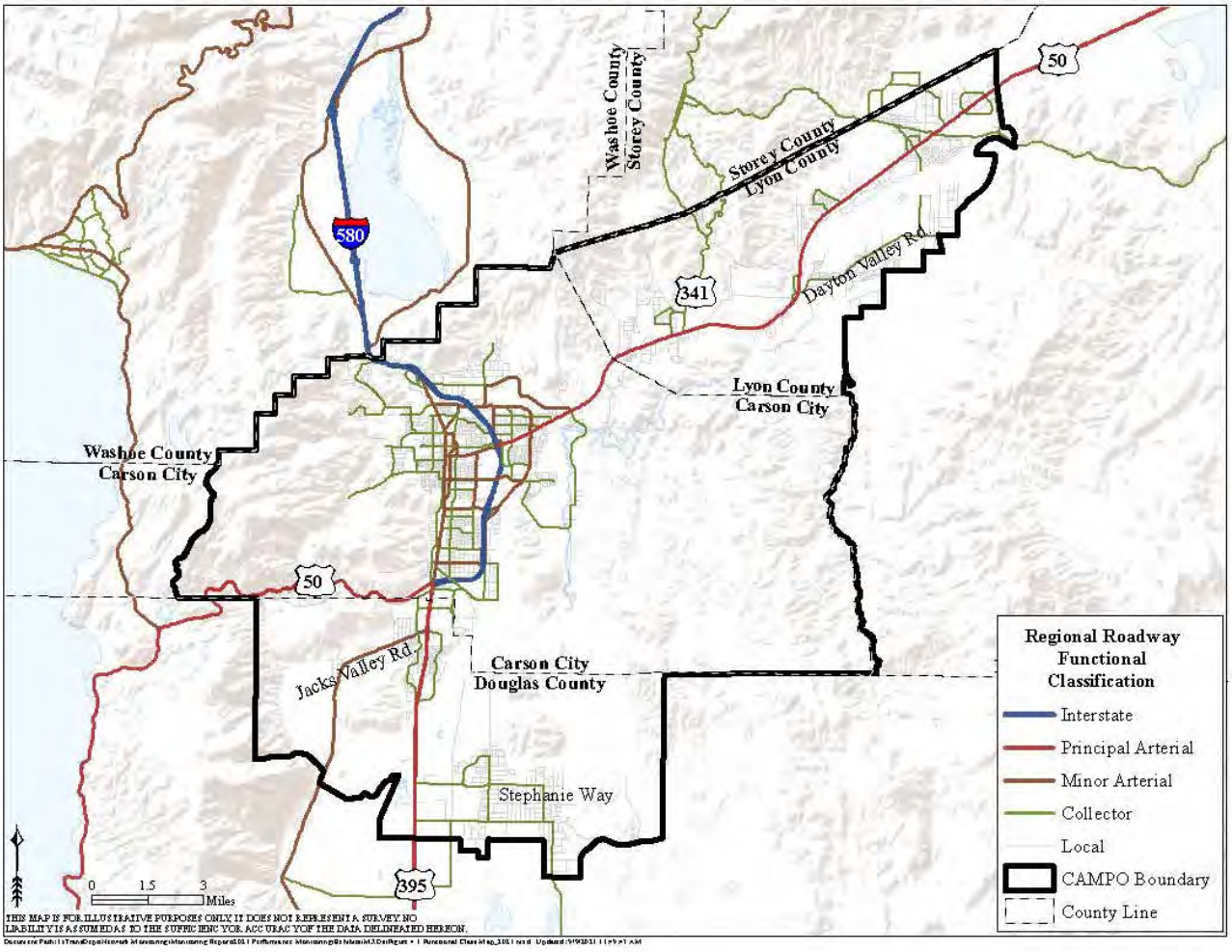
The roadway system is of central importance to the region's economy and is influential to the quality of life for people living and traveling in the Carson area. As required by the Federal government for use of federal funds, CAMPO is responsible for collecting data and tracking the performance of investments made to the transportation network. Performance measures designed to track progress toward adopted goals and targets allow CAMPO to evaluate the effectiveness of regional investment over time. Information from the data is used to prioritize investments that allow vehicles and other modes to utilize the transportation network efficiently and safety. This information is used to inform planning, design, pavement management, capital improvements, operations, and maintenance activities.

To be eligible for federal funding, federal regulations require a roadway to be functionally classified. Functional classification is the process by which streets and highways are grouped into classes according to the character of service they are intended to provide. Functional classification can be explained through the interrelationship between two concepts: roadway mobility and roadway accessibility. While these two functions lie at opposite ends of the continuum of roadway function, most roads provide some combination of each.

Roads with higher classifications serve the mobility needs of a greater number of people and typically carry more traffic. Roads with lower classifications tend to provide access more to individual properties than serve the mobility needs of a greater number of people. These two roles can be best understood by examining two extreme examples. Interstate I-580 through Carson City provides motorists the ability to travel long distances on a facility that completely serves their "mobility" needs. There is no location that is immediately "accessible" to the roadway. In contrast, Appaloosa Court in Carson City is traveled almost exclusively by the individuals that live along the roadway. Hence, the roadway entirely provides "accessibility" and offers almost nothing in terms of mobility.

For nomenclature purposes, those roadways that provide a high level of mobility are called "arterial roads"; those that provide a high level of accessibility and local access are called "local (neighborhood) roads"; and those that provide a more balanced blend of mobility and accessibility – collecting and funneling travelers between the two ends of the roadway mobility/accessibility spectrum - are called "collector roads." Figure 4.1 displays the functional classification of roadways within CAMPO's Metropolitan Planning Area. The classification of roadways is a joint effort between local, regional, state, and federal agencies.

Figure 4.1: 2020 Roadway Functional Classification Map

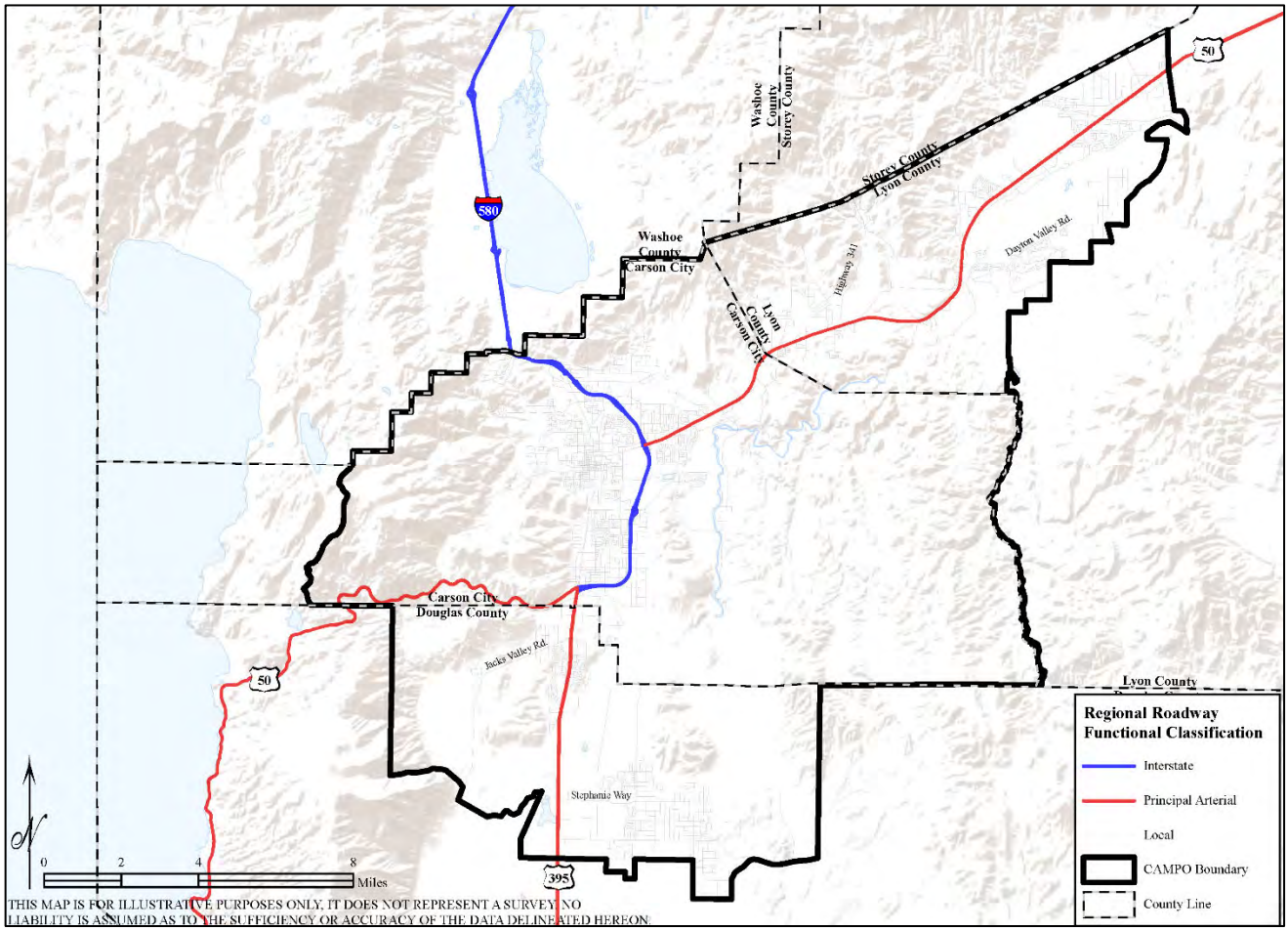


Source: https://www.nevadadot.com/travel-info/maps/functional-classification-maps

Vehicle Volumes

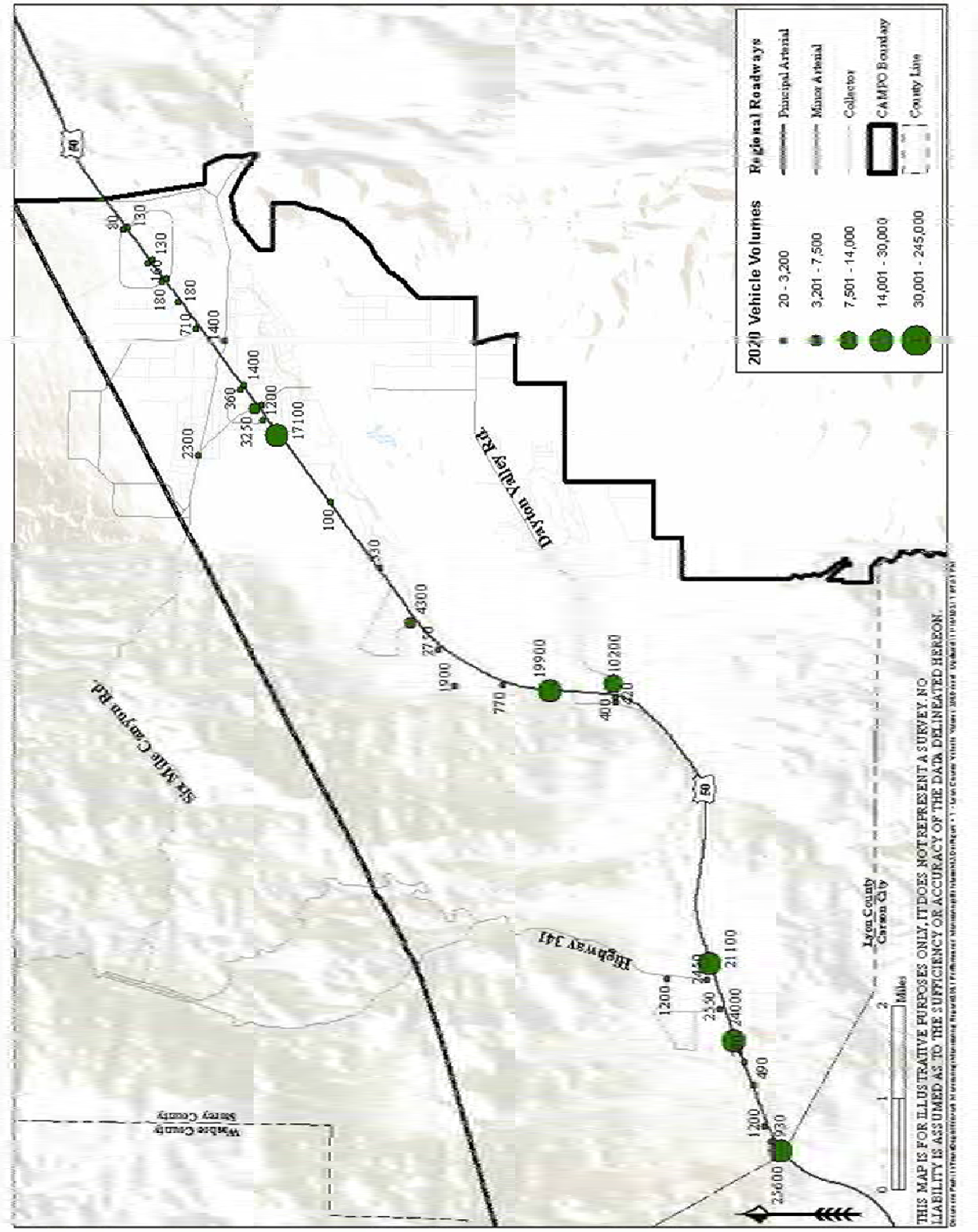
A primary factor to how a road is classified is dependent on its volume. Monitoring of traffic volumes along roadways within CAMPO is conducted in two ways. The Nevada Department of Transportation's Traffic Information division in cooperation with the Federal Highway Administration (FHWA), provides annual reports that contain details on the amount and type of traffic at certain locations along the National Highway System (see Figure 4.2) and along higher-volume roadways that carry regional travel. This information is used to validate CAMPO's travel demand model, plan short-term and long-term projects, and to influence project design. Traffic Volume Data is published through an online application referred to as Traffic Records Information Access (TRINA)[5]. Vehicle volumes from TRINA are displayed in Figure 4.3 through 4.6.

