

# Nevada Truck Parking Implementation Plan

## *Task 4: Draft Needs Assessment—Truck Parking Demand and Gap Analysis*



*prepared for*  
Nevada Department  
of Transportation

*prepared by*  
Cambridge Systematics, Inc.  
*with*  
American Transportation Research Institute  
Horrocks Engineers  
Silver State Traffic Data Collection

March 21, 2019



*draft report*

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*prepared for*

**Nevada Department of Transportation**

*prepared by*

**Cambridge Systematics, Inc.**  
515 S. Figueroa Street, Suite 1975  
Los Angeles, CA 90071

*with*

American Transportation Research Institute  
Horrocks Engineers  
Silver State Traffic Data Collection

*date*

**March 22, 2019**

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## Acronyms and Abbreviations

AADTT	Annual average daily truck traffic
ATRI	American Transportation Research Institute
ELD	electronic logging device
FMCSA	Federal Motor Carrier Safety Administration
FHWA	Federal Highway Administration
HCW	high cube warehouse
HOS	hours of service
ITE	Institute of Transportation Engineers
NATSO	National Association of Truck Stop Operators
NCTP	National Coalition on Truck Parking
NDOT	Nevada Department of Transportation
OOIDA	Owner-Operator Independent Drivers Association



## 1.0 Introduction

Safe and sufficient truck parking has long been a need in the United States. Whether for a quick stop near an urban area to wait for congestion to clear or a business' delivery window to open, or an overnight break to sleep in the middle of a cross-country trip, truck parking is a key concern for:

- Commercial Motor Vehicle drivers.
- Industries that rely on efficient truck-deliveries.
- Consumers who increasingly order goods online and demand expedited delivery service.
- Residents and communities along truck corridors.
- Government agencies who regulate the industry, enforce statutes, pass zoning ordinances, and build and maintain highways and parking infrastructure.

In response to this need, the Nevada Department of Transportation (NDOT) is conducting The Nevada Truck Parking Implementation Plan which will develop a plan for expanding, improving, and integrating freight truck parking and truck parking communications systems in response to Jason's Law, rising demand, changing technology, and safety standards . When implemented by NDOT or the appropriate local transportation agencies, these improvements will help truck drivers by providing adequate and safe public truck parking where it's most needed and enhanced real-time truck parking availability information.

This Implementation Plan consists of the following key tasks:

- Stakeholder Outreach and Coordination.
- Data Collection.
- Needs Assessment.
- Recommendations.
- Implementation Plan.
- Final Report.

This technical memo is part of the Needs Assessment task, and is focused on quantifying the demand for truck parking in Nevada and calculating the gap between demand and supply. A separate Truck Parking Supply technical memo was also prepared to support this effort. The remainder of this document consists of the following sections:

- Section 2—Federal Highway Administration (FHWA) Demand Analysis.
- Section 3—Demand Analysis Using ATRI Origin-Destination Data.
- Section 4—Urban Parking Analysis.
- Section 5—Utilization Analysis.
- Section 6—Summarized Truck Parking Gap Analysis.

Finally, four appendixes provide additional details and methodology behind the analysis conducted in this study.





## 2.0 Truck Parking Demand Analysis

This section details the two methodological approaches used to calculate truck parking demand and provides results for the freight corridors included in the analysis: I-15, I-80, US 395/I-580, US 93, and US 95.<sup>1</sup>

The demand for truck parking is based on a number of factors. Hours of service (HOS) regulations developed by the Federal Motor Carrier Safety Administration (FMCSA), summarized in Table 2.1, are one of the key contributing factors. In addition, shipper and receiver delivery needs, and driver preferences for stopping locations and amenities also influence where trucks park.

**Table 2.1 Summary of Federal HOS Regulations**

HOS Provision	Description
<b>11-Hour Driving Limit</b>	Drivers may drive a maximum of 11 hours after 10 consecutive hours off duty. All time spent at the driving controls of a commercial motor vehicle (CMV) in operation is considered driving time.
<b>14-Hour Driving Limit</b>	Property-carrying drivers may not drive beyond the 14 <sup>th</sup> consecutive hour after coming on duty, following 10 consecutive hours off duty.
<b>Rest breaks</b>	Drivers may drive only if eight hours or less have passed since the end of the driver's last off-duty or sleeper berth period of at least 30 minutes.
<b>60/70-Hour Limit</b>	Drivers may not drive after 60/70 hours on duty in 7/8 consecutive dates. A driver may restart a 7/8 consecutive day period after taking 34 or more consecutive hours off duty.
<b>Sleep Berth Provision</b>	Drivers using the sleeper berth provision must take at least eight consecutive hours in the sleeper berth, plus a separate two consecutive hours either in the sleeper berth or off duty.
<b>34-Hour Restart</b>	A driver of a property-carrying vehicle may "restart" a 7/8-consecutive-day period after taking 34 or more consecutive hours off duty.

Source: Federal Motor Carrier Safety Administration.

The mandatory use of electronic logging devices (ELDs) in most commercial vehicles as of April 2018<sup>2</sup> is adding to the parking demand concern. The adoption of ELDs does not change any existing FMCSA regulations, but it does make it more difficult to "game the system." For example, with paper logs, drivers recorded their activities in 15 minute increments and were provided a grace period to find a parking space, once their HOS were up. The grace period did not count towards driving time. ELDs erase that grace period and can track a truck's location. This means that drivers either need to search for and find parking before their HOS are up (thus sacrificing driving time and decreasing productivity) or park immediately once their time is up, regardless of location.

### 2.1 FHWA Methodology

The first approach used to calculate truck parking demand in Nevada is based on three related studies:

<sup>1</sup> Note, US 395 is also included in the FHWA methodology.

<sup>2</sup> Automatic On Board Recording Devices (AOBRD) satisfy the requirement for the December 2017 deadline. AOBRD will not be sufficient after December 2019. Certain other drivers are also exempt from this requirement including those that operate within a 100-mile radius of work and those that use paper records for less than 8 days in a 30 day period. See: <https://www.fmcsa.dot.gov/hours-service/elds/implementation-timeline>. Accessed May 24, 2018.

- FHWA—Study of Adequacy of Commercial Truck Parking Facilities—Technical Report (2002). Referenced as “FHWA.”
- Pennsylvania State Transportation Advisory Committee—Truck Parking in Pennsylvania (2007). Referenced as “Pennsylvania STAC.”
- Virginia DOT—Virginia Truck Parking Study (2015). Referenced as “Virginia DOT.”

The Pennsylvania STAC and Virginia DOT models are based on the original FHWA approach but update some of the variables based on changes in FMCSA HOS regulations since 2002.

The model used to calculate truck parking demand requires 5 key user inputs. These inputs were all included in the original FHWA study:

- Annual Average Daily Truck Traffic (AADTT).<sup>3</sup>
- Corridor Length (L).
- Corridor Speed Limit or Average Speed (S).
- Percent of Trucks making short-haul trips (SH).
- Percent of Trucks making long-haul trips (LH).

The core equation for estimating truck parking demand (D) is shown below.

$$D = THT \times P_{avg} \quad (1)$$

Truck Hours Traveled (THT) is calculated based on:

$$THT = CAADT \times (L/S) \quad (2)$$

At its most basic level, the more time trucks require to transit a corridor (L/S) and the more trucks in the corridor (AADTT), the higher the probability that they will need to stop at some point during that trip. Short-term parking demand and long-term parking demand are calculated separately within the corridor and then combined to produce an overall truck parking demand figure. The key factor in this is determining the percent of traffic on the corridor engaged in long-haul versus short-haul trips. Based on observations and estimates of the percent of trucks that are parked for less than three hours (SH) versus those parked for more than three hours (LH), the original FHWA study used a 36% SH to 64% LH split for urban segments (defined as within 200 miles of a city with a population of 200,000 or more) and a 7% SH to 93% LH split for rural segments. The Pennsylvania STAC model used a 79% SH to 21% LH split while Virginia DOT used a 65% SH to 35% LH split. This study uses the FHWA methodology with a 36% SH to 64% LH split.

Appendix C contains a more detailed description of the model inputs and calculations.

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<sup>3</sup> The FHWA study also included a 15% “buffer” to account for variances in AADTT. The Pennsylvania STAC and Virginia DOT studies did not include this calculation. This analysis includes that buffer to help account for daily and seasonal variances in the data.

### 2.1.1 Results

A summary of results is presented in Table 2.2. The analysis shows that total demand for truck parking is highest on US 93 and the highest demand per mile is on I-15. Even though I-15 has the highest average truck volume, the FHWA model interprets the corridor's relative short length to mean that many trucks pass through the state without creating a demand for truck parking.

**Table 2.2 Truck Parking Demand by Corridor**

	I-15	I-80	US 93 (SR 318)	US 395 (I-580)	US 95
<b>Miles</b>	124	410	520	85	647
<b>4+ Axle AADTT</b>	7,460	3,447	2,651	1,197	1,008
<b>Short-Haul Peak Parking Demand</b>	78	119	151	11	72
<b>Long-Haul Peak Parking Demand</b>	1,130	1,727	2,189	162	1,035
<b>Total Parking Demand</b>	1,208	1,846	2,341	173	1,107
<b>Total Parking Demand per Mile</b>	9.74	4.50	4.50	2.03	1.71

Source: NDOT, Analysis by Cambridge Systematics, 2018. Errors due to rounding.

### 2.1.2 Truck Parking Demand and Supply Gaps

Figure 2.1 shows the demand, supply, and gap between truck parking supply and demand in each of the corridors using the FHWA methodology. Supply is highest on I-80, I-15, and US 93/SR-318. Due to its length and the high volume of trucks in the Las Vegas Valley, demand is highest on US 93/SR-318, followed by I-80 and I-15.

Based on this analysis, only two corridors currently have a deficit of truck parking—US 93 (including SR 318) and US 395 (I-580). However, it is important to note that the actual supply available at any given time in each corridor is likely less than shown because the supply for each corridor is calculated separately. For example, parking located on I-80 between the Fallon Rest Area and Winnemucca is counted in the supply for both I-80 and US 95. Similarly, numerous locations in North Las Vegas provide parking options to vehicles on both I-15 and US 93.

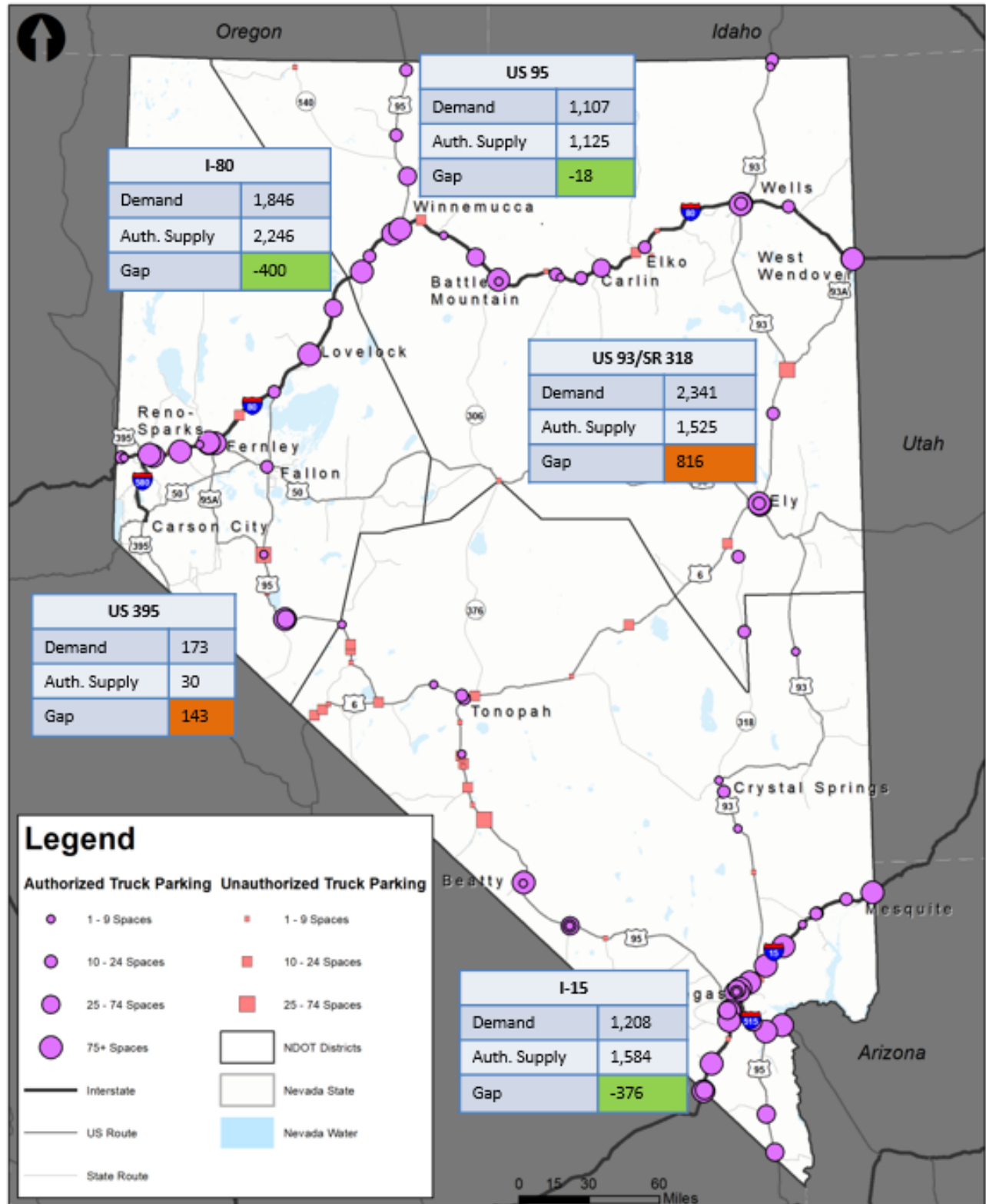
Due to limitations with the FHWA model's ability to distribute parking along a corridor and identify specific locations where there may be a gap in capacity, a drive-time analysis was used to identify areas of highway that are within a 15 and 30 minute drive of authorized parking locations. Areas outside these drive-sheds are potential locations for additional parking to help "fill" the gaps. This drive-time map is shown in Figure 2.2. Areas more than 30 minutes from authorized parking include US 95 northwest of Las Vegas, US 6 near the California border and near the intersection with SR 379, between the intersection of US 93 and US 93A and I-80, and numerous small sections of US 50. There is also a gap on US 93 east of Crystal Springs; however SR 318 is the preferred truck route between Crystal Springs and Ely and that route has better parking coverage.

Figure 2.2 also shows the locations of unauthorized parking in the state to discover if these locations correspond with the areas furthest from authorized parking. US 6 near the California border offers one example. This area is more than 30 minutes from any authorized parking, and unauthorized parking at Vista Point/Chain Up Area and the Montgomery Pass Summit indicates a potential need for additional authorized parking resources.<sup>4</sup> Similarly, unauthorized parking at the salt-sand pad near the junction of US 93 and US 93A may also indicate a gap in the current supply, as it is more than 75 miles between the Schelbourne Rest Area (approximately 20 miles south of the junction) and authorized parking in either Wells or West Wendover.

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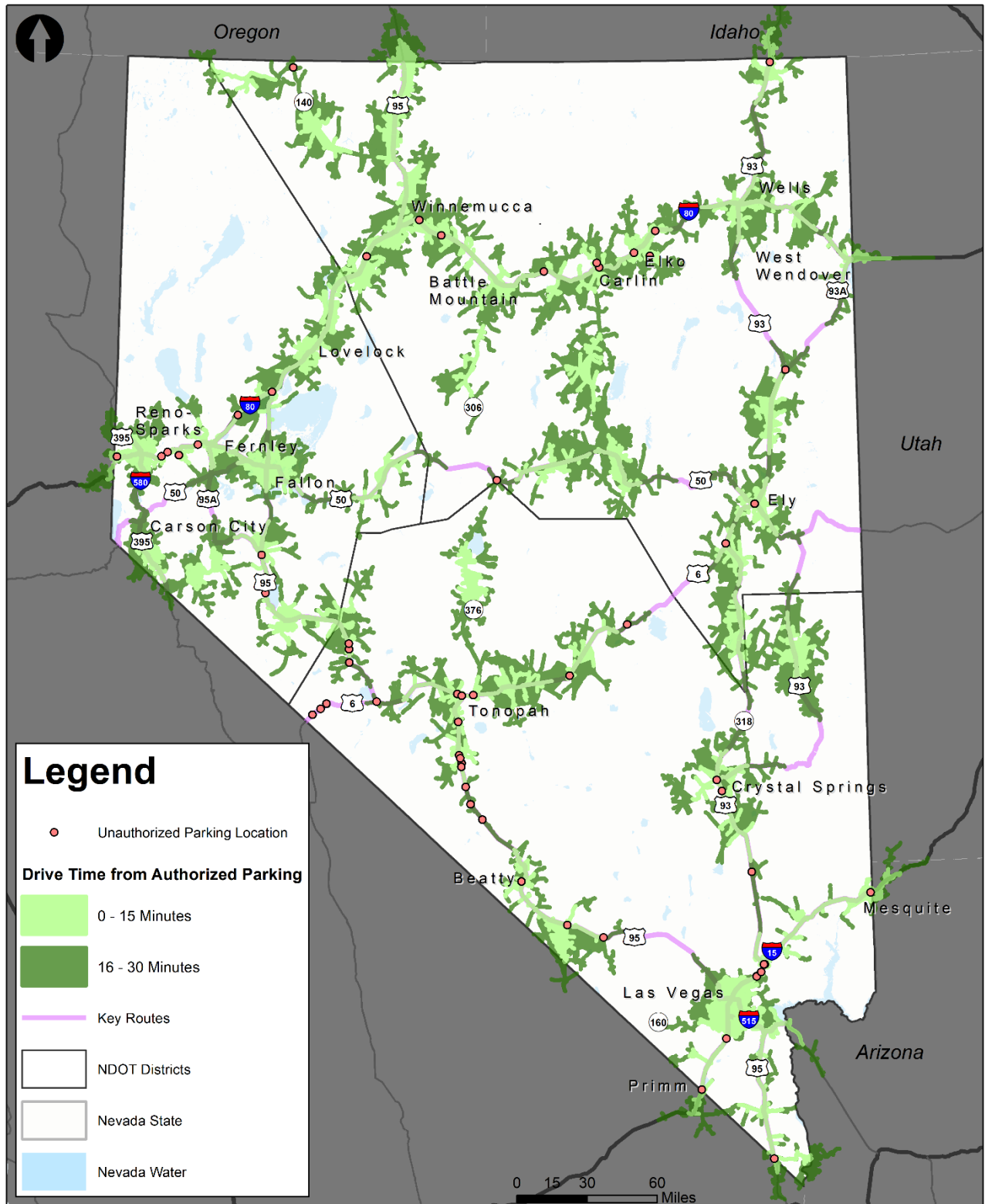
<sup>4</sup> Note that an ongoing study for Caltrans District 9 “Eastern Sierra Corridor US 395 Freight Study” identified additional unauthorized parking in California at the Edna Beaman Elementary School in Benton.

