Introduction

Introduction

Purpose/Introduction

A goal of the Western Nevada Transportation Study is to inventory existing transportation and socio-economic trends, and to forecast these trends over 20 years. It is the intent of the Western Nevada Transportation Study to address future transportation and demographic trends for the study area, which encompasses Storey, Lyon, Churchill, Carson City, and Douglas counties. Washoe County will be reviewed for the purpose of showing the social-economic and transportation impacts of the county.

The Western Nevada Region is in a state of change in terms of population, congestion and economics. The once vast rural area is being transformed into an area akin to suburbia. Communities are becoming increasingly dependent on one another, with urban areas encroaching upon rural areas at a tremendous rate. Based on the counties' inter-dependence it is apparent that a regional approach must be taken when planning for future transportation needs in the six-county western Nevada region. Randall Arendt stated: "Effective regional planning will be especially important in those parts of the country where municipal planning is strong and county planning is weak or absent altogether." Once growth occurs in one area there is usually a spillover effect, which causes other areas linked by transportation to become interconnected. Arendt continues, "Even formally isolated rural regions now face metropolitan development pressures, and the lines between metropolitan and rural places is becoming increasingly blurred."

The western Nevada area is distinctively localized; each city, town and county relies upon the other. The only full-service airport in the region is the Reno-Tahoe International airport. The only Interstate Highway, I-80, runs through Reno. In addition, the area is bounded by the Sierra Nevada mountain range to the west. Many local residents enjoy the natural splendor of the Tahoe Basin, for swimming during the summer months and snow skiing during the winter. The area is bound by economic ties as well. The majority of retail shopping facilities are concentrated in Carson, Douglas, and Washoe counties.

NDOT is charged with the responsibility to coordinate local plans for balanced transportation facilities and services that may include; highways, pathways, special lanes for bicycles, railways, urban public transportation, and aviation facilities.

Institutional Requirements

The Nevada Revised Statues (NRS) Chapter 408 charges the Planning Division of the Nevada Department of Transportation (NDOT) with the development and coordination of a balanced transportation policy that is consistent with the social, economic, and environmental goals of the State. The mission statement for the Department reads as follows:

The Nevada Department of Transportation's mission is to; "efficiently plan, design, construct and maintain a safe and effective transportation system for Nevada's economic environmental, social and intermodal needs".

As a planning tool, the purpose of this report is as follows:

- To provide a reference of existing travel conditions in Carson City County, Douglas County, Lyon County, Storey County, Churchill County, and Washoe County;

- To provide a reference of future regional travel characteristics based on land-use, population, and employment levels;

- To provide a reference of regional traffic conditions and roadway service levels on major corridors within the study area;

- To analyze future land use plans and projected population and employment levels that will influence travel characteristics;

- To identify transportation improvement projects and programs to maintain and improve inter-regional transportation within western Nevada;

- Identify potential multi-modal funding programs for future improvements.

The Transportation Equity Act for the Twenty-First Century (TEA-21) establishes requirements for a statewide planning process and a statewide transportation plan. TEA-21 requires that transportation plans and programs be developed for all areas of the state. These plans and programs are to provide for development of transportation facilities (including pedestrian walkways and bicycle transportation facilities), which will function as an intermodal state transportation system.

Center Street

Regional History

The purpose of providing a regional history is two fold, first it is necessary to look at the past, present and future of a study area and secondly is to show how unique each county is. Western Nevada has a rich and well-documented history. The first white settlement in Nevada was established by Mormon settlers in 1851, as a trading post in Genoa. Genoa was a major merchandising outlet in the region, located on both Pony Express and Overland Stage routes. Several major exploration trails crossed the six counties during this early era, including the John C. Fre'mont/Joseph R. Walker Trail, the California Trail, and the Great Sheep Trails.

To a significant degree, the mining interests in Virginia City drove the early development of the six-county region. In 1861, the construction of Geiger Grade greatly influenced travel to and from the mines in the Comstock Mining Area. By 1873, the population in Virginia City had reached its historical peak of 35,000. During this time, the Virginia and Truckee (V & T) Railroad was fundamental in transporting lumber and supplies from Lake Tahoe to the mines in Virginia City. In 1906, the V&T was extended 15 miles from Carson City to Minden. After the extension, the railroad quickly became a major point of origin for beef and dairy freight.

Ophir Creek

Early development of roadways in the area include U.S 40 (Victory Highway), U.S. 50 (Lincoln Highway) and U.S. 395. These roadways allowed the region to grow into the center of commerce, government, and agricultural activity in Nevada.

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County History

County History

Carson City County

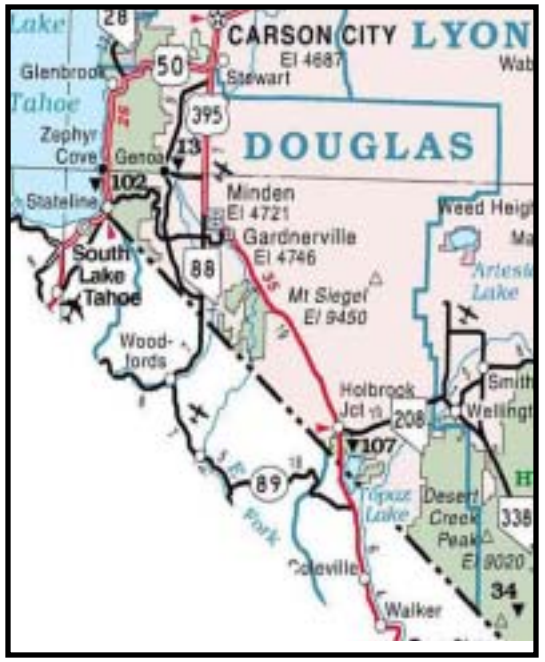
Pioneer Abraham Curry arrived in Eagle Valley in 1858 and soon thereafter surveyed and platted a town site. The farsighted, optimistic, and astute Curry set aside 10 acres expressly for the construction of a capitol complex before the formation of the Nevada Territory in 1861. Carson City is named for the nearby Carson River, which explorer John C. Fre'mont named after his scout, Christopher "Kit" Carson during the 1843-1844 expedition. Carson City was soon designated both the territorial capital and county seat of Ormsby County.

Carson Street

U.S. President Abraham Lincoln, recognizing the importance of Nevada's silver and gold ore to the Union's Civil War effort, and the importance of the fast approaching presidential election, President Lincoln signed the proclamation that ushered Nevada into statehood on October 31, 1864. Carson City was selected as the state capital at the constitutional convention and it has retained that honor to the present day. Following the discovery of gold and silver on the nearby Comstock Lode in 1859, Carson City became a thriving commercial center. The booming mines in Virginia City, Gold Hill, and Silver City resulted in quartz reduction mills being built along the Carson River to process the ore. Lumber for mine timbers and cordwood was provided from the Sierra Nevada mountains around Lake Tahoe. The Virginia and Truckee Railroad was built in 1870 to connect the Comstock mines with the river mills, and to bring lumber and supplies back to the mines. The United States Mint in Carson City was completed in 1869; it is today the site of the Nevada State Museum.

Douglas County

Established in 1861, Douglas County offers a unique advantage of suburban and rural lifestyles. Douglas County offers the facilities and amenities of a metropolitan area, yet remains mainly rural with easy access to all services. Lake Tahoe was named “da ow a ga” meaning edge of the lake, by a tribe of the Washoe Indians. Originally promoted for its trout fishing, Lake Tahoe is still known for its almost endless array of recreational activities including boating, skiing, hiking, camping, fishing, and gaming. The areas of Gardnerville, Minden, Genoa, Johnson Lane and Indian Hills contain the vast majority of Douglas County population.



Carson Valley

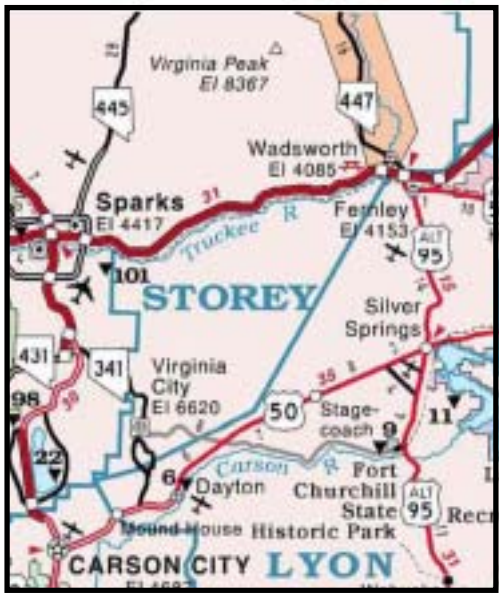
Lyon County

Lyon County was created on November 25, 1861, as one of the original nine counties of the Territory of Nevada. The county's name is believed to commemorate a hero of the Indian wars, Captain Robert Lyon, who came to Nevada in June of 1850. Major communities in Lyon County include Yerington, Fernley and Dayton.

Yerington currently serves as the Lyon County seat, and is located in the center of the lush Mason Valley agricultural area. Fernley was established as the canal township in 1904, as farmland was being irrigated as part of the Newlands Project. Due in large part to the development of two industrial parks, the Tahoe Reno Industrial Park, located at the Tracy-Clark Station exit on I-80, and the Western Nevada Industrial Park, located on the east side of town near the East Main Street exit on I-80 Fernley's population has grown significantly. The recent growth spurt led Fernley to incorporate on July 1, 2001. Dayton is one of Nevada's earliest settlements situated along the Carson River it was a stopping place for California bound pioneers. Gold was discovered at the mouth of Gold Canyon near Dayton in 1849, which subsequently led to prospecting in the canyons to the west at Gold Hill and Virginia City. The Sutro Tunnel was dug through four miles of mountain for the purpose of draining hot water out of Virginia City mine shafts. One of the first water projects in the county was the construction of the Reese ditch in 1856. The purpose of the ditch was to carry water from the Carson River to the entrance of Gold Canyon where it was used for placer mining. For many years the town of Dayton prospered as a mill and trading center and was the county seat for Lyon County until 1911.

Amazon.com Fernley

Smith Valley



Storey County

Storey County was created on November 25, 1861, as one of the original nine counties of the Territory of Nevada. Virginia City is best known for the Comstock Lode that produced nearly $400,000,000 in silver and gold during the Comstock mining era between 1859 and 1893. The Comstock Lode marked one of the richest silver strikes in North American history, and began a population influx to western Nevada, which rapidly accelerated the demands for the region's natural resources. In 1876, the region had a population of 23,000 which represented 37% of the state population by 1930, the population had dwindled to only 500 residents, signifying the "boom and bust" economy of the region. Due to the large population in Storey County the economies of the Truckee Meadows, Carson Valley, Carson City, Douglas County, and Churchill County benefited. In addition, Virginia City supplied much of the necessary capital to build San Francisco.

Alcoa Plant

Virginia City

Churchill County

Churchill County was created on November 25, 1861, but, it remained attached to Lyon County for judicial and revenue purposes. It did not become a distinct county until 1864, at which time La Plata was selected as the county seat. The county was named after Fort Churchill, which was built along the lower Carson River shortly after the Pyramid Lake War of 1860.

Another early settlement in Churchill County was Stillwater. The town originated as an overland stage station in 1862, and was granted a post office in 1865, in 1867 it took over county seat designation. Farmers in the area developed one of the state's first irrigation systems to supply mining camps with farm produce. Today the area is home to the Stillwater National Wildlife Refuge, which contains nearly 77,000 acres of lands managed by the U.S. Fish and Wildlife Service.

The Reclamation Act of 1902, signed by U.S. President Theodore Roosevelt, created the Lahontan Valley Irrigation District. Beginning with the completion of the Derby Diversion Dam on the Truckee River, a 31.5 mile canal to the Carson River and Lahontan Dam, the Newlands Project became the focus of homesteading and farming activity in western Nevada.

The city of Fallon began as a dusty crossroads on Mike Fallon's ranch. In 1896, a post office was established, and by 1903 Fallon had captured the County Seat from the town of Stillwater. The wood-frame courthouse, built that same year, is still in use today, and is listed in the National Register of Historic Places. The courthouse was recently restored to its original condition.

NAS Fallon

Truckee River

Washoe County

In the late summer of 1844, the Truckee River route became an alternate route for California-bound emigrants such as the Stephen-Murphy-Townsend Party. By 1859, C.W. Fuller established Fullers Ferry, which consisted of a small lodging house, a ferry, and a bridge at a location that would later become the center of Reno. In 1868, the Central Pacific Railroad generally followed the Truckee River's course from Truckee, California. Railroad officials soon platted the town around the newly- constructed railroad. The town's name was chosen by railroad officials to honor a slain Civil War officer, General Jesse Reno. The advent of the Central Pacific Railroad in 1868 effectively brought the era of the wagon train to a close.

Sparks Reno's eastern neighbor city was named in honor of John Sparks, Elko County rancher and Governor of Nevada. It sprang into existence in 1903 as a new division point on the Southern Pacific Railroad. The Truckee Meadows has long served as a focal point for economic activity in northern Nevada. Reno's early fortune was tied to mining, milling and lumbering activities. Washoe County was always prosperous compared to other areas because of the railroad gambling was not prosperous until after World War II.

Victorian Square

Socio-Economic

Socio Economic Conditions

Socio economic conditions play a critical role in the ultimate success of any area western Nevada is no exception to this rule. It is necessary to look at where local residents live, work and play it is the foundation on which communities are built. It is the goal of this section to present socio-economic facts and figures in a manner allowing the reader an opportunity to analyze the demographic characteristics of each county in the western Nevada region. Socio-economic profiles will follow individual county discussion.

C Street

Carson Street

Douglas County

Major employers include Harrah's/Harvey's, Caesar's, Bently Nevada, Douglas County School District and the Horizon. Douglas County's Population has grown from 2,023 in 1950 to 43,101 in 2000. The State Demographer projects the Douglas County population will grow to 84,320 by 2020. The following Socio-Economic Profile presents additional characteristics of the region.

Carson City

Major employers in Carson City include the State of Nevada, Carson City School District, Carson Tahoe Hospital, City of Carson City, and the Nevada Department of Transportation. Carson City's Population has grown from 4,198 in 1950 to 53,095 in 2000. The population is projected to grow to 75,535 by the year 2020, based on projections from the Nevada State Demographer. The Socio-Economic Profile also shows additional age characteristics of the region.

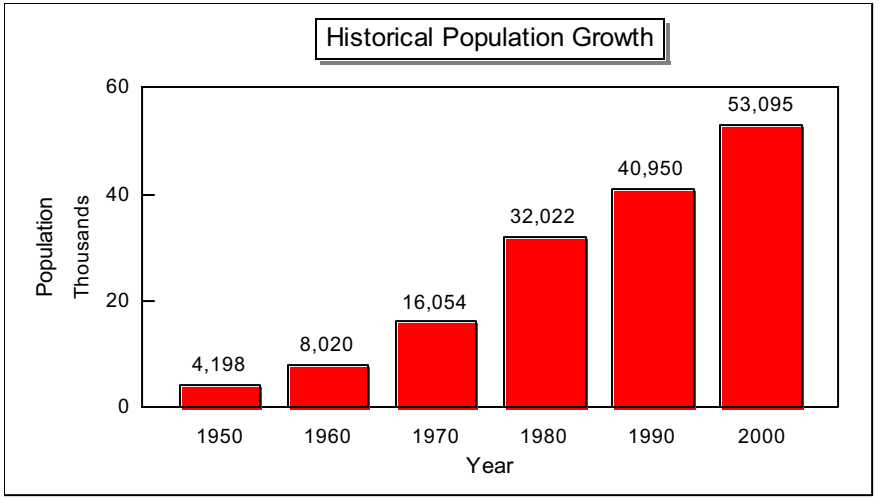
Wally's Hot Springs

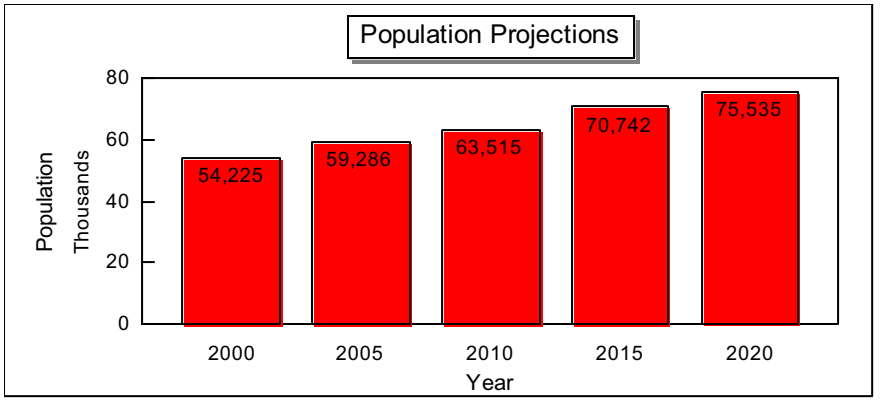
Figure 1

Carson City Socio-Economic Profile

Capitol Building

Costco Wholesale





Carson City Major Employers	
State of Nevada	5,100
Carson City School District	1,000
City of Carson City	700
Carson -Tahoe Hospital	700
Nevada Department of Transportation	600

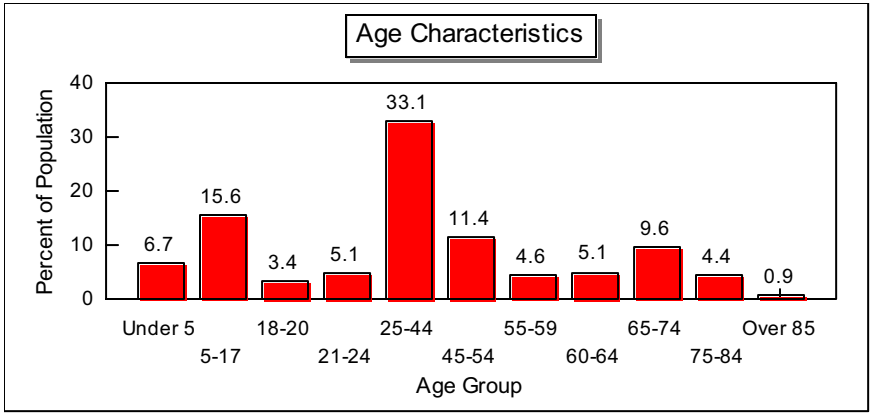


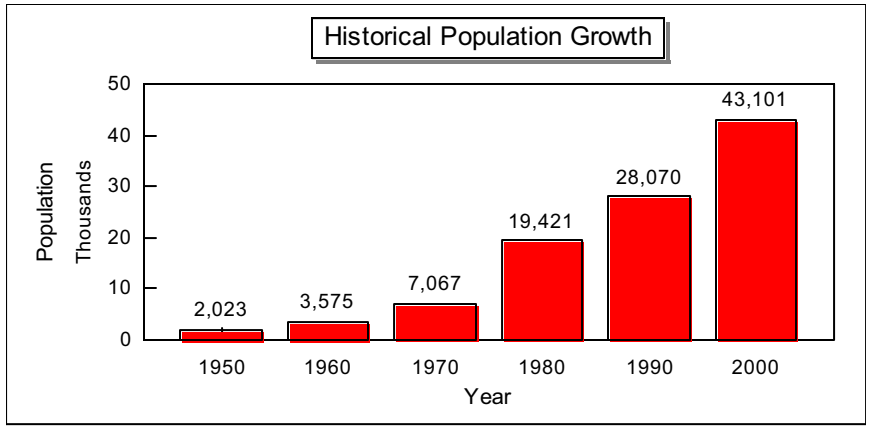
Figure 2

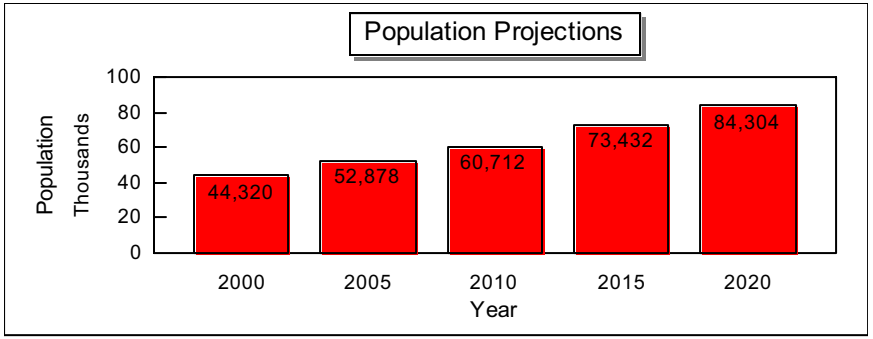
Douglas County Socio-Economic Profile

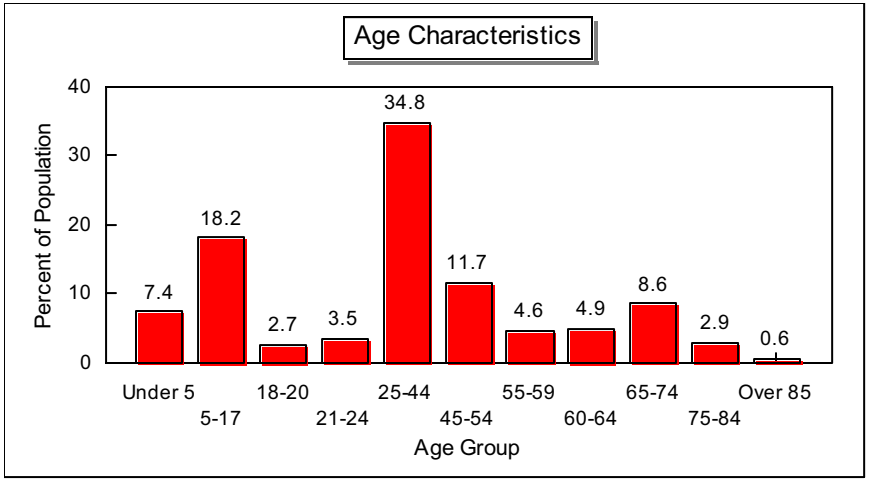
Bently Nevada Headquarters

Harrah's Tahoe

Douglas County Major Employers	
Harrah's	2,500
Harvey's	2,200
Caesar's	1,500
Bently Nevada	900
Douglas County School District	800
Horizon	800







Patrick Business Park

Storey County
Major employers include; Kal Kan Foods, Storey County, Sierra Pacific Power Company, Storey County School District and Eagle-Pitcher Minerals. Storey County's population has grown from 657 in 1950 to 3,897 in 2000. In the future the population is projected to grow to 5,901.

Lyon County
Major employers include Lyon County School District, Amazon.com, Odyssey Business Services, and Lyon County. Lyon County's population has grown from 3,703 in 1950 to 37,393 in 2000. In the future the population is projected to grow to 68,823 in 2020. The State Demographer reports that Lyon County is currently the fastest growing rural county in the state.

