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Southern Nevada
Freight Plan Update

Southern Nevada Freight Plan Update

Final Report

June 16, 2022

final

Southern Nevada Freight Plan Update

prepared for

Regional Transportation Commission of Southern Nevada

prepared by

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date

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Disclaimer

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SOUTHERN NEVADA **FREIGHT PLAN UPDATE**

EXECUTIVE SUMMARY

STUDY PURPOSE AND GOALS

The Southern Nevada Freight Plan Update is to develop transformational policies and infrastructure improvements needed to integrate Southern Nevada into global supply chains and strengthen our economy, with the following goals:

The overarching purpose of the *Southern Nevada Freight Plan Update* is to develop transformational policies and infrastructure improvements needed to ***INTEGRATE SOUTHERN NEVADA INTO GLOBAL SUPPLY CHAINS*** and ***STRENGTHEN OUR ECONOMY.***

ENHANCE SAFETY

Reduce truck involved crashes

PRESERVE INFRASTRUCTURE

Improve bridge and pavement condition on freight corridors

OPTIMIZE MOBILITY

Improve truck travel time reliability on freight corridors

TRANSFORM ECONOMIES

Develop a freight system (infrastructure and policies) that supports economic development and diversification

FOSTER SUSTAINABILITY

Move goods sustainably

CONNECT COMMUNITIES

Provide economic opportunities, while reducing impacts, to equity focused communities

REGIONAL COMMODITY FLOWS

To gain an understanding of commodity flow estimates, key origins and destinations, key trading partners, mode shares, and major commodities moved in, out, within, and through the region, a number of data sources were processed and analyzed, primarily the Freight Analysis Framework (FAF 5.1 and 5.2). Three key points important to understanding freight movement in Southern Nevada are listed below.

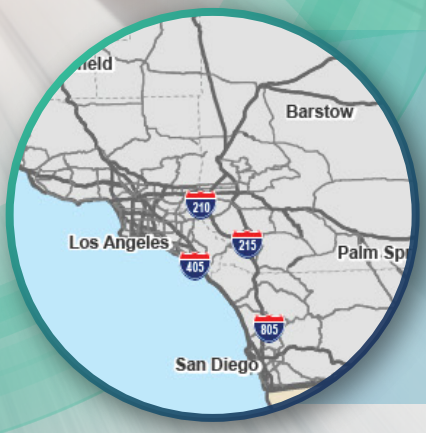
REGIONAL COMMODITY FLOWS KEY TAKEAWAYS

MOST FREIGHT IS TRANSPORTED BY TRUCK

Breaking this down, about 64 percent of total tonnage and 68 percent of total value of goods are moved by truck.

FAR MORE FREIGHT IS IMPORTED THAN EXPORTED

Southern Nevada is primarily a consumption market, with incoming freight exceeding outbound freight by a four-to-one margin.



SOUTHERN CALIFORNIA IS SOUTHERN NEVADA'S DOMINANT TRADING PARTNER

Southern California is the primary trading partner, with about 38 percent of tonnage and 45 percent of dollar value of freight moved from and to Southern Nevada. About 70 percent of the value of freight moving to Southern California is the "miscellaneous manufactures" commodity group. Other key trading partners are the San Jose/San Francisco and Phoenix areas.

Source: FAF 5.1.

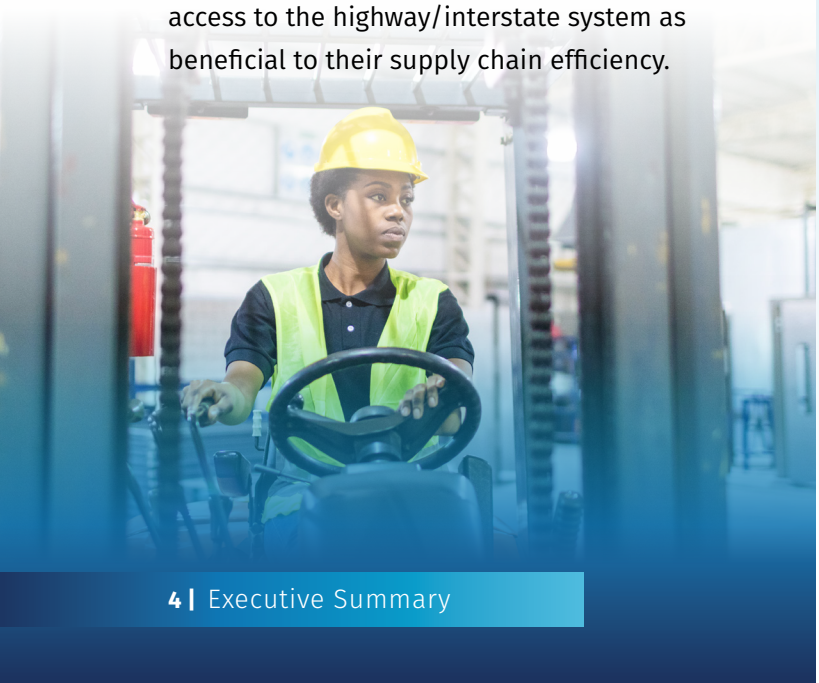
SOUTHERN NEVADA SUPPLY CHAINS

A series of interviews with industry representatives were held to characterize the gateways, corridors and multimodal nodes critical to key freight intensive sectors. The interviews confirmed and added context to the findings of the commodity flow analysis: most freight is transported by truck, far more is imported than exported, and Southern California is the dominant trading partner.

SUPPLY CHAIN STRENGTHS AND GROWTH OF THE LOGISTICS INDUSTRY

Those interviewed reported that the cost of doing business in California, and the increasing need for more warehousing space, are pushing some logistics providers away from Southern California and into the two closest metropolitan centers—Phoenix, Arizona and Southern Nevada.

Consumer goods, food and beverage arrive by truck from Southern California, within a half-day drive, where most are produced or arrive through the Ports of Los Angeles and Long Beach. They are broken down in Southern Nevada warehouses, and then distributed to their final destinations in Southern Nevada, or back to Southern California and throughout the Mountain West. Several interviewees mentioned easy access to the highway/interstate system as beneficial to their supply chain efficiency.



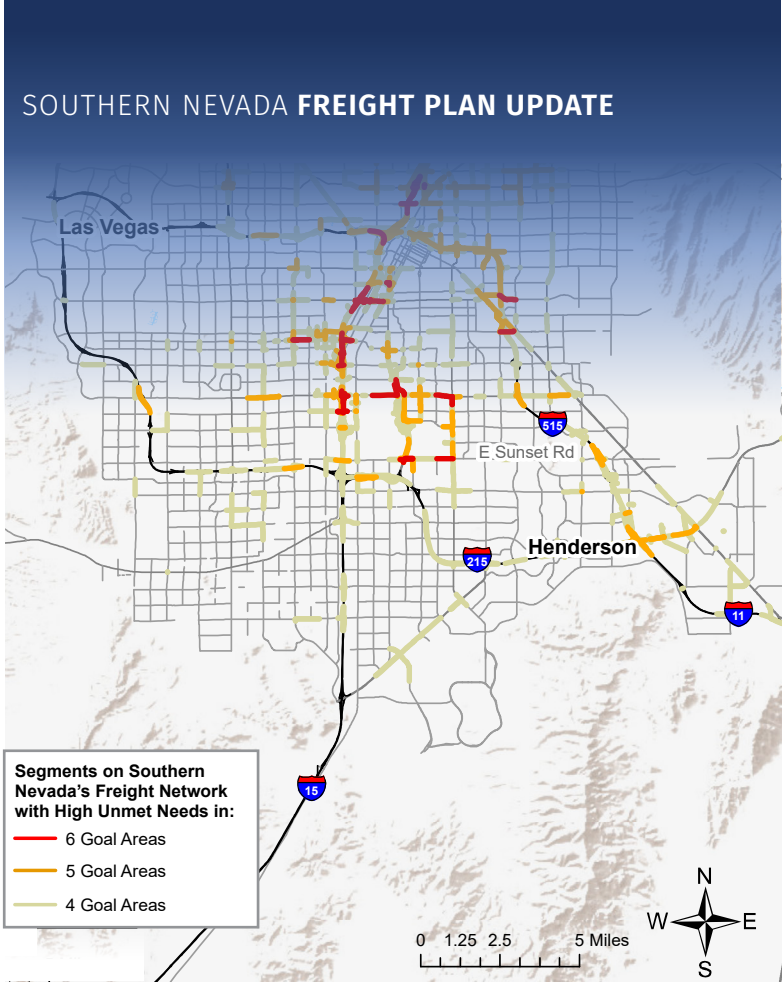
SUPPLY CHAIN CHALLENGES AND NEEDS

Several challenges and needs were introduced by those interviewed, including:

- **LACK OF ADEQUATE WAREHOUSING** space, including the concern that residential development may encroach on industrial areas.
- **LACK OF A TRAINED WORKFORCE** and overall labor shortage.
- **LACK OF TRANSIT OPTIONS TO INDUSTRIAL AREAS** creates several issues: reduces the potential labor pool by eliminating transit dependent employees, is inequitable, and increases congestion because everyone is forced to drive personal vehicles to work which causes congestion and also impacts the free movement of freight.
- **TRAFFIC BOTTLENECKS** around the Las Vegas Speedway and Nellis Air Force Base.
- **THE IMBALANCE BETWEEN INBOUND AND OUTBOUND FREIGHT** in the region, as high as 4:1 leads to higher shipping costs and lower response times by carriers.
- **INSUFFICIENT RAIL ACCESS**.
- **DEVELOPMENT OF A LOGISTICS INDUSTRIAL PARK**, particularly on the south side of the region, was mentioned repeatedly.

PERFORMANCE OF THE FREIGHT SYSTEM

Data were collected to understand where and to what degree the freight system is breaking down across the region. These data included crashes involving trucks, reported travel time and speed on roadway segments compared to free-flow speeds to identify congestion, the condition of bridges and pavement, and the volume of trucks on key corridors. The bulk of the chokepoints are along the I-15 corridor which is the backbone of the freight network through Southern Nevada.



RISK AND RESILIENCY

To identify "transformational policies and infrastructure improvements needed to integrate Southern Nevada into global supply chains and strengthen our economy" (see Plan purpose), **all of the data and input collected throughout the study was assimilated into a strengths, weaknesses, opportunities and threats (SWOT) analysis.** This was followed by a risk and resiliency scenario planning workshop that led to the final development of policy and improvement recommendations.

SOUTHERN NEVADA FREIGHT NETWORK

Having a defined freight network is required to apply for certain federal funding opportunities. For instance, only projects on the National Highway Freight Network (NHFN) are eligible for funding from the National Highway Freight Program (NHFP). In the Las Vegas metropolitan area the NHFN is comprised of all Interstates plus corridors that the Regional Transportation Commission of Southern Nevada (RTC) and Nevada Department of Transportation (NDOT) designate as Critical Urban Freight Corridors (CUFCs). Federal Highway Administration (FHWA) requires that CUFCs either connect to an intermodal facility, provide an alternative highway option, serve a major freight generator, or otherwise be deemed important to freight movement. Roadway segments that clearly meet this criteria are shown in Figure 1. A case could be made for including many others should NHFP funding be desired on a roadway not listed.

INFRASTRUCTURE IMPROVEMENTS

A freight system performance analysis, used to identify roadway segments where multiple needs collide, was prioritized and overlaid onto programmed projects in order to isolate prioritized freight needs that do not have programmed improvement projects associated with them. Figure 2 shows the prioritized unmet freight needs that are located on Southern Nevada's Freight Network (see Figure 1). Freight needs located in equity focus areas received a higher priority score. Increasingly Federal funding is being directed to projects that benefit disadvantaged communities that have historically not benefited from, or were even harmed by transportation projects. For instance, the Justice40 Initiative seeks to deliver at least 40 percent of the overall benefits from Federal investments in climate and clean energy to disadvantaged communities.

Figure 1. Southern Nevada Freight Network: *Interstate Highways and Roadway Segments that Meet CUFC Criteria*

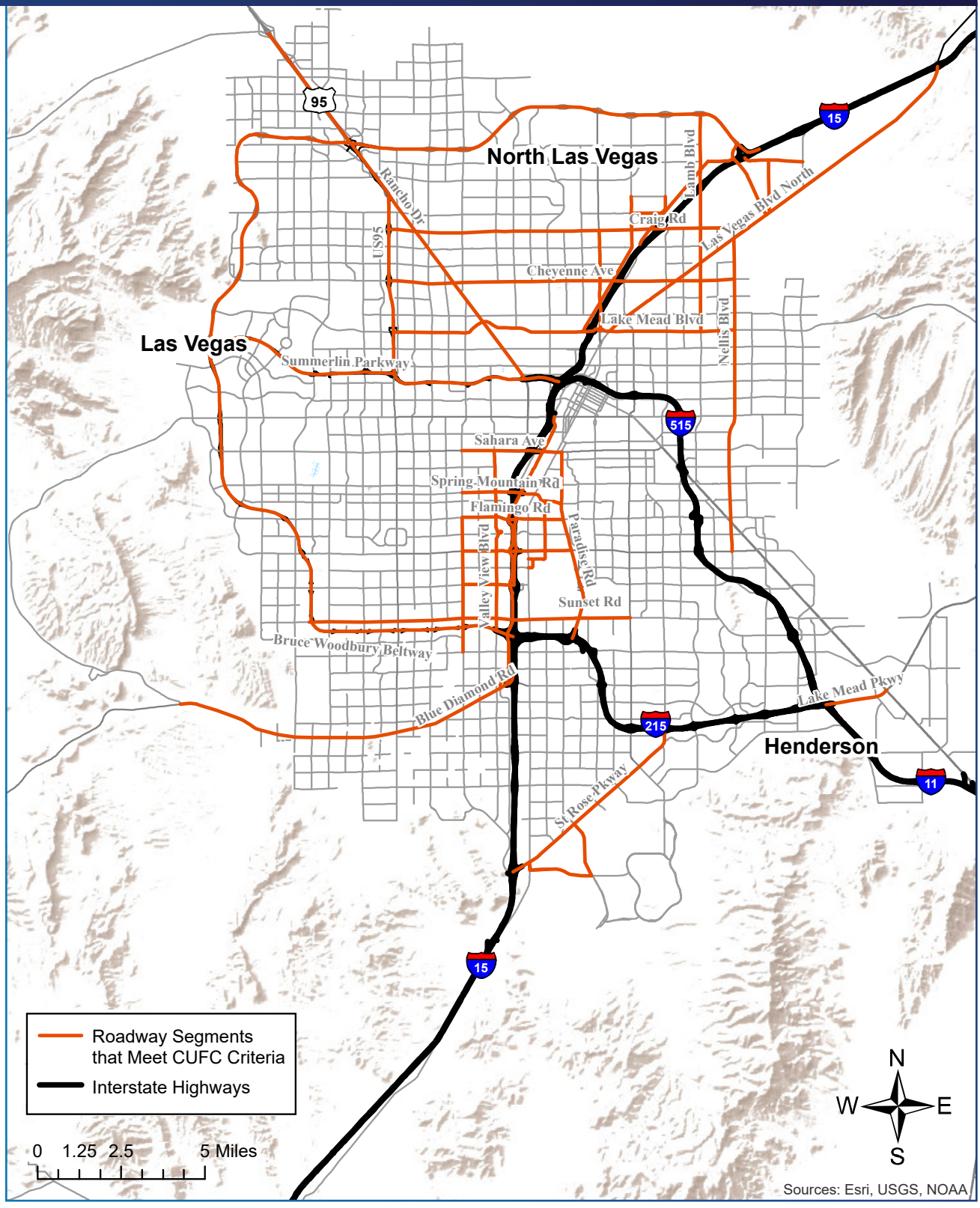
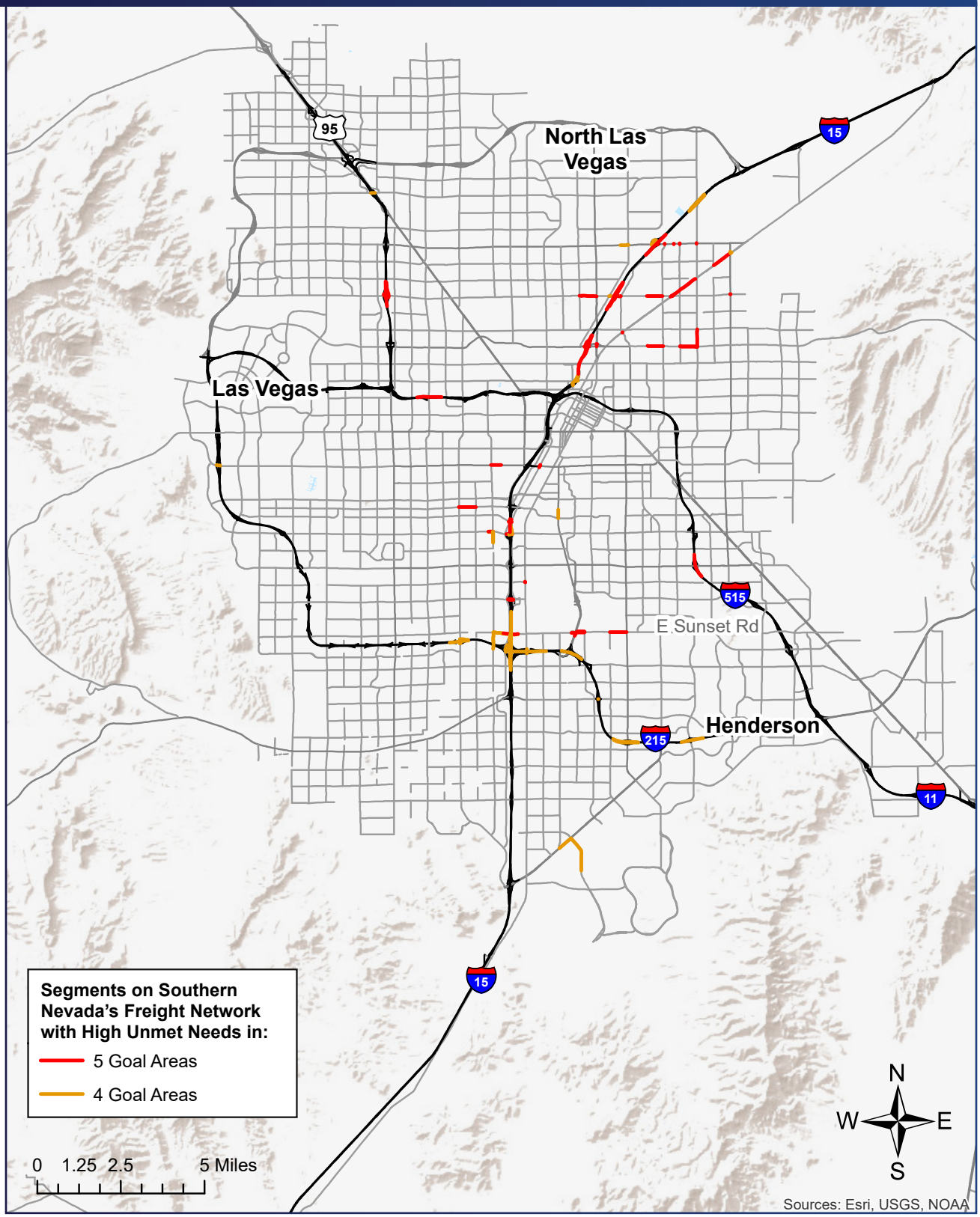
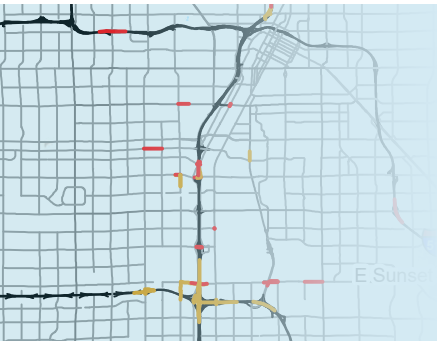


Figure 2. Unmet Freight Needs on Southern Nevada's Freight Network



RECOMMENDED TRANSFORMATIONAL POLICIES AND INFRASTRUCTURE IMPROVEMENTS

The recommended actions for each of the transformational policies and infrastructure improvements are summarized below.

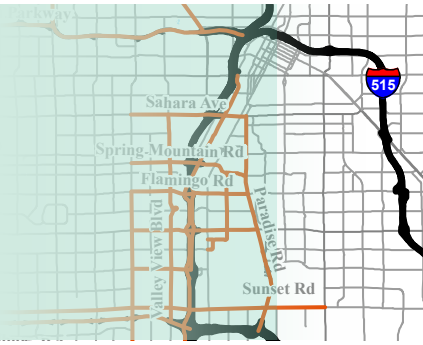


Infrastructure Improvements

Study each of the highway segments shown in Figure 2 to identify the causes of the problems and recommend projects for addressing them. The grouping of segments in the Northeast portion of the Las Vegas metropolitan area could be studied together, as this is the fastest growing warehousing area within the RTC boundaries, and thus will have increasing freight needs in the near future.

Critical Urban Freight Corridors

Coordinate with NDOT to submit CUFC designation requests to FHWA. Designated CUFC segments should be those that include the project limits of projects that are good candidates NHFP funding. This gives the RTC the flexibility to seek NHFP funding if it is determined feasible at some time without having to submit an amended CUFC designation request to FHWA.



SMART LOGISTICS VILLAGE

Support the Governor's Office of Economic Development in efforts to attract private development of a smart logistic village, including intermodal and rail access, and improved intermodal service to the Ports of Los Angeles and Long Beach.

Workforce Access

Conduct a study to improve workforce access to logistics jobs. The study should identify where the current and potential labor pool resides, the location and number of current and forecasted logistics jobs, the current transit options for connecting them, and model strategies for improving access. Strategies could include fixed route transit, car and van pooling, and other shared mobility options.

Truck Parking

Conduct a regional truck parking implementation plan to identify feasible sites, technologies, and funding sources for public investment in truck parking; to encourage and support private investment; and to develop uniform policies supported by NDOT and all local jurisdictions to ensure the need for parking does not continue to worsen.

Zero Emissions Fuel Infrastructure

Support NDOT during preparation of the State Electric Vehicle (EV) Infrastructure Deployment Plan, and any implementation actions that come out of it, in order to encourage the development and availability of zero emission fuel infrastructure for heavy trucks.


Source: Port of Oakland.

Convention Marshalling Yard

Conduct a convention marshalling yard feasibility study and action plan. The study should identify a feasible site, delineate private industry involvement in development and operations, estimate the capital and operational costs, and develop a traffic operational strategies for moving freight during conventions. A final task will be to assimilate the data collected into an economic analysis that describes the costs and benefits of developing the marshalling yard vs. doing nothing. The outputs of the study can be used to secure private investment, and local, state, and federal funding.

Megaregional Cooperation

Support NDOT improve I-15 and develop I-11 through participation in the I-15 Mobility Alliance and other targeted multistate projects and initiatives. Efforts to improve safety and travel time on interstate crossroads (I-15 and I-11) is important to Southern Nevada's logistics industry for the access they provide to California, the Intermountain West, the rest of the U.S., and Mexico.

Preserve Access for Oversize/Overweight (OS/OW) Vehicles

Raise the minimum bridge height standard of interchanges and other overhead structures to 17 feet. Conduct a feasibility study of raising several low bridges that are causing OS/OW detours of several hundred miles or through residential neighborhoods. These include bridges over I-15 at UPRR mainline and at Pabco Road; over Las Vegas Boulevard at the UPRR mainline; and over I-11 at Wagon Wheel Drive.

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List of Abbreviations

3PL	third-party logistics
ATRI	American Transportation Research Institute
BEA	U.S. Bureau of Economic Analysis
BIL	Bipartisan Infrastructure Law
BTS	Bureau of Transportation Statistics
CFS	Commodity Flow Survey
CIP	Capital Improvement Program
CS	Cambridge Systematics
CUFC	Critical Urban Freight Corridor
DC	distribution center
DETR	Nevada Department of Employment Training and Rehabilitation
EPDO	equivalent property damage only
EV	electric vehicle
FAC	Freight Advisory Committee
FAF	Freight Analysis Framework
FDT	FAF Disaggregation Tool
FHWA	Federal Highway Administration
GOED	Governor's Office of Economic Development
HPMS	Highway Performance Monitoring System
IO	Input-Output
IRI	International Roughness Index
LAS	Harry Reid International Airport
LVCVA	Las Vegas Convention and Visitors Authority
NAICS	North American Industry Classification System
NDOT	Nevada Department of Transportation
NEPA	National Environmental Policy Act
NEVI	National Electric Vehicle Infrastructure
NHFN	National Highway Freight Network
NHFP	National Highway Freight Program
NHS	National Highway System
NPMRDS	National Performance Management Research Data Set
OD	origin-destination
OOIDA	Owner-Operator Independent Drivers Association
OS/OW	oversize/overweight
PE	preliminary engineering
PHFS	Primary Highway Freight System
PTI	planning time index
ROW	right of way
RTC	Regional Transportation Commission of Southern Nevada
RTP	Regional Transportation Plan
SCTG	Standard Classification of Transported Goods
SWOT	strengths, weaknesses, opportunities and threats
TAZ	traffic analysis zone
TMC	Traffic Message Channel
TPAS	Truck Parking Availability System
UPRR	Union Pacific Railroad

1.0 Introduction

1.1 Freight in Southern Nevada

Local and national economies rely on the efficient movement of goods from a gateway or point of production to the point of consumption. The gross domestic product is positively correlated with the movement of goods. Freight movements also correlate directly to the types and levels of economic activity in a region—shaping local supply chains. Urban areas are characterized by high densities of residents and employment centers for service industries, warehouses, distribution centers, retail establishments, hospitals, and institutions. As urban areas grow, they tend to evolve from being producers of goods to being consumers of goods.

The movement of freight has a major impact on the mobility and economy of the study area, which covers Southern Nevada and more particularly the Las Vegas metropolitan area. The airport, roadways, and – to some extent – the railroad carry the resources that fuel the area's economic prosperity. The highway system is the primary means of moving freight and goods in the region. Virtually every business and household is dependent on the predictable and efficient movement of trucks. Connectivity to the west coast ports and to the border crossings with Mexico is also important. With the growth in the region the volume of freight passing through the facilities is increasing. The continued success of the freight infrastructure depends upon its ability to provide efficient flow and to expand where necessary to effectively meet the region's future needs. The success also requires maintaining efficient connectivity to, and synergy with, all parts of the regional, national, and international supply chain.

Southern Nevada is unique in that its economy is derived in large part from the tourism industry driven by the hotels, casinos, and entertainment venues that are mostly concentrated in the Resort Corridor, a narrow area along Las Vegas Boulevard. The resort industry creates a huge demand for certain types of goods, and generates an equally large volume of waste and scrap. Additionally, the continued revitalization and expansion in the Resort Corridor requires building materials on a nearly continual basis. The numbers of tourists and the high concentration of labor in the hotels and casinos also place heavy demand on the infrastructure in and around the strip and can impede the efficiency of freight operations.

1.2 Study Process

In June 2015, the Regional Transportation Commission of Southern Nevada (RTC) completed the Southern Nevada Regional Goods Movement Master Plan which provided a snapshot of the region's freight transportation system, a forecast of future freight demand, and recommendations to address regional freight deficiencies. In January 2017, Nevada Department of Transportation (NDOT) completed the Nevada State Freight Plan, which laid a strategic framework to improve the freight mobility and the economic competitiveness for State of Nevada.

Per federal regulations 23 CFR 450.306 (4): "… the MPO shall integrate in the metropolitan transportation planning process, directly or by reference, the goals, objectives, performance measures and targets described in State transportation plans and transportation processes required as part of a performance-based program including appropriate (metropolitan) portions of the State Plan (MAP -21 Section 1118)."

Provisions first introduced in MAP-21 require metropolitan planning organizations to provide potential projects and strategies to increase the accessibility and mobility of people and freight, and in addition, to enhance the integration and connectivity of the transportation system across modes. This Plan update meets

those requirements and is consistent with NDOT One Nevada Transportation Plan goals which NDOT integrates into all modal plans including the State Freight Plan.

The overarching purpose of this Plan is to develop transformational policies and infrastructure improvements needed to integrate Southern Nevada into global supply chains and strengthen our economy. In order to accomplish this the following tasks were completed and are described in subsequent chapters of this report.

- **Freight Goals** were established early in the process to provide guidance and focus.
- A **Commodity Flow Analysis** provided estimates and understanding of key origins and destinations, trading partners, mode shares, and major commodities moved in, out, within, and through the region.
- A **Supply Chain Analysis** of the logistics industry characterized the gateways, corridors and multimodal nodes critical to key freight intensive sectors.
- A **Current System Performance Assessment** of each goal area was conducted to identify system needs.
- **Additional Considerations** such as truck parking from recent study and local policies affecting goods movement were folded into the analysis.
- Recommended **Strategies and Initiatives** for improving the flow of goods and strengthening our economy.

1.3 Freight Goals

The goals for this Freight Plan Update should be consistent with the goals for the Nevada Statewide Freight Plan, however the Southern Nevada Freight Plan Update was completed prior to the Statewide Freight Plan Update. Therefore, a decision was made to ensure consistency with NDOT's One Nevada Transportation Plan goals which NDOT is using as the baseline for all long-range modal plans, and thus should also be applied to the Statewide Freight Plan Update. These goals are shown in **Table 1.1** along with definitions customized for the Southern Nevada Freight Plan Update.

Table 1.1 Southern Nevada Freight Plan Goals

Goal Area	Southern Nevada Freight Plan Update Definition
Enhance Safety	Reduce truck involved crashes.
Preserve Infrastructure	Improve bridge & pavement condition on freight corridors.
Optimize Mobility	Improve truck travel time reliability on freight corridors.
Transform Economies	Develop a freight system (infrastructure and policies) that supports economic development and diversification.
Foster Sustainability	Move goods sustainably.
Connect Communities	Provide economic opportunities, while reducing impacts, to equity focused communities.

Goal Area Source: https://www.dot.nv.gov/projects-programs/programs-studies/one-nevada-transportation-process.

1.4 Stakeholder Outreach

Key sources of input needed to develop the Plan update came from Southern Nevada Freight Advisory Committee (FAC) meetings, interviews conducted for the supply chain analysis, and additional interviews and briefings with other key stakeholders, summarized below.

1.4.1 Southern Nevada Freight Advisory Committee (FAC)

Representatives from a broad range of public agencies and private organizations with an interest in freight mobility in the region were invited to participate in the FAC. Six FAC meetings were held throughout the study to share progress and receive insights at each stage of the project. A Land Use and Economic Development Subcommittee was held in conjunction with meeting 4, Transformational Strategies, to provide guidance on the development of land-use strategies for improving freight mobility, and assessing the potential economic impact of those strategies. The meeting schedule and topics are shown in **Figure 1.1**.

Figure 1.1 FAC Meeting Schedule and Topics

Those that participated in at least one meeting are shown in **Table 1.2**.

Table 1.2 FAC Participants

Agency/Organization	Freight Advisory Committee	Land Use & Economic Development Subcommittee
Apex Logistics	X	
CBRE Brokerage Services	X	
City of Henderson	X	X
City of Las Vegas	X	X
City of North Las Vegas	X	X
Clark County Comprehensive Planning	X	X
Clark County Dept of Aviation	X	X
Clark County Public Works	X	
Clark County Water Reclamation District		X
DeLong Heavy Haul	X	
Dielco Crane Service, Inc.	X	
FedEx Ground	X	

Agency/Organization	Freight Advisory Committee	Land Use & Economic Development Subcommittee
FHWA - Nevada Division	X	
Governor's Office of Economic Development (GOED)	X	X
Henderson Chamber of Commerce	X	
Land Development Associates	X	
Las Vegas Convention & Visitors Authority	X	X
Las Vegas Global Economic Alliance	X	
Las Vegas Metro Chamber of Commerce	X	
Las Vegas Valley Water District		X
Loves	X	
NAIOP So NV and Thomas and Mac Development Group	X	
NDOT	X	X
NDOT District I	X	
Nellis Air Force Base	X	
Nevada Highway Patrol	X	
Nevada Trucking Association	X	
Now Foods	X	
Pilot/FlyingJ	X	
RC Willey	X	
RCG Economics	X	
RTC	X	X
Truline Corporation	X	
UPRR	X	

1.4.2 Interviews and Agency Briefings

A number of interviews were conducted with industry, government, and academic representatives which are described in **Section 3.0** of this report. Additional one-on-one interviews were conducted with other stakeholders throughout the course of the study to gather data and insights.

The following RTC committees were briefed:

- Executive Advisory Committee (May 26, 2022)
- Metropolitan Planning Subcommittee (September 14, 2021 and May 10, 2022)

2.0 Commodity Flow Analysis

2.1 Data Inputs

To gain an understanding of commodity flow estimates, key origins and destinations, key trading partners, mode shares, and major commodities moved in, out, within, and through the region, a number of data sources were processed and analyzed. This section includes a brief description of the data sources used to develop base and future year freight flows in the RTC region to study commodity flows. Current and future multi-modal commodity flows and their details are described in this section.

2.1.1 Freight Analysis Framework (FAF)

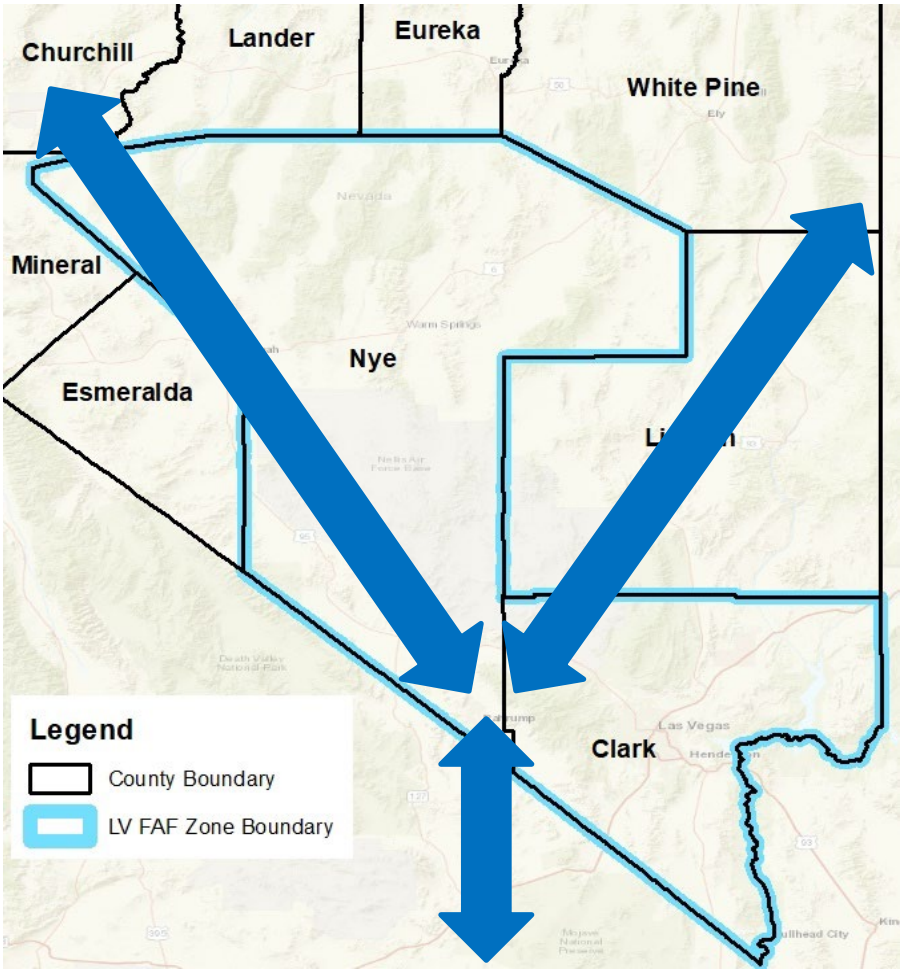
The FAF is a publicly available national policy tool that is developed through a partnership between the Federal Highway Administration (FHWA) and the Bureau of Transportation Statistics (BTS). The FAF is built mainly from the national Commodity Flow Survey (CFS) data, and integrates data from several sources to create a comprehensive picture of freight movement among states and major metropolitan areas. FAF provides estimates for weight and value of commodities by FAF regions of origin and destination, commodity type, and transportation mode, and is broken into 140 FAF zones. The structure of the FAF consists of 132 domestic CFS regions (or FAF zones) divided in the following subsets: metropolitan area determined regions; regions representing a state's territory outside metropolitan regions; and regions identified as entire states, within which no FAF metropolitan regions exist. Metropolitan regions do not cross state boundaries. Eight international trade regions represent foreign FAF zones and exports and imports of U.S.

While the 132 domestic regions in the FAF are statistically significant and sufficient for national policy analysis, this level of geography is not suitable for most state and metropolitan freight planning. Cambridge Systematics (CS) has developed a disaggregation tool that expands the FAF to smaller geographies. The FAF zone pertaining to the RTC region is the "Las Vegas-Paradise-Pahrump" Combined Statistical Area and does not align with the RTC region boundary as it includes the Nye County in addition to the Clark County (See **Figure 2.1**). Hence, FAF data were disaggregated using the CS in-house tool to allow study of freight movements to, from, within, and through the RTC region (i.e. Clark County).

FAF (version 5.1[1]) was used to develop base-year and projected commodity flows for the RTC region. The most recent year data are available based on the 2017 national CFS data is 2017 and forecasts are provided from 2020 up to 2050 in 5-year increments. 2017 was used as the base-year and 2050 was used as the forecast year for this commodity flow study.

[1] Released in August 2021. Version 5.2 (released in late November 2021) was used for regional forecasts data.

Figure 2.1 FAF5 Zone Pertaining to the RTC Region

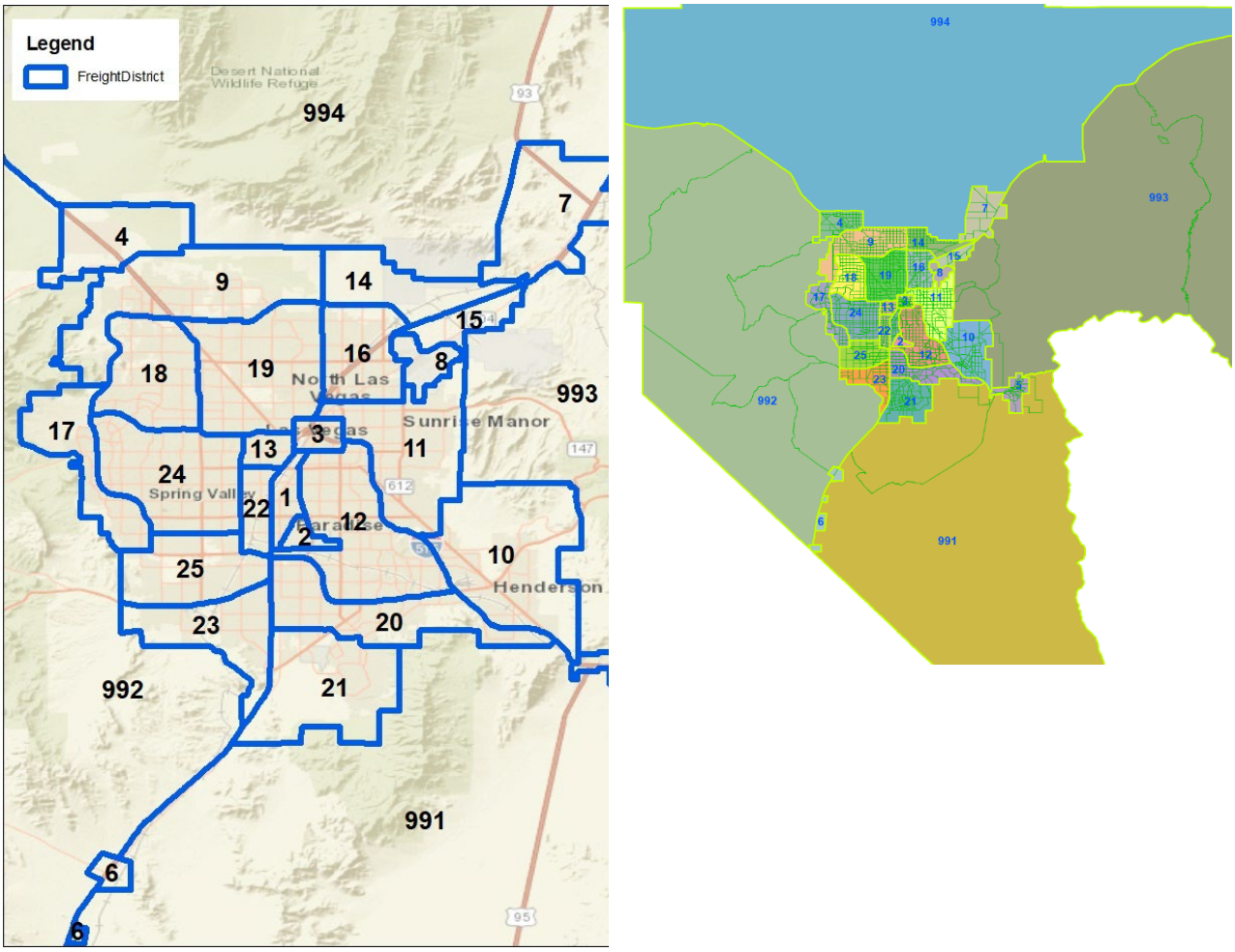


2.1.2 Employment Data

Employment data are a primary input into the FAF disaggregation tool. The FAF disaggregation process uses disaggregation factors developed using employment and I/O tables (described in the next subsection). For this analysis, 3-digits North American Industry Classification System (NAICS) employment data were provided by RTC, available from the Nevada Department of Employment Training and Rehabilitation (DETR). These data include detailed employment by traffic analysis zone (TAZ) for the Clark County (RTC area) and were reviewed and summarized to be used for FAF disaggregation. The flow in the FAF is reported in annual tons and dollars between its regions (FAF zones). The domestic U.S. regions in the FAF are aggregations of U.S. county equivalents. Since Nye County is also included in the FAF zone pertaining to the RTC region, employment data for the Nye County were extracted from the County Business Patterns data. FAF data were first disaggregated into counties (Clark and Nye counties).

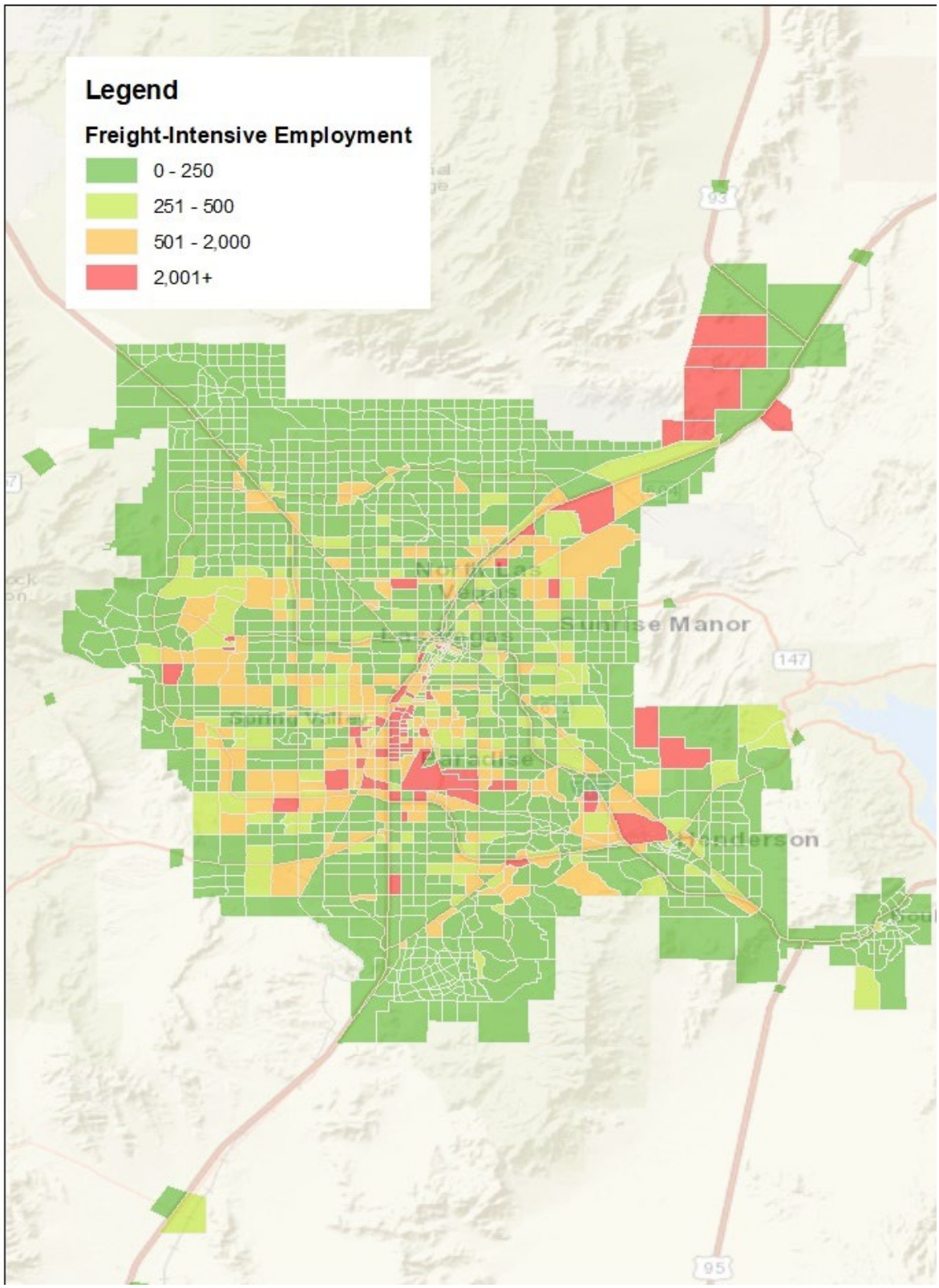
To study freight movements inside the RTC area (Clark County), FAF data were further disaggregated into smaller zones (districts). These “freight districts” are aggregations of TAZs that represent major truck activity areas and from which useful and informative freight movement data can be extracted. **Figure 2.2** shows the freight district boundaries in Las Vegas metropolitan area (left map) and in all of Clark County (right map). Employment data by 3-digit NAICS code for these freight districts were used as one of the inputs to the FAF disaggregation process.

Figure 2.2 RTC Region Freight District Boundaries



In order to better define the boundaries of the freight districts, TAZ boundaries were generally followed and various employment maps were created to ensure those districts accurately represent high truck activity areas . **Figure 2.3** shows an example of the employment maps created using the DETR employment data. This map shows freight-intensive employment by TAZ in the RTC region. Freight-intensive industries include the following NAICS codes: 11 (Agriculture), 21-23 (Mining, Utilities, Construction), 31-33 (Manufacturing), 42 (Wholesale Trade), 44-45 (Retail Trade), 48-49 (Transportation and Warehousing), 62 (Health Care and Social Assistance), and 71-72 (Accommodation and Food Services).

Figure 2.3 Freight-intensive Employment



Source: DETR (processed by the RTC).

2.1.3 Input-Output Tables

The U.S. Bureau of Economic Analysis (BEA) produces Input-Output (IO) "Make" and "Use" tables that report the value of goods consumed or produced by each buyer or seller industry. These data were used to identify the most important consumed commodities (by dollar value) and their associated supplier industries. These tables show production/consumption relationships among nearly 400 industries and commodities. The primary data source for the benchmark IO tables is the Economic Census, which the Census Bureau conducts about every 5 years.