Figure 4.2: National Highway System Roadways within CAMPO



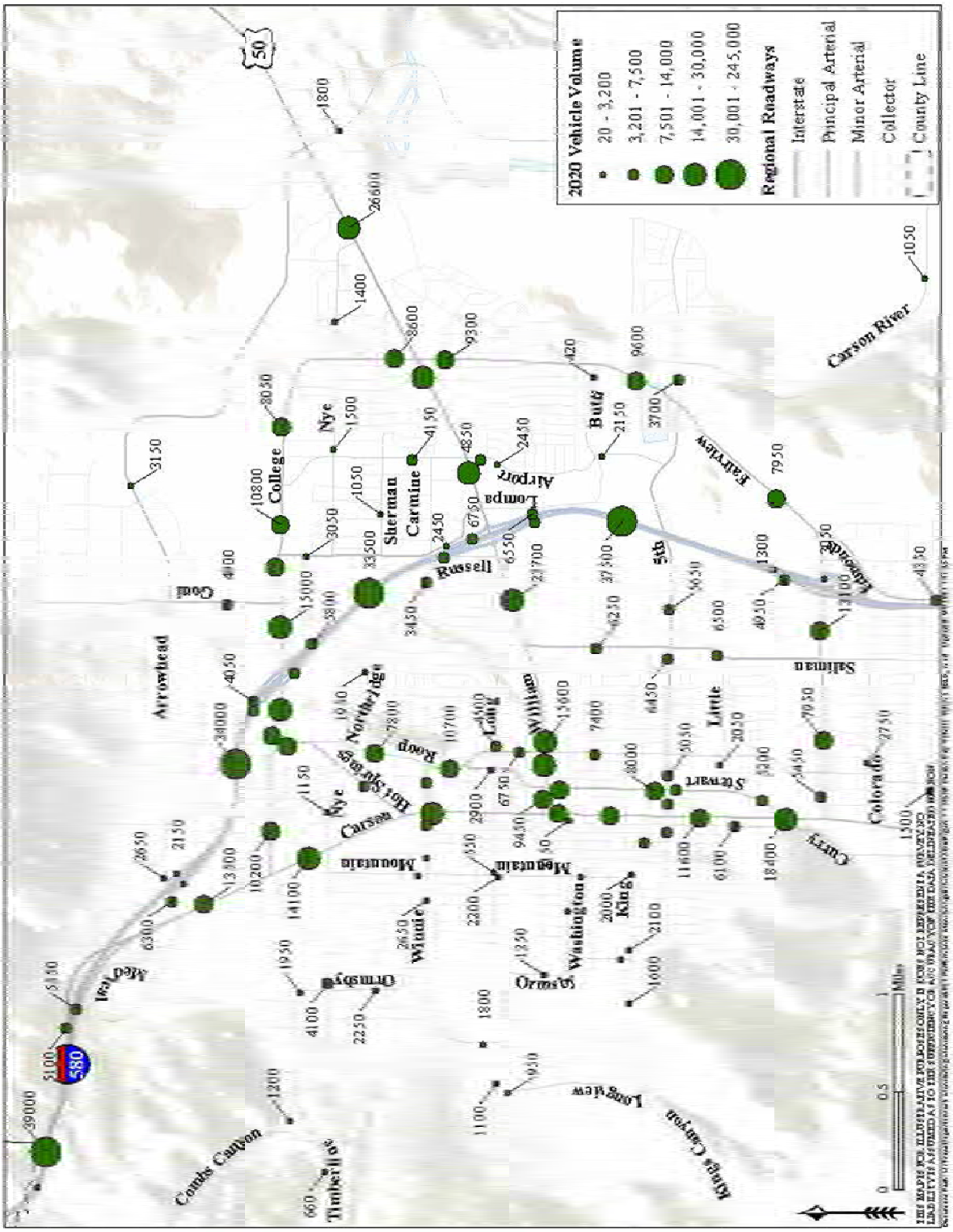
[5] Nevada Traffic Records Information Access - https://www.nevadadot.com/doing-business/about-ndot/ndot-divisions/planning/traffic-information

Figure 4.3: 2020 Lyon County Vehicle Volumes



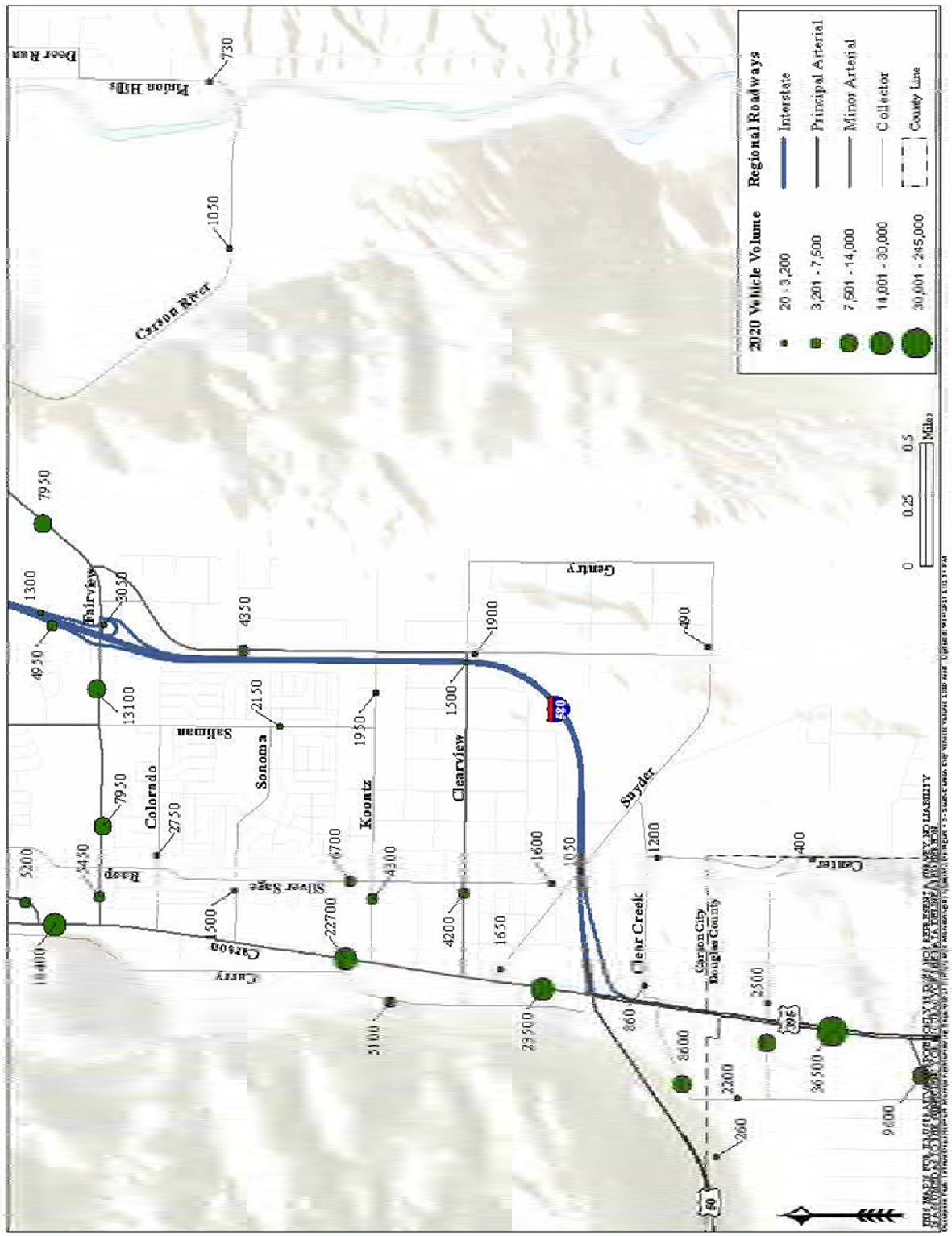
Source: https://www.nevadadot.com/doing-business/about-ndot/ndot-divisions/planning/traffic-information

Figure 4.4: 2020 Northern Carson City Vehicle Volumes



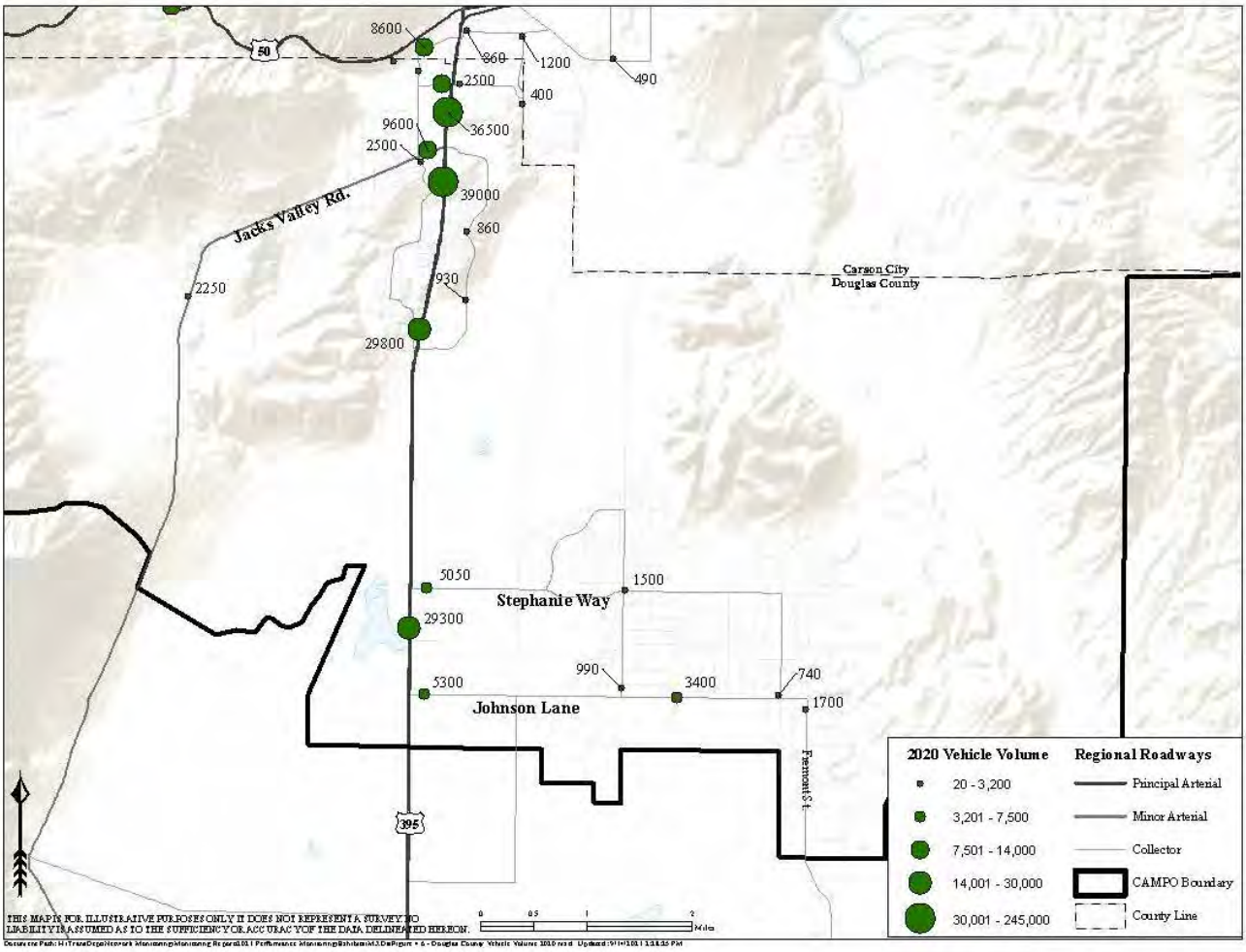
Source: https://www.nevadadot.com/doing-business/about-ndot/ndot-divisions/planning/traffic-information

Figure 4.5: 2020 Southern Carson City Vehicle Volumes



Source: https://www.nevadadot.com/doing-business/about-ndot/ndot-divisions/planning/traffic-information

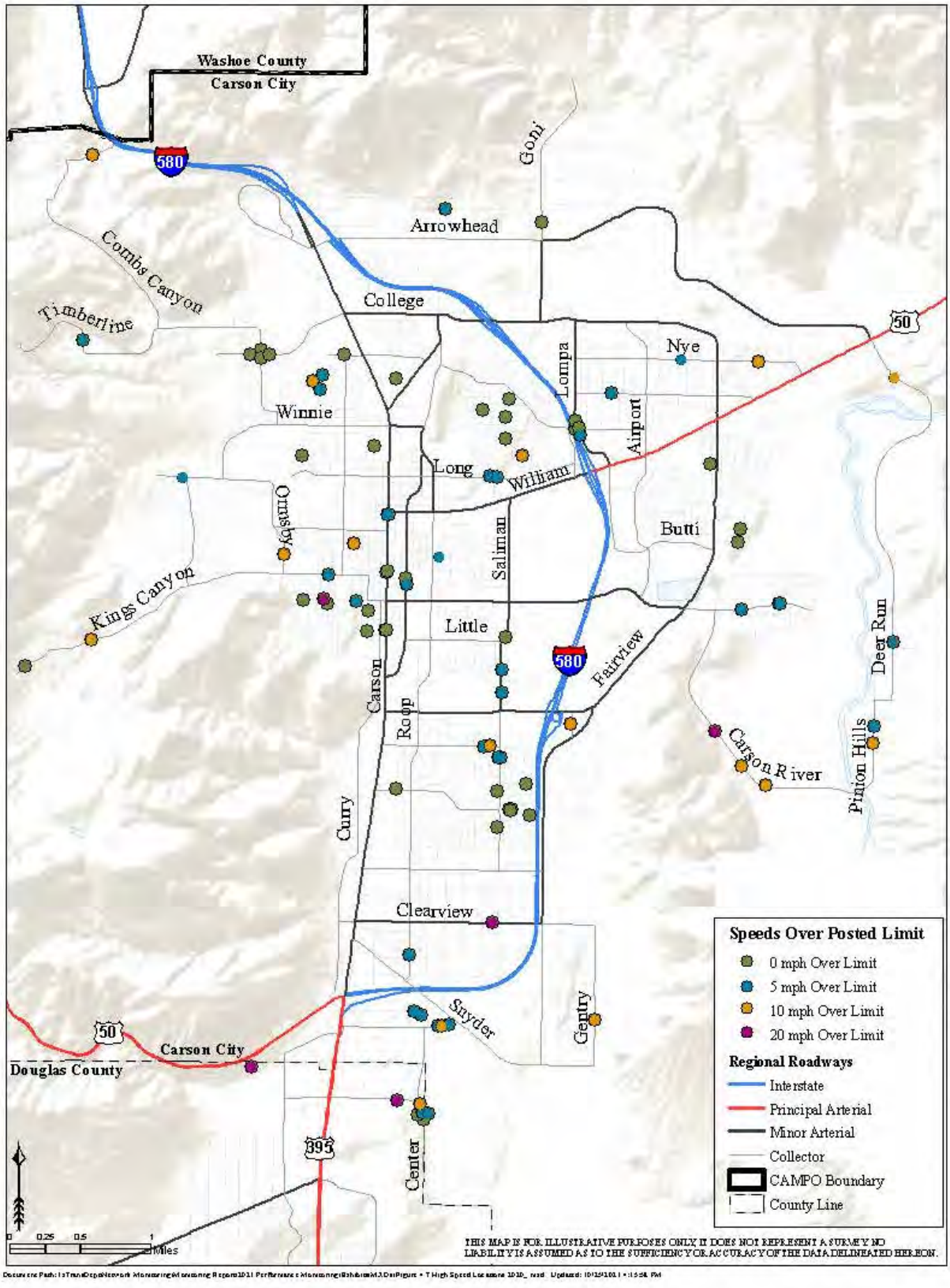
Figure 4.6: 2020 Northern Douglas County Vehicle Volumes



Source: https://www.nevadadot.com/doing-business/about-ndot/ndot-divisions/planning/traffic-information

In addition to data collected by NDOT, traffic volume and speed data along local and regional roadways are obtained with resources from CAMPO and member agencies. Information derived from the data is used in conjunction with data collected by NDOT to fully understand demand on the comprehensive roadway network. CAMPO's traffic counters are commonly deployed by Carson City staff in response to citizen or private developer inquiry regarding volumes or speeding on local and regional roadways. The data is used to conduct traffic control warrant analyses at or along specific intersections or corridors. Information can also assist in identifying areas where vehicle speeds exceed the posted speed limit. Locations where CAMPO's traffic counters were deployed between 2016 to 2021 are graphically presented in Figure 4.7. The symbology in this map displays locations where collected speed data varies significantly from the posted speed limit.