Virginia City

Figure 3

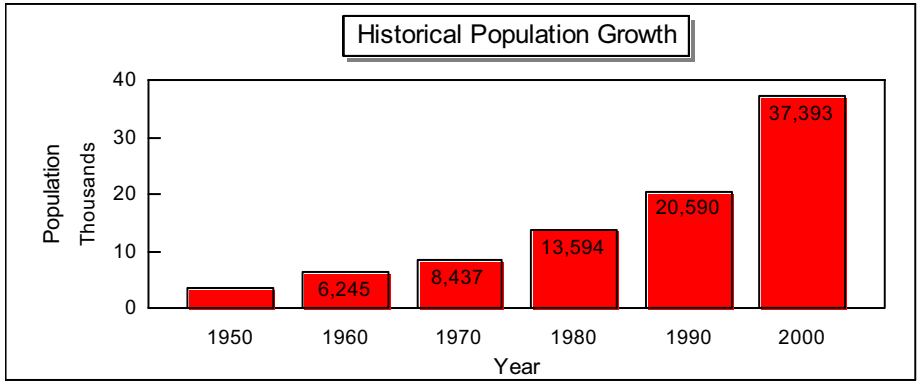
Lyon County Socio-Economic Profile

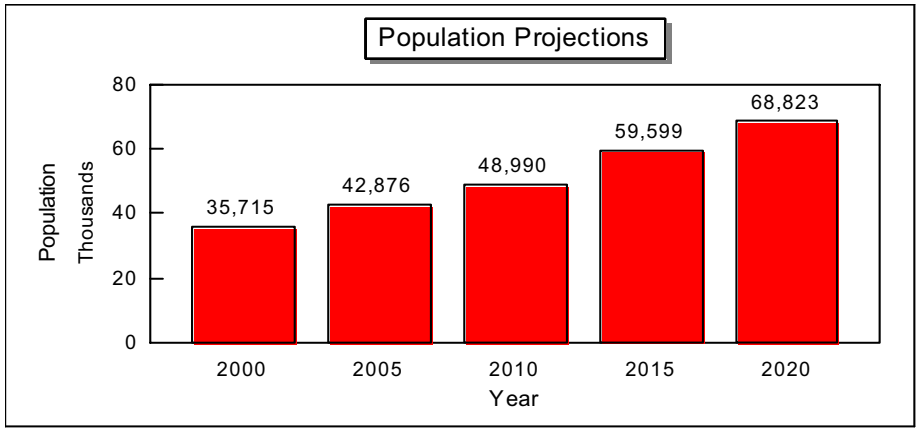
Wabuska

Smith Valley

Fernley

Lyon County Major Employers	
Lyon County School District	800
Amazon.com	600
Odyssey Business Services	400
Lyon County	400





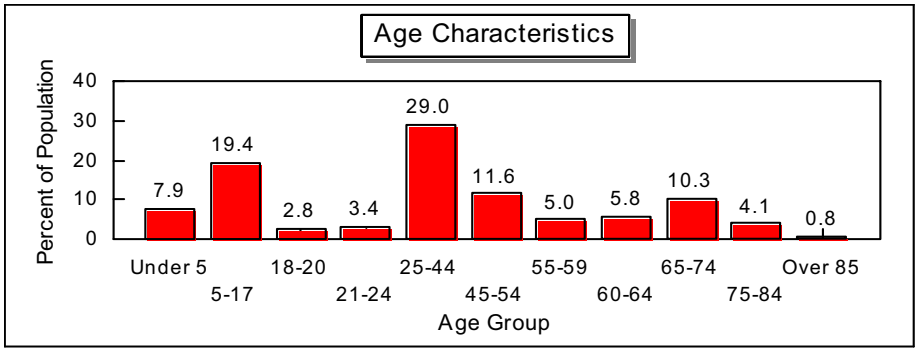


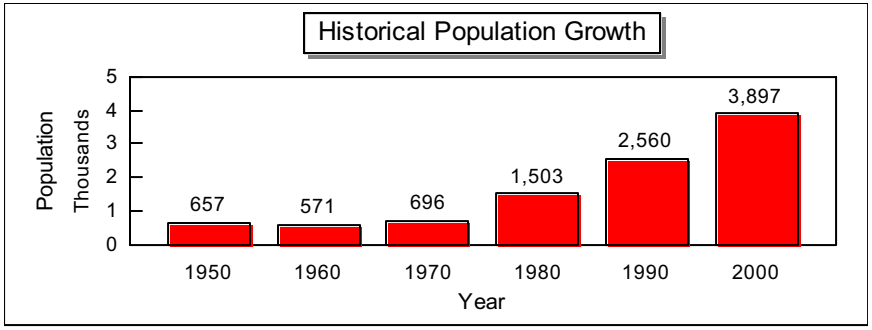
Figure 4

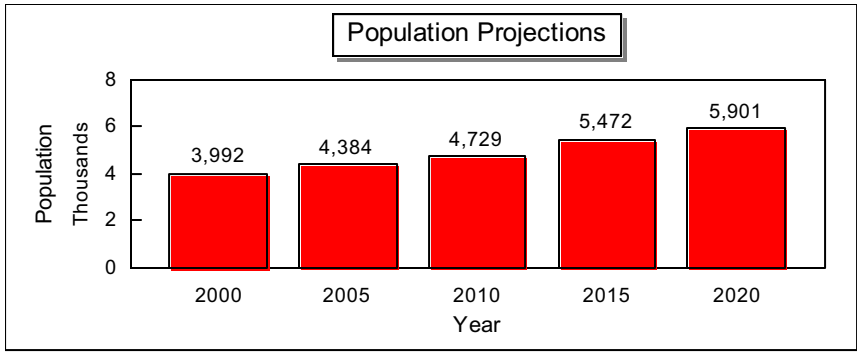
Storey County Socio-Economic Profile

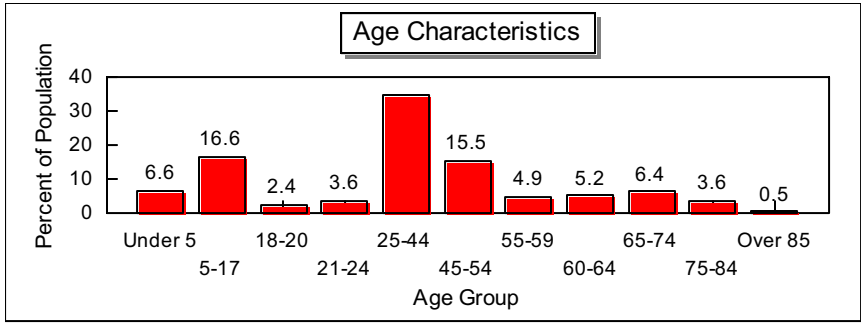
Virginia City

Tahoe Reno Industrial Park

Storey County Major Employers	
Kal Kan Foods	200
Storey County	100
Sierra Pacific Power Company	100
Storey County School District	100
Eagle-Pitcher Minerals, Inc.	100







Churchill County

Churchill County currently is the home of 26,247 residents. Major employers include the Fallon Naval Air Station (NAS), School District, SMI-Joist Nevada, Churchill Community Hospital, and Boeing Aerospace Operations. Churchill County's population has grown from 6,188 in 1950 to 26,247 residents in 2000. In the future, the population is projected to grow to 75,535. The following Socio-Economic Profile shows additional characteristics of the region.

Maine Street

NAS Fallon

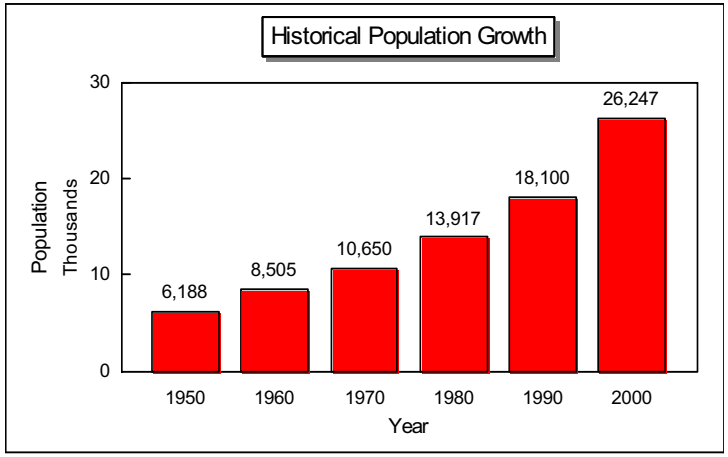
Figure 5

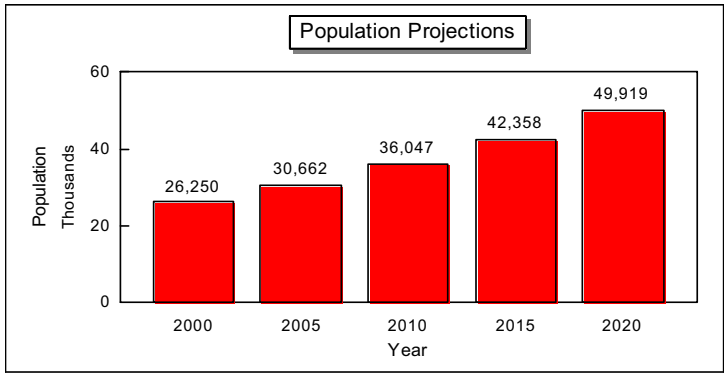
Churchill County Socio-Economic Profile

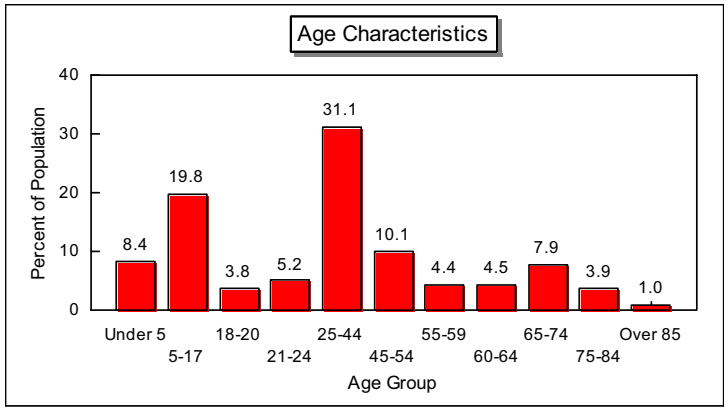
NAS Fallon

US Highway 50, Fallon

Churchill County Major Employers	
Fallon Naval Air Station (NAS)	3,000
Churchill County School District	600
SMI Joist-Nevada	300
Churchill Community Hospital	300
Boeing Aerospace Operations	300







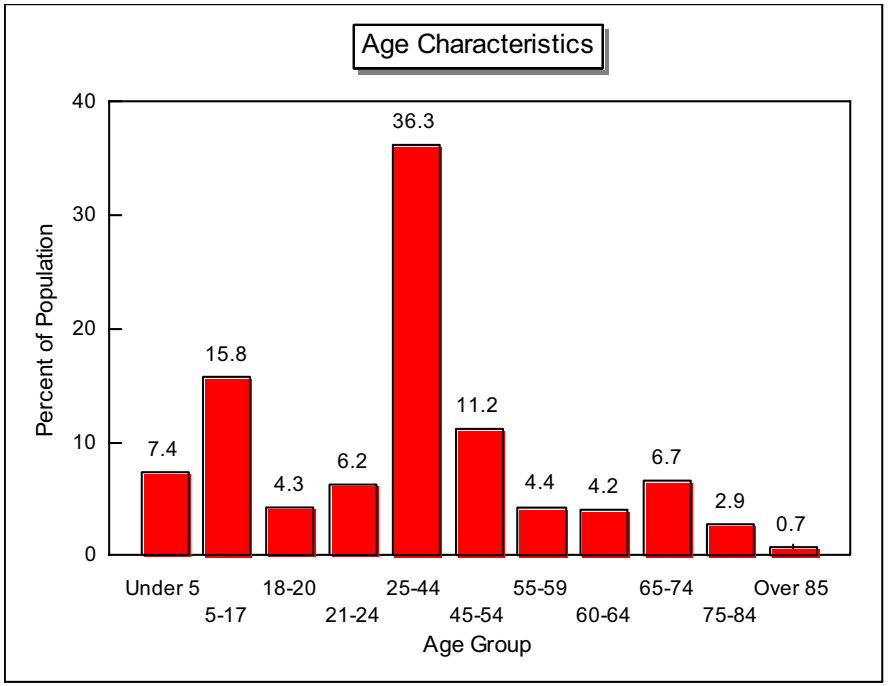
Washoe County
Demographic and traffic data is supplied for Washoe County solely for the purpose of review. An analysis of Western Nevada transportation needs to include Washoe County. Much of the region's movement of people, goods, and services is dependent on its relationship to the Truckee Meadows.

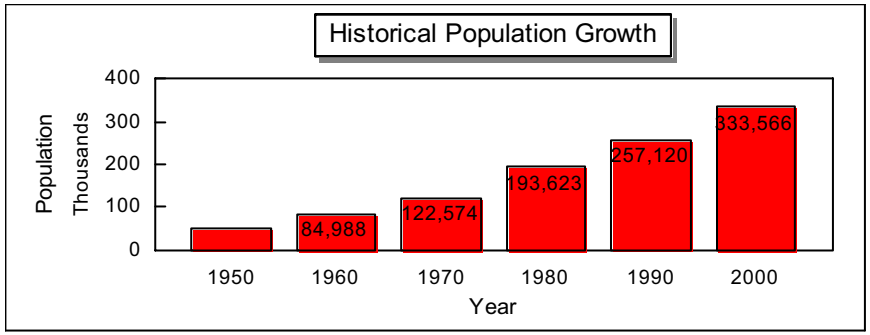
Tanamera Apartments, Reno

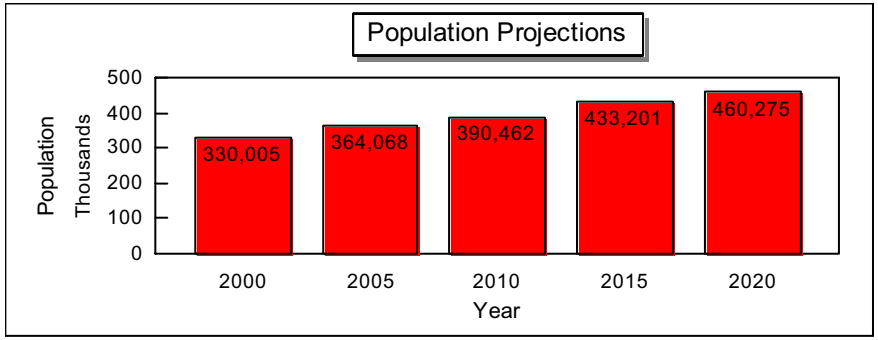
Best Buy, Reno

Western Nevada Region
Regional population has grown from 111,450 in 1960 to 495,084 in 2000. As the statistics indicate, western Nevada has been historically strong in terms of population growth. The region as a whole has grown by 383,634 residents over the last 40 years. This growth represents a four-fold increase in the regions' population. The following table (A-2) shows population growth by county and decade from1960 to 2000.

Figure 6
Washoe County Socio-Economic Profile





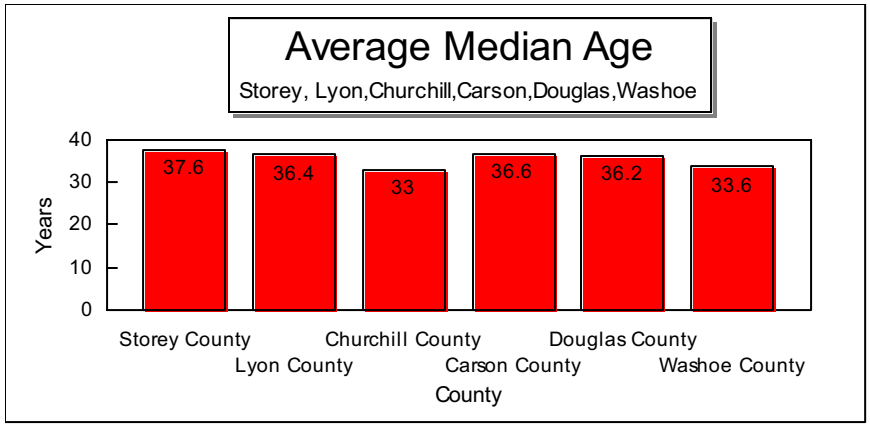


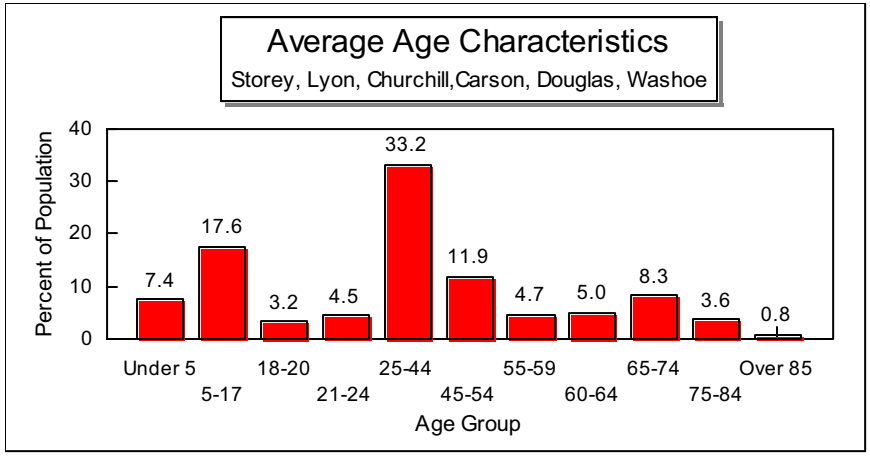
Downtown Reno

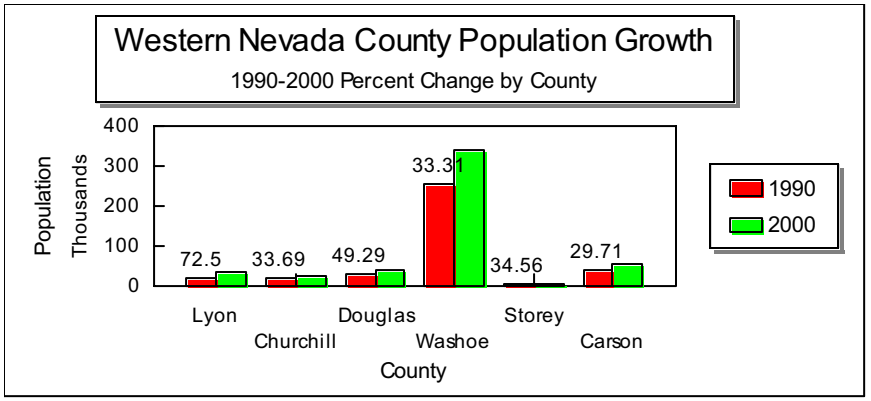
Washoe County Major Employers	
Washoe County School District	5,400
Reno Hilton	2,800
University of Nevada-Reno	2,700
Washoe County	2,700
Silver Legacy	2,600

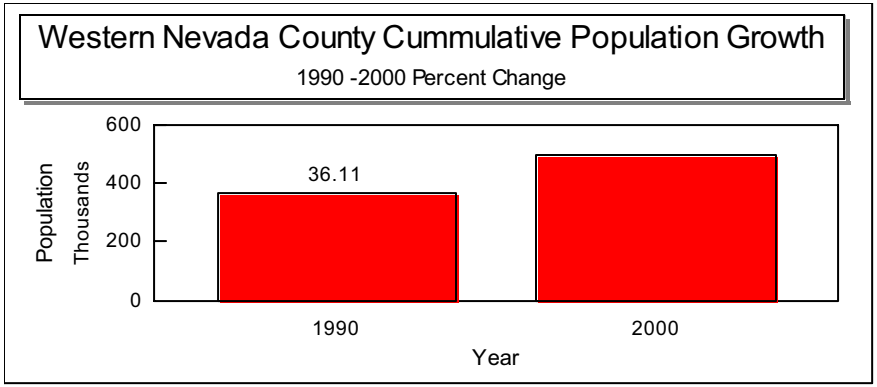
Reno Hilton

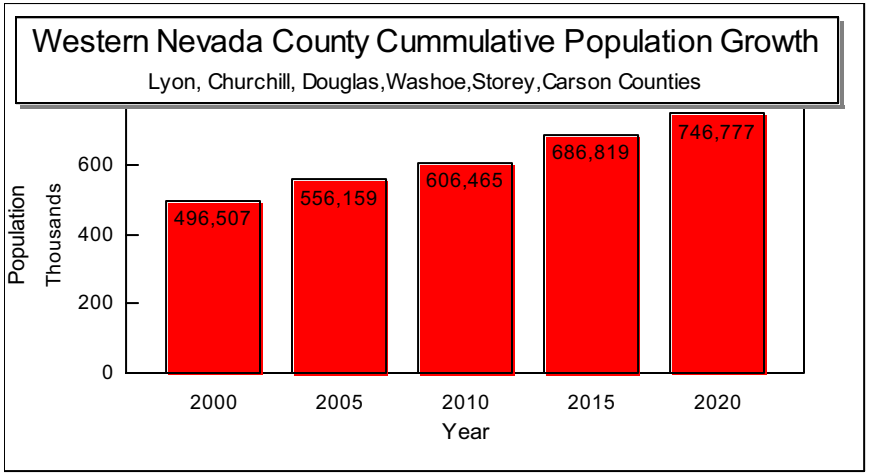
Figure 7
Western Nevada
Socio-Economic Profile/Projections











Traffic

Western Nevada Traffic Corridor Profiles

The purpose of the preceding Chapter was to present a county perspective of socio-economic and travel characteristics. This information is key in analyzing future travel demand and corridor improvements. From a regional perspective, the existing and historical travel characteristics of the six-county roadway network play an important role in determining how to facilitate future travel demands. As shown in Figure 14, the Historic Annual Average Daily Traffic (AADT) has shown a steady growth rate of 3.7 percent between 1990 and 1999. Daily and seasonal traffic volumes indicate that Fridays during the month of August are the busiest travel days. Peak hour traffic volumes, also shown in Figure 14, indicate a typical morning and afternoon commute pattern. Crash trend data compiled by NDOT for the six-county area indicate that crashes have decreased over the past year, from a previous five-year increase.

US Highway 395

U.S. 50 A, Fernley

Due to the dispersed population and employment center within the study area, a significant proportion of work vehicle trips occur between county lines. Recent information developed by the Bureau of Transportation Statistics and the 2000 Census Bureau indicate that approximately 12 percent of employees in the six-county area must travel out of their respective county to their place of employment. The impact of this commuting behavior plays an important role in peak hour traffic congestion and in identifying future transportation improvements. As shown in Figure 17, County Travel Time to Work greater than 30 minutes is relatively high for the outlying areas of Churchill, and Lyon Counties, with the number of Work Trips to Work less than 30 minutes shown in Figure 18, are greatest in Carson and Washoe County.

The time of day these work trips occur, is indicative of the high level of commuting that occurs in and out of the respective counties. As shown in Figure 16, most commuters within the study area leave for work between the 7:30 A.M. and 8:00 A.M. Additional information provided by the Census Bureau, as shown in Figure 14 indicates that most of the travel within the study area occurs in the form of single-occupant vehicles. Figure 20 illustrates that most travel occurs in the six-county region involves single-occupant vehicles, with public transportation and walking ranking second and third respectively.

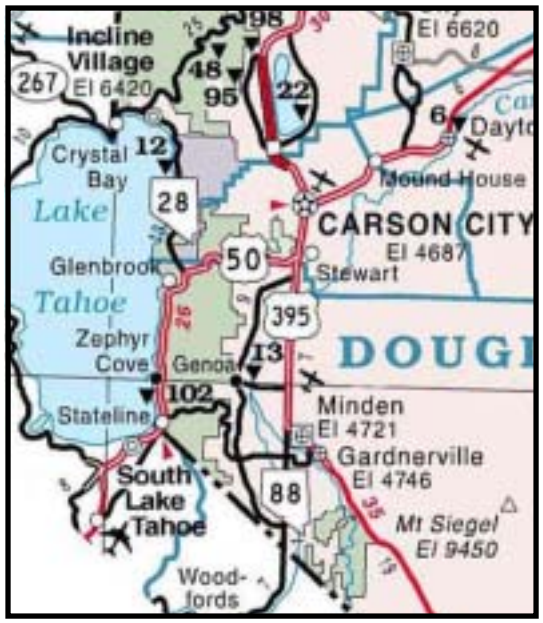
Maine Street, Fallon

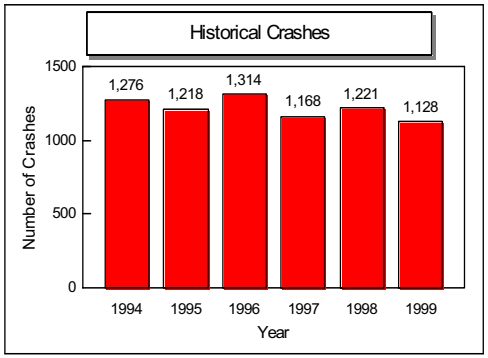
S.Virginia/McCarran, Reno

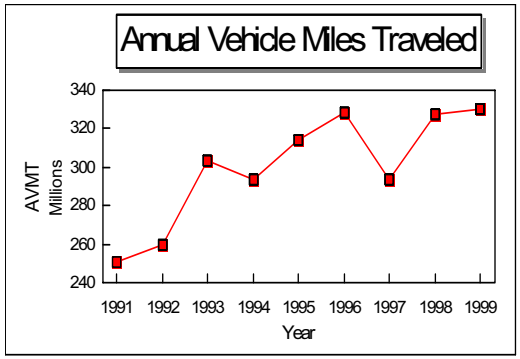
Traffic congestion means different things to different people. Traffic congestion in Fallon is concentrated at the intersection of Williams Avenue and Taylor Street. In Carson City, the busiest intersection is US 50 east and US 395, and in Reno the most congestion occurs at the I-80/US 395 intersection. The following photographs show different traffic congestion scenarios. All traffic congestion means the same thing however: driver delay no matter whether you are in Yerington, Gardnerville, or Sparks. Traffic profiles for the Western Nevada Transportation Study are included for your review.