2.1.4 FAF Disaggregation Approach

Disaggregation of the FAF is a process where there are flows in larger zones, i.e. FAF regions, and there are smaller zones, e.g. counties, within those larger zones, where flows from regions are allocated to those smaller zones. As such, it does not require the absolute commodity activity in a zone. It only requires the relative share of a commodity's activity in a zone. While the share of commodity tons in a smaller geography within a larger FAF region may not be available, information is often available for economic sectors that make/produce those commodities and/or use/consume as origin and destination of those commodities.

The geographic level of the FAF origin-destination (ODs) is high-level and helpful for understanding the flows in and out of the RTC region, but not within. Also, commodity flow movement data by smaller than FAF zone geographies are only available through commercial/proprietary data and are often costly to acquire. Therefore, the recently updated version of the FAF Disaggregation Tool (FDT), developed in-house by CS, was utilized to estimate RTC region's freight flows by commodity, mode, and direction of movement for a base-year and a forecast year. The FDT tool first disaggregates FAF data into county level, and then to district-level as described in the previous section. This tool can be used with every update of FAF data to develop new estimates of commodity flows. By using FAF, the commodity flow estimates will be consistent with the official national forecasts and be available without additional data procurement costs when updates are released by U.S. DOT.

Using the FDT tool, the RTC region's inbound, outbound, and internal movements of commodities were developed. The inputs used were the latest version of the publicly available FAF OD tables (FAF5.1), 3-digit NAICS local employment data (through DETR) and IO tables from BEA. Disaggregating FAF at the freight district level will be most helpful to the RTC for current and future planning and modeling projects.

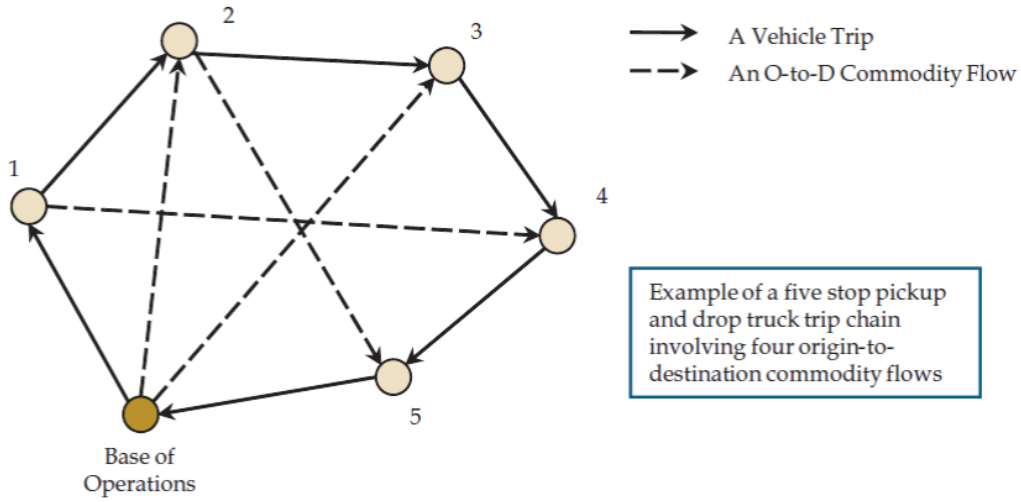
In order to better understand FAF commodity flow estimates, payload factors by commodity were used to convert annual FAF tonnages to number of trucks. Payload factors came from a recent FHWA study where CS updated the truck payload factors to make it more consistent and reliant on open source data (such as VTRIS[2]) and being no longer dependent solely on the 2002 Vehicle Inventory and Use Survey. The advantages of disaggregating FAF commodity flow data for RTC are two-fold. First, the commodity flows by finer geographic level origins and destinations (OD) allows RTC to better analyze supply chains of goods in the region. Second, the disaggregated OD flows can be used for the future update of the RTC's freight travel demand model estimation, calibration, and validation.

As described before, FAF data are mainly based on the national CFS (about two-thirds of the total national tonnage reported in FAF comes from the CFS), which is a shipper-based survey. In other words, the survey collects data by asking shippers of commodities for ultimate origins and destinations and details of

[2] Vehicle Travel Information System Data

commodity and mode of transport. So, FAF data include ultimate origins and destinations for freight flows by the shippers. An item that moves through multiple facilities as it passes through the supply chain may be captured as individual shipments from each of the intermediate points. For example, if a manufacturer moves a product from the factory into a warehouse and from the warehouse to the buyer's warehouse, and from the buyer's warehouse to thea regional distribution center before finally being shipped into a store, FAF would show four distinct movements. As a more localized example, if items are ending in the Resort Corridor, the ultimate shipper could be somewhere in Utah, California or other states and the ultimate receiver is the Resort Corridor. These trips sometimes stop at local distribution centers (DCs)/warehouses. FAF goes through a lot of effort in its origin-destination (OD) table estimation to eliminate those intermediate stops but essentially it is not capable of distinguishing those distribution channels and may report those intermediate destinations as the ultimate origin/destination. In other words, reviewing the OD flows summaries, some origins and destinations might seem to be erroneous which could be a result of the above reasons. **Figure 2.4** shows the difference of shipments between a shipper (package/cargo) perspective and a carrier(vehicle/truck) perspective.

Figure 2.4 Truck Trip Versus OD Commodity Flow

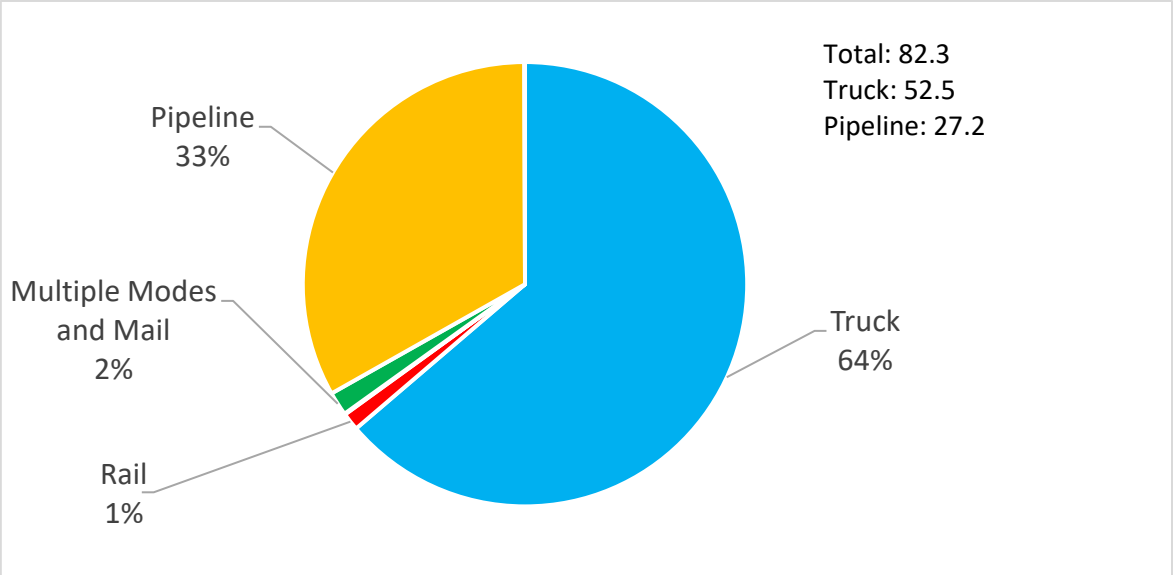


Source: NCFRP Report 8.

2.2 Base Year Commodity Flows

Base-year commodity flow summaries and discussion are included in this subsection. **Figure 2.5** and **Figure 2.6** show mode shares for freight movements to/from/within Clark County. As expected, trucking is the primary mode of transportation for freight in the RTC region with about 64 percent share of total tonnage and 68 percent of total value of goods moved. According to these FAF data estimates, pipeline moves about 33 percent of tons (mainly coal and petroleum products). To further understand these movements, tons are segmented by direction of movement (**Figure 2.7**).

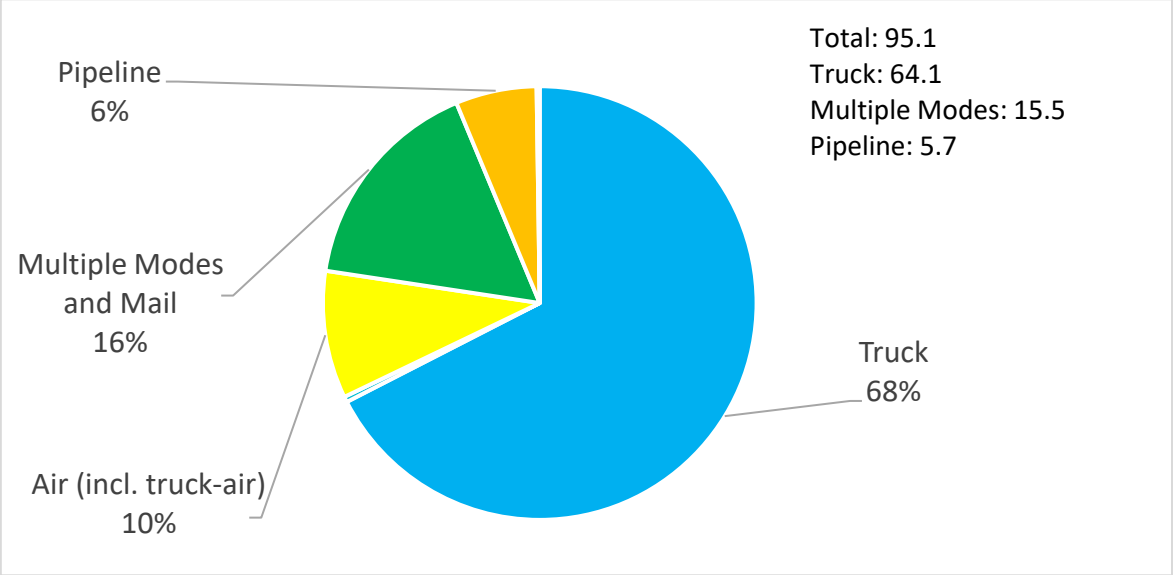
Figure 2.5 Mode Shares By Tons (To/from/within Clark County, 2017)



Source: FAF 5.1

Note: Mode and totals in the table are in Million Tons

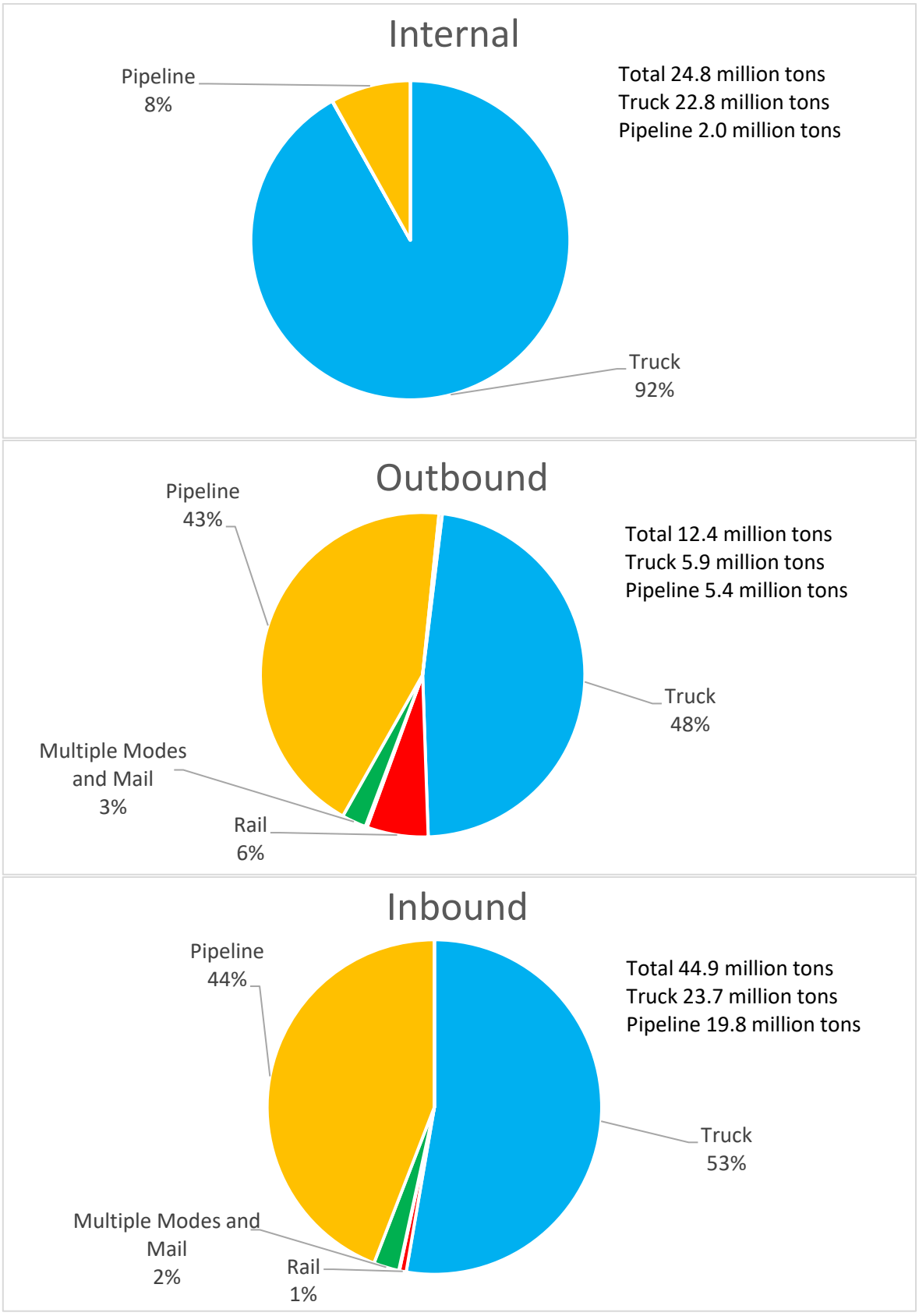
Figure 2.6 Mode Shares By Value (To/from/within Clark County, 2017 Disaggregated FAF)



Source: FAF 5.1

Note: Mode and totals in the table are in Billion Dollars

Figure 2.7 Mode Shares By Direction By Tons (Clark County, 2017)

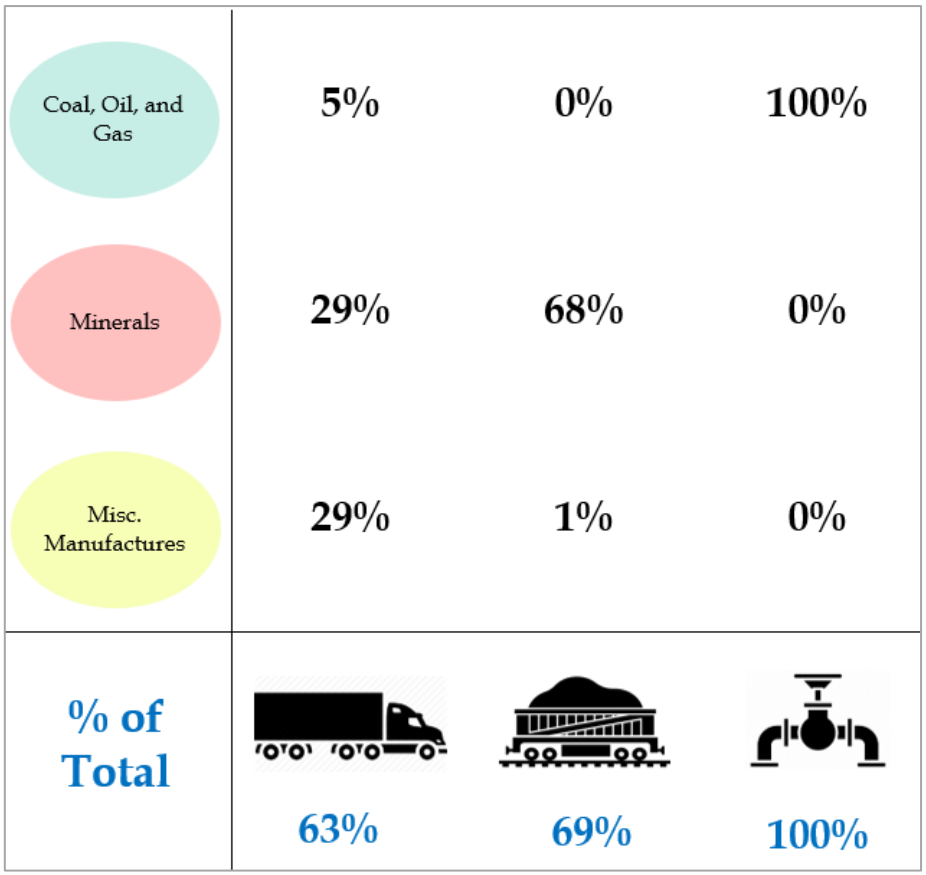


Source: FAF 5.1

Out of the 82.3 million tons of freight moved in the region, about 30 percent (i.e. 24.8 million tons) are moved internally (i.e. trip both begins and ends inside Clark County). Also, there are nearly four times more inbound freight movements than outbound by tons. In other words, Clark County consumes more than it produces, which is reasonable expected given the big residential and entertainment/recreation land uses in this County. Outbound freight moved by pipeline primarily includes shipments moving to LA/LB California (including "Other coal and petroleum products", "Coal-n.e.c.", "Liquefied natural gas", and "liquefied propane" commodity groups). For verification, a quick search of pipeline transportation companies near the area shows that the "Kern River Pipeline" transports natural gas from southwestern Wyoming to markets in the Desert Southwest and California and most likely is one of the main contributors to pipeline freight movements to/from the Clark County. According to various sources[3], it supplies 80 percent of the natural gas used by Las Vegas and the pipeline is 1,679 miles long and transports up to 1.8 BCF/day of natural gas.

In order to study top commodity groups moved by main transportation modes, a cross-classification of total tons moved by mode and commodity groups were developed. **Figure 2.8** shows the top commodity groups moved by each of the truck, rail and pipeline modes and their respective share of tons. These movements were also summarized by direction of movement (See **Figure 2.9**).

Figure 2.8 Top Commodities By Mode, By Tons (Clark County, 2017)



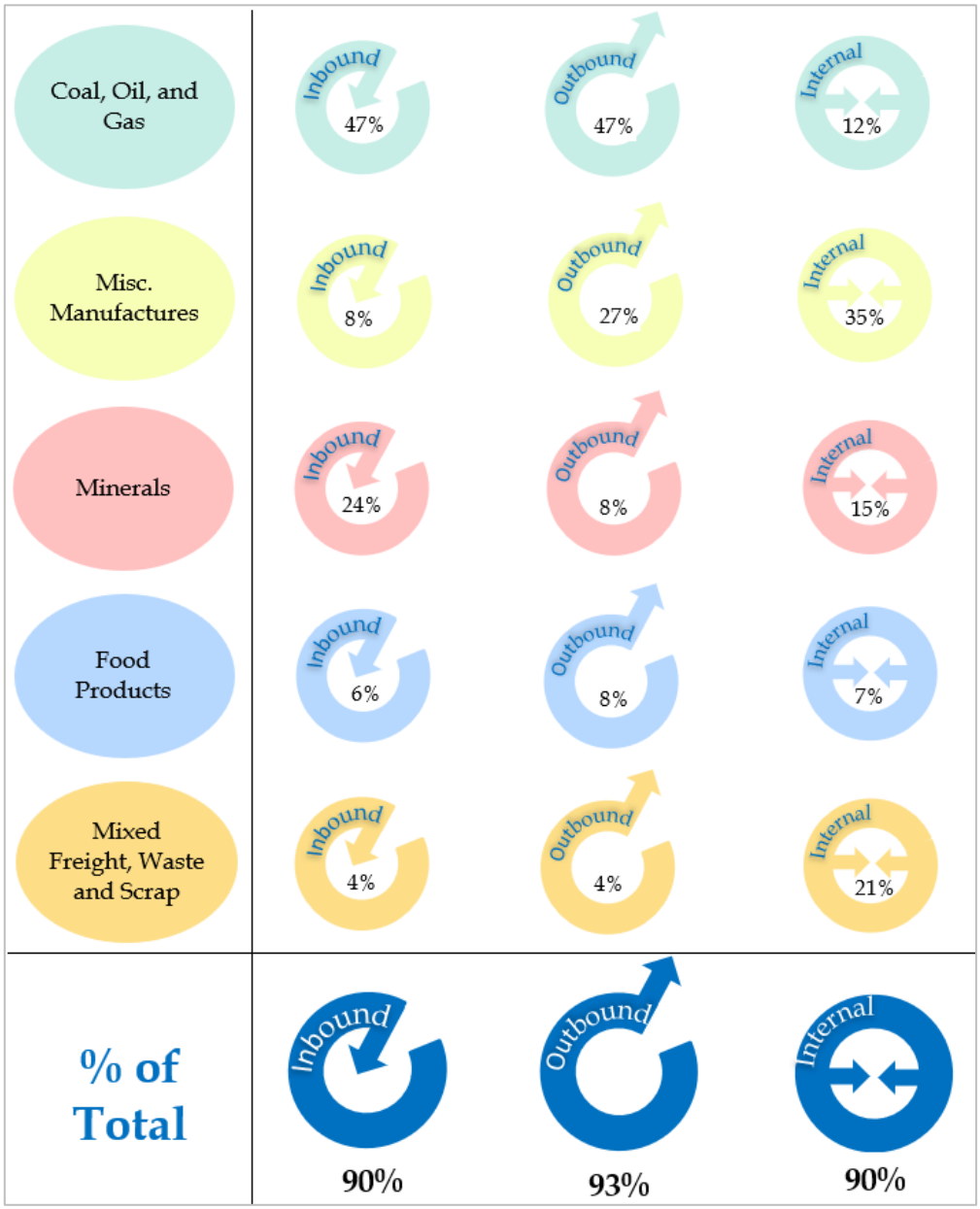
Source: FAF 5.1

[3] Robison, Jennifer (September 5, 2010). "NV Energy plant repurposes heat from natural-gas compression to yield energy". Las Vegas Review-Journal.

Coal, oil and gas, minerals and miscellaneous manufacturers are the top three commodities accounting for about 74 percent of what is moved to/from/within Clark County (tons of the top 3 commodities divided by total tons moved). About 68 percent of commodities moved by rail are minerals.

Looking at movement by direction, about 47 percent of inbound and outbound movements are the coal, oil, and gas commodity groups. The five top commodities ("Coal, oil, and gas", "Misc. manufactures", "Minerals", "Food products", and "Mixed freight, Waste and scrap") account for more than 90 percent of all directions of freight movements in the region. These are the key commodity groups in the region accounting for the majority of goods movements in the region and are main candidates for future supply chain studies.

Figure 2.9 Top Commodities By Direction By Tons (Clark County, 2017)

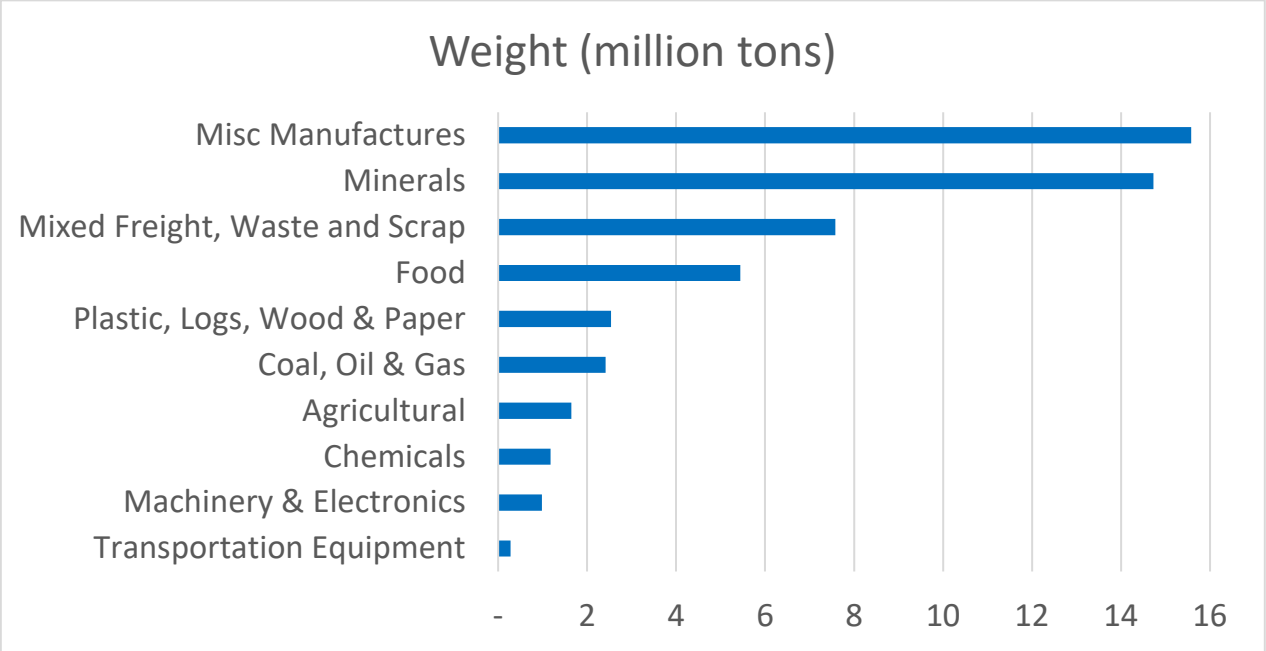


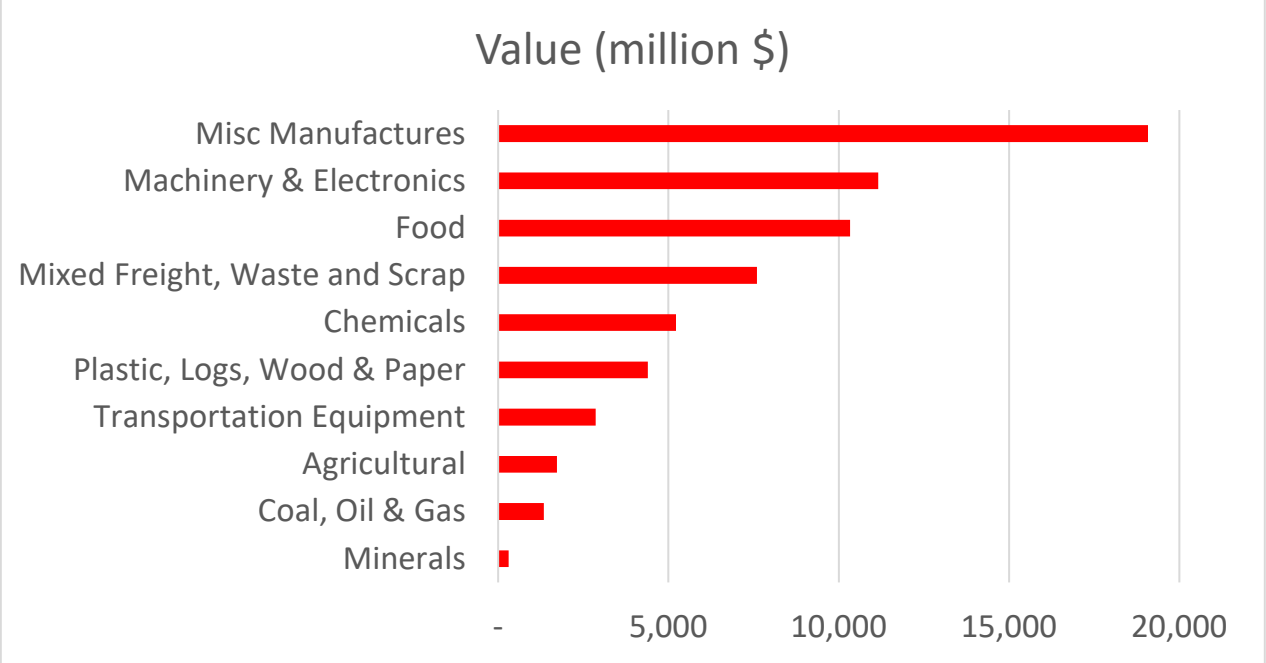
Source: FAF 5.1

Note: Totals might not match due to rounding.

Figure 2.10 shows the top commodities moved by truck by tons and by value. “Misc. manufactures” is the top commodity group by dollar value and tonnage. The top 3 commodities account for more than 72 percent of tons and 63 percent value of freight moved in the region.

Figure 2.10 Top Commodities Moved by Truck (Clark County, 2017)

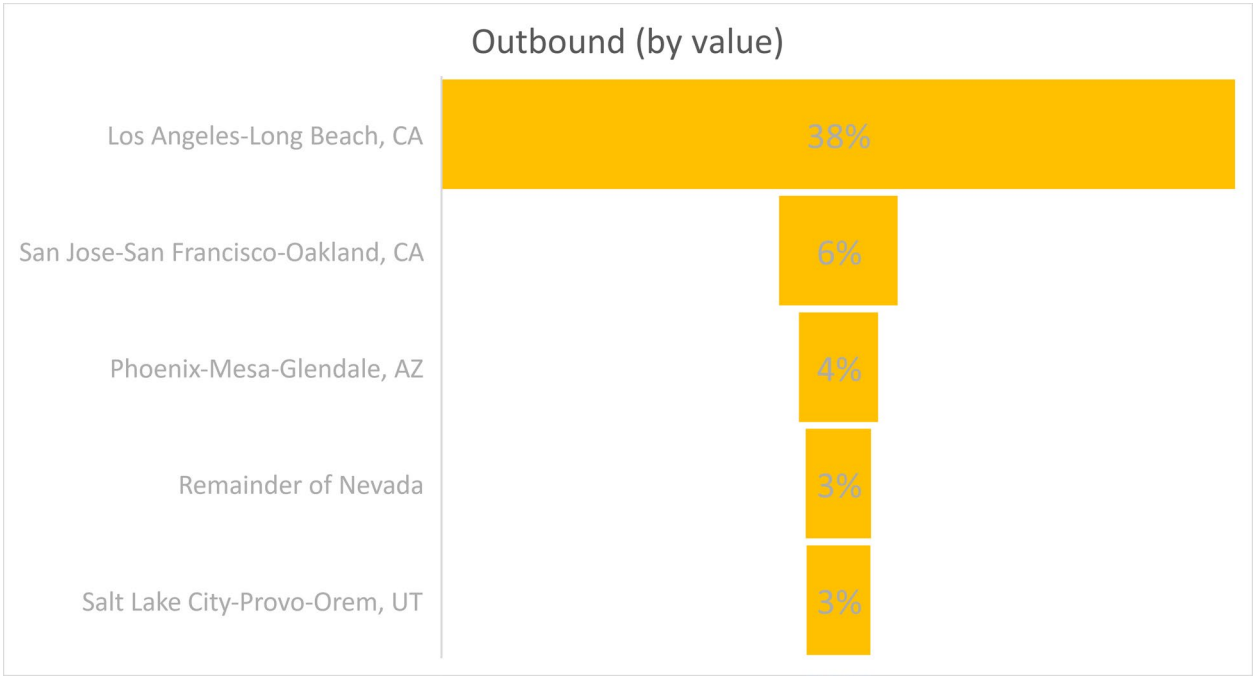


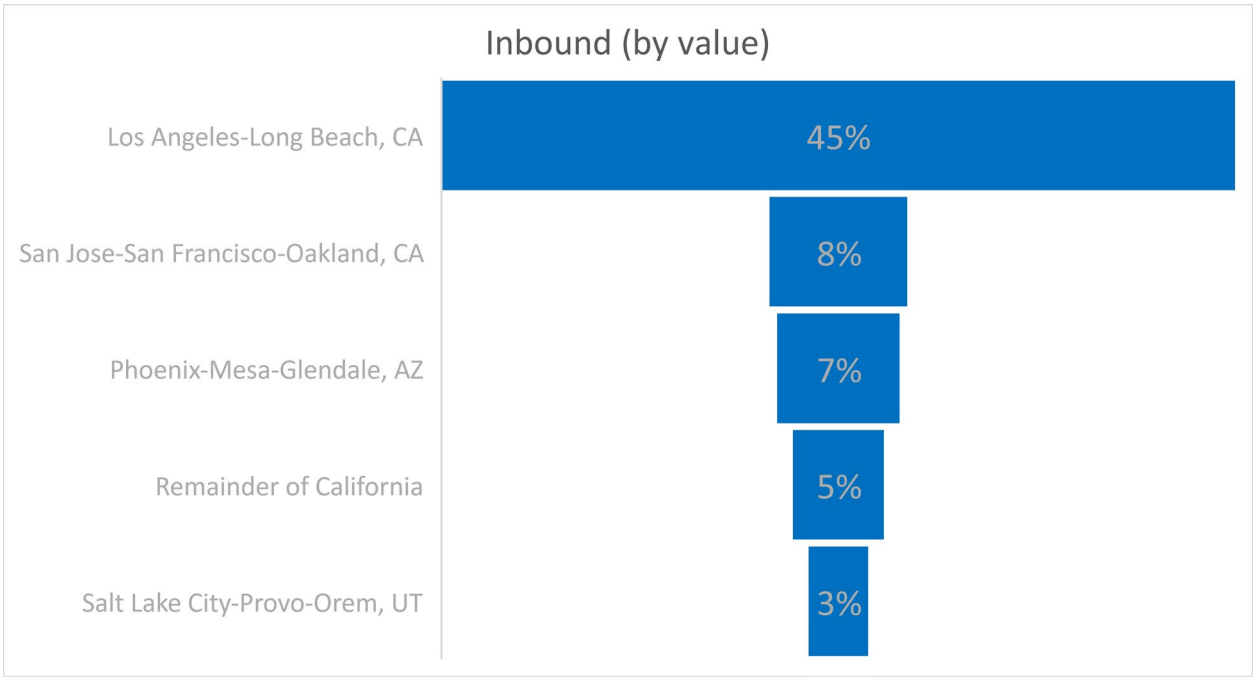


Source: FAF 5.1

Figure 2.11 shows the key trading partners of the RTC region by value for inbound and outbound movements. The Los Angeles/Long Beach area in California is the primary trading partner, with about 38 percent and 45 percent of dollar value of freight moved from and to the RTC region. About 70 percent of the value of freight moving to LA/LB area is the "Misc. manufactures" commodity group. Similarly, about 50 percent of the value of commodities moved from LA/LB area to the Clark County are "Machinery & electronics" and "Misc. manufactures" commodity groups. Other key trading partners for the RTC region are the San Jose/San Francisco and Phoenix, AZ areas.

Figure 2.11 Top Trading Partners By Value (Truck Only, Clark County, 2017)

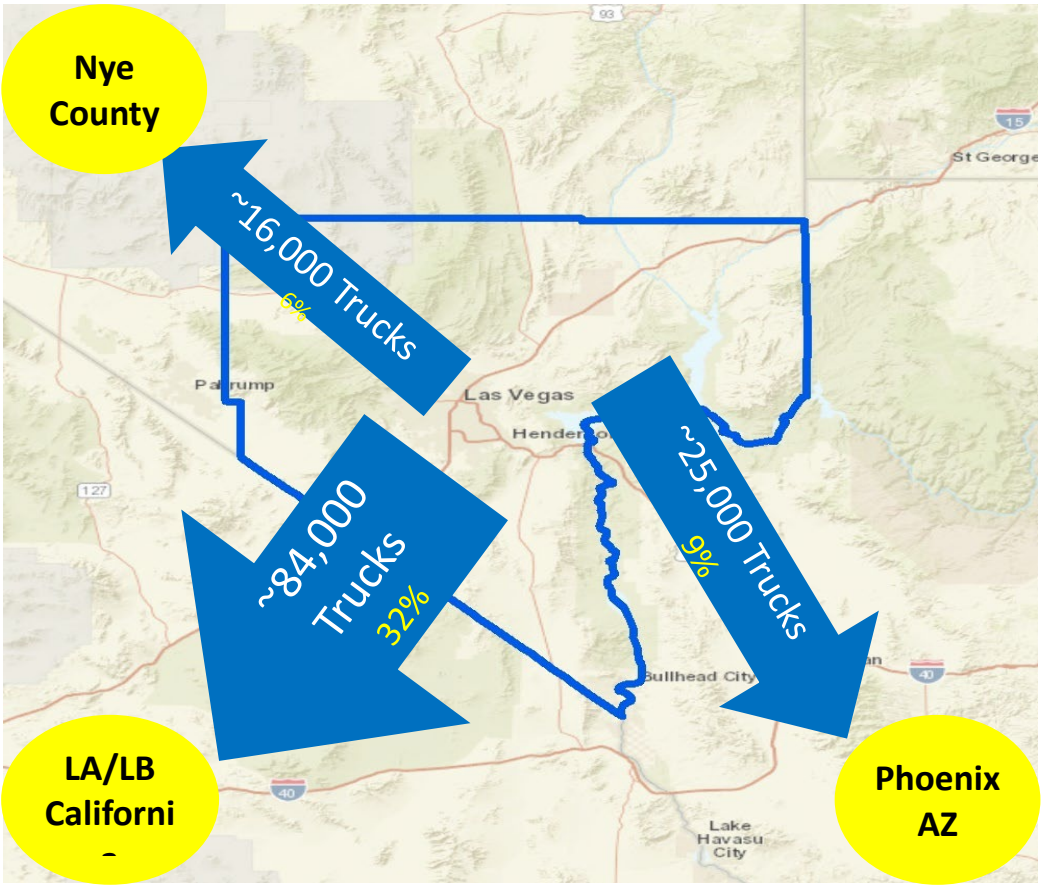




Source: FAF 5.1

Figure 2.12 and **Figure 2.13** show the key destinations and origins for RTC's inbound and outbound freight movements with total annual number of trucks[4] and their shares.

Figure 2.12 Outbound Truck Movements – Key Destinations (Annual Trucks, 2017)



Source: FAF 5.1

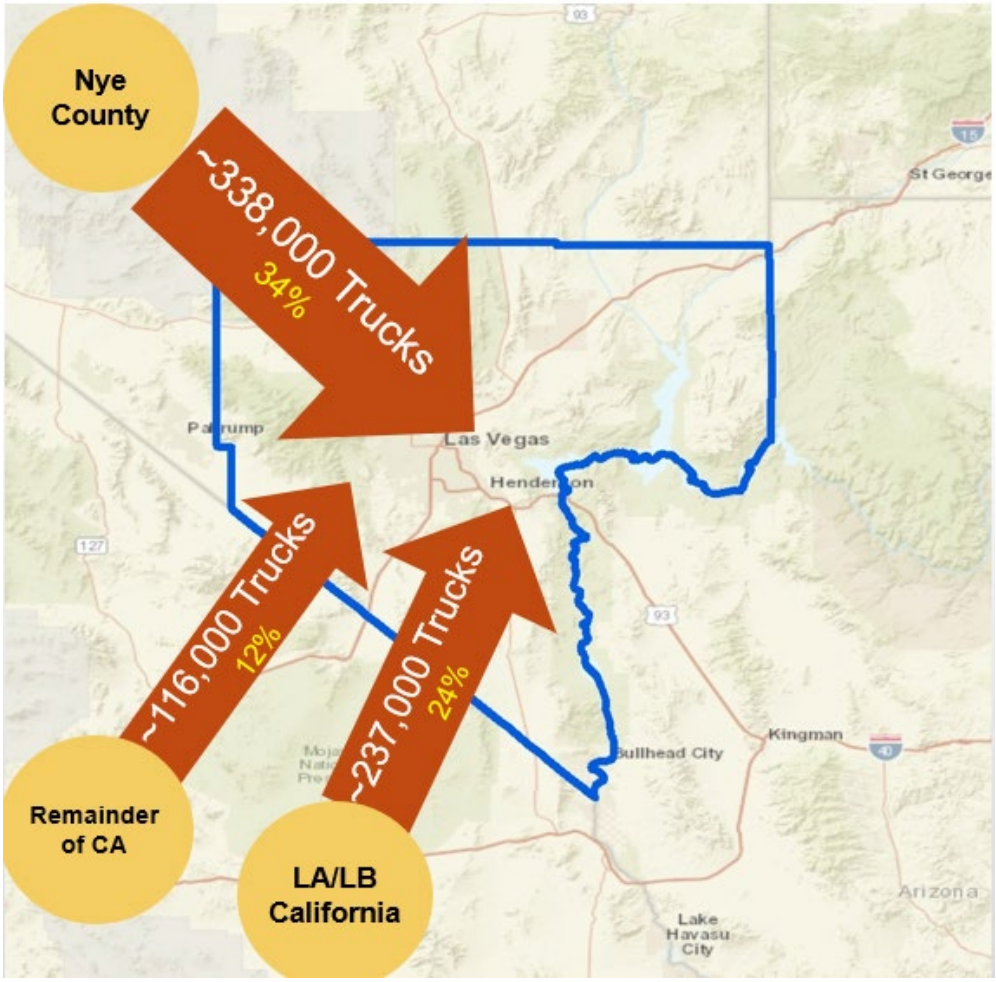
Approximately 270,000 trucks annually leave Clark County for destinations outside mainly going to destinations in the Los Angeles and Long Beach areas with about 84,000 of annual trucks. Phoenix, AZ and Nye County are the two next top destinations with approximately 25,000 and 16,000 annual trucks. These top three trading partners account for ~50 percent of all RTC's outbound truck movements.

On the other hand, approximately 988,000 trucks annually end in Clark County from origins outside the area. Nye County is the largest origin with about 388,000 trucks in a year destined to the RTC region. Los Angeles and Long Beach areas and the remainder of California[5] are the two next key destinations with approximately 237,000 and 116,000 annual trucks. These top three trading partners account for ~70 percent of all RTC's inbound truck movements.

[4] Truck equivalents-calculated by converting tons using average payload factors by commodity.

[5] Remainder of California FAF zone includes anywhere in the state excluding large metropolitan areas (Los Angeles/Long Beach, San Diego, San Jose, Sacramento, and Fresno areas)

Figure 2.13 Inbound Truck Movements – Key Origins (Annual Trucks, 2017)



Source: FAF 5.1

2.2.1 Districts-Level Summaries

Looking at the district-level freight movements, districts 12, 24, and 19 are the top three districts by total tons, trucks, and value of movements to and from districts. These three districts account for about 32 percent of all trucks moved to and from districts. These districts are also among the top 10 in total freight-intensive employment. See **Figure 2.2** for locations of these districts. District 12 includes the area between interstates 215, 515 and east of the international airport with many freight-intensive land uses. District 24 mainly includes the Spring Valley area and is between 215 beltway, S Decatur Blvd. and the state routes 95 and 613. District 19 includes the 215 beltway, state route 95, and N 5th Ave in North Las Vegas.

For movements with both origin and destination inside the Clark County, districts 12, 24, and 16 are the top three with most trucks moved to or from the districts. Commodity groups “Misc. Manufactures”, “Mixed Freight, Waste and Scrap”, and “Minerals” are the key commodities moved inside Clark County by total tonnage. In terms of value, “Food” and “Misc. Manufactures” are the main commodity groups moved inside Clark County.

Table 2.1 shows the top 10 OD districts by total tons moved to and from districts. **Table 2.2** shows the top 10 OD districts by total value of movements to and from districts.

Table 2.1 Top 10 Districts By Total Tons (thousand tons)

District	Total Tons (Production)	Total Tons (Attraction)	Total Tons	Total Trucks*
12	3,247	5,727	8,975	394,080
24	3,018	5,209	8,227	324,228
19	1,735	5,235	6,969	276,616
16	4,047	2,542	6,590	269,104
11	1,615	5,214	6,829	262,883
22	2,313	2,067	4,380	193,276
10	1,990	2,037	4,027	174,439
20	650	3,044	3,694	159,791
25	1,170	2,296	3,466	153,512
1	1,269	1,416	2,685	127,224
12	3,247	5,727	8,975	394,080

Source: FAF 5.1

* Calculated by converting tons using average payload factors by commodity

Table 2.2 Top 10 Districts By Total Value (million dollars)

District	Total Value (Production)	Total Value (Attraction)	Total Value
12	5,453	6,430	11,884
24	1,105	5,942	7,046
19	1,600	5,373	6,973
16	3,840	2,496	6,336
22	4,207	1,923	6,130
11	461	5,279	5,740
25	2,883	2,455	5,338
10	2,645	2,103	4,749
20	883	3,386	4,269
1	1,149	2,530	3,679

Source: FAF 5.1

2.2.2 Pass-through Truck Traffic

FAF commodity flow data do not provide pass-through flows. Subsequently, the disaggregation tool only outputs the flows that are to, from, and within the region. So, the pass-through movements that have no cargo stops within the study area, cannot be determined from the FAF OD matrix alone. To estimate these flows, additional processing (i.e. windowing or subarea extraction) is required which uses the transportation network to which those trips would be assigned to and the identification of the network links on the study area border as cordon lines. Therefore, to create a database of to, from, within and through flows, it is necessary to combine the results of the disaggregation and the subarea extraction processes. FAF itself is an OD table of commodity movements, and pass-through is a subset of that OD table. These pass-through truck movements are also important for freight and infrastructure planning in the RTC region. So, CS used an in-house process for estimating pass-through trucks by overlaying the OD data onto the FAF network to route truck trips. The FAF network mostly contains the primary freight network and highways, however by disaggregating FAF into finer geographic levels we are able to use a more detailed network and derive more disaggregated flows through Southern Nevada. It should be noted this process is an approximation of pass-through flows and assumes that all trips between regions begin or end in the representative county for that region. It also assumes that the RTC network is the extracted FAF model network. The process uses an All-Or-Nothing assignment on reported congested time in 2012 (FAF4), since FAF5 assigned network has not yet been released as of writing this memo.

Figure 2.14 shows a regional picture of pass-through flows. **Figure 2.15** shows a zoomed-in version for the Clark County area showing the I-15 being used by trucks passing through the region and also the alternate route using the SR 95 on the southeast of the region.

Figure 2.14 Pass-Through Flows (Regional Picture), Average Daily Trucks

Source: FAF 5.1, with additional processing from Cambridge Systematics

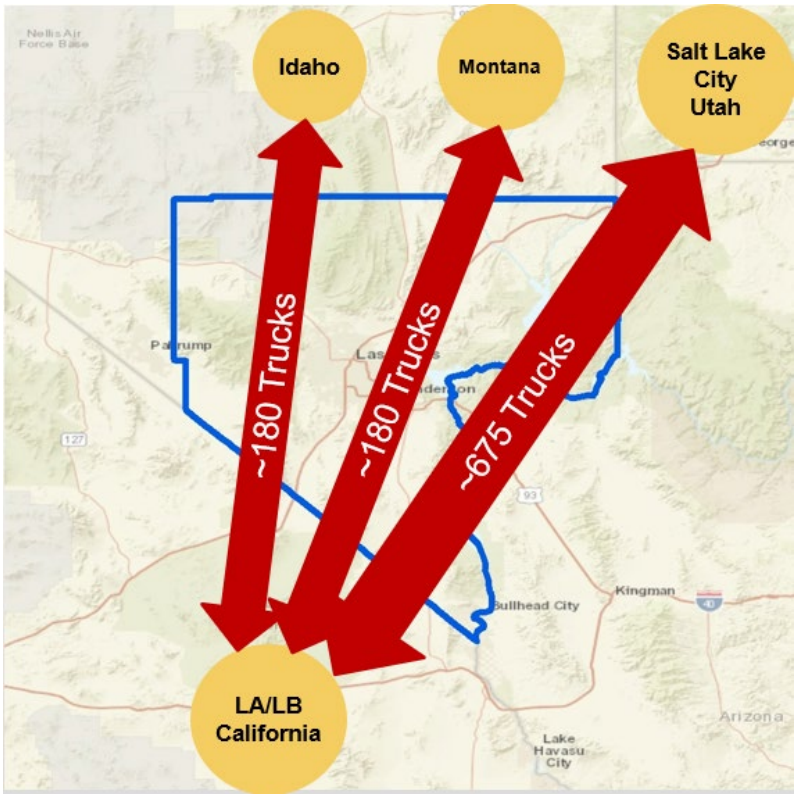
Figure 2.15 Pass-Through Flows (Clark County), Average Daily Trucks

Source: FAF 5.1, with additional processing from Cambridge Systematics

According to the 2017 FAF subarea extraction results, there are about 2,500 trucks passing through the region in an average day. About 28 percent of these trucks carry food products (mainly grain and dairy products and fats and oils) and move between the Los Angeles/Long Beach area in California to destinations in Utah, Montana, and Idaho. About 21 percent of pass-through movements carry “Misc. Manufactures” (e.g. Nonmetallic mineral products, furniture). These two commodity groups together account for about half of the pass-through truck movements. The Los Angeles/Long Beach area and Salt Lake City, Utah are responsible for about 30 percent and 17 percent of pass-through flows in the Clark County respectively. **Figure 2.16** shows the top OD pairs for pass-through flows.