Figure 2.1 Truck Parking Demand and Supply Gap—FHWA Model Approach



Source: NDOT, Analysis by Cambridge Systematics, 2018.

Figure 2.2 Truck Parking – 15 and 30 Minute Drive Shed



Source: NDOT, Analysis by Cambridge Systematics, 2018.

### 2.1.3 Model Limitations

The FHWA model has a number of inherent limitations. For example, while the model provides an adequate baseline to answer state-level, corridor-wide demand questions (is there enough parking in the corridor?), it has a limited ability to quantify demand at a more detailed level (is the parking in the right location?). This lack of specificity is a concern in a state like Nevada with corridors that traverse both long stretches of very rural land and smaller areas with high population densities. The model's even distribution of parking demand between these areas is unlikely to match reality.

Specifically, the FHWA model's limitations include:

- Cannot sub-divide parking demand within the corridor.
- Use of an average speed for the entire corridor does not account for geography, land use, or time of day differences (peak/off-peak).
- Random distribution of truck arrival time in the corridor—cannot distribute truck volume based on hourly counts.
- Random distribution of remaining hours of service for trucks in the corridor.
- No consideration of lost productivity due to time used to search for parking.
- Limited ability to consider traffic joining or leaving the corridor at intermediate locations (e.g., other overlapping or intersecting corridors).

The following section describes an alternative approach to the FHWA methodology.





## 3.0 Updated Truck Parking Demand Analysis

Due to the limitations noted in the prior section regarding the FHWA Truck Parking Demand model, this project utilized data provided by the American Trucking Research Institute (ATRI) to examine in more detail truck flows and parking demand on the four key freight corridors in Nevada—Interstates 15 and 80, and US 93 and US 95.

### 3.1 Origin-Destination Analysis

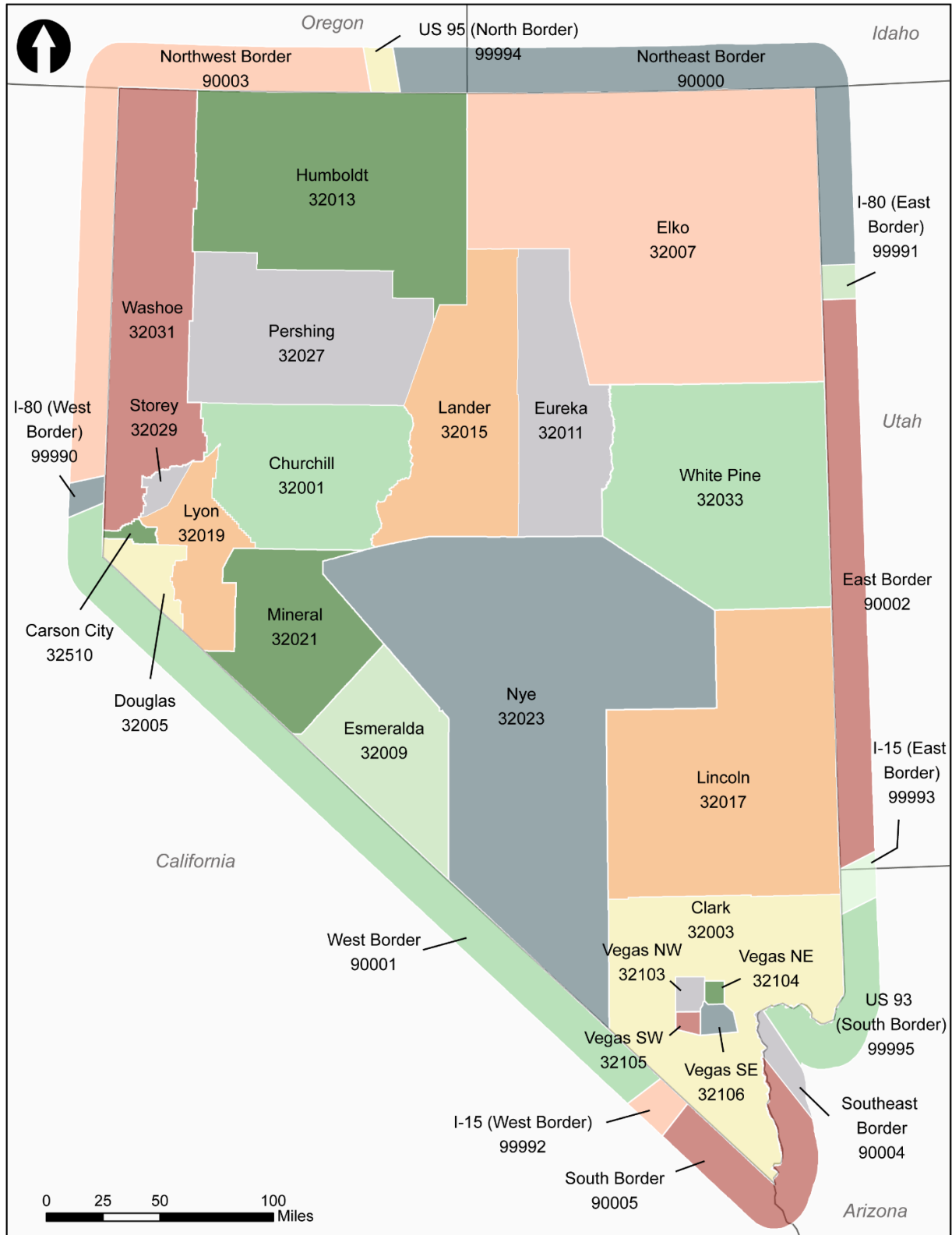
As part of this study, ATRI developed an origin-destination analysis for trucks in the state based on data from October 2017. This approach divided the state into county zones (with the exception of Clark County which was split into four metro-Las Vegas zones and a “remainder” Clark County zone) and added a number of border zones which indicate when a truck enters or leaves the state boundary as shown in Figure 3.1. Vehicles that entered or left the state through one of the border zones and trucks that stopped for four or more hours in one of the internal Nevada zones are included in the analysis. Since the focus of this analysis is on long-term, long-haul parking, stops shorter than four hours were not included. These stops are likely either staging parking for deliveries or vehicles stopped during a pickup/delivery, which do not typically utilize the same parking facilities as long-haul trucks. Alternatively, the stops could be for a shorter rest break or to get food and fuel which limits the impact on capacity due to the higher turnover rate.

Trucks entering the state on I-15 (I-15 West Border and I-15 East Border), I-80 (I-80 West Border and I-80 East Border), US 93 (US 93 South Border and Northeast Border), and US 95 (South Border and US 95 North Border) and stopping for more than four hours (or exiting the state) were used to calculate a percent distribution of stops. For example, of the trucks in ATRI’s data set that entered the state from I-80s West Border (California) and either stopped for more than four hours or exited the state without stopping, 19.5 percent stopped in Washoe County and 4.8 percent stopped in Lyon County.

In addition, trips starting in the two biggest origin zones (Clark County and Washoe County) were examined to determine if trips originating in these locations should be distributed across the rest of the state similarly to trips originating from a bordering state. The analysis showed that, for trucks beginning a trip in Clark County, more than 99 percent either exited the state before stopping for four or more hours or their next stop was also in Clark County, indicating that any travel outside the County did not generate a demand for long-term parking. For Washoe County, over 96 percent of trips either exited the state or had their next long-term stop in Washoe County. This indicates that the vast majority of trips originating in Clark and Washoe counties (either as a true “origin” or after a stop of four or more hours) are not requiring additional long-term parking in the state. For this reason, these trips were not distributed.

The full matrix of origin-destination pairs is shown in Appendix A.

Figure 3.1 Zones for ATRI Origin-Destination Analysis



Source: ATRI.

## 3.2 Origin-Destination Gap Analysis

Finally, to calculate corridor and county demand totals, the percent distribution of stops in each county by corridor was combined with truck volume data obtained from NDOT on each route near their entry point into Nevada. This process essentially created an “expansion factor” to account for vehicles not included in ATRI’s original database. When available, truck volume data from NDOT permanent counter stations during the week of September 17-21, 2018 was used. This data is split into inbound and outbound traffic allowing just the inbound truck volumes to be used to calculate the distribution. If no permanent NDOT counter was available near the entry zones, NDOT Truck Volume Classification data from 2017 or counts from temporary NDOT counters was used with the volume on each segment split in half to approximate the inbound flow.<sup>5</sup>

This approach allows for truck parking demand to be distributed across the corridor and identify need by route and by county, a key improvement over the FHWA model which only identifies demand at the corridor level. Table 3.1 below shows the truck parking demand for stops of longer than four hours, supply, and gap by route for I-80, I-15, US 93 (including SR 318) and US 95 and compares the results from this analysis to the FHWA approach. The only route with a gap using the ATRI data is I-15, with a deficit of approximately 130 truck parking spaces. This is consistent with stakeholder input indicating that I-15 is the most difficult route on which to locate parking. The largest difference between the two analysis approaches is demand on US 93 and US 95 where the distance component of the FHWA model and the reliance on an average truck volume (which includes higher volumes in the urban areas along both routes) likely inflates the demand on the corridors. This leads to US 93 having a gap according to the FHWA model versus a surplus using ATRI data, and US 95 having a very small surplus using the FHWA model and a large surplus using ATRI data. Again, it is important to note that the supply in each corridor is counted separately, so total supply is lower due to some parking locations counting in multiple corridors.

**Table 3.1 Truck Parking Gap by Corridor (Origin-Destination Analysis)**

Corridor	I-80	I-15	US 93 (SR 318)	US 95
Demand by Corridor (4+ hour stops)	1,986	1,716	1,065	105
Supply by Corridor (authorized parking)	2,246	1,584	1,525	1,125
<b>Gap by Corridor (authorized parking)</b>	<b>(260)</b>	<b>132</b>	<b>(460)</b>	<b>(1,020)</b>
Gap by Corridor (FHWA Methodology)	(400)	(376)	816	(18)

Source: NDOT, ATRI, Analysis by Cambridge Systematics, 2018. Numbers in parenthesis indicate a surplus of parking.

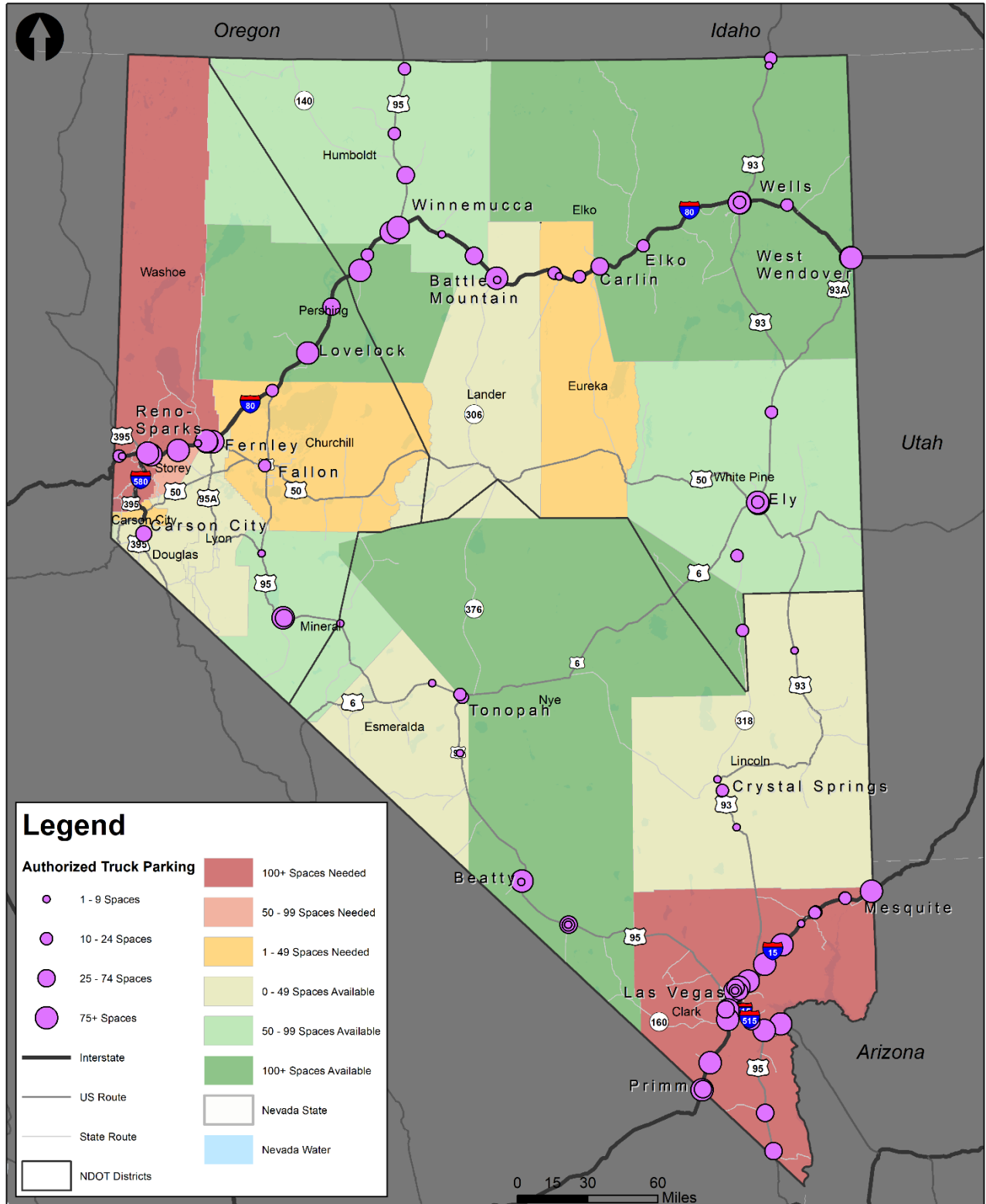
Figure 3.2 shows the aggregated demand and gap in each county, based on the authorized supply of parking along those specific routes.<sup>6</sup> At the county level, the largest truck parking gap occurs in Clark County with a deficit of more than 550 spaces. This again matches stakeholder information which ranked I-15 as the most difficult corridor to find parking in. The presence of US 93 and US 95 in the county also adds to the total

<sup>5</sup> US 95 southbound from Idaho used 2017 NDOT Average Truck Classification Count. I-15 westbound from the Arizona border used data from ATR 008009 (3.2 miles east of Exit 64/US 93) on 8/30/2017. I-80 westbound from the Utah border used an average of NDOT temporary ATR 820821 counts from 7/14/17-7/19/17 at Pilot Peak Interchange (Exit 398).

<sup>6</sup> Parking supply on US 6, US 50, US 395, or any state routes in each county are not included as part of the gap analysis due to lack of truck origin-destination data for these routes.

demand. Washoe County has a deficit of approximately 250 spaces followed by Storey County (likely driven mostly by the Tahoe-Reno Industrial Center) with a deficit of approximately 90 spaces. Carson City, Churchill County, and Eureka County also show smaller deficits. In the remainder of the state including most of the I-80, US 93, and US 95 corridors, aggregated supply at the county level is sufficient to meet demand. Pershing, Elko, and Nye counties in particular have a surplus of more than 100 truck parking spaces.

Figure 3.2 Truck Parking Gap by County



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



## 4.0 Urban Parking Analysis

As identified in the long-term parking needs analysis in the prior sections, 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 are also the primary generators of short-term staging parking demand due to higher concentrations of industrial/warehousing/commercial property, 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.

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.

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.

Full-service truck stops offer parking as means to attract sales from ancillary services (fuel, food, repairs, etc.). Most make some spaces available for paid reservations, but the revenues from this pale in comparison to sales of other products and services. The truck parking model developed to service long-haul drivers may not make fiscal sense for short-term staging or long-term parking.

The location and demand for both longer-term parking and short-term staging are described below and NDOT may have a support role to play in addressing these needs (as will be further discussed in the Implementation Plan technical memo). However, potential solutions to these issues mainly rest in the hands of private-sector businesses or local government instead of NDOT, and these topics will not be a focal point for recommendations in future work.

### 4.1 Longer-term Parking Demand

The Owner-Operator Independent Drivers Association (OOIDA) is a trade association that represents independent owner-operator truck drivers. OOIDA is involved in regulatory and legislative forums on the local, state, national, and international levels to ensure a safe, efficient, and equitable business climate for their members.

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.<sup>7</sup> 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 4.1 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. Figure 4.2 shows the concentrations of OOIDA membership in the Reno/Carson City area. The North Valleys area of Reno (zip code 89506, near I-80 and US 395) has more than double the number of OOIDA members than the next highest zip codes.