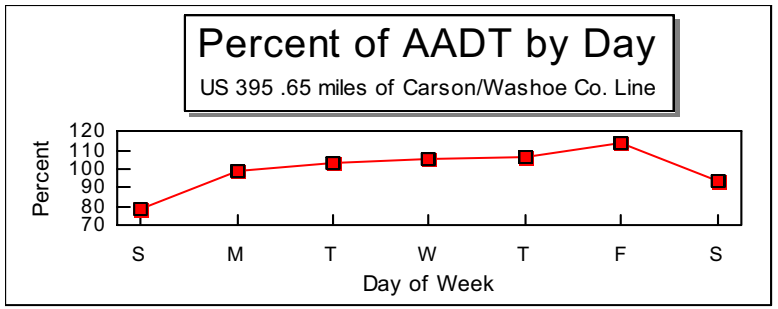
Figure 8

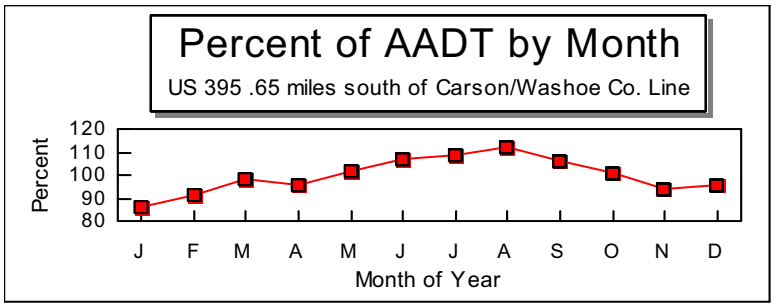
Carson City Traffic Profile

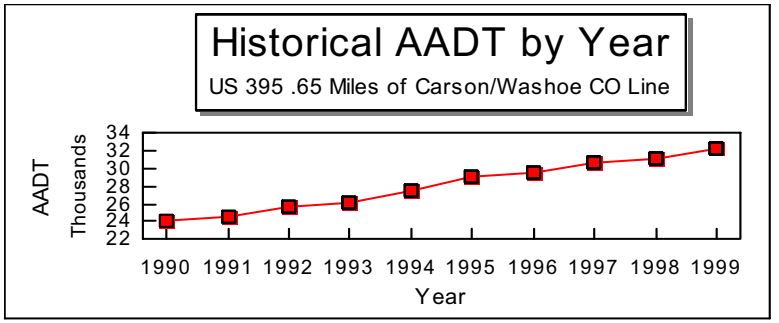












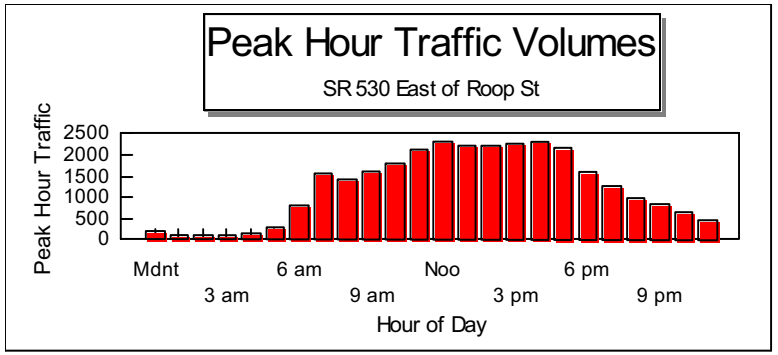
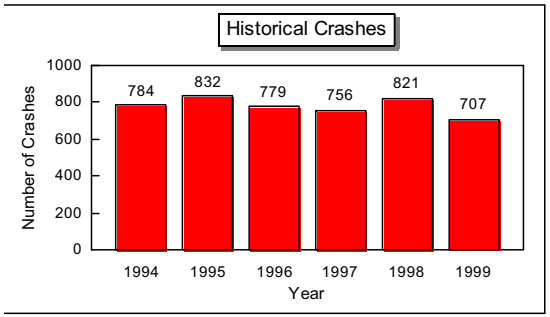
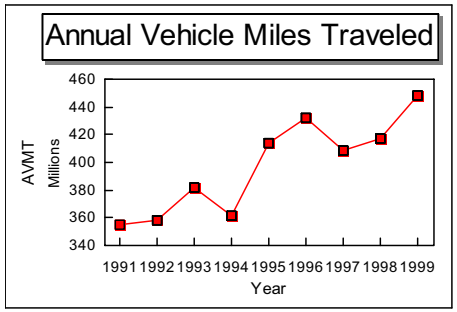
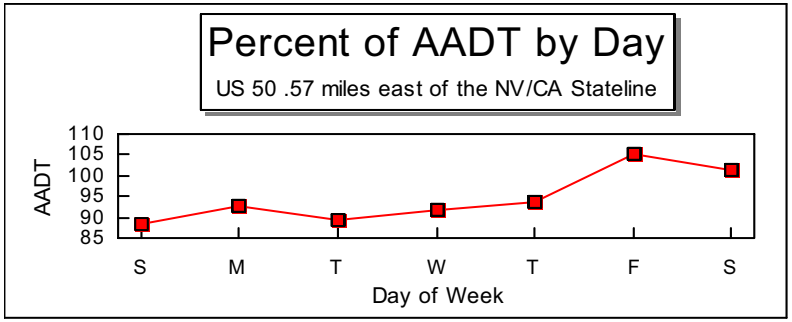


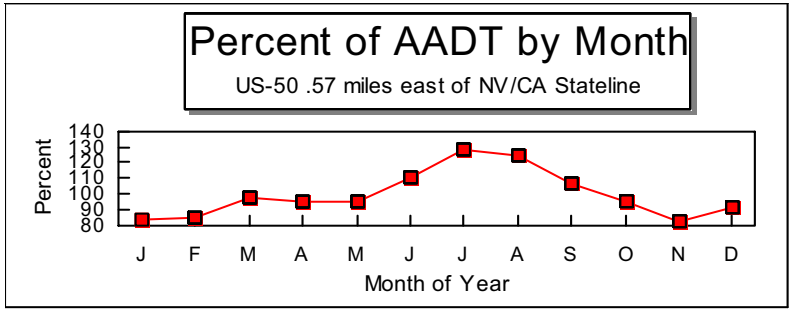
Figure 9

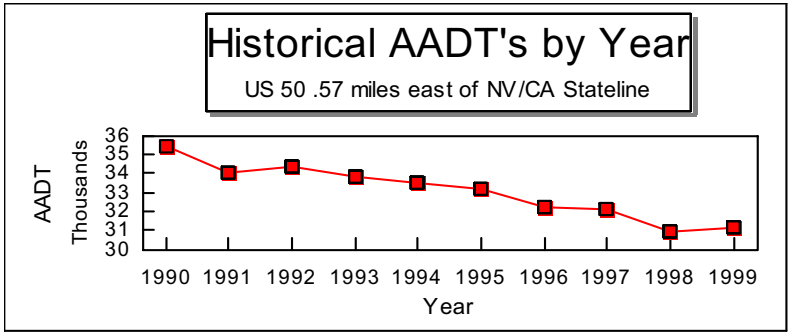
Douglas County Traffic Profile











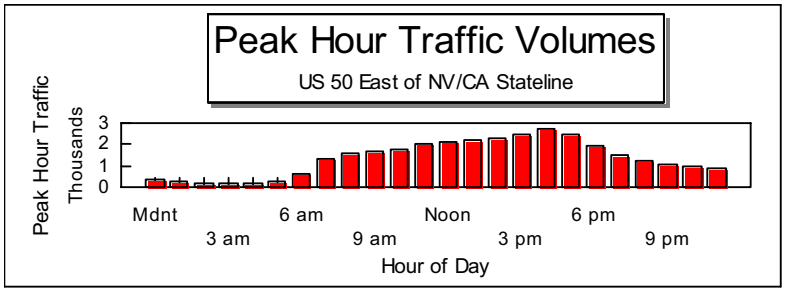
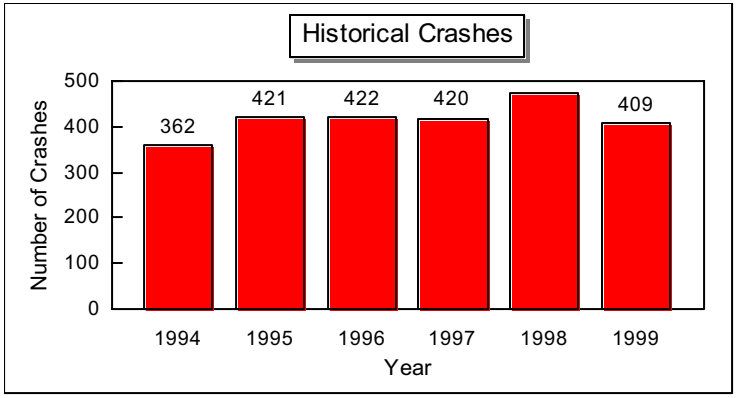
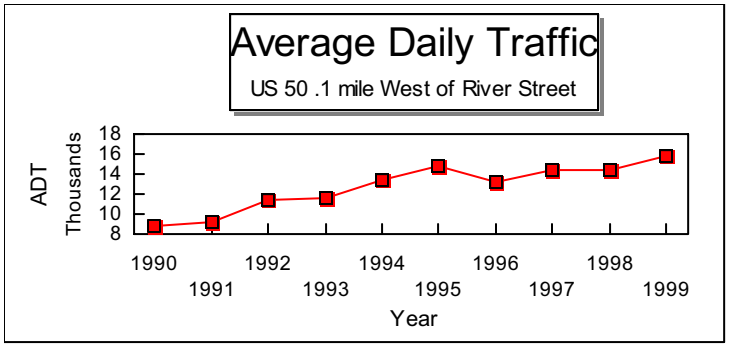
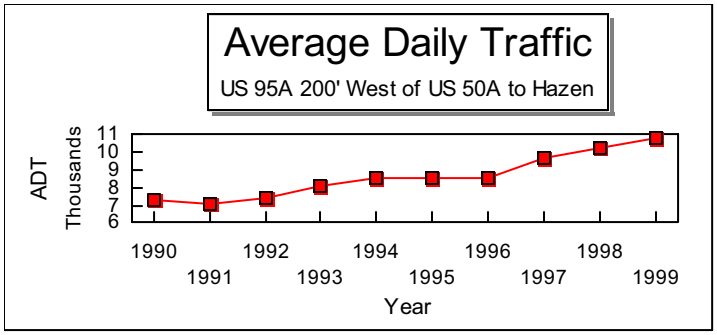


Figure 10

Lyon County Traffic Profile







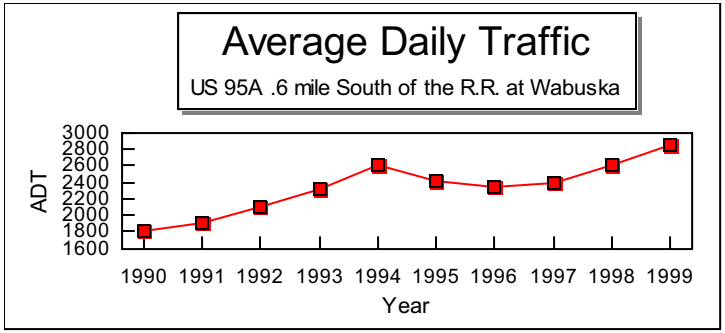
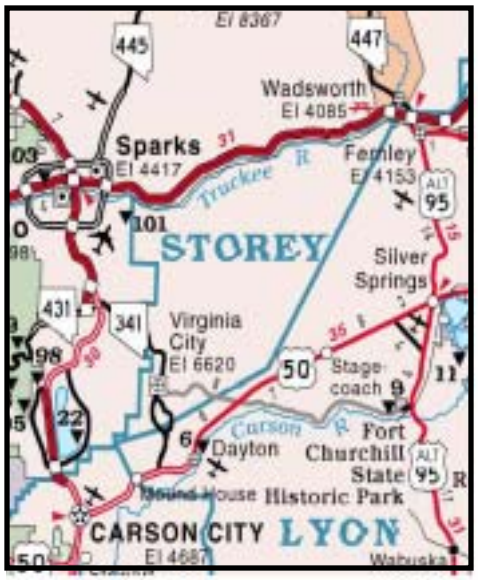
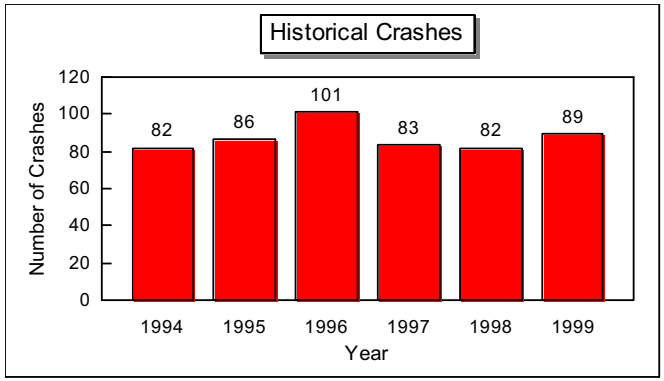
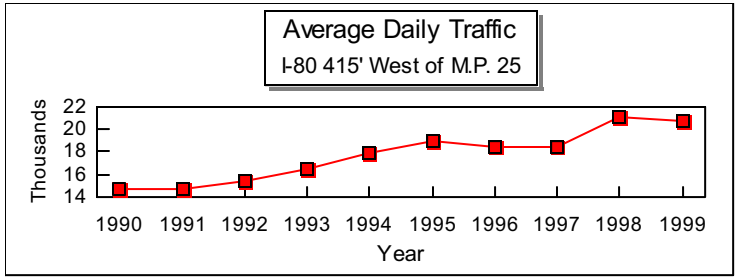


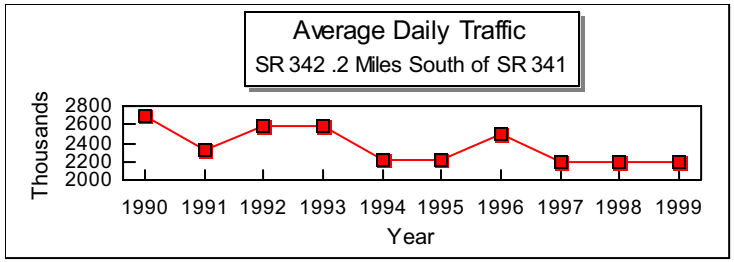
Figure 11

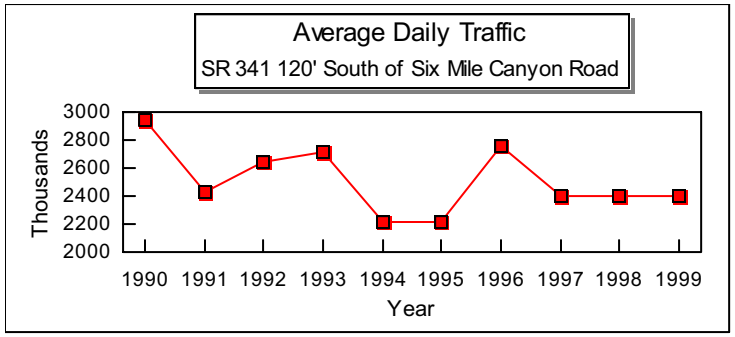
Storey County Traffic Profile











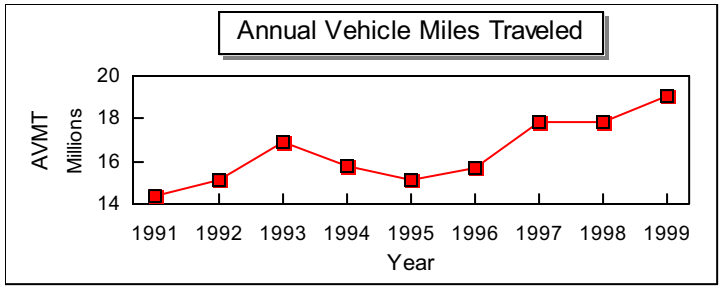
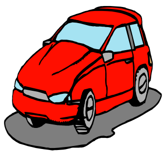
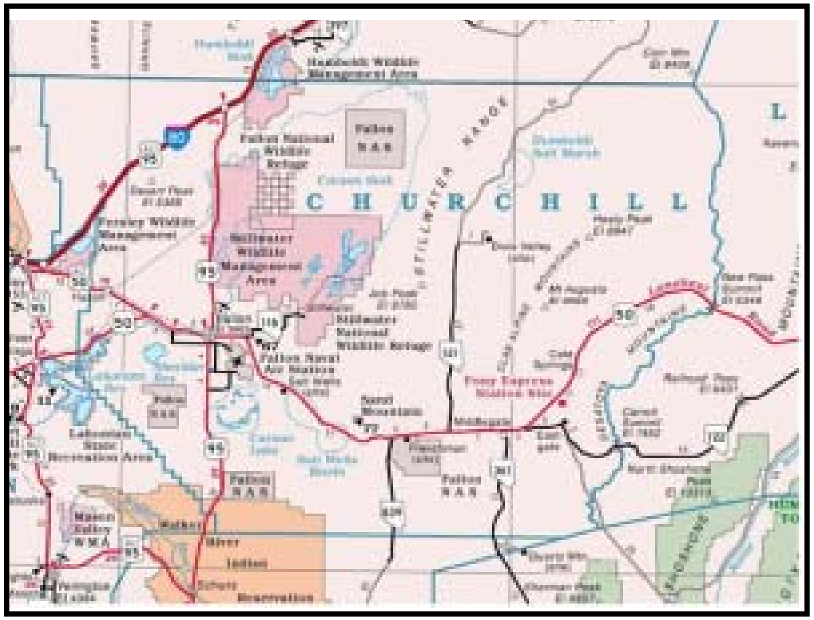
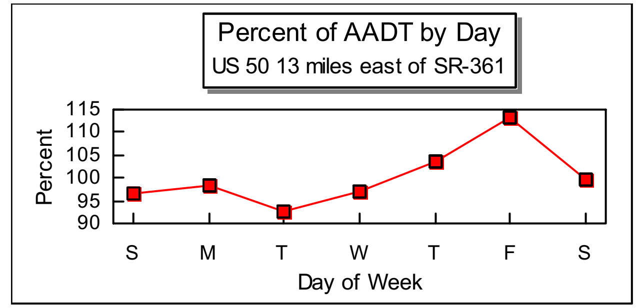


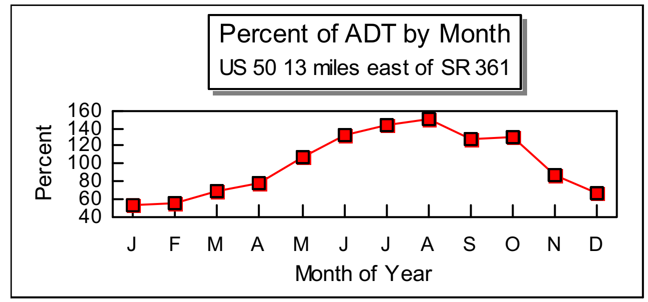
Figure 12

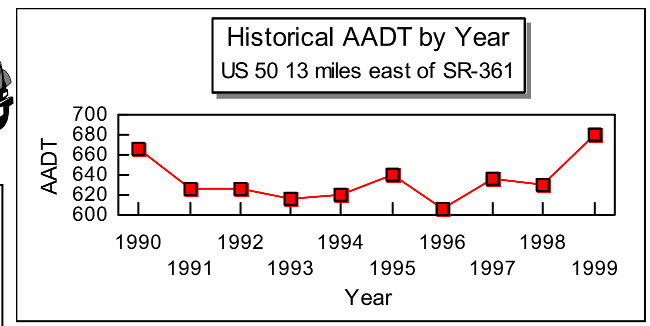
Churchill County Traffic Profile

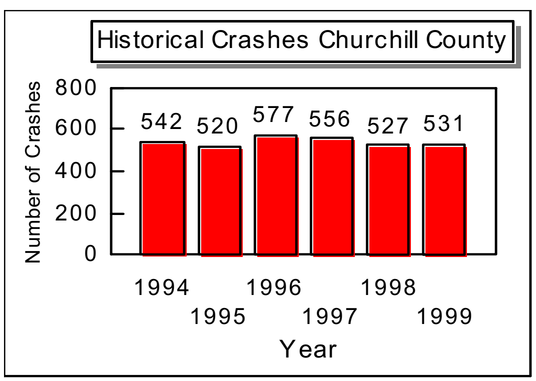


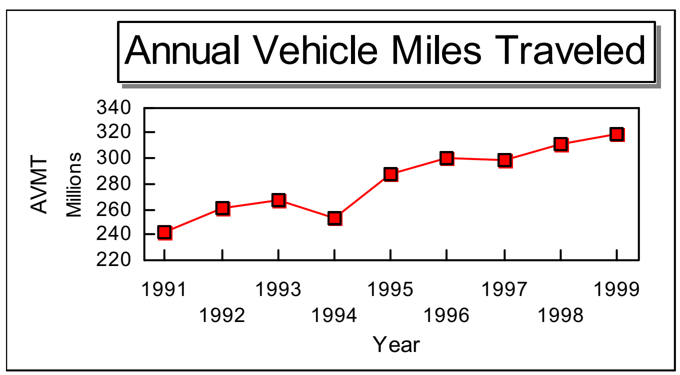












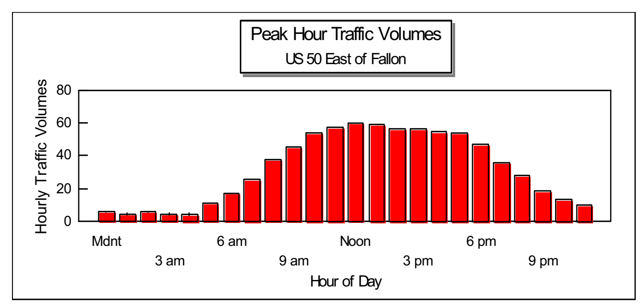
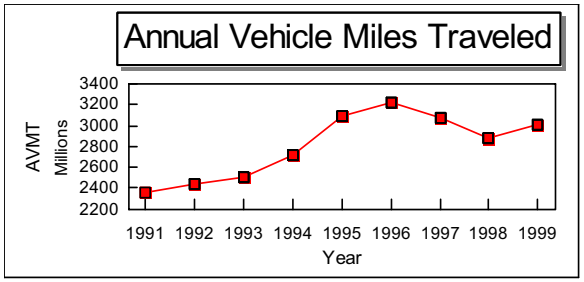
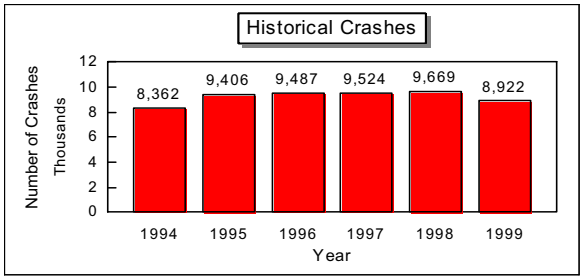
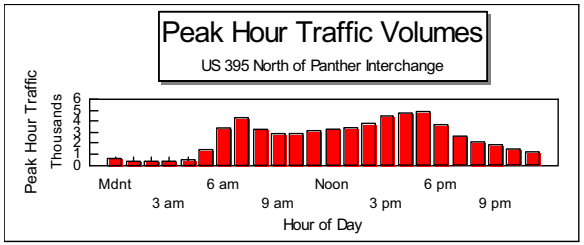