Key commodity groups moved between the Los Angeles/Long Beach area and Salt Lake City, Utah are “Misc. Manufactures” (e.g. Nonmetallic mineral products, furniture) and food. Key commodity groups moved between the Los Angeles/Long Beach area, and Idaho/Montana are “Food and Agricultural Products”. **Table 2.3** shows the top 10 OD pairs, commodities and average pass-through trucks per day.

Figure 2.16 Pass-Through Flows (Top OD Pairs, Daily Trucks)



Source: FAF 5.1, with additional processing from Cambridge Systematics

Table 2.3 Pass-through Flows Top 10 OD Pairs By Commodity

Origin	Destination	Commodity	Trucks per day
Los Angeles-Long Beach, CA	Salt Lake City-Provo-Orem, UT	Misc. Manufactures	131
Los Angeles-Long Beach, CA	Salt Lake City-Provo-Orem, UT	Food	99
Salt Lake City-Provo-Orem, UT	Los Angeles-Long Beach, CA	Misc. Manufactures	68
Montana	Los Angeles-Long Beach, CA	Food	65
Wyoming	Los Angeles-Long Beach, CA	Chemicals	54
Remainder of Utah	Los Angeles-Long Beach, CA	Food	41
Los Angeles-Long Beach, CA	Salt Lake City-Provo-Orem, UT	Plastic, Logs, Wood & Paper	40
Los Angeles-Long Beach, CA	Salt Lake City-Provo-Orem, UT	Transportation Equipment	40
Remainder of California	Remainder of Utah	Food	40
Salt Lake City-Provo-Orem, UT	Remainder of Arizona	Mixed Freight, Waste and Scrap	40

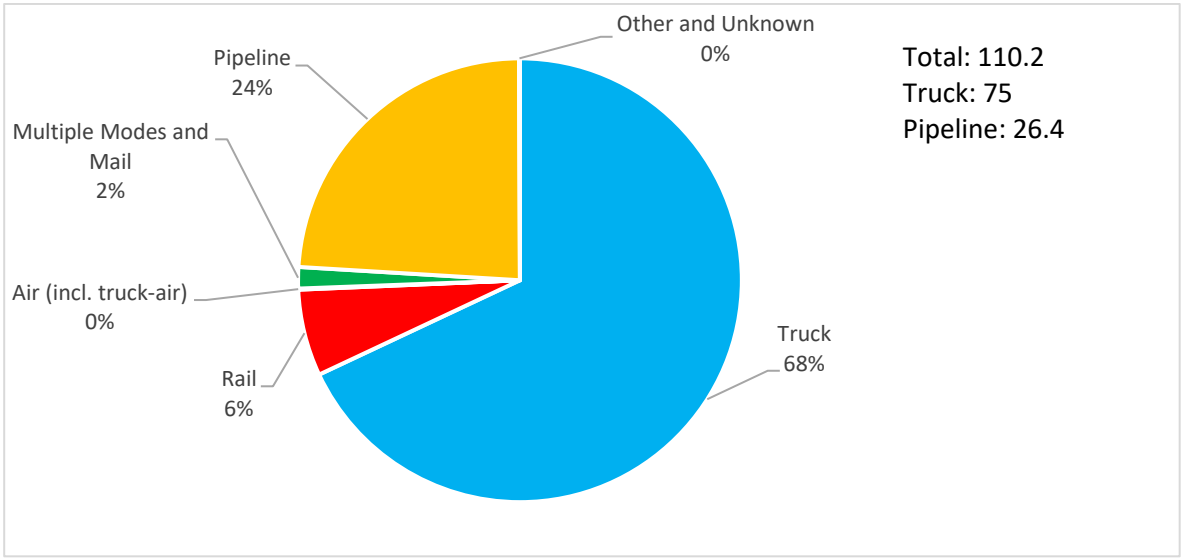
Source: FAF 5.1, with additional processing from Cambridge Systematics

2.3 Future Year Commodity Flows

Future year commodity flow summaries and discussion are included in this subsection. **Figure 2.17** and **Figure 2.18** shows mode shares for freight movements to/from/within Clark County. Trucking is the primary

mode of transportation for freight in the RTC region with about 68 percent share of total tonnage (4 percent increase from base-year) and total value of goods moved. Pipeline is forecasted to move less share of tonnage (24 percent vs. 33 percent) in 2050. These tons are forecasted to mostly shift to the rail mode with an increased share of tons (6.3 percent vs. 1.3 percent). Tons are segmented by direction of movement in **Figure 2.19**.

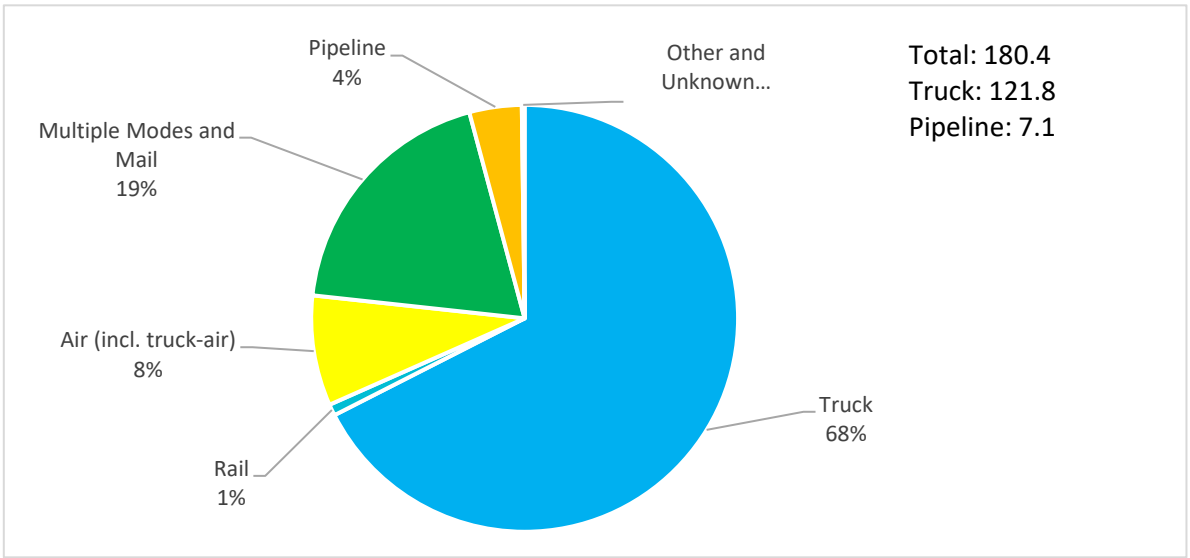
Figure 2.17 Mode Shares By Tons (To/from/within Clark County, 2050)



Source: FAF 5.2

Note: Mode and totals in the table are in Million Tons

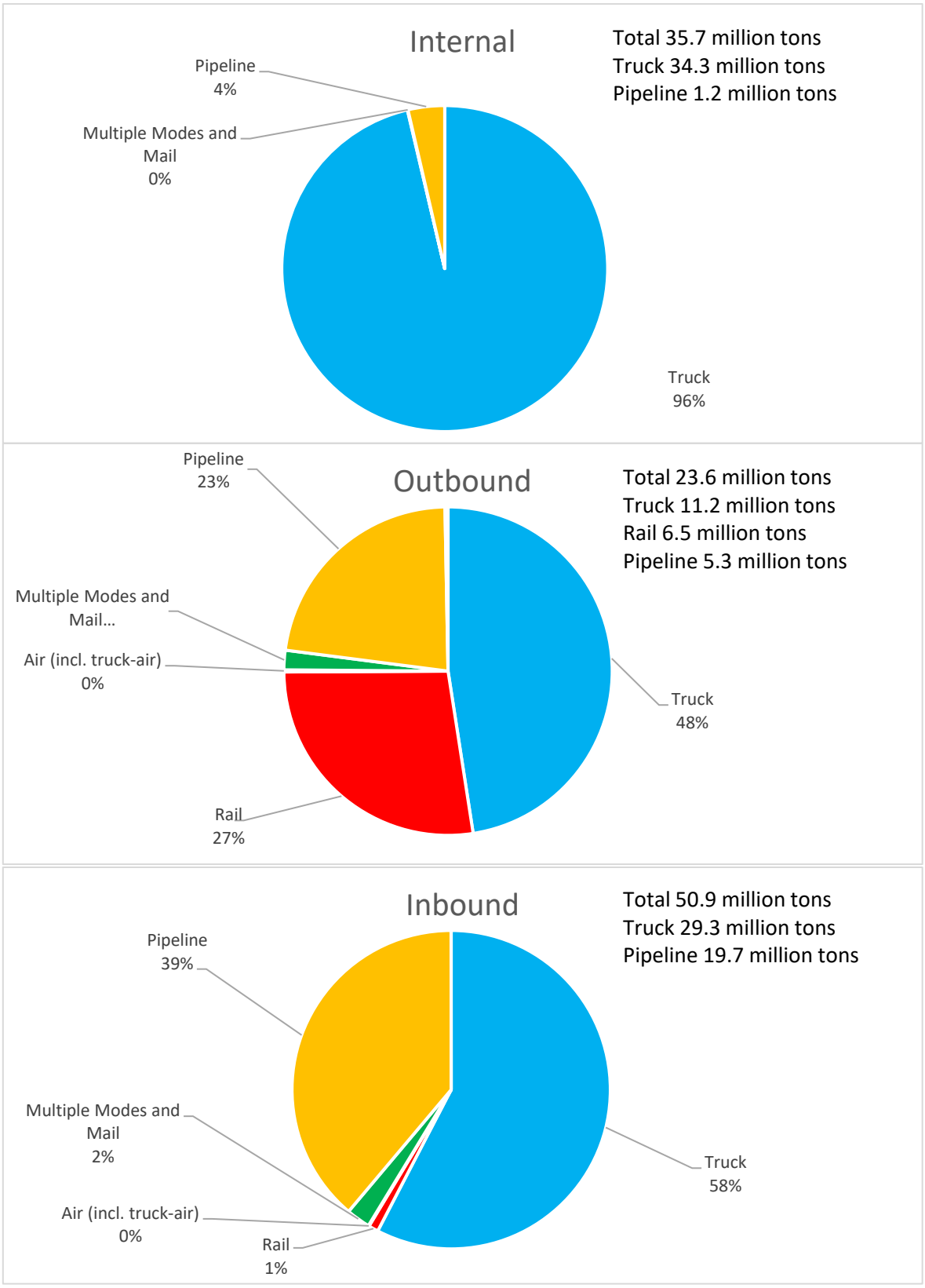
Figure 2.18 Mode Shares By Value (To/from/within Clark County, 2050)



Source: FAF 5.2

Note: Mode and totals in the table are in Billion Dollars

Figure 2.19 Mode Shares By Direction By Tons (Clark County, 2050)

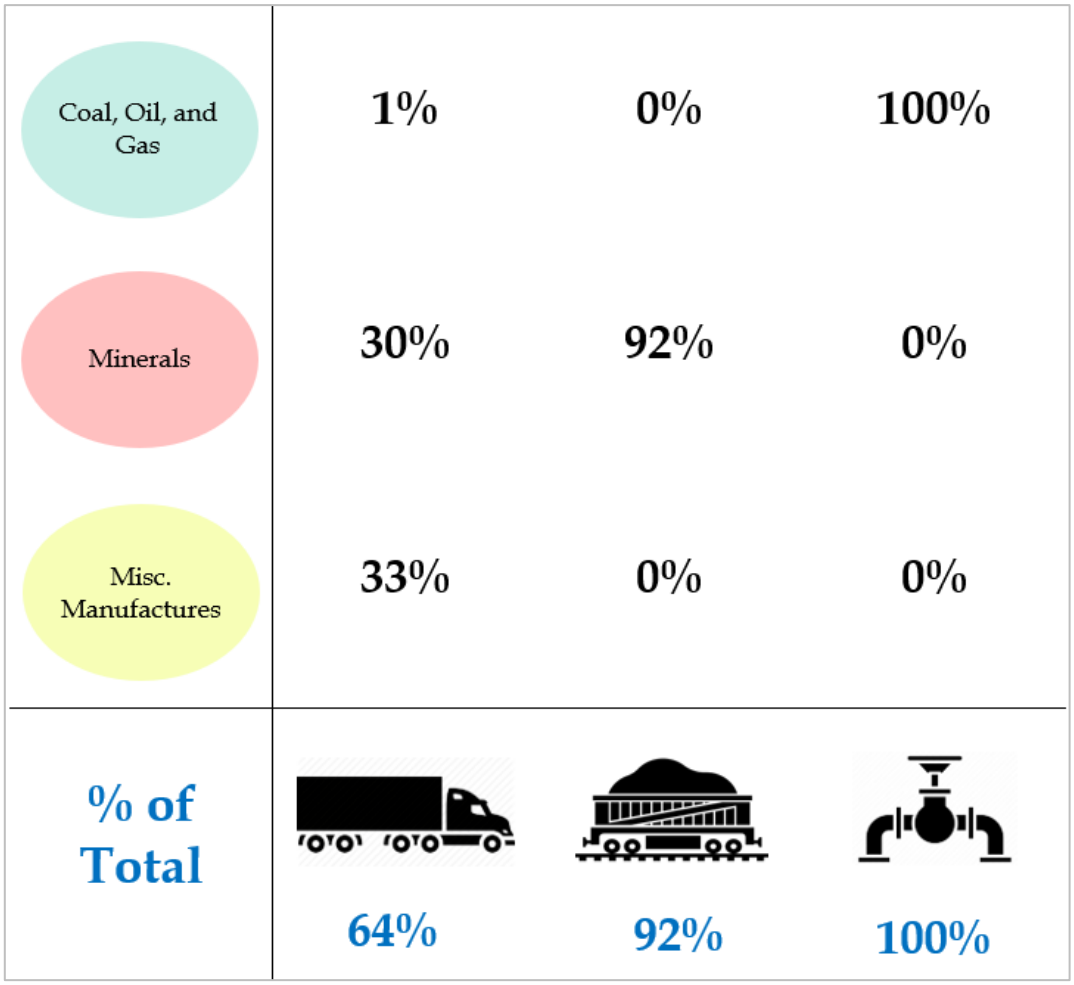


Source: FAF 5.2

The internal movements (i.e. trip both begins and ends inside Clark County) share of all movements are forecasted to increase by 2 percent. This translates to a 44 percent increase in internal tons in 2050. Outbound tons show a major increase (~89 percent), increasing the share of outbound movement of all movements to 21 percent vs. 15 percent in 2017. In other words, Clark County is forecasted to partially cover the gap between production and consumption with new production industry developments in the region.

In order to study top commodity groups moved by main transportation modes, a cross-classification of total tons moved by mode and commodity groups were developed. **Figure 2.20** shows the top commodity groups moved by each of the truck, rail and pipeline modes and their respective share of tons. These movements were also summarized by direction of movement (See **Figure 2.21**).

Figure 2.20 Top Commodities By Mode, By Tons (Clark County, 2050)

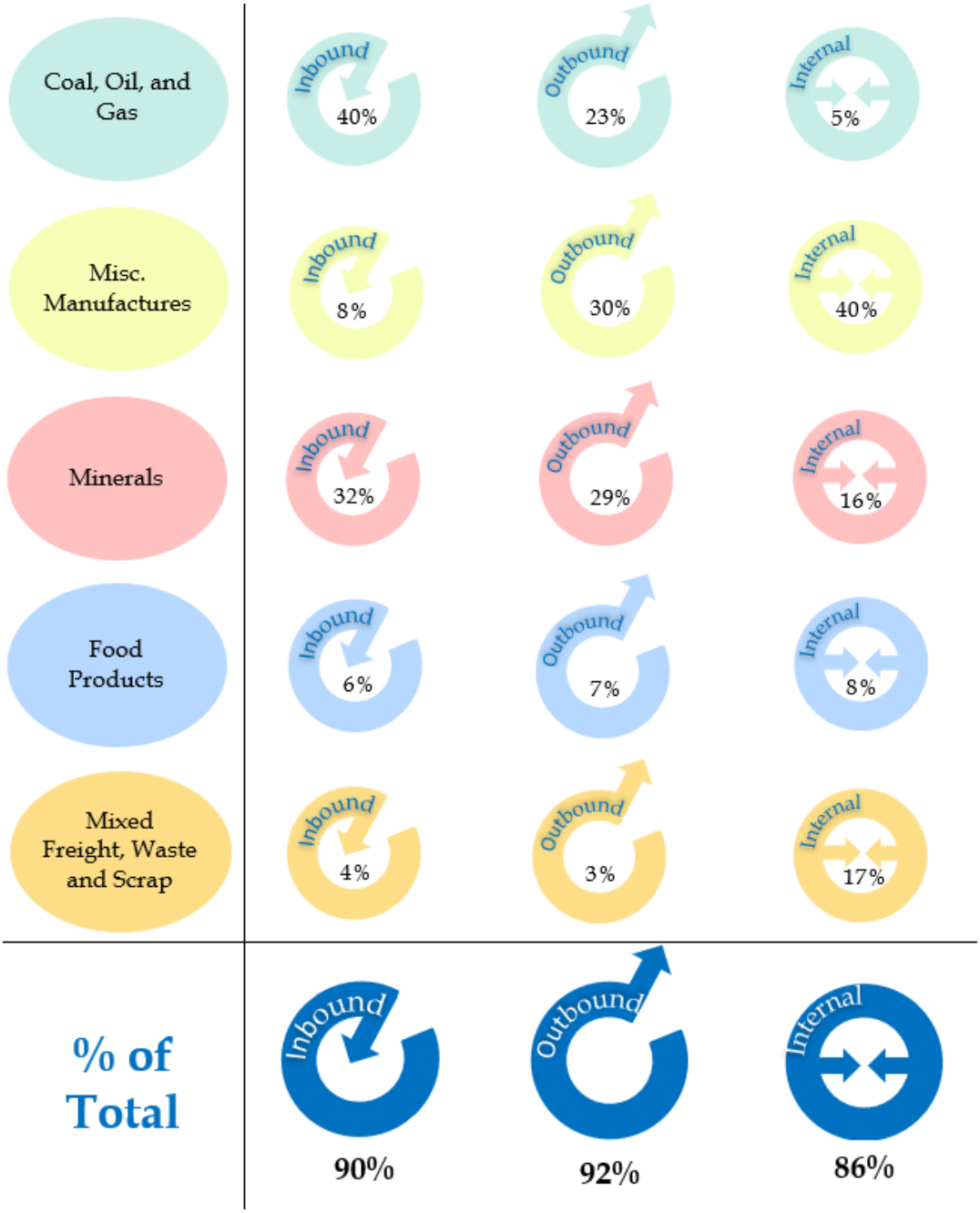


Source: FAF 5.2

It is forecasted that by 2050, coal, oil and gas, minerals and miscellaneous manufacturers are still the top three commodities accounting for about 74 percent of what is moved to/from/within Clark County. About 92 percent of commodities moved by rail are minerals. About 63 percent of what is moved by truck are minerals, and miscellaneous manufacturers commodity groups.

By direction of movement, the five top commodities in 2017 are still the tops in 2050, accounting for more than 90 percent of inbound and outbound and 86 percent of internal movements. Forecasts suggest that outbound share of coal, oil, and gas will decrease by 24 percent and minerals outbound tons will increase by 21 percent. This shows a possible shift to more production and exporting of minerals in the region . The internal and inbound shares for these top five commodities change slightly. For example, forecasts suggest that the inbound share of coal, oil, and gas will decrease by 7 percent and the inbound share of minerals will increase by 8 percent from 2017.

Figure 2.21 Top Commodities By Direction By Tons (Clark County, 2050)



Source: FAF 5.2
Note: Totals might not match due to rounding.

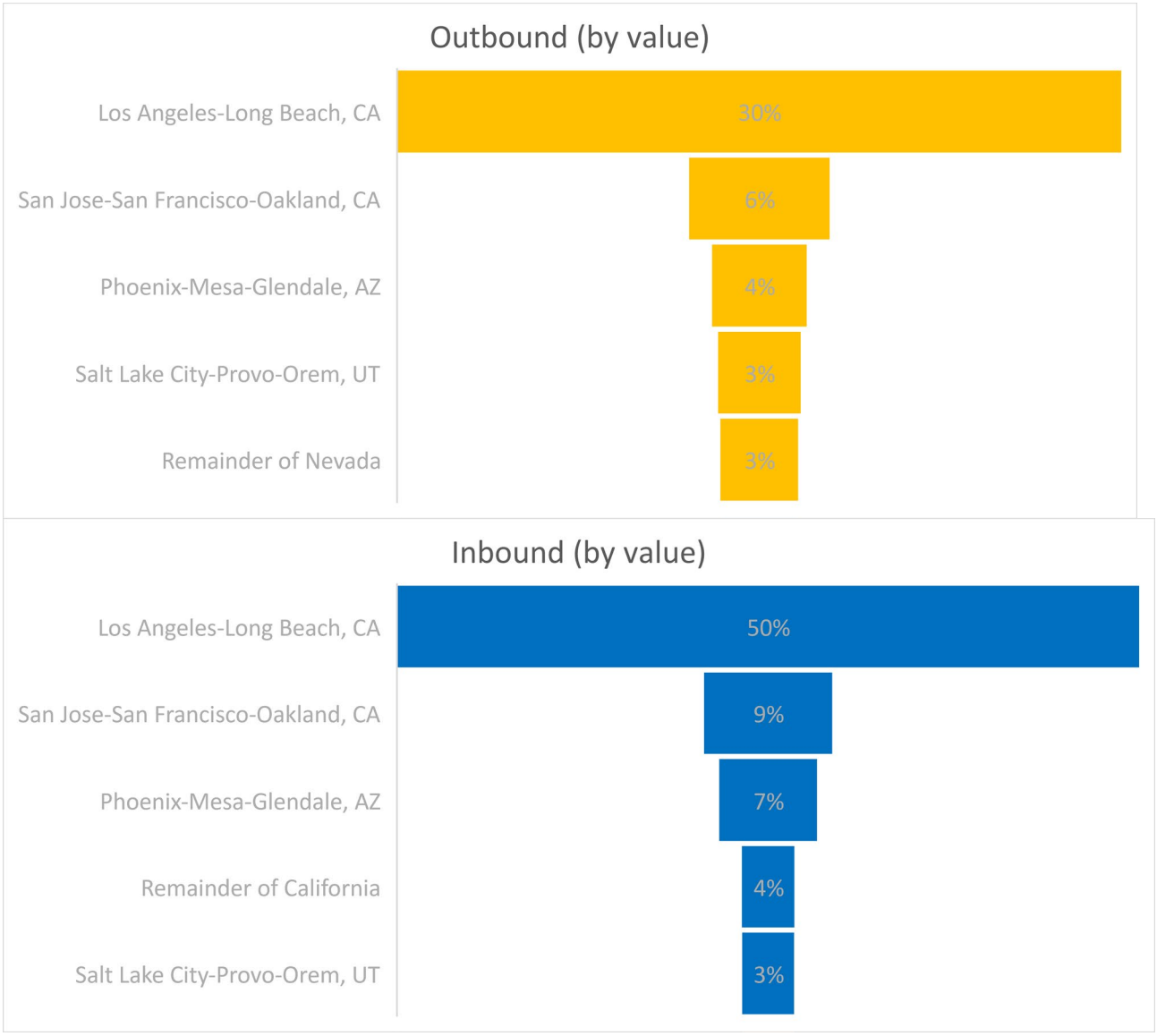
Figure 2.22 shows the top commodities moved by truck by tons and by value forecasted for 2050. “Misc. manufactures” is still the top commodity group by value and tonnage compared to 2017. The top 3 commodities account for more than 75 percent and 61 percent of tons and value of freight moved in the region. Coal, oil, and gas tons is forecasted to decrease by about 60 percent and chemicals tons to increase by about 106 percent from 2017. Overall tons are forecasted to increase by about 40 percent.

Figure 2.22 Top Commodities Moved by Truck (Clark County, 2050)

Source: FAF 5.2

Figure 2.23 shows the key trading partners of the RTC region by value for inbound and outbound movements. The Los Angeles/Long Beach in California is forecasted to still be the primary trading partner, with about 30 percent and 50 percent of dollar value of freight moved from and to the RTC region. Other key trading partners for the RTC region are the San Jose/San Francisco and Phoenix, AZ areas.

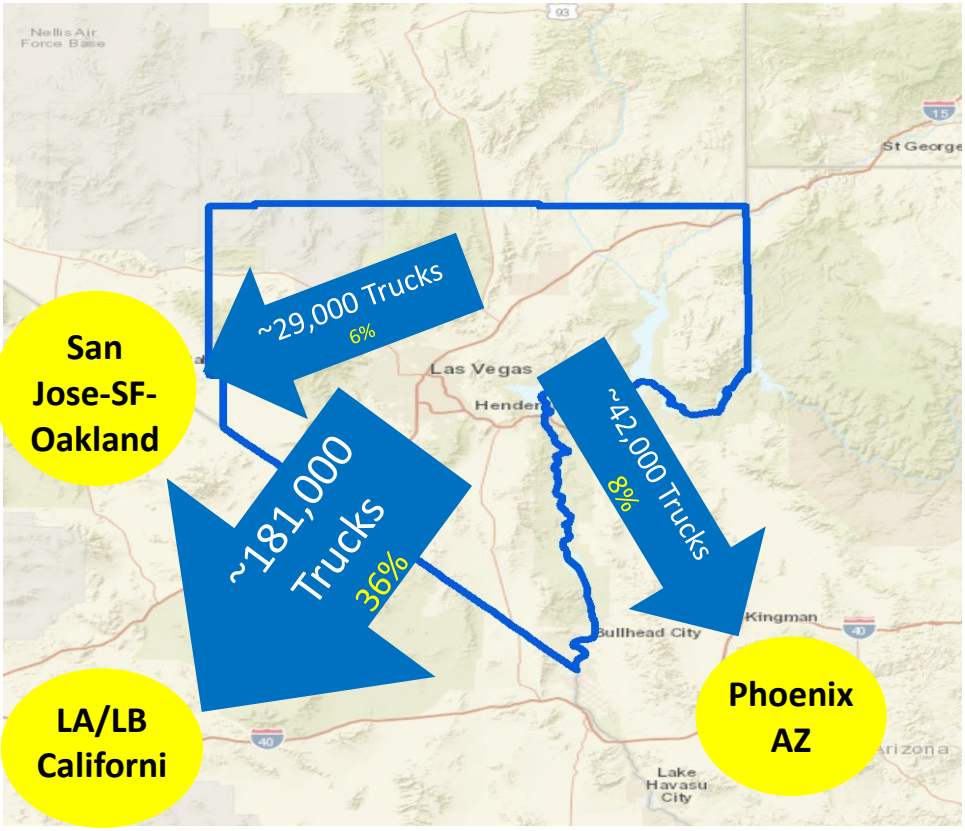
Figure 2.23 Top Trading Partners By Value (Truck Only, Clark County, 2050)



Source: FAF 5.2

Figure 2.24 and **Figure 2.25** show the key destinations and origins for RTC's inbound and outbound freight movements in 2050 with total annual number of trucks[6] and their shares.

Figure 2.24 Outbound Truck Movements – Key Destinations (Annual Trucks, 2050)



Source: FAF 5.2

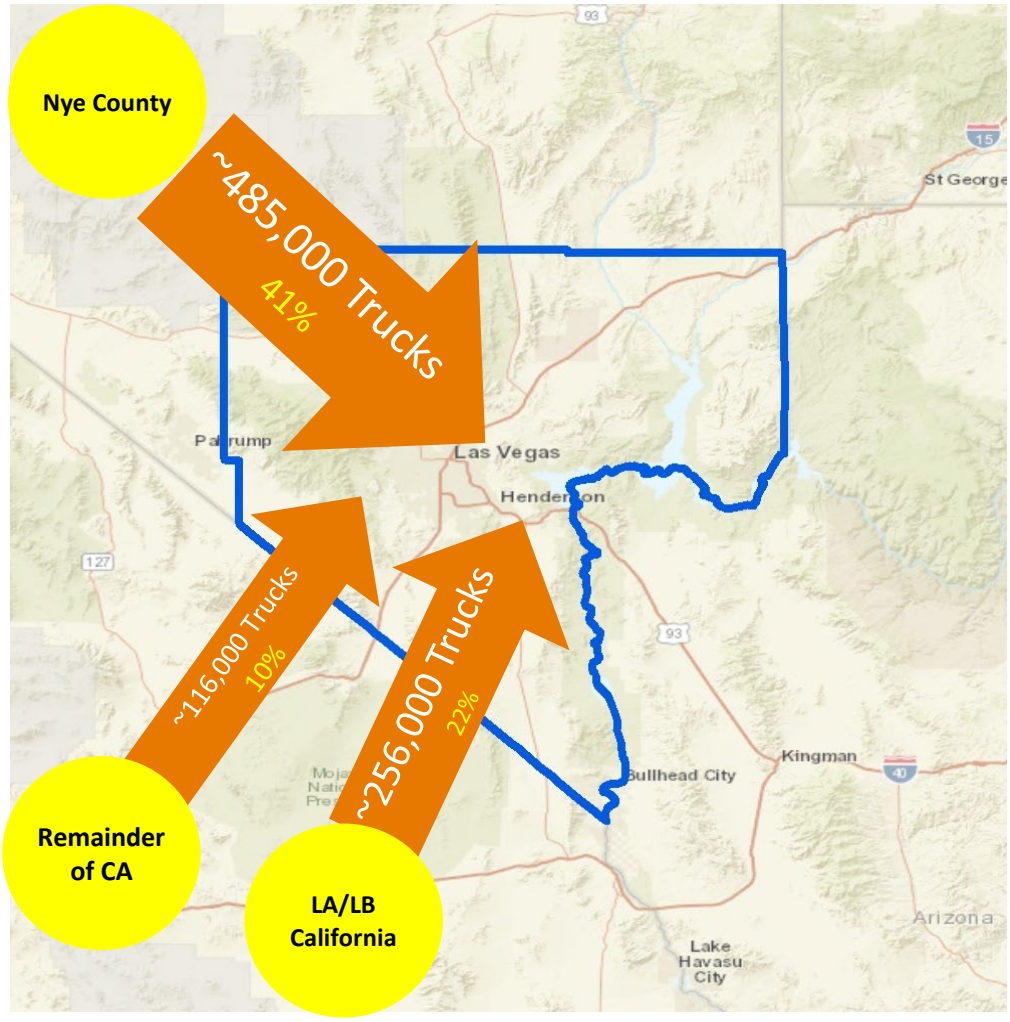
In 2050, it is forecasted that approximately 507,000 trucks annually leave Clark County for destinations outside mainly going to destinations in the Los Angeles and Long Beach areas with about 181,000 annual trucks and Phoenix, AZ and San Jose, CA are the two next top destinations with approximately 42,000 and 29,000 annual trucks. These top three trading partners account for ~50 percent of all RTC's outbound truck movements in 2050.

On the other hand, approximately 1,182,000 trucks annually have trip ends in the Clark County from origins outside the area. Nye County being the main region with about 485,000 trucks in a year destined to the RTC region. Los Angeles and Long Beach areas and the remainder of California[7] are the two next key destinations with approximately 256,000 and 116,000 annual tucks. These top three trading partners account for ~73 percent of all RTC's inbound truck movements.

[6] Truck equivalents-calculated by converting tons using average payload factors by commodity.

[7] Remainder of California FAF zone includes anywhere in the state excluding large metropolitan areas (Los Angeles/Long Beach, San Diego, San Jose, Sacramento, and Fresno areas)

Figure 2.25 Inbound Truck Movements – Key Origins (Annual Trucks, 2050)



Source: FAF 5.2

2.3.1 Districts-Level Summaries

The district-level freight movements in 2050 show that districts 12, 24, and 16 are the top three districts by total tons, trucks, and value of movements to and from districts. Districts 12 and 24 were the top 2 in base-year data as well, but district 16 is forecasted to be in the top 3 instead of district 19 in base-year. Similar to base-year, the top three districts account for about 32 percent of all trucks moved to and from districts. See **Figure 2.2** for locations of these districts. District 16 is next to district 19 and includes the area northeast of Las Vegas between N 5th Ave, 215 beltway, W Carey Ave, and Nellis Air base.

For movements with both origin and destination inside the Clark County, same districts as in base-year data (districts 16, 24, and 12) are the top three with most trucks moved to or from the districts. Also, similar to base-year data, it is forecasted that commodity groups “Misc. Manufactures”, “Mixed Freight, Waste and Scrap”, and “Minerals” are the key commodities moved inside Clark County by total tonnage.

Table 2.4 shows the top 10 OD districts by total tons moved to and from districts. **Table 2.5** shows the top 10 OD districts by total value of movements to and from districts.

Table 2.4 Top 10 Districts By Total Tons (thousand tons)

District	Total Tons (Production)	Total Tons (Attraction)	Total Tons	Total Trucks*
12	4,666	7,838	12,504	555,649
24	4,150	7,120	11,270	437,226
16	6,959	3,518	10,477	432,433
19	2,696	7,183	9,879	388,069
11	2,656	7,182	9,839	373,065
22	3,676	2,852	6,529	290,442
10	3,465	2,777	6,241	270,837
20	1,041	4,180	5,222	228,899
25	2,014	3,165	5,179	232,309
09	1,232	3,142	4,373	166,514

Source: FAF 5.2

* Calculated by converting tons using average payload factors by commodity

Table 2.5 Top 10 Districts By Total Value (million dollars)

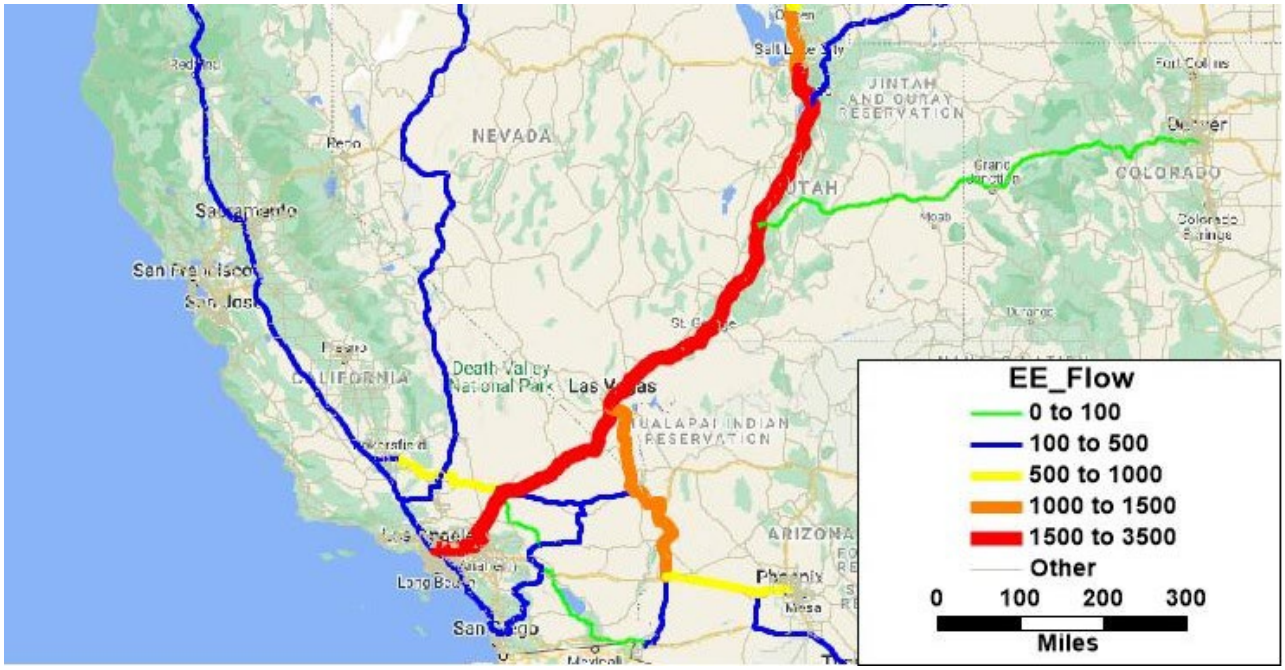
District	Total Value (Production)	Total Value (Attraction)	Total Value
12	9,456	12,206	21,661
19	3,265	10,462	13,726
24	1,707	11,411	13,118
16	7,731	4,789	12,520
11	809	10,402	11,212
22	7,370	3,486	10,855
25	5,106	4,704	9,809
10	5,495	4,026	9,521
20	1,824	6,508	8,332
01	2,334	4,530	6,864

Source: FAF 5.2

2.3.2 Pass-through Truck Traffic

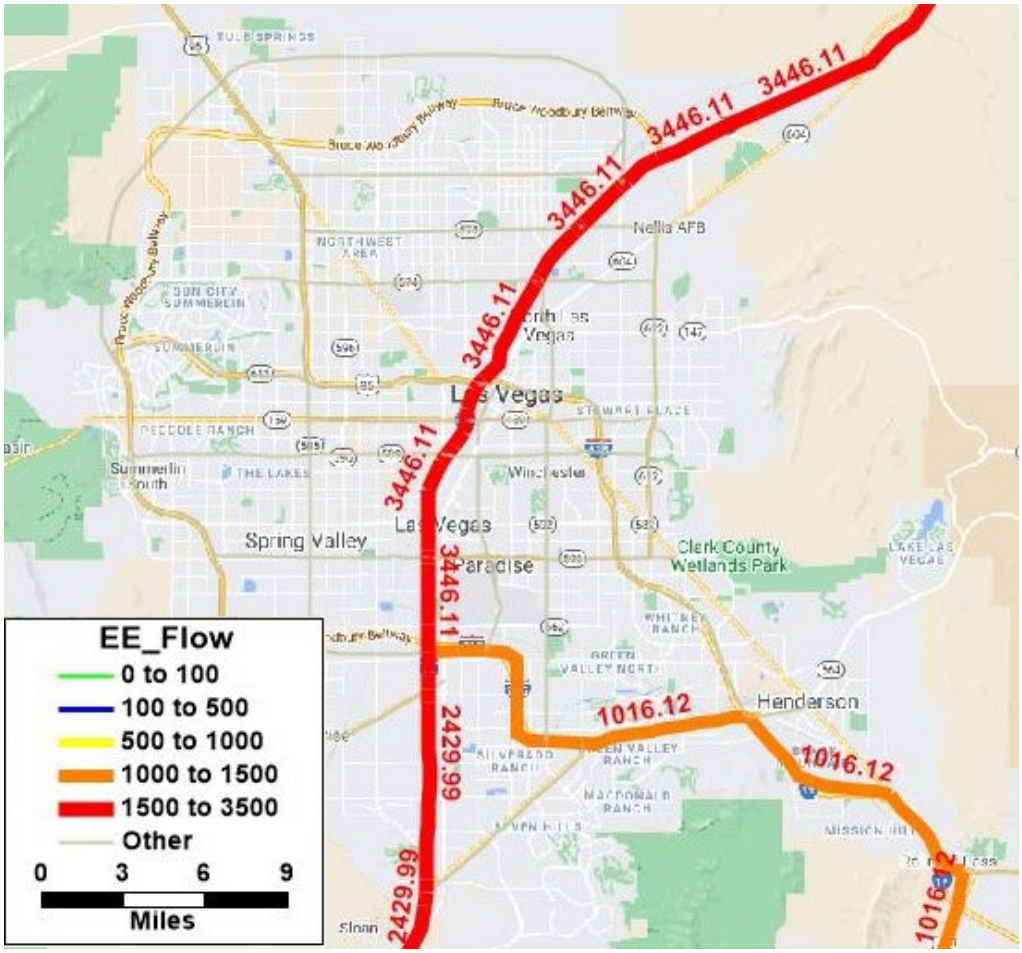
Pass-through flows for 2050 were estimated with the same process used for base-year data (subarea extraction). **Figure 2.26** shows a regional picture of pass-through flows. **Figure 2.27** shows a zoomed-in version for Clark County.

Figure 2.26 Pass-through Flows (Regional Picture), Average Daily Trucks



Source: FAF 5.2, with additional processing from Cambridge Systematics

Figure 2.27 Pass-through Flows (Clark County), Average Daily Trucks

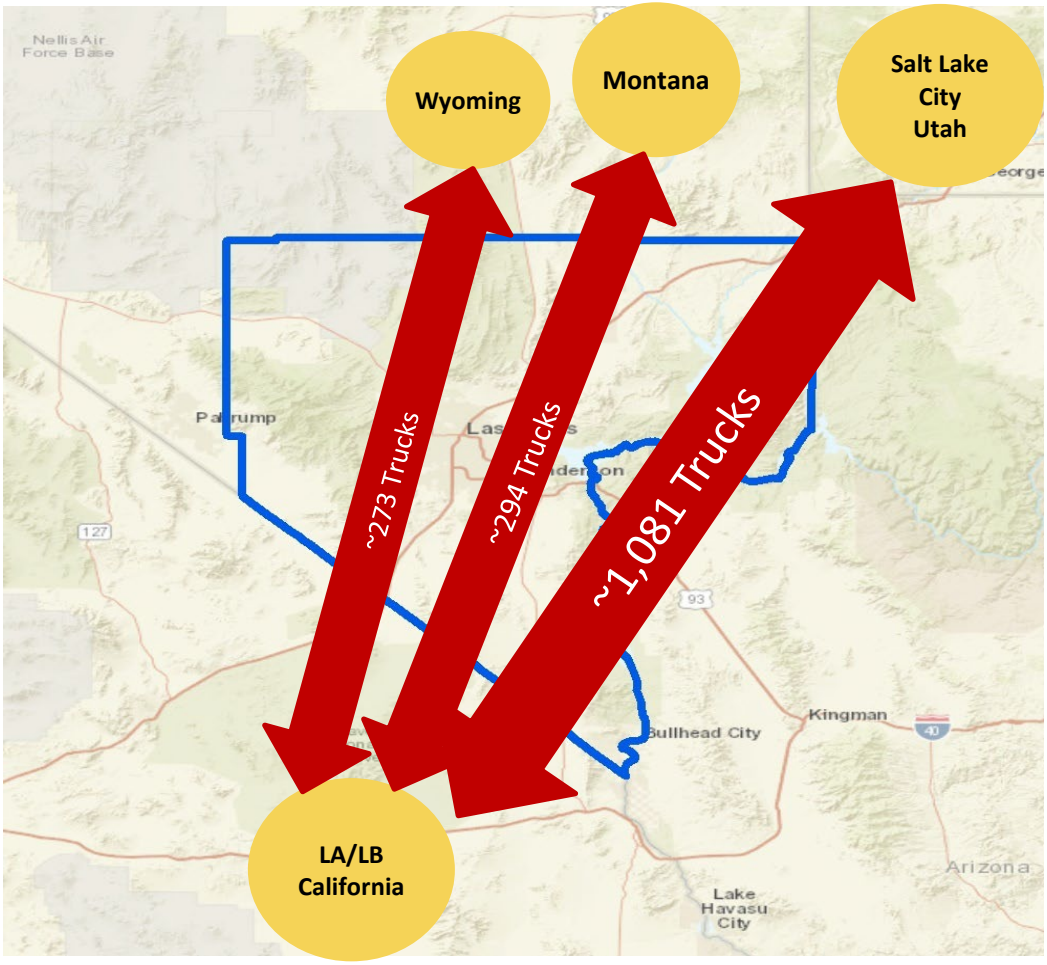


Source: FAF 5.2, with additional processing from Cambridge Systematics

According to the 2050 FAF subarea extraction results, there are about 4,100 trucks passing through the region in an average day. About 25 percent of these trucks carry food products (mainly grain and dairy products and fats and oils) and will be moving between the Los Angeles/Long Beach area in California to destinations in Utah, Montana, and Idaho. About 20 percent of pass-through movements carry “Misc. Manufactures” (e.g. Nonmetallic mineral products, furniture). These two commodity groups together will account for about 45 percent of pass-through truck movements. **Figure 2.28** shows the top OD pairs for pass-through flows. In terms of percent growth from base-year, pass-through movements of chemicals commodity group is forecasted to grow ~174 percent while other commodities show average growth of ~60 percent. The significant growth in chemicals is mainly appearing in movements between Wyoming and Los Angeles/Long Beach area, passing through the RTC region.

Similar to base-year data, key commodity groups moved between the Los Angeles/Long Beach area and Salt Lake City, Utah are “Misc. Manufactures” (e.g. Nonmetallic mineral products, furniture) and food products. **Table 2.6** shows the top 10 OD pairs, commodities and average pass-through trucks per day.

Figure 2.28 Pass-through Flows (Top OD Pairs, Daily Trucks)



Source: FAF 5.2, with additional processing from Cambridge Systematics

Table 2.6 Pass-through Flows Top 10 OD Pairs By Commodity

Origin	Destination	Commodity	Trucks per day
Los Angeles-Long Beach, CA	Salt Lake City-Provo-Orem, UT	Misc. Manufactures	193
Wyoming	Los Angeles-Long Beach, CA	Chemicals	170
Los Angeles-Long Beach, CA	Salt Lake City-Provo-Orem, UT	Food	152
Salt Lake City-Provo-Orem, UT	Los Angeles-Long Beach, CA	Misc. Manufactures	87
Los Angeles-Long Beach, CA	Salt Lake City-Provo-Orem, UT	Plastic, Logs, Wood & Paper	84
Montana	Los Angeles-Long Beach, CA	Food	80
Remainder of Utah	Los Angeles-Long Beach, CA	Food	79
Los Angeles-Long Beach, CA	Salt Lake City-Provo-Orem, UT	Transportation Equipment	70
Salt Lake City-Provo-Orem, UT	Remainder of Arizona	Mixed Freight, Waste and Scrap	70
Los Angeles-Long Beach, CA	Salt Lake City-Provo-Orem, UT	Machinery & Electronics	70

Source: FAF 5.2, with additional processing from Cambridge Systematics

3.0 Supply Chain Analysis

A series of interviews were held to characterize the gateways, corridors and multimodal nodes critical to key freight intensive sectors. Stakeholders were identified with the assistance of the FAC and economic development representatives in the region, including GOED, Las Vegas Global Economic Alliance, and the North Las Vegas Economic Development Authority. Identified stakeholders were provided with a one-page fact sheet and informational email invitation to a one-hour interview via telephone with project personnel. Interviewees were offered confidentiality for their responses.

Fifteen total interviews were conducted over the study period, and included a broad range of stakeholders in the regional freight transportation system. The industries represented are shown in **Table 3.1**.