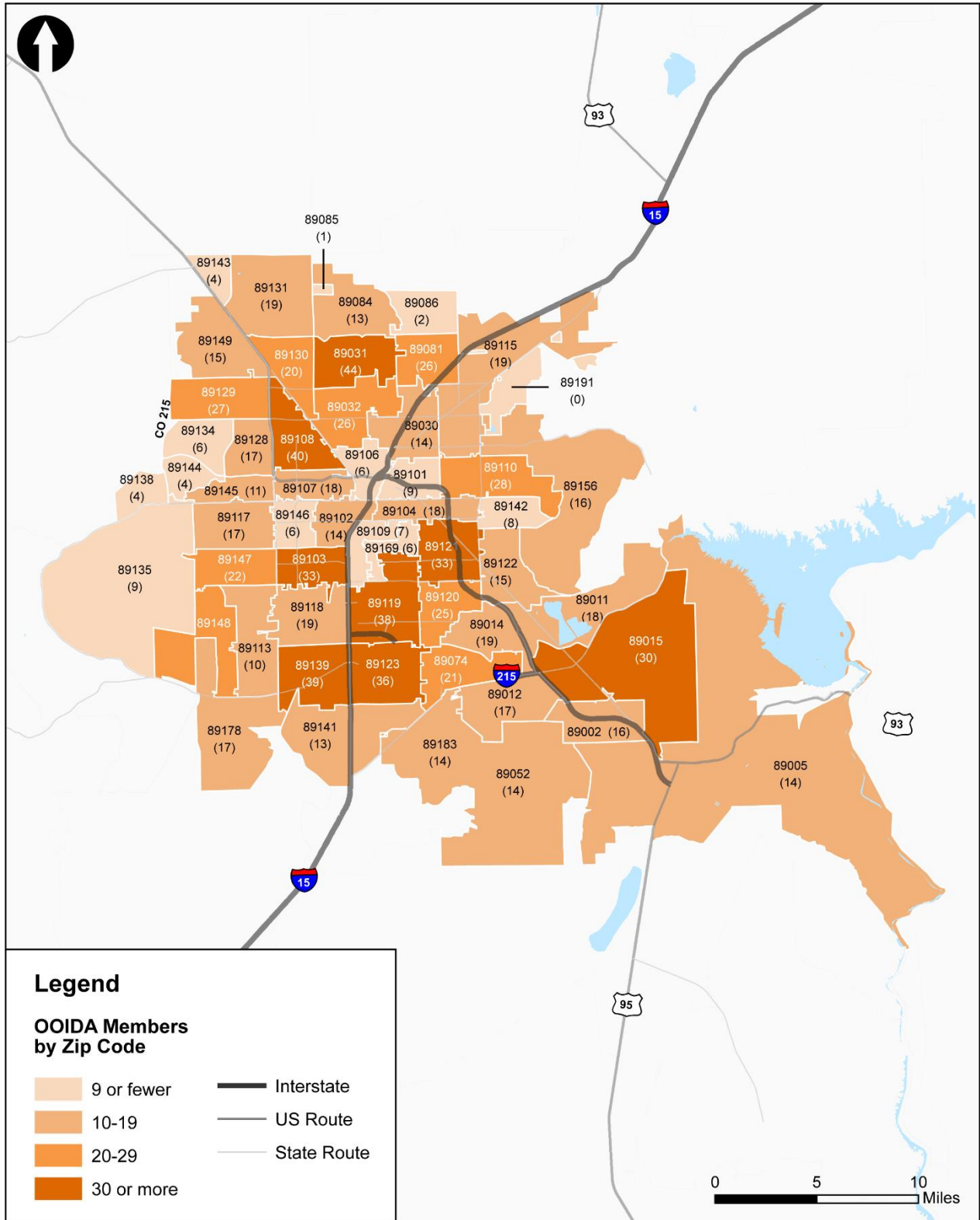
Additional truck parking in these areas would potentially benefit both owner-operator independent drivers as well as other truck drivers.

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<sup>7</sup> <https://www.oida.com/WhoWeAre/>.

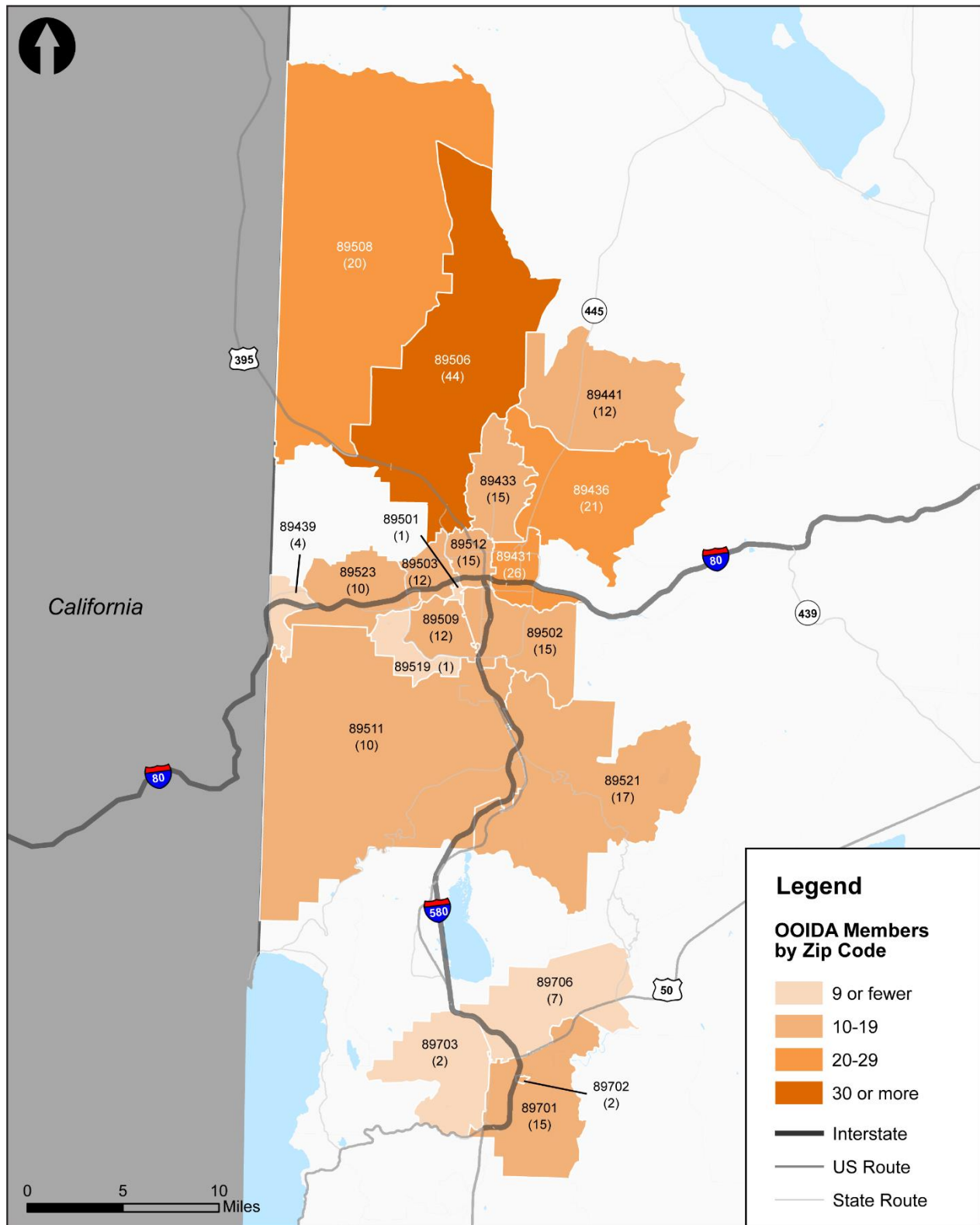


Figure 4.1 OOIDA Membership—Las Vegas Valley



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

Figure 4.2 OOIDA Membership—Reno/Carson City Vicinity



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

## 4.2 Short-Term Staging and Parking

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. 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



Source: Cambridge Systematics.

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. One source, the Institute of Transportation Engineers (ITE), developed national guidance to estimate vehicle trip generation at high-cube warehouse (HCW) distribution centers and included estimates of truck parking demand as part of the study. ITE provides the following definition of a HCW:

*A building that typically has at least 200,000 gross square feet of floor area, has a ceiling height of 24 feet or more, and is used primarily for the storage and/or consolidation of manufactured goods (and to a lesser extent, raw materials) prior to their distribution to retail locations or other warehouses. A typical HCW has a high level of on-site automation and logistics management. The automation and logistics enable highly-efficient processing of goods through the HCW. HCWs are grouped into five types: fulfillment center, parcel hub, cold storage facility, transload facility, and short-term storage facility.<sup>8</sup>*

ITE grouped HCWs into five types according to their distinctive features. The five types of HCW are:

- Transload—usually pallet loads or larger handling products of manufacturers, wholesalers/distributors, or retailers with little or no storage durations.
- Short-Term Storage—products held on-site for a short time.
- Cold Storage—HCW with permanent cold storage in at least part of the building.
- Fulfillment Center—storage and direct distribution of e-commerce product to end users.
- Parcel Hub—transload function for a parcel delivery company.

<sup>8</sup> Institute of Transportation Engineers. “High-Cube Warehouse Vehicle Trip Generation Analysis.” October 2016. <https://www.ite.org/pub/?id=a3e6679a-e3a8-bf38-7f29-2961becdd498>.

Table 4.1 below shows the recommended truck and trailer parking and loading dock location characteristics for the five types of HCWs.

**Table 4.1 Vehicle Trip Generation Analysis—Truck and Trailer Parking and Loading Dock Location Information**

	Truck and Trailer Parking	Loading Dock Location
<b>Standard Warehouse/Storage</b>	Limited truck parking area; increases with distance to major distribution hub	Either on one side or on two adjacent sides
<b>Transload Facility</b>	Large, open trailer parking area surrounding facility; produces high land to building ratio	Minimum of two sides (adjacent or opposite); can be on four sides
<b>Short-Term Storage</b>	Ratio of truck parking spaces to docks can vary between 0.5:1 and 1.5:1, with 1:1 being very common	On either one or two sides
<b>Cold Storage</b>	Can vary with whether products are frozen or perishable	
<b>Fulfillment Center</b>	Significantly higher truck parking ratios than for other HCWs	
<b>Parcel Hub</b>	Very high truck parking ratios to dock positions, often 2:1 or more	Usually on both long sides of building; can be on four sides

Source: Institute of Transportation Engineers. “High-Cube Warehouse Vehicle Trip Generation Analysis.” October 2016.

This guidance is comparable with real-world construction. For example, the guidelines above match those used at the KCI Intermodal Business Centre, a modern warehouse/distribution center built in Kansas City, MO. This facility is designed to accommodate multi-tenant, cross-dock, modern bulk goods operations. The KCI Intermodal Business Center has 54 fully equipped bays and 119 (12.5’X60’) truck trailer parking positions (2:1 ratio), supporting the ITE guidelines.<sup>9</sup>

However, most of these facilities reserve all of the on-site parking spaces for internal operations. Outside companies, and their own fleet if they have one, will often drop trailers in the yard to be off-loaded at a later time when docks are available. Many drivers, especially owner-operators and trucks, are unable to off-load only part of their cargo.. The truck parking spaces on site are reserved for those trailer drops, and then yard hostlers are used to shuttle trailers around the yard. Additionally, for safety and security reasons, most HCWs limit drivers within their gates to back into a bay, load/unload, and leave. There are no guidelines for the number of parking spaces needed outside the gate for trucks waiting their turn to enter the gate.



*Yard Hostler*

<sup>9</sup> KCI Intermodal BusinessCentre—LogisticsCentre IV. <http://www.kcilogistics.com/logisticscentre-iv/>.

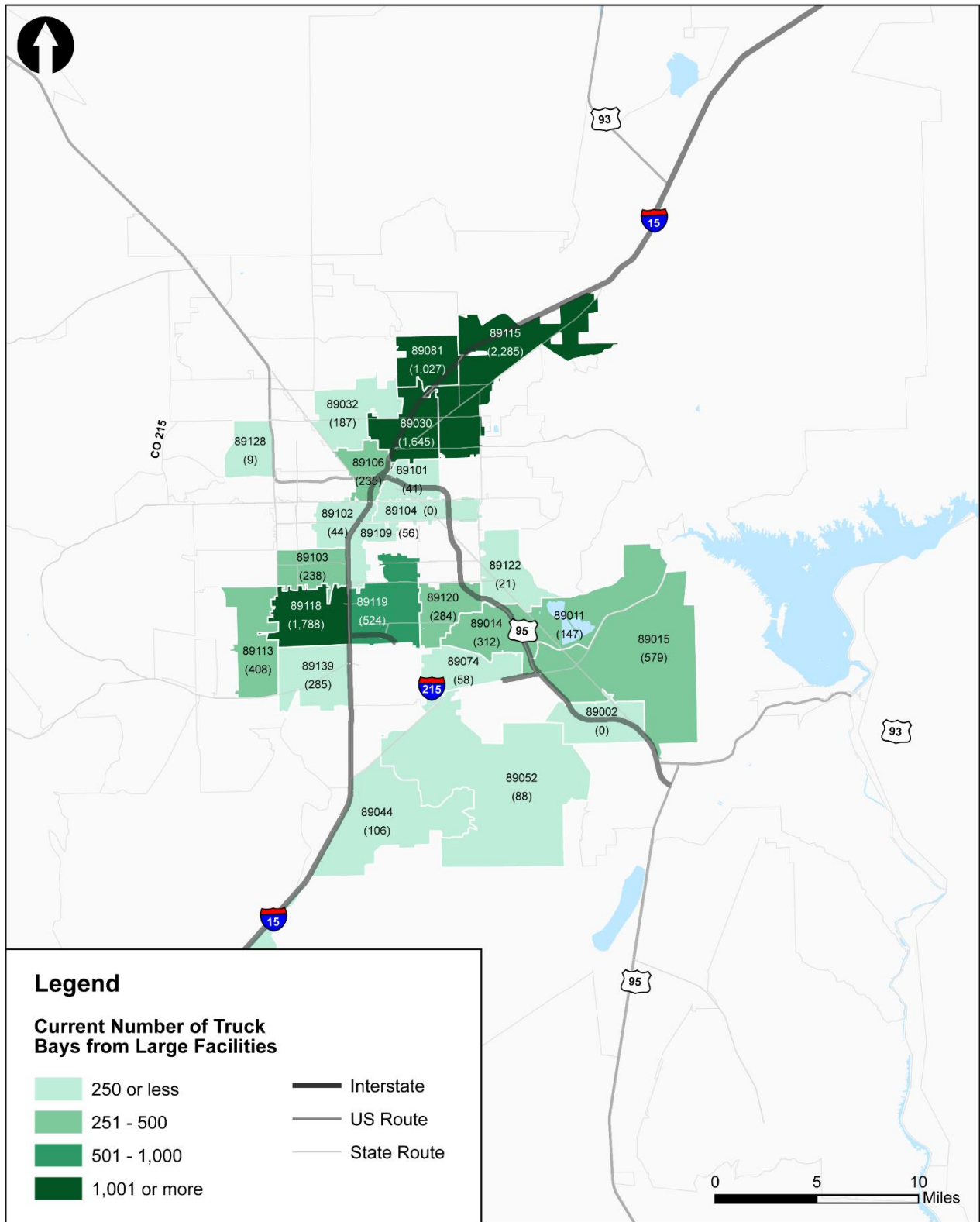
To approximate the areas where short-term staging and parking is most needed in the Las Vegas metropolitan region, this study used data from CBRE, a commercial real estate company, to map out concentrations of truck bays. CBRE provided data for the number of truck bays for all facilities at the zip code level. This data was split into facilities with 1-4 bays or 5 or more bays. Small businesses with fewer docks (1-4 bays) typically handle fewer vehicles and need less space for on-site parking while warehouses with a large number of truck bays are more likely to generate significant traffic and parking demand. While this methodology cannot account for sales volume, seasonal shifts, or other factors that could generate a higher number of truck trips in a smaller facility, it does provide a high-level summary of truck activity at larger facilities.

Figure 4.3, Figure 4.4, Table 4.2, and Table 4.3 show the current and future number of truck bays by zip code in the Las Vegas metropolitan area for facilities with five or more bays. Future capacity includes truck bays under construction, in development, or in planning. 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 North Las Vegas and Boulder Junction. Two-thirds of the planned growth in truck bays (1,146 out of 1,744) is occurring in North Las Vegas and Boulder Junction.

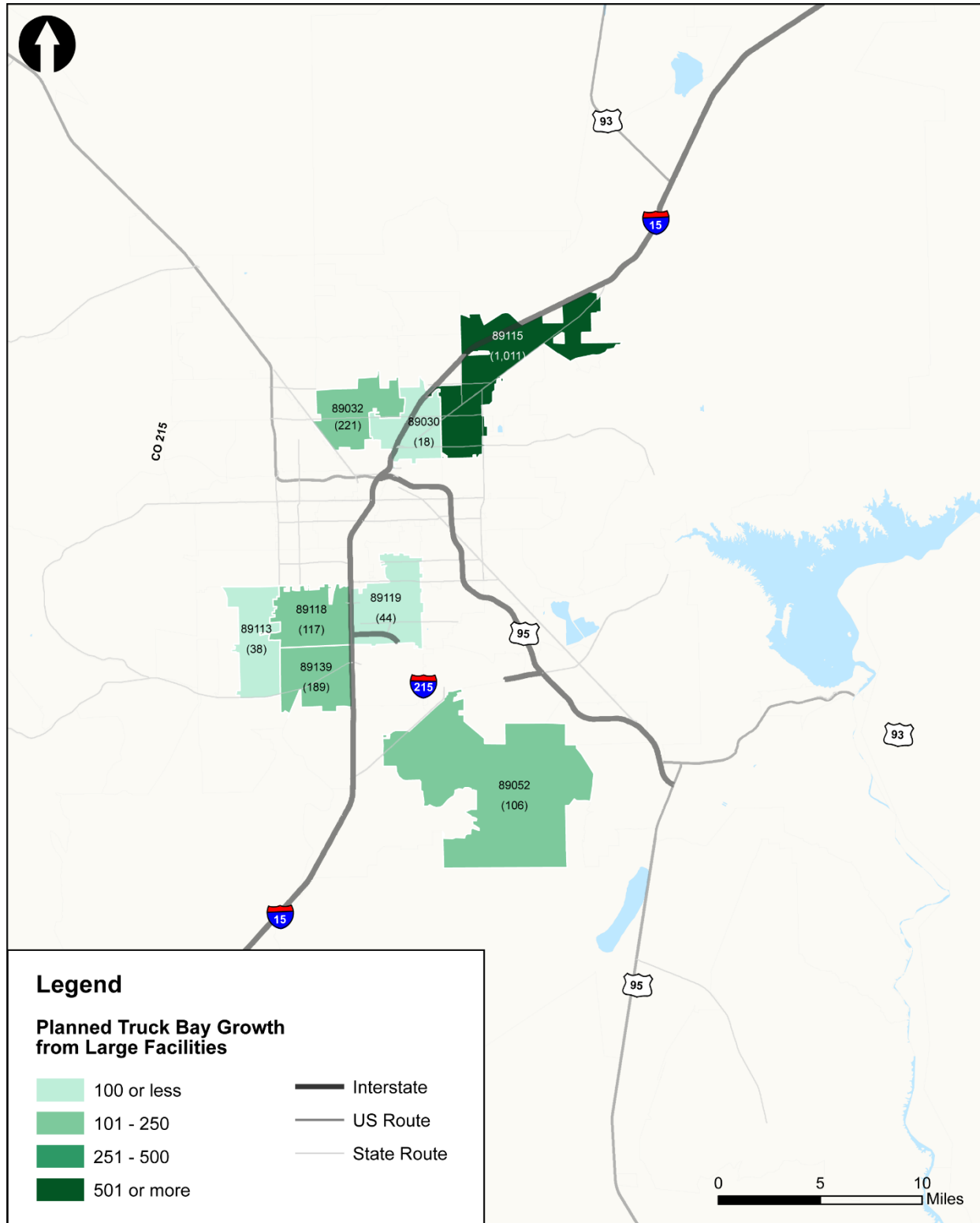


Figure 4.3 Current Number of Truck Bays—Las Vegas Valley



Source: CBRE, Analysis by Cambridge Systematics, 2018.