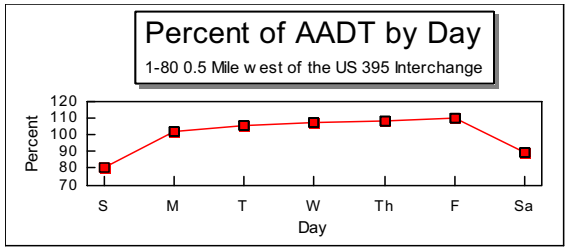
Figure 13

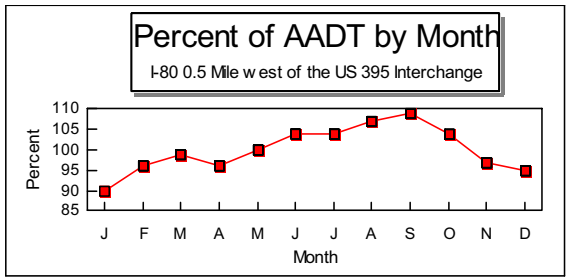
Washoe County Traffic Profile

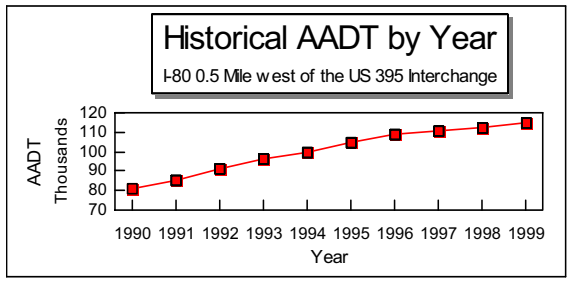


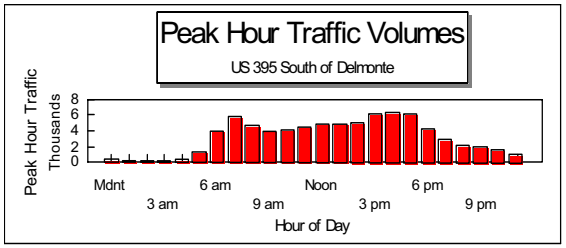


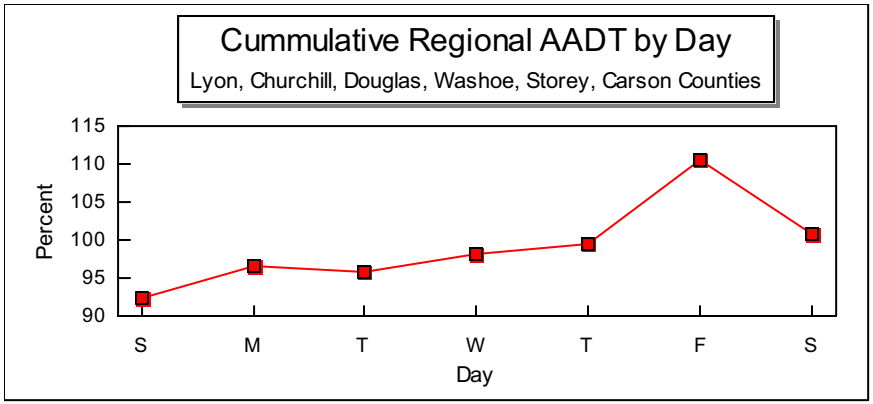


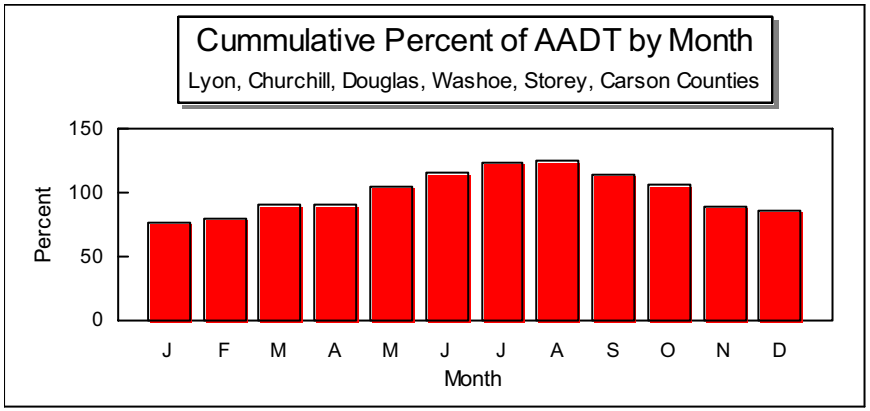












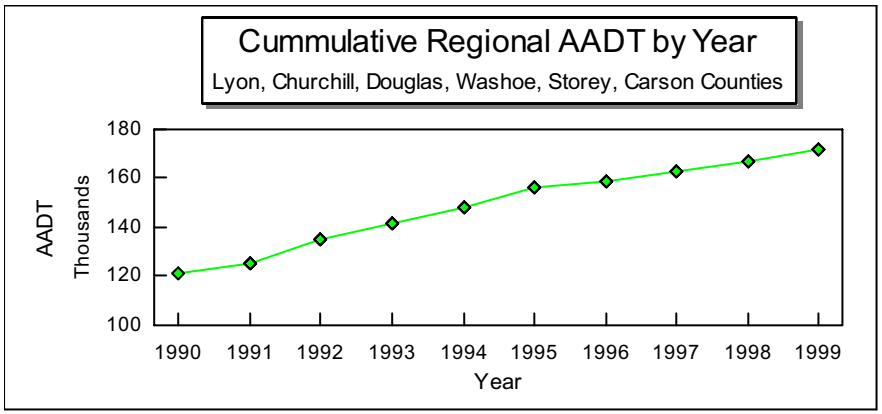
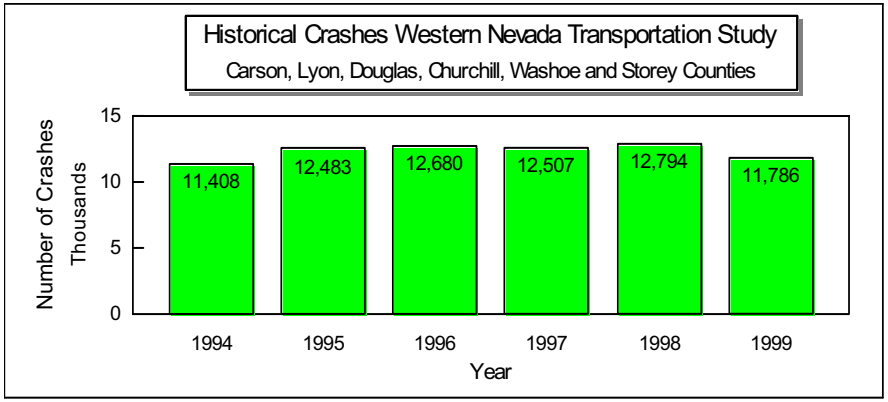
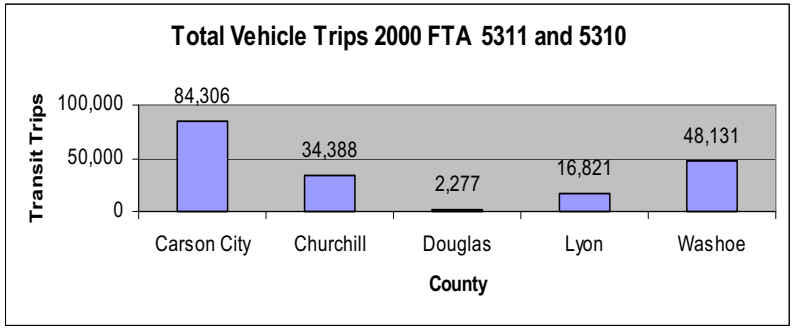
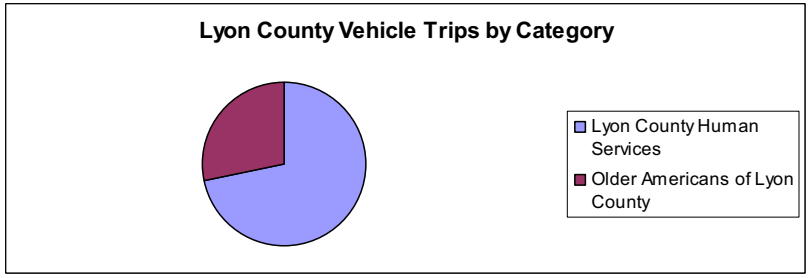


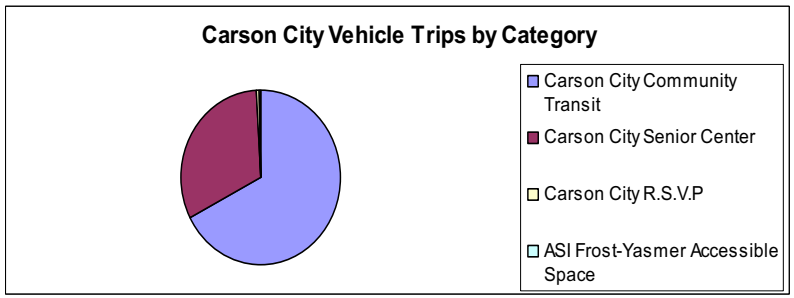
Figure 14
Western Nevada Traffic Profile

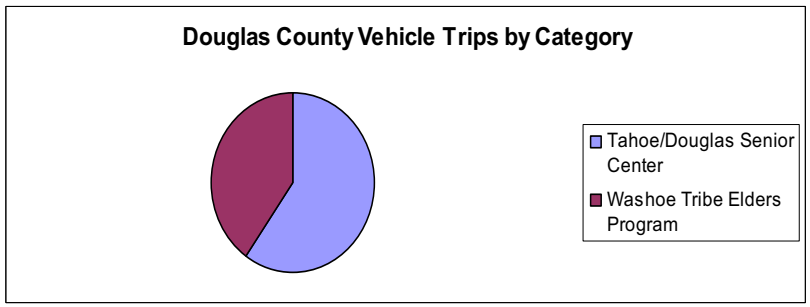


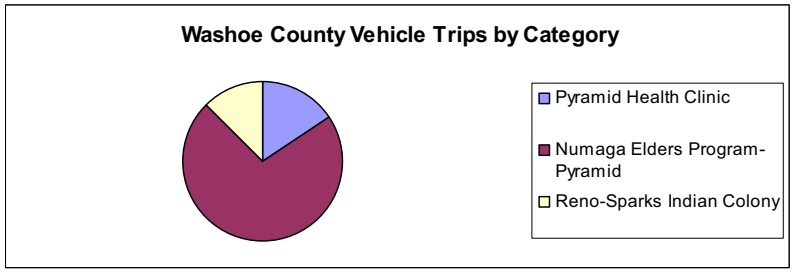
2000 Federal Transit Administration (FTA) Ridership Profile











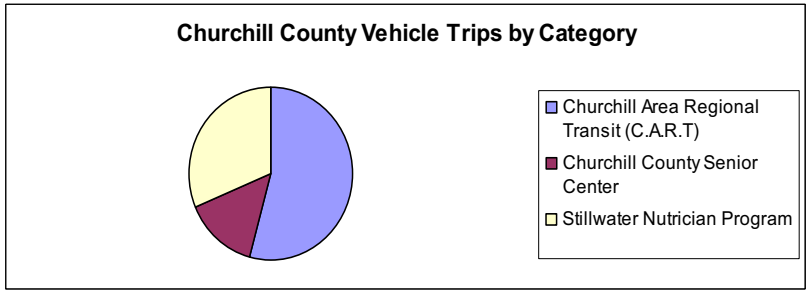
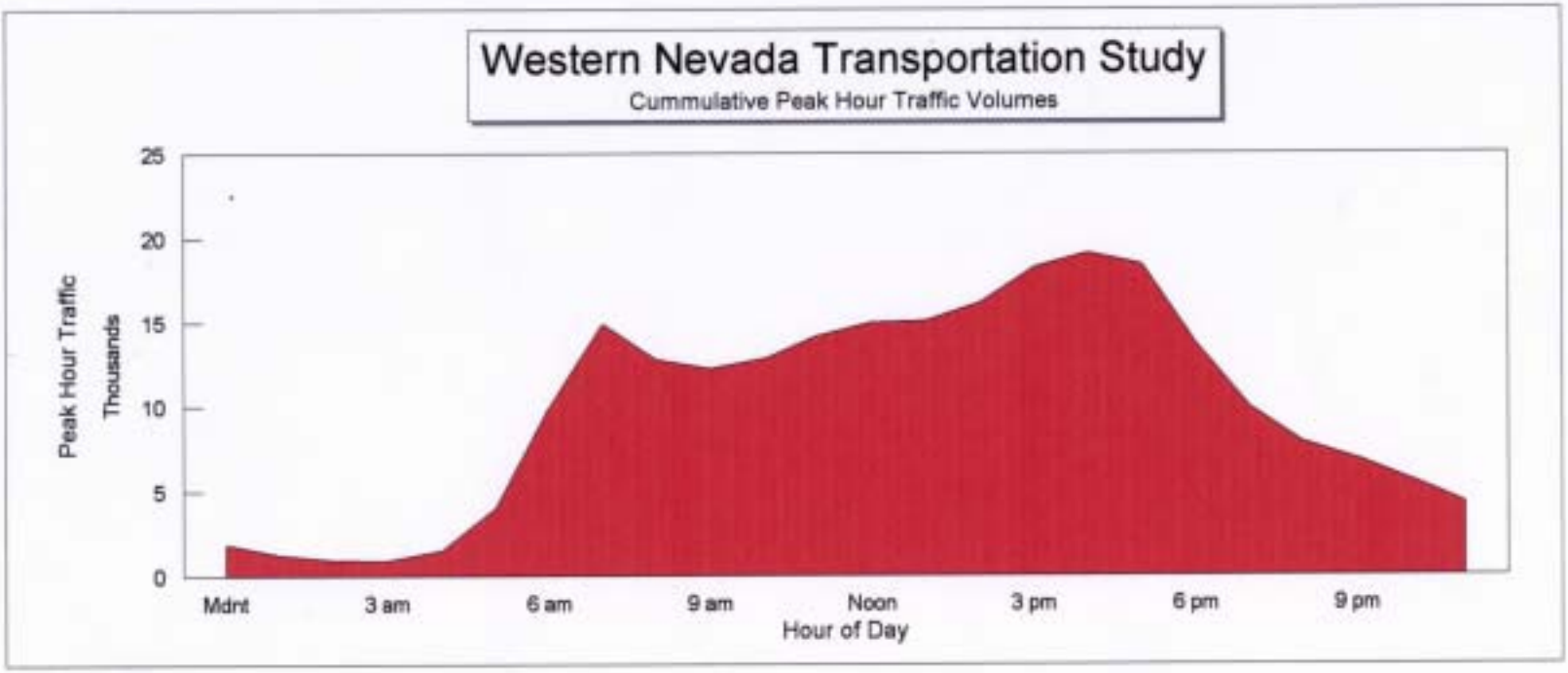
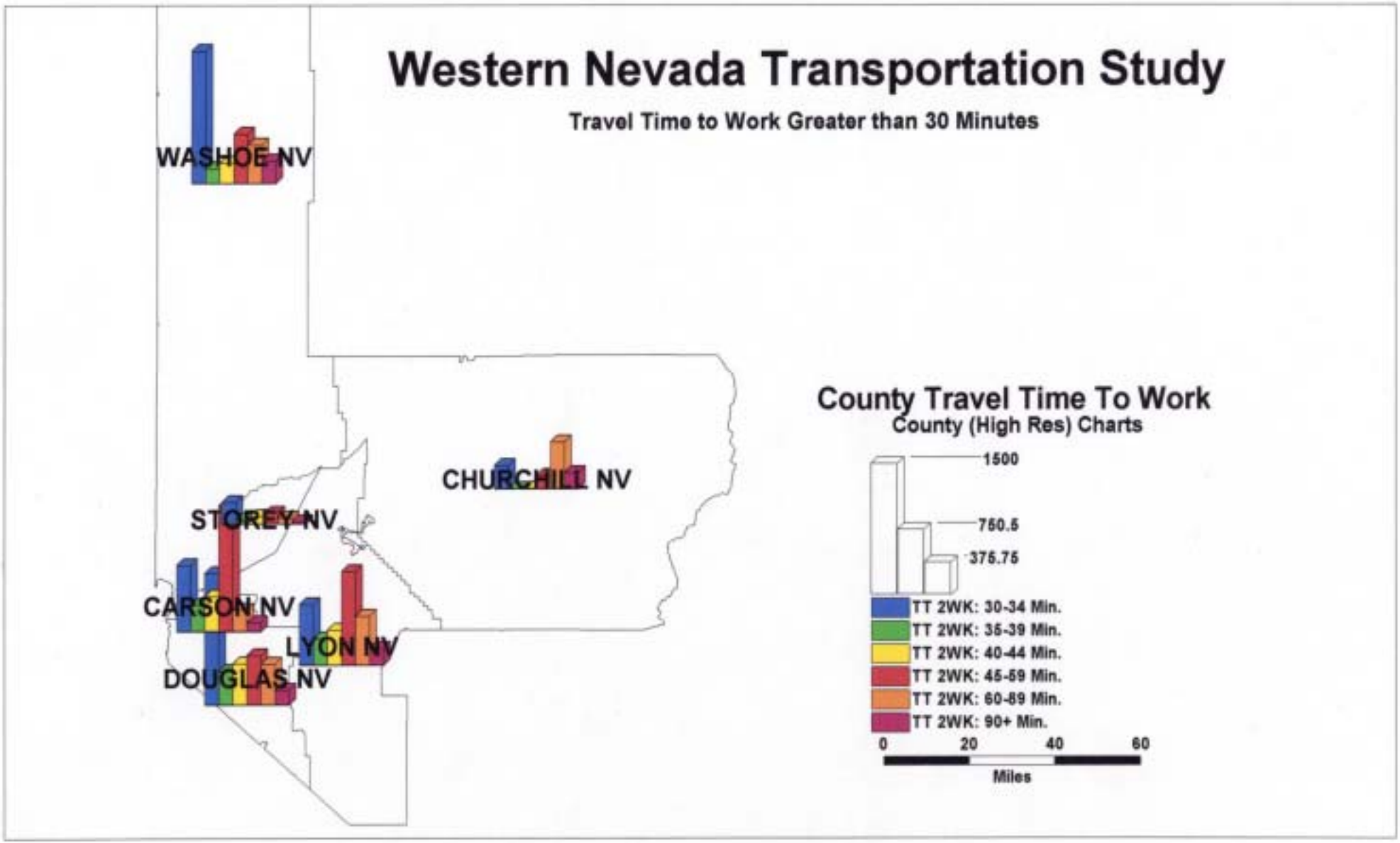
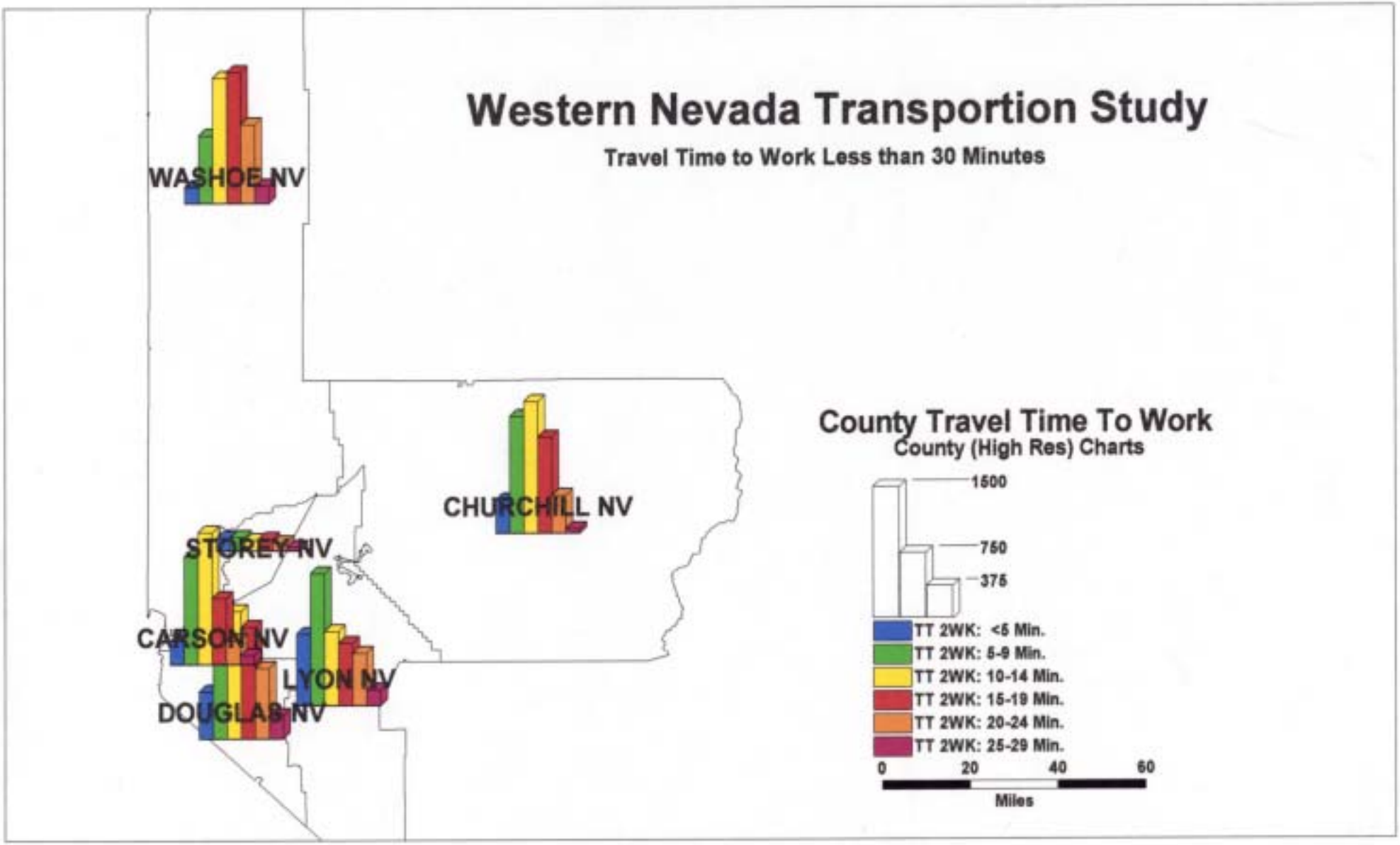


Figure 16


Western Nevada Transportation Study
Cummulative Peak Hour Traffic Volumes
Peak Hour Traffic
Thousands
25
20
15
10
5
0
Mdnt
3 am
6 am
9 am
Noon
3 pm
6 pm
9 pm
Hour of Day


Western Nevada Transportation Study
Travel Time to Work Greater than 30 Minutes
WASHOE NV
CHURCHILL NV
STOREY NV
CARSON NV
LYON NV
DOUGLAS NV
County Travel Time To Work
County (High Res) Charts
1500
750.5
375.75
TT 2WK: 30-34 Min.
TT 2WK: 35-39 Min.
TT 2WK: 40-44 Min.
TT 2WK: 45-59 Min.
TT 2WK: 60-89 Min.
TT 2WK: 90+ Min.
0
20
40
60
Miles


Western Nevada Transportion Study
Travel Time to Work Less than 30 Minutes
WASHOE NV
CHURCHILL NV
STOREY NV
CARSON NV
LYON NV
DOUGLAS NV
County Travel Time To Work
County (High Res) Charts
1500
750
375
TT 2WK: <5 Min.
TT 2WK: 5-9 Min.
TT 2WK: 10-14 Min.
TT 2WK: 15-19 Min.
TT 2WK: 20-24 Min.
TT 2WK: 25-29 Min.
0
20
40
60
Miles