Table 3.1 Supply Chain Interviews: Stakeholder Categories

Industry Sector	Interviews Conducted
Trucking Companies	3
Distribution (DC, Retail, 3PL)	4
Railroad	1
Military	1
Research	2
Government; Economic Development	4
Total interviews conducted	15

3.1 Interview Guide

The topics and questions listed below were used to guide the discussions, however not all interviews covered every question.

3.1.1 Business Context

- Can you tell me about your facilities in southern Nevada?
- Who makes decisions related to logistics (both supplier and customer) for these facilities?
- Can you tell me more about the goods moving in/out of these facilities?
- What do you see as your biggest challenges and opportunities for your business in Southern Nevada over the next 5 years? Where does logistics fall in terms of key challenges/opportunities?
- Are there any issues that hinder your logistics efficiency in Southern Nevada?

3.1.2 Trends and Events Impacting Logistics Practices

- How has COVID impacted your logistics related business practices (both suppliers and customers, stock on site, etc)?
- How has the rise in e-commerce impacted your logistics related business practices (both suppliers and customers, stock on site, etc)?
- Are there other recent trends (technology, economy, etc) that have influenced your business in terms of logistics?

3.1.3 Regional Competitiveness

- Opinions about the competitiveness of southern Nevada for your business.
  - Why did you choose to locate in Southern Nevada?
  - How competitive is southern Nevada in terms of logistics, i.e. shipping costs or access?

3.1.4 Industry Issues

- Recommendations that you would like to see included in the Southern Nevada Freight Plan Update
  - What would you like to see out of the freight plan update? What would make this plan a win from your perspective?
  - Is there anything we didn't ask about that we should know for this plan? Who else should we talk to?

3.2 Summary of Input Received

Several of the more common and important responses received are shown in the bulleted list below, and summarized by category in the following subheadings.

- **Lack of adequate warehousing** space including the concern that residential development may encroach on industrial areas.
- **Lack of a trained workforce** and overall labor shortage .
- **Lack of transit options to industrial areas** creates several issues: reduces the potential labor pool by eliminating transit dependent employees, is inequitable, and increases congestion because everyone is forced to drive personal vehicles to work which congestion also impacts the free movement of freight.
- **Traffic bottlenecks** around the Las Vegas Speedway and Nellis Air Force Base.
- **The imbalance between inbound and outbound freight** in the region, as high as 4:1 leads to higher shipping costs and lower response times by carriers.
- **Insufficient rail access**.

- **Development of a logistics industrial park**, particularly on the south side of the region, was mentioned repeatedly.

3.2.1 Business Context

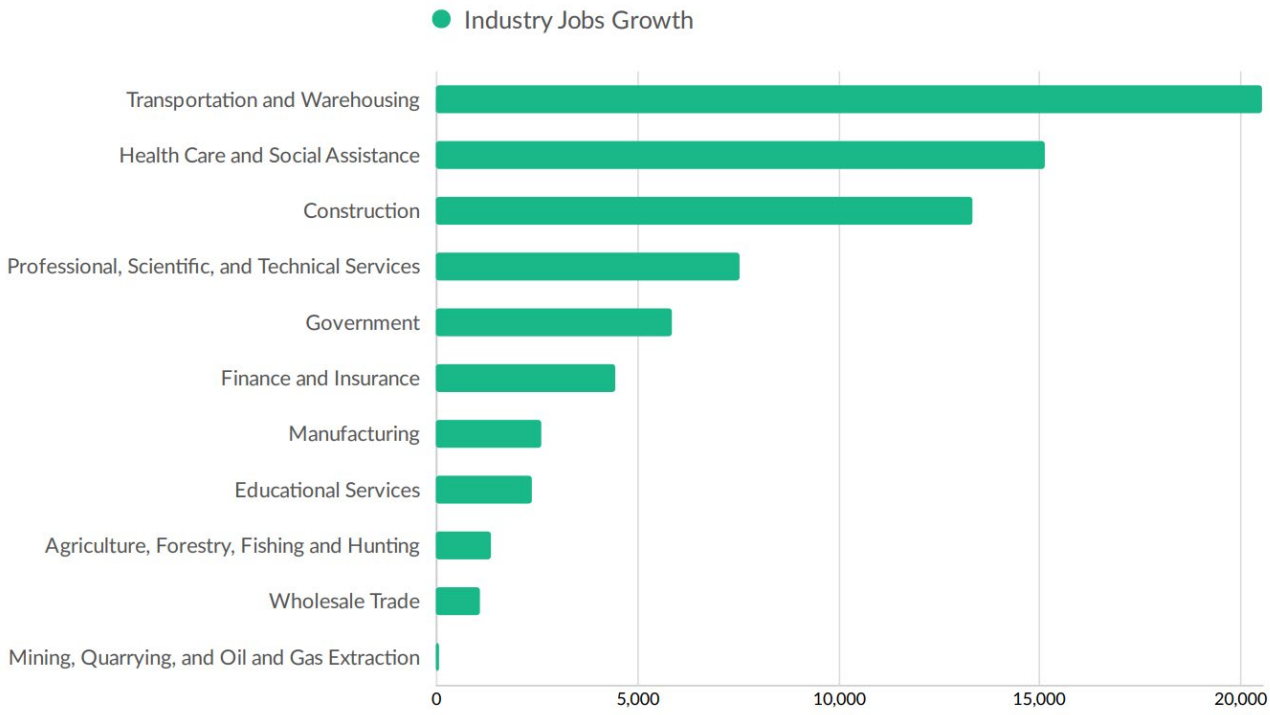
The initial group of questions for the stakeholder interviews evaluated the business context by asking about types of goods/ materials moved, location decisions, technology used, modes used, and main connections for the region. Due to the range of industry representatives in the interviewee group, the research team received a strong variety of experiences and perspectives. In general terms, the goods and materials moved included consumer goods, food and beverage, construction materials, heavy haul items, and military equipment. The decision to locate the business location in the Las Vegas area largely derived from geographic markets, particularly in relation to consumer goods and food and beverage, and from connectivity to larger freight facilities in California such as the Port of LA/ LB. Freight-related technology was not addressed broadly by any interviewee, aside from comments asserting that those decisions were made at the corporate level and not the location level.

To begin understanding the supply chain context in southern Nevada, understanding the modal share in the region is essential. Based upon interviews, freight is moved overwhelmingly by truck in the region, though there is repeated and considerable interest in expanding rail access for multiple freight categories. The primary origins for freight moving into the region are California, with secondary origins in the US West and Mountain West. Similarly, destinations for freight exiting the region are the US West and Mountain West.

3.2.2 Trends and Events Impacting Logistics Practices

The ongoing rise in e-commerce volumes has put pressure on the logistics system and transportation network for several years. During 2020, COVID and its resulting quarantines and stay-at-home orders exacerbated this exponential increase leading to higher transportation costs and lower availability of logistics providers/ carriers. Both trends have led to an increasing pressure on the freight transportation system and its infrastructure network. The growth of the logistic industry is illustrated by a recent GOED report that includes the top growth industries in Clark County, shown in **Figure 3.1**.

Figure 3.1 Top Growth Industries in Clark County (increase in number of jobs from 2016 to 2021)



Source: https://goed.nv.gov/why-nevada/data-portal/

3.2.3 Regional Competitiveness

The interviewees were next asked about their logistics challenges and opportunities, regulatory challenges, regional strengths vis-à-vis the freight transportation network, and access issues/ bottlenecks. The logistics challenges include the aforementioned exponential volume increases resulting from e-commerce and the COVID impact, while opportunities include increasing the qualified logistics workforce in the region. Interviewees had positive comments regarding the regulatory environment in Southern Nevada including the forward-looking transportation planning for some parts of the area. The strengths of the region include the geographic location, in proximity to California, the forward-looking transportation planning for some infrastructure components, and the beneficial tax environment for businesses generally.

Interviewees had very specific comments regarding access issues and traffic bottlenecks. On the positive side, several interviewees mentioned easy access to the highway/ interstate system as beneficial to their supply chain efficiency. Other interviewees mentioned specific traffic bottlenecks around the Las Vegas Speedway and Nellis Air Force Base.

3.2.4 Industry Issues

The logistics industry struggles with multiple issues, not all of which can be impacted by regulatory and infrastructure improvements. For example, there is a considerable imbalance between inbound and outbound freight in the region, as high as 4:1. This imbalance leads to higher shipping costs and lower response times by carriers. Other industry issues, however, may be improved upon through the Freight Plan Update, including infrastructure design standards leading to higher bridge clearance for oversize/overweight

(OS/OW) cargo, increased rail access, provision of truck and trailer parking with driver facilities, and improvements in workforce development to address the overall labor shortage as well as the skilled workforce required for the region's logistics businesses. Throughout the interview process, a theme emerged related to the lack of adequate warehousing space given the exponential growth of the industry. There was concern regarding land use and zoning regulations, particularly in preserving land use by disallowing encroachment of residential development in industrial areas. Relatedly, there is a repeated interest in the development of a logistics industrial park, particularly on the south side of the region.

While we often exclude transit from discussion on a freight plan update, the lack of transit options to industrial areas was also a pervasive theme in the interviews. With additional employees required for the new warehouses and distribution centers, the additional passenger vehicles required to transport these employees are clogging the roads, leading to congestion for freight movement, as well. Therefore, transit providing employee ingress and egress is seen as an essential part of the solution to efficient and effective freight flow in the area.

3.2.5 Strategies and Improvements

Interviewees were also asked for an ideal outcome or desired improvements to be included in the freight plan update, to promote the efficient operation of their business, if applicable. These comments were in addition to the previously stated industry issues and capacity constraints. While there was no consensus on this question, there were some compelling responses. An increase in regular rail access was mentioned often, as were transit solutions for moving employees to and from their work at warehouses and distribution centers, particularly. One interviewee also recommended updating RTC-SNV's traffic model to reflect the dramatic increase in the number of employees working in individual distribution centers, as that has increased beyond the current estimations used for traffic modeling.

4.0 Current System Performance Assessment

Southern Nevada is uniquely situated for freight movement and is home to key freight infrastructure and facilities. This is in part due to its proximity to two of the largest ports in the United States, the Port of Los Angeles and Port of Long Beach (which combined handled over 11 million TEUs of loaded cargo in 2020)[8]. This chapter outlines the existing freight system and the baseline conditions that inform the freight performance analysis.

4.1 Existing Freight System by Mode

The characteristics of Southern Nevada's freight system are described below by mode. The information presented here is derived from a number of data sources, including from the 2015 Southern Nevada Freight Plan and from the following NDOT reports:

- Nevada State Rail Plan (2021)
- Nevada Hazardous Commodity Flow Study (2019)
- Nevada State Freight Plan (2017)

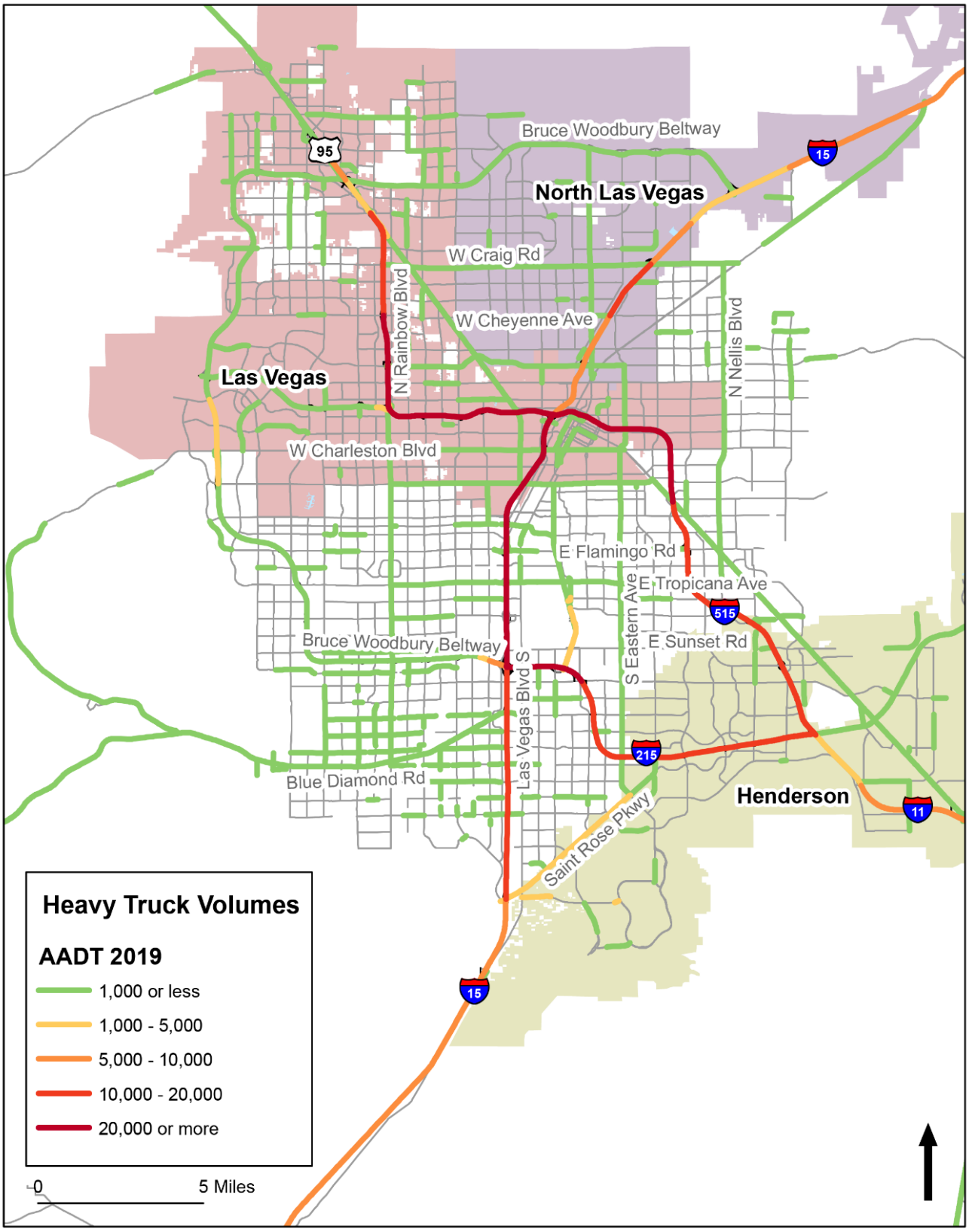
4.1.1 Trucking

The I-15 corridor is a major north-south highway connecting the Ports of Los Angeles and Long Beach with the mountain west through the Las Vegas Metro area. In 2007 the I-15 corridor was designated by USDOT one of six "Corridors of the Future" because of its regional significance to goods movement.

Figure 4.1 uses 2019 traffic count data from NDOT to show corridors of high truck volumes. Freight movement is concentrated on I-15, US-95, I-11, I-515, and I-215 with volumes reaching 20,000 or more. Other areas of slightly elevated truck volumes include Saint Rose Parkway and a western segment of Bruce Woodbury Beltway.

[8] Port of Long Beach Statistics Total Loaded TEUs (Import + Export) 5,474,277 in 2020 https://polb.com/business/port-statistics/#yearly-teus ; Port of Los Angeles Container Statistics, Total Loaded TEUs (Import + Export) 6,358,445 https://www.portoflosangeles.org/business/statistics/container-statistics/historical-teu-statistics-2020

Figure 4.1 Truck Volumes in Clark County



Source: NDOT 2019.

4.1.2 Rail Transportation

Rail freight originating and terminating in Nevada is predominantly bulk commodities such as coal, minerals, chemicals, glass, stone, and petroleum. In addition to the intermodal facilities and industrial parks, UPRR operates classification, maintenance, storage, and switching yards at select locations within the state.[9]

The UPRR Las Vegas Intermodal Facility in southern Nevada is one of two intermodal facilities in the state where trailer-on-flat-car or container-on-flat-car can be transferred between railcars and/or trucks. With the Arden Yard on the South Central Route serving the southern part of the state.

The Arden Yard has two receiving/departure tracks and five double-ended classification tracks. It handles the switching requirements for Las Vegas as well as BMI Branch traffic. The UPRR Arden Yard is used for drop-off and pick-up of traffic for southern Nevada, rail staging, switching, and as a crew change location for the Cima subdivision.[10]

The Nevada State Rail Plan includes exhibits of the rail network in Southern Nevada, and three inset maps of areas that are "well-positioned for new rail-served operations that have dense concentrations of businesses with two characteristics: 1) proximity to active tracks, and 2) elevated shipping activity in truckload or carload lots. These areas are particularly intriguing due to their potential for becoming centers of carload traffic growth with frequent and reliable switching service and localized solicitation effort." These areas are shown on the following figures:

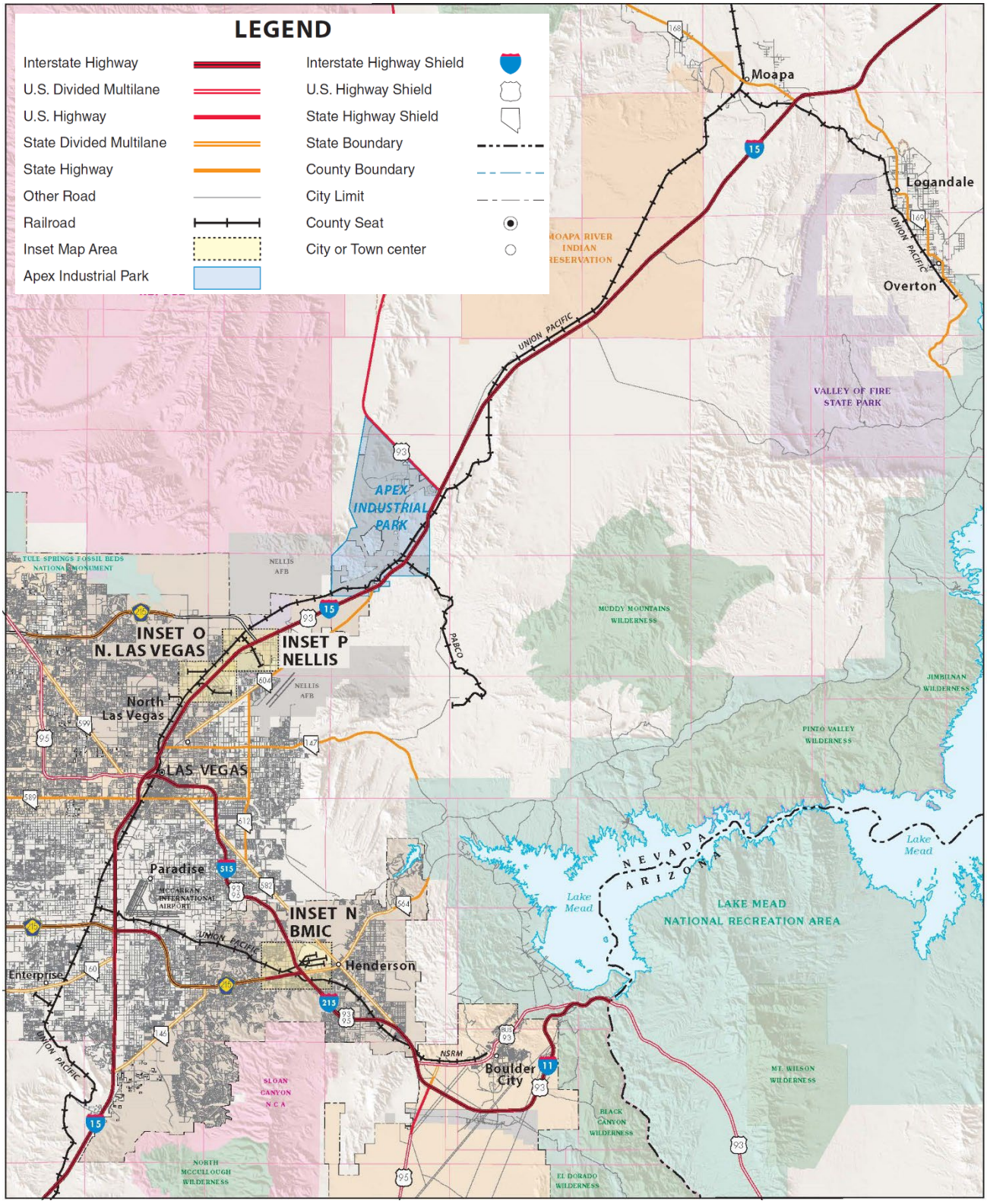
- Figure 4.2 Southern Nevada Rail Network
- Figure 4.3 Well-positioned Rail-served Area: Black Mountain Industrial Complex[11]
- Figure 4.4 Well-positioned Rail-served Area: North Las Vegas
- Figure 4.5 Well-positioned Rail-served Area: Nellis/Speedway

[9] 2021 Nevada State Rail Plan. https://www.dot.nv.gov/mobility/rail-planning/state-rail-plan/-fsiteid-1.

[10] 2021 Nevada State Rail Plan

[11] Note: The Rail Plan provides the following explanation of the three inset Figures: "The numbered and colored disks correspond to line items with details on each property that are catalogued in the NVSRP's statewide database presented in the Appendix as the Inventory of Nevada Industry: Businesses with sidetracks and nearby truckload shippers (black disks for businesses with active rail sidetracks, purple for those with inactive rail sidetracks, and red for those next to rail right-of-way that could build new sidetracks easily), and as Appendix Item Truckload Shipper Inventory (blue disks for truckload shippers farther away from rail right-of-way)."

Figure 4.2 Southern Nevada Rail Network



Source: Nevada State Rail Plan.

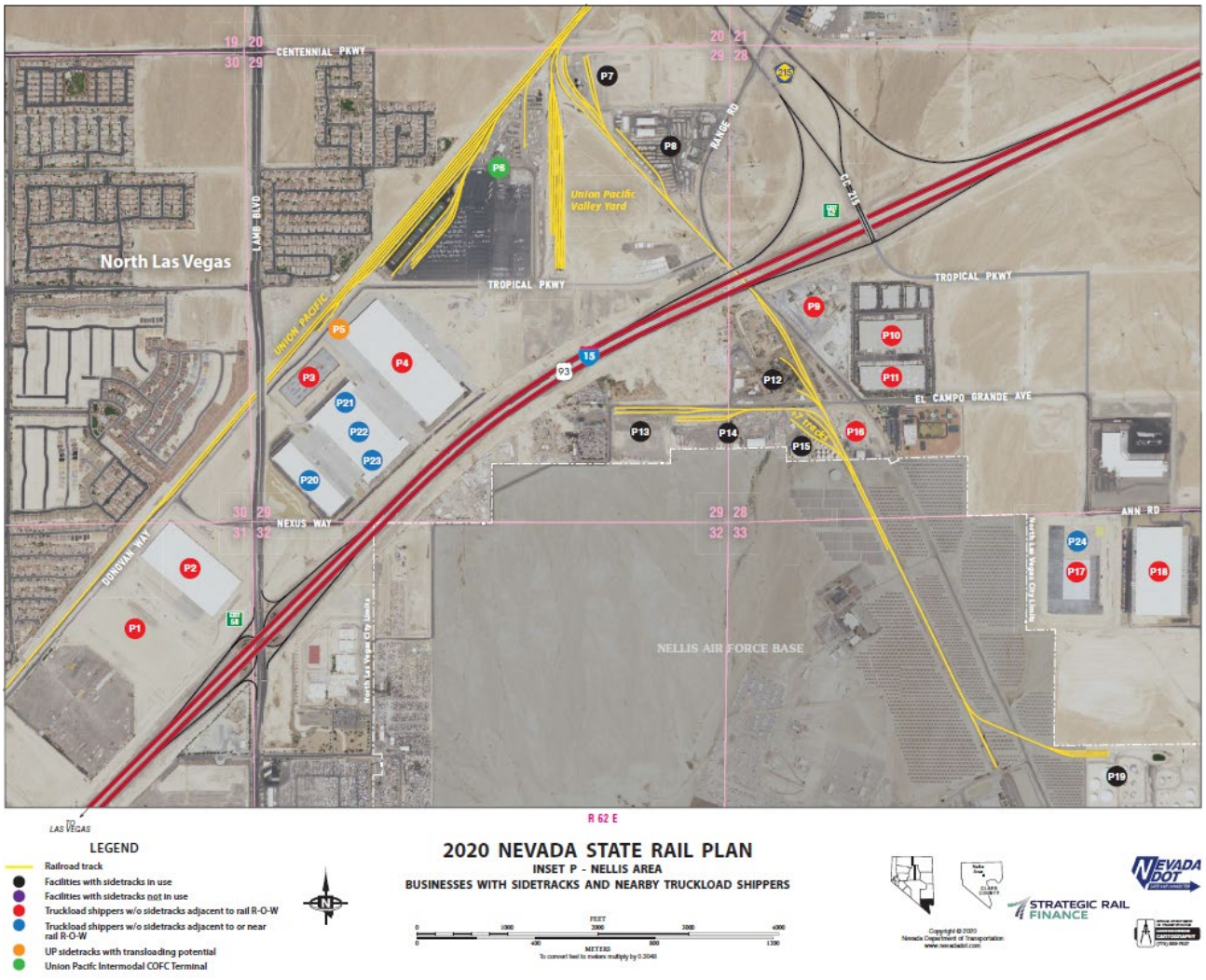
Figure 4.3 Well-positioned Rail-served Area: Black Mountain Industrial Complex

Source: Nevada State Rail Plan.

Figure 4.4 Well-positioned Rail-served Area: North Las Vegas

Source: Nevada State Rail Plan.

Figure 4.5 Well-positioned Rail-served Area: Nellis/Speedway



Source: Nevada State Rail Plan.

4.1.3 Aviation

Harry Reid International Airport (LAS) was the ninth busiest airport in the United States in 2019 with 24.7 million enplanements.[12]

The high level of passenger service at the airport, specifically international flights, enables LAS to offer a significant amount of available belly space for air cargo. This available cargo capacity allows LAS to potentially compete for air cargo in the greater Southwest region, especially given the cost competitiveness of Las Vegas in the warehouse and distribution space. This combined with access to various Southwest

[12] Federal Aviation Administration. 2020. Air Carrier Activity Information System.

destinations, including Utah and Southern California, via the I-15 corridor and nearby rail service (both located within 1 mile of the airport).[13]

The airport also continues to expand air cargo capabilities, with 210,000 square feet of cargo and shipping facilities, serving approximately 100,000 tons of cargo a year. The main intermodal air cargo facility is the Marnell Air Cargo Center which opened in 2010. Located on the east side of the airport, it provides direct access to loading facilities for both trucks and airplanes. Several hundred trucks pick up or deliver goods to the Air Cargo Center each day. This facility is a designated Foreign Trade Zone.

In 2019, the airport carried 120,207 tons (or 264.2 million pounds) of cargo, which was a slight increase (1.3%) over the previous year. As

Table 4.1 shows, 2020 saw a sharp decrease in cargo by weight, with a 9% drop between 2019 and 2020 after previous years of growth. This dip in cargo is much less severe than the decrease in passenger travel which fell 57% during the same time period.

Table 4.1 Harry Reid International Airport Annual Cargo Movement

Year	Cargo Pounds	Cargo Tons	Change
2017	244,877,867 lbs	122,438 tons	+9.8%
2018	260,747,795 lbs	130,373 tons	+6.5%
2019	264,259,792 lbs	132,129 tons	+1.3%
2020	240,415,561 lbs	120,207 tons	-9.0%

Source: Clark County Department of Aviation Statistics.

4.1.4 Pipelines

Pipelines constitute another form of transportation of goods and can carry commodities such as natural gas, petroleum, or bio-fuels. They are a low-cost modal option if the material can be transported in this manner. The major natural gas pipeline through the Las Vegas metropolitan area is located along I-15 and is known as the Kern River Transmission Company system, beginning in southwest Wyoming and running southwest through Utah, Southern Nevada, and Southern California. This system has a capacity of 1.8 billion cubic feet per day and delivers more than 90 percent of its product to Southern Nevada and Southern California.

Nevada relies on neighboring states for its petroleum supply and it is the main commodity transported via pipeline to Southern Nevada. Southern California and Utah refineries supply Southern Nevada via the CALNEV Kinder Morgan Pipeline (Long Beach to Las Vegas) and the Holly Energy UNEV Pipeline: (Utah to Las Vegas). In 2019, 5.3 million tons, valued at $2.4 billion delivered to the holding tanks in the northwest corner of the Las Vegas metropolitan area and at Apex Industrial Park. Tanker trucks are distributed from these locations to fueling stations throughout the Las Vegas metropolitan area and to several mines in Northern Nevada, via US 95 and US 93. Tanker trucks are on the road 24 hours a day because night shifts provide more productive local fueling station deliveries largely due to reduced roadway congestion.

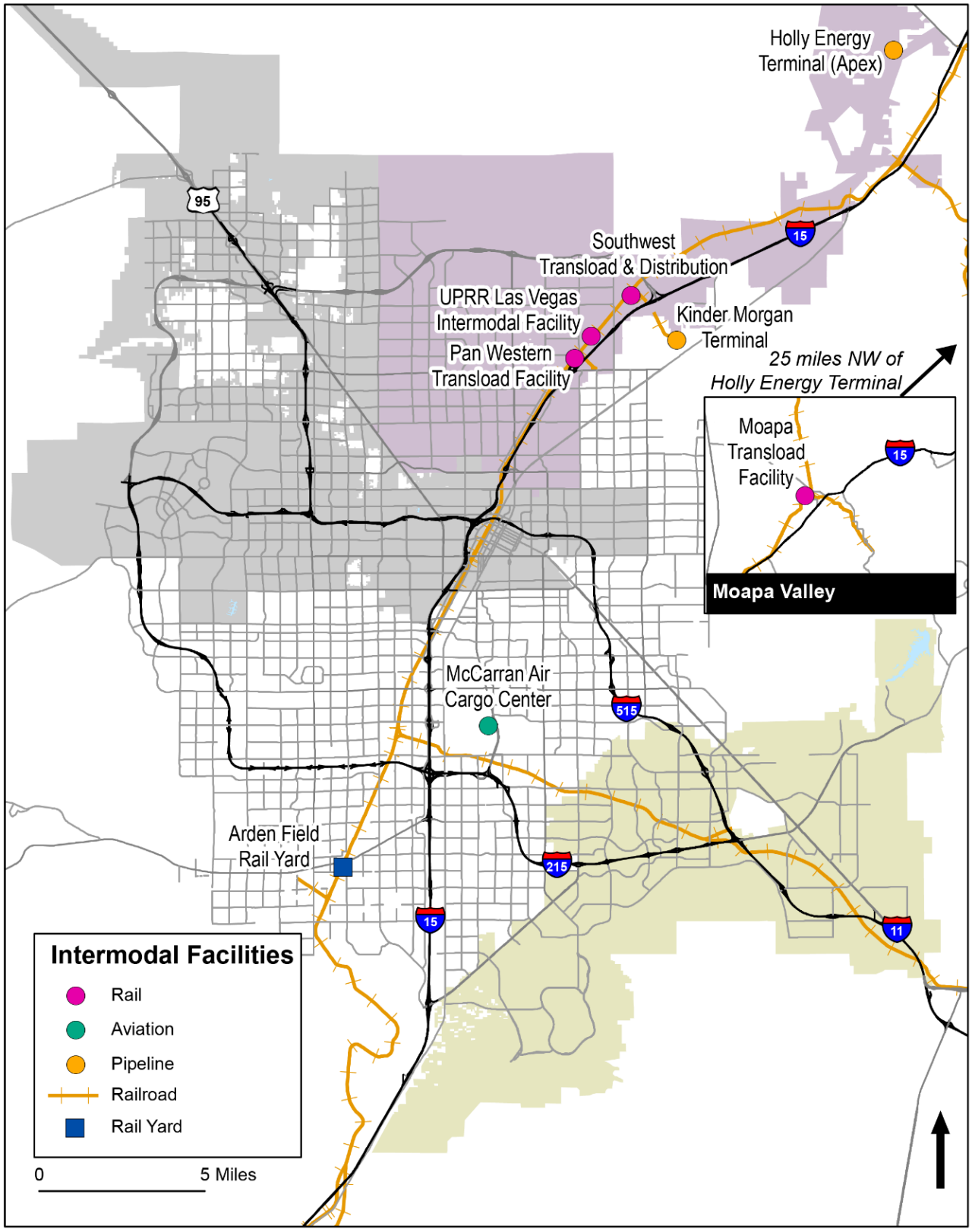
[13] 2017 Nevada State Freight Plan

Nevada does not export or ship anything within the state using pipelines. For more information on the pipeline system see the 2019 Nevada Hazardous Commodity Flow Study.

4.1.5 Intermodal Facilities

A vital part of the freight network is the interface between different modes. Transferring goods between trains, trucks, planes, and pipes takes place at intermodal facilities shown in **Figure 4.6**. These include rail, aviation, and pipeline facilities. Rail facilities are concentrated in the northeast and include the Moapa Transload facility (located about 25 miles northwest of the main study are), Southwest Transload & Distribution, UPRR Las Vegas Intermodal Facility, and the Pan Western Transload Facility. The Marnell Air Cargo Center serves as the area's aviation freight hub. In total, the Las Vegas region includes approximately 140 acres of intermodal facilities. The Arden Field Rail Yard is also shown for context on **Figure 4.6** but is not an intermodal facility. A description of each intermodal facility follows **Figure 4.6**.

Figure 4.6 Intermodal Facilities



UPRR Las Vegas Intermodal Facility (Valley Yard and Southwest Transload & Distribution)

The Las Vegas Intermodal Facility is located at 4740 Tropical Parkway in North Las Vegas near US 15 and the Bruce Woodbury Beltway. UPRR owns the yard, which includes an intermodal (Container on Flat Car only) and auto carload facility operated by Southwest Transload & Distribution. The Las Vegas facility contains four tracks, two for auto unloading/loading and two for intermodal. Each track accommodates about 16 cars. Storage capacity is sufficient for about 80 trailers and containers. Traffic includes paper products, autos, and building materials.

In 2021 NDOT reported that UPRR traffic at the Las Vegas Intermodal facility has declined due to UPRR's shifting of traffic from its South Central Route through southern Nevada to its Sunset Route through Arizona. UPRR has made major improvements in the former SPTC Sunset Route (Los Angeles to New Orleans) following the UPRR/SPTC merger to accommodate more traffic because of the Sunset Route's more favorable grades and alignment.[14]

Moapa Transload Facility

The Moapa Transload Facility, shown in **Figure 4.7**, includes two rail sidings and two conveyor belts to transfer dry bulk freight.

Figure 4.7 Moapa Transload Facility

Source: Google Street View. Image Capture June 2011.

Pan Western Transload Facility

Transloading services are provided for box, flat, center beam, gondola, hopper, and liquid railcars. Onsite services include: forklifts, straddle cranes, conveyors, pumps and compressors. Typically handles

[14] 2021 Nevada State Rail Plan

aggregates, fuels, liquids, dimensional and over-dimensional freight, as well as hazardous materials. It has 24,000 feet of rail capacity that can accommodate up to 250 railcars at the 24.8-acre facility.

Marnell Air Cargo Center

The Marnell Air Cargo Center is a freight and distribution facility and designated foreign trade zone that includes two buildings totaling 200,000 square feet on 19.2 acres. It typically accommodates airline and mail cargo. See above section on Aviation for more details.

CALNEV Pipeline and Kinder Morgan Terminal

The CALNEV pipeline transports gasoline, jet fuel, and diesel fuel from Colton Terminal in Southern California to Kinder Morgan's Las Vegas Terminal, adjacent to Nellis Air Force Base in Southern Nevada. Kinder Morgan's Las Vegas Terminal is located on 66 acres, where 41 refined petroleum tanks have a combined storage capacity of 1.18 million barrels. Gasoline and ethanol are blended before being transported by truck to Nevada retail gas stations. Diesel fuel is transported by truck to retail gas stations and to fuel mine operations. Jet fuel is stored at the Nellis Air Force base and Harry Reid International Airport and transported by truck to other regional airports.

The gasoline is blended with ethanol at the "rack" or loading facility before distribution to retail facilities. Ethanol is transported to the terminal via UPRR. The CALNEV pipeline is 566 miles long, operated by Kinder Morgan, and consists of 14 inch and 8-inch parallel pipes.[15]

UNEV Pipeline and Holy Energy Terminal (Apex)

The UNEV pipeline transports petroleum products into Las Vegas from Woods Cross, Utah to Holly Energy's Terminal at Apex Industrial Park in Southern Nevada. The Holly Energy Terminal is located on 53 acres, where 12 refined petroleum tanks have a combined storage capacity of 330,000 barrels. Gasoline and ethanol are blended before being transported by truck to Nevada retail gas stations. Diesel fuel is transported by truck to retail gas stations and to mines fuel operations.

The gasoline stored at the Holly Energy Terminal is blended with butane on site, then blended with ethanol at the "rack" or a loading facility before distribution to retail facilities. Butane and Ethanol are both transported to Apex Industrial Park by truck and stored in tanks onsite.

The UNEV pipeline is 427 miles long and operated by Holly Energy and consists of a 12-inch pipe. The UNEV pipeline is responsible for delivering a minority of Southern Nevada's petroleum supply to the Holly Energy Terminal for distribution to the market, but does provide redundancy to the market which is a vital resource to the state.[16]

4.2 Freight System Performance Analysis

The following section provides an overview of the current freight system in Southern Nevada. This section is organized by plan goal area and shows a baseline of existing conditions performance.

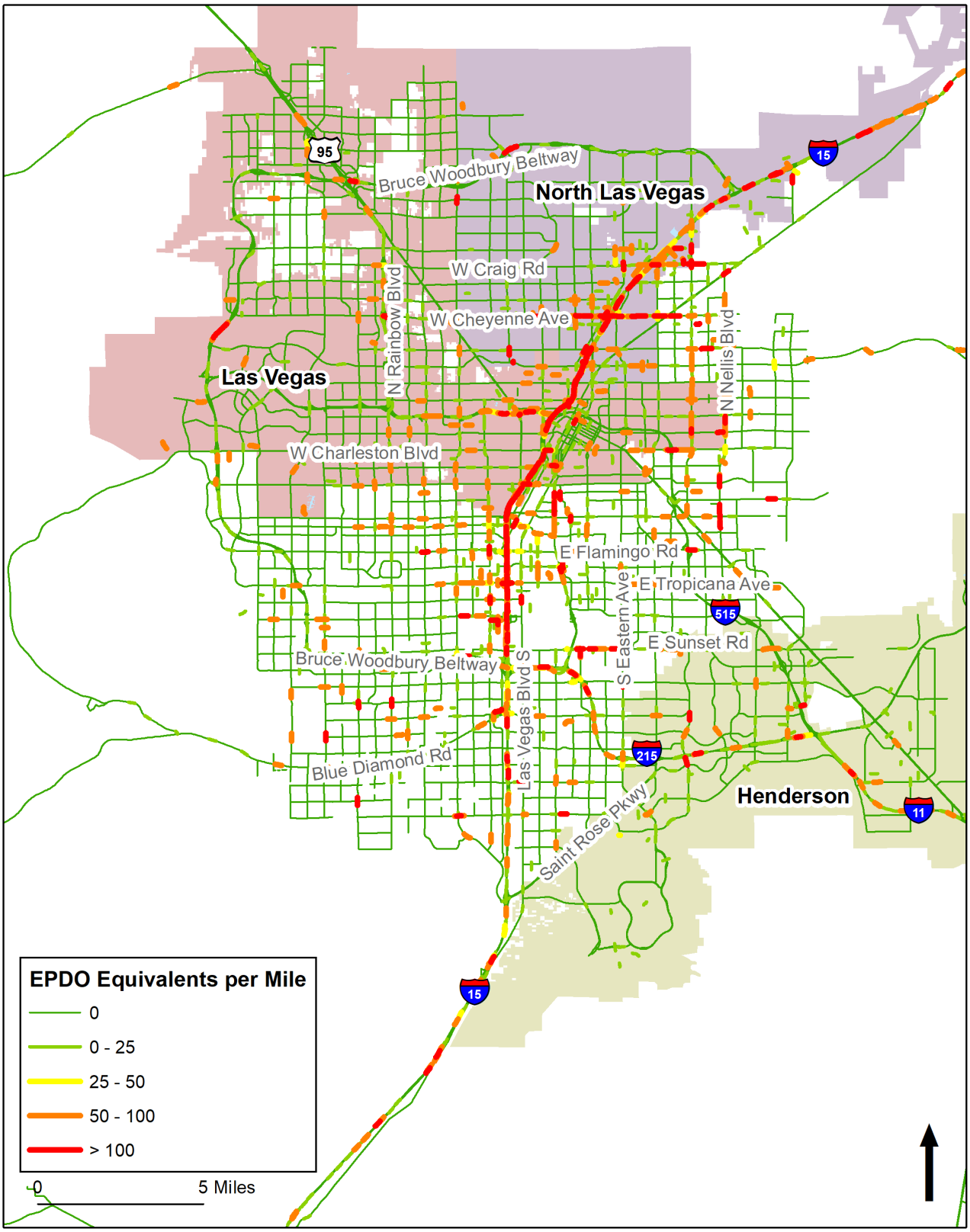
[15] Cambridge Systematics. 2019. Nevada Hazardous Commodity Flow Study

[16] Cambridge Systematics. 2019. Nevada Hazardous Commodity Flow Study

4.2.1 Enhance Safety

The Enhance Safety goal is focused on reducing truck involved crashes in Southern Nevada. **Figure 4.8** shows truck involved crashes, from data provided by NDOT for the five-year period from 2014 to 2018, using the equivalent property damage only (EPDO) method documented in the Highway Safety Manual. This uses weighting factors related to the societal costs of fatal, injury, and property damage-only crashes that are assigned to crashes by severity. In many cases, the truck driver is not at fault. Crashes are shown per mile, with areas in red depicting 100 or more crashes. There are crashes concentrated on the I-15 corridor and Cheyenne Avenue, but also occur throughout the road network.

Figure 4.8 Truck involved crashes in Clark County

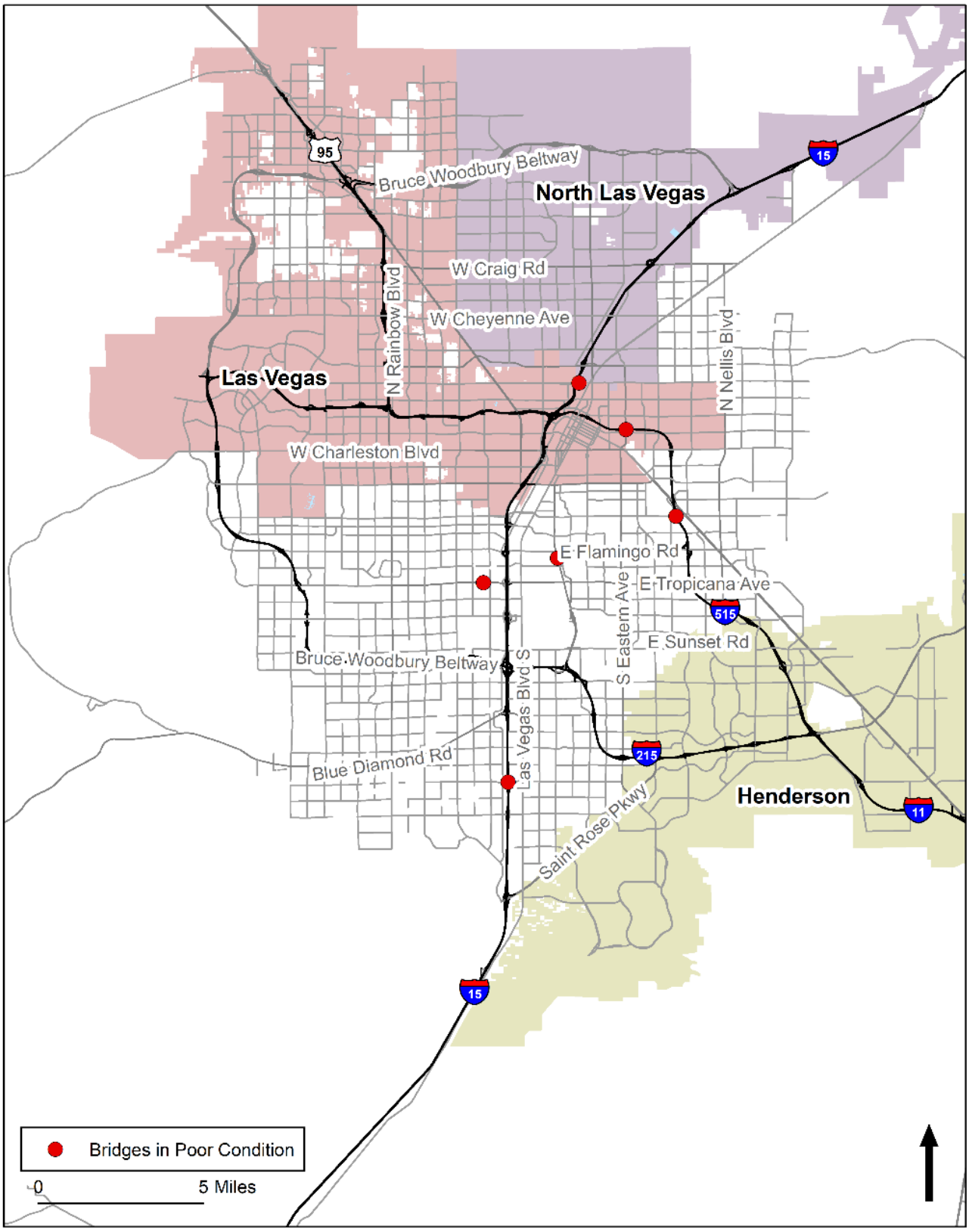


Source: NDOT 2014 – 2018 Crash Data.