**Figure 4.4 Truck Bays Under Construction, In Development, or In Planning Through 2020—Las Vegas Valley**



Source: CBRE, Analysis by Cambridge Systematics, 2018.

**Table 4.2 Current and Planned Future Truck Bays by Zip Code—Las Vegas**

Zip Code	Current Bays	Planned Bays (through 2020)	Total Bays
89011	147	–	147
89014	312	–	312
89015	579	–	579
89030	1,645	18	1,663
89032	187	221	408
89044	106	–	106
89052	88	106	194
89074	58	–	58
89081	1,027	–	1,027
89101	41	–	41
89102	44	–	44
89103	238	–	238
89106	235	–	235
89109	56	–	56
89113	408	38	446
89115	2,285	1,011	3,296
89118	1,788	117	1,905
89119	524	44	568
89120	284	–	284
89122	21	–	21
89128	9	–	9
89139	285	189	474
<b>Total</b>	<b>10,367</b>	<b>1,744</b>	<b>12,111</b>

Source: CBRE, Analysis by Cambridge Systematics, 2018.

**Table 4.3 Truck Bays Summary Statistics by Category—Las Vegas**

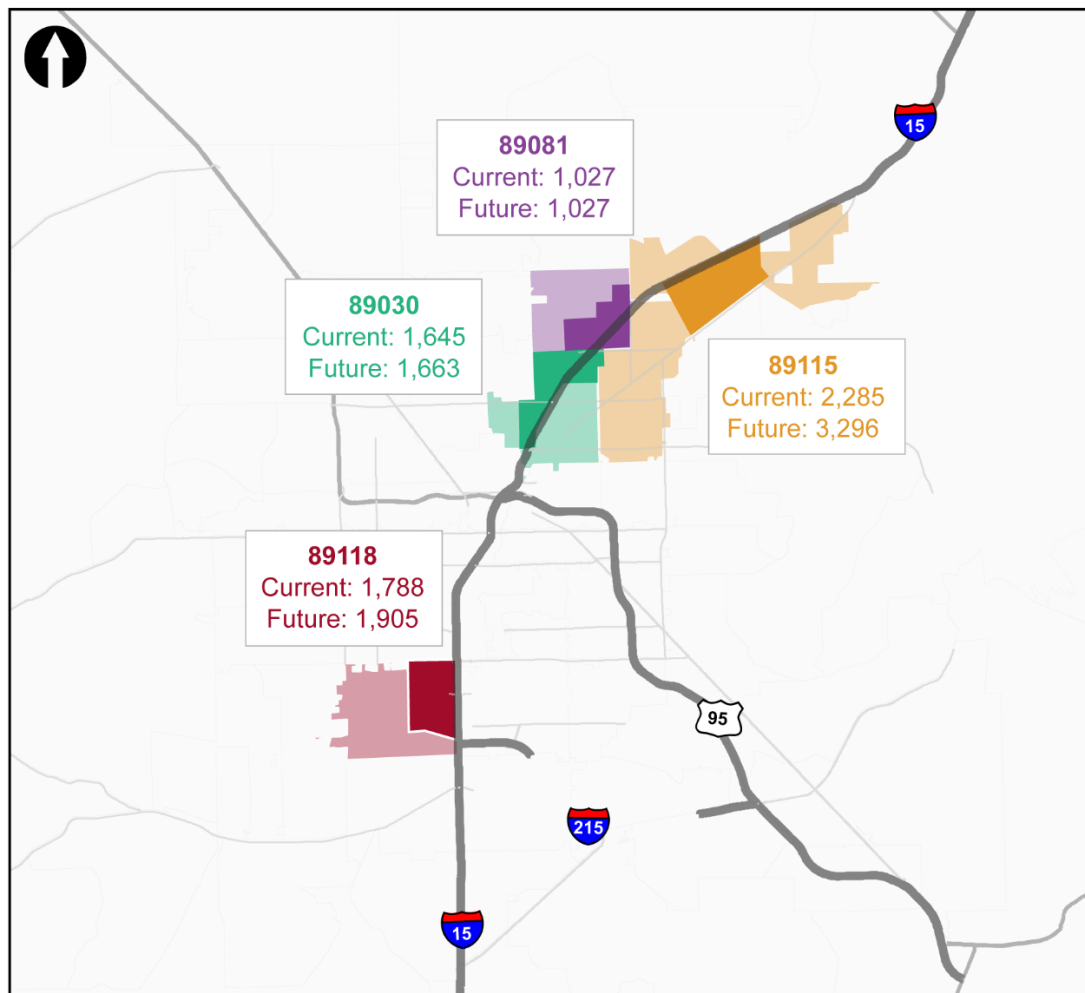
Truck Bay Category	Number of Zip Codes	Current Bays	Planned Bays	Total Bays	Growth in Bays	Percent of Total Growth
250 or less	12	1,230	327	1,557	26.6%	18.8%
251–500	4	1,289	227	1,516	17.6%	13.0%
501–1,000	2	1,103	44	1,147	4.0%	2.5%
1,001 or more	4	6,745	1,146	7,891	17.0%	65.7%
<b>Total</b>	<b>22</b>	<b>10,367</b>	<b>1,744</b>	<b>12,111</b>	<b>16.8%</b>	<b>100.0%</b>

Source: CBRE, Analysis by Cambridge Systematics, 2018.



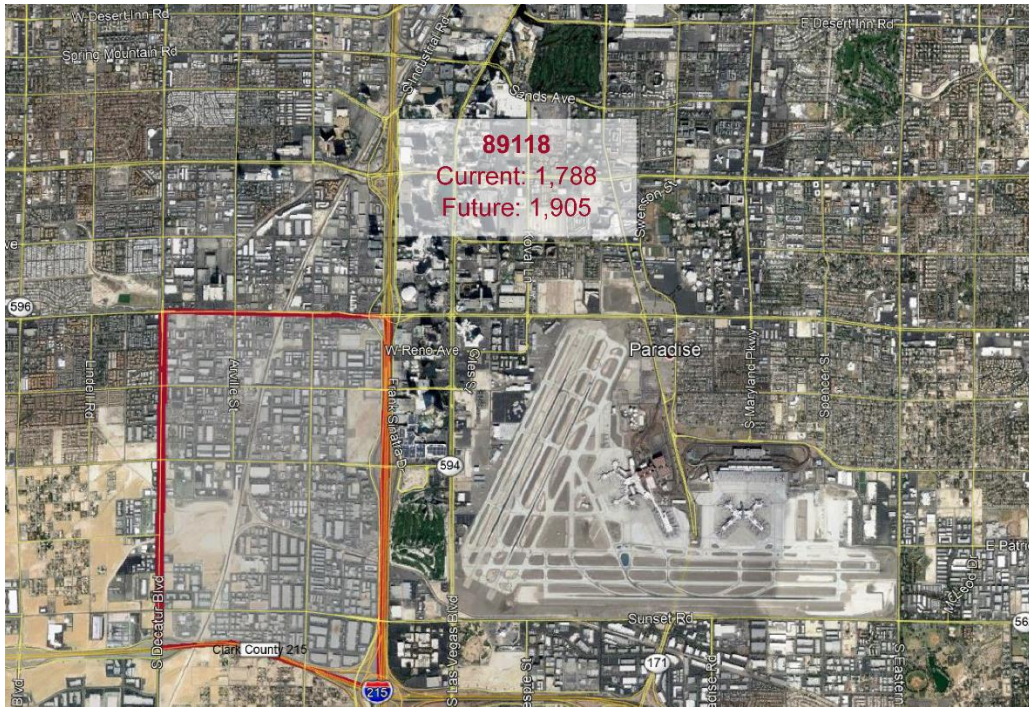
In order to highlight the most critical areas, Google Earth imagery was used to identify industrial and commercial clusters in each zip code. These clusters are smaller areas within the zip code that are the likely focal points for truck activity. Figure 4.5 shows the four zip codes with the highest concentration of truck bays currently (1,001 or more). Truck bays in these zip codes are expected to increase by 17% through 2020. Figure 4.6 and Figure 4.7 show in more detail the areas with the highest concentration of industrial and commercial uses within these four zip codes.

**Figure 4.5 Concentrations of Truck Bays in Zip Codes with 1,001 or More Truck Bays—Las Vegas Valley**



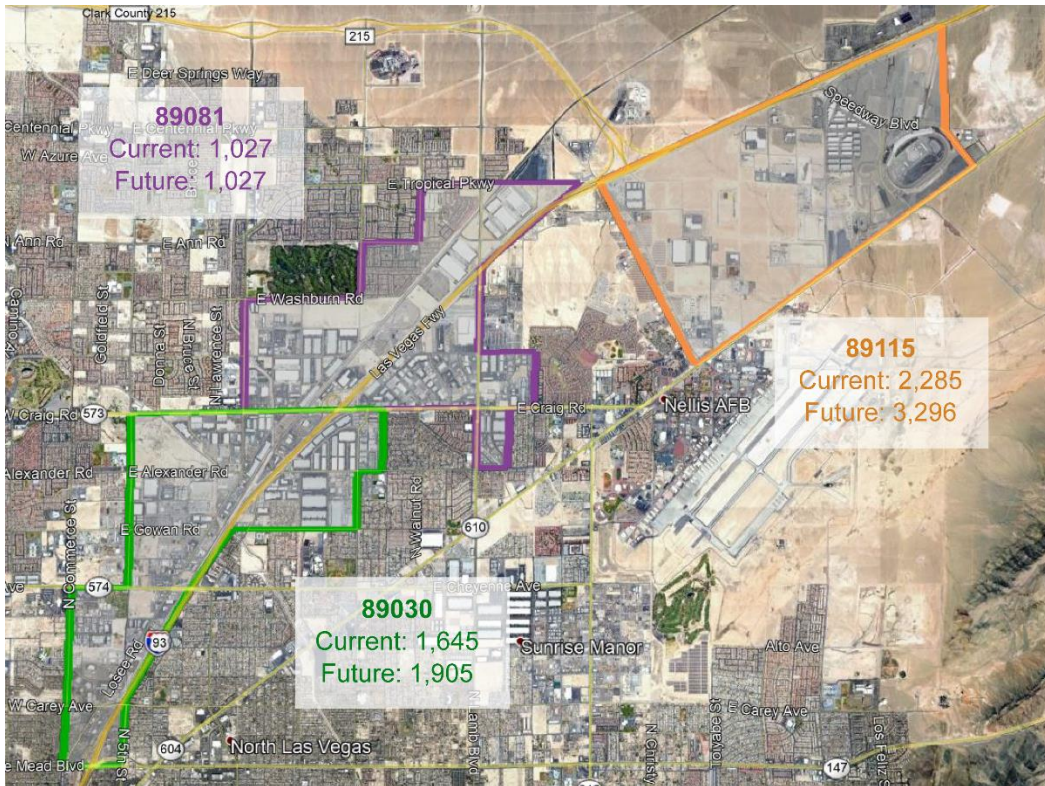
Source: CBRE, Google Earth, Analysis by Cambridge Systematics, 2018.

Figure 4.6 Industrial and Commercial Concentrations Aerial—Las Vegas



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

Figure 4.7 Industrial and Commercial Concentrations Aerial—North Las Vegas



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

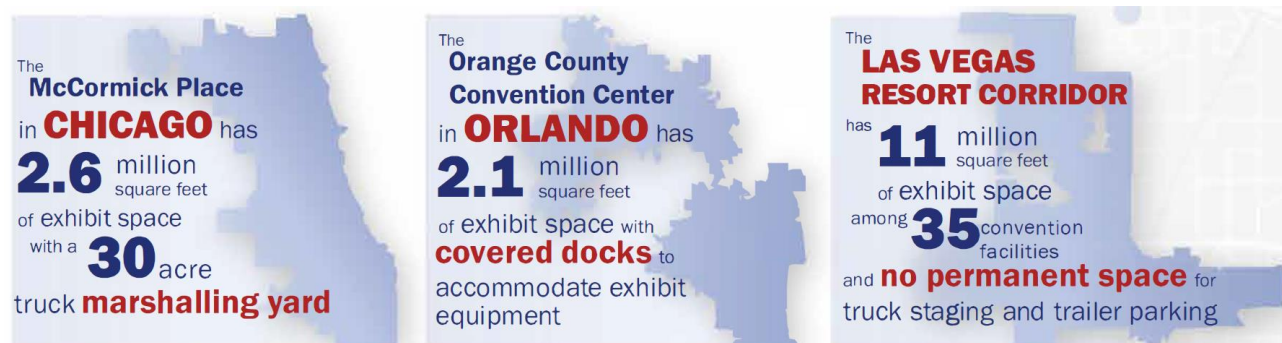


### 4.3 Convention Marshalling Yard

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 is already congested with over 4,500 truck trips per day during the peak convention season.<sup>10</sup>

A marshalling yard<sup>11</sup> is an off-site location that serves as the initial gathering place for exhibits en route to a tradeshow. 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. 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.

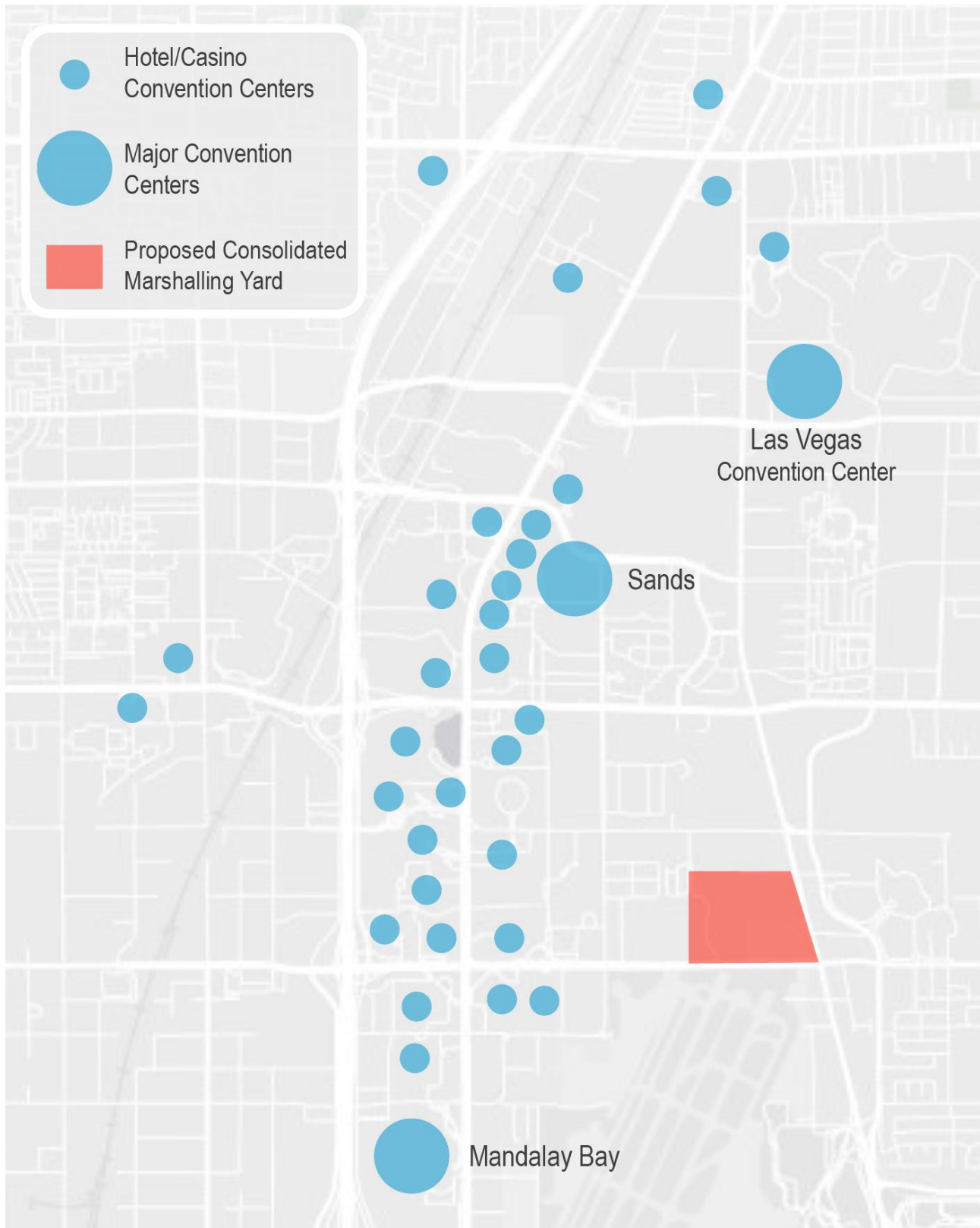


Representatives from the Las Vegas Convention and Visitors Authority (LVCVA) and the major convention service providers, Freeman and GES, have been trying to identify a location within the Resort Corridor for a consolidated marshalling yard for the use of all service providers. The most promising location is an unused 60 acre parcel (Figure 4.8) 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 FAA 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's large enough to accommodate staging for many events at once by multiple management companies.