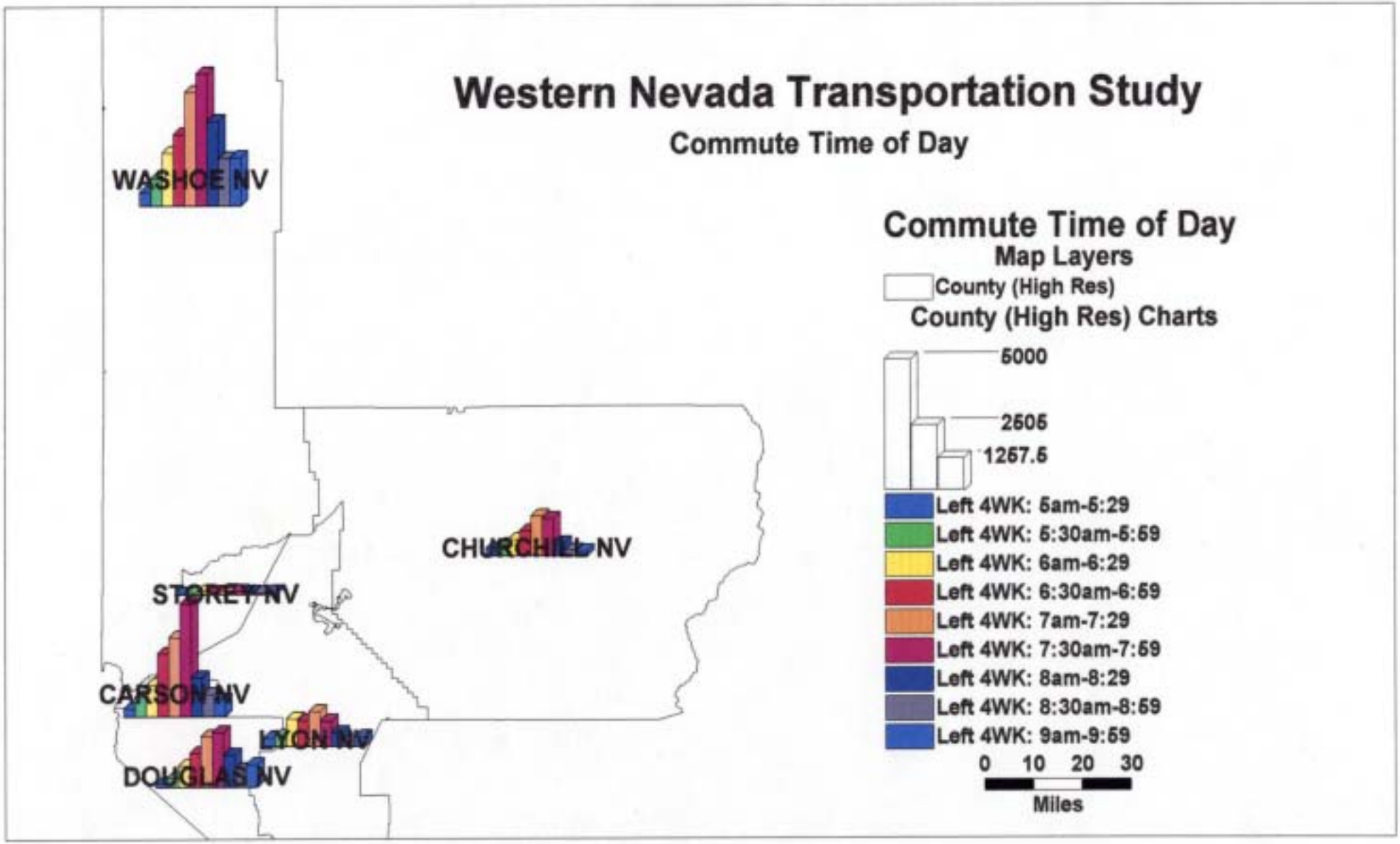
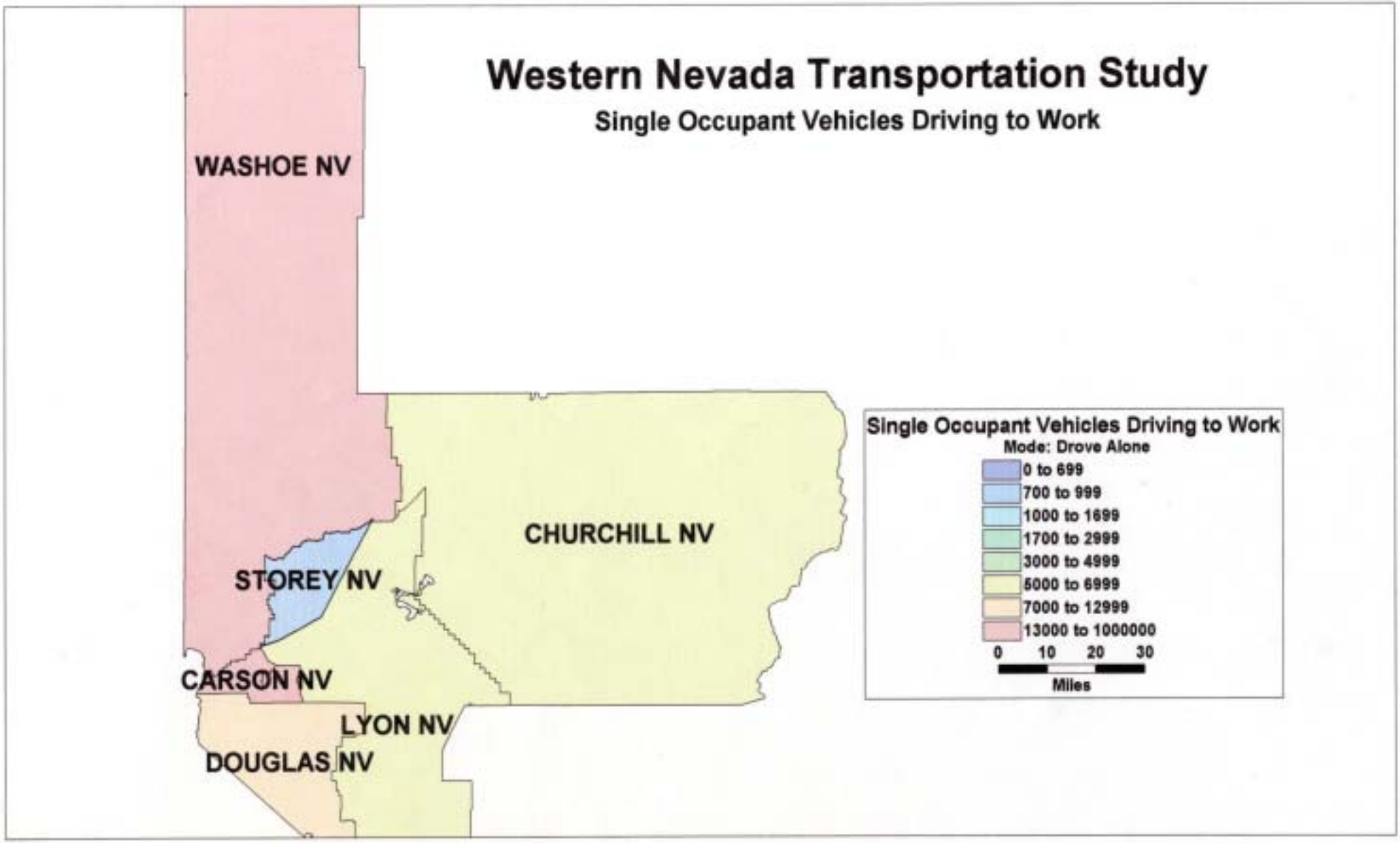
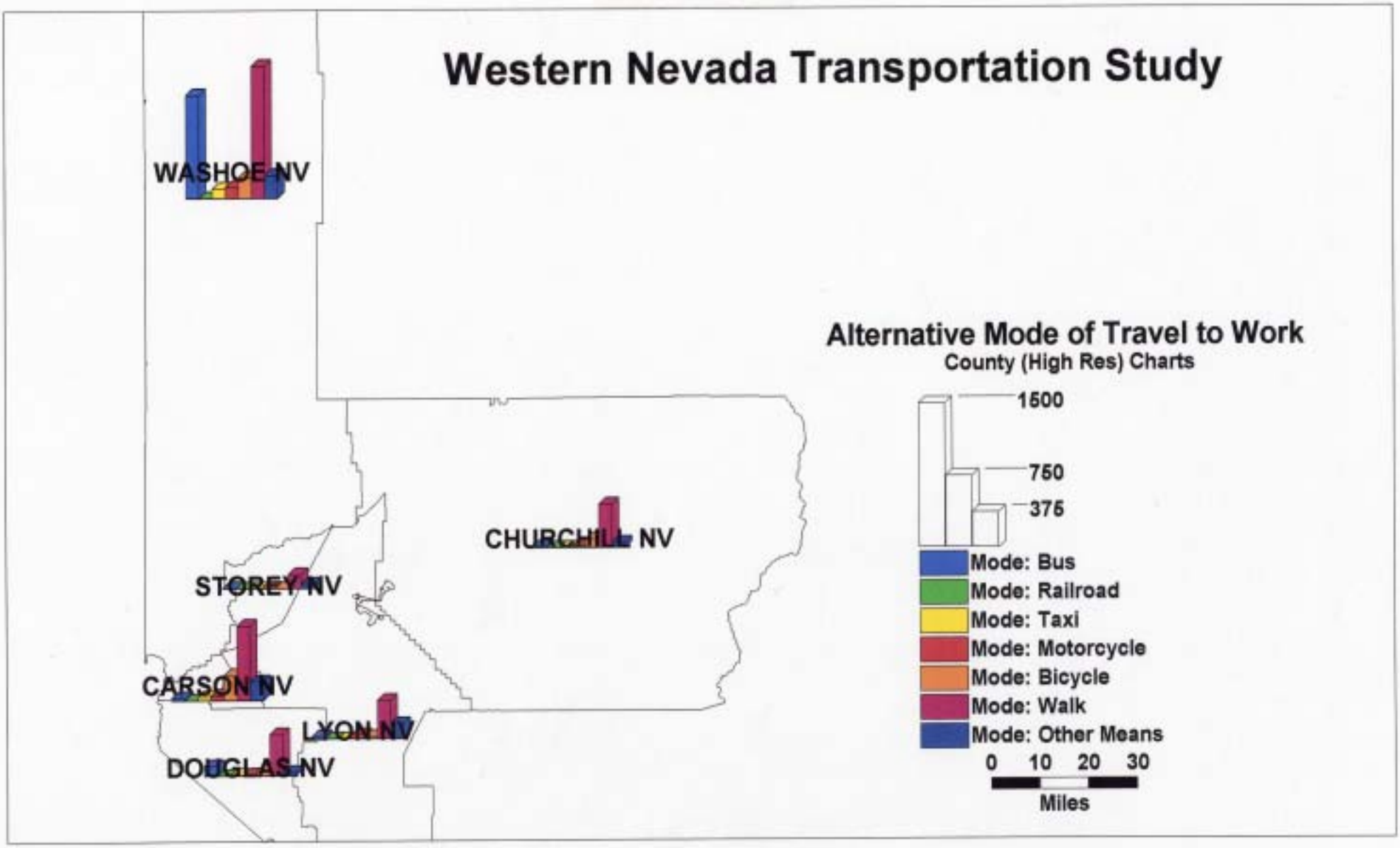

Western Nevada Transportation Study
Commute Time of Day
WASHOE NV
CHURCHILL NV
STOREY NV
CARSON NV
LYON NV
DOUGLAS NV
Commute Time of Day
Map Layers
County (High Res)
County (High Res) Charts
5000
2505
1257.5
Left 4WK: 5am-5:29
Left 4WK: 5:30am-5:59
Left 4WK: 6am-6:29
Left 4WK: 6:30am-6:59
Left 4WK: 7am-7:29
Left 4WK: 7:30am-7:59
Left 4WK: 8am-8:29
Left 4WK: 8:30am-8:59
Left 4WK: 9am-9:59
0 10 20 30
Miles

Figure 20


Western Nevada Transportation Study
Single Occupant Vehicles Driving to Work
WASHOE NV
CHURCHILL NV
STOREY NV
CARSON NV
LYON NV
DOUGLAS NV
Single Occupant Vehicles Driving to Work
Mode: Drove Alone
0 to 699
700 to 999
1000 to 1699
1700 to 2999
3000 to 4999
5000 to 6999
7000 to 12999
13000 to 1000000
0 10 20 30
Miles


Western Nevada Transportation Study
WASHOE NV
CHURCHILL NV
STOREY NV
CARSON NV
LYON NV
DOUGLAS NV
Alternative Mode of Travel to Work
County (High Res) Charts
1500
750
375
Mode: Bus
Mode: Railroad
Mode: Taxi
Mode: Motorcycle
Mode: Bicycle
Mode: Walk
Mode: Other Means
0 10 20 30
Miles

Travel Demand

Western Nevada Travel Demand Model Development

In general, travel demand forecasting attempts to quantify the amount of travel on existing and future transportation systems. Demand for transportation is created by the separation of urban activities with the supply of transportation represented by the roadways capacity of the street network. Development of a traffic model generally considers:

a) The identification of appropriate land use zoning, and/or impact of new developments on adjacent roadway facilities;

b) A range of population alternatives typically needs to be considered to address the needs of the current population and the population for future years;

c) The transportation system's ability to facilitate movement of goods is integral to the over-all economic well-being and success of a community;

d) Land use regulations are often of interest to evaluate appropriate ways to encourage land development, which can also foster economic development.

US 395, Carson City

U.S. 50 Stateline

The development of the western Nevada transportation traffic model is very similar to the development of traffic models used for a larger urban area. The difference is often in the application of the model to local area policy concerns and the ability to use model components in less detail than may be required for other areas. Given this common framework, local areas often will define the level of detail necessary for model components to address local needs and local circumstances. As regional needs change, or requirements change due to growth, specific model components can be modified to fit these concerns.

In order to identify the impact of future traffic volumes within the study area, the travel corridors located in the six-county area were used to concentrate modeling efforts. The traffic volumes on these corridors range from 60,000 ADT on Interstate 80 to 265 ADT on State Route 361. The following table shows the traffic corridors that were analyzed in the Western Nevada Transportation Study.

Yerington, Nevada

Table 1 **Analyzed Corridors in the Western Nevada Region**
Lyon County
US 95 A
State Route 339
State Route 208
State Route 338
Churchill County
US 95
State Route 121
State Route 361
Douglas County
State Route 88
State Route 208
Carson City
US 50
US 395
Washoe County
State Route 447
State Route 445
State Route 431
State Route 341
State Route 28

Background

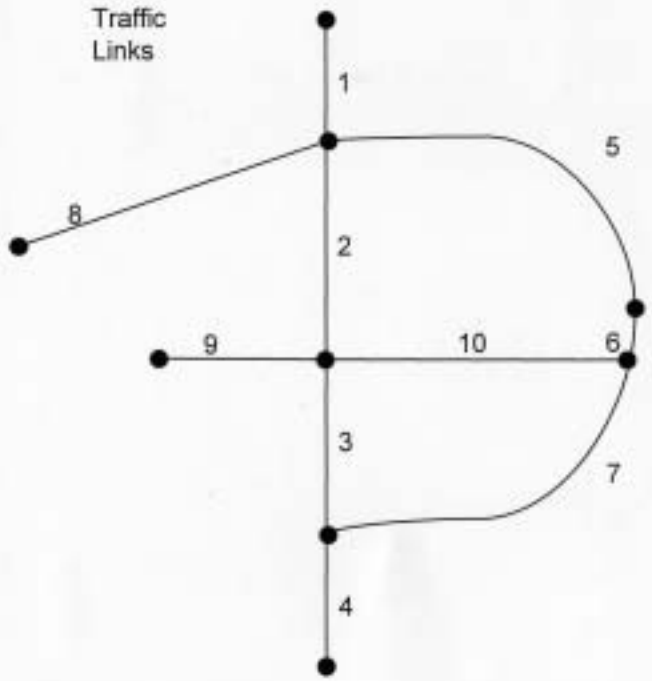
Travel demand is estimated from three basic factors, trip Generation, trip distribution and trip assignment. The first step is to determine the demographic characteristics of the study area. Generally, this includes gathering information about population, dwelling units, vehicles per household, visitation levels, and employment data. In order to achieve a level of consistency, previous modeling efforts in the urban areas of Reno, Carson City, Fernley, Fallon, and Douglas County were used to determine street network consistency, estimates of population and employment growth and to estimate future external traffic entering and exiting the urban areas. For regional planning efforts, the focus is on trip generation estimates that are stratified by three trip purposes: home-based work, home-based other, and non-home-based.

Table 2
Trip Generation Rates

Land-Use	**Trips Generated**
Single Family Home	9.55 per dwelling unit
Apartment	6.47 per unit
County Park	12.14 per acre
Movie Theater	529.47 per screen
Business Park	4.58 per employee
Source: ITE Trip Generation	

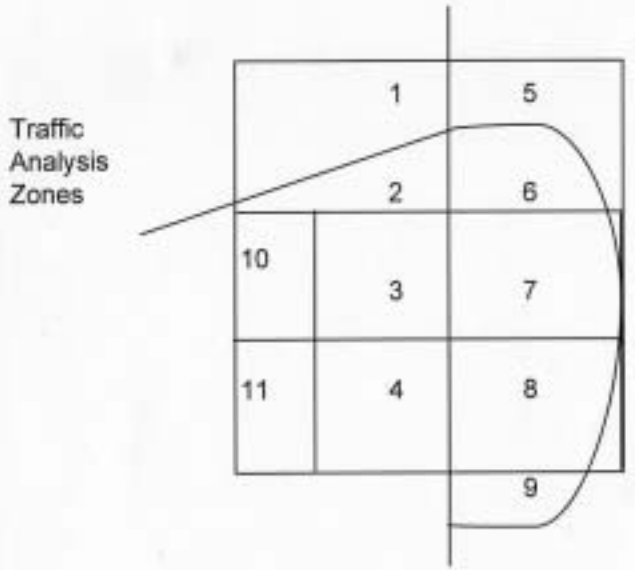
The second step in the modeling process is distributing vehicle trips using a computerized program called Gravity Model. The Gravity Model parallels Newton's Law of Gravity, which states that the force of attraction between two bodies is directly proportional to the square distance between them. The Gravity Model is often applied to trip distribution so that all trips starting in one zone (productions) are attracted to other zones (attractions).

The third step is a computerized assignment procedure called Equilibrium. Equilibrium occurs when no trip can be made on any other path than the one assigned without increasing the total travel time of all trips within the model network. The assignment of trips is an iterative process, which adjusts travel time based on congestion that in return is based on assigned volumes approaching assigned roadway capacities.



In order to geographically illustrate the study areas roadway network, the major roadways were divided into links, and at each end of a link is a point called a node. The location of each node and link is to provide a unique identification consistent with the State Plane Coordinates, which is similar to Latitude and Longitude coordinate records. In order to develop an accurate representation of the major corridors within the study area, the roadway centerline files, developed as part of the *Caliper* and *TransCAD* geographic street files were used as a base street-network file. Link attribute data, (i.e., roadway capacity, roadway speeds, and observed traffic counts) are assigned to the roadway links given the circumstances they represent. Figure II-7 indicates the number of through traffic lanes used to assign roadway capacity in the analyzed travel corridors, while Figure II-8 indicates the node number assignments.

After assigning the link and node record characteristics, the links and nodes are overlaid by larger geographical areas called Traffic Analysis Zones (TAZ). In order to analyze demographic information on a zonal basis, the Census Tracts utilized by the U.S. Census Bureau were used to represent the TAZs. As shown in Figures II-9 thru Figure II-13, the western Nevada roadway network is represented by 97 TAZs, 256 two-way links, 126 nodes, and 14 external stations.



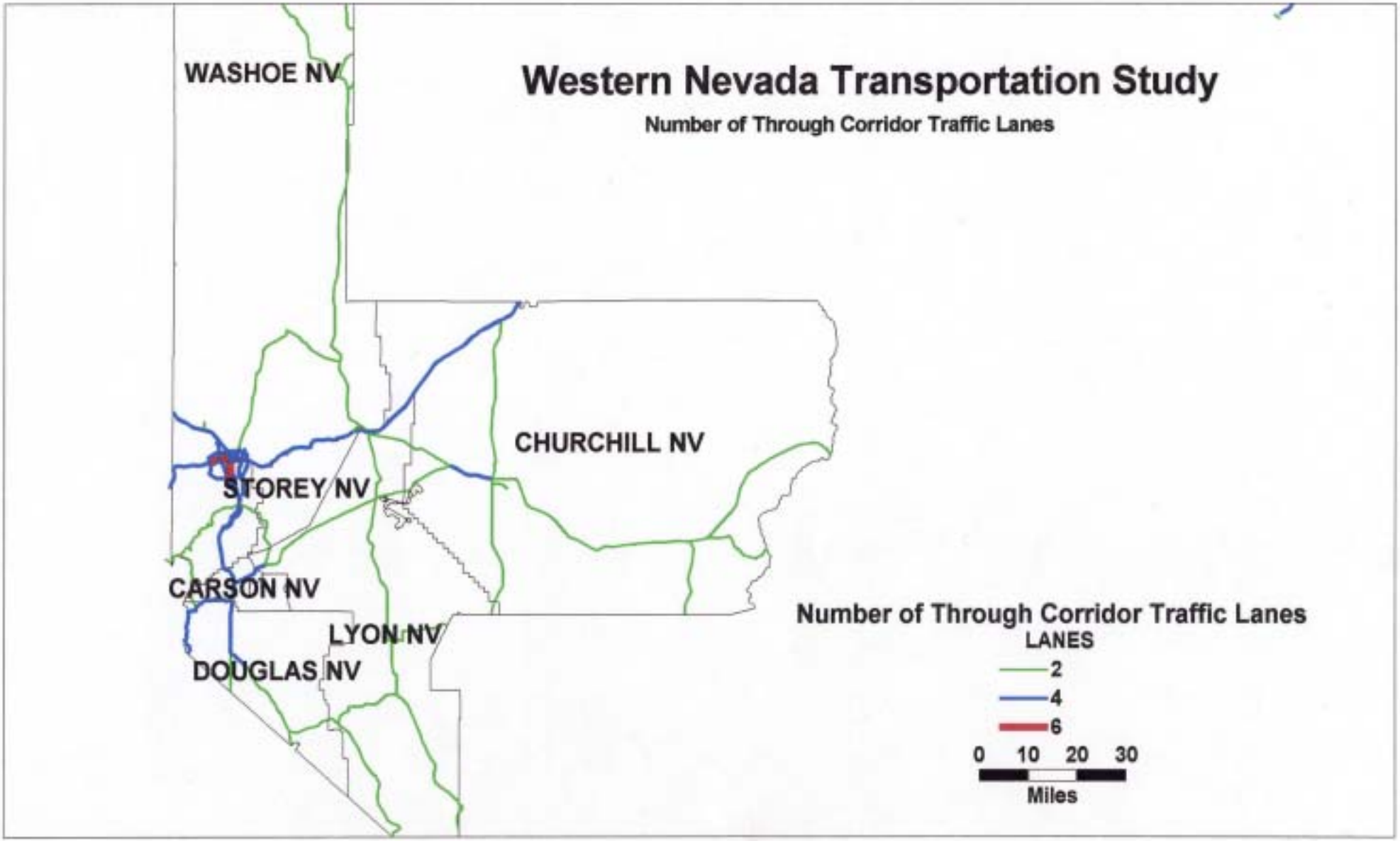

Western Nevada Transportation Study
Number of Through Corridor Traffic Lanes
WASHOE NV
CHURCHILL NV
STOREY NV
CARSON NV
LYON NV
DOUGLAS NV
Number of Through Corridor Traffic Lanes
LANES
2
4
6
0 10 20 30
Miles

Figure 23

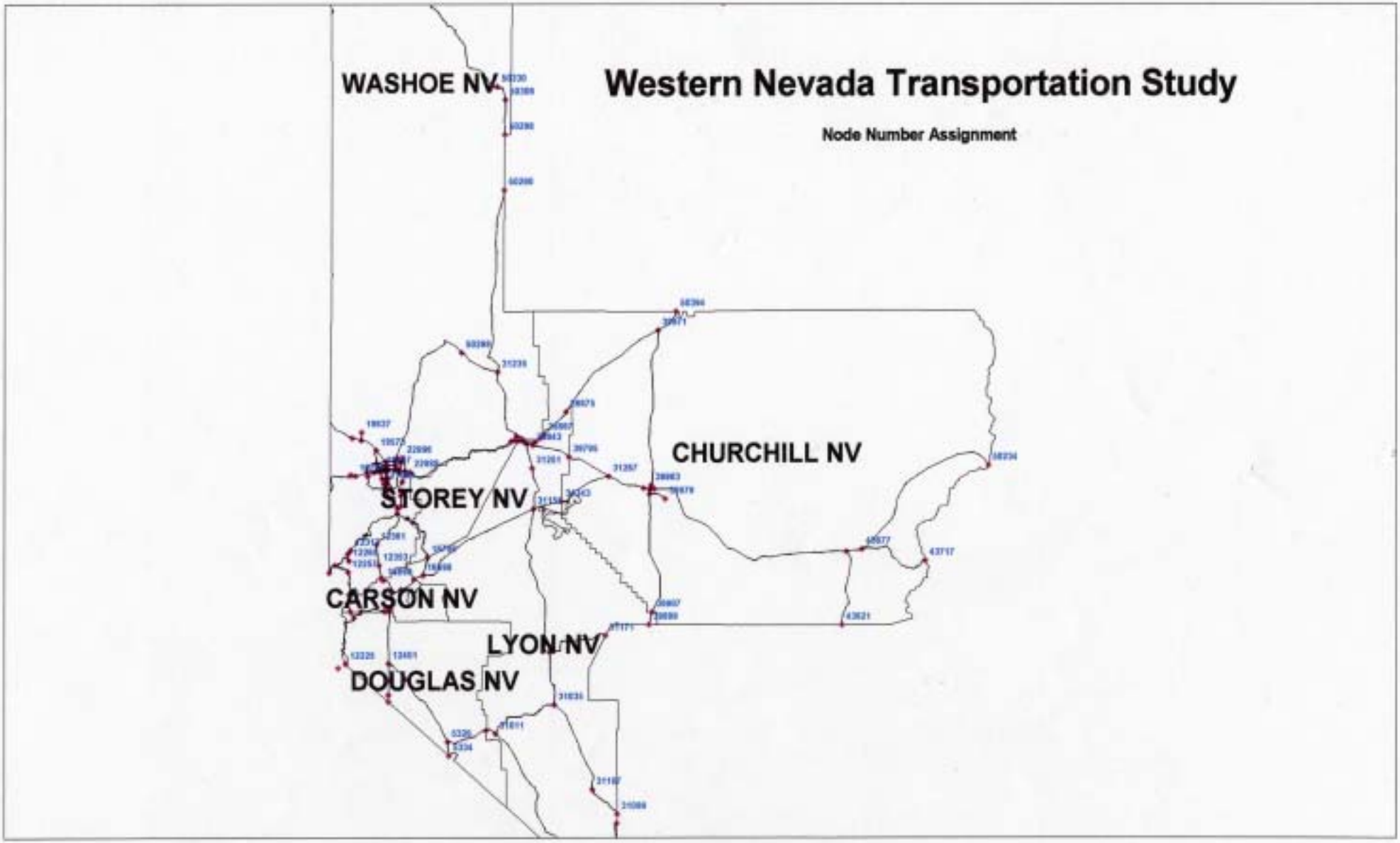

Western Nevada Transportation Study
Node Number Assignment
WASHOE NV
CHURCHILL NV
STOREY NV
CARSON NV
LYON NV
DOUGLAS NV