4.2.2 Preserve Infrastructure

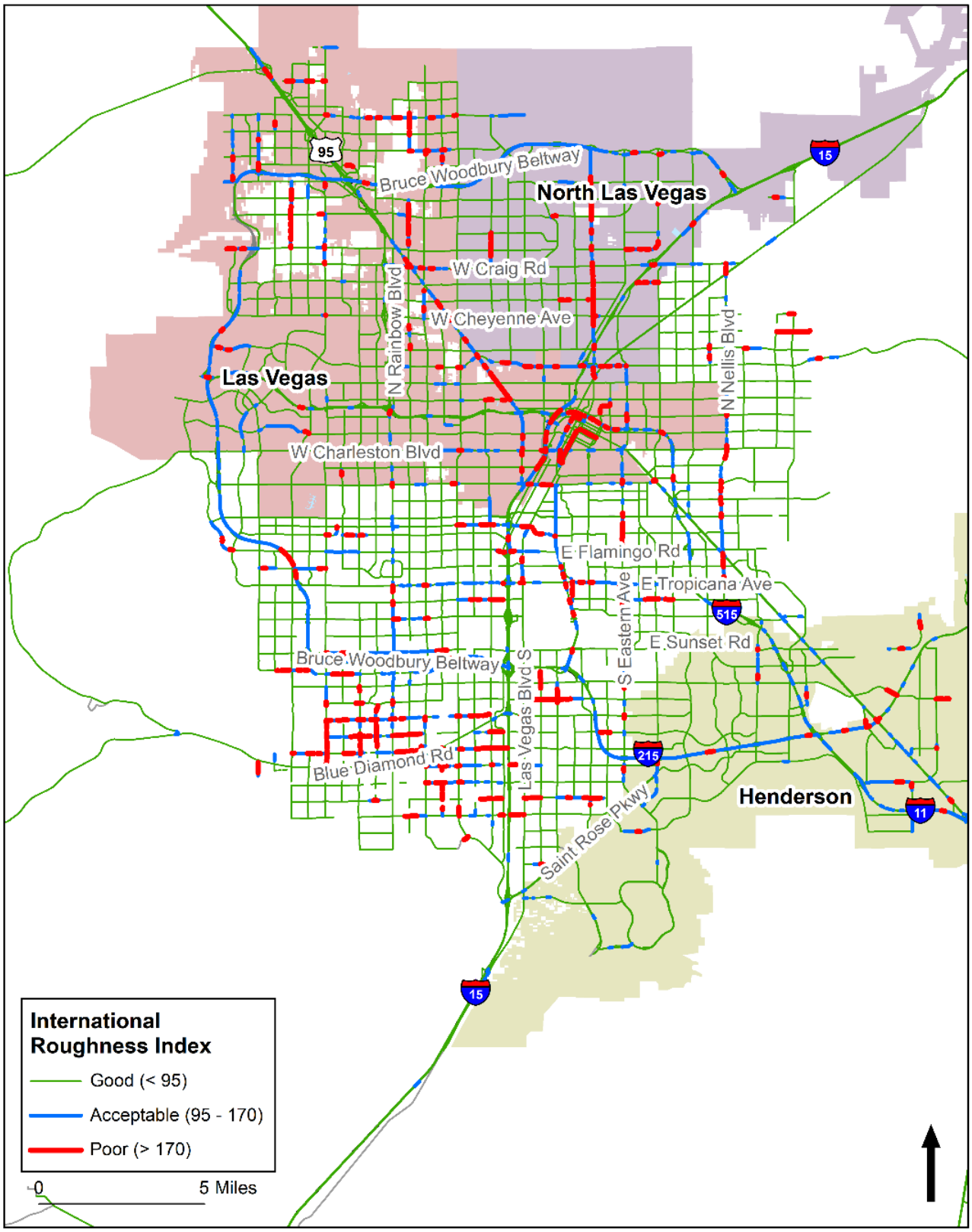
The preserve infrastructure goal seeks to improve bridge and pavement condition on freight corridors. There are six bridges within the study area (shown in **Figure 4.9**) that are considered in poor condition. **Figure 4.10** shows the International Roughness Index (IRI) in the study area. The IRI records pavement surface deviations (like pot holes) that impact vehicle suspension and cause a rougher ride. A score greater than 170 indicates poor pavement condition and is shown in red. Rough pavement is concentrated in the downtown core of Las Vegas, and in the southwest sector of the County. The figure reports on the most recent Highway Performance Monitoring System (HPMS) data from 2018, and do not account for resurfacing projects completed in the past four years.

Figure 4.9 Bridges in Poor Condition



Source: 2020 National Bridge Inventory.

Figure 4.10 Pavement Condition in Clark County



Source: 2018 HPMS.

4.2.3 Optimize Mobility and Foster Sustainability

Within Clark County

The Optimize Mobility goal seeks to improve truck travel time reliability on freight corridors while the Foster Sustainability goal aims to move goods sustainably. Since congestion leads to less travel time reliability and more pollution, the planning time index (PTI) is used to track both goals. FHWA defines PTI as:

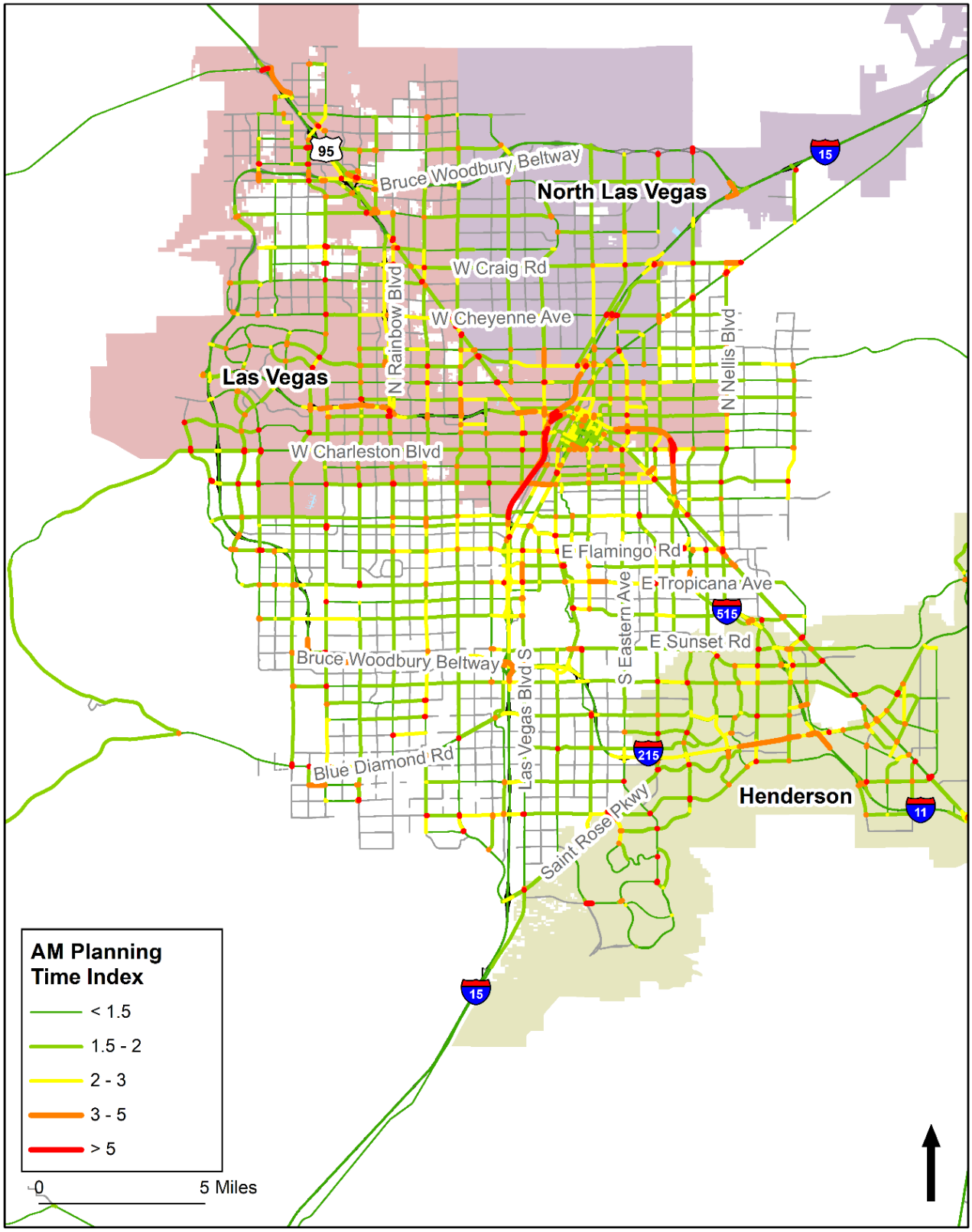
"The planning time index represents the total travel time that should be planned when an adequate buffer time is included. The planning time index…includes typical delay as well as unexpected delay. Thus, the planning time index compares near-worst case travel time to a travel time in light or free-flow traffic. For example, a planning time index of 1.60 means that, for a 15-minute trip in light traffic, the total time that should be planned for the trip is 24 minutes (15 minutes × 1.60 = 24 minutes)."[17]

The field-observed travel time and speed data are provided by INRIX, and are collected anonymously from a fleet of probe vehicles (cars and trucks) equipped with mobile devices. The data are assigned to Traffic Message Channel (TMC) directional roadway segments that are about half a mile to a mile long in urban and suburban areas.

PTI was calculated to show the amount of vehicle delay in the study area during morning (**Figure 4.11**) and evening (**Figure 4.12**) peak times. I-15 through the Resort Corridor has the highest areas of delay during both the AM and PM peaks, shown in red. Intersections throughout the study area also show higher PTIs. More recent INRIX data are available, however vehicle volumes were significantly down in 2020 due to COVID restrictions, so it is believed that 2019 data are more representative of current conditions.

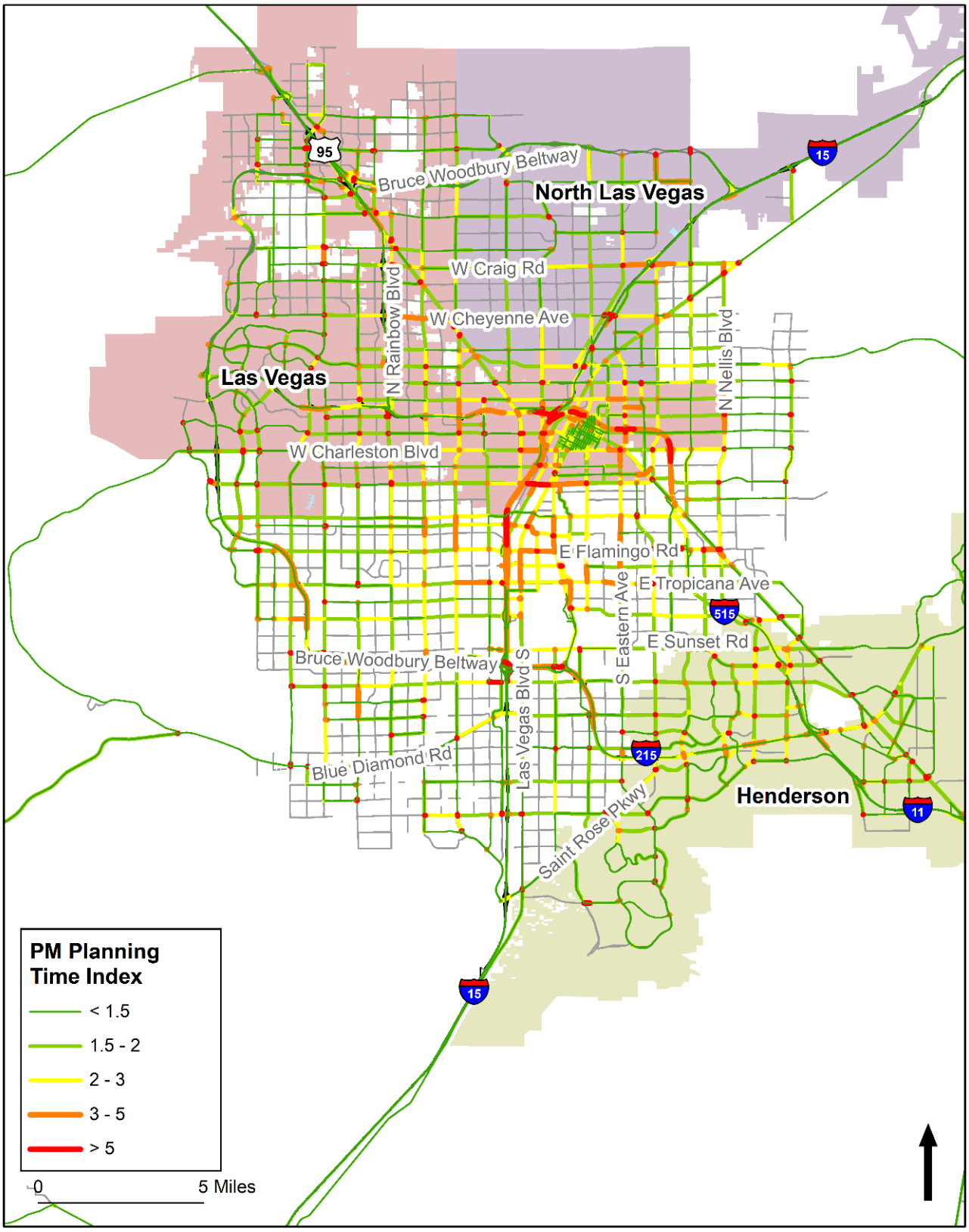
[17] FHWA. Travel Time Reliability: Making It There On Time, All The Time. Accessed at: https://ops.fhwa.dot.gov/publications/tt_reliability/TTR_Report.htm.

Figure 4.11 Truck Planning Time Delay AM



Source: INRIX 2019.

Figure 4.12 Truck Planning Time Index PM



Source: INRIX 2019.

Outside Clark County

Because I-15 is the primary freight corridor connecting Southern Nevada to its major trading partners, in particular Southern California, travel time and speeds on I-15 are key measures of interregional system performance. Data are collected and analyzed for 2021 from the National Performance Management Research Data Set (NPMRDS), a dataset identical to INRIX but available to the RTC for the entire National Highway System (NHS). Two measures are used:

- **Average Peak Hour Speeds (see Figure 4.13)**: For each highway segment along I-15 a "peak hour" was defined as the hour of the day with the lowest average speed, averaged over the entire year. So, for example, an urban segment could have its lowest average speed of 30 mph at 7:00 am on weekdays, while a rural segment could have its lowest average speed of 36 mph at 2:00 pm every Sunday. Both segments would be marked as having average peak hour speeds below 40 mph. This metric indicates locations of consistent chokepoints along I-15.

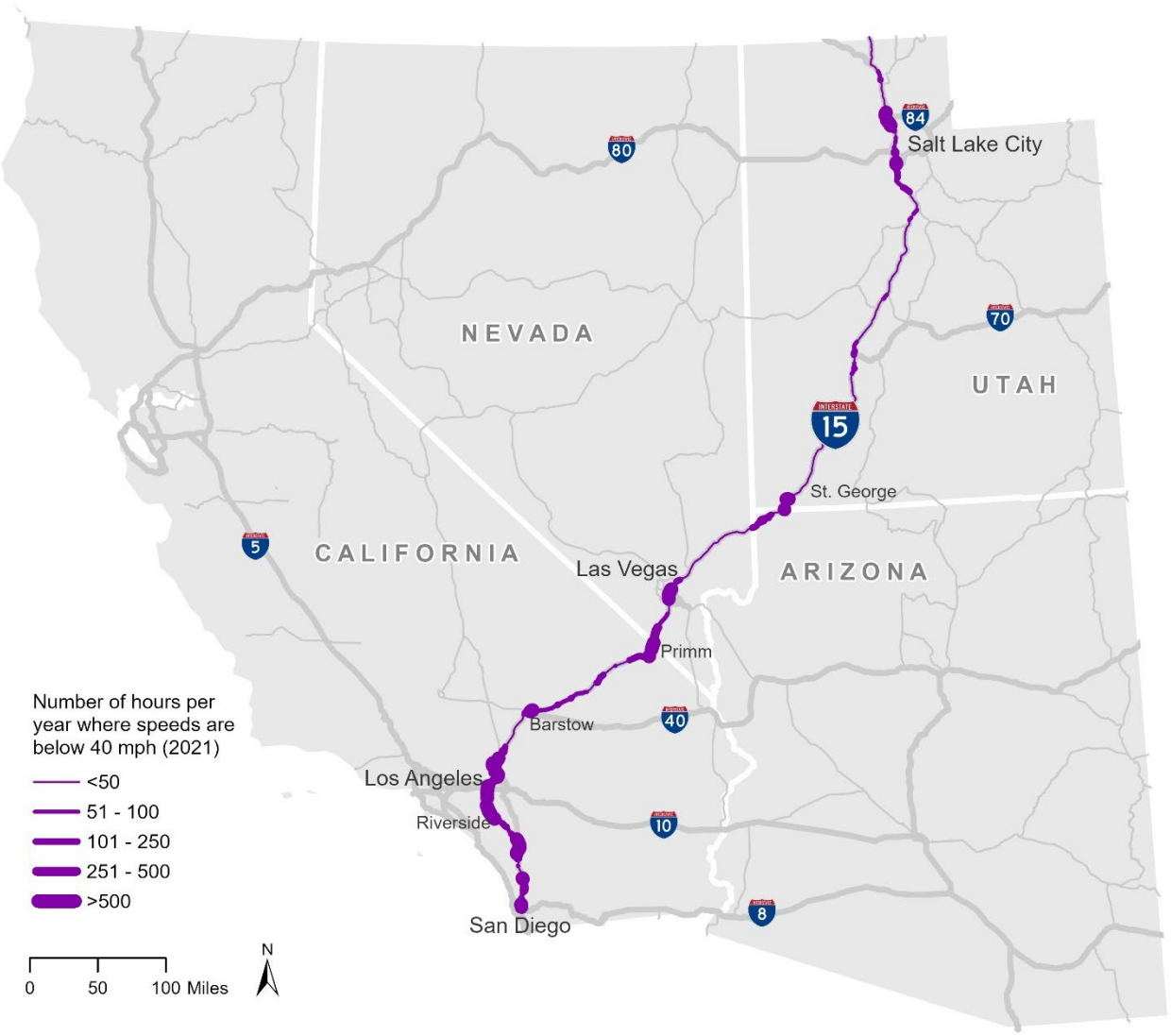
- **Total Number of Hours where Speeds are Below 40 mph (see Figure 4.14)**: For each highway segment along I-15 the number of hours where the average speed was below 40 mph were counted to show the severity of the chokepoint. For instance, two segments could have average peak hour speeds under 40 mph, but one segment could experience those speeds for 1,000 hours out of the year, and the other for only 250 hours. Congestion would be considered more severe on the first of the two example segments. The highest possible value a road segment could have is 8,760 hours (24 hours/day x 365 days).

Congestion in the urban areas is expected, however, congestion on rural portions of I-15 between Southern Nevada and Southern California is also prominent and impacts interregional goods movements. Much of this congestion occurs on southbound I-15 on Sundays, or Mondays after a three-day weekend, as tourists (critical to Southern Nevada's economy) return home. Southbound I-15 reduces from three lanes in Nevada to two lanes in California, creating a significant bottleneck at Primm, Nevada on the border of the two states.

Figure 4.13 I-15 Interregional Location of Chokepoints: Average Peak Hour Speeds

Source: NPMRDS 2021.

Figure 4.14 I-15 Interregional Severity of Chokepoints: Total Number of Hours where Speeds are Below 40 mph

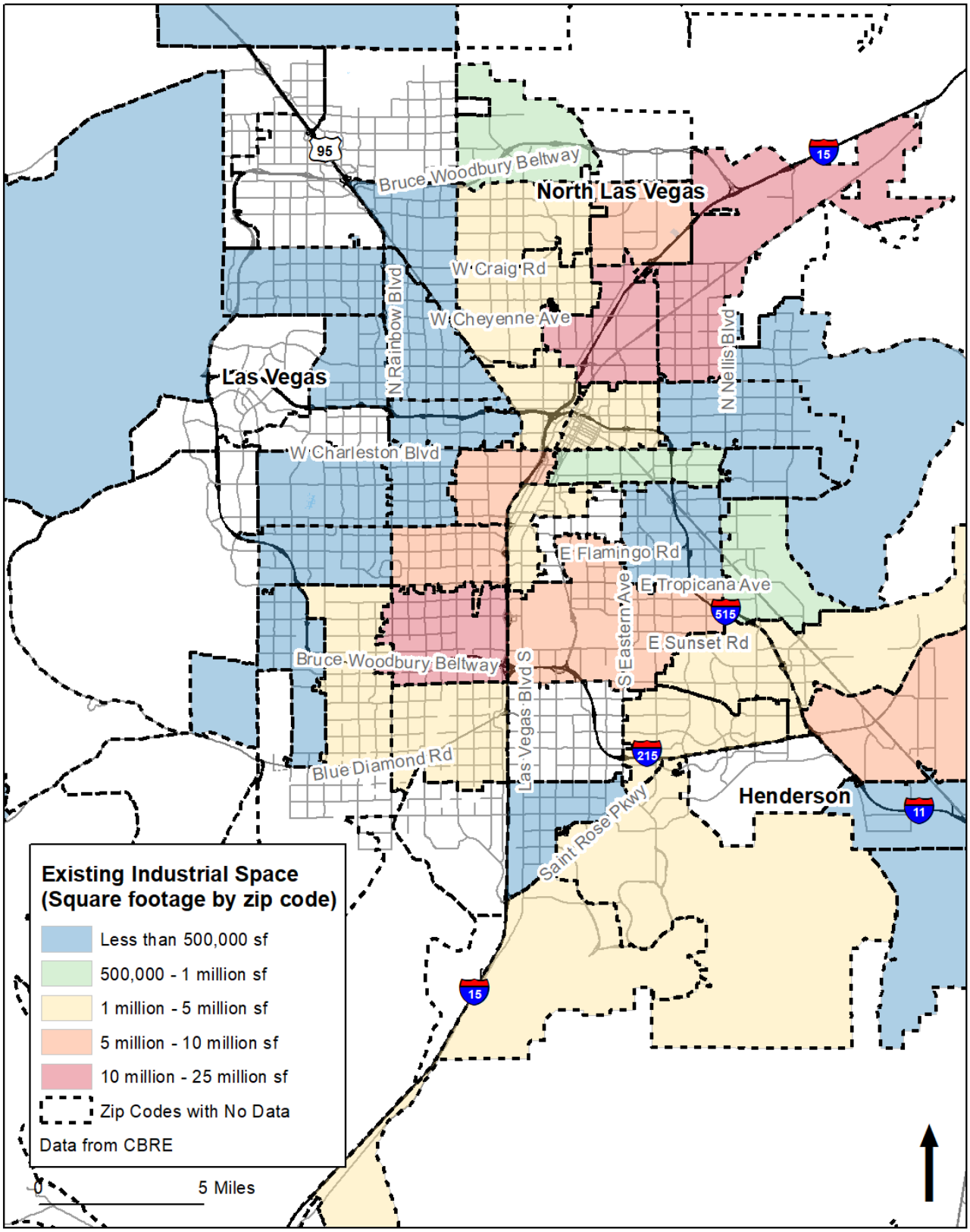


Source: NPMRDS 2021.

4.2.4 Transform Economies

The Transform Economies goal focuses on developing a freight system that supports economic development and diversification. This study uses industrial warehouse space as a proxy for areas with significant freight activity. Existing industrial warehouse space is shown in **Figure 4.15** with red showing the highest concentrations of warehouse space (10 – 25 million square feet), and blue showing the zip codes with less than 500,000 square feet of space. There are higher concentrations of warehouse space near intermodal facilities in North Las Vegas and around the Bruce Woodbury beltway.

Figure 4.15 Industrial Warehouse Space



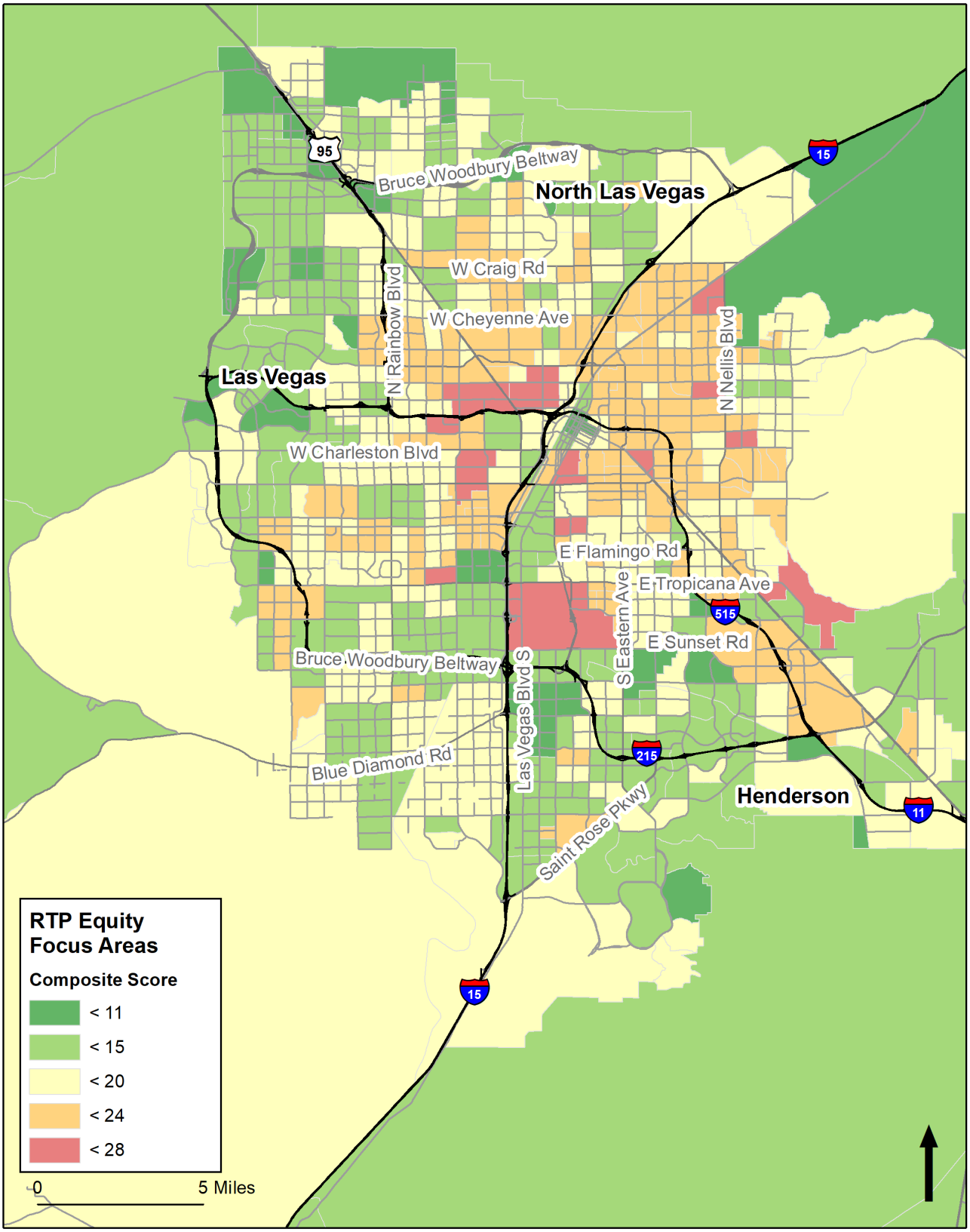
Source: CBRE. 2020.

4.2.5 Connect Communities

The purpose of the Connect Communities goal is to provide economic opportunities while reducing impacts to equity focused communities. Increasingly Federal funding is being directed to projects that benefit disadvantaged communities that have historically not benefited from, or were even harmed by transportation projects. For instance, the Justice40 Initiative seeks to deliver at least 40 percent of the overall benefits from Federal investments in climate and clean energy to disadvantaged communities.

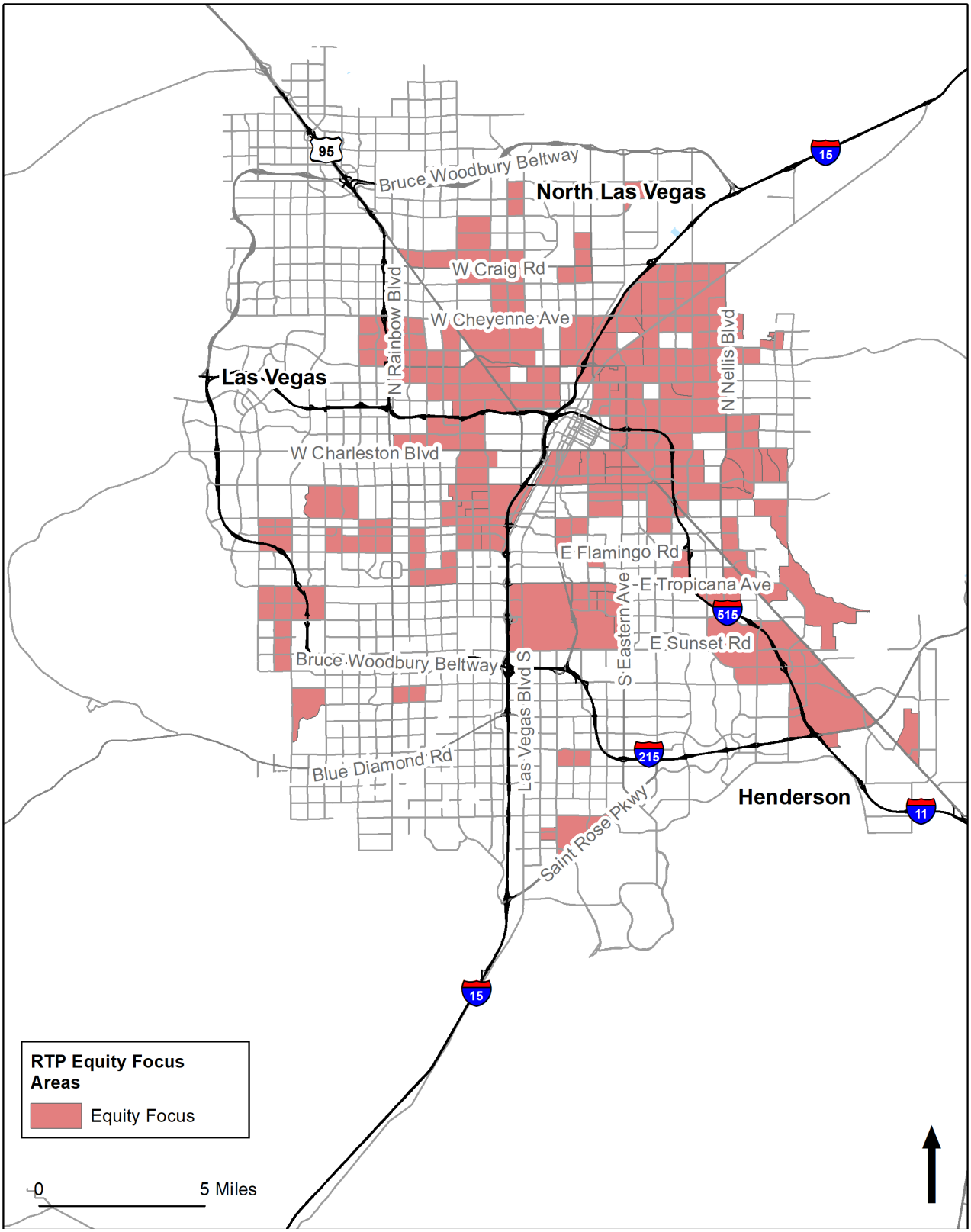
The equity analysis for this study follows the methodology described in the RTC's recent ACC*ESS 2050: Regional Transportation Plan*, which identifies equity focus areas by assigning a composite score to census tracts based on the tract's calculated percentile for key demographic characteristics. These include percentage of the tract population with Limited English Proficiency, population under 18 years of age, population over 64 years of age, people with disability status, low-income households, minority households, and no-vehicle households. Percentile scores are calculated for each census tract's rank within the RTC planning region, and composite scores are calculated by taking the sum of the tract's score for each demographic indicator. **Figure 4.16** shows these equity focused areas which cluster in the North and Western parts of the region. **Figure 4.17** shows just the areas with a composite score above 24.

Figure 4.16 Equity Focus Areas



Source: ACCESS 2050: Regional Transportation Plan.

Figure 4.17 Equity Focus Areas that Scored Above 24



Source: ACCESS 2050: Regional Transportation Plan.

4.3 Major Freight Activity Clusters

The Southern Nevada Freight Districts (see **Figure 2.2**) with the greatest truck volumes, concentrations of shippers & receivers, and freight employment are shown in the figures **Figure 4.18** through **Figure 4.23**, noted below. Included with each profile are the freight performance indicators.

- Figure 4.18 Freight District Profile: District 15 (Speedway)
- Figure 4.19 Freight District Profile: District 16 (I-15 North)
- Figure 4.20 Freight District Profile: District 1 (Resort Corridor)
- Figure 4.21 Freight District Profile: District 22 (Valley View)
- Figure 4.22 Freight District Profile: District 25 (SW Beltway/Blue Diamond)
- Figure 4.23 Freight District Profile: District 21 (West Henderson)

Figure 4.18 Freight District Profile: District 15 (Speedway)

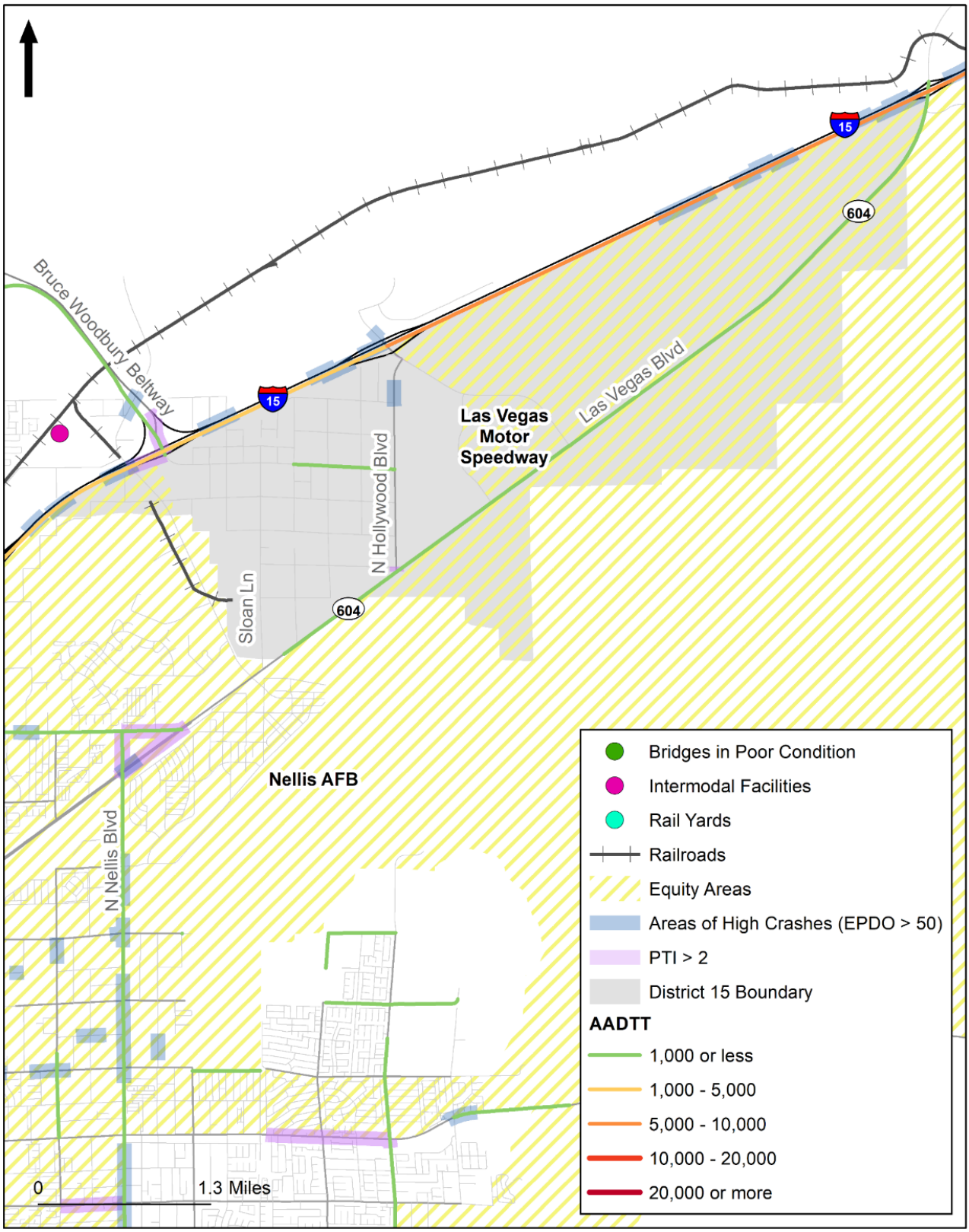


Figure 4.19 Freight District Profile: District 16 (I-15 North)

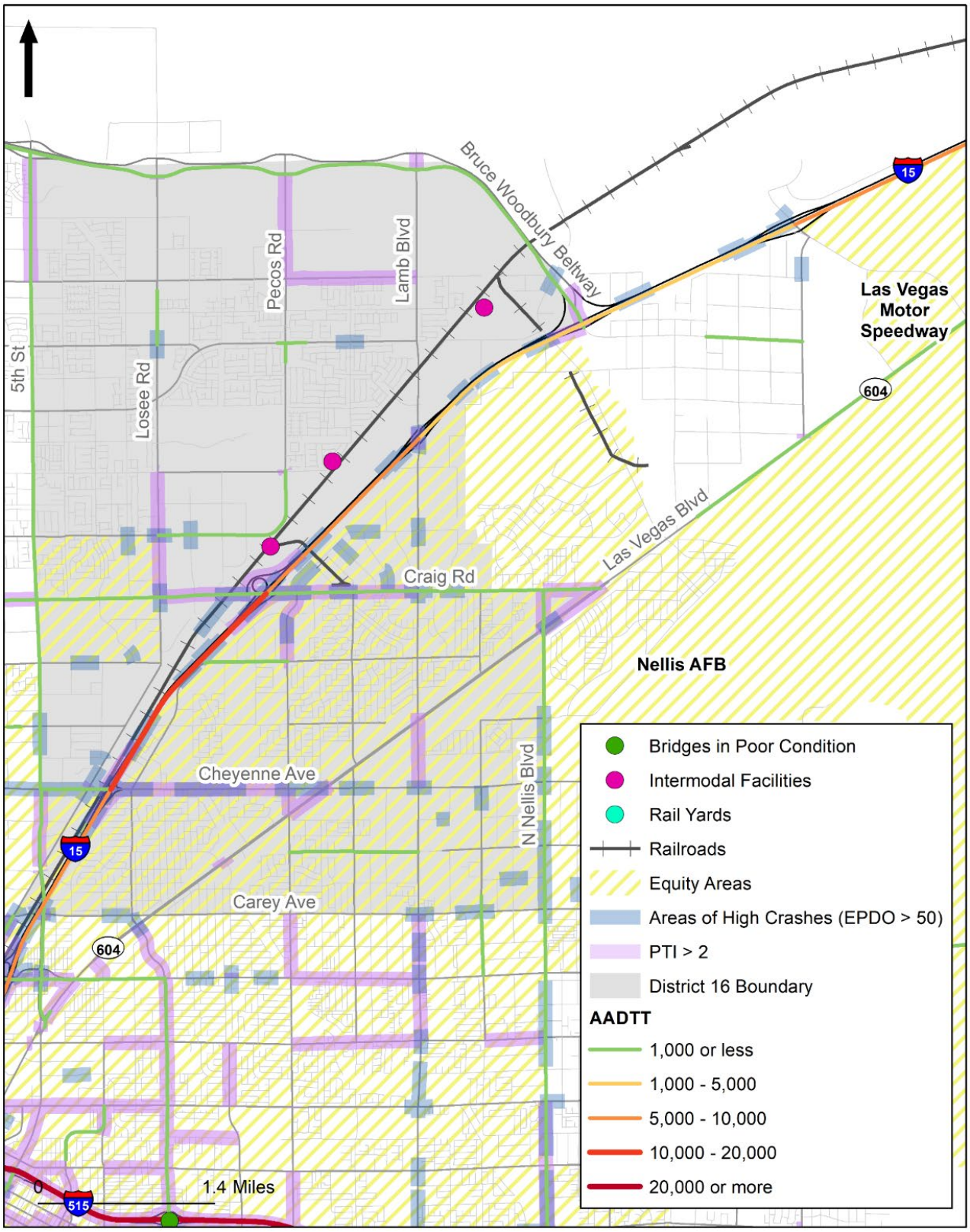


Figure 4.20 Freight District Profile: District 1 (Resort Corridor)

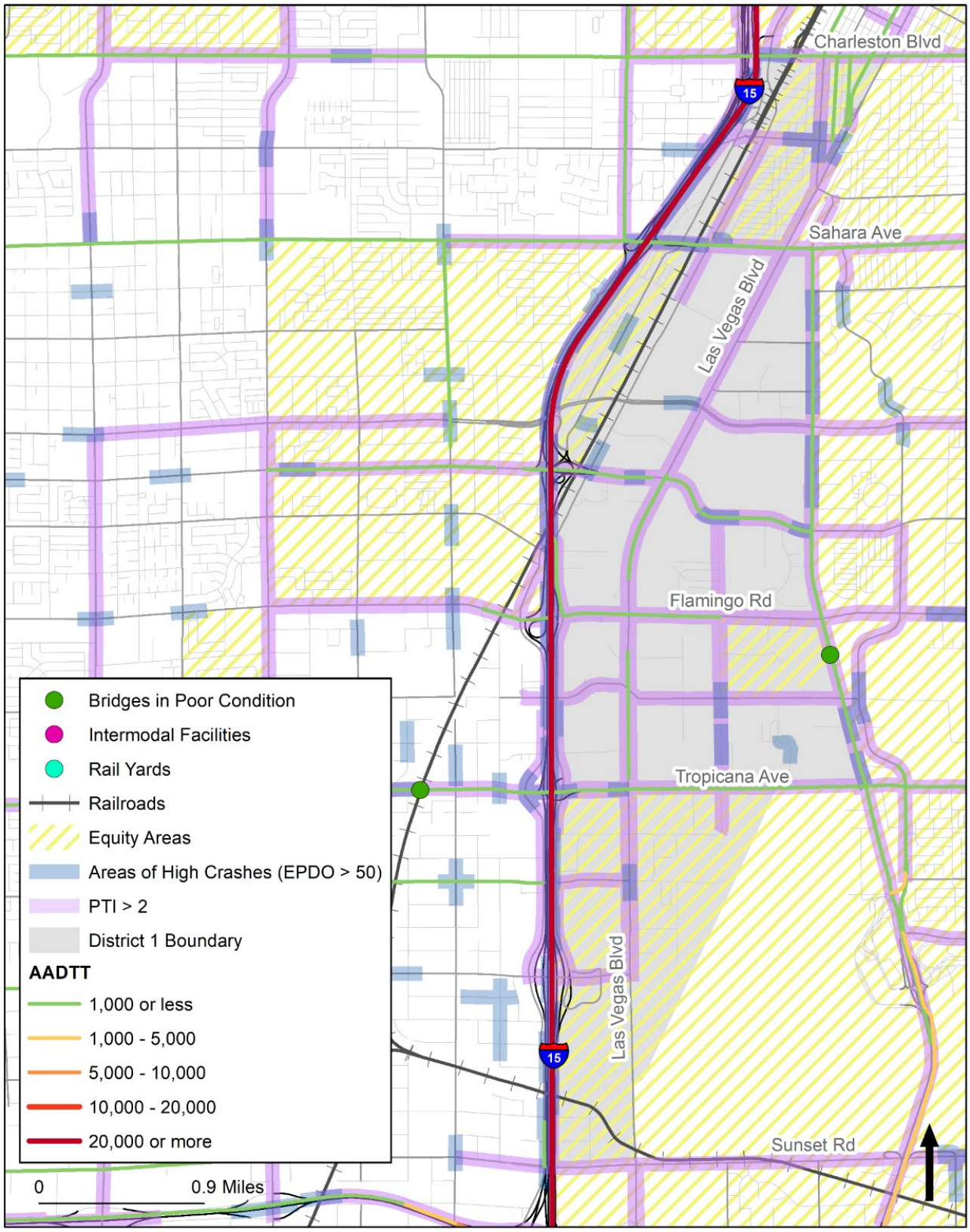


Figure 4.21 Freight District Profile: District 22 (Valley View)

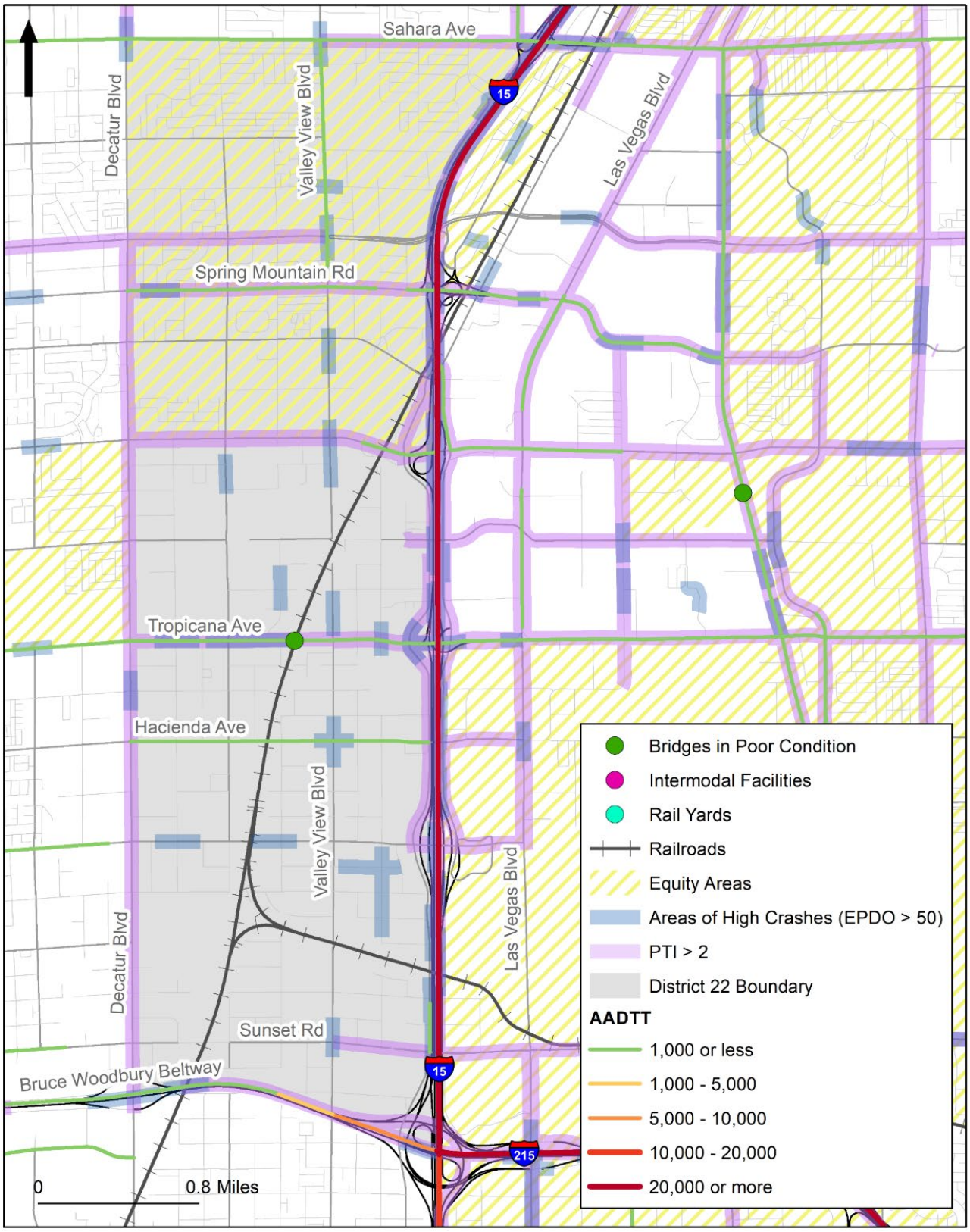


Figure 4.22 Freight District Profile: District 25 (SW Beltway/Blue Diamond)