<sup>10</sup> Las Vegas Convention and Visitors Authority.

<sup>11</sup> Also commonly spelled “marshaling.”

**Figure 4.8 Potential Consolidated Freight Marshalling Yard—Las Vegas**



Source: Cambridge Systematics

## 5.0 Utilization Analysis

A final piece of this analysis confirmed the actual utilization of truck parking areas and determined if the models discussed in the previous sections align with conditions on the ground. This was achieved in two ways. The first used ATRI truck GPS data to identify trucks parked at specific truck parking locations. The second used smartphone application data as a second source to validate parking at specific facilities.

### 5.1 ATRI Utilization

The methodology and results behind ATRI's truck GPS utilization analysis are provided in the following sections.

#### 5.1.1 Methodology

ATRI's GPS data does not cover every truck utilizing parking in Nevada. The ATRI database includes between 15% and 50% of all Class 6-8 trucks, depending on roadway type. Nationwide, ATRI's raw data sample is between 800,000 and 1,000,000 vehicles, of which approximately 89% are "18 wheelers." In order to more accurately determine utilization, an expansion factor is needed to extrapolate the ATRI parked vehicle counts to an estimate of the full population of parked trucks in the study area.

To calculate expansion factors, multi-unit (4+ axle) AADTT figures were collected from multiple NDOT count stations in proximity to the parking locations studied in this analysis. If no permanent count station was in the vicinity, NDOT 2017 average multi-unit truck counts for the closest highway segment to the parking location were used. Preference was given to using detailed NDOT counts whenever practical. These locations along with the 60 truck parking locations analyzed are shown in Figure 5.1 on the following page.<sup>12</sup> Values from the NDOT count stations were obtained for four two-week periods:

- December 3-16, 2017.
- March 16-30, 2018.
- May 6-19, 2018.
- September 9-22, 2018.

These dates were chosen to cover any seasonal swings and avoid major holidays which can skew travel patterns. ATRI pulled truck GPS data on the above dates at the NDOT counter stations. To avoid double-counting trucks at each location, a truck could only be included in the volume calculations once per hour. The number of trucks at these count locations were then summed up for each day in the data sample, and the daily totals were then averaged to derive ATRI's AADTT at each location. Finally, expansion factors were calculated for each count station (or highway segment) by dividing the AADTT figures by the corresponding ATRI AADTT figure.

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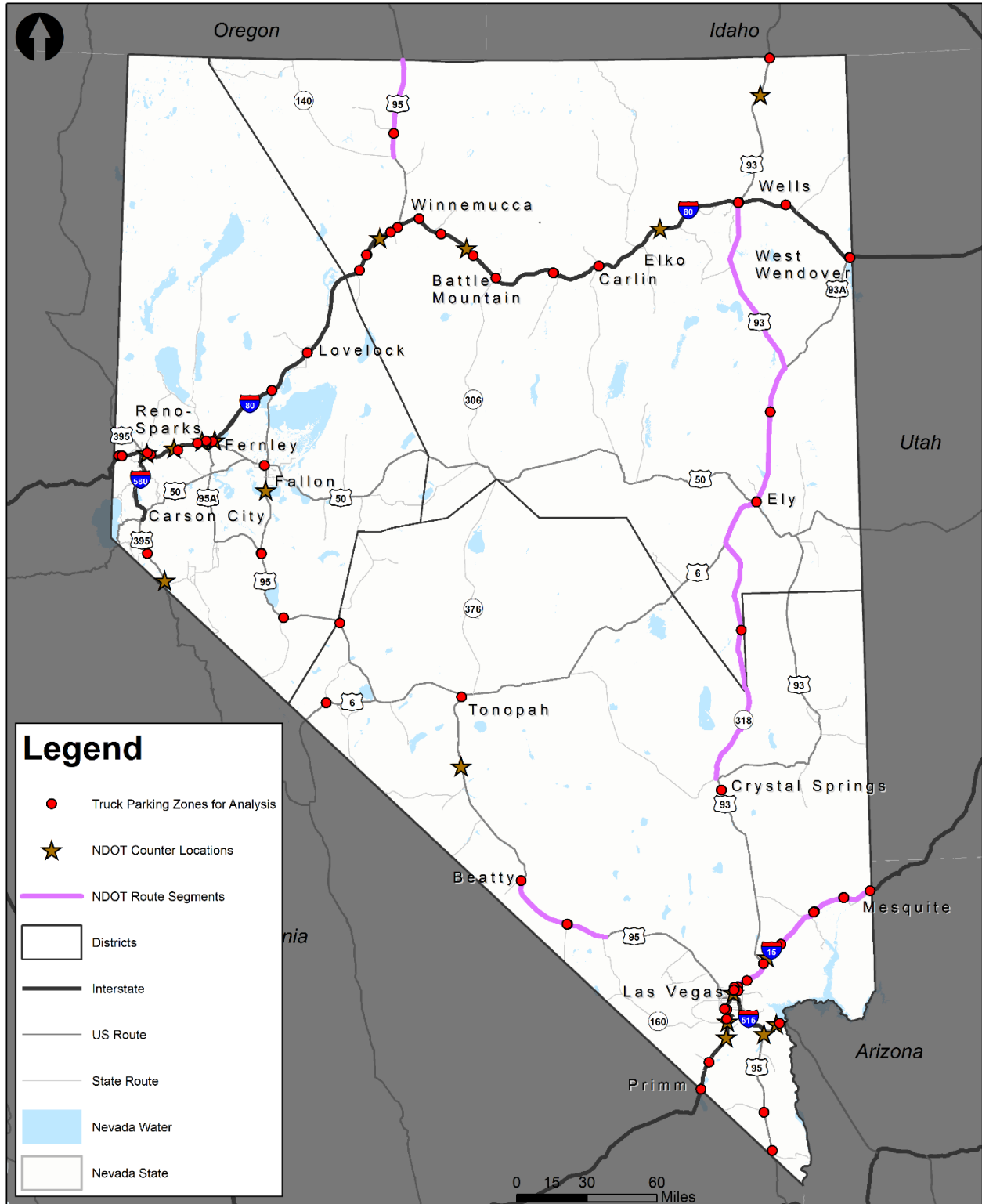
<sup>12</sup> The Button Point Rest Area on I-80 in Winnemucca was included in the initial list of 60 sites. This site is now closed and ATRI reported 0 data for the location. As such, it is not included in the remainder of the analysis.

ATRI then sampled GPS data for trucks parked in 59 zones throughout the state on the same dates. Two example zones are shown in Figure 5.2.<sup>13</sup> To avoid double-counting parked trucks at each location, a truck could only be included in the parked truck calculations once per hour. The number of trucks at these parking locations were then summed up for each day in the data sample by hour of day. These hourly totals were then averaged to derive the average number of parked trucks each hour at the parking locations. By applying the expansion factor from the closest count station or highway segment to the hourly ATRI sample parked truck count data at the corresponding parking locations, an expanded parked truck count was derived.

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<sup>13</sup> Note that parking areas specifically avoided fueling bays, queuing for washing, and other locations where trucks may be stopped for short periods of time that could influence the data.

**Figure 5.1** NDOT Count Stations, Highway Segments, and Truck Parking Zones for ATRI Truck GPS Analysis



Source: ATRI, Analysis by Cambridge Systematics, 2018.



**Figure 5.2 Example ATRI Truck GPS Zones—Loves Travel Center (top) and Pilot Travel Center (bottom) in Fernley, NV**



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



### 5.1.2 Preliminary Results

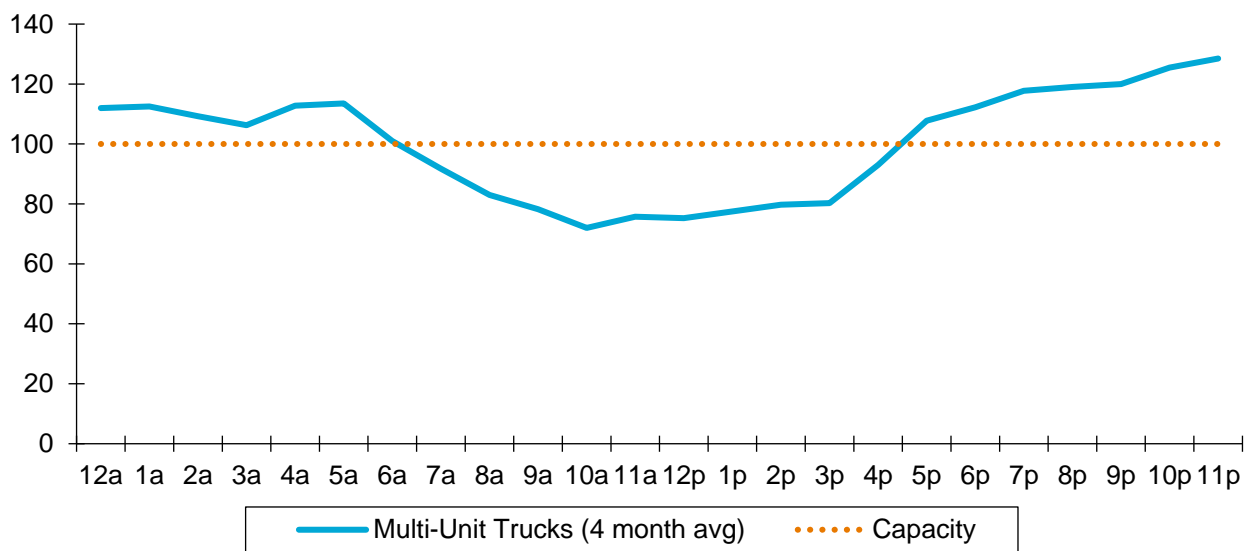
Results of this analysis identified 16 out of 59 locations where the average parking demand over the four two-week periods is above capacity at some time during the day. These sites include:

- Petro Center/Speedway Boulevard (North Las Vegas).
- Loves Travel Center (North Las Vegas).
- TA Travel Center (Las Vegas).
- Pilot Travel Center (Las Vegas).
- Whiskey Petes/Flying J (Primm).
- Mormon Mesa (I-15).
- Luning Rest Area.
- Boomtown Hotel and Casino.
- Flying J (Fernley).
- Loves (Fernley).
- Pilot (Fernley).
- Golden Gate (Clark).
- Wadsworth Rest Area (WB).
- Golconda (Roadside parking and sand-salt pad).
- Beowawe Rest Area.
- Pilot (Carlin) and Carlin Ramp.

Appendix B provides site profiles including utilization graphs for all 59 locations surveyed.

Some of these sites exhibit peak parking during the late evening and early morning hours with a decrease during the middle of the day. This type of parking pattern is often associated with long-haul drivers. An example of this is Figure 5.3 from the Flying J Travel Center in Fernley.

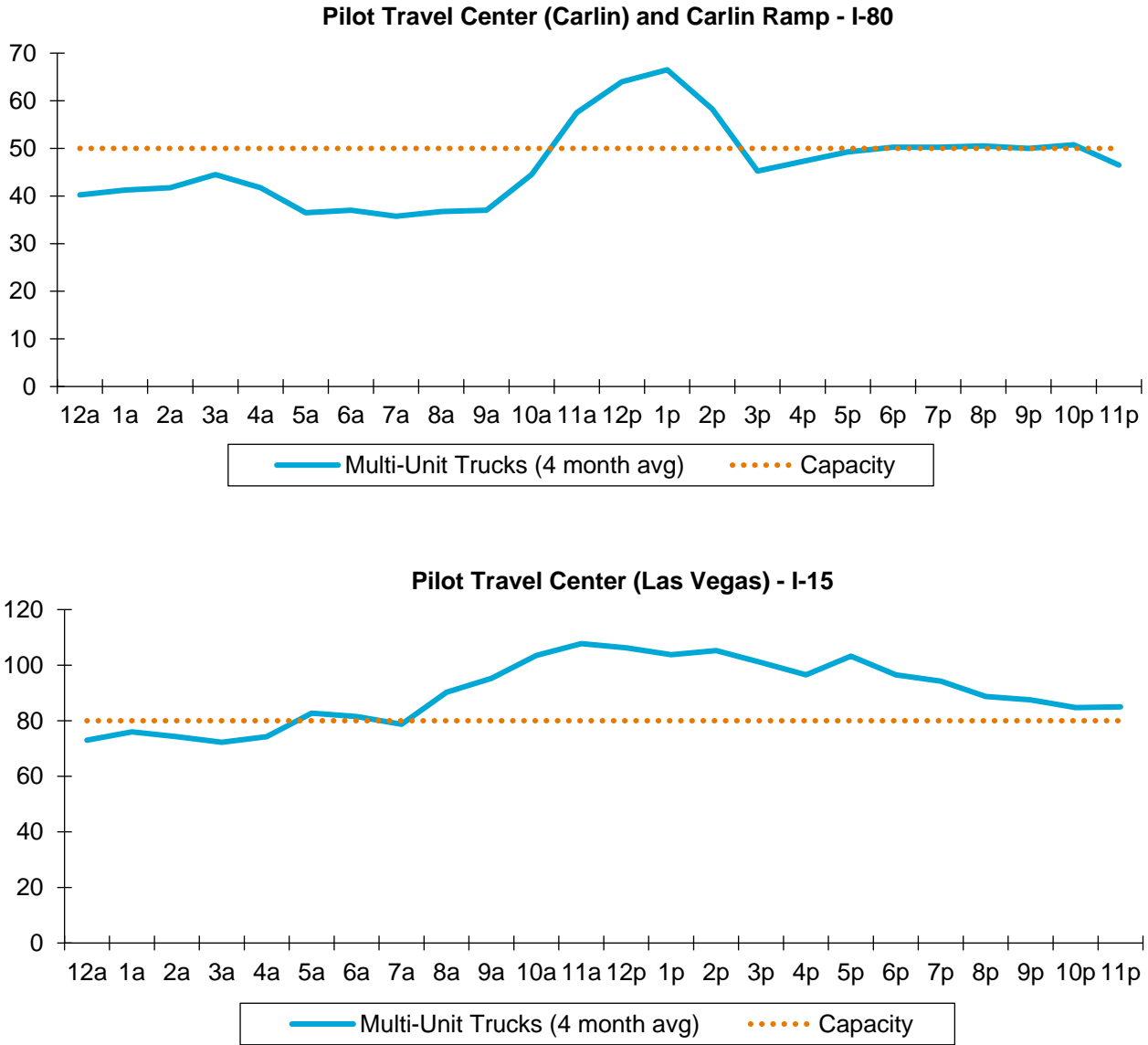
**Figure 5.3 Truck Parking Utilization—Flying J (Fernley)**



Source: ATRI.

However, this trend was not universal. For example, parking utilization at the Pilot in Carlin (which also includes trucks parked between Fir St. and the I-80 EB on-ramp) is shown in Figure 5.4. The Pilot Travel Center off I-15 at Craig Road in Las Vegas is also shown in Figure 5.4. These two sites experience peak utilization during the middle of the day, with high volumes at the Pilot Travel Center in Las Vegas spanning a longer timeframe than the Carlin Pilot.

**Figure 5.4 Truck Parking Utilization—Pilot (Carlin) and Pilot (Las Vegas)**



Source: ATRI.

A potential concern with the data was identified during processing. The expansion factor developed for multi-unit trucks using the NDOT count station on I-80 at Wadsworth was very high (8.664 averaged across the four months).<sup>14</sup> This means that the NDOT multi-unit truck counts during the four two-week periods used by ATRI were more than eight times higher than ATRI GPS “pings” on that highway segment. This expansion factor was applied to the Flying J, Loves, and Pilot in Fernley as well as the Golden Gate Travel Plaza in Clark and the Wadsworth Rest Area—all of which show peak utilization rates above capacity. However, the Flying J Travel Center dips below capacity between 6 a.m. and 5 p.m. while the other four sites remain

<sup>14</sup> The lowest expansion factor (1.212 averaged across the four months) was used for a location in Ash Springs centered on the Shell Gas Station. This site used an NDOT 2017 average multi-unit truck count from US 93 between I-15 and SR 318.

above capacity during the entire day (the Loves and Pilot at times show more than 100 excess trucks at each location). Polygons used to geo-fence and count ATRI trucks in Fernley are shown in Figure 5.5.