Figure 24

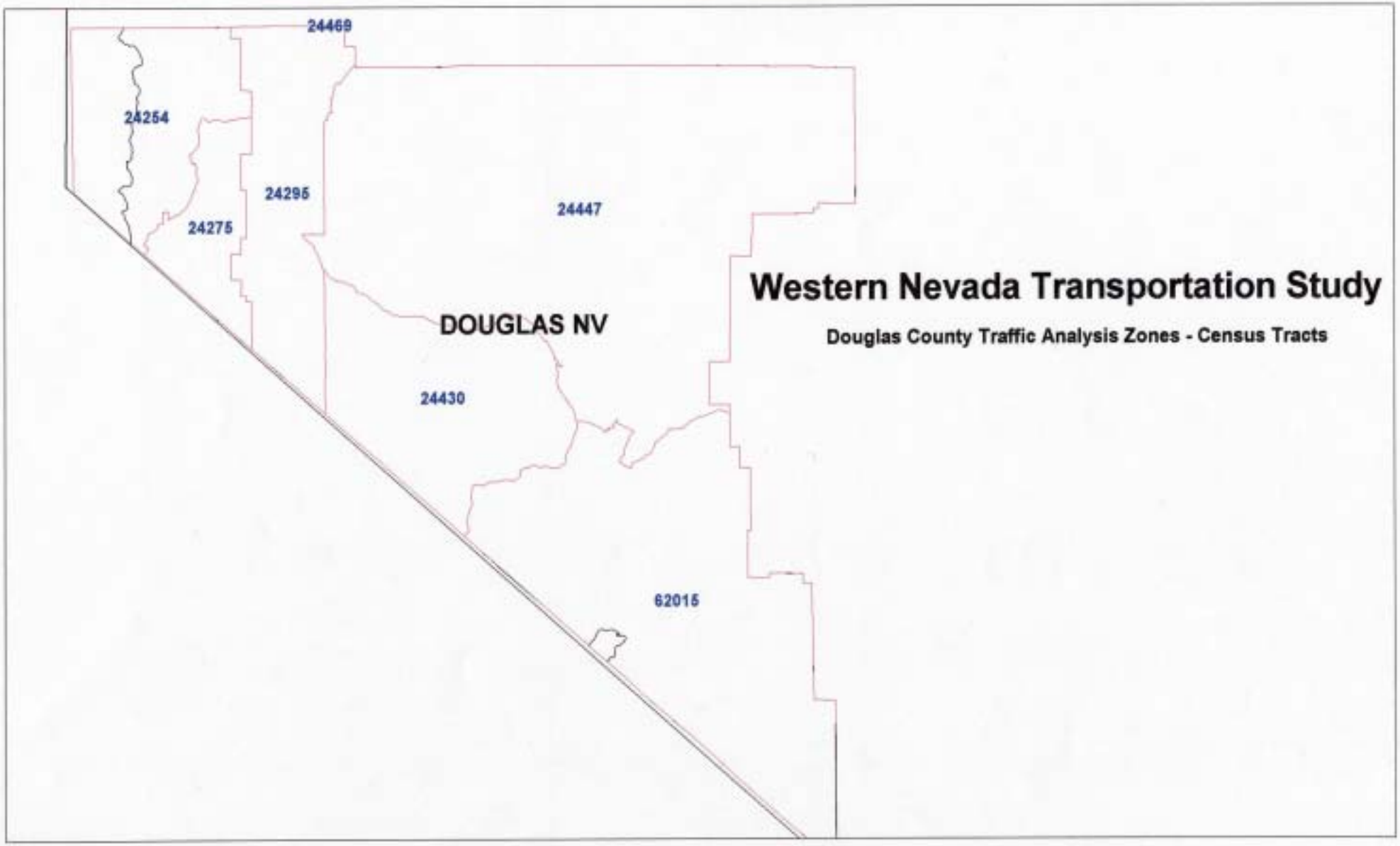
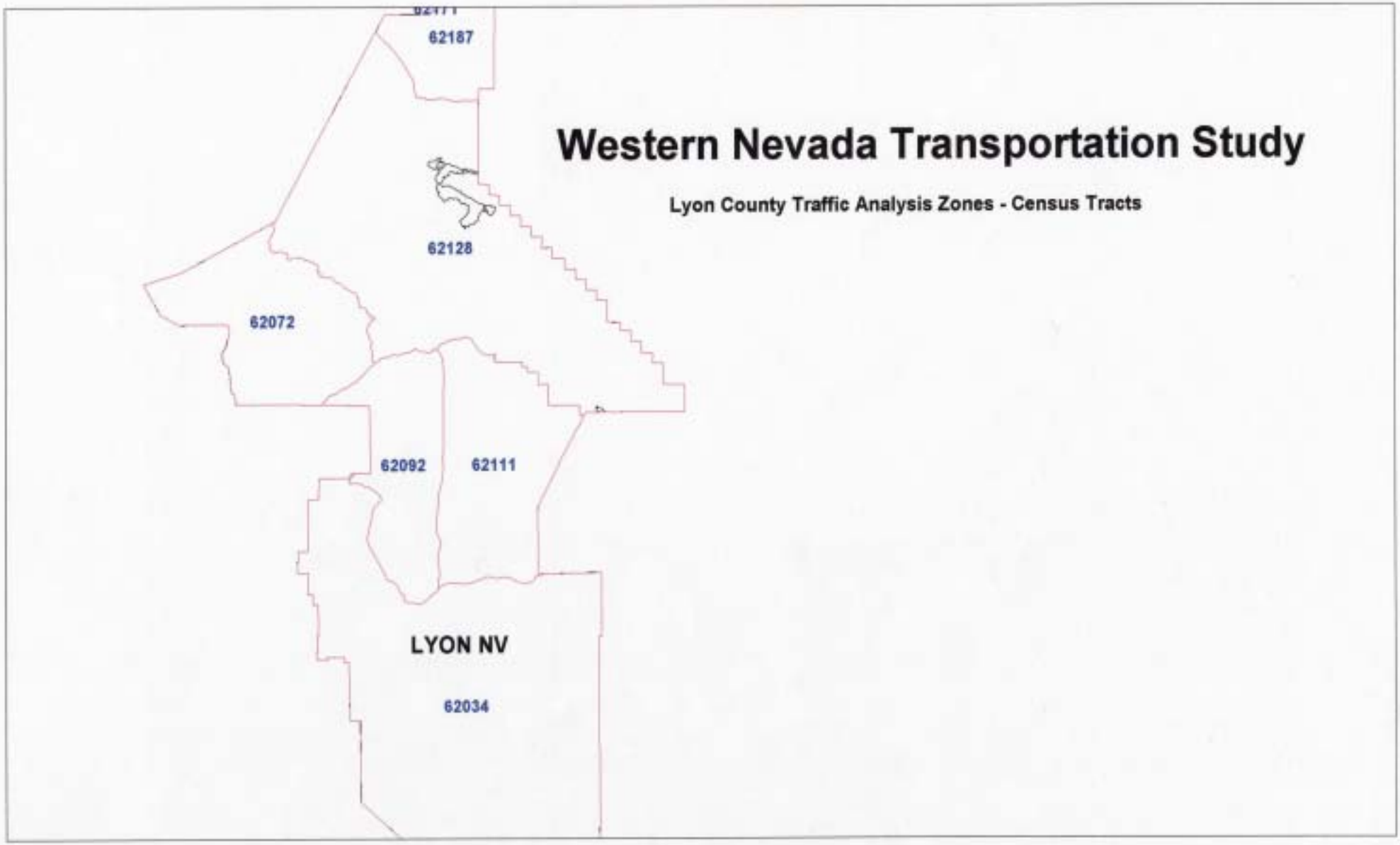

24469
24254
24295
24275
24447
DOUGLAS NV
24430
62015
Western Nevada Transportation Study
Douglas County Traffic Analysis Zones - Census Tracts

Figure 25


62187
Western Nevada Transportation Study
Lyon County Traffic Analysis Zones - Census Tracts
62128
62072
62092
62111
LYON NV
62034

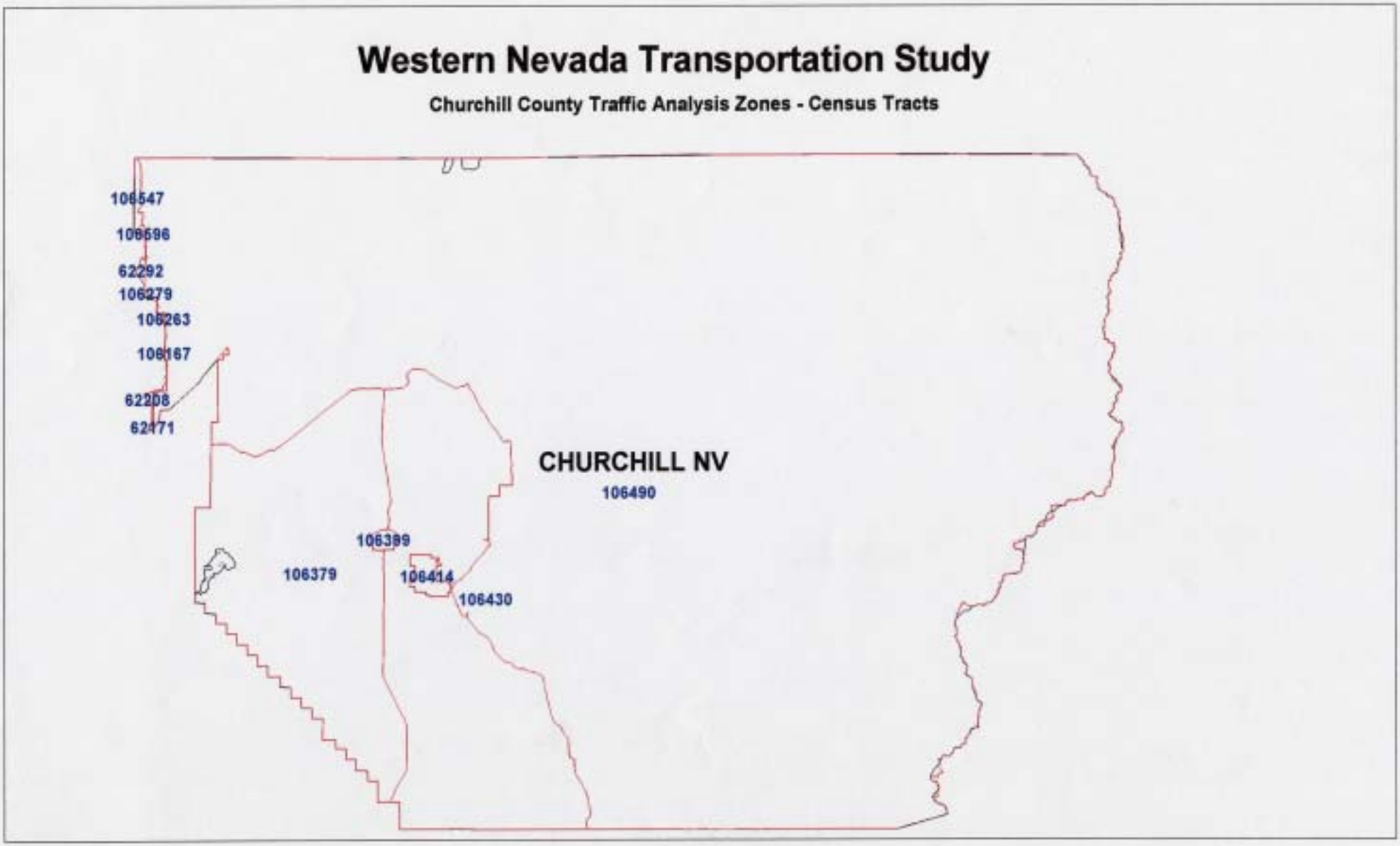
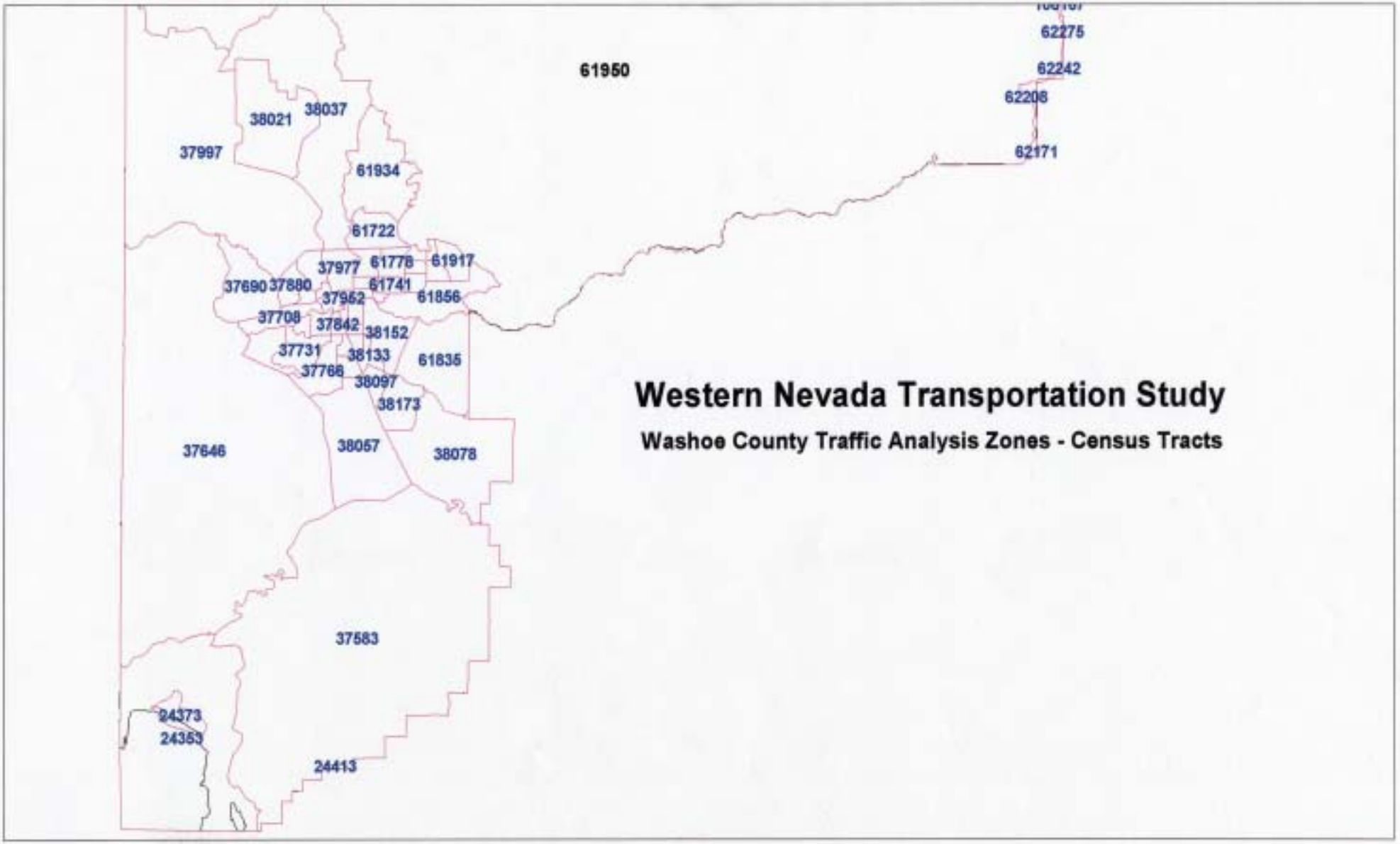
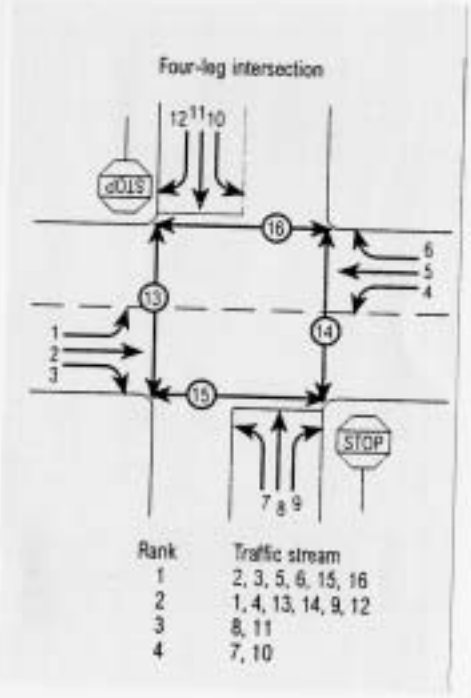

Western Nevada Transportation Study
Churchill County Traffic Analysis Zones - Census Tracts
106547
106596
62292
106279
106263
106167
62208
62171
CHURCHILL NV
106490
106389
106379
106414
106430

Figure 27


61950
62275
62242
62208
62171
38021
38037
37997
61934
61722
37977
61778
61917
37690
37880
61741
37952
61856
37709
37842
38152
37731
38133
61835
37766
38097
38173
37646
38057
38078
37583
24373
24353
24413
Western Nevada Transportation Study
Washoe County Traffic Analysis Zones - Census Tracts

In order to supplement the demographic information contained in the urban area models discussed previously, directional traffic counts on specific highway links were also used to identify vehicle trip activity. This method has the advantage of treating directional traffic counts as stochastic variables. The process is an iterative one that switches back and forth between the traffic assignment stage and the vehicle origin-destination matrix estimation stage. Directional traffic counts often reflect the best accounting of the travel demand placed upon a roadway system. An origin-destination matrix that is based and is able to consider the hourly and daily accounting of vehicle trips, supplemented with a zonal accounting of housing and employment characteristics, was used to develop the initial 2000 (Base Year) traffic model for the western Nevada study area. The utilization of directional traffic counts in the development of the Origin–Destination Matrix is also beneficial towards model accuracy. Calibration of the model output is directly related to traffic counts input on the street network and the housing and employment data entered at the zonal level. Model validation is an important part of travel demand model development and must be presented through proper analysis. Data collection, as necessary, must be performed to ensure that adequate model validation information exists. The "best practice" modeling methodology must be accompanied by diligent model validation with quality data to produce reliable and accurate travel model estimates, and future forecasts.



As shown in Table 1, approximately 209,804 dwelling units were accounted for in the study area for the 2000 base year. Employment, which is a derivative of the floor areas Commercial, Office, Hotel-Casino and Industrial Land Uses, were estimated at 244,100 for the six-county area.

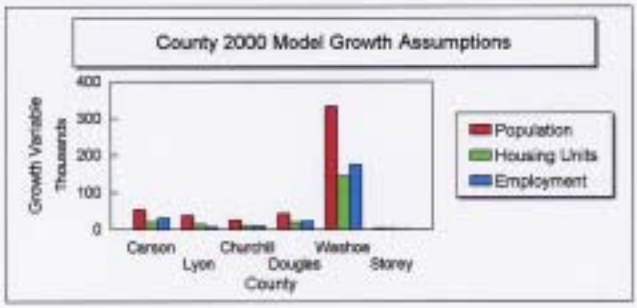
Table 3

Western Nevada Transportation Model Growth Assumptions

County

2000	Carson	Lyon	Churchill	Douglas	Washoe	Storey
Population	53,095	37,393	26,247	43,101	333,566	3,897
Housing Units	21,283	14,279	9,732	19,006	143,908	1,596
Employment	31,000	7,000	8,100	22,000	175,000	1,000
Commercial (KSF)	6,100	1,400	1,620	1,700	34,000	500
Hotel/Casino (KSF)	761	175	200	14,300	60,000	70
Office (KSF)	2,100	450	540	700	15,000	80
Industrial ((KSF)	3,500	800	900	1,200	23,000	1,300

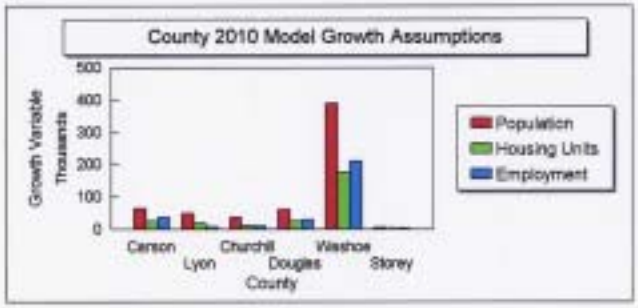
*KSF = 1,000 square feet
* Employment Statistics does not include agricultural employment



County

2010	Carson	Lyon	Churchill	Douglas	Washoe	Storey
Population	63,500	49,000	36,000	60,700	390,500	4,750
Housing Units	25,600	20,000	12,000	24,000	175,000	2,100
Employment	36,000	7,600	8,400	28,000	210,000	3,300
Commercial (KSF)	7,200	1,460	1,690	1,810	35,500	1,100
Hotel/Casino (KSF)	600	185	220	14,400	60,500	90
Office (KSF)	2,500	500	590	760	17,000	110
Industrial ((KSF)	4,600	1,100	1,000	1,300	23,700	3,300

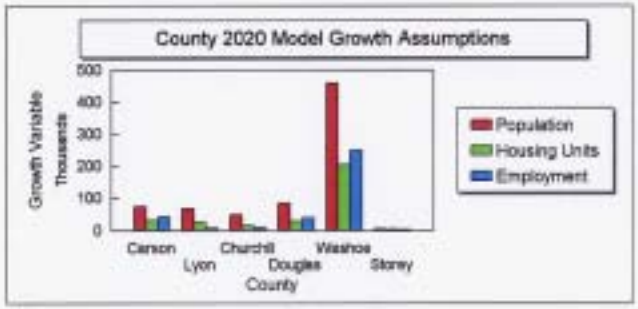
*KSF = 1,000 square feet
* Employment Statistics does not include agricultural employment



County

2020	Carson	Lyon	Churchill	Douglas	Washoe	Storey
Population	75,500	69,000	50,000	84,300	460,000	6,000
Housing Units	30,200	25,000	14,500	29,000	205,000	2,600
Employment	43,000	8,000	8,600	39,000	250,000	3,600
Commercial (KSF)	8,600	1,500	1,710	2,200	41,000	1,500
Hotel/Casino (KSF)	1,240	200	250	14,500	70,000	110
Office (KSF)	2,800	600	610	820	20,000	130
Industrial ((KSF)	6,020	1,600	1,200	1,350	25,100	4,500

*KSF = 1,000 square feet
* Employment Statistics does not include agricultural employment



Base Year System Analysis

Two of the most common indicators of operating conditions on a roadway are the volume-capacity (V/C) ratio and the Level of Service (LOS) designation. By calculating the V/C ratio on a roadway section, a determination of the operating LOS can be made. As shown in Table 3, as the V/C ratio approaches 1.00, the roadway begins to approach its practical carrying capacity or LOS "F".

Sierra Street, Reno

Table 3
Level of Service Designations

Level of Service	V/C Ratio	Description
A	.00 -.60	Free Flow, Low Volumes, High Speed
B	.60 -.69	Stable Flow, Lower Operating Speeds
C	.70 -.79	Stable Flow, Higher Volumes
D	.80 -.89	Approaching Unstable, Restrictions to Operating Flows
E	.90 -.99	Unstable Flow, Near Capacity
F	1.00	Forced Flow, At Capacity

Source: Highway Capacity Manual

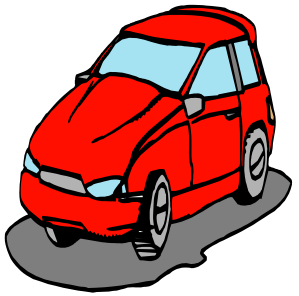
Capacity is defined as the number of vehicles that has a reasonable expectation of passing over a given section of a lane or roadway in one direction (or in both directions for a two-lane or a three-lane highway) during a given time period under prevailing roadway and traffic conditions. The capacity of a roadway or intersection depends on a number of general conditions listed below;

- Number of Vehicles
- Vehicle Turning Movements
- Composition of Traffic
- Roadway Alignment
- Lane Widths
- Shoulder Width
- Travel Speed
- Adjacent Parking
- Signalization
- Pedestrians

US 395- Minden

Level of Service (LOS) is a term that denotes any one of an infinite number of different combinations of operating conditions that may occur on a given lane or roadway when it is accommodating different levels of traffic volumes. Level of Service as defined by the Highway Capacity Manual (1994) is a qualitative and quantitative measure describing operational conditions within a traffic stream. Based on the observed traffic counts and 2000 model output, Average Daily Traffic Volumes (ADT) for the year 2000 were modeled for the corridors listed previously.

As shown in Figure 28 through Figure 29, overall corridor analyses indicates that the Corridor Volume/Capacity ratios are at acceptable levels along several of the corridors outside the urban areas. The LOS along the U.S. Route 395 travel corridor between the urban areas of Gardnerville-Minden, Carson City, and Reno range from LOS "C" to LOS "D" and LOS "E". Other travel corridors of concern include U.S Highway 50 between Carson City and Dayton, and along portions of State Route 431 where traffic has been measured at LOS "C".



C Street, Virginia City

As mentioned previously, the capacity of a roadway is dependent upon a number of general conditions, which can affect the LOS at a given location. It should be noted that the LOS designations listed on Figure 29 do not consider the presence of adjacent intersections, parking, roadway alignment, composition of traffic, turning movements, or signalization. All of the above conditions can reduce the overall capacity of a given roadway, which in return can negatively influence the assigned LOS of a given facility at a given time. In order to fully investigate the future operational characteristics of a given corridor, a more extensive collection of traffic characteristics would be required.

Future Year Corridor Analysis

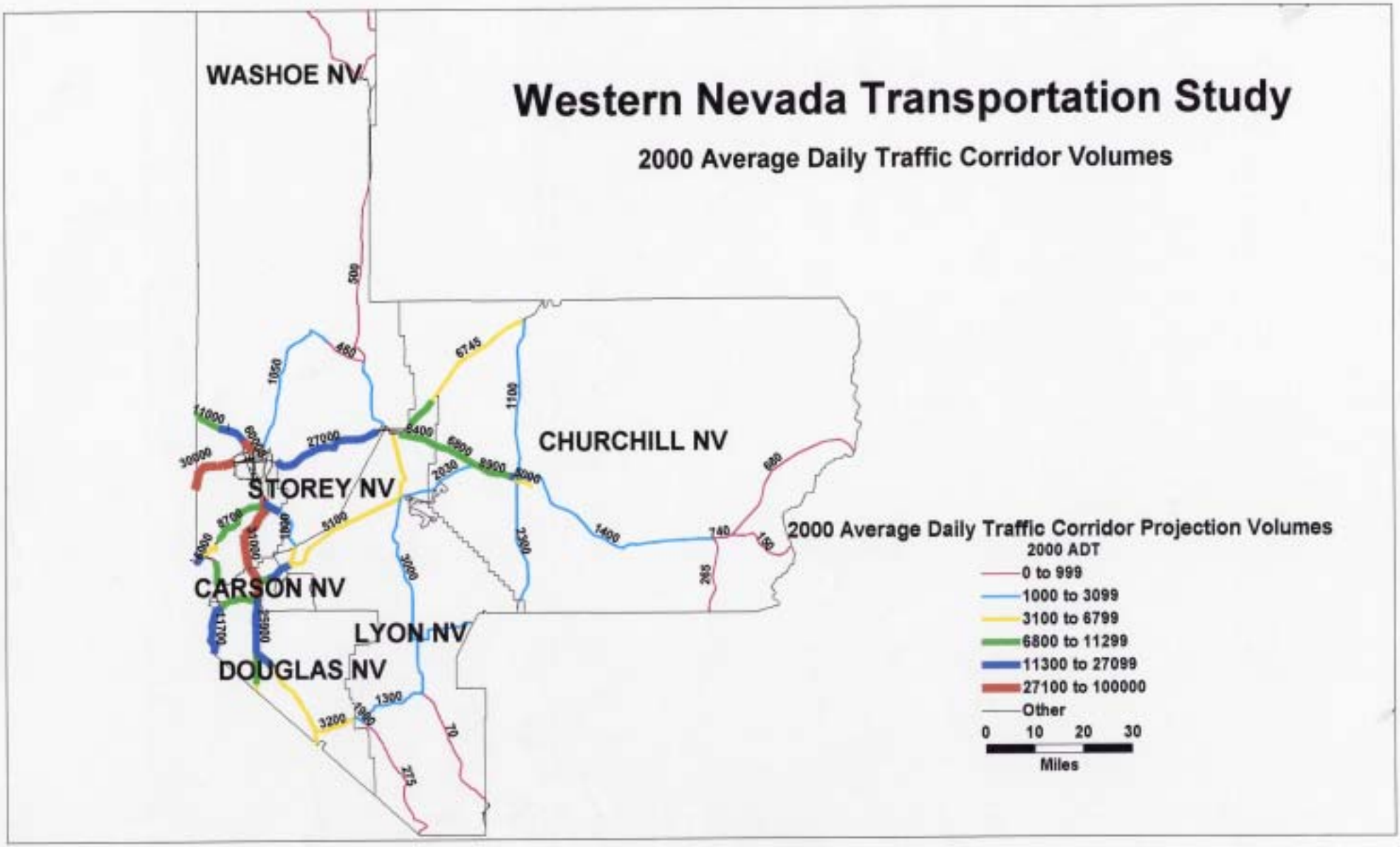
In order to forecast future traffic volumes on the Western Nevada street corridor network, NDOT utilized the collection of demographic data conducted in transportation planning efforts for those urban areas listed previously. In addition to these plans, proposed subdivision plans, and commercial development plans submitted to the respective County Assessor's Offices and the Nevada State Clearinghouse were researched. As shown in Table 3 on page

52, growth in the six-county area is anticipated to reach 604,450 in the year 2010 and 744,800 in 2020 with the number of housing units increasing to 258,700 in the year 2010 and 306,300 in the year 2020.