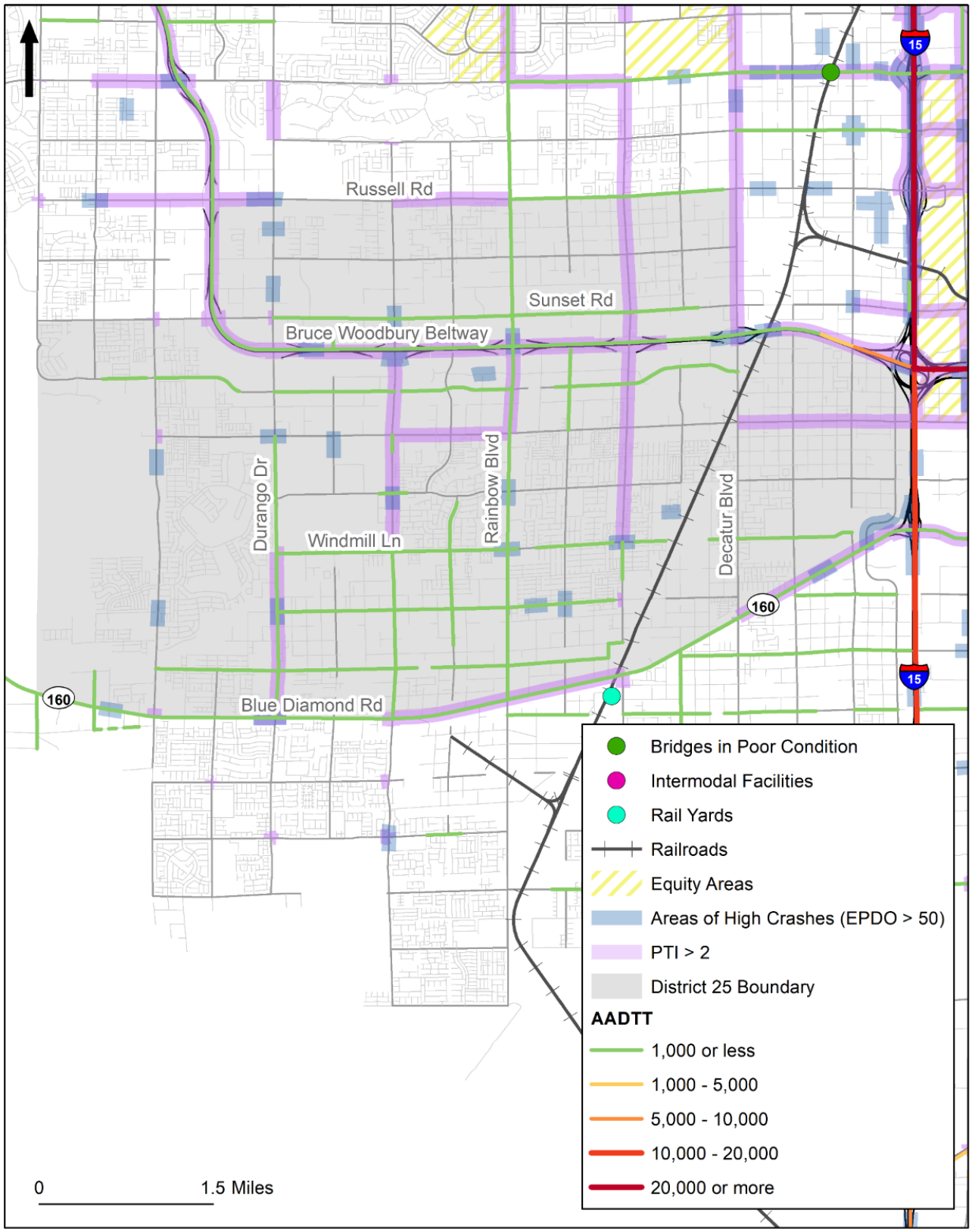
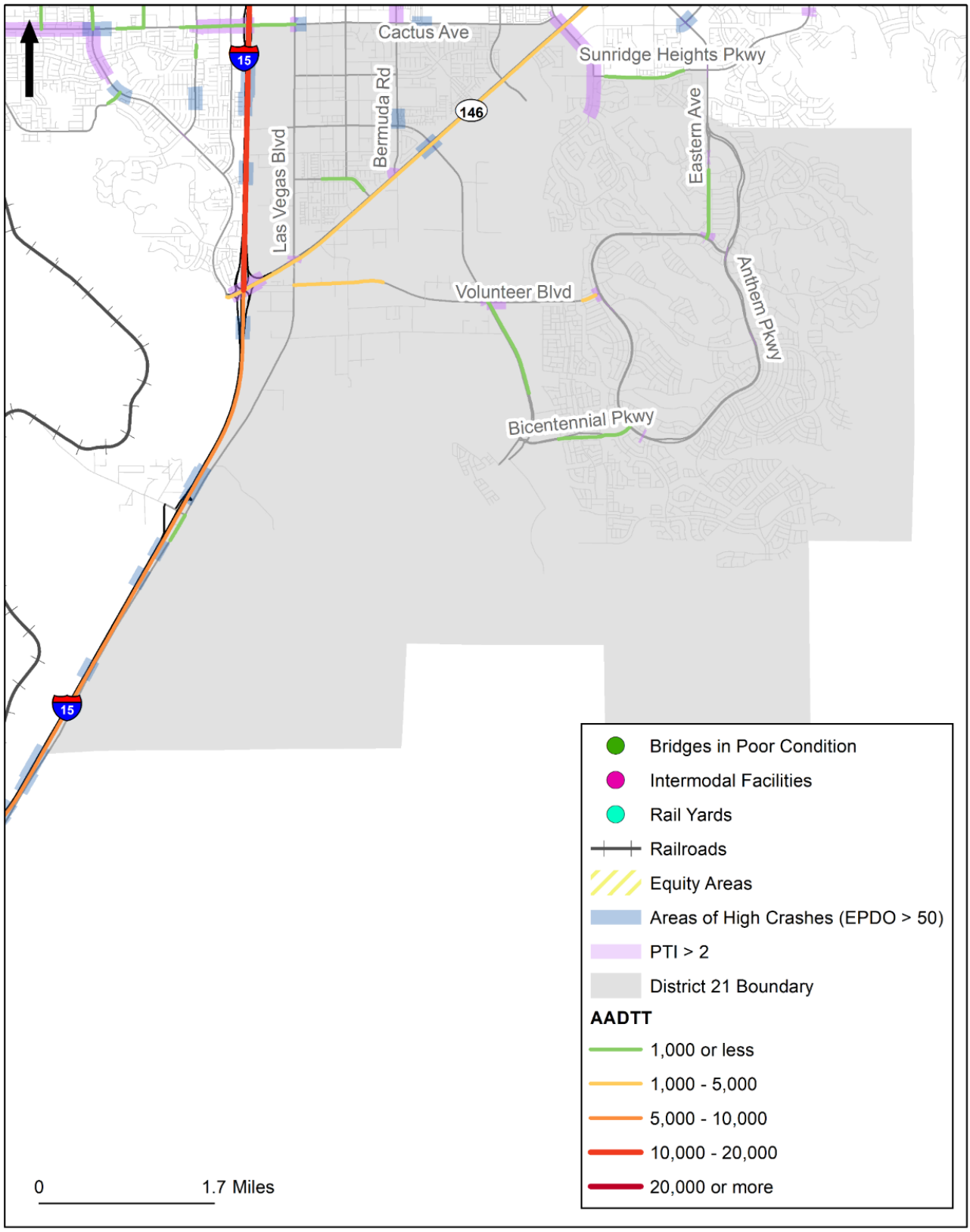


Figure 4.23 Freight District Profile: District 21 (West Henderson)



5.0 Additional Considerations

5.1 Truck Parking

The section contains excerpts from the 2019 Nevada Truck Parking Implementation Plan prepared by Cambridge Systematics for NDOT.[18]

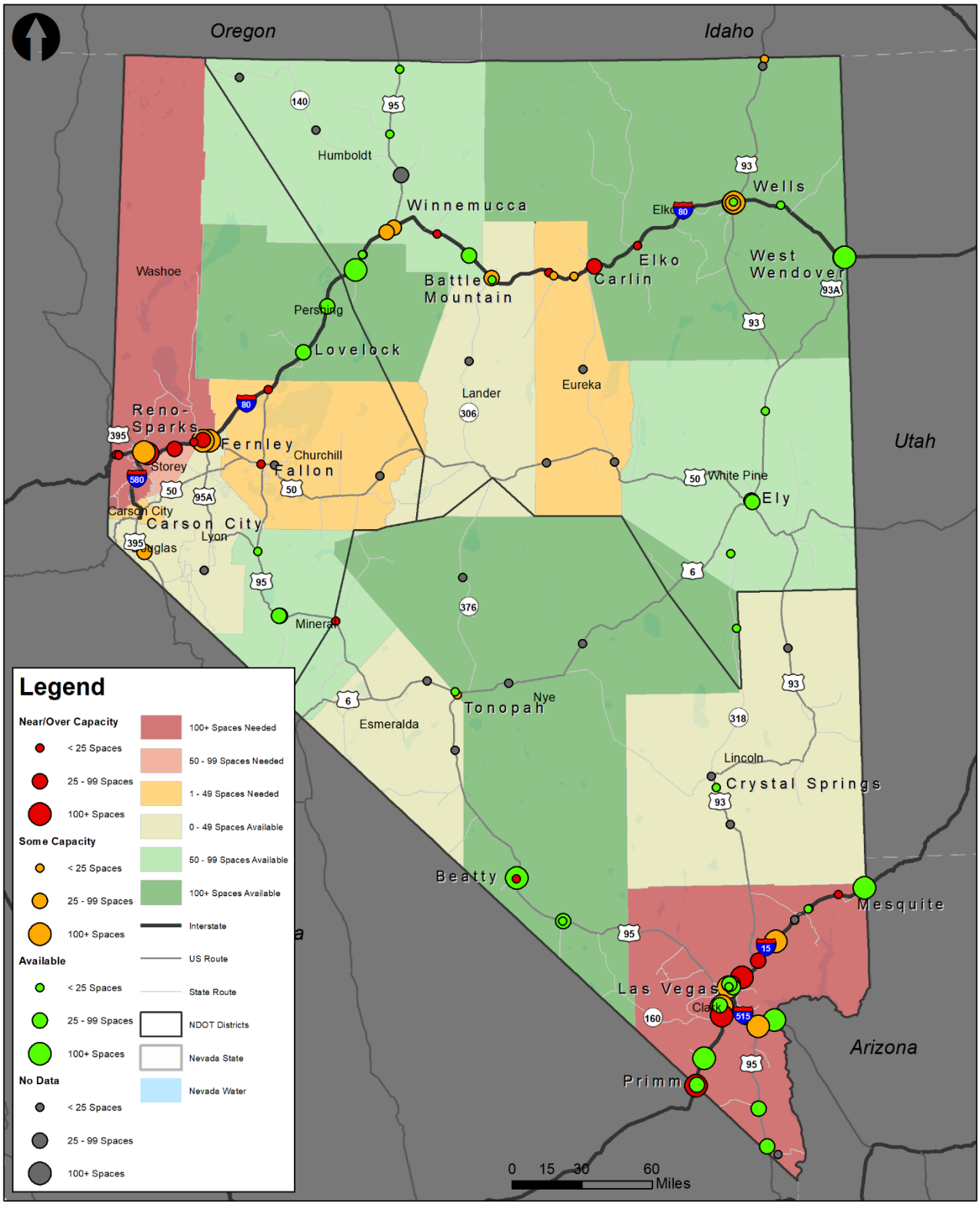
5.1.1 Statewide Demand for Truck Parking

Based on the analysis and stakeholder outreach conducted for the Nevada Truck Parking Implementation Plan, the largest gaps in truck parking occur in the two major urban areas in Nevada—Las Vegas, and Reno/Sparks. Clark County has a gap of more than 550 truck parking spaces and Reno County is lacking approximately 250 truck parking spaces. Stakeholder input identified I-15 in the southwest portion of Las Vegas as an area of particular need given the origin-destination patterns in the region and the important trade ties to southern California.

Figure 5.1 shows the existing gap at the county level as well as the gap at all authorized parking locations and the location of unauthorized public parking locations based on data from the American Transportation Research Institute (ATRI). Note that the county-level gap is based on supply and demand on major freight corridors only (I-15, I-215, I-80, I-580, U.S. 93/SR 318, U.S. 95, and U.S. 395). The utilization gap (or surplus) includes additional sites beyond those routes and is based on data from ATRI with additional input from Park My Truck, TruckerPath, and stakeholders or field visits.

[18] The report can be accessed here: https://www.dot.nv.gov/doing-business/about-ndot/ndot-divisions/planning/freight-planning

Figure 5.1 Truck Parking Gap by County and Composite Availability at Authorized Parking Sites



Source: NDOT, ATRI, Analysis by Cambridge Systematics, 2018.

5.1.2 Urban Parking Demand

As noted previously, the areas with the highest levels of demand are mainly in and around the urban centers of the State—Clark County in the south and Washoe and Storey Counties in the north. In addition to long-haul parking demand which is the primary focus of this study, these counties also are the primary generators of short-term staging demand due to higher concentrations of shippers and receivers, higher residential populations, and the higher cost of land which limits space to develop parking (either on-site or in nearby parking facilities) than in the rest of the State. These urban areas also generate a demand for longer-term parking for owner-operators—private contractors who own their vehicle and are not affiliated with a large company fleet. When at home, these drivers need a place to park their truck for a day or more, which is not allowed by major truck stops.

The location and demand for both longer-term parking and short-term staging are described below. NDOT may have a support role to play in addressing these needs, however, potential solutions to these issues mainly rests with private-sector businesses and local governments.

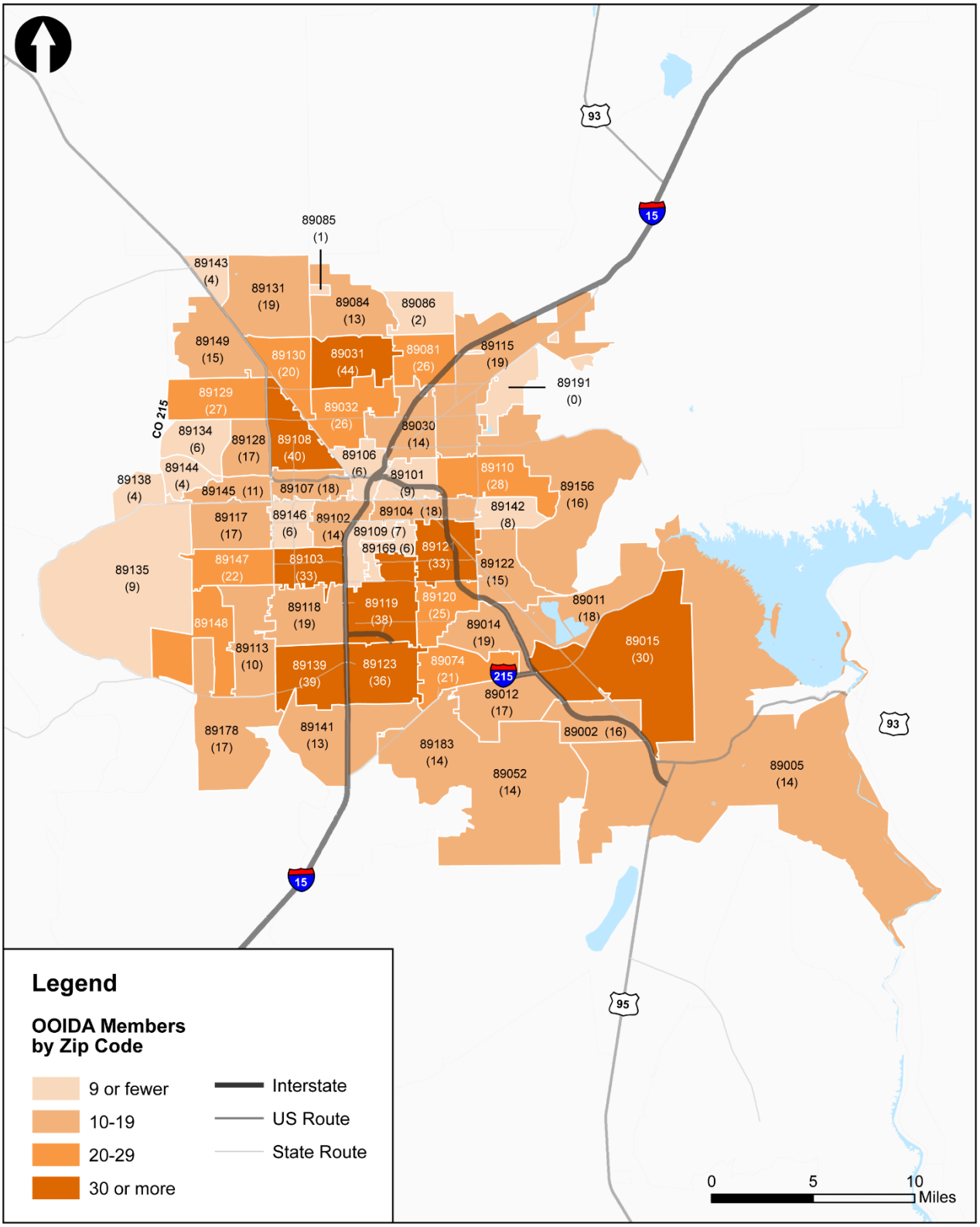
Longer-Term Parking Demand

The Owner-Operator Independent Drivers Association (OOIDA) is a trade association that represents independent owner-operator truck drivers. Owner-operator independent drivers own their own trucks instead of working for a company and driving a company vehicle. Since they do not have a warehouse or truck terminal to park their trucks at when off duty, they often park in residential areas between trips. Although parking of this type is different from other long-haul parking (e.g., there is no need for restrooms, trucks are not typically idling), this can become a source of conflict with neighboring residents and puts the owner-operator at risk of vehicle or cargo theft. As complaints mount, municipalities commonly post signs restricting truck parking in residential areas, but this just leads to parking in other undesirable areas, as the drivers must park somewhere, and does not solve the problem.

There are over 160,000 OOIDA members in the U.S. and Canada. In Nevada, OOIDA has 1,376 members, 68 percent of whom are located in the Las Vegas metropolitan area.[19] Even though OOIDA membership is not inclusive of all NV truck drivers, their membership reflects a particular type of truck parking need—long-term parking near residential areas. **Figure 5.2** shows the concentrations of OOIDA membership in the Las Vegas Metro area. Zip codes with the most OOIDA members (30 or more) are located near major highways (I-15, I-215, I-515, and US 95) with the largest concentration in the 89031 zip code in the City of North Las Vegas. Additional truck parking in these areas would potentially benefit both owner-operator independent drivers as well as other truck drivers.

[19] https://www.ooida.com/WhoWeAre/.

Figure 5.2 OOIDA Membership by Zip Code—Las Vegas Valley



Source: NDOT, OOIDA, Analysis by Cambridge Systematics, 2018.

Short-Term Staging and Parking Demand

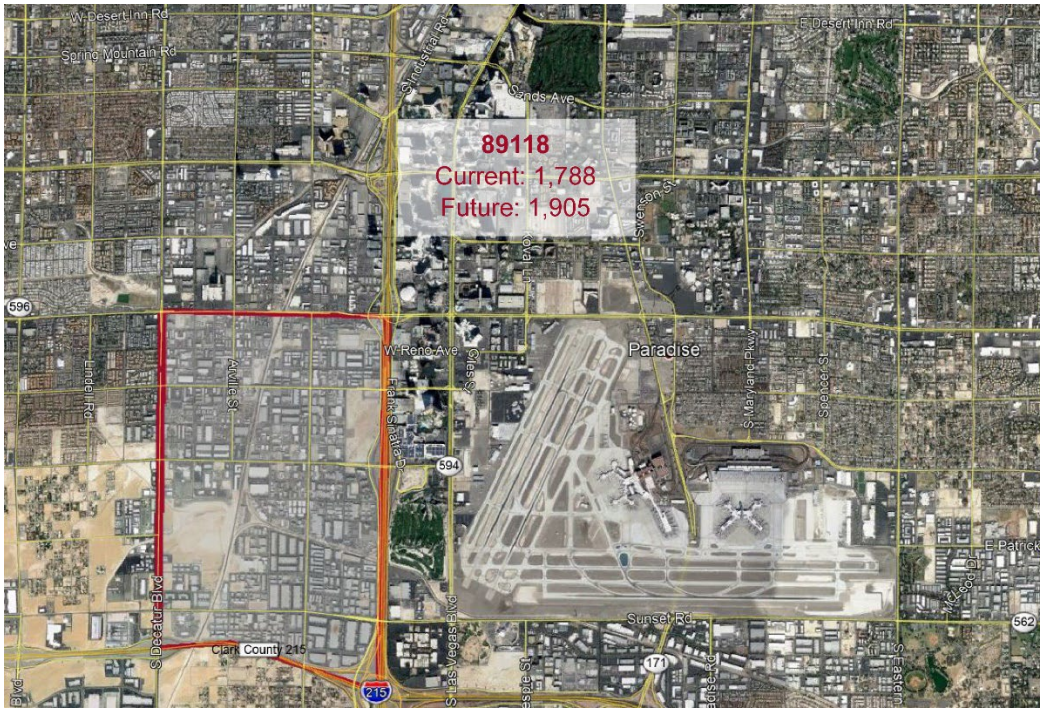
In addition to long-haul parking needs, stakeholders noted issues with short-term staging and parking, especially in industrial and commercial areas at the north and south ends of the Valley in North Las Vegas, and Clark County.

Short-term staging parking demand is different from long-haul demand in that trucks are parking while waiting to make a pickup or delivery instead of resting for a long period of time to satisfy FMCSA rest requirements. Therefore, trucks typically try to park as close to the loading/delivery location as possible and the short parking duration leads to more turnover at any single location. Additionally, drivers often need to rearrange their loads according to their delivery/pick-up appointments, termed cross-docking, so that pallets for the first appointment are at the end of the trailer, and so forth. Many commercial businesses have specific windows during which trucks can be on site to load or unload their goods. If drivers arrive before that time in order to guard against delays or other disruptions, they commonly are not allowed to park and wait on site. Without adequate short-term parking options near these industrial and commercial areas, trucks often park in unauthorized locations or on the street, leading to safety and maintenance issues.

There is limited research on the amount of on-site parking required to support short-term staging parking at truck-reliant businesses. However, most of these facilities reserve all of the on-site parking spaces for internal operations. Outside companies are often allowed to drop trailers in the yard to be off-loaded at a later time when docks are available. The truck parking spaces on-site are reserved for those trailer drops, and then yard hostlers are used to shuttle trailers around the yard. There are no guidelines for the number of parking spaces needed outside the gate for trucks waiting their turn to enter the gate.

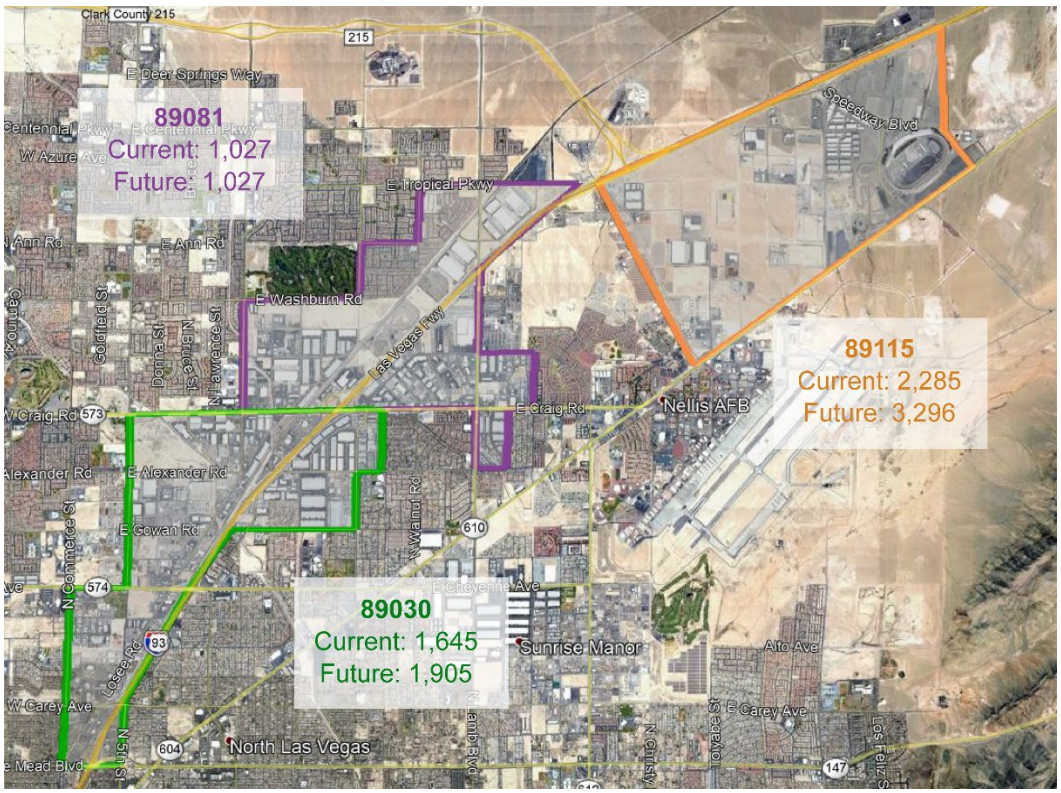
To approximate the areas where short-term staging and parking is most needed in the Las Vegas metropolitan region, this study used data from CBRE, a commercial real estate company, to map out concentrations of truck bays. CBRE provided data for the number of truck bays for all facilities at the zip code level. The current and future number of truck bays by zip code in the Las Vegas metropolitan area for facilities with five or more bays was identified. This study did not attempt to calculate the existing on-site truck parking capacity, which limits the ability to quantify potential gaps. The majority of warehouses are located in four zip codes (89030, 89081, 89115, and 89118) in industrial areas of North Las Vegas and west of the Resort Corridor. Two-thirds of the planned growth in truck bays is occurring in these areas and is expected to increase by 17 percent through 2020. In order to highlight the most critical areas within these zip codes, Google Earth imagery was used to identify industrial and commercial clusters. **Figure 5.3** and **Figure 5.4** show the four zip codes with the highest concentration of truck bays currently (1,001 or more).

Figure 5.3 Industrial and Commercial Concentrations Aerial—Las Vegas



Source: CBRE, Google Earth, Analysis by Cambridge Systematics, 2018.

Figure 5.4 Industrial and Commercial Concentrations Aerial—North Las Vegas



Source: CBRE, Google Earth, Analysis by Cambridge Systematics, 2018.

Convention Marshalling Yard

The convention industry is a pillar of the Southern Nevada economy that brings in an average of $127 million per show and supports 65,000 jobs. In 2017, 6.6 million people visited Las Vegas for a convention, stayed longer and generally spent more money than leisure visitors. Current expansion projects will add more than three million square feet of meeting space to the Resort Corridor. This will add more trucks to the Resort Corridor, which already is congested with over 4,500 truck trips per day during the peak convention season.[20]

A marshalling yard is an off-site location that serves as the initial gathering place for exhibits en route to a tradeshow.[21] Having a permanent place to serve this purpose would enable congestion management strategies like reversible managed lanes, signal timing enhancements and special event coordination to be put in place. The goal of the marshalling yard in Las Vegas is to segregate and manage truck flows in the Resort Corridor and improve customer satisfaction with on-demand set-up and take-down.

Major competitors of the Las Vegas convention industry—convention centers in Chicago, Illinois and Orlando, Florida—provide onsite marshalling yards (see **Figure 5.5**). In order to maintain its premier position in the industry and the economic benefits to the State, the Las Vegas Resort Corridor needs a convention marshalling yard.

Figure 5.5 Comparison of Convention Facilities

Data Source: Las Vegas Convention and Visitors Authority.

Representatives from the Las Vegas Convention and Visitors Authority (LVCVA) and the major convention service providers, Freeman and GES, have been trying to identify a location within the Resort Corridor for a consolidated marshalling yard for the use of all service providers. The most promising location is an unused 60-acre parcel of land at the end of one of the McCarran Airport runways at the Northwest corner of Tropicana Avenue and Swenson Street, and owned by the Clark County Department of Aviation. Because of Federal Aviation Administration restrictions, most revenue generating uses are limited for this space. However, it is an ideal location for a marshalling yard because of its close proximity to the convention centers and meeting spaces and it is large enough to accommodate staging for many events at once by multiple management companies.

[20] Las Vegas Convention and Visitors Authority.

[21] Also commonly spelled “marshaling.”

5.1.3 Toolbox of Truck Parking Solutions

Solutions for urban truck parking needs can take a number of forms. However, due to land use authority and limited publicly available land, NDOT's role in many of these solutions may be as a supporting, rather than a lead, agency. These solutions are typically determined by local planning processes.

Promote On-Site Parking at Shippers and Receivers

When land use and zoning decisions allow for new commercial and industrial development, but do not account for the increased demands for truck parking, the costs for future mitigation are often passed on to the local jurisdiction. These costs include the cost of providing truck parking and costs associated with safety, congestion, and community disruption. A common reaction is to pass ordinances restricting truck parking, which redistributes the need to another area in the community or a nearby community.

Local ordinances routinely set employee and customer parking requirements for developments; however, on-site truck parking and staging areas are rarely required. In 2017, the Township of Upper Macungie, Pennsylvania, in the Lehigh Valley became a notable exception to this rule. The Township passed a new zoning requirement that requires one off-street truck parking space for every loading dock at a new warehouse or distribution facility.[22] The new zoning regulations also mandate one truck staging space (with a 10-feet x 80-feet dimensions) for every two loading spaces at a distribution or warehouse facility. Further, the new requirements specified that applicants (developers) must present evidence that parking will be adequate to accommodate expected demand. The language is integrated into the city's general parking code.

Counties, cities, and municipalities across the Nation already develop traffic impact assessments and review site plans for new developments. However, these processes do not always consider the specific transportation and truck parking needs generated by freight activity. Traffic impact assessment processes should be reviewed to include anticipated truck volumes at a site and the impacts of staging near the site.

FHWA will soon release the *Truck Parking Development Handbook* which will include guidance, sample ordinance language, and various tools for estimating the demand for truck parking generated by new developments. The Caltrans Statewide Truck Parking Study developed a truck parking generation rate for estimating truck parking demand based on the service industry and estimates of truck trips from a traffic impact assessment. They each have different approaches based on available data.

Deploy Smart Curbside Management Techniques

While local regulations often discourage on-street truck parking, it can be safely accommodated in the right context, in locations with sufficiently wide streets, industrial or commercial land uses, lack of bicycle and pedestrian traffic, and beyond a specified distance from sensitive land uses such as schools. Truck drivers already use these spaces for parking, as shown in **Figure 5.6**, and they could be used more efficiently and safely if managed appropriately. Criteria would need to be developed so that only those curbs that meet the criteria are considered for truck parking. This strategy targets truck parking needs near existing staging demand, and it is intended to only provide short-term parking due to the lack of amenities and services.

This strategy also offers opportunities for cities to partner with private sector technology developers who are creating the business model and technologies (apps) to facilitate curb area parking solutions to truck drivers.

[22] Township of Upper Macungie Municipal Code § 27-601. https://ecode360.com/14517379.

Drivers could locate parking within a short time window and close geographic proximity to their destination, reserve a spot for a specific time window, and facilitate payment through a mobile app or other reservation system. This approach aims to make more efficient use of existing curb areas in commercial and industrial areas by communicating both location and availability, and then enabling the ability to reserve spaces.

Recognizing the need to help owner-operators who live in their city, the city of Auburn, Washington designated four areas inside industrial zones where truck parking is acceptable, and issues parking permits to truck drivers who are residents of the city. The designated curbs are appropriately signed and truck drivers with the appropriate permit are allowed to leave their truck for a maximum of 72 hours, without any occupants, while they are home and off duty.[23] This is a unique usage of industrial curb space that is appropriate for longer periods because the drivers do not stay with their trucks and therefore do not need any services or amenities. This has helped to remove parked trucks from residential areas where drivers typically park when home.

Figure 5.6 Informal Curbside Parking

Source: Cambridge Systematics

Promote Truck Parking on Unused Industrial Properties (Airbnb of Truck Parking)

In urban areas, where land is most scarce and expensive, constructing large truck parking facilities may not be feasible. However, private industrial property owners may have underutilized land that could be used for shared parking for a fee, like an Airbnb for truck parking. Mobile applications allow property owners to market their available space and truck drivers and companies to identify, reserve, and pay for parking at available locations, expanding the pool of inventory and providing a financial incentive for participating property owners. Truckers are directed to parking in existing lots which are already zoned for commercial or industrial uses and where truck access and parking are already permitted.

[23] For more information visit: https://www.auburnwa.gov/cms/one.aspx?portalId=11470638&pageId=15503832.

Build Dedicated Truck Parking Facilities Near Shippers and Receivers

Truck parking facilities are needed most in suburban and urban areas near major logistics centers, closer to a truck driver's origin or destination points. These would be located outside of highway right of way (ROW) on adjacent roads, accessed via interchanges, and could be used for short-term staging, trailer storage, required rest breaks, or long-term parking for owner-operators when off-duty at home.

Local jurisdictions often own and operate municipal car parking garages and lots, and could offer similar parking services for trucks. Unlike a municipal car parking lot, truck drivers typically remain with their vehicle and therefore need essential amenities such as a paved and striped parking area, restrooms, water, vending machines, lighting, green space and picnic tables. Security fencing and gate would also be important to secure equipment and loads in cases where the driver might not stay with the truck, as is the case for owner-operators parking their investment (truck) while they are off-duty. The City of Weed, CA is one that has taken the lead at building public parking in a (small) urban environment (see sidebar).

The City of Weed, CA approached truck parking as an **economic development opportunity**. After providing free municipal truck parking adjacent to an existing Pilot Travel Center, additional investment has followed including plans for a new Love's Travel Stop with 97 additional truck parking spaces. The 12 existing business in South Weed (including multiple hotels, food stores, and a Chevron) near the truck parking area generate $1.8 million in sales tax revenue, 84% of the total revenue for this City of 3,000.

Expand and Upgrade I-15 Truck Pull-Offs/Turnouts

There are three truck pull-offs or truck turnouts located on I-15 northeast of Las Vegas. They are located at Milepost 88, Milepost 96, and Milepost 110 (Mormon Mesa). All provide space for trucks to park in both directions but have no amenities for drivers. The ATRI GPS utilization analysis indicates that Mormon Mesa is near or above capacity and the MP 96 location is above 50 percent utilization at most times of the day although does not commonly reach capacity. A sampling of mobile application data indicates that the Milepost 88 and Milepost 96 locations have a lower utilization rate than Mormon Mesa.

A number of enhancements at these locations would help improve conditions. First, amenities such as trash receptacles and a vault toilet should be considered. Second, adding stripping (either on existing surface or through paving and stripping) could increase the capacity of the lot by reducing confusion and make it easier to accurately identify capacity.

The Nevada Truck Parking Implementation Plan includes conceptual designs and planning level cost estimates for expansion of truck parking at these three sites. Costs are outlined below:

- MP 88: Southbound would cost approximately $600,000 to add 13 spaces and would include a new off ramp. Northbound would cost approximately $550,000 to add 13 spaces and would include a new off ramp. Both sites would be expandable in the future.
- MP 96: Southbound would cost approximately $3.6 million to add 100 spaces and would require a new off ramp. The site would be expandable to meet future need. Northbound would cost approximately $3.8 million to add 100 spaces and require a new on ramp.

- MP 110: Southbound would cost approximately $1 million to add 29 spaces and would require a new off ramp. Northbound would cost approximately $600,000 to add 12 spaces and would require a new on ramp.

Partner with the Private Sector

Private truck parking facilities provide the vast majority of all parking spaces in the State. It is unlikely that public agencies can build enough spaces to close the gap. While the private sector continues to develop truck parking, there are actions the public sector can take to facilitate and leverage private investment. Because truck parking sits at the nexus of public safety and private goods movement, and because it results in mutual benefits to public and private partners, truck parking development creates a ripe environment for public-private partnerships. A few of the many plausible partnerships for public agencies to consider include:

- Private party designs, builds, finances, operates, and maintains a publicly owned parcel adjacent to a major freight hub.
- Develop parking at a publicly owned parcel adjacent to an existing commercial truck parking facility.
- Purchase a parcel adjacent to an existing commercial truck parking facility to construct additional parking.
- Truck parking facility developed by Caltrans on publicly owned parcel within the highway ROW and operated and maintained by a private partner.

Provide Zero Emission Fuels at Truck Parking Facilities

Zero-emission trucks are expected to experience rapid growth in the coming years which will require diligent planning to build and locate the infrastructure needed to support these vehicles. Because of the time required to charge a heavy truck in the most economic manner, it makes sense to collocate truck parking with electric truck charging. The Bipartisan Infrastructure Law (BIL) includes funding for expanding alternative fueling infrastructure, and NDOT is currently preparing an Alternative Fueling Infrastructure Plan for administering those funds.

Convention Marshalling Yard

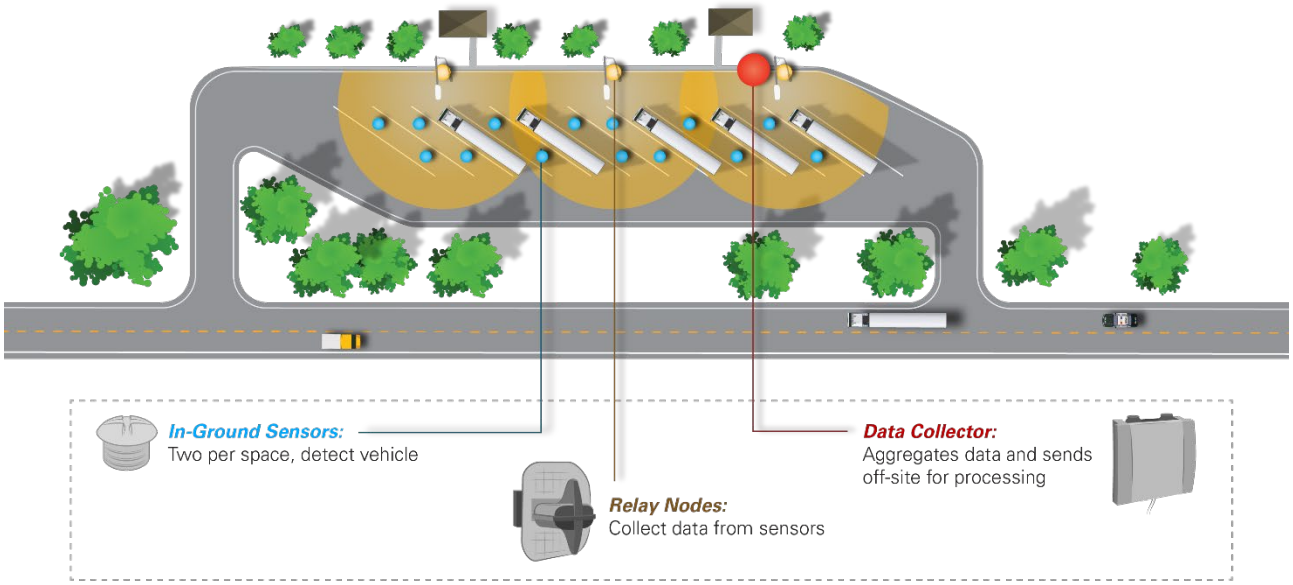
Major competitors of the Las Vegas convention industry—convention centers in Chicago, Illinois and Orlando, Florida—provide onsite marshalling yards. In order to maintain its premier position in the industry and the economic benefits to the State, the Las Vegas Resort Corridor needs a convention marshalling yard. Clark County, the RTC of Southern Nevada, LVCVA, and major convention service providers should work together to identify a location within the Resort Corridor for a consolidated marshalling yard for the use of all service providers.

Develop a Truck Parking Availability System

A Truck Parking Availability System (TPAS) would include dynamic signs along the highway alerting drivers of upcoming available parking sites, distances, and the number of currently available spots at each site. TPAS' are typically deployed at public rest areas and other dedicated truck parking facilities or in partnership with private lots (such as truck stops). This strategy allows drivers to make better-informed decisions about

whether to continue driving or choose available parking nearby despite the loss of driving hours. A typical TPAS system consists of sensors at parking facilities to detect available (and occupied) spaces, software to monitor and report on availability, and some include closed-circuit television cameras to provide real-time visual monitoring (**Figure 5.7** provides an example concept). The parking availability is then displayed in real-time via mobile applications and on dynamic signs along the highway in advance of the parking sites. While this approach does not add new capacity or additional amenities, it makes drivers aware of available spaces on their route to better distribute parking where capacity exists, thereby reducing the frequency of undesignated parking. NDOT developed a ConOps and is in the process of drafting procurement documents for deploying a TPAS pilot project.

Figure 5.7 TPAS Site Concept



Source: Nevada TPAS Concept of Operations, NDOT, March 2020.

5.2 Local Policies Affecting Goods Movement

A scan of comprehensive plans and related documents from Clark County and the Cities of Las Vegas, Henderson and North Las Vegas revealed several freight supportive policies, priorities, and initiatives cited below.

Transform Clark County Master Plan, Adoption Draft - October 2021[24]

Policy 4.2.6: FREIGHT NETWORK Support efforts to enhance connectivity between truck, rail, and air transport to support the efficient movement of goods in and through Clark County. Support development that is compatible with freight operations to protect existing uses and maintain opportunities for future expansion

[24] https://857bb0c0-bbd7-47ed-95d3-277685036743.filesusr.com/ugd/10a638_11655b0690ce4e159acb5d5152b81b43.pdf

of employment and industrial land uses in areas with desirable freight access. [See also, Core Value 5, A Diverse and Resilient Economy]

City of Las Vegas 2050 Master Plan[25]

Page 3-31: "The city must continue to diversify the economy in emerging sectors to remain competitive and 'recession' proof. ...The City can continue to benefit as a logistics and distribution hub for the regional and global supply chain. To the extent the City can play a role regionally, it must continue to support transportation investments that ensure the flow of freight to other parts of the region, state, and country.

Page 3-32: "The City can also benefit through the full development of the "Job Creation Zone" in the northwestern Nu Wav Kaiv area along the I-11, where opportunities to leverage light manufacturing and aerospace, UAV, autonomous technologies, and supportive military or defense activities can exist, in partnership with the Las Vegas Paiute Tribe."

Transportation Goal I.A (Page 4-2): "Connect and enhance accessible bike and pedestrian facilities as part of a safe, efficient complete street and road network that moves people and goods."

Page 4-19: See the section heading: "Las Vegas Is Optimally Located To Continue Growing As A Hub For Logistics, Distribution, And Intermodal Freight" which addresses a number of freight related opportunities and priorities including:

- Support for I-11 to link Phoenix, Las Vegas, and Northern Nevada
- Support for expansion of I-15 and the importance of linkage with Southern California
- Support for rail-based modal development – specifically along the UPRR corridor
- "Because the I-15 corridor is the region's major freight corridor, many regional trucking and intermodal facilities have been constructed in major industrial zones and business parks. Relatively few major logistics hubs exist within the City of Las Vegas; Spectrum in East Las Vegas, the Las Vegas Tech Center in Twin Lakes, and the Las Vegas Business Park in West Las Vegas, as well as historic Downtown Las Vegas industrial uses around the Spaghetti Bowl, are among the major locations. Clustering has helped common infrastructure to be shared and used efficiently; however, this results in increased air and noise pollution for residents in adjacent areas, roadway wear and tear, and truck traffic. The City regulates freight distribution, and truck routes pursuant to Title 11.48 and the appended Master Plan of Streets and Highways, which permit truck routes on primary and secondary arterials. The development of a job creation zone in Nu Wav Kaiv, serving as a northwestern gateway and economic development hub, has the potential to create a new logistics point along the I-11 corridor."

Page 4-26 Implementation Strategies: "Work with NDOT, RTC, LVGEA and other public entities to develop a regional freight plan that addresses:

- "Reduction and elimination of congestion on the City's interstates and along major trucking routes that hinder the movement and distribution of goods.

[25] https://protect-us.mimecast.com/s/DB8kCW6jm2CrYOQH62lJv

- “Electrification of freight infrastructure
- “Create a northwestern transportation gateway in the Nu Wav Kaiv planning area »Incentives for intermodal or multimodal freight
- “Development of urban freight distribution and consolidation centers
- “Truck loading plans, multimodal infrastructure requirements, last-mile delivery solutions, and off-hour delivery programs.”

Henderson Strong Comprehensive Plan[26]

Page 8: "A freight railroad route (UPRR) and two interstate highways (I-15 and US 95) and the 215 Southern Beltway cross Henderson and serve to connect people and move goods throughout the city and to other parts of the state. Together with Las Vegas, North Las Vegas, Boulder City and the unincorporated townships of Clark County, these communities comprise the Southern Nevada region, an area whose overall future and aspirations are presented in the Southern Nevada Strong Regional Plan (2015)."

Page 66, Advanced Manufacturing & Logistics: "Both manufacturing and logistics operations are becoming far more automated, requiring more highly skilled workers than in previous decades. While the job count may be smaller, the operations are more technologically complex and the capital investment is high. This sector is important for the city as it brings export industries to our community and long-term sustainable employers."

Page 72, Target Industry Attraction: "Goal E8: Prioritize recruitment efforts and strategic marketing campaigns for Henderson’s target industries, including advanced manufacturing and logistics; healthcare and life sciences; headquarters and global finance; technology; and hospitality, tourism and retail."

City of North Las Vegas Comprehensive Master Transportation Plan

The City is currently developing a Comprehensive Master Transportation Plan which, among other things, establishes a designated truck route. The Plan under development notes that the City of North Las Vegas is home to a large share of distribution facilities—some of the highest concentrations of warehouse space in Southern Nevada is located in North Las Vegas.

Preserving a network of truck routes with appropriate design considerations will facilitate access, mobility, and safety for trucks, thereby strengthening the City of North Las Vegas’ position as a preferred location for distribution facilities and the growing freight logistics industry.

[26] https://www.cityofhenderson.com/government/departments/community-development-and-services/land-use-plans/comprehensive-plan

6.0 Risk and Resiliency

To identify "transformational policies and infrastructure improvements needed to integrate Southern Nevada into global supply chains and strengthen our economy" (see Plan purpose), all of the data and input collected throughout the study was assimilated into a strengths, weaknesses, opportunities and threats (SWOT) analysis. This was followed by a risk and resiliency scenario planning workshop that led to the final development of policy and improvement recommendations.

6.1 SWOT Analysis

The SWOT analyses was a distillation of commodity flow, supply chain, system performance, truck parking, and freight policies combined with stakeholder input. The final key points, as modified with FAC input, are shown in **Figure 6.1**.

Figure 6.1 SWOT Summary

Strengths

- Proximity to the largest economy in the US (California)
- Favorable tax and regulatory environment
- Available developable land
- Access to highway, rail, air network
- Supportive environment for autonomous transportation testing (cars, trucks, drones)

Weaknesses

- Limited rail intermodal access
- Lack of trained logistics workforce
- Lack of transit options to warehousing areas
- Lack of truck parking

Opportunities

- Capture pass-through freight by adding value
- Implement best practices in:
  - Logistics development patterns
  - Technological advances

Threats

- Supply chain disruptions
- Inflation
- Limited water resources
- Natural disasters

6.2 Scenario Planning

The freight system has always been essential to maintaining the region's collective quality of life and the COVID-19 pandemic has only heightened its importance. In the midst of this crisis, the logistics industry has provided critical, life-saving services to Southern Nevada and the rest of the country by delivering essential supplies such as food, paper products, personal protective equipment, and sanitation supplies. These efforts have helped raise the public consciousness about—and appreciation of—the importance of efficient supply chain and distribution operations.

A Scenario Planning Workshop was held with the FAC to develop strategic initiatives that would ensure the region's freight system will be prepared for future "shocks" to the system, regardless of cause. The Workshop was used to develop and test a range of potential future scenarios, impacts, and strategies for the

region. This approach departs from traditional predictive forecasts or scenario models that are based on select data points. These traditional approaches do not account for unanticipated changes, rapid transformations, or implicit uncertainties.

Key steps followed include developing engaging, regional-specific, plausible futures; developing a menu of strategies (policies, programs, and projects); testing those strategies against other alternative futures; and recommending a robust set of potential future actions based on performance against desired outcomes.

The Scenario Planning Workshop participants were then divided into two breakout groups and asked to identify strategies that would build on strengths, shore up weaknesses, capitalize on opportunities, and hedge against threats. The combined list became baseline scenario strategies. Participants were then presented with a series of probable alternative future scenarios and asked which of the baseline strategies would still be applicable under each alternative scenario and whether new strategies would be needed. The alternative scenarios are listed below.