Figure 4.7: Vehicle Counter Deployment Locations with Speed Variance (2016-2021)



Travel Demand and Performance Forecast

CAMPO uses travel demand modeling software to forecast demand on the roadway network. The modeling considers future population, economic factors, and other variables, including land use patterns and estimates of future activity from local governments. The CAMPO model was updated in 2016, 2018 and again in 2020. In the 2020 model update, the land uses in each traffic analysis zone (TAZ) were compared to current year 2020 City records and the data was updated to reflect current year 2020 conditions. Land use types used in each TAZ were reviewed and updated to be more reflective of actual land uses in each zone as necessary. Population and employment demographics data was updated for the new land uses based on existing averages for the area. The CAMPO model was validated against the latest available year 2019 Annual Average Daily Traffic (AADT) count data obtained from the Nevada Department of Transportation (NDOT) for the 161 roadway segments in the CAMPO TDM. The review compared the 2019 NDOT AADT counts against the updated Base Year 2020 CAMPO TDM scenario to determine the accuracy of the model for validation purposes. The results of the validation were found to be consistent with nationally accepted parameters established by the Federal Highway Administration.

Since 2016, Interstate 580 was extended approximately three miles from the termini at Fairview Drive to the intersection of U.S. Highway 50 West and U.S. Highway 395. This has significantly influenced travel patterns and performance in the CAMPO area. Additionally, outside of the CAMPO boundary, USA Parkway was completed in 2017, which has increased commute travel from areas in and around CAMPO to the Tahoe Regional Industrial Park (TRIC), originally only accessed via Interstate 80. These roadway network changes have been incorporated into CAMPO's travel demand model.

A complete model documentation report is provided at the link below:
http://carson.org/home/showdocument?id=50163

A 2020 update to the model was incorporated into the 2050 RTP. It is provided at the link below:
https://www.carson.org/home/showdocument?id=74038

The travel demand model predicts system demand and performance in model scenarios: a base year scenario of 2020, a near-term scenario of 2030, and a long-range scenario of 2050. The near-term and long-range scenarios are further analyzed by adding transportation improvement projects, which are categorized by projects that are reasonably anticipated to be funded (constrained), and which projects do not have funding identified (unconstrained). CAMPO staff utilizes two model outputs Level of Service (LOS) and travel time estimates. The LOS measure can be used to evaluate roadway sections based on a comparison of vehicle volume and roadway capacity. The travel time measure, also known as travel time reliability, measures the time it takes to travel from one location to another. Travel time reliability is significant to many transportation system users, whether they are vehicle drivers, transit riders, or freight shippers. Personal and business travelers value reliability because it allows them to make better use of their own time. Freight shippers and carriers' value predictable travel times to refine their logistics and to remain economically competitive.

Outputs from CAMPO's travel demand model on travel time are contained in Table 4.1. Due to the I-580 extension, constructed in 2017, the travel times between the years 2015 and 2021 have reduced. Over the long-term, the travel demand model is forecasting increases in travel time during the afternoon peak travel times (PM) and along the U.S. 50 East corridor.

Table 4.1: Travel Times in Minutes between Metropolitan Planning Area Gateways

		Year 2015		Year 2020		Year 2030		Year 2050	
From	**To**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
U.S. Hwy 395 North (Carson City and Washoe County Line near Hobart Road)	U.S. Hwy 50 East (Near Chaves Road)	30.2	39.4	24.6	34.1	24.6	37.5	24.6	47.8
	U.S. Hwy 395 South (0.4 miles south of Johnson Lane)	23.1	30.4	16.0	24.5	16.0	25.6	16.0	27.9
	U.S. Hwy 50 West (2.7 miles west of U.S. Hwy 395)	16.8	18.7	11.7	13.0	11.7	13.2	11.7	13.7
U.S. Hwy 50 East (Near Chaves Road)	U.S. Hwy 395 North (Carson City and Washoe County Line near Hobart Road)	35	33.6	24.7	28.3	24.8	28.9	24.9	30.2
	U.S. Hwy 395 South (0.4 miles south of Johnson Lane)	48.2	53.6	32.2	43.2	32.3	44.6	32.4	47.8
	U.S. Hwy 50 West (2.7 miles west of U.S. Hwy 395)	41.9	41.9	27.9	31.7	28.0	32.3	28.1	33.5
U.S. Hwy 395 South (0.4 miles south of Johnson Lane)	U.S. Hwy 395 North (Carson City and Washoe County Line near Hobart Road)	26.4	26.4	16.1	19.3	16.1	19.8	16.2	20.9
	U.S. Hwy 50 East (Near Chaves Road)	46.6	55.2	31.9	43.3	31.9	47.1	31.9	57.8
	U.S. Hwy 50 West (2.7 miles west of U.S. Hwy 395)	16.1	15.3	10.4	12.5	10.4	12.8	10.5	13.5
U.S. Hwy 50 West (2.7 miles west of U.S. Hwy 395)	U.S. Hwy 395 North (Carson City and Washoe County Line near Hobart Road)	17.3	18.5	11.7	13.0	11.7	13.3	11.7	13.7
	U.S. Hwy 50 East (Near Chaves Road)	37.5	47.3	27.5	37.0	27.5	40.5	27.5	50.7
	U.S. Hwy 395 South (0.4 miles south of Johnson Lane)	13.3	19.1	10.3	17.8	10.3	18.6	10.3	20.6

Source: CAMPO's 2050 Regional Transportation Plan
*AM represents morning peak travel times and PM represents afternoon peak travel times
**Year 2015 data is from CAMPO's 2040 Regional Transportation Plan

Outputs from CAMPO's travel demand model on LOS are provided on the following pages. Only the near- and long-term scenarios which incorporate fiscally constrained projects are provided, all other scenarios are contained within the model documentation report. Level of Service (LOS) is a measurement used to determine how well a transportation facility is operating from a traveler's perspective. The travel demand model assigns a letter designation from A to F, with LOS A representing the best operating conditions, and LOS F the worst. The LOS is based on the average daily traffic, opposed to using a peak travel period. Figures 4.8, 4.9, and 4.10 delineate the LOS for approximately 1,152 road segments in each of the three scenarios (base-year, near-term, and long-range). Between 2020 and 2050, the LOS will diminish primarily on U.S. Highway 50 East and U.S. Highway 395.

Figure 4.8: 2020 Base Year Conditions: Roadway Level of Service (LOS)