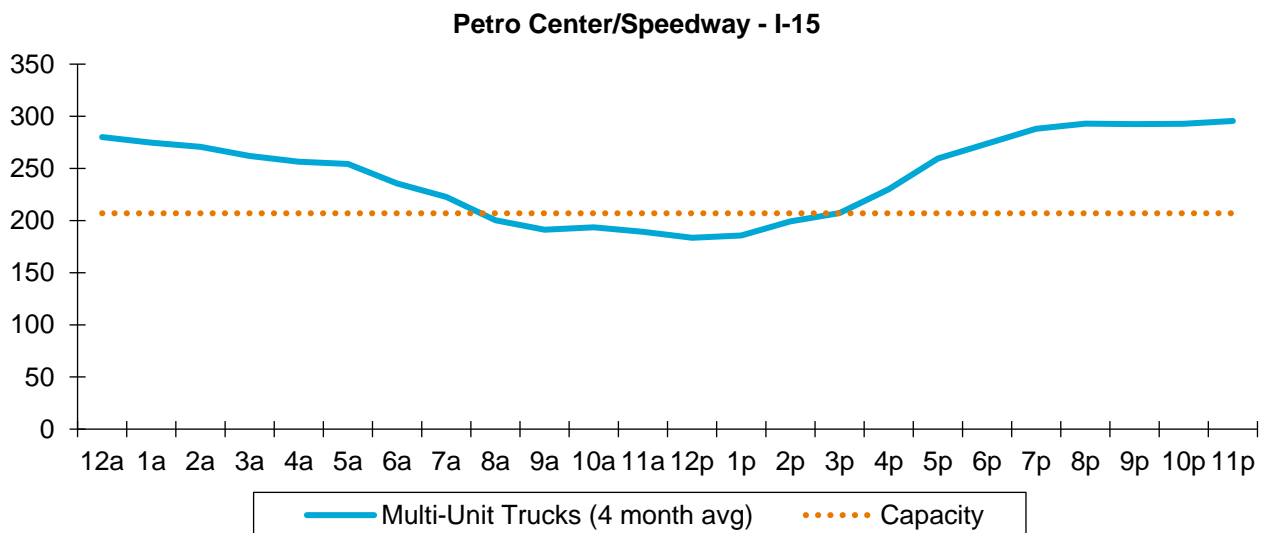
**Figure 5.5 Fernley, NV Truck Parking Locations for ATRI GPS Analysis**



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

The Petro Center on I-15 at Speedway Boulevard, north of Las Vegas is another site that appears to be over capacity even though it has a lower expansion factor (4.896). Figure 5.6 shows the utilization rate at this facility with peak utilization rate of nearly 100 more trucks than spaces available. However, representatives from Petro attended a FHWA-led Truck Parking Roundtable in Las Vegas on November 15, 2018 and indicated that this facility never reaches capacity.

**Figure 5.6 Truck Parking Capacity—Petro (Speedway Boulevard I-15)**



Source: ATRI.

### 5.1.3 Smartphone Application Data

To try to corroborate ATRI expanded counts, two other sources were explored. First, the “Park My Truck” application developed by the National Association of Truck Stop Operators (NATSO) was checked at 5:00 a.m. and 10:00 p.m.<sup>15</sup> between December 18 and December 21, 2018 at nine sites that were consistently updated in the application. These sites include:

- Pilot Travel Center (West Wendover)—120 spaces.
- Petro Wells (Wells)—250 spaces.
- Flying J Travel Plaza (Wells)—85 spaces.
- *Petro Speedway (North Las Vegas)—207 spaces.*
- *Pilot Travel Center (North Las Vegas)—80 spaces.*
- *TA Las Vegas (@ Blue Diamond Road)—144 spaces.*
- Flying J Fuel Stop (Winnemucca)—70 spaces.
- *Pilot Travel Center (Fernley)—100 spaces.*
- Petro Sparks (Sparks).—400 spaces.



*Pilot Travel Center (North Las Vegas)*

Source: Cambridge Systematics.

The four sites in *italics* are those identified by ATRI as being overcapacity based on the four two-week counts conducted. Of these sites, only the TA Las Vegas (@ Blue Diamond Road) had zero spaces available at any observed time.<sup>16</sup> Of the remaining sites, only the Petro at Speedway Boulevard in North Las Vegas dropped below 10 spaces (9 available on 12/18 at 8:50 p.m.). Collected data is shown in Appendix D.

These data do not provide a clear indication that the ATRI data are either consistently high or low. For example, the Park My Truck application for the Pilot Travel Center (North Las Vegas) consistently shows 25-40 spaces available at the observed times and the Pilot Travel Center in Fernley often had about half of their 100 spaces available. ATRI utilization data for both locations show that demand during the morning and evening peaks is typically higher than available capacity. However, for the largest single parking facility in the

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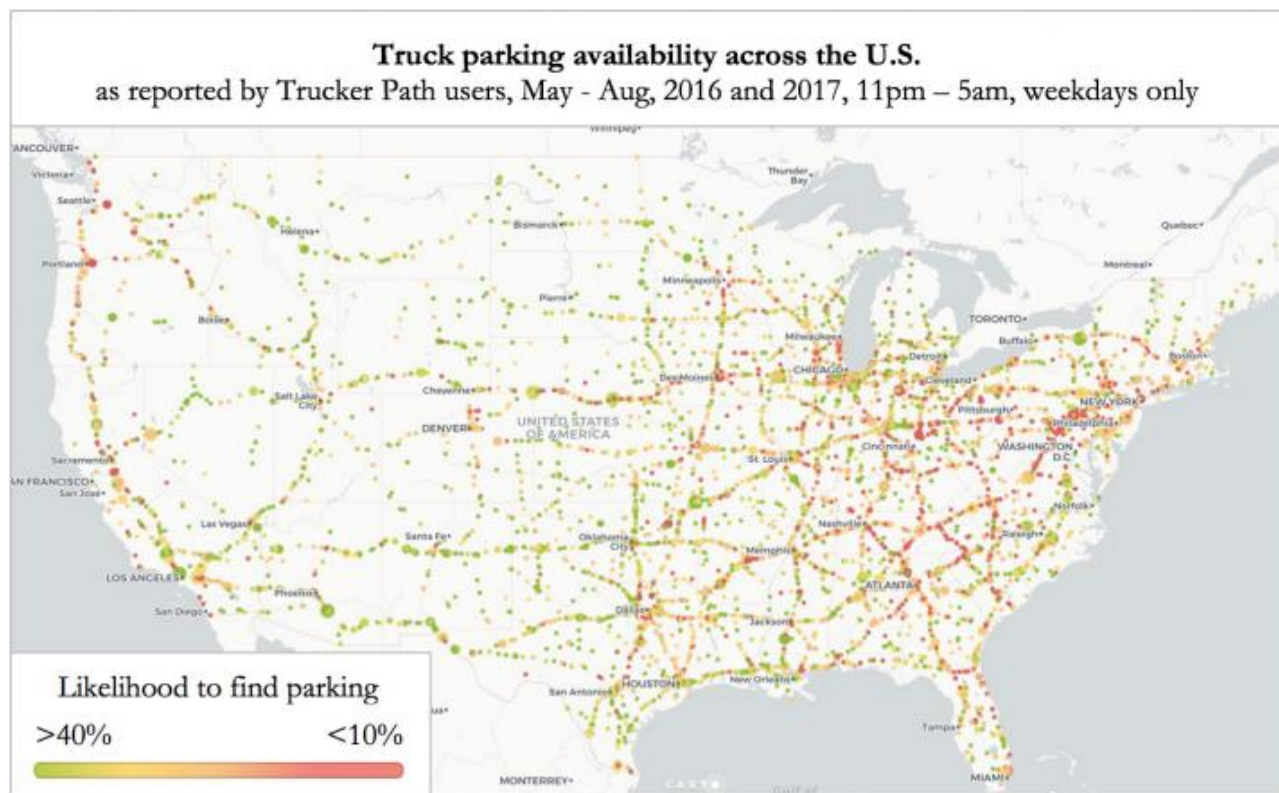
<sup>15</sup> 7 a.m. on 12/18. Depending on the day and site, some utilization data was as much as two hours old at the time recorded. The Petro facilities and the TA Las Vegas (Blue Diamond Road) frequently had data that was less up-to-date at the time observed.

<sup>16</sup> No availability on 12/18 (8 p.m.), 12/19 (5 a.m.), 12/19 (8 p.m.), 12/20 (5 a.m.), 12/20 (9 p.m.).

State (Petro in Sparks), Park My Truck shows a high of 71 spaces available while ATRI data indicates nearly 200 open spaces.

The second approach used data from the TruckerPath application. This application is crowd-sourced and uses categories to indicate available parking which reduces the accuracy.<sup>17</sup> The crowd-sourcing approach also means that there is no standard time when the data is updated, providing a much more random data set. However, the application does have better coverage than Park My Truck and provided some data on 14 of the 16 locations identified by ATRI as overcapacity.<sup>18</sup> Data from the application including the number of available spaces and the adjusted time was obtained from December 18, 2018 through December 21, 2018. TruckerPath also produced an availability map for the U.S. based on data from May—August 2016 and 2017, shown in Figure 5.7 below. Based on these data, there is at least one location in North Las Vegas shown in red with a number of other locations in the urban areas of Las Vegas and the Reno/Sparks in yellow. Other locations in yellow include the Flying J in Battle Mountain and Pilot in Carlin on I-80, the Wa She Shu Travel Plaza on US 395, at least one location in Primm (Flying J and Whiskey Pete’s Hotel/Casino), and the Texaco in Tonopah on US 95.

**Figure 5.7 Truck Parking Availability (TruckerPath). May–August, 2016 and 2017.**



Source: Trucker Path Truck Parking Report—July 2018. <http://files.truckerpath.com/web/trucker-path-parking-white-paper-2018.pdf>

<sup>17</sup> “Lots of Spots” “Some Spots” and “Lot is Full.”

<sup>18</sup> The roadside and salt-sand pad at Golconda on I-80 and the Luning Rest Area on US 95 had no data available.

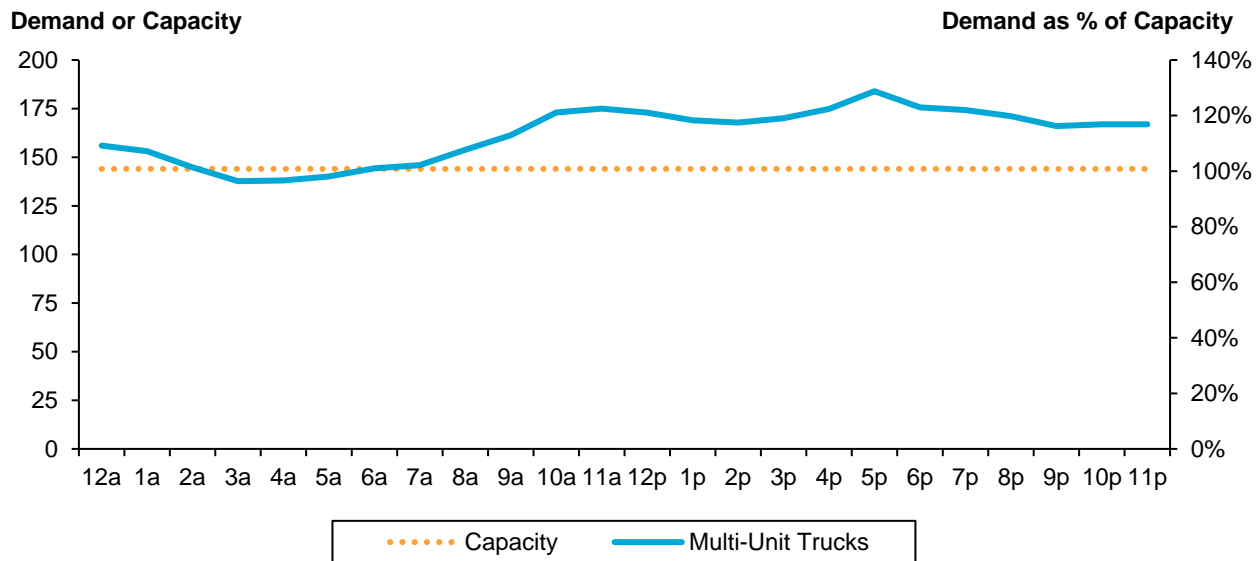


### 5.1.4 ATRI Utilization Modification

A review of the expansion factors developed by ATRI based on NDOT data shown in Figure 5.1 produced some results which do not appear to match stakeholder input from truck stop operators and other data identified in this study such as the Park My Truck application.<sup>19</sup> It is difficult to determine the exact cause of this issue—a number of factors including the base NDOT truck counts, the percent of trucks captured by ATRI, specific travel patterns in these areas during the count periods, and other issues may play a role. Because of this, the study team took a broader look at the expansion factors used in each corridor in an attempt to produce more consistent data. The truck parking locations were categorized as rural or urban and linked to the appropriate highway. Thus, the Pilot Travel Center in Winnemucca is classified as I-80 Rural, the Petro in Sparks as I-80 Urban, the Moapa Travel Center as I-15 Rural, etc. Modified expansion factors were then developed that “smoothed” the values across similar highway segments and eliminated expansion factors that produced abnormal results. Details of this process are provided in Appendix B.

Based on this process, updated utilization rates indicate that 13 locations are over capacity at some point during the day.<sup>20</sup> There are also a couple of locations, like the TA Travel Center in Las Vegas (shown in Figure 5.8 below) where the amount of time overcapacity dropped in this modified approach.

**Figure 5.8 Truck Parking Capacity—Petro (Speedway Boulevard)**



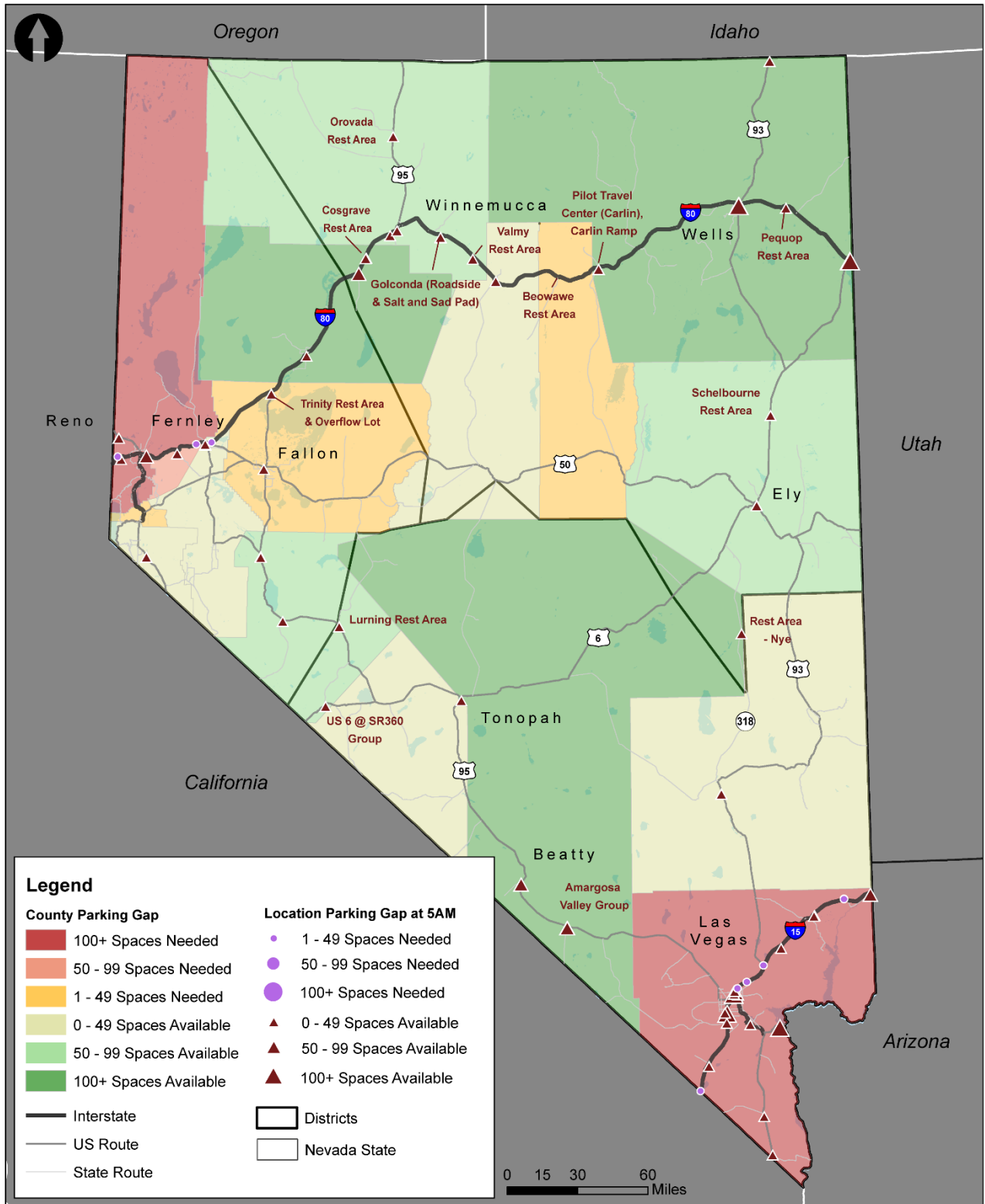
Source: ATRI, Analysis by Cambridge Systematics, 2019.

Figure 5.9 through Figure 5.14 on the following pages show locations that were over capacity at either 5:00 a.m. or 10:00 p.m. based on the average counts from the four two-week time periods sampled as well as the county-level gaps developed during the origin-destination analysis. The maps all indicate that the largest truck parking gaps are found in Clark, Washoe, and to a lesser extent Storey counties.

<sup>19</sup> Specifically, high expansion factors (above 8) developed for truck parking locations between approximately Clark and the western side of Fernley as well as some urban Las Vegas expansion factors. See Appendix E for details.