- **Slow Growth**: Long-term population growth slows or stagnates due to continued economic downturns, low growth policies from continued and severe drought, or other.
    - Local freight demand drops
    - Reduced tax revenues
    - Insufficient transportation funding
    - Deterioration of infrastructure (pavement, operations) and bridge failures
- **Escalating Global Climate Change**: Increased drought in Southwest leads to flooding, earthquakes, fires
    - Increased demand for renewable and clean energy
    - Reduced gas tax revenues
    - Greater supply chain disruptions
    - Increased business operations costs
    - Increased preference for products that are made and sourced in ‘the right way’
- **Escalating Racial and Economic Inequality**: Racial and economic inequality leads to rioting and social disruptions
    - Increase in minimum wage
    - Increased cost of doing business
    - Supply chain disruptions

- **Rapid Adoption of Technology**: Autonomous trucks for long-haul shipments, truck trains for long-haul shipments, last mile autonomous truck and drone deliveries, automated warehouse operations
    - Supply chain innovations
    - Increased autonomous trucks and robot/drone deliveries
    - Fewer but higher paying jobs

The purpose of this exercise was not to try to predict the future and what strategies would be needed, but to identify strategies that would be beneficial across most plausible future scenarios. The workshop participants indicated that all of the baseline strategies had at least some applicability to all of the alternative future scenarios; however, some strategies were believed to be more applicable and necessary under any scenario. **Table 6.1** lists the strategies in ranked order and indicates whether it is within the influence of the RTC and partner agencies.

Table 6.1 Freight Strategies Applicable Under all Plausible Future Scenarios

Strategy[27]	% of Votes	Within influence of RTC and partners?
Roadway Improvements	17%	Yes
Smart Logistics Village	14%	Partial
Transit Access	13%	Yes
Truck Parking	12%	Yes
Zero Emissions Fuel Infrastructure	12%	Partial
Convention Marshalling Yard	9%	Partial
Water infrastructure Improvements	17%	No
Open up developable land	7%	No
Workforce Training (added after the vote)	n/a	No

[27] Note: Strategies to improve the water infrastructure and workforce training, or to release Federally managed lands for development are outside the influence of transportation agencies, so will not be addressed in this Plan update.

7.0 Recommendations

This chapter outlines the transformational policies and infrastructure improvements needed to integrate Southern Nevada into global supply chains and strengthen our economy, and the process for identifying and prioritizing them.

7.1 Transformational Policies and Initiatives

Summarized below are a set of recommended transformational policies and initiatives derived from other relevant studies, stakeholder interviews, and from the scenario planning workshop.

7.1.1 Smart Logistics Village

"Integrated Logistics Centers are industrial parks or mixed-use developments specifically constructed around high performance freight servicing facilities. A full portfolio of activities relating to transport, logistics, and the distribution of goods, both for national and international transit, is often offered by various operators. Manufacturing and other industrial uses are then situated around the core transportation facilities. In this way, the transportation-related "village" makes highly efficient use of the core capabilities, such as regular rail or intermodal service."[28]

For the logistics and operations sector and the manufacturing sector to flourish in Southern Nevada—and to attract new players in these sectors—they need supportive infrastructure that provides reliable and efficient access to national and global markets, as well as multiple modes for shipping and receiving goods, combined with the ability to transfer seamlessly between modes. For example, the Reno-Tahoe Industrial Center was selected by Tesla for its new battery plant, in part, because it is served by I-80 and both UPRR and BNSF railroads, providing excellent access to natural resources, supply chains, and markets for its product. The Tahoe Reno Industrial Center is the largest industrial park in the nation and also is home to Walmart's western distribution center, and to Alcoa, Zulily, PetSmart, and others.

Successful freight villages attract sustainable, well-paying direct and indirect jobs (generated from businesses and industries needed to support the tenants), in addition to the short-term construction jobs. A large integrated logistics center in Alliance Texas (near Fort Worth) is served by two class I rail lines (BNSF Railway and UPRR), an industrial airport with two 11,000 ft runways, and is home to 500+ companies employing 63,000+ people, with an estimated economic impact (1990-2021) of $100.6 billion.[29]

The KC SmartPort in Kansas City is a different model. It "…is a non-profit economic development organization that works to attract freight-based companies, such as manufacturing, distribution and warehouses, to the 18 county, bi-state Kansas City region."[30] Instead of a single development, KC SmartPort promotes four intermodal parks and 20 industrial sites scattered across their region.

[28] National Cooperative Freight Research Program (NCFRP). 2011. Report 13: Freight Facility Location Selection: A Guide for Public Officials. Transportation Research Board. Washington, D.C.

[29] https://www.alliancetexas.com/resources#facts

[30] https://kcsmartport.thinkkc.com/

The Nevada State Rail Plan promotes freight rail strategies, which could be associated with a smart logistics village. These strategies include:

- Develop the rail-served industry southwest of the Las Vegas-Henderson metro area to increase economic development with less traffic impact on downtown Las Vegas
- Preserve as much as possible, the remaining developable commercial land for rail-served industry
- Connect as many of the existing shippers to rail as possible
- Support developers and shippers in North Las Vegas with their rail planning efforts
- Redevelop Black Mountain Industrial Center for rail-served heavy industry
- Establish two-way intermodal service to San Pedro Bay, CA

Recommended Action

Support GOED in efforts to attract private development of a smart logistic village, including intermodal and rail access, and improved intermodal service to the Ports of Los Angeles and Long Beach.

7.1.2 Transit Access

Some stakeholders indicated that public transit access to warehousing/distribution facilities is inadequate, making it difficult for workers without access to a personal vehicle to get to work reliably on time. Stakeholders also indicated that the logistics industry competes with the tourism industry for workers and having better transportation options for its workforce would make logistics jobs more attractive. An article in the October 11, 2021, issue of the Washington Post reported that nationwide "the warehouse and transportation industry had a record 490,000 openings in July [2021]".[31] Improving access to jobs for lower income workers by improving transit to those jobs is consistent with state and regional economic diversification goals.

One of the strategies noted in the RTC's Access 2050 plan is to "provide an accountable and transparent planning process" which includes "efficient and equitable distribution of funds: Anticipated spending is distributed across the region based on multiple factors like public needs, population, social equity, tax base, etc." Relative to freight, Access 2050 states:

"A focus on addressing freight issues is a relatively new element of federal planning requirements, and effectively incorporating freight mobility with the other strategies of Access 2050 that are more concentrated on people focused outcomes of safety, travel efficiency, equity, and health may be a challenge, although the RTC is committed to improving freight mobility and *achieving the benefits that will come from better freight movement, including the key linkage between freight mobility and economic development*" (italics added).

Given the desire to link "freight mobility and economic development" and to distribute funds equitably, the region has an opportunity to prioritize transportation funding to improve transit access for those most in need to jobs within a target industry desperate to attract workers.

[31] https://www.washingtonpost.com/business/2021/10/11/warehouse-jobs-holidays-seasonal-hiring/

Recommended Action

Conduct a transit study to improve access to logistics jobs. The study should identify where the current and potential labor pool resides, the location and number of current and forecasted logistics jobs, the current transit options for connecting them, and model strategies for improving access. Strategies could include fixed route transit, car and van pooling, and other shared mobility options.

7.1.3 Truck Parking

The issues surrounding truck parking along with a toolbox of strategies for addressing it, are summarized in **Section 5.1.3** of this Plan update.

Recommended Action

Conduct a regional truck parking implementation plan to identify feasible sites, technologies, and funding sources for public investment in truck parking; to encourage and support private investment; and to develop uniform policies supported by NDOT and all local jurisdictions to ensure the need for parking does not continue to worsen.

7.1.4 Zero Emissions Fuel Infrastructure

The RTC supports Nevada's aggressive GHG emissions-reduction targets established with the passage of SB 254 in 2019: 28% by 2025, 45% by 2030, and net-zero (near-zero) by 2050.[32] The State has established policies and programs needed to achieve these targets. Those in the transportation emissions sector include:

- Adopt low- and zero-emissions vehicle standards
- Implement clean truck program
- Adopt low-carbon fuel standards
- Implement state car allowance rebate system ("Cash for Clunkers")
- Close emissions inspection loopholes for classic cars license plates

The BIL establishes a National Electric Vehicle Infrastructure Formula Program ("NEVI Formula") to provide funding to States to strategically deploy electric vehicle (EV) charging infrastructure and to establish an interconnected network to facilitate data collection, access, and reliability.

> *NEVI Formula funding is available for the "construction and installation of EV charging infrastructure to support operational, resiliency, national energy security, environmental, and community goals for freight transportation". (NEVI Formula Program Guidance)*

Nevada has $5.6 million available for the first fiscal year (additional funding will be available for each subsequent year of the program) and is required to prepare a State EV Infrastructure Deployment Plan before funds will be released. NDOT is currently preparing that Plan, scheduled for completion by August 2022.

[32] https://climateaction.nv.gov/policies/exec-summary/#:~:text=With%20the%20passage%20of%20SB,step%20toward%20managing%20climate%20change.

FHWA released The NEVI Formula Program Guidance on February 10, 2022, that indicates: "The purpose of public funding is not to discourage private investment, but instead to catalyze additional private investment and supplement and fill gaps to provide a convenient, reliable, affordable, and equitable national EV charging network."[33]

Recommended Action

Support NDOT during preparation of the State EV Infrastructure Deployment Plan, and any implementation actions that come out of it, in order to encourage the development and availability of zero emission fuel infrastructure for heavy trucks.

7.1.5 Convention Marshalling Yard

The need for a convention marshalling yard is described in **Section 5.1** Truck Parking.

Recommended Action

Conduct a convention marshalling yard feasibility study and action plan. The study should identify a feasible site, delineate private industry involvement in development and operations, estimate the capital and operational costs, and develop a traffic operational strategies for moving freight during conventions. A final task will be to assimilate the data collected into an economic analysis that describes the costs and benefits of developing the marshalling yard vs doing nothing. The outputs of the study can be used to secure private investment, and local, state, and federal funding.

7.1.6 Megaregional Cooperation

Sec. 21106 of the BIL, Multi-State Freight Corridor Planning, authorizes "states and certain other local governmental entities that are regionally linked with an interest in a specific multi-State freight corridor to enter into multi-State compacts to promote the improved mobility of goods".[34]

NDOT has a long history of supporting the I-15 Mobility Alliance, and the RTC has been an important contributor. The Alliance was selected as one of six corridor coalitions nationwide to receive federal funding under the Multistate Corridor Operations and Management Program which was used to execute the I-15 Dynamic Mobility Project[35]. The project addressed the need to improve real-time information

> *"The vision of the [I-15 Mobility] Alliance and its members is to develop a comprehensive, multimodal master plan for the I-15 Corridor; prioritize projects and policies of interregional significance; seek financial and other resources necessary for the implementation of the master plan; and devise appropriate governance mechanisms for the ongoing efficient and effective construction, operations, and maintenance of the corridor on a more sustainable basis." (https://i15alliance.org/)*

[33] FHWA. The National Electric Vehicle Infrastructure (NEVI) Formula Program Guidance. https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/nominations/90d_nevi_formula_program_guidance.pdf

[34] AASHTO. 2021. AASHTO Comprehensive Analysis of the Bipartisan Infrastructure Bill. Accessed: https://policy.transportation.org/wp-content/uploads/sites/59/2021/09/2021-09-15-AASHTO-Comprehensive-Analysis-of-IIJA-FINAL.pdf

[35] https://i15alliance.org/projects/multistate-i-15-dynamic-mobility-project/#1578004216384-39e9fca0-1aa0

exchange between the states and population centers, as well as improve availability and consistency of interstate traveler information along the corridor.

NDOT, in partnership with Caltrans, was awarded a National Economic Partnerships grant by FHWA in June 2019 to develop an I-15 Freight Mobility Enhancement Plan to recommend policies and technologies for improving truck parking along the corridor from Southern Nevada to San Diego. The National Economic Partnerships initiative promotes efficiency and regional cooperation by identifying best transportation planning practices to implement across jurisdictional boundaries, with specific emphasis at the megaregion level. The RTC participated in the study.

In December of 2021 California Governor Gavin Newsom, at the urging of Nevada Governor Steve Sisolak, announced the temporary expansion a five-mile stretch of I-15 just south of the Stateline to ease traffic congestion during peak hours.[36] These types of multistate coordination and cooperation should continue.

Continued advancement of the I-11 is also important and will require multistate cooperation. According to the 2017 Nevada State Freight Plan:

“Multi-dimensional access improvements include additions to the direction from which freight can be competitively collected and distributed as well as improvements in the facilities that transfer goods from one mode to another. At present, Las Vegas and Reno have limited market access due to the road and rail pattern in Nevada. The two primary corridors traversing the state, I-15 and I-80, provide only east-west and southeast-northwest access. Thus, Las Vegas and Reno are classified as having one dimensional distribution because they are simply stops along corridors. Adding direct connections between and beyond Reno and Las Vegas will greatly improve the range in which freight could be collected and distributed from these points and improve connectivity to the growing NAFTA trade. An intermodal I-11 corridor represents a significant opportunity to increase both metros’ ability to perform distribution functions, becoming crossroads with multi-directional access. This added connectivity would increase synergy between Nevada’s major hubs and improve their access to western U.S. markets, eventually to Canada and Mexico.”[37]

Recommended Action

Support NDOT, as the lead agency for multistate cooperation, through participation in the I-15 Mobility Alliance and other targeted projects or initiatives; especially those that aim to improve safety and travel time on the interstate crossroads (I-15 and I-11) so important to Southern Nevada’s logistics industry for the access they provide to California, the Intermountain West, the rest of the U.S., and Mexico.

7.1.7 Preserve Access for Oversize/Overweight (OS/OW) Vehicles

Access must be provided for OS/OW vehicles that carry equipment for heavy industry, such as mining and power generation, large cranes used in construction, displays for conventions, and other items that are critical to the economy. With few exceptions, OS/OW vehicles do not travel the same routes or use the same roads frequently enough to design for those trips.

[36] https://www.gov.ca.gov/2021/12/05/governor-newsom-and-governor-sisolak-announce-i-15-expansion-project-to-tackle-congestion-at-california-nevada-border/

[37] Nevada State Freight Plan. https://www.dot.nv.gov/home/showpublisheddocument/8628/636379527648130000

Freeways are the most common corridors for OS/OW vehicles, and many are OS/OW vehicles higher than the 16-foot-6-inch clearance for most bridges, per American Association of State Highway and Transportation Officials standards. Therefore, OS/OW vehicles must use on- and off-ramps to avoid bridges, and when that is not practical, divert through a combination of side roads. Over-dimensional vehicles need wider turning radii; however, this is usually not as big of a problem as height restrictions.

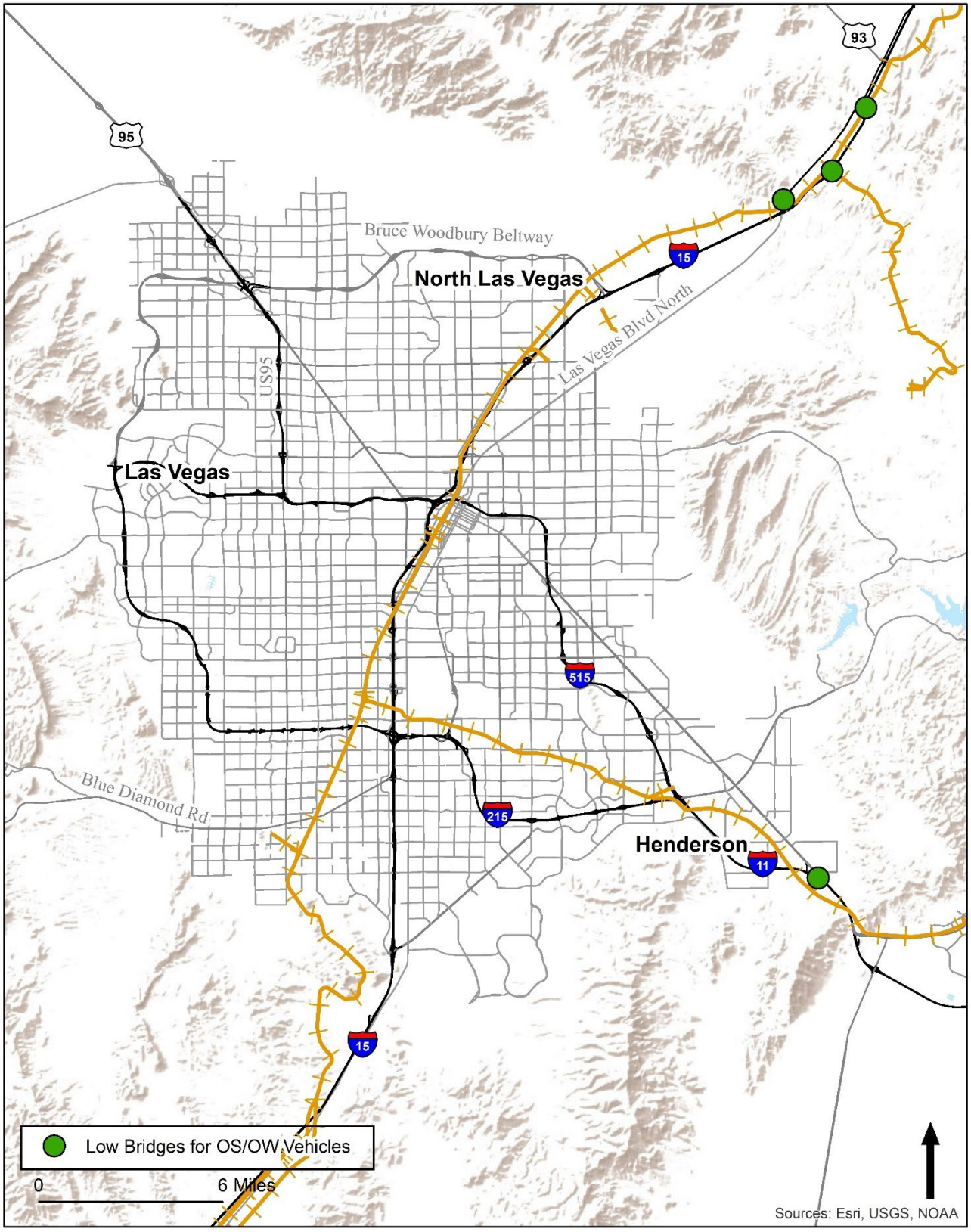
A grouping of three bridges on or near I-15 (at UPRR mainline and at Pabco Road) and Las Vegas Boulevard (at UPRR mainline) just south of the I-15/US93 Interchange are particularly problematic for higher profile OS/OW vehicles, shown on **Figure 7.1**. Between the three of them they effectively block access to I-15 and the only alternate route, Las Vegas Boulevard. Higher profile OS/OW vehicles are forced to take a detour of several hundred miles. Another problematic bridge shown on **Figure 7.1** is the I-11 interchange at Wagon Wheel Drive which forces higher profile OS/OW vehicles to detour through residential neighborhoods. Detours of long distances or through residential neighborhoods are not desirable or cost-effective for anyone.

These bridges need to be raised, and all new and rehabilitated structures raised to 17-feet wherever feasible. The vast majority of loads are under 17 feet, therefore, whenever possible structures over roadways should be at least 17 feet high. Uniform Standard Drawings for Clark County, and NDOT Standard Drawings require at least an 18-feet-0-inch minimum clearance for all signs, traffic signal and lighting mast arms, school flashing signs, etc. As noted previously, bridge clearances are 16 feet 6 inches. However, many of the pedestrian bridges in the Las Vegas metropolitan area, including those on Las Vegas Boulevard and St. Rose Parkway, exceed 18 feet.

Recommended Action

Raise the minimum bridge height standard of interchanges and other overhead structures to 17 feet. Conduct a feasibility study of raising the bridges over I-15 at UPRR mainline and at Pabco Road; over Las Vegas Boulevard at the UPRR mainline; and over I-11 at Wagon Wheel Drive.

Figure 7.1 Problematic Bridges for OS/OW Vehicles



7.2 Infrastructure Improvements

The core mission of the RTC and its partners is to build and maintain a road network for safely and efficiently transporting people and goods. This section describes the process for identifying needed roadway freight needs and the resulting projects. In addition, keeping roadways that freight depends on free of congestion, safety hazards, and failing infrastructure is the top priority noted by stakeholders during the scenario planning workshop.

An assessment was conducted to identify needed infrastructure improvements. First, the freight system performance analysis (see **Section 4.2**) was used to identify roadway segments where multiple needs collide. Next, a gap analysis was conducted to isolate prioritized unmet freight needs—segments with no programmed improvement projects for addressing the need. Finally, the unmet freight needs located on critical freight corridors were identified as recommended studies to determine the appropriate resolutions to address the needs. This prioritization process and resulting recommendations are described below.

7.2.1 Freight Needs Analysis

Segments with the highest priority freight needs are those with the highest values for each of the five freight system performance factors (see **Section 4.2**), as described below. All priority segments must first meet the threshold for Transform Economies—an indication the segment is an important freight corridor.

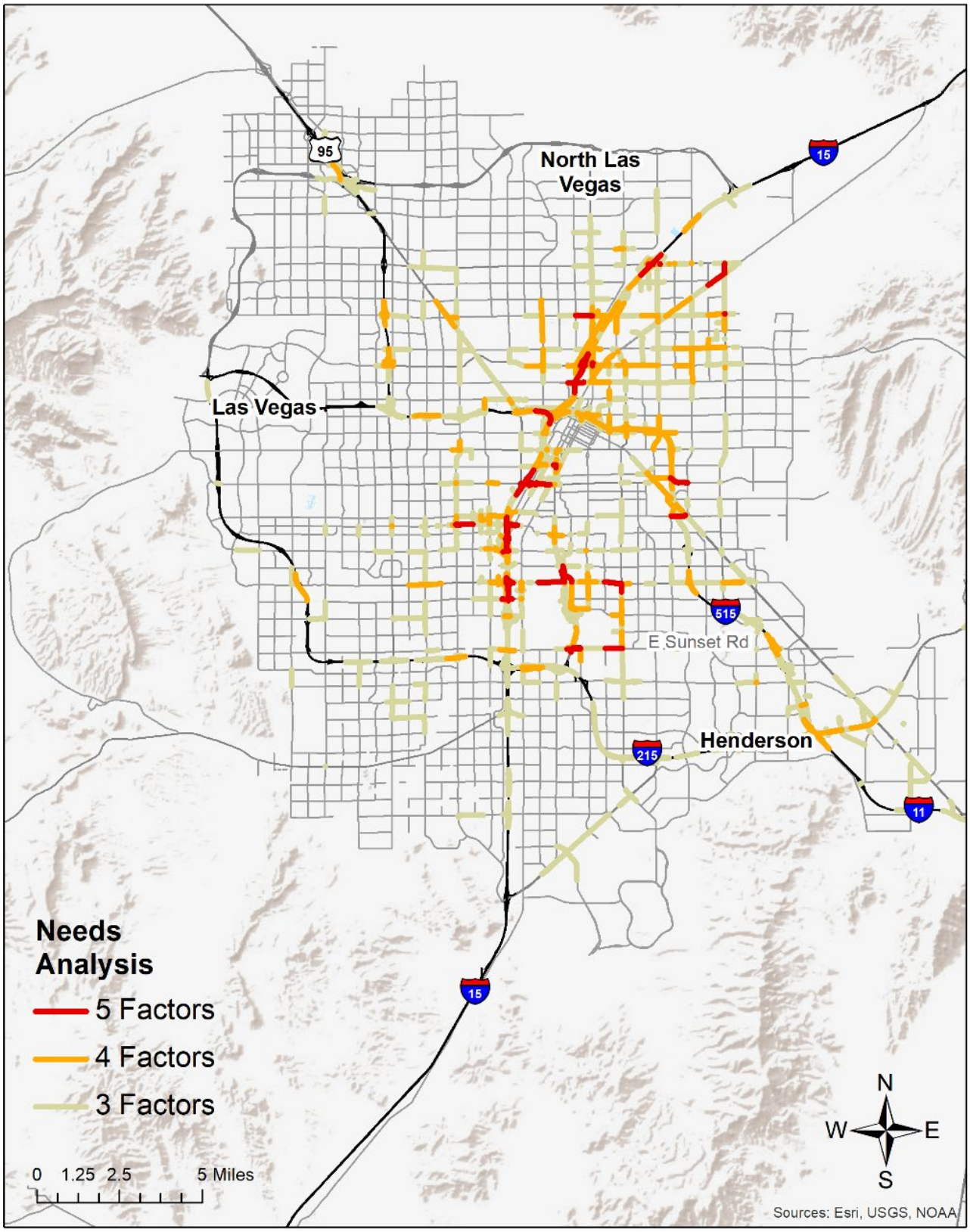
- **Transform Economies**: Segments with daily truck volumes greater than 2,000, ***or*** that are located in zip codes with more than 5 million square feet of warehouse space
- **Enhance Safety**: Segments with EPDO equivalents per mile greater than 50
- **Preserve Infrastructure**: Segments with poor pavement quality, ***or*** bridges in poor condition
- **Optimize Mobility & Foster Sustainability**: Segments with AM ***or*** PM PTI greater than 2.0
- **Connect Communities**: Segments located within an equity focus area with a score of 24 or greater

The Connect Communities factor is neither an indication the segment is important to freight, nor that there is a freight related issue. However, if a segment with a high freight need is also located in an equity focus area (the criteria for Connect Communities), then the resolution to the issue is also important to that equity focus area, and therefore is a higher priority.

The roadway segments with the highest freight needs are shown on **Figure 7.2**. Roadways shown in red are those where all five need factors overlap, while roadways in orange have at least 4 factors and roadways in beige show only three factors. As noted, all of these high priority segments must include the Transform Economies factor—either located on a segment with daily truck volumes greater 2,000, or in a zip code with more than 5 million square feet of warehouse space—in order to qualify as a segment important for freight.

All of the factors are weighted equally. A survey for weighting the goal areas was distributed to the FAC but the response wasn't sufficient to provide a representative sampling. In addition, demonstrating an equitable distribution of benefits is an increasingly important criteria for prioritizing projects and attracting federal funding. Therefore, it is important that the connect communities goal (provide economic opportunities, while reducing impacts, to equity focused communities) needs to be on an equal footing with the other goals.

Figure 7.2 Priority Freight Segments with the Greatest Combined Need



7.2.2 Unmet Freight Needs (Gap Analysis)

The RTC administers millions of dollars that are programmed in the Regional Transportation Plan (RTP) and the Capital Improvement Program (CIP). The priority freight segments, those with the greatest combined freight need, were overlaid onto programmed projects (see **Figure 7.3**) in order to identify gaps—segments with a freight need, but no programmed project to address the need. The programmed projects included all of the RTP projects, and the regionally significant CIP projects funded from the fuel revenue.

Some of the programmed projects, such as bike and pedestrian projects, would most likely not improve a safety, capacity or operational freight need. Therefore, the programmed projects were filtered by "project type" to only include those listed in **Table 7.1** under "Programmed Project Filters", while freight need criteria include only those listed under "Freight Need Criteria" (where at least one factor must be Transform Economies). The resulting unmet freight needs, with no programmed projects to address them, are shown in **Figure 7.4**.

Table 7.1 Project and Need Filters for Determining Unmet Freight Needs

Programmed Project Filters	Freight Need Criteria
Capacity projects—those that would increase capacity	**Transform Economies** (daily truck volumes greater than 2,000, or Warehouse space per zip code greater than 5 million square feet)
Interchange/Intersection projects—those that would improve interchanges or intersections	**Enhance Safety** (EPDO Equivalents less than 50 per mile)
Other—which primarily includes operational improvements	**Optimize Mobility & Foster Sustainability** (PTI greater than 2.0 during AM or PM peak)
	Connect Communities (located within an equity focus area with a score of 24 or greater)

Programmed maintenance and capacity projects were paired with pavement in poor quality criteria (see **Figure 7.5**); and programmed bridge and capacity projects were paired with bridges in poor condition (see **Figure 7.6**) to identify gaps in the Preserve Infrastructure factor. All segments must include Transform Economies, and the priority increases if those segments are also in an equity focus area with a score of 24 or greater.

Figure 7.3 All Programmed Projects Overlaid onto Segments with Priority Freight Needs

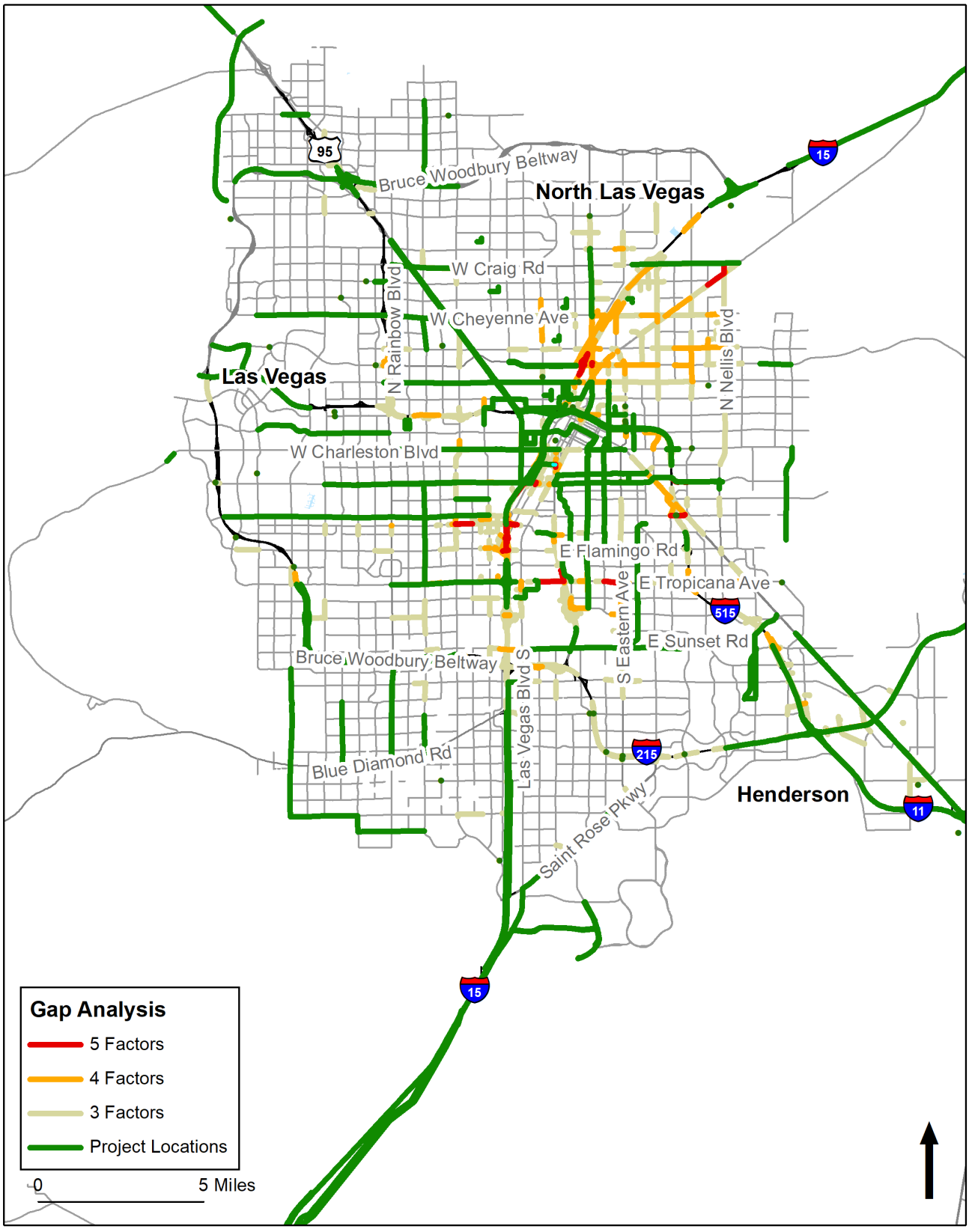


Figure 7.4 Unmet Freight Needs (Gaps in Programmed Projects by Safety, Mobility/Sustainability, Economy, and Connect Communities Need Factors)

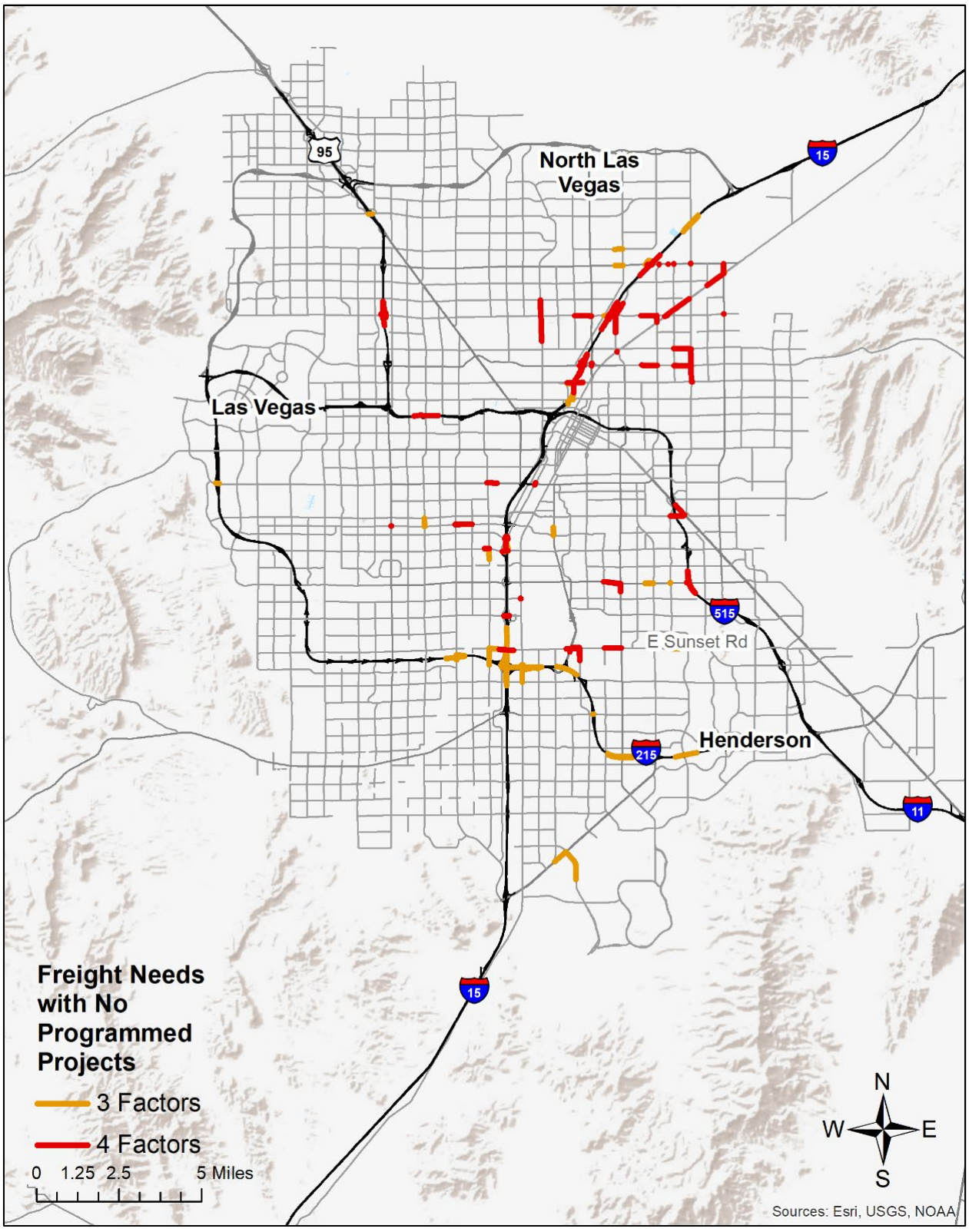


Figure 7.5 Gaps in Freight Need by Pavement Condition

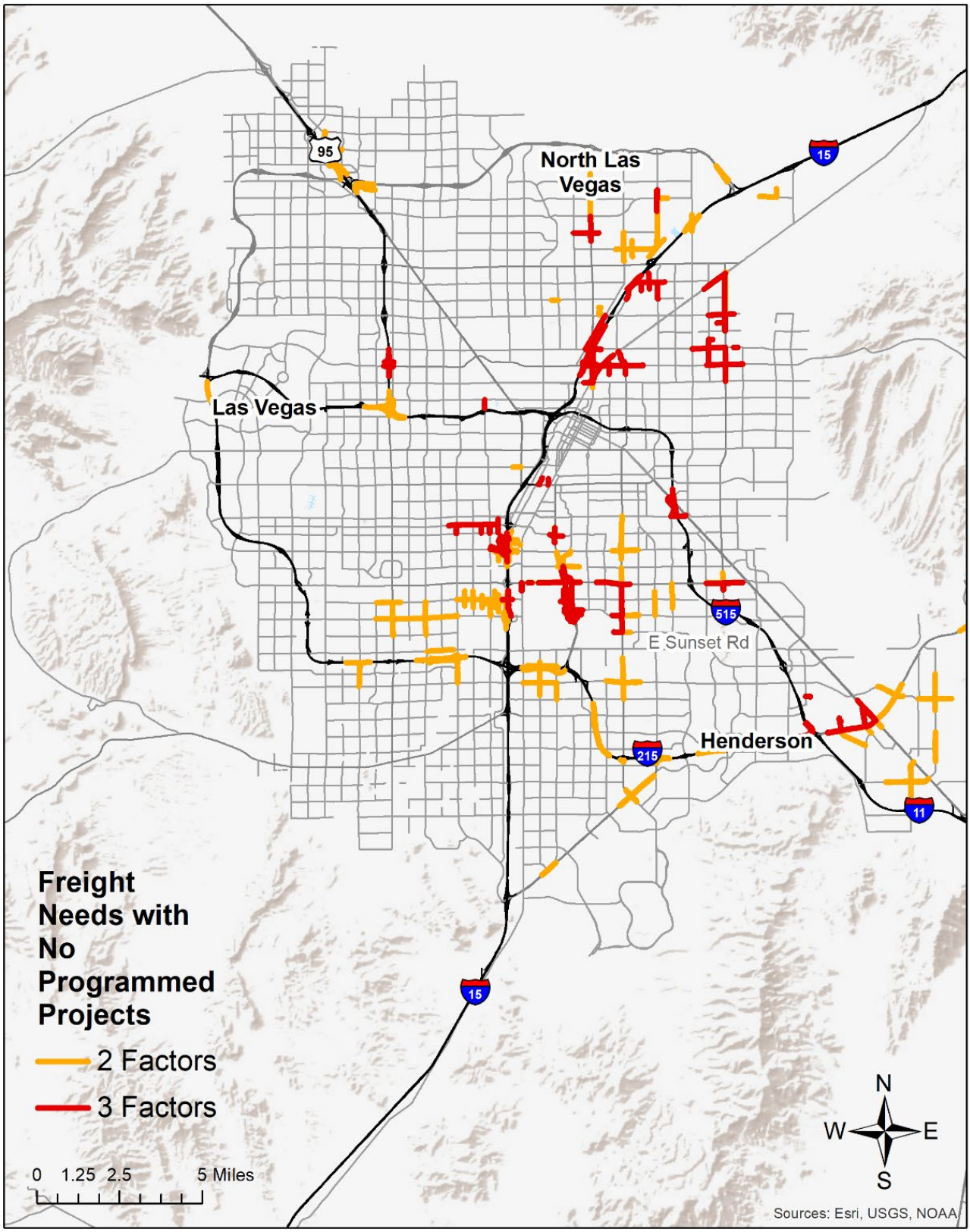
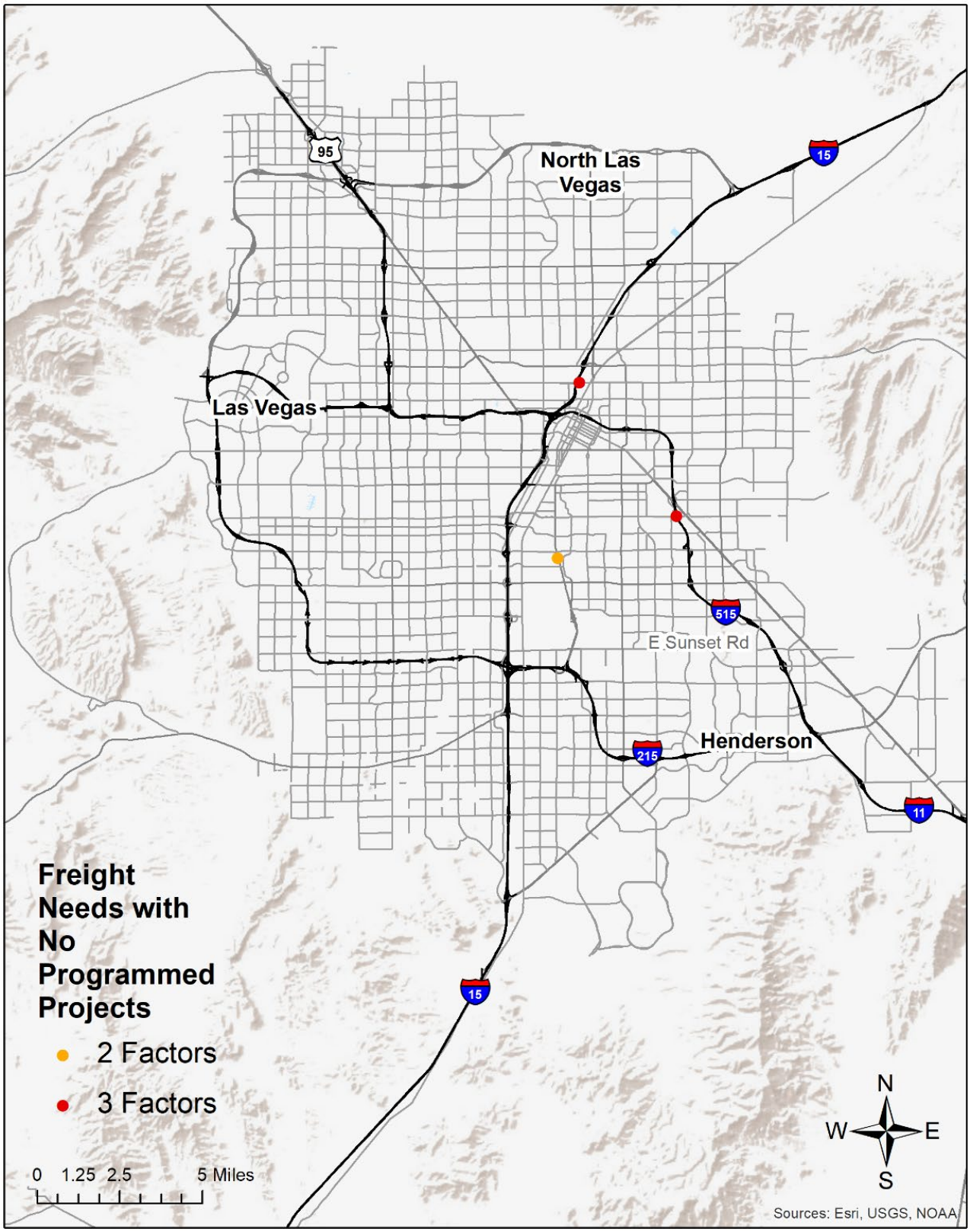


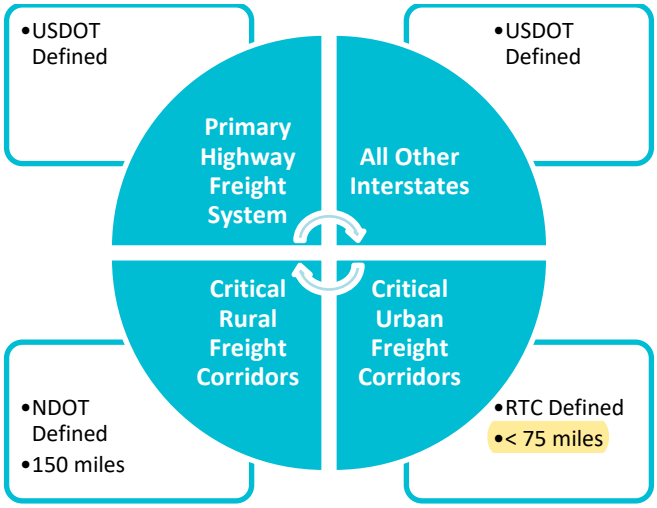
Figure 7.6 Gaps in Freight Need by Bridge Condition



7.2.3 Critical Urban Freight Corridors

Having a defined freight network is required to apply for certain federal funding opportunities. For instance, only projects on the National Highway Freight Network (NHFN) are eligible for funding from the National Highway Freight Program (NHFP). The NHFN is comprised of the Primary Highway Freight System (PHFS), all other Interstates, Critical Urban Freight Corridors (CUFCs), and Critical Rural Freight Corridors (CRFCs), as shown in **Figure 7.7**. According to FHWA guidance, the RTC, in consultation with NDOT, may define CUFCs within its MPO boundaries.

Figure 7.7 Makeup of the National Highway Freight Network



A public road designated as a CUFC must be in an urbanized area and meet one or more of the following four criteria:[38]

1. Connects an intermodal facility to the Primary Highway Freight System (PHFS), the Interstate System, or an intermodal freight facility (see).
2. Located within a corridor of a route on the PHFS and provides an alternative highway option important to goods movement (see).
3. Serves a major freight generator, logistic center, or manufacturing and warehouse industrial land (see).
4. Corridor that is important to the movement of freight within the region, as determined by the MPO or the State (see).

Figure 7.12 shows all roadway segments combined, and **Table 7.2** lists them. A case could be made for including many others should NHFP funding be desired on a roadway not listed. Because Interstate highways are already included in the NHFN, and therefore qualify for NHFP funding, it is not necessary to identify or designate them as CUFCs.