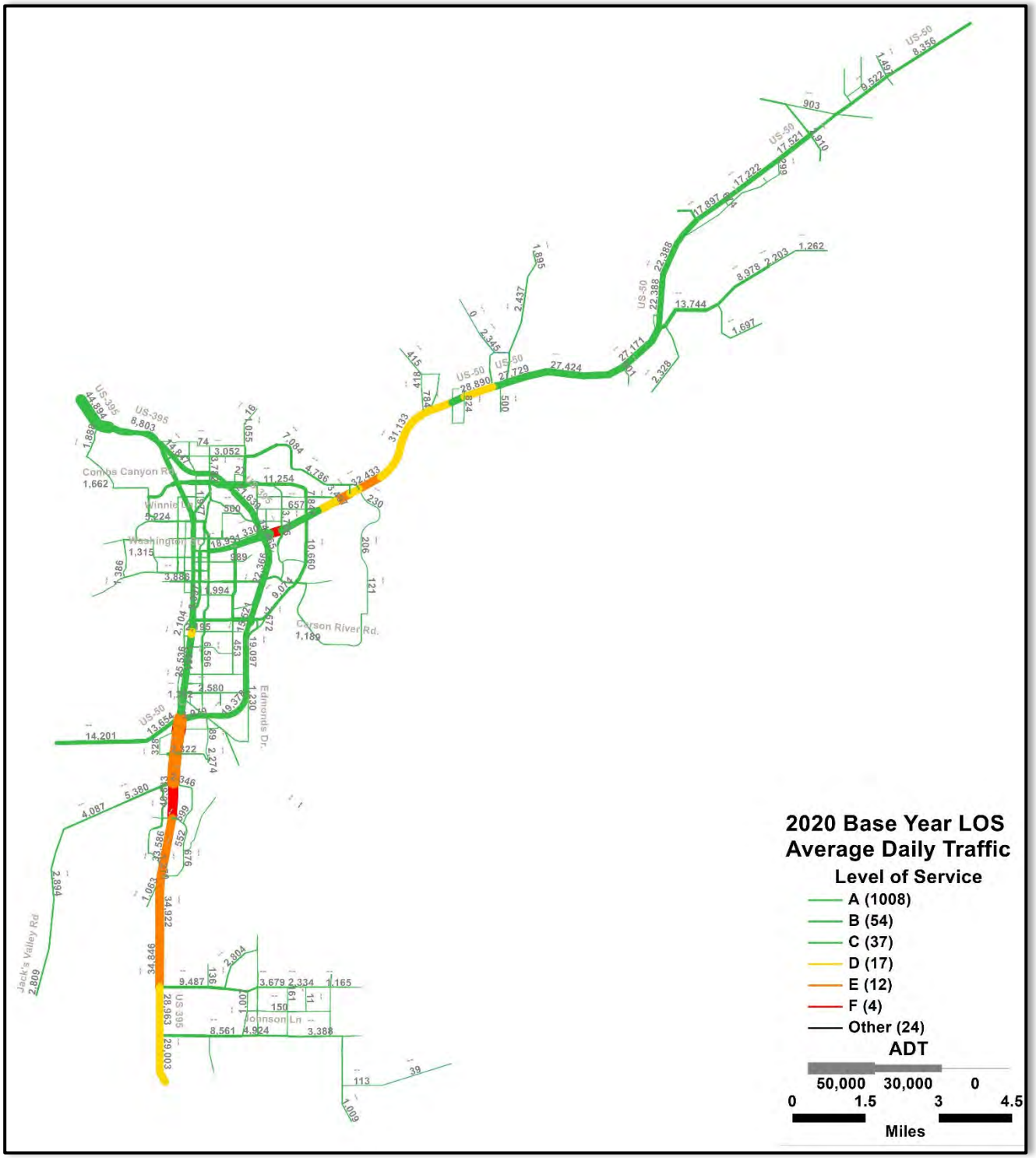


Figure 4.9: 2030 Near-Term Conditions: Roadway Level of Service

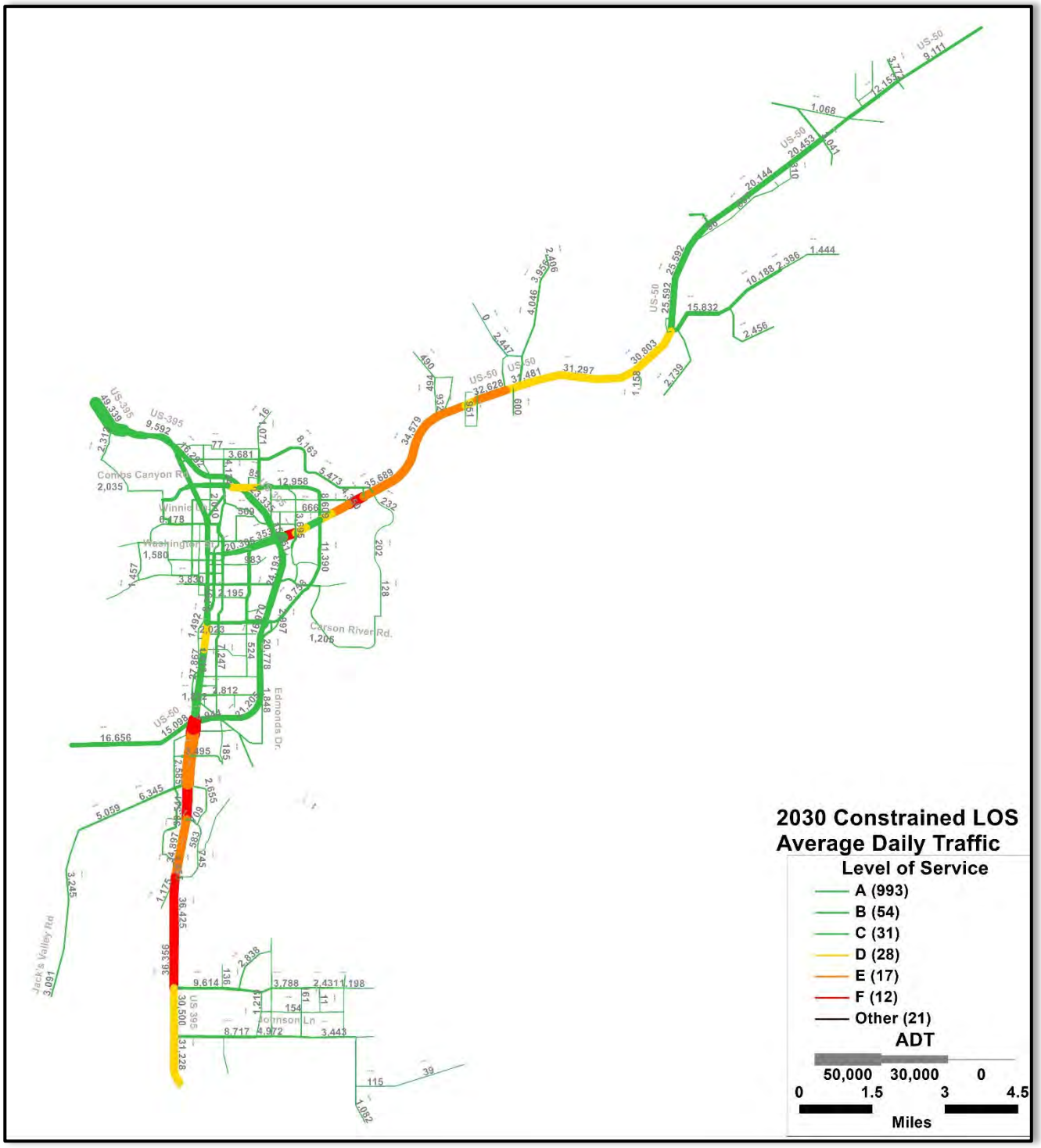
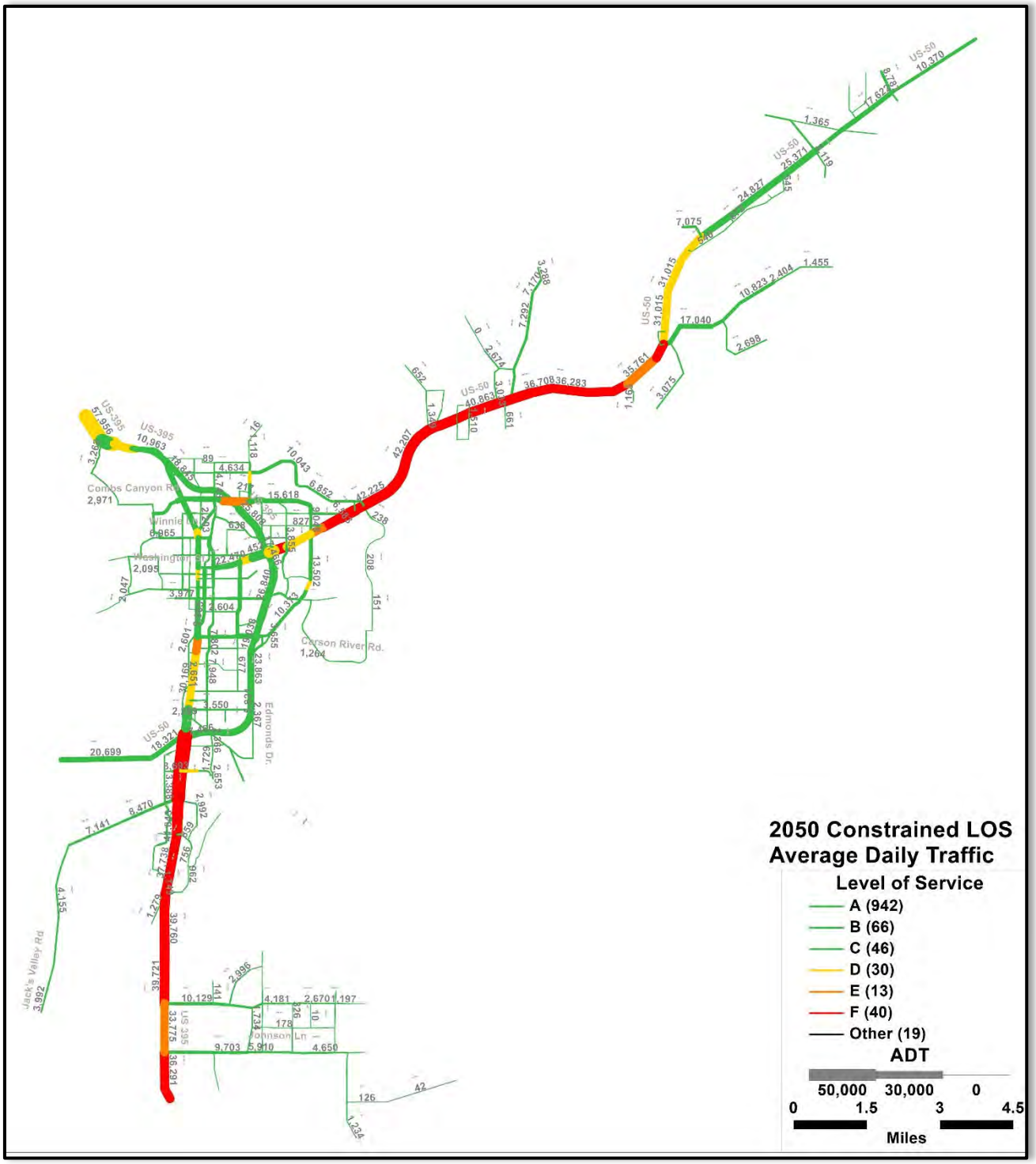


Figure 4.10: 2050 Long-Range Conditions: Roadway Level of Service



Local Roadway Pavement Condition

The roadway network provides vehicle mobility and is by far one of the most significant investments made by local agencies. Preservation of the roadway network has been identified as a high priority by federal, state, regional, and local agencies. The adopted 2019-2023 Pavement Management Plan was developed through a partnership between Carson City Public Works and CAMPO. The plan serves as a framework for preserving, rehabilitating, and reconstructing Carson City's and CAMPO's roadway network. Although the plan was originally developed to incorporate only Carson City's roadways, CAMPO has since collected Pavement Condition Index (PCI) data for Douglas County roads within the Metropolitan Planning Area and looks forward to eventually supporting Pavement Management planning for Western Lyon County as well.

The plan tracks pavement condition over time, using pavement management software and professional services to survey the condition of roadways. This methodology utilized within the plan allows staff to set targets and annually evaluate the allocation of resources for maintaining pavement infrastructure. The pavement survey assigns a PCI rating to sections of roadway. The PCI rating is calculated using standards developed by the U.S. Army Corps of Engineers and measures the type, extent, and severity of pavement surface distresses and smoothness of the road. The PCI helps to evaluate the rate of pavement deterioration and to develop an appropriate pavement management strategy.

The following PCI ranges are used to help determine the pavement condition:

- Satisfactory to Good – PCI 70-100
- Poor to Fair – PCI 40-69
- Failed to Very Poor – PCI 0-39

Table 4.2 presents the PCI for roadways within Carson City. Per the pavement management plan, Carson City is divided into five performance districts. The data reflects increases to regional road PCI in the Performance Districts that were allocated funding during the first two years of Pavement Management Plan implementation: District 1 (2019) and District 2 (2020). An increase to the Regional Road PCI in District 4 is also observed, attributable to the recently completed South Carson Complete Streets Project. Overall, Carson City roadway condition has decreased 10 percent since 2015, with local road condition deteriorating by 15 percent. To reverse the deterioration, additional resources must be invested into the roadway system.

Table 4.2: Carson City Pavement Condition Index – Annual Report Card

Pavement Condition Index (PCI) - Annual Report Card										
Facility Type		Estimated PCI							Percent Change 2020 to 2021	Percent Change 2015 to 2021
		2015	2016	2017	2018	2019	2020	2021		
City-wide	Regional Roads	68	68	67	68	67	67	63	-7%	-8%
	Local Roads	63	62	61	59	57	53	49	-8%	-22%
	All Roads	65	64	63	62	60	58	54	-8%	-17%
Performance District 1	Regional Roads	68	67	67	66	66	62	56	-9%	-18%
	Local Roads	62	62	62	60	56	52	48	-8%	-23%
	All Roads	64	64	64	62	59	55	51	-9%	-22%
Performance District 2	Regional Roads	74	74	73	72	70	71	68	-4%	-8%
	Local Roads	70	67	64	60	58	54	49	-9%	-30%
	All Roads	71	70	67	65	62	60	56	-6%	-21%
Performance District 3	Regional Roads	75	74	72	74	74	71	68	-4%	-9%
	Local Roads	53	53	57	57	57	54	51	-5%	-3%
	All Roads	60	60	62	62	62	59	56	-5%	-6%
Performance District 4	Regional Roads	58	59	61	64	62	75	69	-8%	20%
	Local Roads	60	59	58	56	52	49	45	-8%	-25%
	All Roads	59	59	59	59	56	58	53	-8%	-10%
Performance District 5	Regional Roads	68	67	64	63	62	58	53	-9%	-21%
	Local Roads	70	68	66	64	61	57	52	-9%	-26%
	All Roads	69	68	65	64	61	57	52	-9%	-24%

PCI numbers are beginning to decline at a faster rate than previous years because the bulk of Carson City roads are approaching “At Risk” or “Poor” conditions (see Table 4.2 and Figure 4.11). Figure 4.11 illustrates the steepest deterioration rates between 69 PCI and 25 PCI. The average PCI for local Carson City roads is 49 PCI, directly in the middle of the curve meaning that these roads are deteriorating at a faster pace compared to roads with an 85 PCI. CAMPO completed its pavement survey in Douglas County for the portion of Douglas County within the CAMPO Metropolitan Planning Area in 2019. The pavement condition for arterial and collector roadways within CAMPO and the percentage of all roadways with a PCI rating of 55 or below is presented in Table 4.3 for Carson City and Douglas County. The 2019 pavement condition for Northern Carson City and Southern Carson City are provided in Figure 4.12 and Figure 4.13.

Figure 4.11 : Relationship between Road Pavement Condition (PCI) and Deterioration Rates

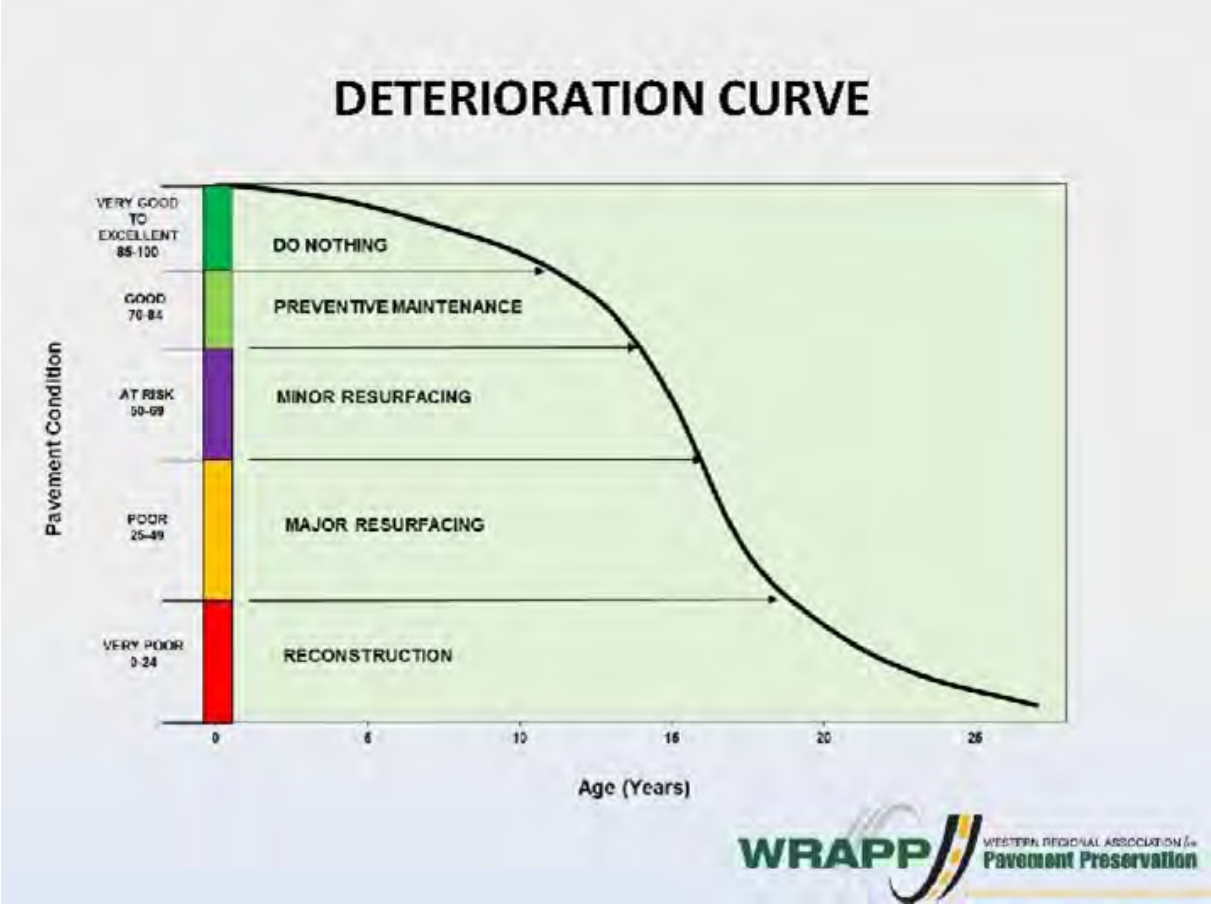


Table 4.3: Pavement Condition Index, Carson City & Douglas County

	Pavement Condition Index by Jurisdiction*			
	Carson City		Douglas County	
	2016 (2040 RTP)	2020 (2050 RTP)	2016 (2040 RTP)	2020 (2050 RTP)
Average Pavement Condition Index (PCI)** rating for collector and arterial roadways within the CAMPO boundary by jurisdiction	68	67	76	72
Percentage of all roadways with a PCI rating of 55 or below in the CAMPO boundary by jurisdiction	24%	44%	30%	45%

*CAMPO currently does not have any pavement condition data for Lyon County
**Pavement Condition Index (PCI) is a scale of 0 to 100, 100 being the best