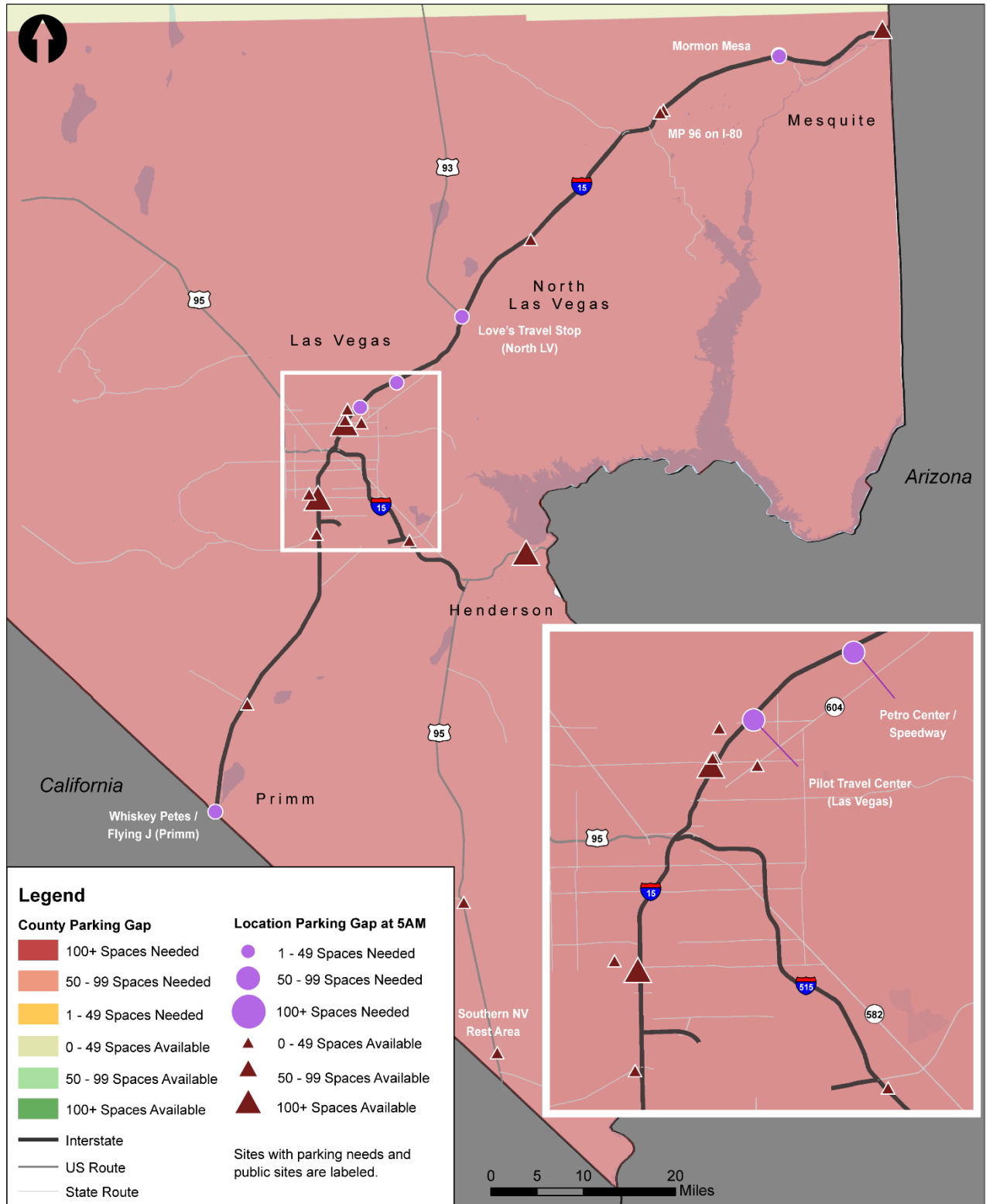
<sup>20</sup> The Pilot in Fernley and the Golden Gate in Clark are the two sites which no longer are listed as over-capacity.

Figure 5.9 Truck Parking Gap—Statewide (5:00 a.m.)



Source: ATRI, Analysis by Cambridge Systematics, 2019.

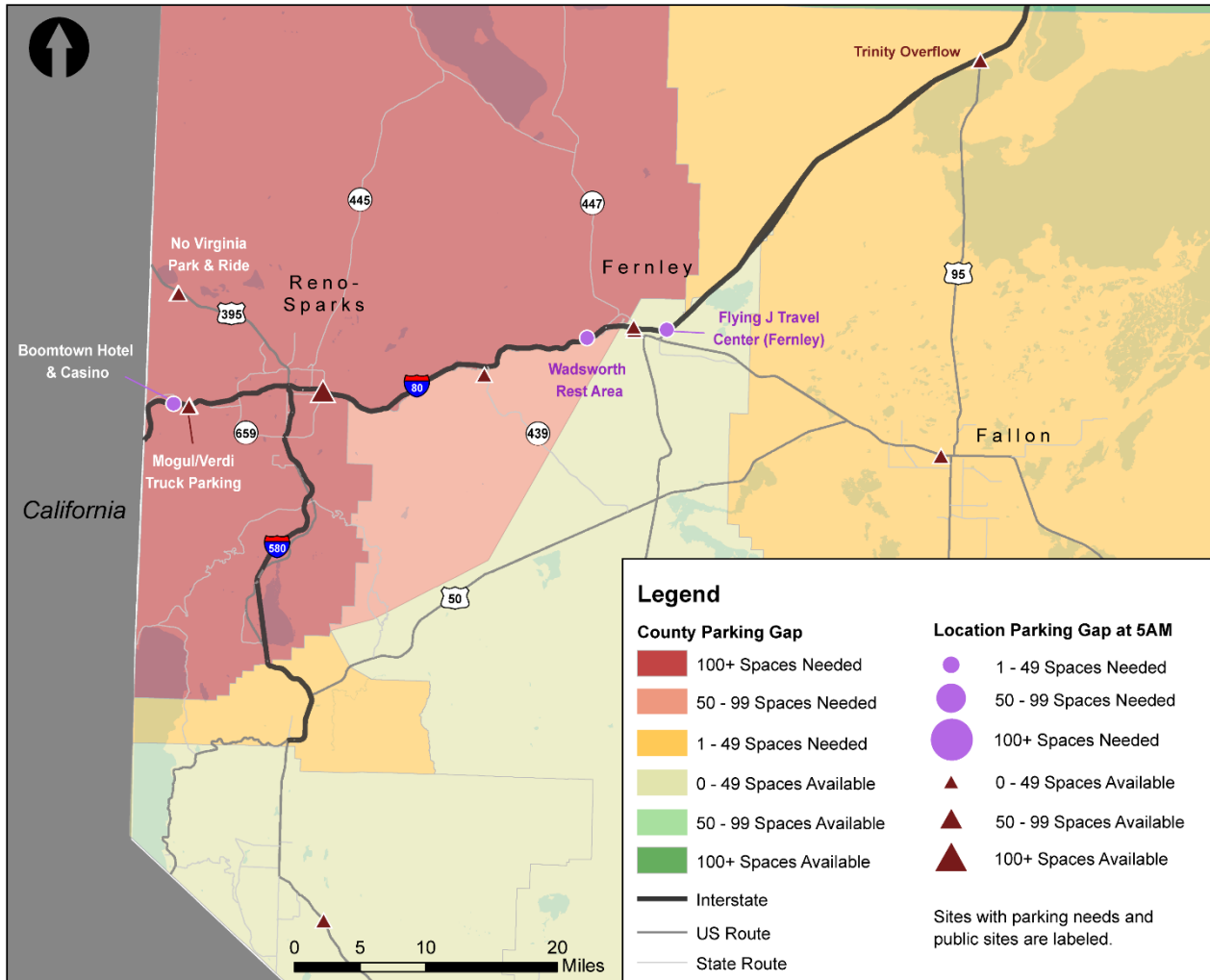
Figure 5.10 Truck Parking Gap—Southern Nevada (5:00 a.m.)



Source: ATRI, Analysis by Cambridge Systematics, 2019.

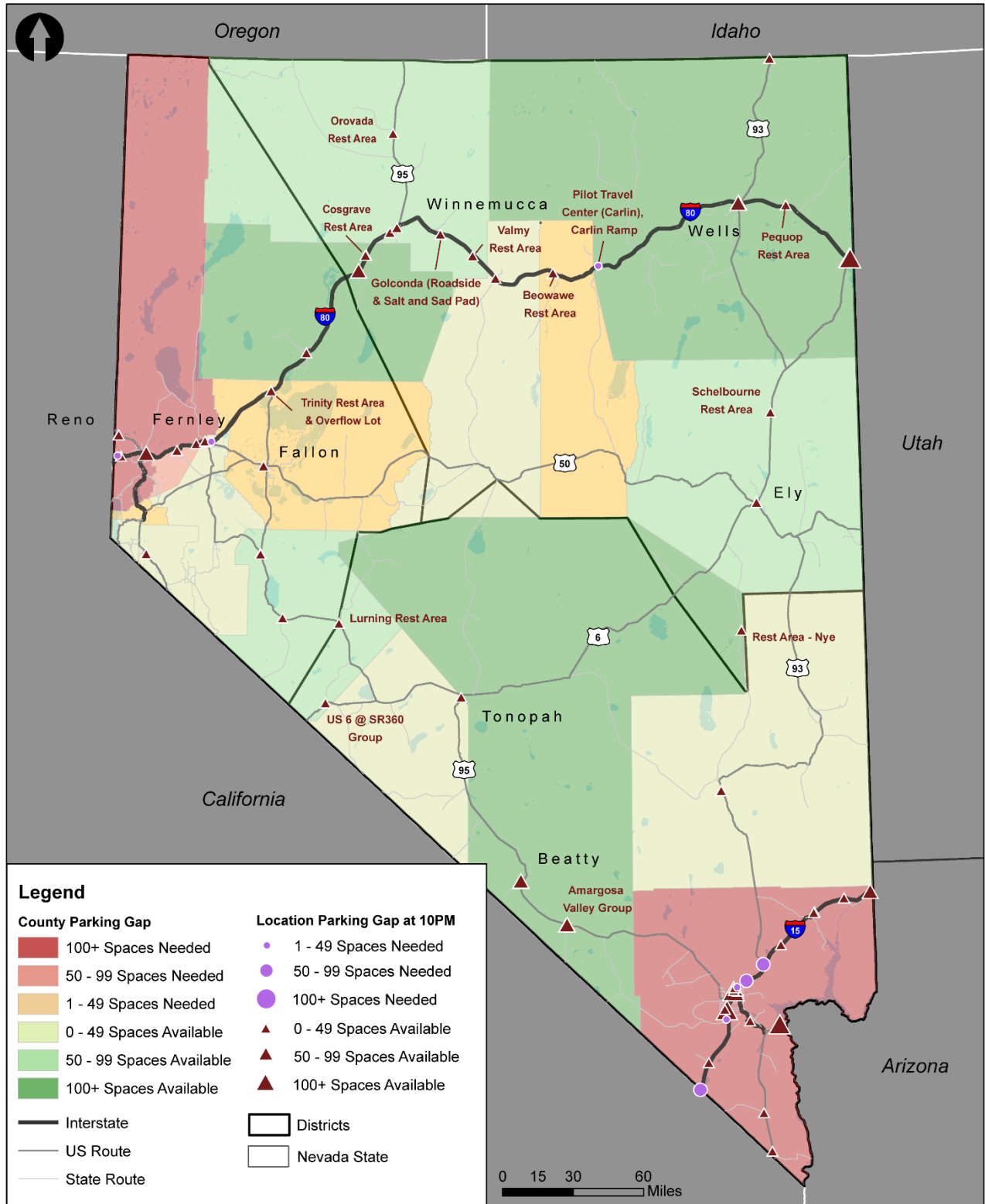


Figure 5.11 Truck Parking Gap—Northwestern Nevada (5:00 a.m.)



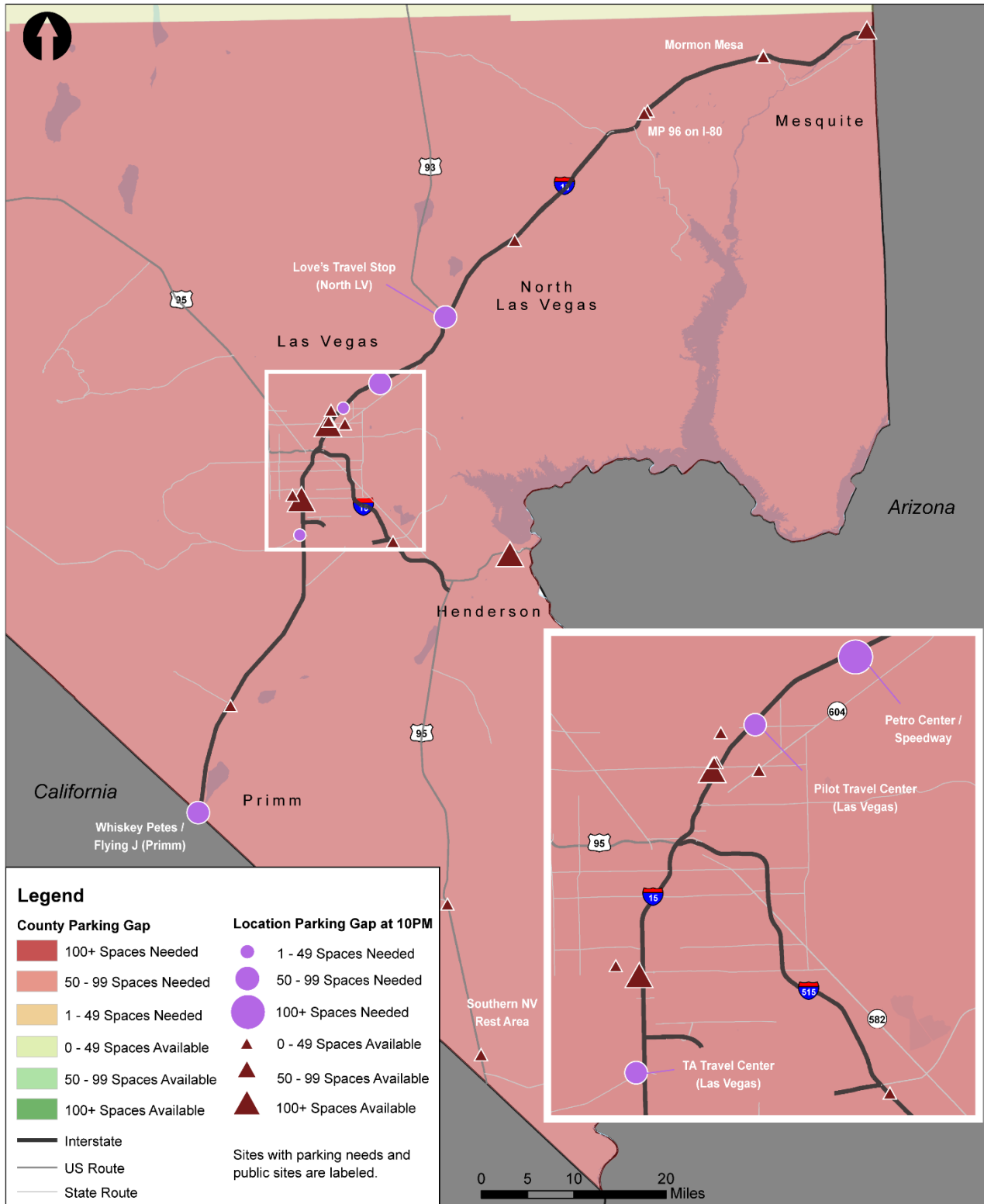
Source: ATRI, Analysis by Cambridge Systematics, 2019.

Figure 5.12 Truck Parking Gap—Statewide (10:00 p.m.)



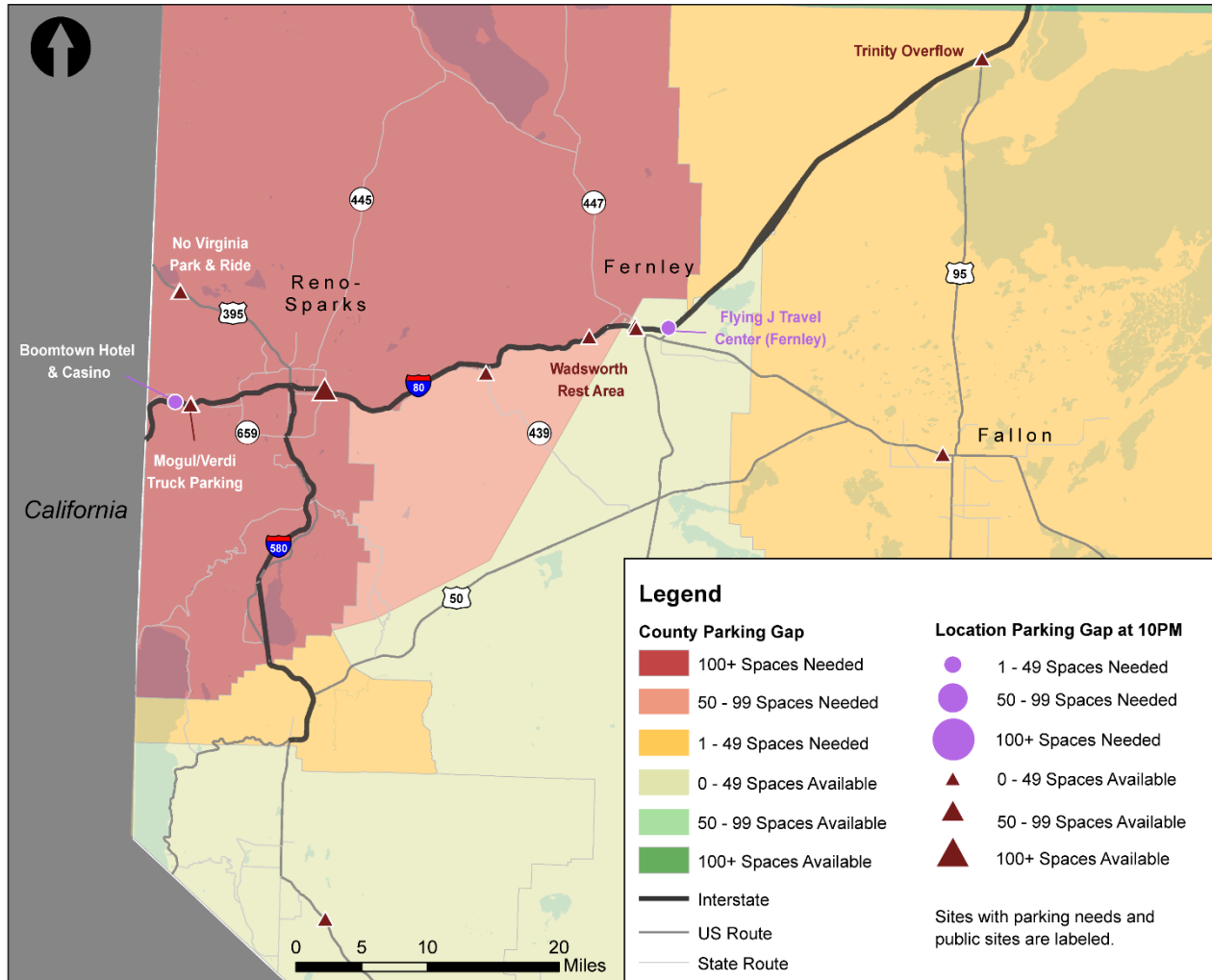
Source: ATRI, Analysis by Cambridge Systematics, 2019.