In addition to estimating the anticipated population and housing growth over the next 20 years, estimates concerning the amount of employment and commercial, Hotel/Casino, Office, and Industrial land uses were compiled for the six county area. This information was collected from a variety of sources including the General Land Use Plans for the respective counties and from previous modeling efforts. In addition to the land use assumptions, NDOT compiled the annual traffic growth rates of the corridors between urban areas and utilized this information in the estimating average daily traffic for the forecast years of 2010 and 2020. Utilizing the growth assumptions shown in Table 3 on page 52 and historical corridor growth trends, future travel forecasts were developed for the future years of 2010 and 2020. In order to identify future corridor capacity deficiencies, the western Nevada street network discussed previously was used to estimate the impact of the proposed growth.

As shown in Figures 30 and 31, roadway capacity deficiencies in the year 2010 are estimated to occur along the U.S Route 395 Corridor where LOS is anticipated to reach LOS "E" in the year 2010. Additional roadway capacity deficiencies are anticipated to occur along U.S. Highway 50 between Carson City and Dayton where LOS has been estimated to reach LOS "D". As indicated in Figure II-20 through Figure II-22, continued roadway deficiencies are anticipated to occur along U.S. Route 395 in the year 2020. As shown in Figure 22, continued growth along the U.S. Highway 50 corridor east of Dayton will cause this corridor to reach LOS "D" to its terminus with State Route Alternate 95 in Silver Springs where the current roadway is limited to two travel lanes.

Sunridge Subdivision, Douglas


Western Nevada Transportation Study
2000 Average Daily Traffic Corridor Volumes
WASHOE NV
CHURCHILL NV
STOREY NV
CARSON NV
LYON NV
DOUGLAS NV
2000 Average Daily Traffic Corridor Projection Volumes
2000 ADT
0 to 999
1000 to 3099
3100 to 6799
6800 to 11299
11300 to 27099
27100 to 100000
Other
0 10 20 30
Miles

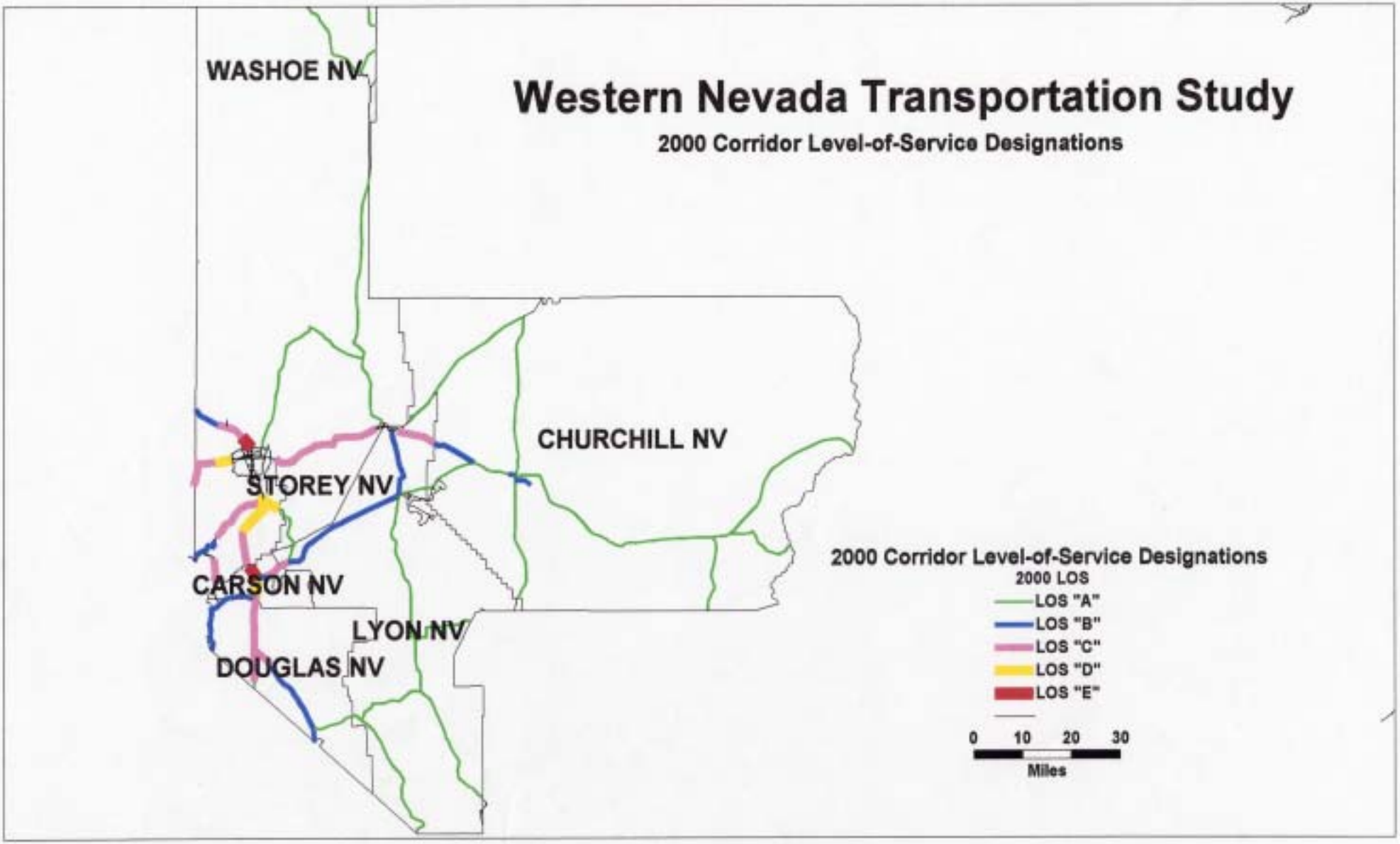

Western Nevada Transportation Study
2000 Corridor Level-of-Service Designations
WASHOE NV
CHURCHILL NV
STOREY NV
CARSON NV
LYON NV
DOUGLAS NV
2000 Corridor Level-of-Service Designations
2000 LOS
LOS "A"
LOS "B"
LOS "C"
LOS "D"
LOS "E"
0 10 20 30
Miles

Figure 30

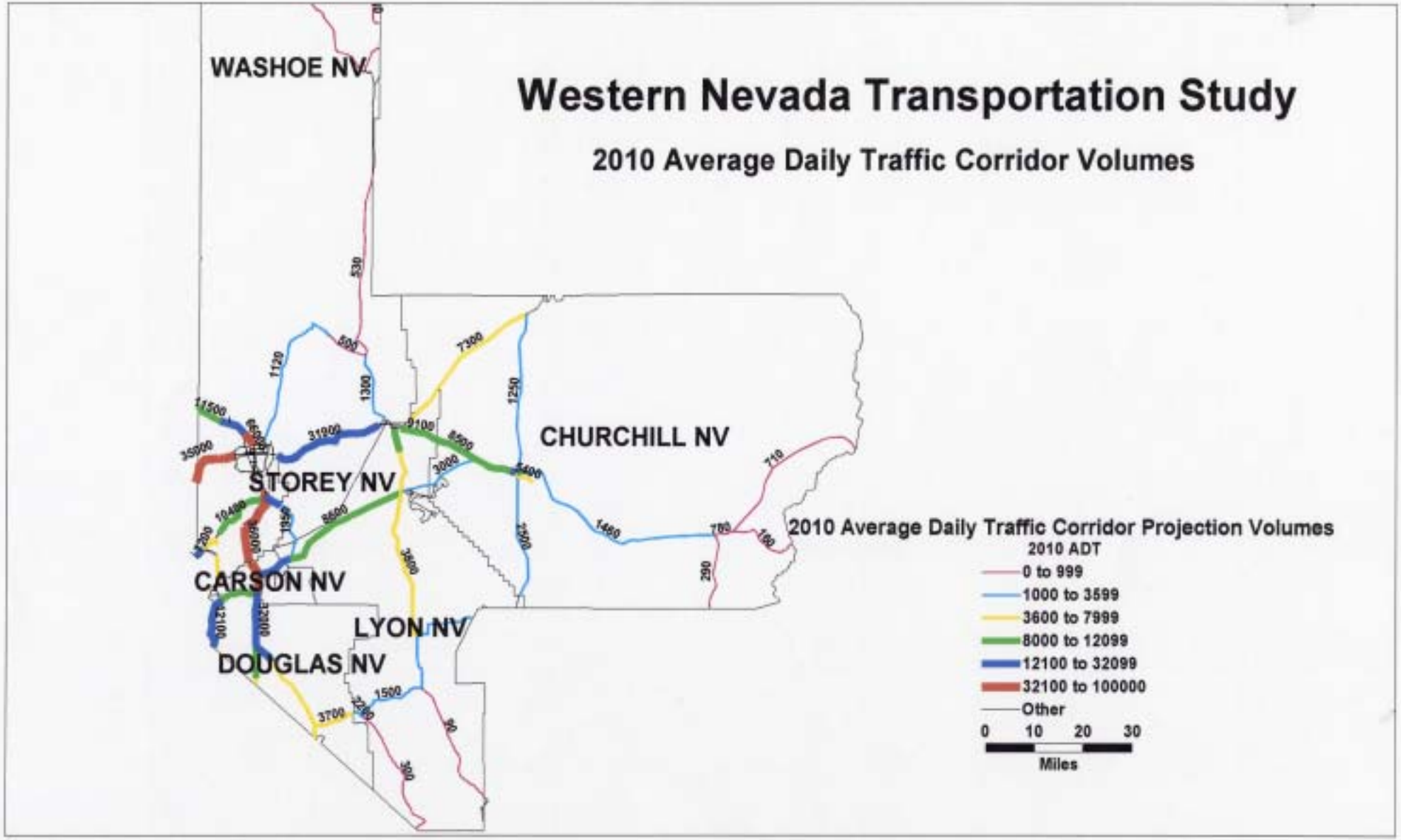
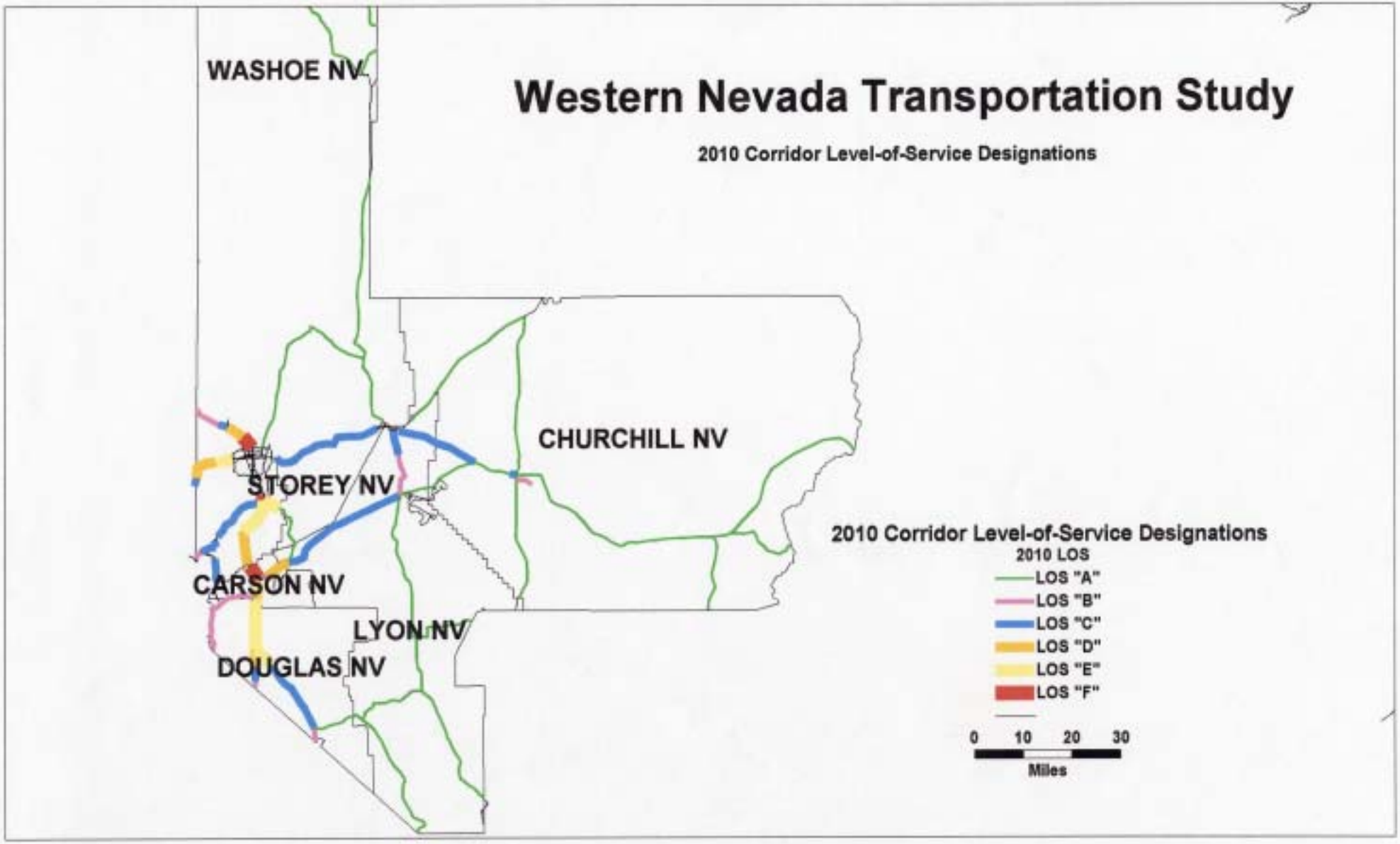

Western Nevada Transportation Study
2010 Average Daily Traffic Corridor Volumes
WASHOE NV
CHURCHILL NV
STOREY NV
CARSON NV
LYON NV
DOUGLAS NV
2010 Average Daily Traffic Corridor Projection Volumes
2010 ADT
0 to 999
1000 to 3599
3600 to 7999
8000 to 12099
12100 to 32099
32100 to 100000
Other
0 10 20 30
Miles

Figure 31


Western Nevada Transportation Study
2010 Corridor Level-of-Service Designations
WASHOE NV
CHURCHILL NV
STOREY NV
CARSON NV
LYON NV
DOUGLAS NV
2010 Corridor Level-of-Service Designations
2010 LOS
LOS "A"
LOS "B"
LOS "C"
LOS "D"
LOS "E"
LOS "F"
0 10 20 30
Miles

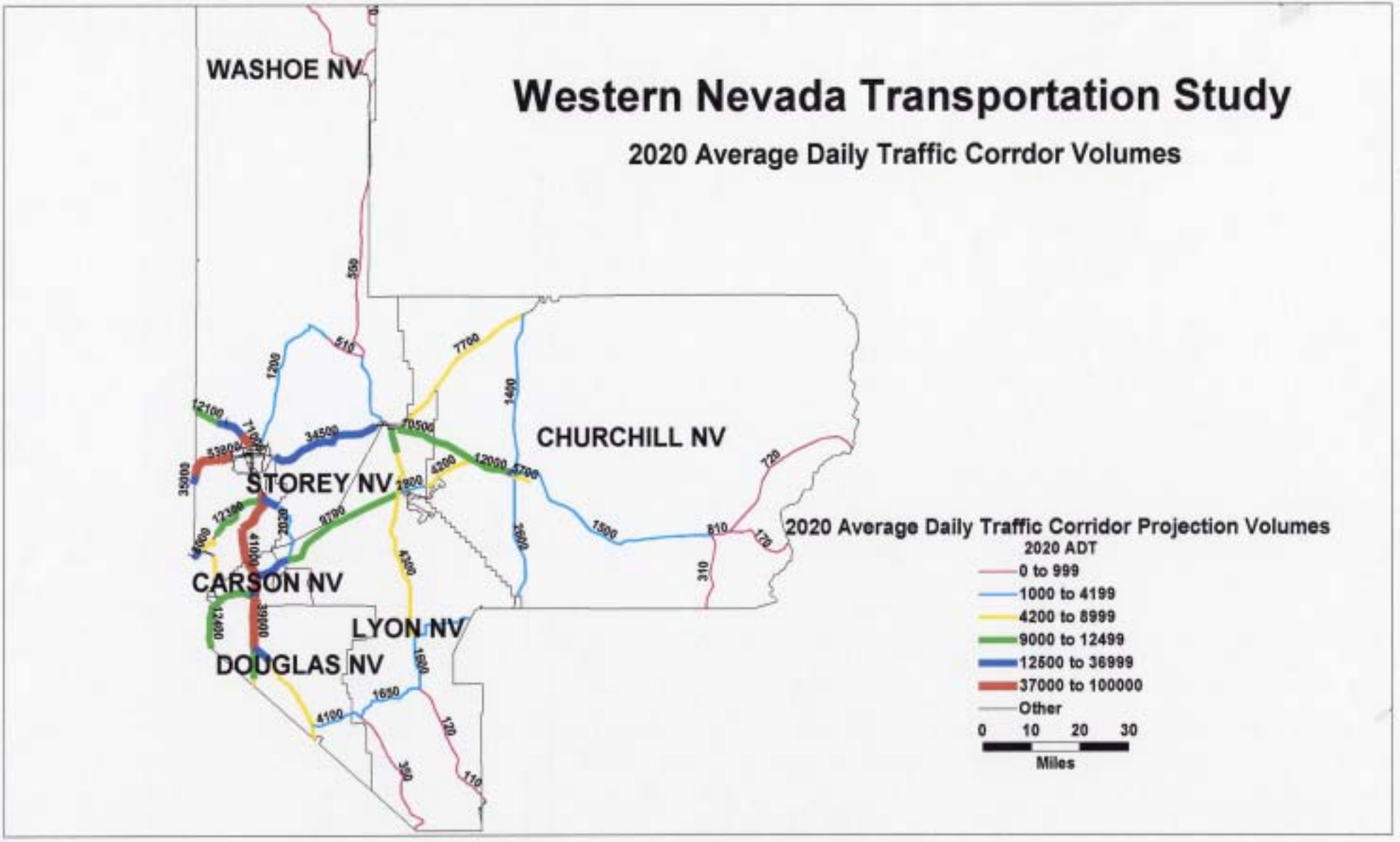
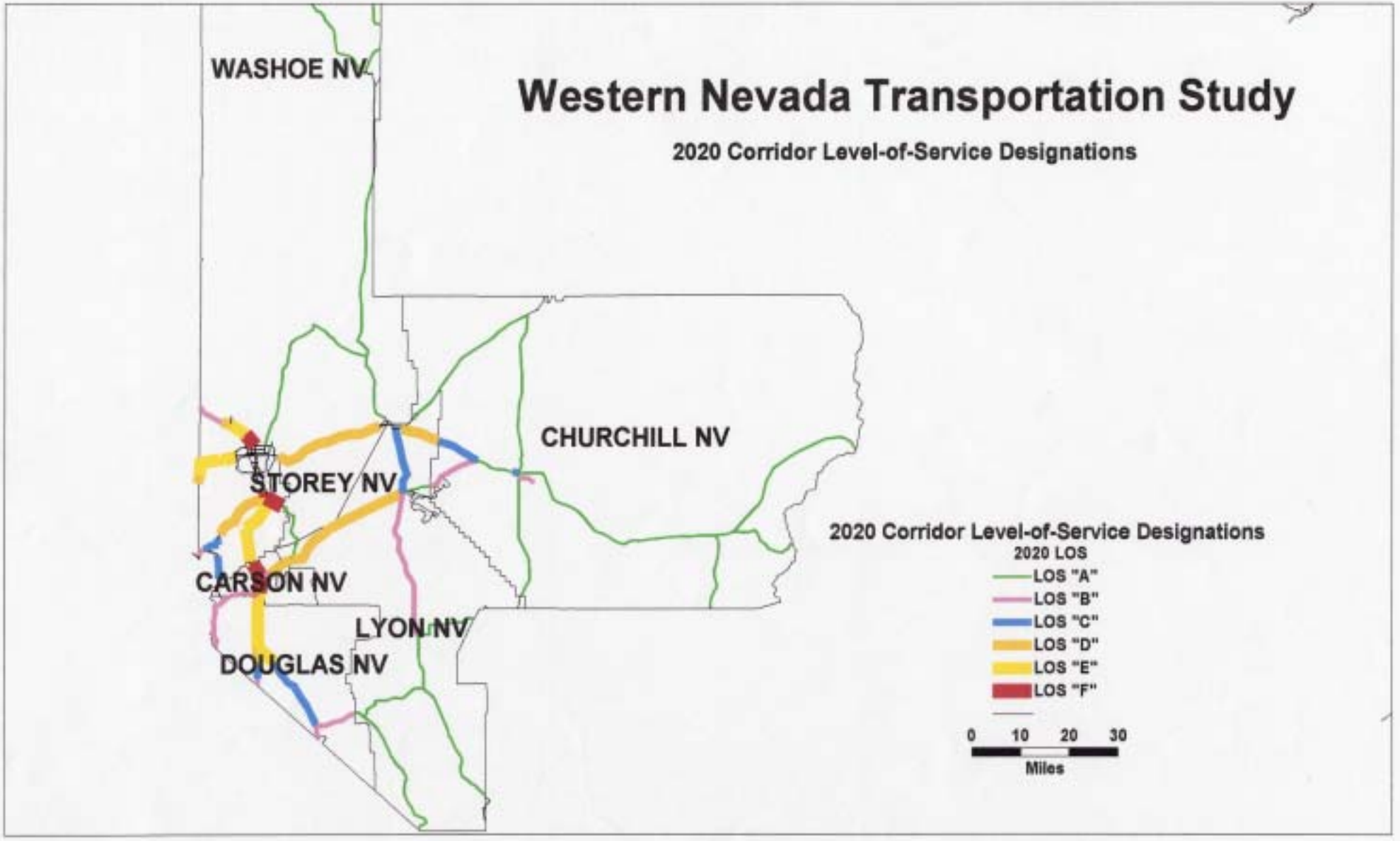

Western Nevada Transportation Study
2020 Average Daily Traffic Corrdor Volumes
WASHOE NV
CHURCHILL NV
STOREY NV
CARSON NV
LYON NV
DOUGLAS NV
2020 Average Daily Traffic Corridor Projection Volumes
2020 ADT
0 to 999
1000 to 4199
4200 to 8999
9000 to 12499
12500 to 36999
37000 to 100000
Other
0 10 20 30
Miles

Figure 33


Western Nevada Transportation Study
2020 Corridor Level-of-Service Designations
WASHOE NV
CHURCHILL NV
STOREY NV
CARSON NV
LYON NV
DOUGLAS NV
2020 Corridor Level-of-Service Designations
2020 LOS
LOS "A"
LOS "B"
LOS "C"
LOS "D"
LOS "E"
LOS "F"
0 10 20 30
Miles

PRIDE, Silver Springs

Future Improvement Strategies

The development of future multi-modal improvement strategies to assist with the increase in traffic congestion levels along the travel corridors will play an important role towards facilitating the mobility of travelers in Western Nevada. In order to provide potential strategies to assist in alleviating future levels of traffic congestion, the following listing of strategies are recommended to assist in the decision making process about future transportation improvements.