Figure 4.12: Northern Carson City 2021 Pavement Condition Index (PCI)

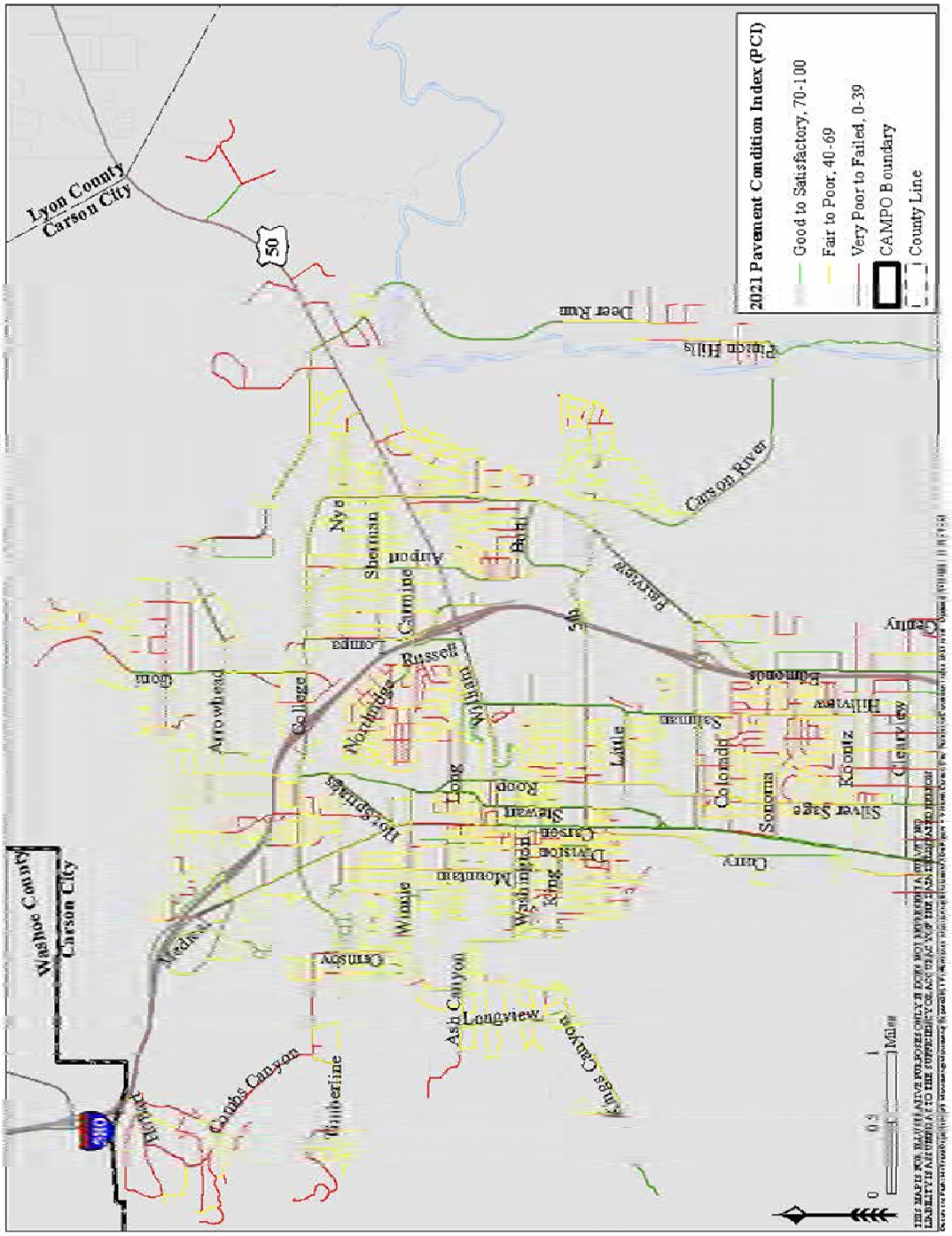
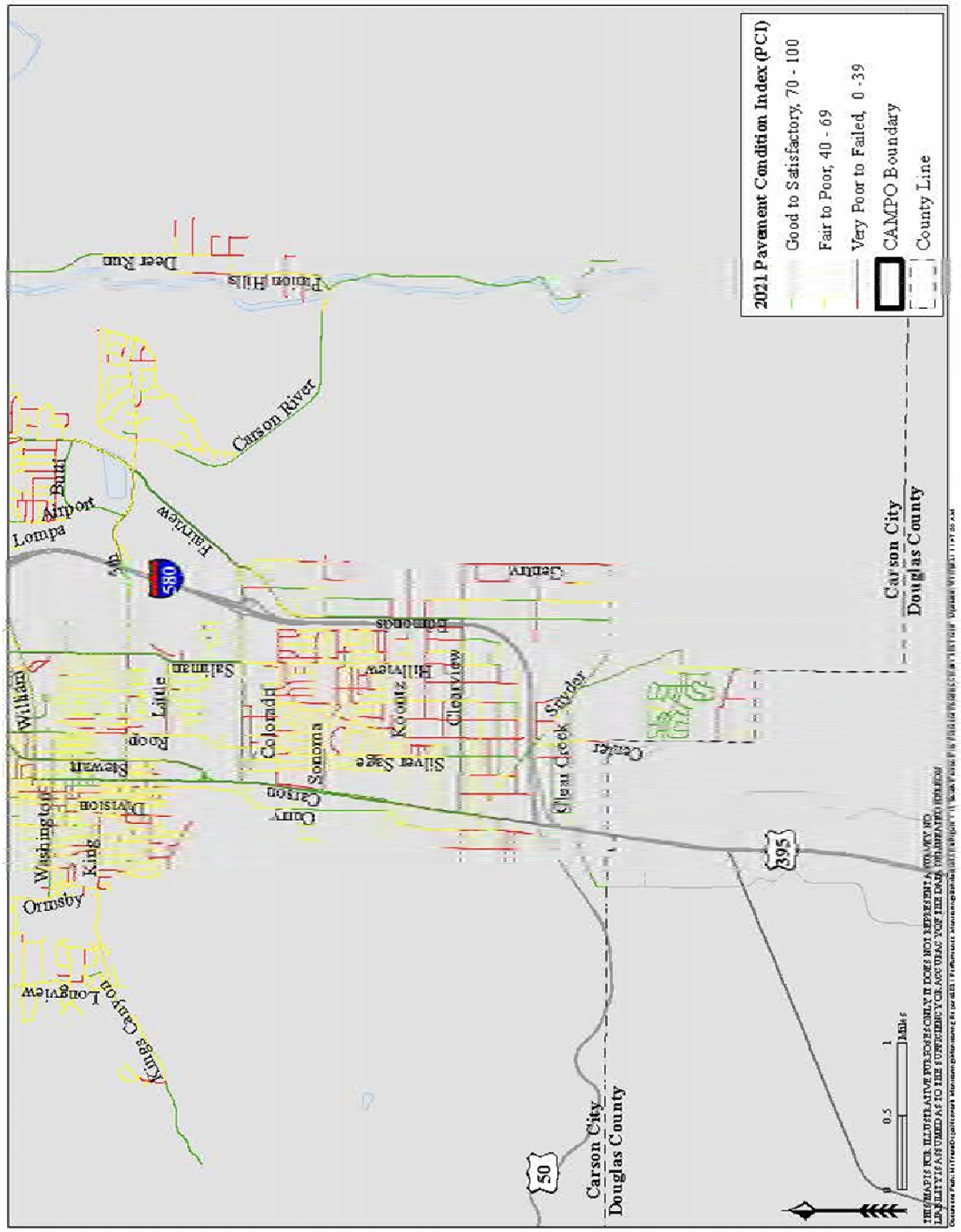


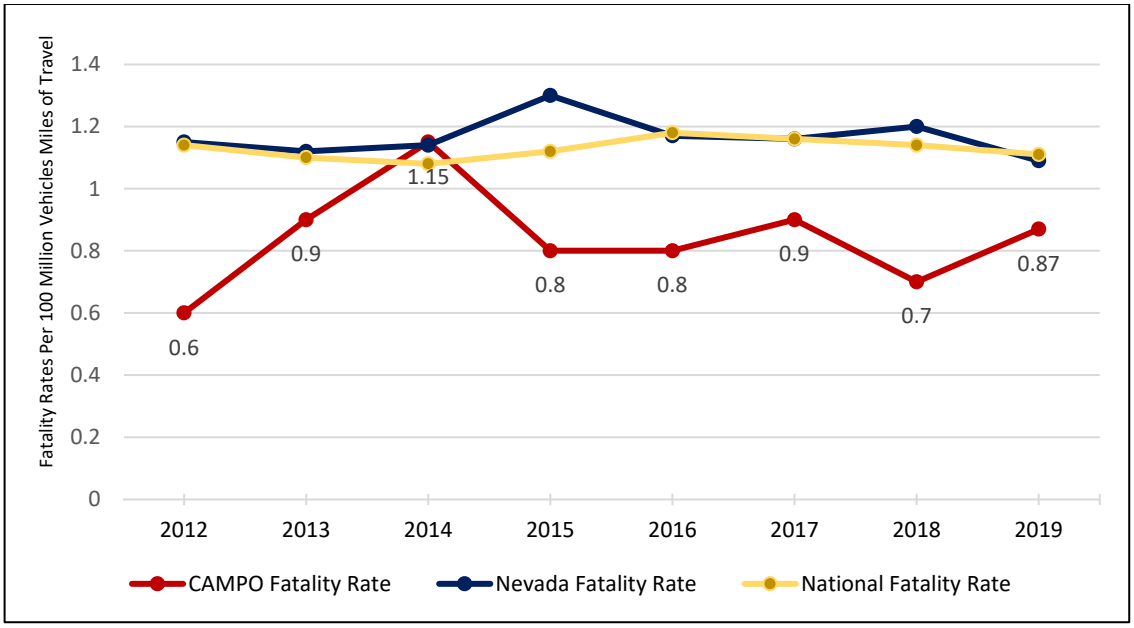
Figure 4.13: Southern Carson City 2021 Pavement Condition index (PCI)



Safety Data Monitoring

CAMPO monitors fatality rates compared with state and national trends. A comparison of the fatality rate per 100 million vehicle-miles of travel of the Nation, State of Nevada, and CAMPO is displayed in Figure 4.14. CAMPO's member agencies continually aim to infuse safety elements and best practices into all transportation projects. This includes FHWA's Proven Safety Countermeasures Initiative, which identifies safety treatments and strategies that are encouraged to be implemented by state, tribal, and local transportation agencies to reduce serious injuries and fatalities. CAMPO has reported significantly lower fatality rates than the state of Nevada and the United States as a whole since 2015.

Figure 4.14: Comparative Fatality Rates (2012-2019)



Source: https://www.fhwa.dot.gov/tpm/

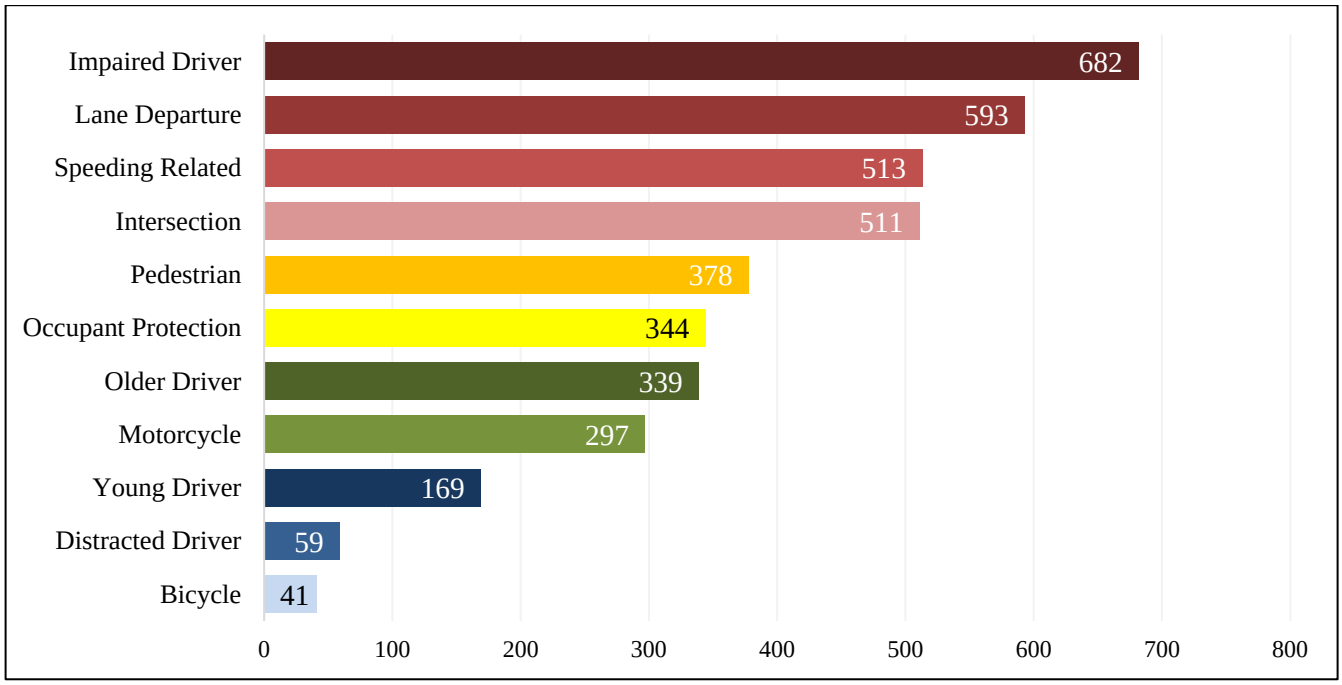
Nevada Strategic Highway Safety Plan (SHSP)[6]

The Nevada Department of Transportation and Department of Public Safety formed a Technical Working Group to develop a statewide safety plan in 2004, with a recent update in 2021 for the years 2021-2025. Nevada's Strategic Highway Safety Plan (SHSP) is a comprehensive data-driven statewide safety plan that identifies the highest causes of fatalities and serious injuries on Nevada's roadways, and provides a coordinated framework for reducing the crashes that cause fatalities and serious injuries. The SHSP establishes statewide goals and critical emphasis areas focusing on the 6 E's of traffic safety: Equity, Engineering, Education, Enforcement, and Emergency Medical Services/Emergency Response/Incident Management, and Everyone. Goals and strategies are developed in consultation with federal, tribal, state, local, and private-sector safety stakeholders. The purpose of the SHSP is to eliminate traffic related fatalities and serious injuries by combining and sharing resources across disciplines and strategically targeting efforts to the areas of greatest need. Nevada has enlisted state, local, tribal, and federal agencies; institutions; private-sector firms; and concerned citizens to help solve this problem.