[38] https://ops.fhwa.dot.gov/fastact/crfc/sec_1116_gdnce.htm

Figure 7.8 Roadway Segments that Meet CUFC Criteria #1: Intermodal Connectivity

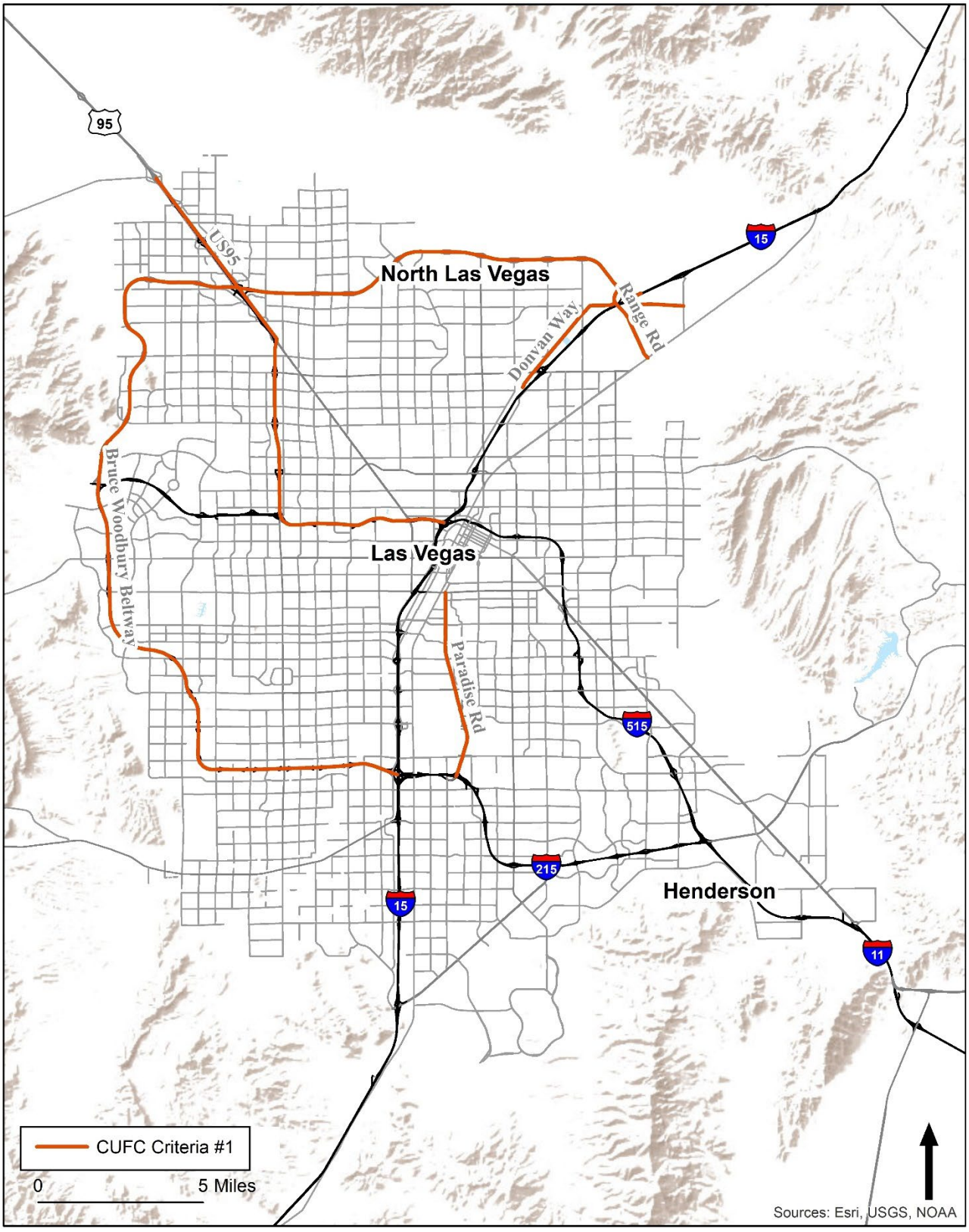


Figure 7.9 Roadway Segments that Meet CUFC Criteria #2: Alternate Routes

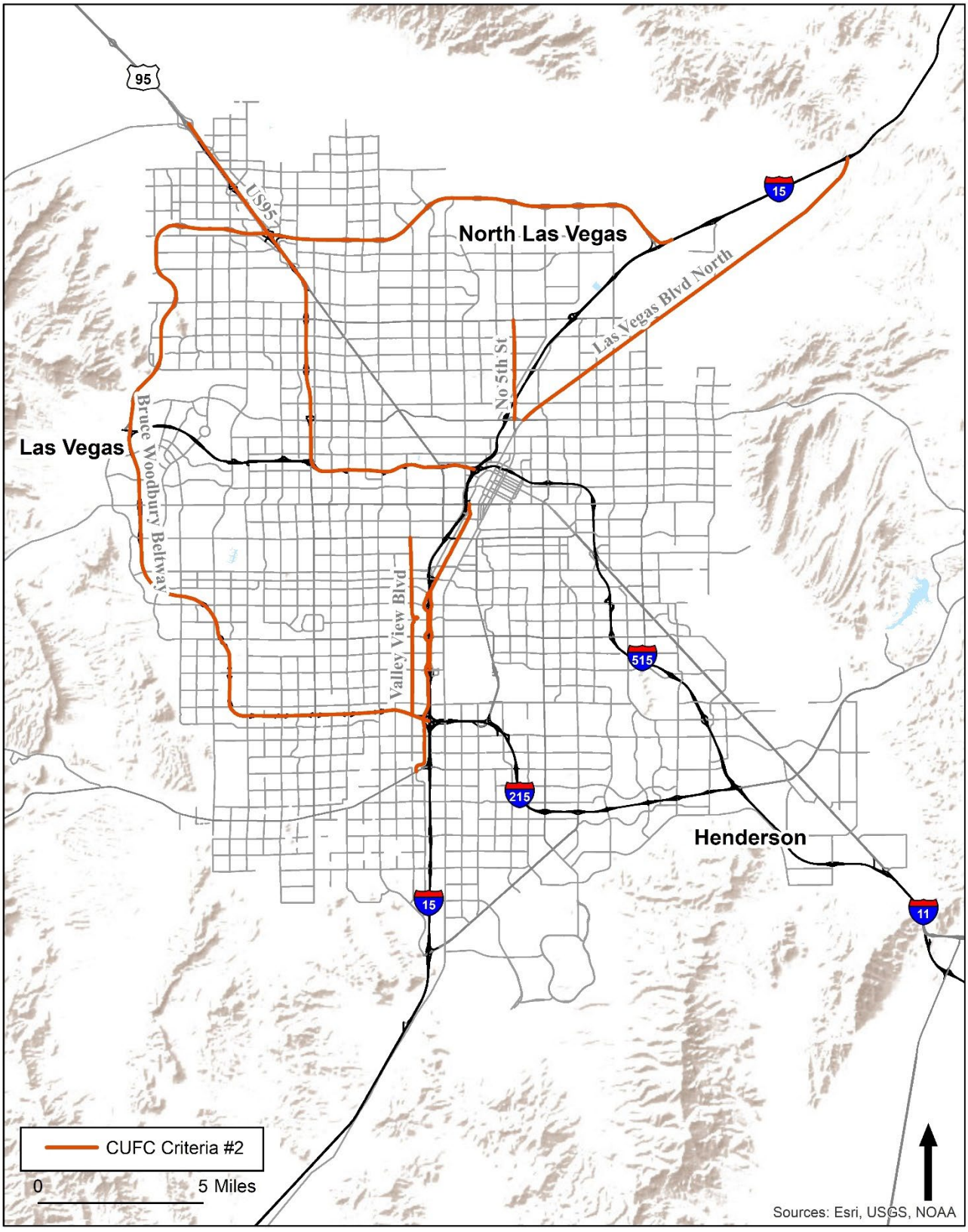


Figure 7.10 Roadway Segments that Meet CUFC Criteria #3: Logistics Connectivity

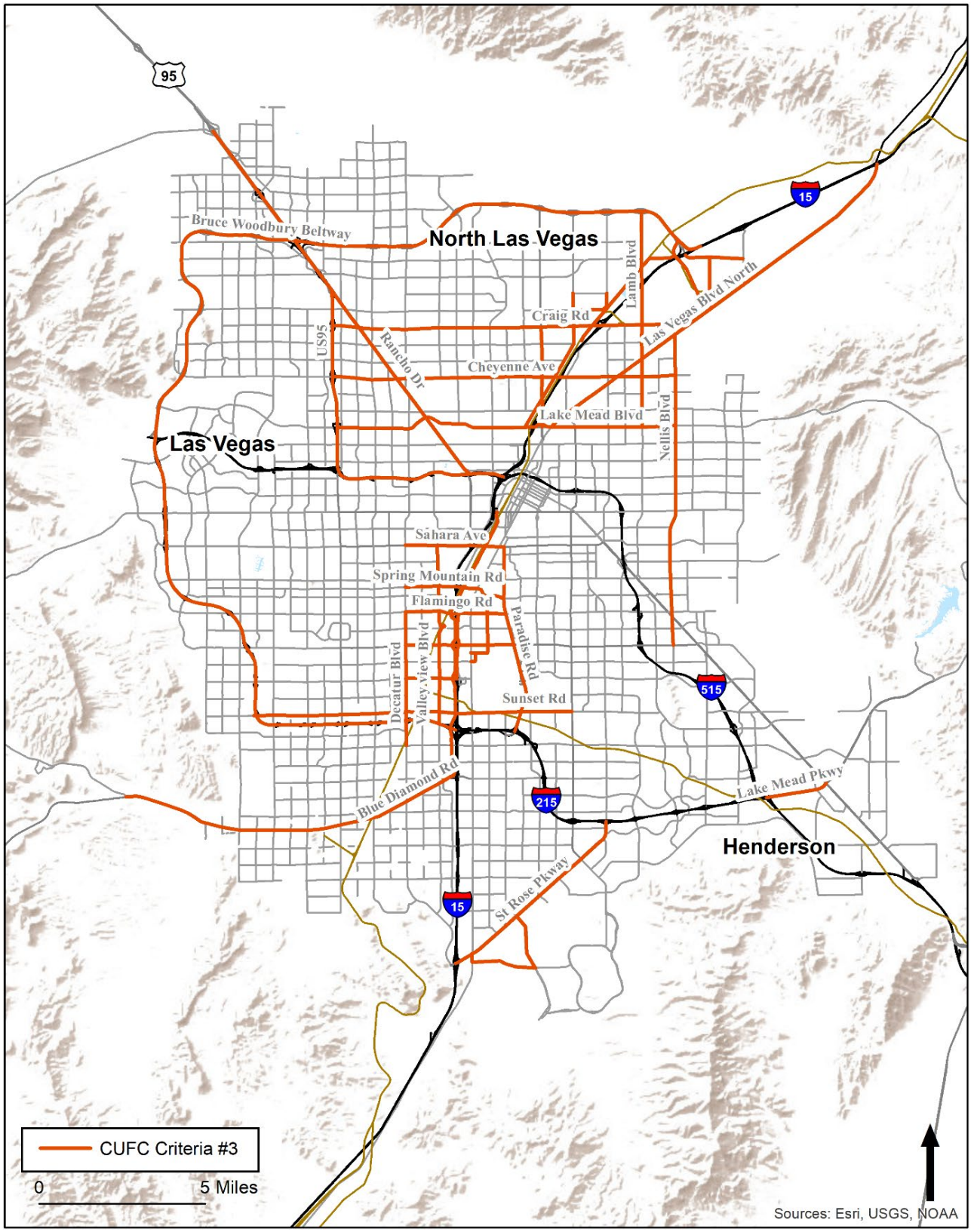


Figure 7.11 Roadway Segments that Meet CUFC Criteria #4: Regional Importance

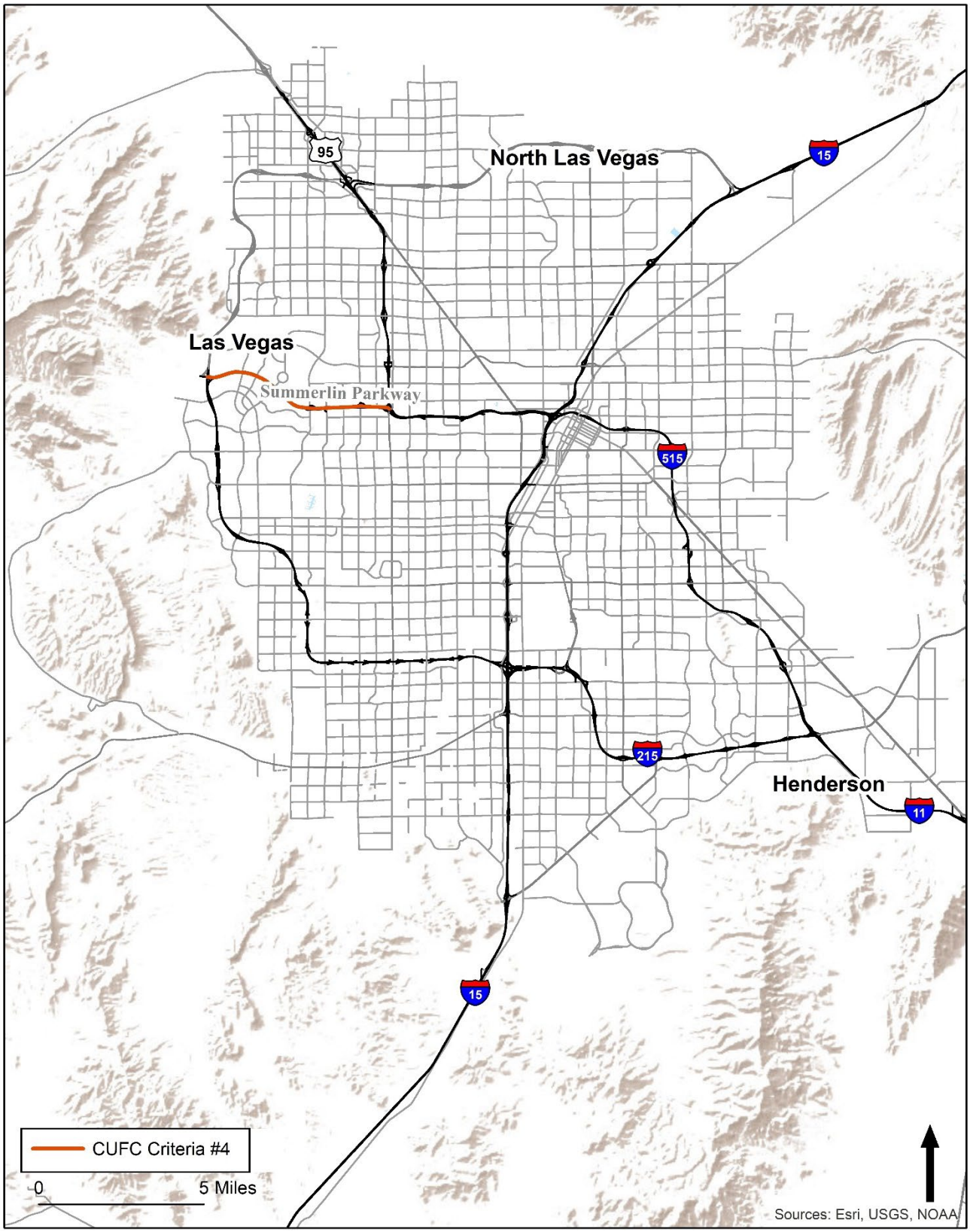


Figure 7.12 Roadway Segments that Meet all CUFC Criteria

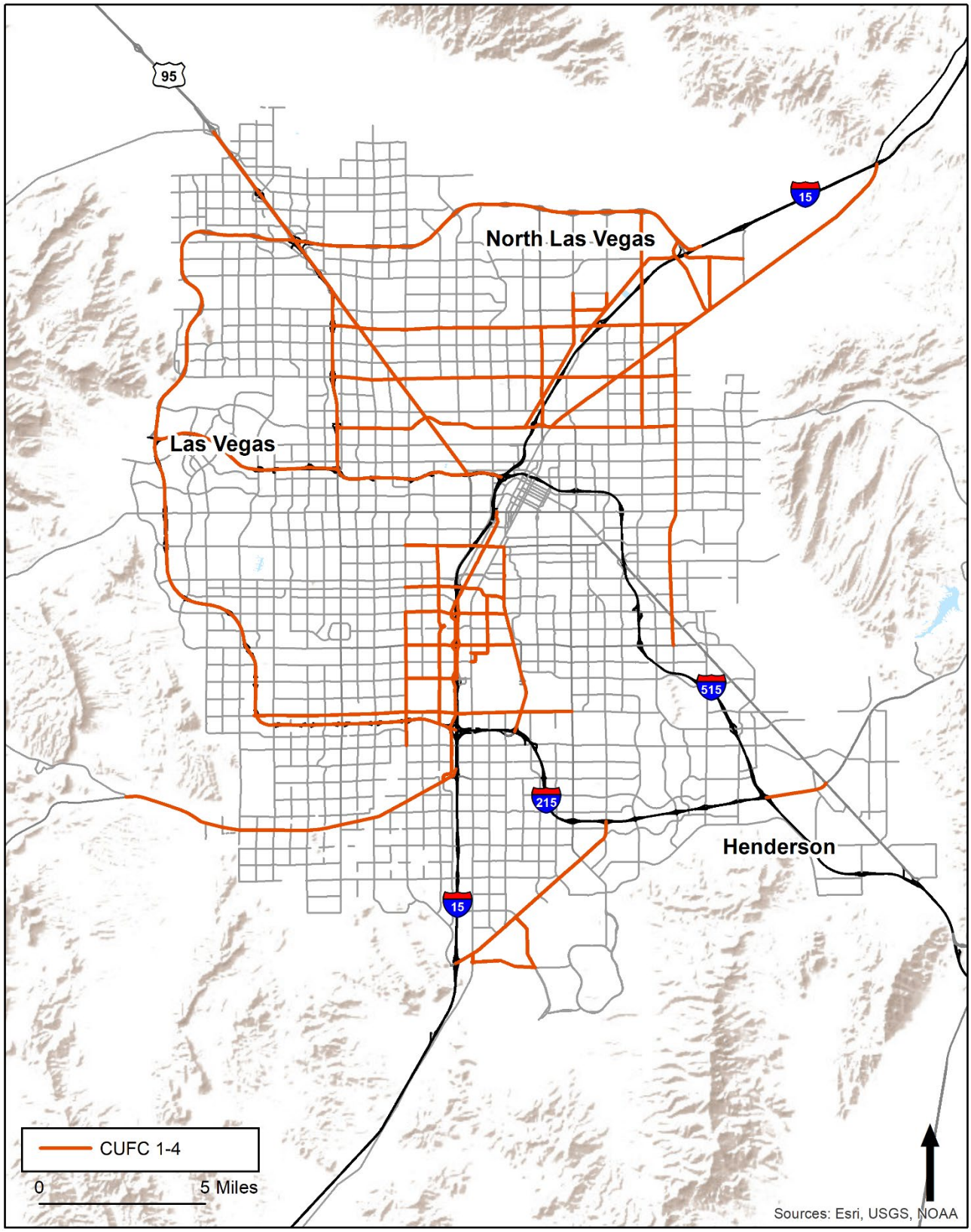


Table 7.2 Table of Roadway Segments that Meet all CUFC Criteria

Roadway	From	To	Length (miles)	Meets Criteria #
Bruce Woodbury Beltway	I-15	I-15	39.2	1, 2, 3
US95	157 (Kyle Canyon Rd)	I-15	16.6	1, 2, 3
Summerlin Pkwy	Bruce Woodbury Beltway	US95	5.9	4
Las Vegas Blvd North	I-15	Lake Mead Blvd	12.7	2, 3
Sloan Ln	Tropical Pkwy	Las Vegas Blvd North	1.6	3
Range Rd	Bruce Woodbury Beltway	Las Vegas Blvd North	2.5	1, 3
Tropical Pkwy	Bruce Woodbury Beltway	Hollywood Blvd	1.8	1, 3
Tropical Pkwy	Donovan Way	Range Rd	0.8	1, 3
Donovan Way	Tropical Pkwy	Southern terminus of Donovan Way	3.2	1, 3
Lamb Blvd	Bruce Woodbury Beltway	Lake Mead Blvd	6.5	3
Craig Rd	US95	Las Vegas Blvd North	10.8	3
Pecos Rd	Washburn Rd	Lone Mountain Rd	0.7	3
Lone Mountain Rd	Losee Rd	Pecos Rd	0.7	3
Losee Rd	Washburn Rd	Lake Mead Blvd	4.4	3
No 5th St	Craig Rd	Lake Mead Blvd	3	2, 3
Cheyenne Ave	US95	Nellis Blvd	10.3	3
Nellis Blvd	Craig Rd	Tropicana Ave	10	3
Lake Mead Blvd	US95	Nellis Blvd	10.4	3
Rancho Dr	US95	US95	7	3
Paradise Rd	Sahara Ave	Airport Connector	5	1, 3
Airport Connector	Paradise Rd	Bruce Woodbury Beltway	0.6	1, 3
Industrial Rd	Charleston Blvd	Sahara Ave	1.1	2, 3
Sammy Davis Jr Dr	Sahara Ave	Frank Sinatra Dr	3.1	2, 3
Frank Sinatra Dr	Sammy Davis Jr Dr	Russell Rd	1.1	2, 3
Dean Martin Dr	Sammy Davis Jr Dr	Blue Diamond Rd	5.9	2, 3
Giles St	S Las Vegas Blvd	Reno Ave	0.4	3
Reno Ave	S Las Vegas Blvd	Koval Ln	0.5	3
Koval Ln	Sands Ave	Reno Ave	1.7	3
Sahara Ave	Decatur Blvd	Paradise Rd	3	3
Spring Mountain Rd	Decatur Blvd	S Las Vegas Blvd	2.2	3
Sands Ave	S Las Vegas Blvd	Paradise Rd	0.9	3
Flamingo Rd	Decatur Blvd	Paradise Rd	3	3
Tropicana Ave	Decatur Blvd	Paradise Rd	3.2	3
Russell Rd	Decatur Blvd	I-15	1.5	3
Sunset Rd	Bruce Woodbury Beltway	Eastern Ave	9.6	3

Roadway	From	To	Length (miles)	Meets Criteria #
Valley View Blvd	Sahara Ave	Bruce Woodbury Beltway	5.6	2, 3
Decatur Blvd	Flamingo Rd	Warm Springs Rd	4.02	3
Blue Diamond Rd	SR 160 / SR 159	I-15	10.6	3
St Rose Pkwy	I-215	I-15	6.4	3
Lake Mead Pkwy	I-515	Boulder Hwy	1.9	3
Raiders Way	St Rose Pkwy	Volunteer Blvd	1.7	3
Volunteer Blvd	Raiders Way	Las Vegas Blvd	1.9	3
		Total Miles	223	

Unfortunately, Nevada is only allowed to designate 150 miles of CUFCs, far fewer than actually meet the criteria and could qualify. Most states are in a similar position of having a far greater number of qualified CUFCs than they are able to designate, and therefore most have made the decision to only designate portions of their freight network for which they have a programmed project they wish to fund using the NHFP. It is recommended that the RTC discuss a similar approach with NDOT in order to give the RTC maximum flexibility in funding freight projects.

Recommended Action

Coordinate with NDOT to submit CUFC designation requests to FHWA. Designated CUFC segments should be those that include the project limits of projects that are good candidates NHFP funding. This gives the RTC the flexibility to seek NHFP funding if it is determined feasible at some time without having to submit an amended CUFC designation request to FHWA.

7.2.4 Recommended Infrastructure Improvement Studies

Critical freight corridors in Southern Nevada include Interstate highways and the CUFCs (see **Figure 7.12** and **Table 7.2**). Unmet freight needs located on these critical freight corridors, shown in **Figure 7.13**, need to be studied to identify the causes of the problems and recommend projects for addressing them. **Table 7.3** groups many of the smaller unmet freight needs into logical corridors or study areas.

Figure 7.13 Unmet Freight Needs on Critical Freight Corridors

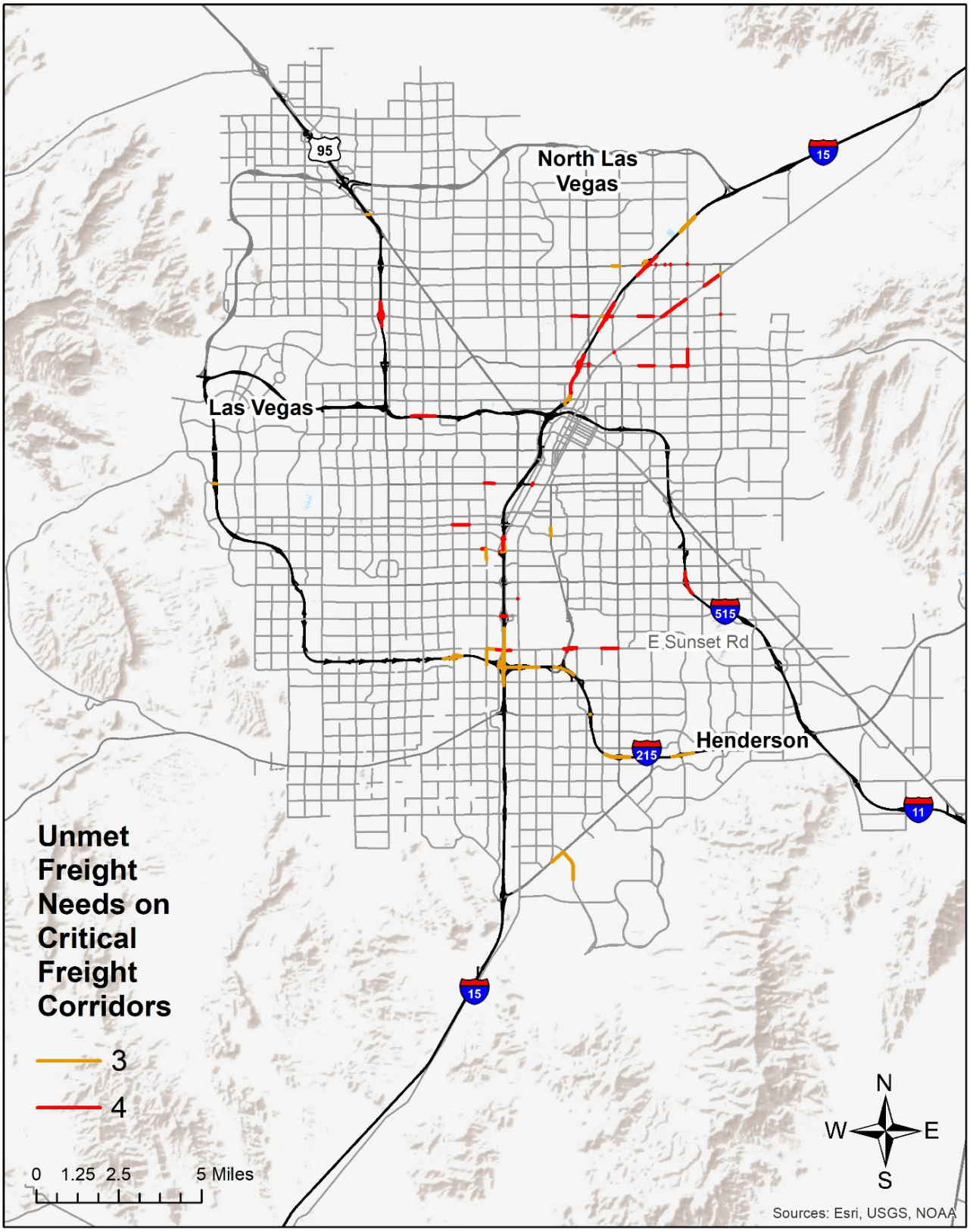


Table 7.3 Recommended Highway Freight Improvement Studies Located on Critical Freight Corridors

Roadway	From	To	Priority Freight Score	Notes
I-15 North	Lamb Blvd	Washington Ave	4 and 5	Including interchanges and ½ mile either side
Craig Rd	North 5th St	Las Vegas Blvd	4 and 5	Needs Losee, Mitchell, McGuire, Walnut
Cheyenne Ave	Commerce St	Las Vegas Blvd	4 and 5	
Lake Mead Blvd	Eastern Ave	Lamb Blvd	5	
Las Vegas Blvd	Speedway Blvd	Cheyenne Ave	4 and 5	
Lamb Blvd	Carey Ave	Lake Mead Blvd	5	
US95	Cheyenne Ave	Cheyenne Ave	5	Mainline, ramps and ½ mile either side of Interchange
US95	Summerlin Pkwy	Decatur Blvd	5	Westbound
Sahara Ave	Valley View Blvd	Spanish Oaks Dr	5	
Industrial Rd	Sahara Ave	Sahara Ave	5	Intersection
Sammy Davis Jr Dr	Frank Sinatra Dr	Twain Ave	5	
Twain Ave	Sammy Davis Jr Dr	Frank Sinatra Dr	5	
Spring Mountain Rd	Decatur Blvd	Arville St.	5	
Paradise Rd	Edison Cir	Sands Ave	4	
Valley View Blvd	Flamingo Rd	Harmon Ave	4	
Flamingo Rd	Hugh Heffner Dr	Valley View Blvd	4 and 5	
I-15	Flamingo Rd	Flamingo Rd	4 and 5	Interchange
Russell Rd	I-15	I-15	5	At interchange
Sunset Rd	Valley View Blvd	Eastern Ave	4 and 5	
Southern Beltway	Decatur Blvd	Green Valley Parkway	4	Needs at Decatur, I-15 (including interchange ramps), Airport Connector, Eastern, Green Valley)
I-515	Tropicana Ave	Tropicana Ave	5	Northbound lanes, ½ mile either side
Raiders Way	St Rose Pkwy	Bowes Ave	4	
St Rose Pkwy	Raiders Way	Bermuda Rd	4	

Recommended Action

Study each of the highway segments noted in Table 7.3 to identify the causes of the problems and recommend projects for addressing them. The grouping of segments in the Northeast portion of the Las Vegas metropolitan area could be studied together, as this is the fastest growing warehousing area within the RTC boundaries, and thus will have increasing freight needs in the near future. The City of North Las

Vegas, Clark County, NDOT, and Nellis Air Force Base have jurisdiction over the roads in this area and so would all be key stakeholders in the study.

7.2.5 Programmed Projects Prioritized by Freight Need

Programmed projects with the greatest benefit for goods movement can also be prioritized by overlaying them onto prioritized freight needs and critical freight corridors. The categories of programmed—Capacity, Interchange/Intersection, and Other—that overlap with three, four, or five prioritization factors are of increasingly high priority for goods movement. Programmed projects that overlap with multiple roadway segments are assigned the same score as the overlapped segment with the highest freight need. Twenty-three programmed projects overlap with priority freight needs on critical freight corridors as shown in **Figure 7.14** and **Table 7.4**.

Figure 7.14 Map of Programmed Projects Prioritized by Freight Need

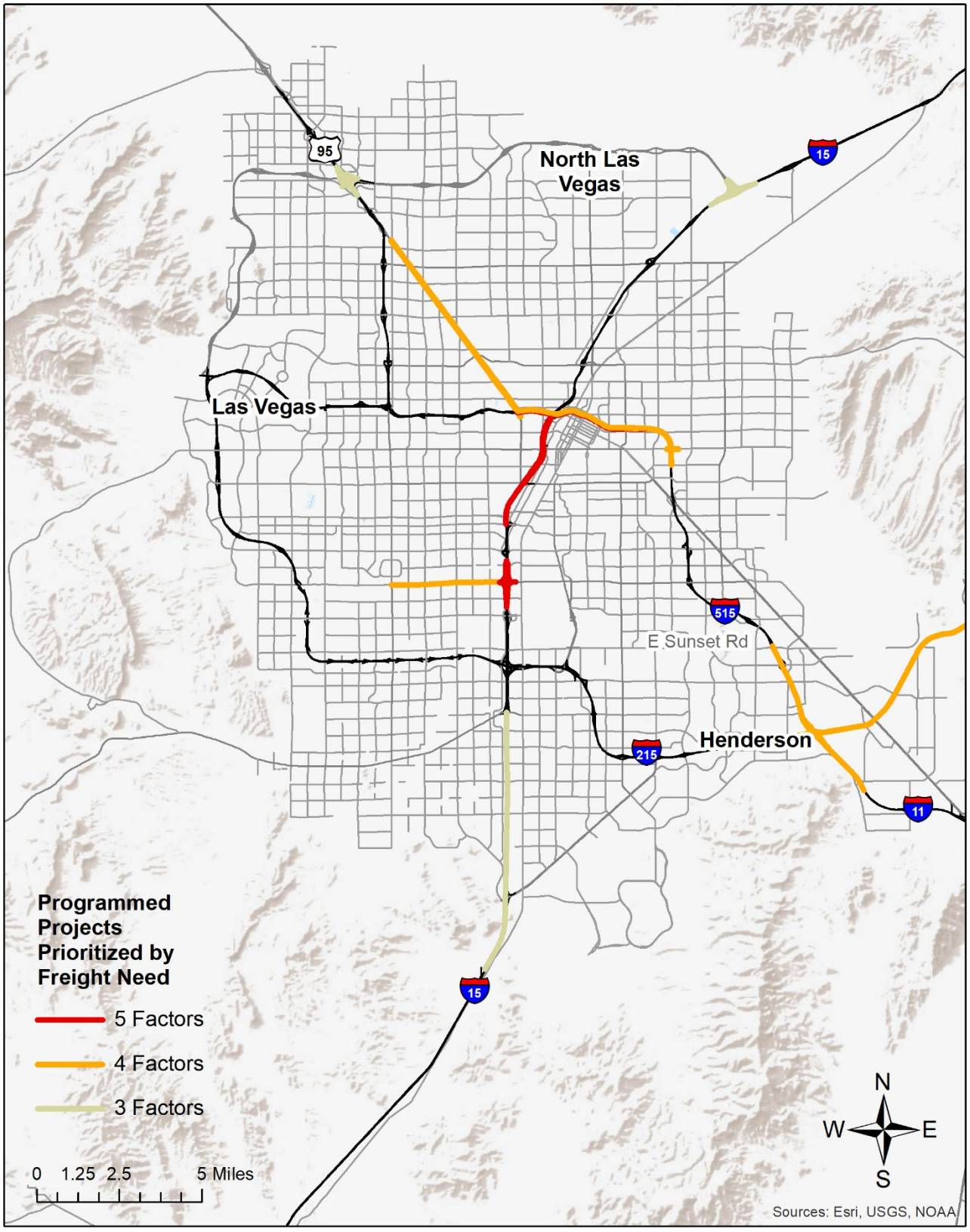


Table 7.4 Table of Programmed Projects Prioritized by Freight Need

Project ID	Project Title	Project Sponsor	Priority Freight Score
CL20180048	I 515 Widening and HOV Ramps MLK to Charleston - NEPA	NDOT	5
CL20170039	Tropicana Interchange Reconstruction; Harmon HOV ramps	NDOT	5
CL20190039	Neon Future Phase B1, I-15 Nb Fm Sahara To Spaghetti Bowl, Ramp Braiding - Future Project	NDOT	5
CL20200030	Neon Future Phase B2, I-15 From Spring Mountain To Spaghetti Bowl, Reconstruct Sahara Interchange - Future Project	NDOT	5
CL20170039	I-15 At Tropicana Ave; Interchange Improvements (Package 1)	NDOT	5
CL20180049	I-515/ US-95 From US-95 Ranch Blvd To Mojave Rd I-515; Mileposts US-95 76.75 To I-515 72.77 Package 1 Nepa (Downtown Access Project Nepa)(Amended Under 19-27)	NDOT	5
N/A	Tropicana Avenue	Clark County	4
037B-MVFT	Rancho Drive	City of Las Vegas	4
CL20180052	I 11/I 215/I 515/SR 564 Henderson Bowl NEPA	NDOT	4
CL20130030	I 515 Charleston Blvd. Interchange	NDOT	4
N/A	Rancho Drive (NEPA)	City of Las Vegas	4
N/A	Rancho Drive	City of Las Vegas	4
N/A	Lake Mead Parkway SR564 Corridor (PE ROW CON)	City of Henderson	4
CL20130030	I-515 Charleston Blvd. Interchange	NDOT	4
CL20190056	I-15 Northbound Truck Climbing Lane Sandhill Road	NDOT	4
CL20200005	I-15 Nb Truck Climbing Lane 1	NDOT	4
CL20200111	I-15 North, Widening Lanes From Apex To Garnet Package 3	NDOT	4
CL20200028	I-11/I-215/I-515/SR 564 Henderson Bowl Pe And Construction (Amended Under 19-03)	NDOT	4
CL20180050	I-515/ US-95 From US-95 Ranch Blvd To Mojave Rd I-515; Mileposts US-95 76.75 To I-515 72.77 (Downtown Access Project) (Amended Under 19-27)	NDOT	4
CL20160086	US 95 NW PHASE 3D, MP 88 AND CC215 from Grand Montecito to Tenaya, MP CL 37-39 and US 95 at Lone Mountain MP CL 89.43	NDOT	3
CL20140033	I 15/CC 215 System to System Interchange	NDOT	3
N/A	Rancho Drive	City of Las Vegas	3
CL20200031	I-15 South - Construct/Widen Package 2 (Sloan Rd. To Blue Diamond Rd.)-Future Project	NDOT	3

7.3 Summary of Recommended Transformational Policies and Infrastructure Improvements

The recommended actions for each of the transformational policies and infrastructure improvements are summarized in **Table 7.5**.

Table 7.5 Recommended Actions for Implementing Transformational Policies and Infrastructure Improvements

Transformational Improvement	Recommended Action(s)
Smart Logistics Village	Support GOED in efforts to attract private development of a smart logistic village, including intermodal and rail access, and improved intermodal service to the Ports of Los Angeles and Long Beach.
Workforce Access	Conduct a study to improve workforce access to logistics jobs. The study should identify where the current and potential labor pool resides, the location and number of current and forecasted logistics jobs, the current transit options for connecting them, and model strategies for improving access. Strategies could include fixed route transit, car and van pooling, and other shared mobility options.
Truck Parking	Conduct a regional truck parking implementation plan to identify feasible sites, technologies, and funding sources for public investment in truck parking; to encourage and support private investment; and to develop uniform policies supported by NDOT and all local jurisdictions to ensure the need for parking does not continue to worsen.
Zero Emissions Fuel Infrastructure	Support NDOT during preparation of the State EV Infrastructure Deployment Plan, and any implementation actions that come out of it, in order to encourage the development and availability of zero emission fuel infrastructure for heavy trucks.
Convention Marshalling Yard	Conduct a convention marshalling yard feasibility study and action plan. The study should identify a feasible site, delineate private industry involvement in development and operations, estimate the capital and operational costs, and develop a traffic operational strategies for moving freight during conventions. A final task will be to assimilate the data collected into an economic analysis that describes the costs and benefits of developing the marshalling yard vs doing nothing. The outputs of the study can be used to secure private investment, and local, state, and federal funding.
Megaregional Cooperation	Support NDOT, as the lead agency for multistate cooperation, through participation in the I-15 Mobility Alliance and other targeted projects or initiatives; especially those that aim to improve safety and travel time on the interstate crossroads (I-15 and I-11) so important to Southern Nevada's logistics industry for the access they provide to California, the Intermountain West, the rest of the U.S., and Mexico.
Preserve Access for OS/OW Vehicles	Raise the minimum bridge height standard of interchanges and other overhead structures to 17 feet. Conduct a feasibility study of raising the bridges over I-15 at UPRR mainline and at Pabco Road; over Las Vegas Boulevard at the UPRR mainline; and over I-11 at Wagon Wheel Drive.
Infrastructure Improvements	Study each of the highway segments noted in Table 7.3 to identify the causes of the problems and recommend projects for addressing them. The grouping of segments in the Northeast portion of the Las Vegas metropolitan area could be studied together, as this is the fastest growing warehousing area within the RTC boundaries, and thus will have increasing freight needs in the near future. The City of North Las Vegas, Clark County, NDOT, and Nellis Air Force Base have jurisdiction over the roads in this area and so would all be key stakeholders in the study.
Critical Urban Freight Corridors	Coordinate with NDOT to submit CUFC designation requests to FHWA. Designated CUFC segments should be those that include the project limits of projects that are good candidates NHFP funding. This gives the RTC the flexibility to seek NHFP funding if it is determined feasible at some time without having to submit an amended CUFC designation request to FHWA.

Appendix A. Commodity Flow

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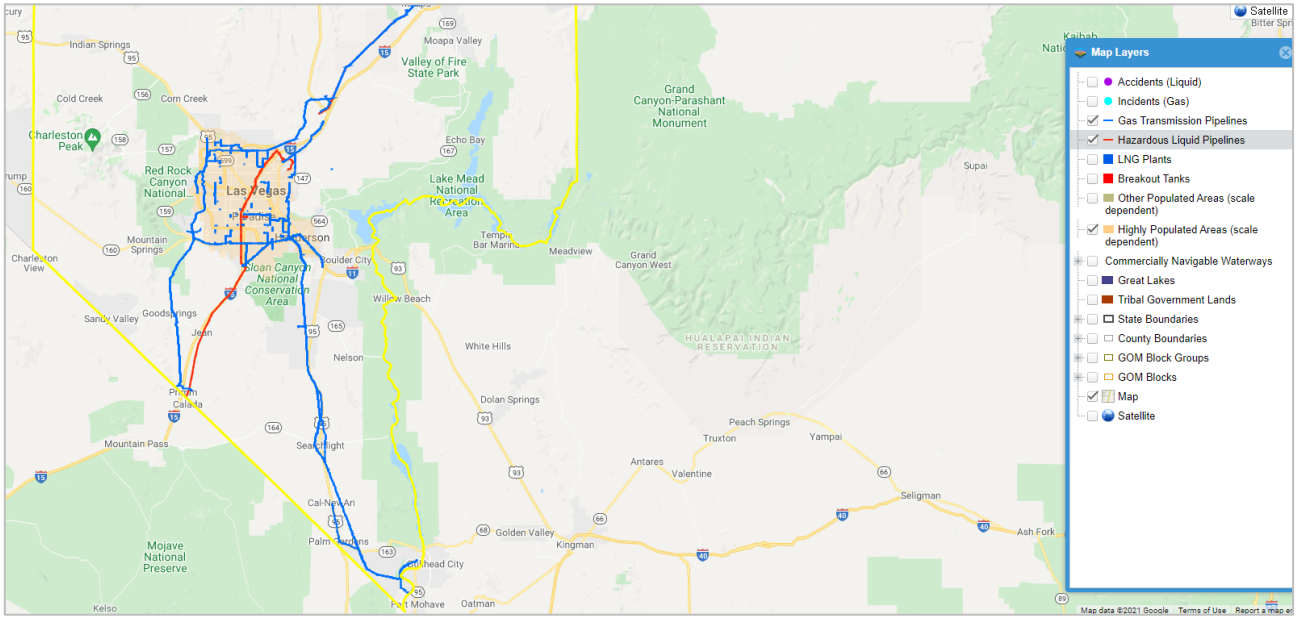
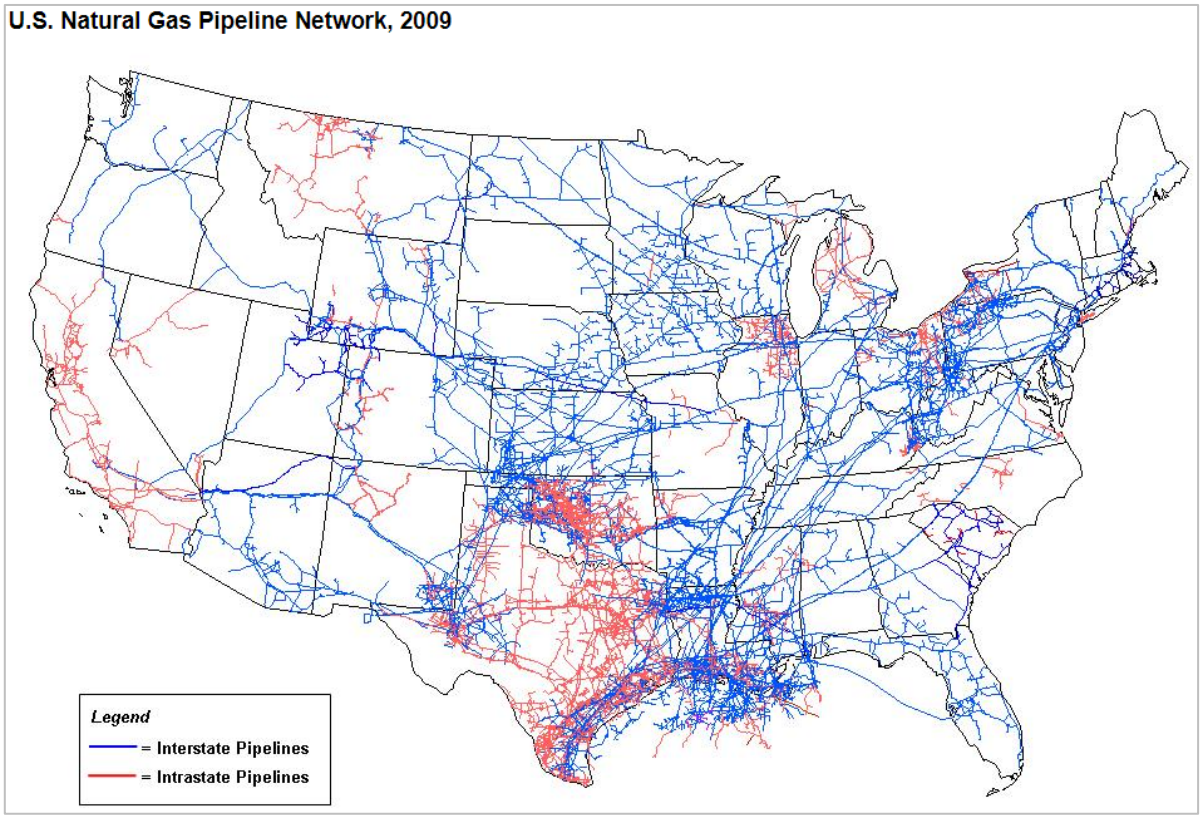
A.1 Las Vegas Area Pipeline Map



A.2 National Natural Gas Pipeline Map



A.3 FAF Data (SCTG[39] code) and RTC Commodity Codes

STCG2	Commodity	RTC CG	Name	FAF4 TPEF
1	Live animals/fish	1	Agricultural	21.72
2	Cereal grains	1	Agricultural	28.43
3	Other ag prods.	1	Agricultural	22.19
4	Animal feed	1	Agricultural	22.92
5	Meat/seafood	4	Food	15.72
6	Milled grain prods.	4	Food	9.37
7	Other foodstuffs	4	Food	17.81
8	Alcoholic beverages	4	Food	18.69
9	Tobacco prods.	4	Food	11.29
10	Building stone	8	Minerals	26.69
11	Natural sands	8	Minerals	29.78
12	Gravel	8	Minerals	32.96
13	Nonmetallic minerals	8	Minerals	31.56
14	Metallic ores	8	Minerals	31
15	Coal	3	Coal, Oil & Gas	34.95
16	Crude petroleum	3	Coal, Oil & Gas	24.01
17	Gasoline	3	Coal, Oil & Gas	21.11
18	Fuel oils	3	Coal, Oil & Gas	27.88
19	Coal-n.e.c.	3	Coal, Oil & Gas	20.01
20	Basic chemicals	2	Chemicals	21.79
21	Pharmaceuticals	2	Chemicals	14.41
22	Fertilizers	2	Chemicals	23.79
23	Chemical prods.	2	Chemicals	20.05
24	Plastics/rubber	9	Plastic, Logs, Wood & Paper	14.26
25	Logs	9	Plastic, Logs, Wood & Paper	25.77
26	Wood prods.	9	Plastic, Logs, Wood & Paper	19.5
27	Newsprint/paper	9	Plastic, Logs, Wood & Paper	21.81
28	Paper articles	9	Plastic, Logs, Wood & Paper	11.04
29	Printed prods.	6	Misc Manufactures	10.26
30	Textiles/leather	6	Misc Manufactures	12.38
31	Nonmetal min. prods.	6	Misc Manufactures	31.39
32	Base metals	6	Misc Manufactures	15.1
33	Articles-base metal	6	Misc Manufactures	15.07
34	Machinery	5	Machinery & Electronics	16.76
35	Electronics	5	Machinery & Electronics	13.14
36	Motorized vehicles	10	Transportation Equipment	17.43
37	Transport equip.	10	Transportation Equipment	23.54
38	Precision instruments	5	Machinery & Electronics	9.49
39	Furniture	6	Misc Manufactures	14.17
40	Misc. mfg. prods.	6	Misc Manufactures	14.84
41	Waste/scrap	7	Mixed and Unknown Freight, Waste and Scrap	23.44
43	Mixed freight	7	Mixed and Unknown Freight, Waste and Scrap	26.53
99	Unknown	7	Mixed and Unknown Freight, Waste and Scrap	-

[39] Standard Classification of Transported Goods

Code	Commodity
1	Agricultural
2	Chemicals
3	Coal, Oil & Gas
4	Food
5	Machinery & Electronics
6	Misc. Manufactures
7	Mixed, Unknown Freight, Waste and Scrap
8	Minerals
9	Plastic, Logs, Wood & Paper
10	Transportation Equipment