Amtrak, Reno

Southwest Airlines, Reno

Traffic Flow Improvement Strategies

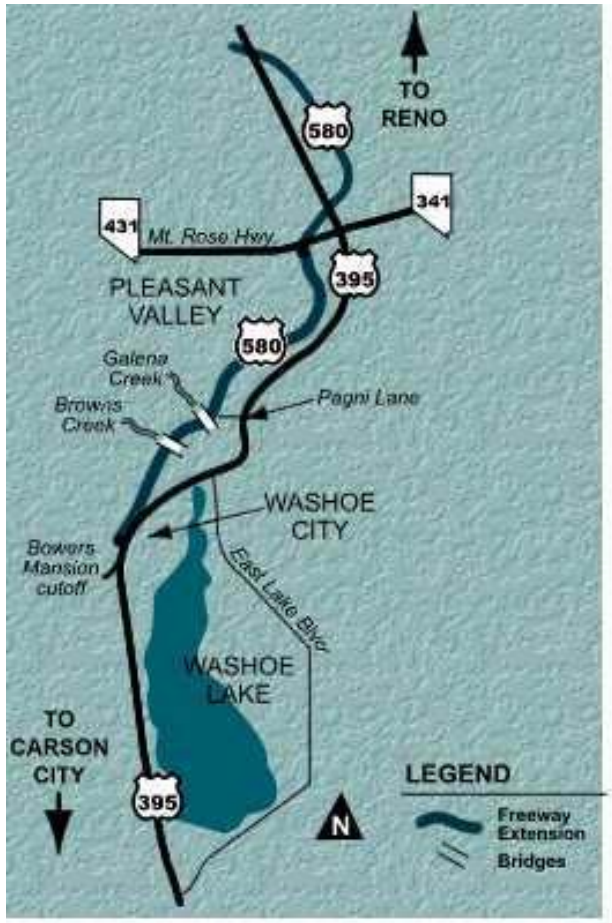
Carson City Freeway

Within the urban area of Carson City, the Nevada Department of Transportation has developed a preliminary design for the Carson City Freeway. The project is being implemented in two phases with sub-phases included in each. Phase I of the project will include 3.8 miles of a controlled-access freeway from U.S. 50 east to the northern connection of U.S. 395. Phase II of the project will add 4.9 miles of controlled-access from U.S. 50 east to a southern connection with U.S. 50 west at its present intersection with South Carson Street. The entire freeway is being designed with two travel lanes in each direction. The intent of the Freeway design is to relieve traffic congestion along U.S. 395 within the urban areas of Carson City. Based on modeling estimates for the year 2020, as shown in Figure 34, the Carson City Freeway will improve the LOS along U.S. 395 within the urban areas of Carson City from LOS “F” to LOS “C” with the estimated LOS on the Freeway at LOS “B”.

New Carson City Freeway

I-580-US 395 Freeway Extensions

Currently, U.S. 395 south of Reno is an undivided, four-lane highway that runs through the residential areas of Steamboat, Pleasant Valley, and Washoe City. It is also the only all-weather roadway connecting South Lake Tahoe, Douglas County, Lyon County, and Carson City to the Reno urban area, and Reno-Tahoe Airport. Without the freeway extension, the travel time between Reno and Carson City is expected to double during peak hours with a corresponding increase in accidents. Based on modeling estimates shown in Figure B-22 the Freeway Extension is anticipated to improve the travel conditions on US. 395 from LOS "E" to LOS "C" with the LOS on the Freeway Extension anticipated to achieve LOS "B" in the year 2020.



Access Management

Although driveways are essential to providing vehicular access to property, they can also seriously affect the safety and quality of operations of the adjacent roadway. Recent survey calculations established by the Institute of Transportation Engineers (ITE) estimate that under average conditions the capacity of a four-lane arterial with a posted speed limit of 45 mph will be reduced by over one percent for every percent of the traffic that turns between the right lane and driveways at signalized intersections. The proliferation of driveways tends to have a cumulative effect. The application of basic access management controls can often minimize disruptions to through traffic, and will assist in safe and efficient access to adjacent land developments.

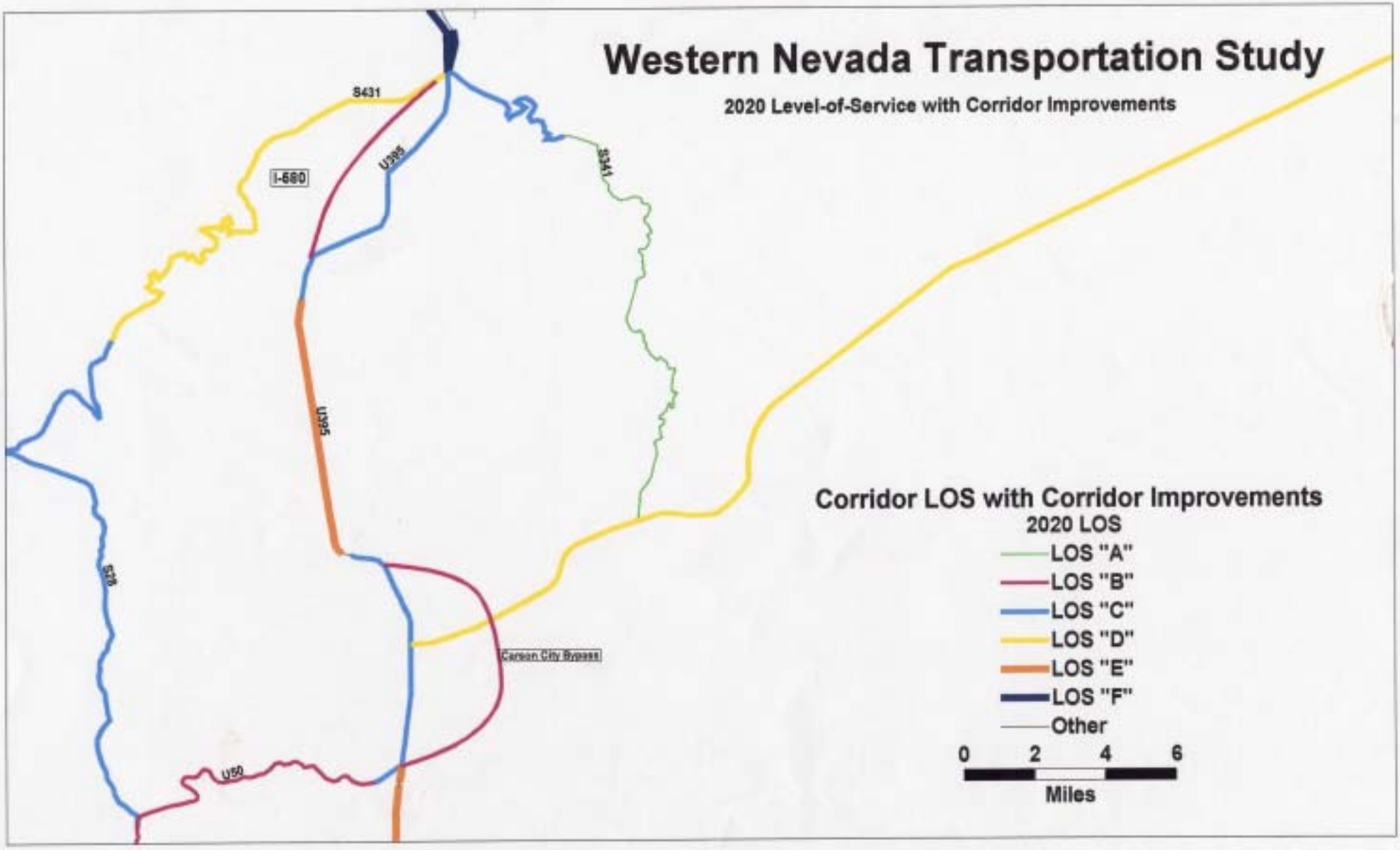
In general, the objective of access control is to provide or manage access to land development while simultaneously preserving traffic safety, capacity, and speed on the surrounding roadway system. Basic principals of access control should include:
1. Separate conflict areas. Reduce the number of driveways or increase the spacing between driveways and intersections;

2. Limit the types of conflicts. Reduce the frequency of conflicts or reduce the area of conflict at some or all driveways on the roadway by limiting or preventing certain kinds of maneuvers;

3. Remove turning vehicles or queues from the through lanes. Reduce both the frequency and severity of conflicts by providing separate paths and storage areas for turning vehicles and queues.

The number of driveways should be minimized, and depending upon the size of the traffic generator, limited to one two-way driveway or a pair of one-way driveways for each parcel. When property frontages are narrow, it may be desirable to restrict driveways to joint access locations at property lines in order to satisfy minimum driveway spacing criteria. For large developments, it is often desirable to consolidate access traffic at a single point, which can then be signalized.

Figure 34


Western Nevada Transportation Study
2020 Level-of-Service with Corridor Improvements
S431
I-580
U395
S341
S671
U395
S28
Carson City Bypass
U50
Corridor LOS with Corridor Improvements
2020 LOS
LOS "A"
LOS "B"
LOS "C"
LOS "D"
LOS "E"
LOS "F"
Other
0
2
4
6
Miles

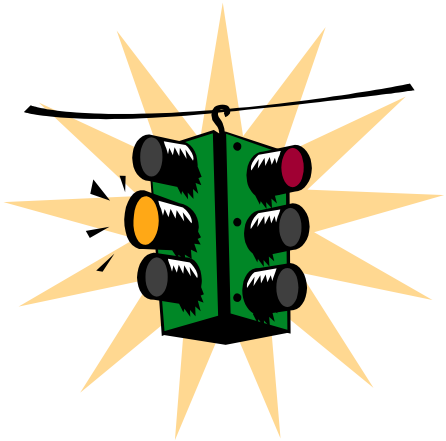
The development of access management along the roadway corridors in Western Nevada can be achieved through land use strategies that discourage strip development and promote clustering of land uses. Where future development is proposed, effort should be given to coordinate and consolidate proposed access points with existing ones.

Desert Rose RV Park, Fernley

In July of 1999, NDOT adopted Access Management System and Standards. The purpose of these standards is to regulate access onto state highways in order to protect the health, safety and welfare of the public, to maintain the highway rights-of-way, and to preserve the functional level of state highways while meeting the needs of the motoring public. It is recommended that local jurisdictions in conjunction with NDOT start the process of applying a variety of land-use planning and regulatory tools to promote access management along its roadway corridors, and to follow the standards established by NDOT's Access Management Standards.

Intelligent Transportation Systems (ITS)
Traffic Signal Improvements and Coordination

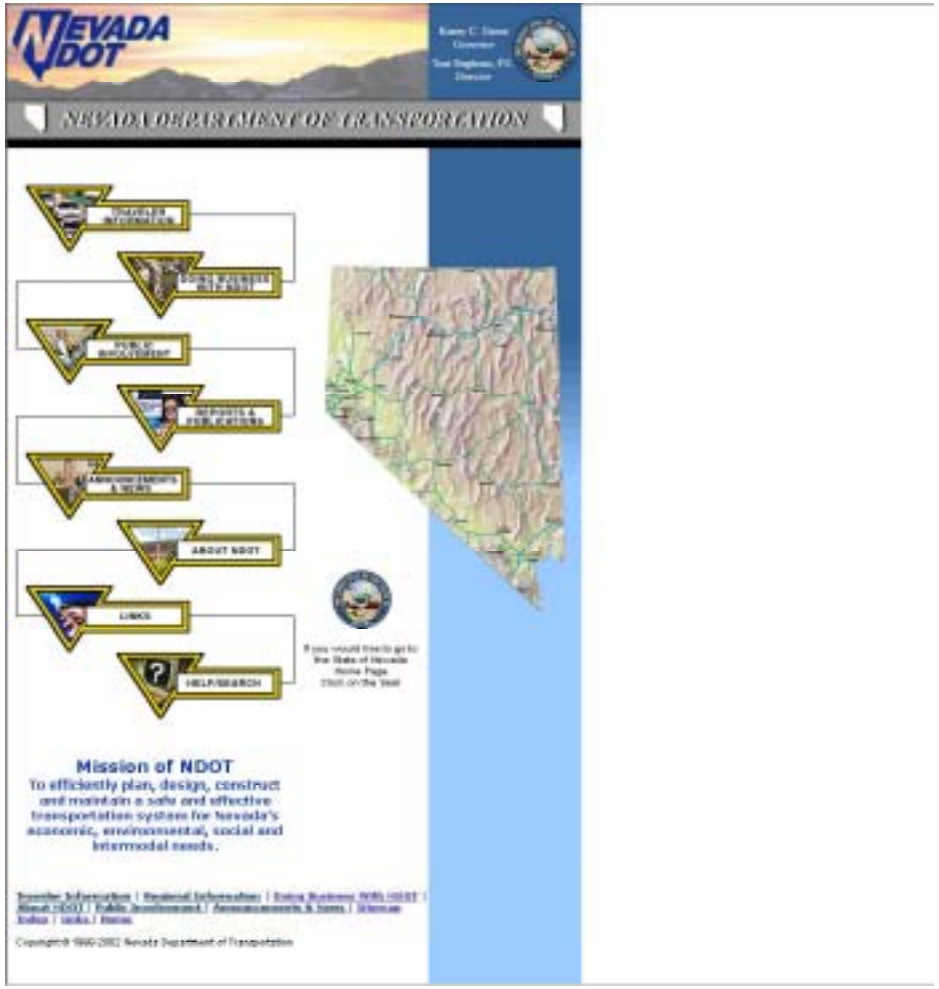
Traffic signal improvements and coordination can generally provide the greatest payoffs for reducing congestion on surface streets. It is reported that effective traffic signal timing on arterial and local streets can reduce traffic delays by 15 percent. As traffic and population levels increase along impacted travel corridors, there are a number of relatively basic improvements that should continue to be made to maintain the traffic flow, such as: new signals, timing plan improvements, coordinated signals and traffic signal maintenance.



Future traffic signal improvements should include conducting signal warrant analyses along corridors and to optimize the platoon and arrival type of vehicles, to produce significant gaps in traffic flow. Traffic signal installation should follow the criteria requirements for signal installation in the Manual on Uniform Traffic Control Devices (MUTCD).

Currently, NDOT in conjunction with a consultant project team, is examining current and future transportation issues along the I-80/U.S. 395 corridors. The architecture for the I-80/US 395 corridors is a framework for planning, defining, integrating, and deploying ITS. Examples of ITS applications that have been proposed to date include:

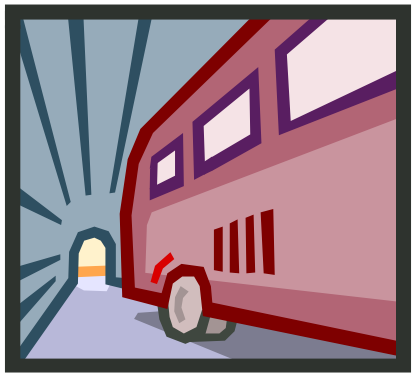
- Variable Message Signs at the mountain passes that provide en-route conditions and warnings to travelers;
- Freeway management system in Reno that will allow for better traffic control and incident management;
- Expansion of existing Road/Weather Information Systems (RWIS);
- Improved dissemination of DOT road and weather information over the Internet;
- Closed-circuit televisions installed at the mountain summits for improved surveillance.



Lane Expansion and Turn Lane Improvements

Widening key intersection approaches with turn lanes and increasing roadway capacity along travel corridors can help alleviate future congestion. As indicated in Figure II-22 LOS along the US395 Corridor is anticipated to reach LOS "E" in the year 2020. Future improvements programmed in the Long Range Element of the Statewide System of Projects include the widening of 4 lanes of traffic to 6 lanes, and left turn lane improvements at the intersection of U.S 395 and State Route 88. Additional improvements include widening of 5 lanes of traffic in Churchill County on U.S. Highway 50 from the Leetseville Junction to the Scheckler Cutoff.

Silver Springs



Future improvements should also consider turn lane channelization and street lighting improvements along major intersections at U.S. Highway 50 between Silver Springs and Dayton as well as along Alternate 95 and Alternate 50 in Lyon County. Heavy truck traffic along several of the corridors can cause delays and pose safety risks along steep grades. Where appropriate, truck climbing lanes and passing lanes should be constructed along portions of U.S. Alternate 50, State Route 208, and State Route 95.

Transit Strategies

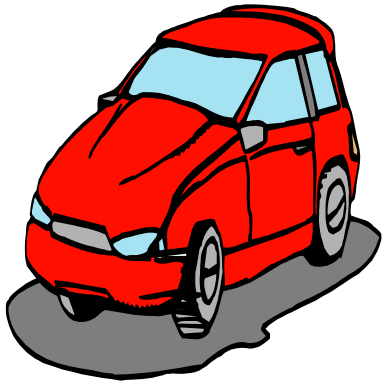
As the population of Western Nevada continues to grow, the need to provide transit services to the elderly and persons with disabilities and commuters will continue to be important. Another important factor in developing opportunities for increased transit use is the growing number of people who commute along the U.S. Highway 50 and U.S Route 395/

Interstate 80 corridors. Based on information provided by the U.S. Census Bureau, approximately 12 percent of the western Nevada commuters travel out of county to their place of employment. Thus, the opportunity to influence alternative modes of traveling to and from work are great.

PRIDE Transit Service

In August of 2000, NDOT and the Washoe County Regional Transportation Commission joined forces to provide a new express bus transit service on U.S. 395 between Carson City and Reno. The purpose of the system is to help senior citizens and those access to other forms of transportation. It is also intended to provide an alternative form of commuter transportation. Current service includes a Weekday Express, which runs on one-hour headways during the morning and afternoon commute hours. Weekend and Friday evening service is also provided to the Reno/Tahoe International Airport. In June of 2001, Garnerville and Minden were added to the PRIDE Express Service.

Most recently, the PRIDE Service has expanded its service along the U.S. Highway 50 corridor from Carson City to Fallon with service to Silver Springs, Dayton, and Fernley. Along the I-80 Corridor, transit service from Sparks to the Patrick Interchange has been initiated. The project will provide transportation for commuters in conjunction with the newly developed Reno-Tahoe industrial parks in Storey County and Lyon County.



Park-n-Ride Lots – Carpool Incentives

As areas experience more traffic congestion, it becomes more important to invest in options for alternate forms of transportation. One of the most economically feasible transportation strategies is the construction and use of park-and-ride facilities. Park-and-ride facilities can be constructed in a variety of locations including vacant properties, properties used for parking, shopping centers, and churches. In addition, other sites having existing paved areas with available space during weekdays should be given consideration.

In the western Nevada transportation study area there are many adequate locations for park-and-ride facilities. The following are sites that are possible locations for park and ride lots:

Table 5 Possible Park and Ride Locations
Topaz Ranch Estates, Douglas County
Rite-Aid/Scolari's, Gardnerville
Gorman's Market, Gardnerville
State Route 206/207 Junction
Carson Valley Inn, Minden
Home Depot/Target, Douglas County
US 395/US 50 (Spooner) Junction
Southgate Shopping Center, Carson City
Gottchalks, Carson City
Long's, Carson City
US 395/State Route 431 Junction
Dayton Senior Center
Carson Plains Market, Lyon County
US 50/US 50A Junction
Raley's Shopping Center, Fallon

Primary consideration should be given to the following factors when determining an adequate park-and-ride facility:

- At or near existing informal park-and-ride activity sites, parking on shoulders or on leveled areas;
- Adjacent or accessible to one of the primary arterials or freeways serving the area. Well-designed interchanges might provide space for park-and-ride lots;
- In areas where vandalism and theft can be minimized;
- Between the central business district, and other work activity centers and the residential zones, which will contribute park-and-ride trip makers;
- Further from the activity center than any major traffic congestion bottlenecks;
- Desirably in an area readily served by an existing transit link to the activity center which can provide both peak and off-peak service to the facility;
- Lots should be easily accessible for the transit operator with well-designed pick-up locations and drop-off turnouts.

Source: AASHTO Guide for the Design of Park-and-Ride Facilities Manual

Fallon Site

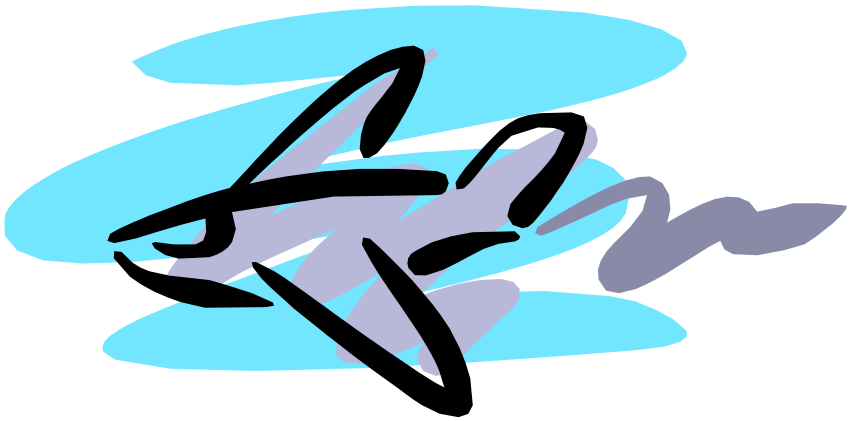
Location planning of park-and-ride lots is largely determined by identifying existing locations where commuters are informally parking their vehicles. Typically these locations are at the intersections of major roadways where commute travel is highest. Physical improvements at these locations include street lighting, paved surfaces, and trash receptacles. When constructed these facilities will be of tremendous value to the public. The excellent locations shown are in Silver Springs, Fernley, and Fallon.

Aviation Strategies

The ability to connect rural populations with major cities in conjunction with domestic and international destinations through the aviation system is vital to the state and local economies. At the state level, NDOT designates a system of airports in Nevada that perform an essential role in the economic and social development of the area. At the national level, the Federal Aviation Administration has designated a system of airports of national significance, called the National Plan of Integrated Airport Systems (NPIAS). The NPIAS includes primary and non-primary commercial service airports. Within the six-county area there are seven airports that provide general aviation services, with Reno/Tahoe International providing the only commercial air service within the study area. Table 6 shows general aviation facilities in Western Nevada. General aviation facilities are defined as having aviation other than military and commercial common carriage and includes business flying, instructional flying, personal flying, and commercial flying such as aerial photography and agricultural spraying.

Table 6
General Aviation Facilities in Western Nevada

Name	Location
Tiger Field	Fernley
Minden-Tahoe	Minden
Carson City	Carson City
Silver Springs	Silver Springs
Reno-Stead	Reno
Yerington	Yerington



Based on the 1995 Nevada State Airport System Plan, the implementation of aviation activities that can be carried out by NDOT include providing encouragement and technical assistance to individual airport sponsors, accomplishing several tasks regarding statewide issues, and coordinating the State's aviation activities with the FAA. Ground access to the airports in the state is to be in accordance with the Nevada Revised Statutes Chapter 408. NDOT is to promote and encourage development of adequate ground access to public-use airports with multi-modal interface to develop and coordinate a balanced transportation policy consistent with the social, economic and environmental goals of the state. Recent legislation mandates the development of an Aviation Trust Fund, which would enable rural airports to access funding for airport improvements.

LAND USE AND ZONING STRATEGIES

Increasing Development Density

Housing developments along the six-county travel corridors typically produce large development tracts in hopes of attracting greater property taxes. This type of development requires an increase in other public service infrastructure needs. In order to accommodate the low-density development patterns, increases in roadway, sewer, water and utility services are also required. Once constructed, the operational and maintenance costs of these services can be high. High housing densities promote a compact form of development that allows public service facilities to operate more efficiently and at lower operating costs. This pattern of development coupled with mixed-use commercial land uses can also facilitate alternative modes of transportation reducing the travel distances and the number of automobile trips. It is recommended that future zoning strategies encourage more a compact, high-density development within urbanized areas.

FINANCING

Statewide Transportation Improvement Program

Annually, the NDOT develops a Statewide Transportation Improvement Program (STIP) for the State. The STIP implements the statewide transportation planning process. NDOT administers and implements programs for the planning development, construction, and operation of the State's transportation system. The STIP includes a three-year priority list of transportation projects. Programs and projects contained in the STIP are derived from and are consistent with the Statewide Intermodal/Multi modal transportation plan. Included in the STIP are capital and non-capital transportation projects including transportation enhancements, Federal Lands Highways projects, trails projects, pedestrian walkways, and bicycle facilities.

Federally funded projects using Surface Transportation Program (STP) funds or National Highway System (NHS) funds that satisfy the capacity assessment and the benefit/cost analysis are prioritized in the STIP following consultation with local governments. This consultation is accomplished through county tours. During these tours, the NDOT discusses specific needs with local officials and citizens. Following the tours, the NDOT submits the Annual Work Program and the STIP containing prioritized capacity-increasing projects to the State Transportation Board for approval.

Additional transportation projects including Hazard elimination and railroad crossing projects, Statewide pavement maintenance projects, and Transit projects are identified annually. As these Projects are identified; they are analyzed to determine Priority ranking for available funding and inclusion in the STIP.

Table 7
State and Federal Transportation Funding Programs

Federal Lands Highways
Scenic Byways Program
Congestion Mitigation and Air Quality (CMAQ)
Demonstration Projects
Hazard Elimination and Railroad Crossing Program
Statewide Pavement Maintenance
Bridge Replacement and Rehabilitation
Enhancement Program
Federal Aviation Administration
Federal Railroad Administration
Transit Projects and Programs

Conclusion

In conclusion, Western Nevada will continue to grow at a steady rate for the next 20 years. The region needs to work together to bridge gaps in future transportation needs. Without this joint effort and cooperation the region will not possess a coordinated mutually beneficial transportation network.