[6] Nevada Strategic Highway Safety Plan (SHSP) - https://zerofatalitiesnv.com/safety-plan-what-is-the-shsp

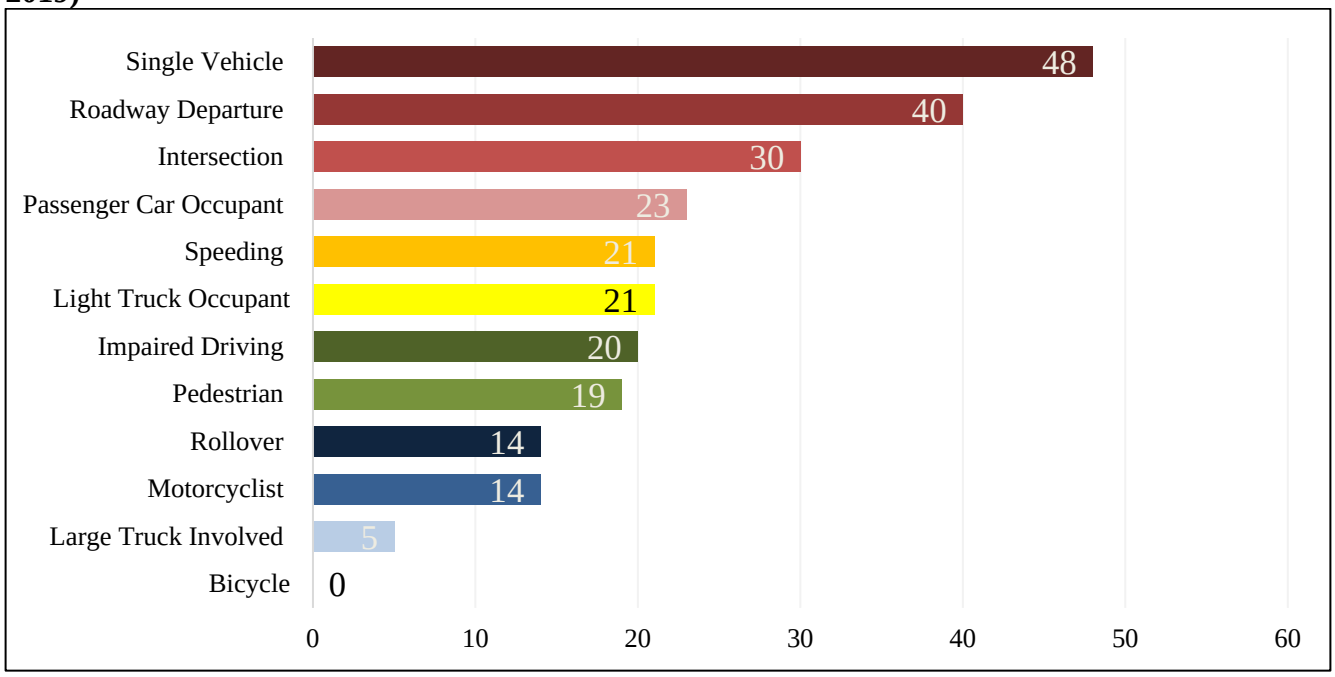
Figure 4.15 identifies the number of fatalities for the State of Nevada categorized by critical emphasis area. Figure 4.16 identifies the combined number of fatalities for Carson City, Douglas County, and Lyon County by critical emphasis area.

Figure 4.15: Nevada Total Fatalities by Emphasis Area (2015-2019)



Source: Nevada Department of Public Safety

Figure 4.16: Carson City, Douglas County and Lyon County Fatalities by Emphasis Area (2015-2019)



Source: Nevada Department of Public Safety

Federal Performance Measures for Roadways

Performance of the roadway system is monitored and evaluated through a series of performance measures, established in the Moving Ahead for Progress in the 21st Century (MAP-21) Act and required by the Fixing America's Surface Transportation (FAST) Act. The Federal Highway Administration (FHWA) has established defined performance measures and target-setting methodology for MPOs and state transportation agencies to monitor and report. The performance measures are aimed at tracking safety, infrastructure condition, and system performance. Developing transportation projects and programs that aim to address these performance measures will help CAMPO's member agencies be competitive when applying State and Federal discretionary grant funding. Notably, 71 percent of existing revenue within the CAMPO area is from a federal source.

Safety Performance Measures

A top priority of CAMPO's Regional Transportation Plan is to increase the safety of the transportation system for all its users. The U.S. Department of Transportation (U.S. DOT) FHWA Safety Performance Measure (PM) Final Rule establishes requirements for the purpose of assessing fatalities and serious injuries on public roads. The five established performance measures, based on a five-year rolling average, are:

- Number of Fatalities
- Rate of Fatalities per 100 million Vehicle Miles Traveled
- Number of Serious Injuries
- Rate of Serious Injuries per 100 million Vehicle Miles Traveled
- Number of Non-motorized Fatalities and Serious Injuries

The performance measures create a consistent method to count and gauge the safety of CAMPO's Transportation Network. The Fatality Analysis Reporting System (FARS) and the National Highway Transportation Safety Administration (NHTSA) provide the data for measuring fatalities and serious injuries, respectively. Vehicle Miles Traveled (VMT) statistics are estimated using the statewide travel demand model maintained by the Nevada Department of Transportation (NDOT).

Target-Setting Process - The Safety PM Final Rule establishes the process for State Departments of Transportation (DOTs) and Metropolitan Planning Organizations (MPOs) to adopt and report safety targets along with a set of performance measures to assess progress toward targets. MPOs shall establish their performance targets for each of the five measures no later than 180 days after the State submits annual targets.

State Targets - NDOT's statewide targets are reported in their Highway Safety Improvement Program Annual Report.

CAMPO Requirements for Safety Target-Setting - CAMPO may choose to support the State's targets or establish CAMPO-specific targets for one or more of the five performance measures noted above. Performance targets must be set annually by the MPO.

Each year staff analyzes alternative statistical trend line projections to evaluate appropriate targets for the CAMPO planning area. Crash data becomes available approximately ten months after the close of each calendar year. A five-year baseline projection trend is required to be evaluated. Additional

projection trends are encouraged to be evaluated against the five-year baseline. Targets must be data-driven, realistic, and attainable.

CAMPO adopts targets by February 28th of each year. This Monitoring Report does not adopt any new targets. A 0.5% reduction of the five-year baseline trend was adopted for CAMPO's 2018, 2019, and 2020 targets, for each of the five required performance measures. At the time this report was finalized, data from the 2020 calendar year was not yet released by the Nevada Department of Transportation. Consequently, this report does not contain an evaluation to determine whether 2020 targets set in 2019 were achieved. In review of the 2019 Targets, CAMPO met two of the five targets, which are highlighted in green below. Table 4.4 contains information on the five safety performance measures, including the five-year baseline data and CAMPO's adopted 2018-2020 targets, respectively.

In February 2021, CAMPO chose to support Nevada statewide safety targets in lieu of the CAMPO-specific targets used previously.

Table 4.4: Safety Performance Measure Data and Targets

		Fatalities			Serious Injuries			Fatalities and Serious Injuries Non-Motorized			Rate of Fatalities		Rate of Serious Injuries		Vehicles Miles Traveled (VMT)
		Target	#	Rolling Average	Target	#	Rolling Average	Target	#	Rolling Average	Target	Rate	Target	Rate	
Year	2008	-	1	-	-	12	-	-	6	-	-	-	-	-	-
	2009	-	2	-	-	7	-	-	2	-	-	-	-	-	-
	2010	-	6	-	-	8	-	-	1	-	-	-	-	-	-
	2011	-	5	-	-	8	-	-	0	-	-	-	-	-	458,370,939
	2012	-	1	3.00	-	7	8.40	-	5	2.80	-	0.64	-	1.79	470,558,752
	2013	-	9	4.60	-	11	8.20	-	7	3.00	-	0.94	-	1.68	487,520,736
	2014	-	8	5.80	-	12	9.20	-	12	5.00	-	1.19	-	1.89	487,200,339
	2015	-	3	5.20	-	8	9.20	-	5	5.80	-	0.91	-	1.61	571,234,641
	2016	-	7	5.60	-	10	9.60	-	8	7.40	-	0.90	-	1.55	619,768,739
	2017	-	6	6.60	-	2	8.60	-	6	7.60	-	0.97	-	1.27	677,473,469
	2018	5.57	5	5.80	9.55	11	8.60	7.36	4	7.00	0.90	0.83	1.54	1.24	696,272,881
	2019	6.57	8	5.80	8.56	13	8.8	7.56	3	5.2	0.97	0.87	1.26	1.32	665,777,895
	2020	5.77			8.56			6.97			0.83		1.23		
	2021	*			*			*			1.036		3.239*		

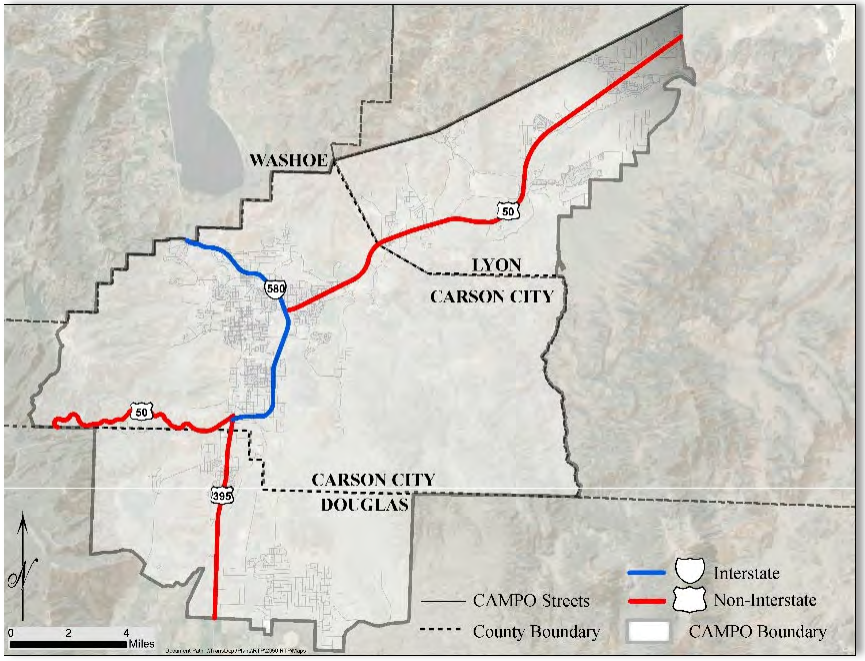
1. Targets for all Performance Measures are stated as a five-year rolling average
2. Rolling averages consist of five-year rolling average, which includes the reporting year
3. Serious Injuries are when an injured person is unable to leave the accident scene without assistance
4. Rate of Fatalities and Serious Injuries are per 100 million Vehicle Miles Traveled (VMT) and use the five-year rolling average
5. Green shading denotes target was met; red sharing denotes target was not met.

* In February 2021, CAMPO decided to support the State's safety targets in lieu of using CAMPO-specific targets. Targets for statewide fatality and serious injury rates are listed here. Number targets will be calculated by using rates and CAMPO VMTs, which are not yet available for 2021. Therefore, the targets for Fatalities, Serious Injuries, and Fatalities and Serious Injuries Non-Motorized are blank.

Pavement & Bridge Condition and System Reliability Performance Measures

FHWA published the Pavement and Bridge Condition Performance Measures Final Rules in the Federal Register on January 18, 2017, with an effective date of May 20, 2017. The rule established performance measures to assess the condition of pavements and bridges on the National Highway System (NHS) (see Figure 4.17).

Figure 4.17: National Highway System Roadways and Bridges within CAMPO's Boundary



Federally required performance measures for Pavement Condition are:

(1) Percentage of Interstate pavements in Good condition
(2) Percentage of Interstate pavements in Poor condition
(3) Percentage of non-Interstate NHS pavements in Good condition
(4) Percentage of non-Interstate NHS pavements in Poor condition

Pavement conditions for this Final Rule use the International Roughness Index (IRI) along with cracking, rutting, and faulting distresses to measure roadway condition. This is different than how local member agencies measure roadway condition. Local member agencies use the Pavement Condition Index (PCI) to measure pavement condition. The difference between IRI and PCI, is that IRI measures smoothness or ride quality while PCI measures conditions based on surface distresses.

Federally required performance measures for Bridge Condition, which include all bridges on the NHS, including bridges that function as on- and off-ramps, are:

(1) Percentage of NHS bridges by deck area in Good condition
(2) Percentage of NHS bridges by deck area in Poor condition

The performance measures evaluate the bridge deck, bridge structure above ground, bridge structure below ground, and associated culverts. These evaluations are performed, monitored, and reported by NDOT. CAMPO monitors these performance measures to advocate for resources as needed.

FHWA published the National Highway System and Freight Performance Measures Final Rules in the Federal Register on January 18, 2017, with an effective date of May 20, 2017. Federally required performance measures for System Reliability, developed to assess the performance of the interstate and non-interstate segments of the National Highway System as well as regional freight movement, are:

(1) Interstate Travel Time Reliability Measure: Percent of person-miles traveled on the Interstate that are reliable
(2) Non-Interstate Travel Time Reliability Measure: Percent of person-miles traveled on the non-Interstate NHS that are reliable
(3) Freight Reliability Measure: Truck Travel Time Reliability (TTTR) Index

The Final Rules for Pavement Condition, Bridges, and System Reliability performance measures require a performance report which include baseline conditions along with two- and four-year targets. MPOs can support NDOT's targets or establish their own, quantifiable targets. These performance measures are calculated, tracked, and reported by NDOT. CAMPO monitors these performance measures to advocate for resources as needed. CAMPO currently supports NDOT's two- and four-year targets for Pavement Condition, Bridge Condition, and System Performance measures. CAMPO staff has requested that NDOT provide all NHS data for these performance measures that are specific to CAMPO's Metropolitan Planning Area. Acquisition of this data will allow for a statewide and nationwide comparison. Table 4.5 contains the latest data provided by data for roadways and bridges on the National Highway System within CAMPO's Metropolitan Planning Area.

Table 4.5: Statewide Performance Measures for Pavement Condition, Bridge Condition, and System Reliability

Performance Measure	2019		
	Baseline	2-Year Target	4-year Target
Percentage of Pavements of the Interstate System in Good **Condition**	--	--	74.7%
Percentage of Pavements of the Interstate System in Poor Condition	--	--	1.4%
Percentage of Pavements of the Non-Interstate National Highway System (NHS) Classified as in Good Condition	79.4%	67.6%	55.8%
Percentage of Pavements of the Non-Interstate National Highway System (NHS) Classified as in Poor Condition	4.7%	5.7%	6.5%
Percentage of National Highway System (NHS) Bridges Classified as in Good Condition	42.2%	35.0%	35.0%
Percentage of National Highway System (NHS) Bridges Classified as in Poor Condition	0.5%	7.0%	7.0%
Percent of the Person-Miles Traveled on the Interstate that are Reliable	86.8%	86.9%	87.0%
Percent of the Person-Miles Traveled on the Non-Interstate National Highway System (NHS) that are Reliable	--	--	87.0%
Truck Travel Time Reliability (TTTR) Index	1.28	1.28	1.26

Source: NDOT 2020 Performance Management Report
https://www.fhwa.dot.gov/tpm/reporting/state/state.cfm?state=Nevada

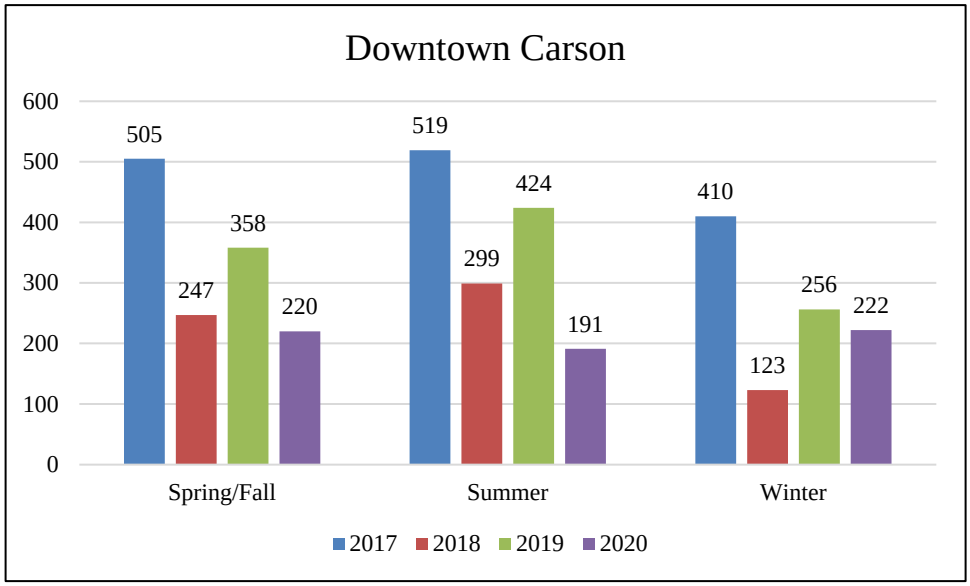
4.2 – COMPLETE STREETS

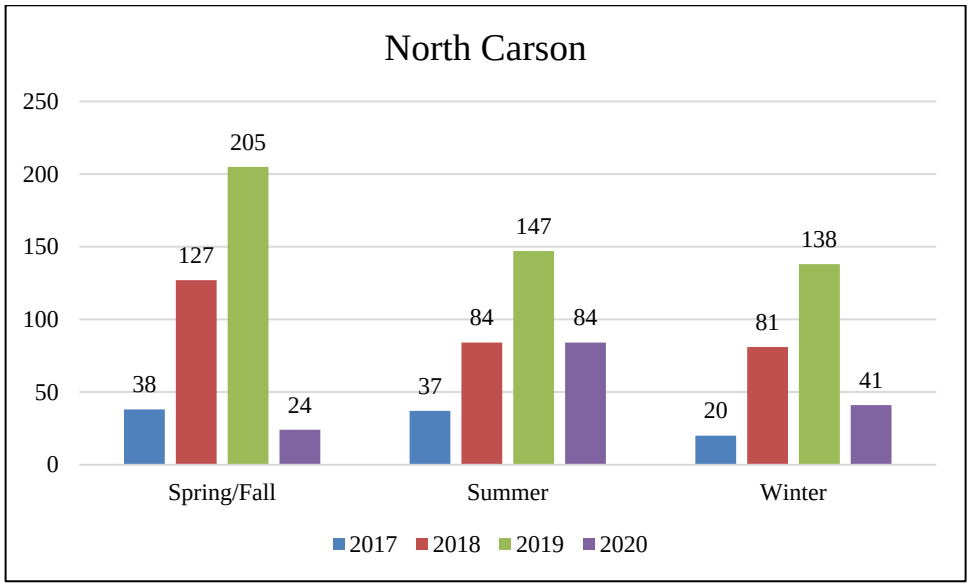
Complete Streets are designed and operated to enable safe access and comfortable accommodation of users of all ages and abilities, including pedestrians, cyclists, movers of commercial goods, persons with disabilities, public transportation vehicles and their passengers, older adults, children, and motorists. Since 2017, CAMPO staff have monitored pedestrian and bicycle activity on four corridors designated by the Carson City Board of Supervisors for Complete Streets treatment. The corridors are Downtown Carson Street, North Carson Street, South Carson Street, and East William Street. Complete Streets enhancements were completed in the Downtown Corridor (2017) and South Carson Street Corridor (2020). Complete Streets improvements are planned for William Street in 2023 and North Carson Street in 2025.

Pedestrian Monitoring

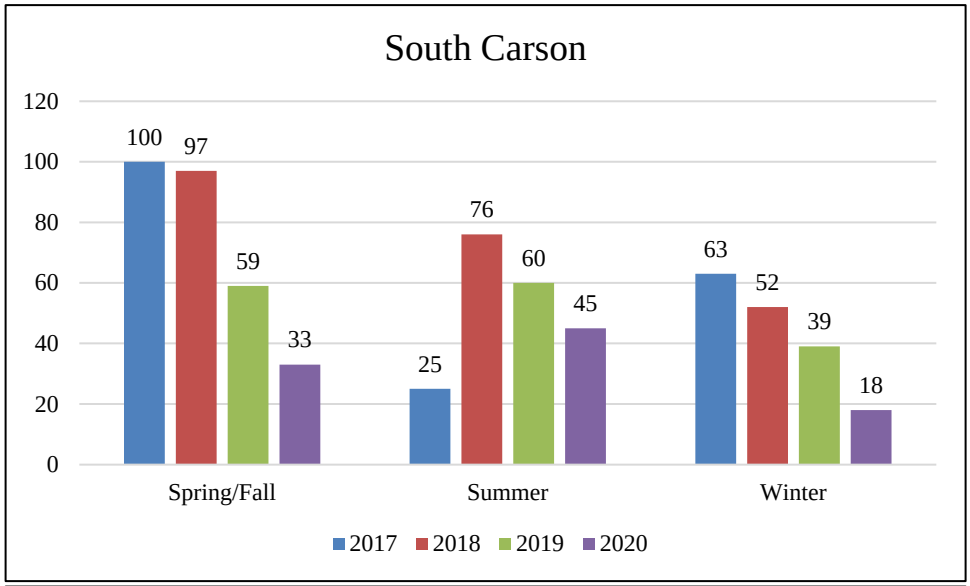
Figures 14.18- 14.21 display the 2017 and 2018 baseline pedestrian data as well as 2019 and 2020 data, including annual average volumes and seasonal average volumes by corridor. As CAMPO continues to monitor pedestrian volumes along the four complete streets corridors in Carson City, it is important to remember that CAMPO's monitoring program is still relatively young. It is difficult to draw conclusions from only a couple years' data, however, the value of data collection in the long term cannot be overstated.

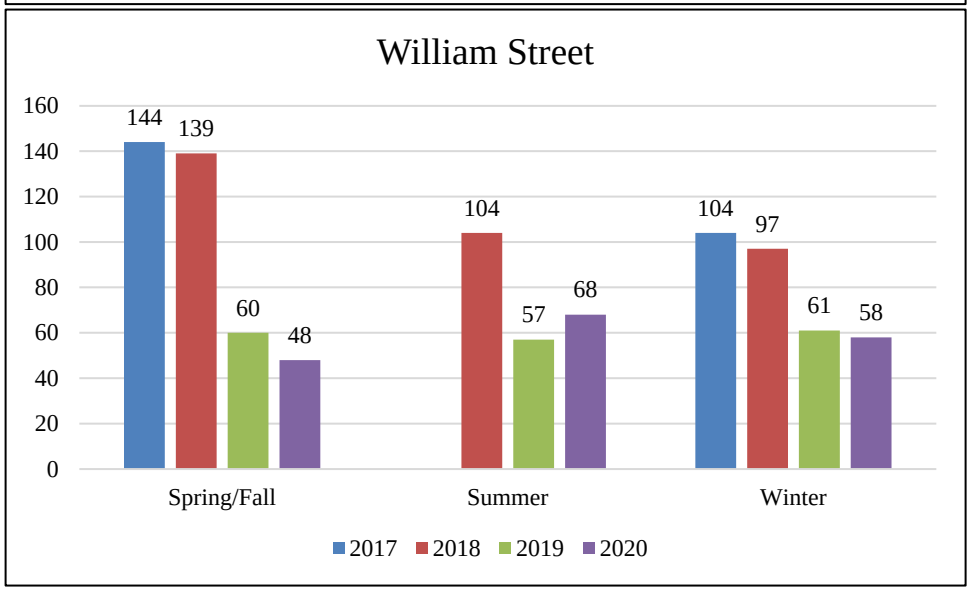
Figures 4.18-21 Average Daily Pedestrian Volume per Season by Corridor and Year (2017-2020)





Figures 4.18-21 Average Daily Pedestrian Volume per Season by Corridor and Year (2017-2020) (continued)





Notes:

1. Seasonal months are defined as follows:
   Summer (May, June, July, August); **Spring / Fall** (March, April, September, October); **Winter** (November, December, January, February)
2. Outliers have been removed

Figure 4.22 provides average daily pedestrian volumes by corridor from 2017 to 2020.

Figure 4.22: Average Daily Pedestrian Volumes by Corridor (2017-2020)

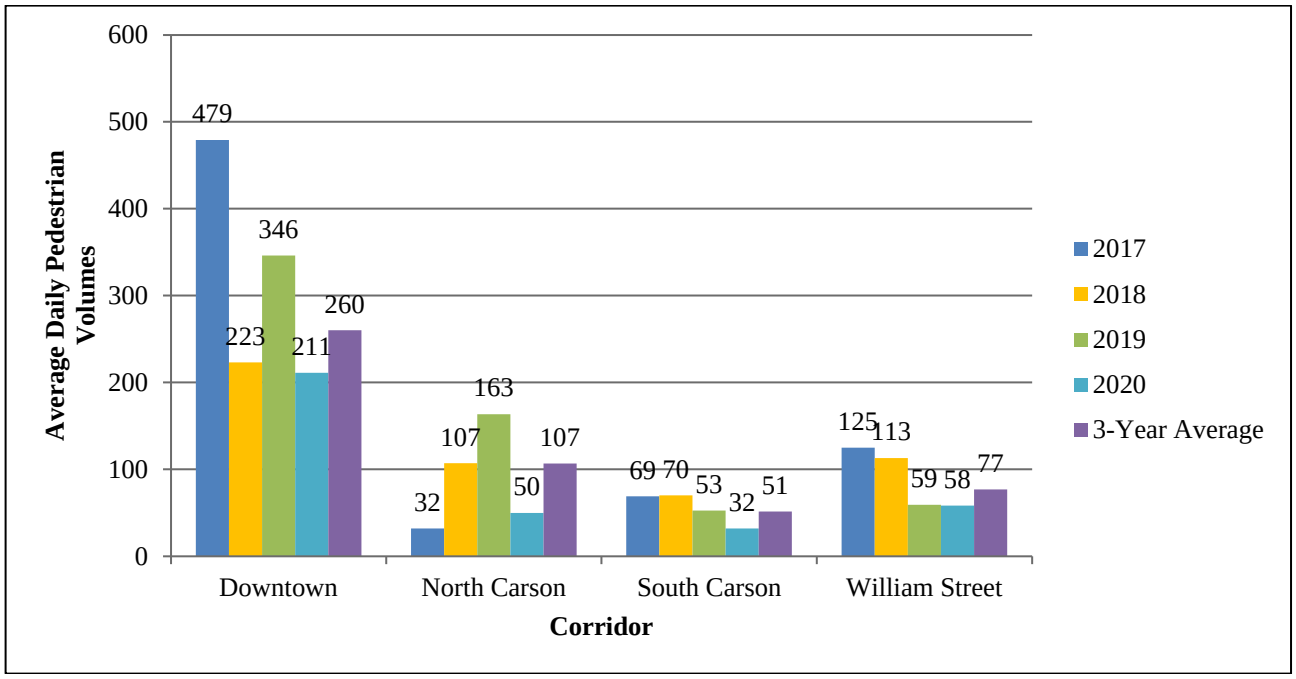


Figure 4.23: Pedestrian Counter Locations (2017-2020)

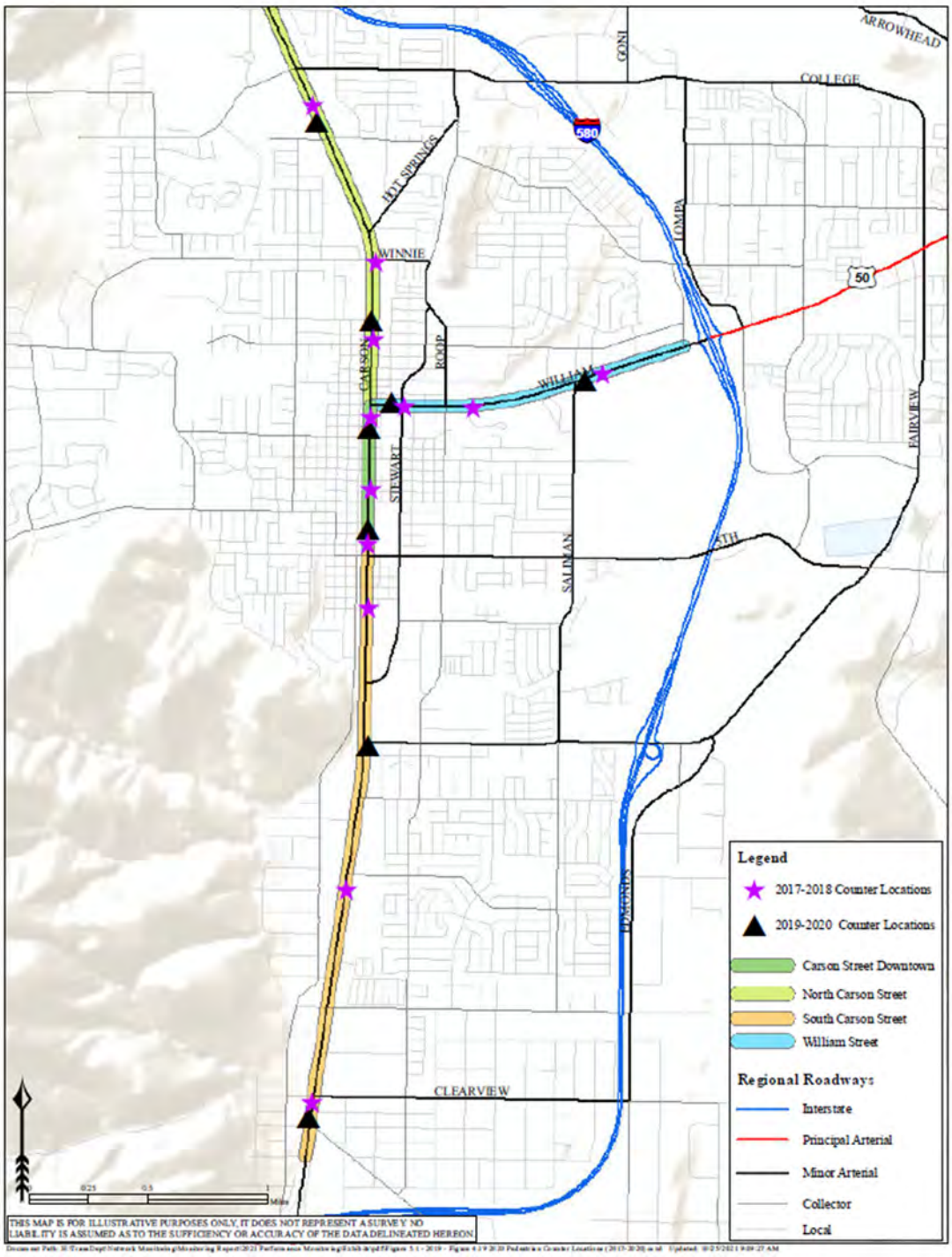


Figure 4.23 displays pedestrian counter locations from 2017 through 2020. In 2019 the pedestrian counters began to be installed in a more permanent manner, placing counters in a single location for six months at a time. This was done to obtain a more consistent data sample.

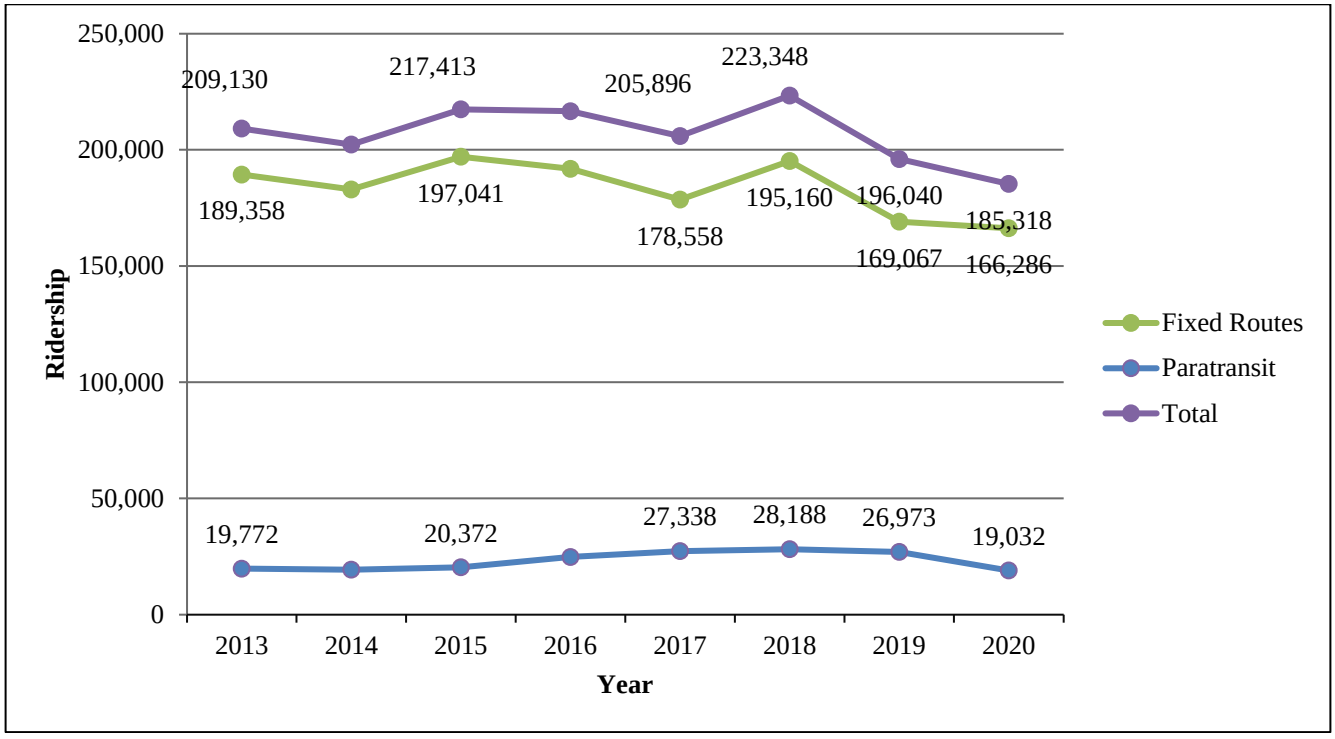
4.3 – TRANSIT MONITORING

In the CAMPO area, Jump Around Carson (JAC) is the primary transit provider. The JAC bus transit system is comprised of 62 bus stops along four fixed routes. As required by federal regulations, JAC provides a complementary paratransit service that provides "door to door" bus service for persons with disabilities who cannot access the fixed bus routes and are located within a mile from an established fixed route.

Between 2013 and 2020, the average combined ridership for JAC is 207,003. Ridership is defined as the number of boarding passengers. The demand for transit mobility in the United States and the Carson area is significantly influenced by socioeconomical factors, such as demographics (age and gender), economics (income and occupation), public resources (transit infrastructure and performance), and land use. Fluctuation in employment levels, gas prices, household income, bus cleanliness, and bus on-time performance can significantly impact annual ridership.

Figure 4.24 shows ridership data between 2013 and 2020. Total ridership for JAC increased by 8.5% from 2017 to 2018. 2019 however saw a decrease in ridership of 12%, mainly attributed to JAC's prior contract operator, that experienced difficulties in staff retention and performance. JAC contracted with a new transit operator in 2020 to improve service quality, but ridership dropped by 7% to the lowest level of the decade. This was caused largely by the coronavirus pandemic. Ridership is expected to increase as public health conditions improve and normal travel patterns resume.

Figure 4.24: JAC Ridership (FY 2013-FY 2020)



Source: Jump Around Carson National Transit Database, Annual Reports, 2013-2020

The JAC transit map is depicted in Figure 4.25, which identifies JAC's four fixed routes and the JAC Assist (paratransit) service areas which include a three-quarter mile area and a mile area (extended service area) beyond the fixed routes.

Figure 4.25: JAC Transit Map (Fall 2020)

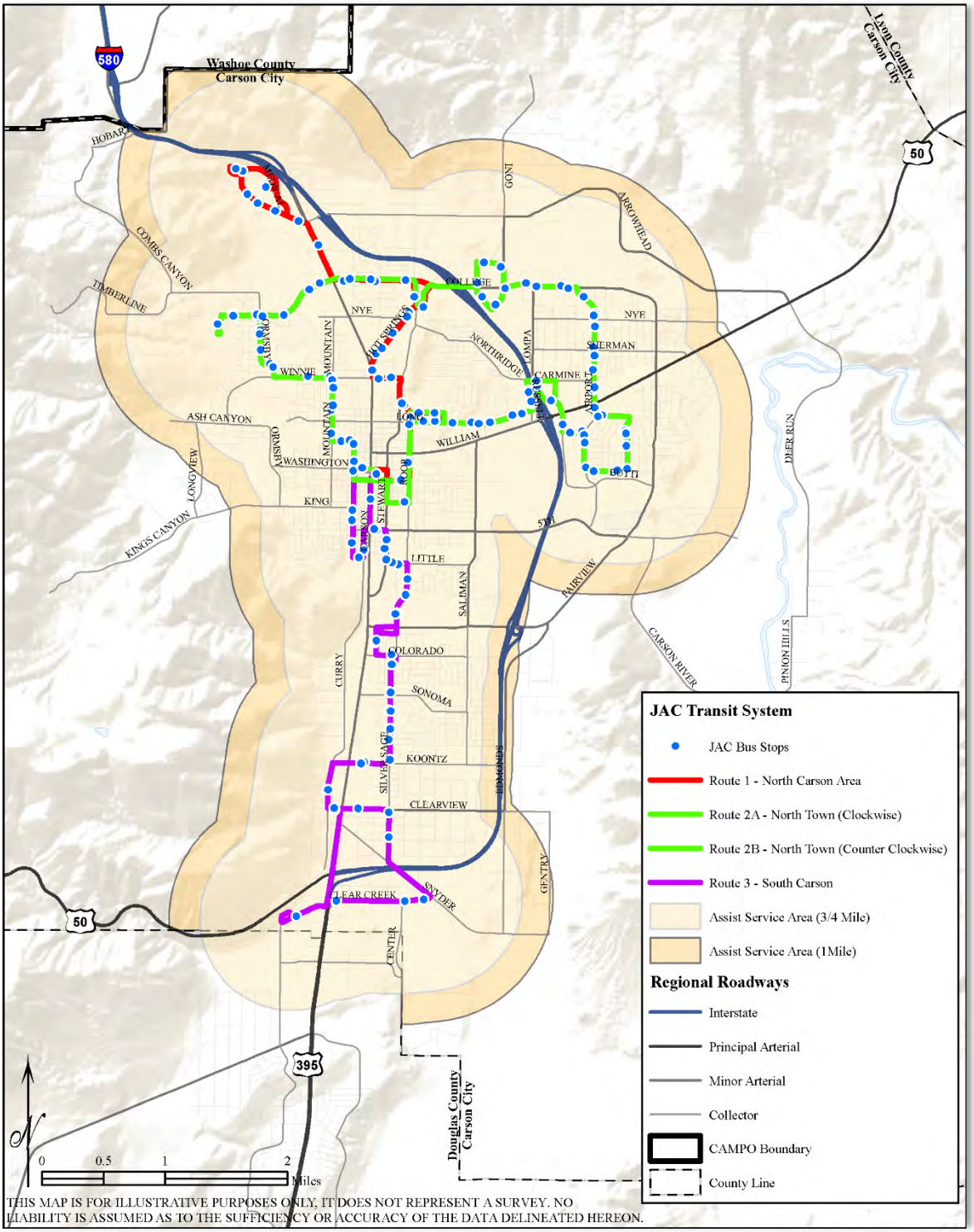


Table 4.7 provides the annual performance reporting of key metrics utilized to understand efficiency and effectiveness of JAC's transit operation from 2017 through 2020.

Table 4.7: Jump Around Carson Operating Statistics (2017-2020)

	FY 2017		FY 2018		FY 2019		FY 2020	
	Fixed	**Para**	**Fixed**	**Para**	**Fixed**	**Para**	**Fixed**	**Para**
Annual Unlinked Trips	178,558	27,338	195,160	28,188	169,067	26,973	166,286	19,032
Operating Expenses per Unlinked Passenger Trip	$4.65	$15.74	$4.39	$16.10	$4.59	$18.62	$7.02	$11.70
Operating Expenses per Vehicle Revenue Mile	$4.36	$5.40	$4.80	$5.15	$4.47	$6.14	$6.77	$3.98
Operating Expenses per Vehicle Revenue Hour	$55.35	$53.98	$57.21	$55.19	$51.84	$59.93	$78.20	$36.84
Number of Passengers per Revenue Hour	11.9	3.4	13.0	3.4	11.3	3.2	11.1	3.1
Number of passenger per Revenue Mile	0.9	0.3	1.1	0.3	1.0	0.3	1.0	0.3
Number of passengers per revenue day	583.5	89.3	637.8	92.1	545.4	88.1	539.9	61.8
Monthly ridership	14,880	2,278	16,263	2,349	14,089	2,248	13,857	1,586
Farebox recovery rate	8.5%	6.0%	9.0%	5.6%	6.1%	3.5%	3.3%	6.5%

CHAPTER 5 – ONGOING AND FUTURE MONITORING EFFORTS

Outlined within CAMPO's 2050 Regional Transportation Plan, CAMPO's established goals, objectives, and performance measures form the basis of CAMPO's performance-based planning framework that informs ongoing policymaking and investment decisions. CAMPO staff will continue to monitor the changing socioeconomical factors and the mobility needs of the region to appropriately respond to demands on CAMPO's transportation infrastructure. In the next fiscal year, CAMPO staff intends to focus on improving bicycle and pedestrian monitoring methodologies and counter deployment to better monitor and inform investment decisions. CAMPO staff also plan to analyze changes in road vehicle volumes to determine which roads are seeing increases in traffic volume to assist in data driven, performance-based project identification.

Several resources will be available for use for the 2022 Monitoring Report including 2020 Census, 2021 Growth Management Report, updated Traffic Analysis Zones (TAZ), and Pavement Condition Index survey data. These resources may be used to report and contextualize trends that impact the transportation infrastructure in the CAMPO area. Additionally, we are considering potential methodologies to better analyze vehicle counts within the CAMPO area and coordinated monitoring for bicycles and pedestrians for smaller engineering projects.