Figure 5.13 Truck Parking Gap—Southern Nevada (10:00 p.m.)



Source: ATRI, Analysis by Cambridge Systematics, 2019.

Figure 5.14 Truck Parking Gap—Northwestern Nevada (10:00 p.m.)



Source: ATRI, Analysis by Cambridge Systematics, 2019.

## 6.0 Gap Analysis Conclusions

The following sections identify gaps in truck parking during normal operating conditions and during emergency closures.

### 6.1 Truck Parking Gap During Normal Operating Conditions

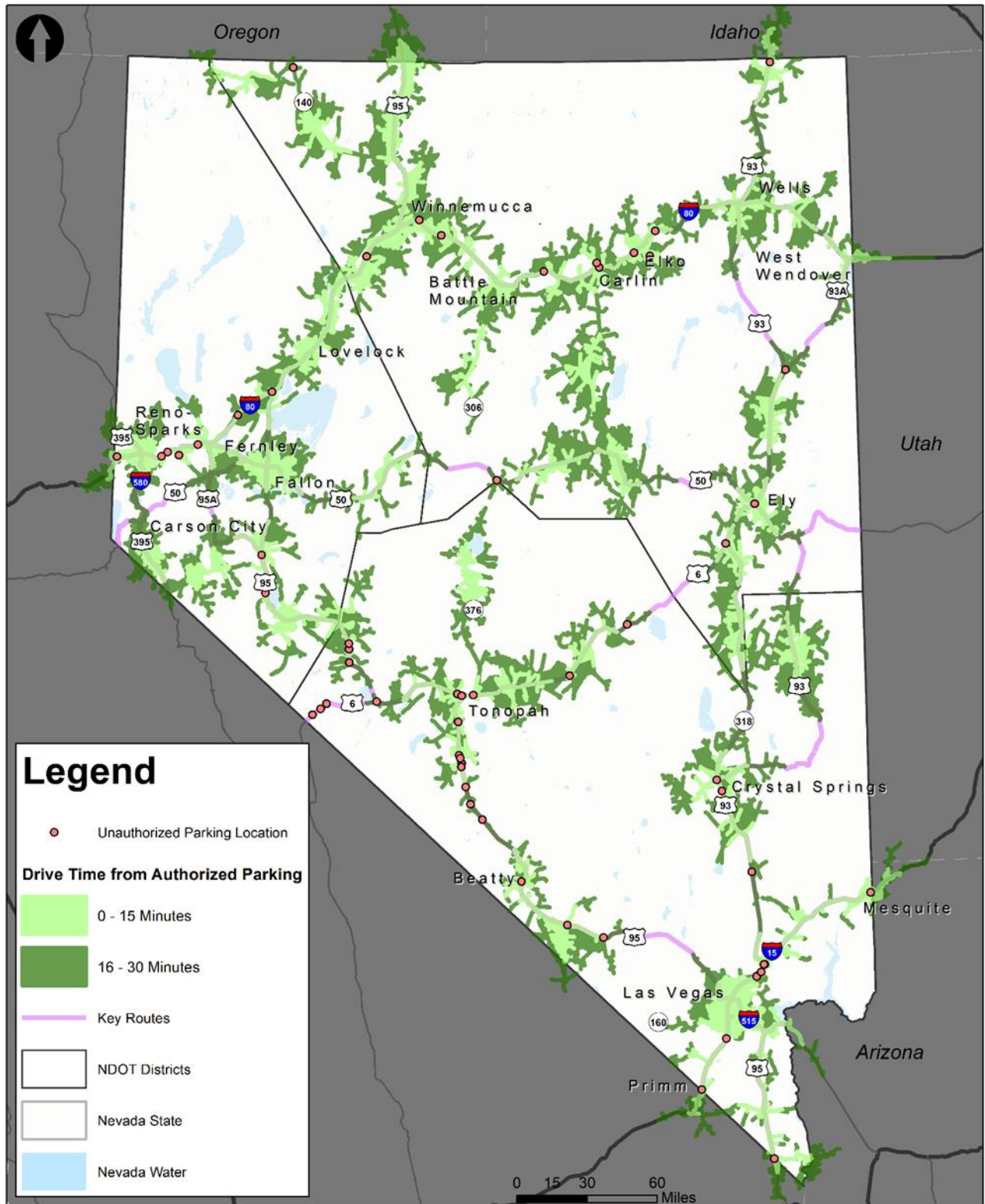
Based on the above analysis and stakeholder outreach conducted for this study, the largest gaps in truck parking occur in the two major urban areas in Nevada—Las Vegas, and Reno/Sparks. Clark County has a gap of more than 550 truck parking spaces and Reno County is lacking approximately 250 truck parking 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. Beyond these two urban areas, truck parking gaps are limited and widely distributed across the remainder of the Interstate system with some limited need identified in Churchill County and near Carlin on I-80. On the US route system, small gaps on US 6 near the California border, on US 95 near Indian Springs, and on US 93 near the US 93/93A split in Lincoln exist although at the county level supply may actually outpace demand.

One additional gap—Storey County—is likely a combination of trucks on longer interstate routes as well as trucks specifically serving the Tahoe-Reno Industrial Center which may make the need more closely related to staging parking concerns than long-haul.

There are also a couple of locations where additional amenities at a publically-controlled truck parking area may make sense. Research from the National Coalition on Truck Parking (NCTP) indicates that minimal amenities such as lighting, a waste receptacle, and a portable or vault toilet are commonly available at public truck parking locations. Most rest areas in Nevada provide these amenities, but a location such as the truck parking area on I-15 at Mormon Mesa could be a logical target for adding additional infrastructure improvements. Cost estimates for enhancements at recommended locations will be provided in the Implementation Plan technical memo.

Figure 6.1 on the following page shows the drive-time analysis gap and Figure 6.2 shows a map of stakeholder identified gaps. Outside the urban areas needs identified via these two methods appear closely aligned. Figure 6.3 through Figure 6.5 show 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 ATRI data. Note that the county level gap is based on supply and demand on I-15, I-215, I-80, I-580, US 93/SR 318, US 95, and US 395 only. 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.

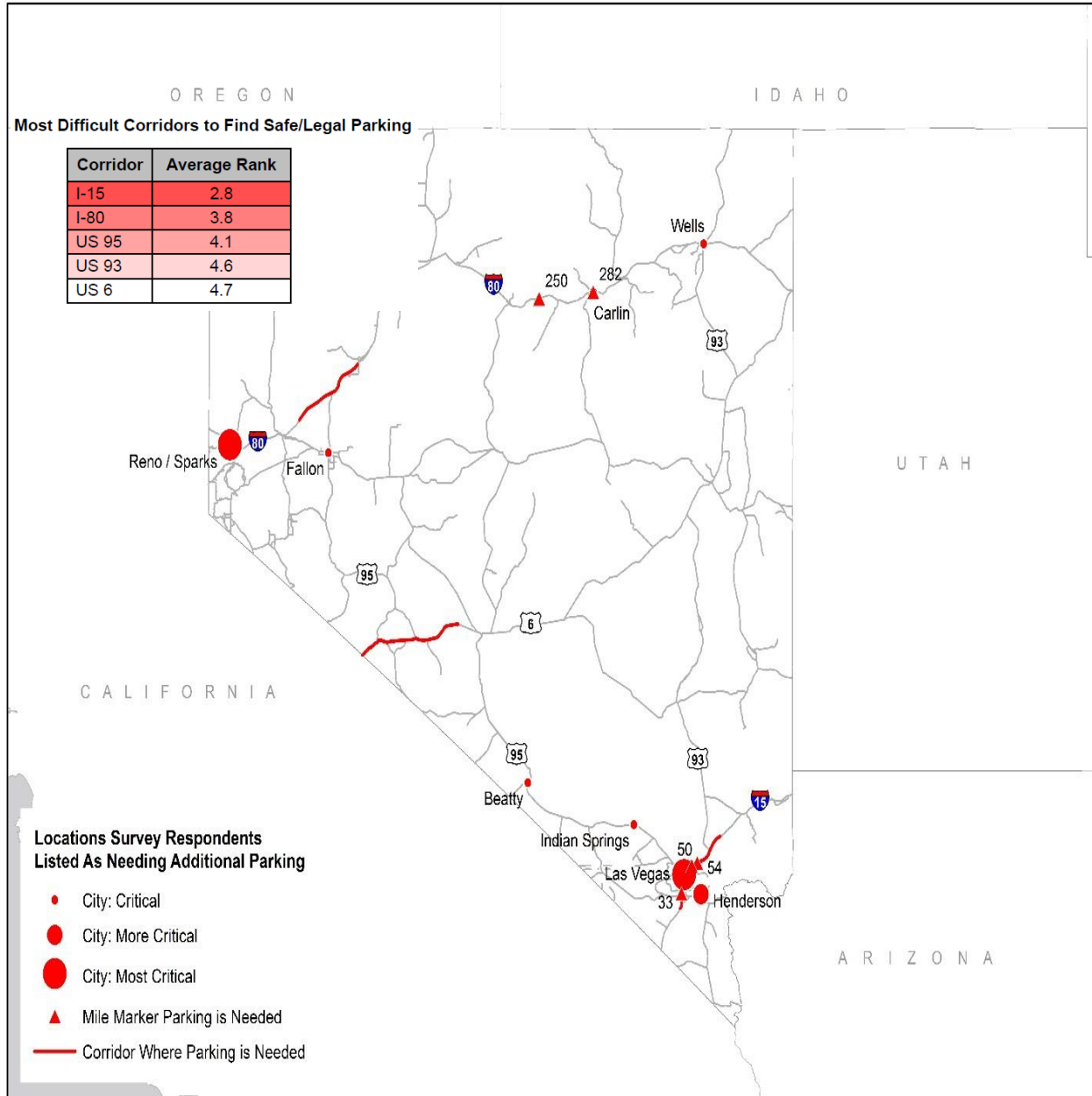
Figure 6.1 Truck Parking – 15 and 30 Minute Drive Shed



Source: NDOT, Analysis by Cambridge Systematics, 2018.

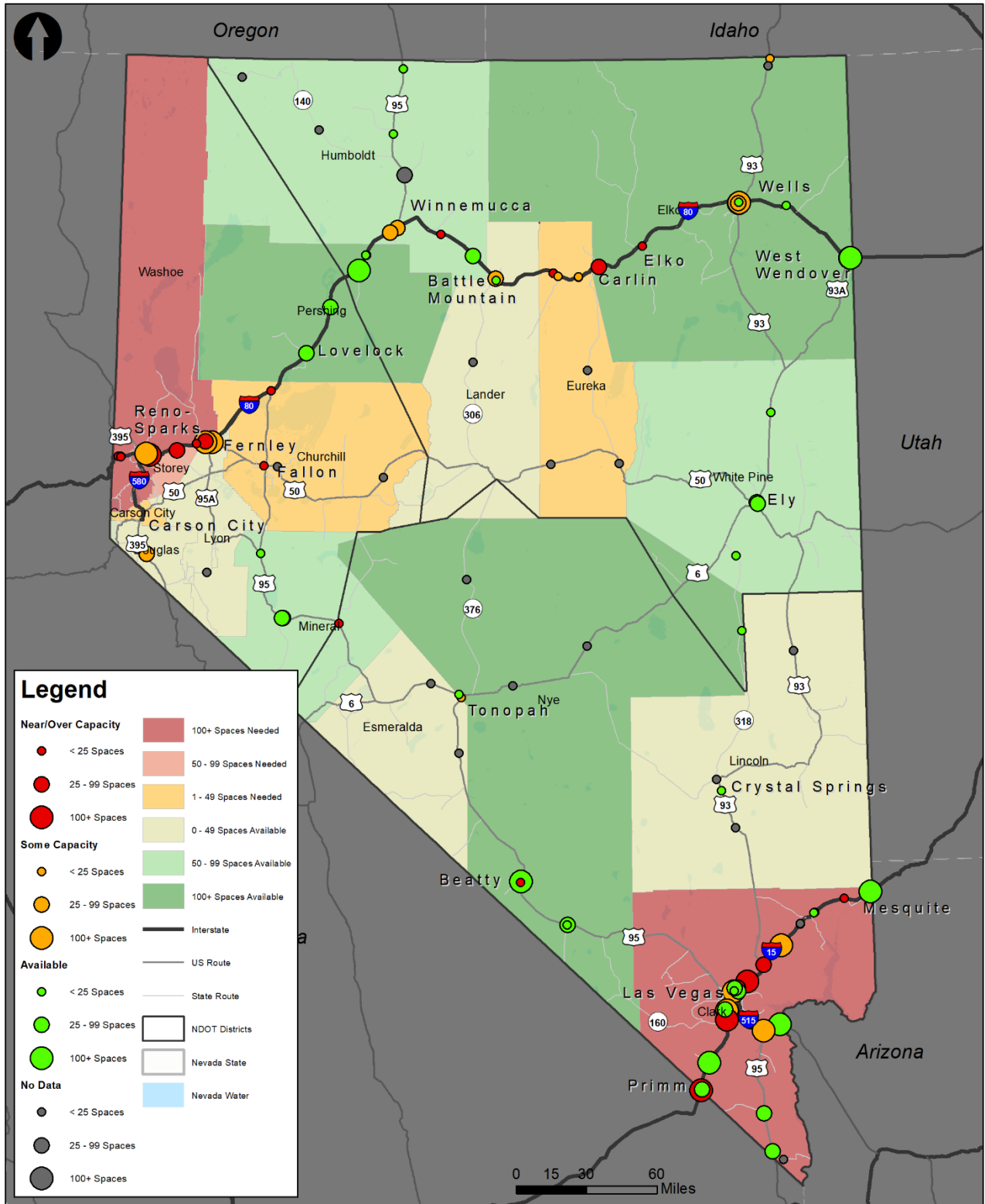


Figure 6.2 Truck Parking – Stakeholder Identified Needs



Source: ATRI.

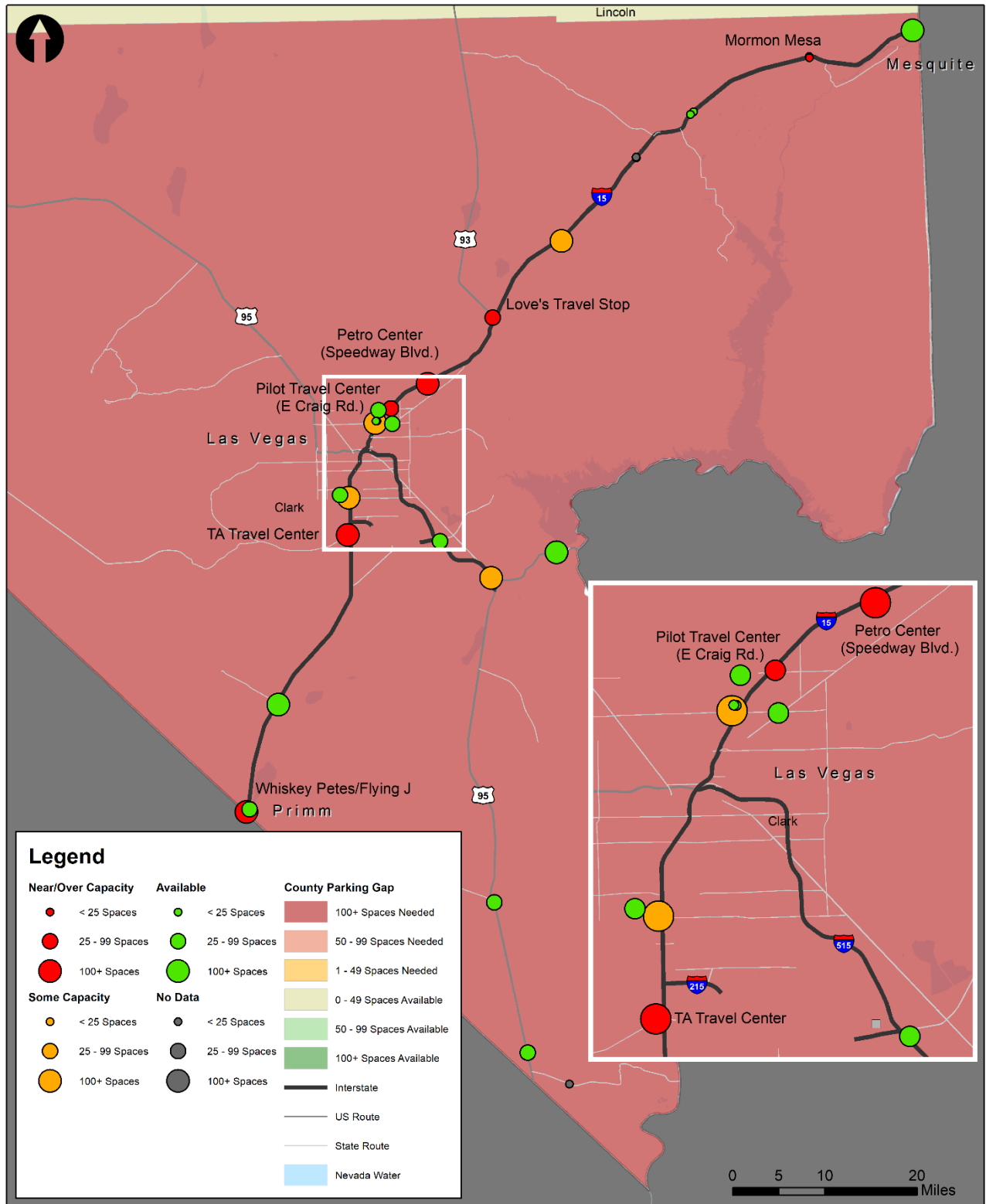
**Figure 6.3 Truck Parking Gap by County and Composite Availability at Authorized Parking Sites**



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

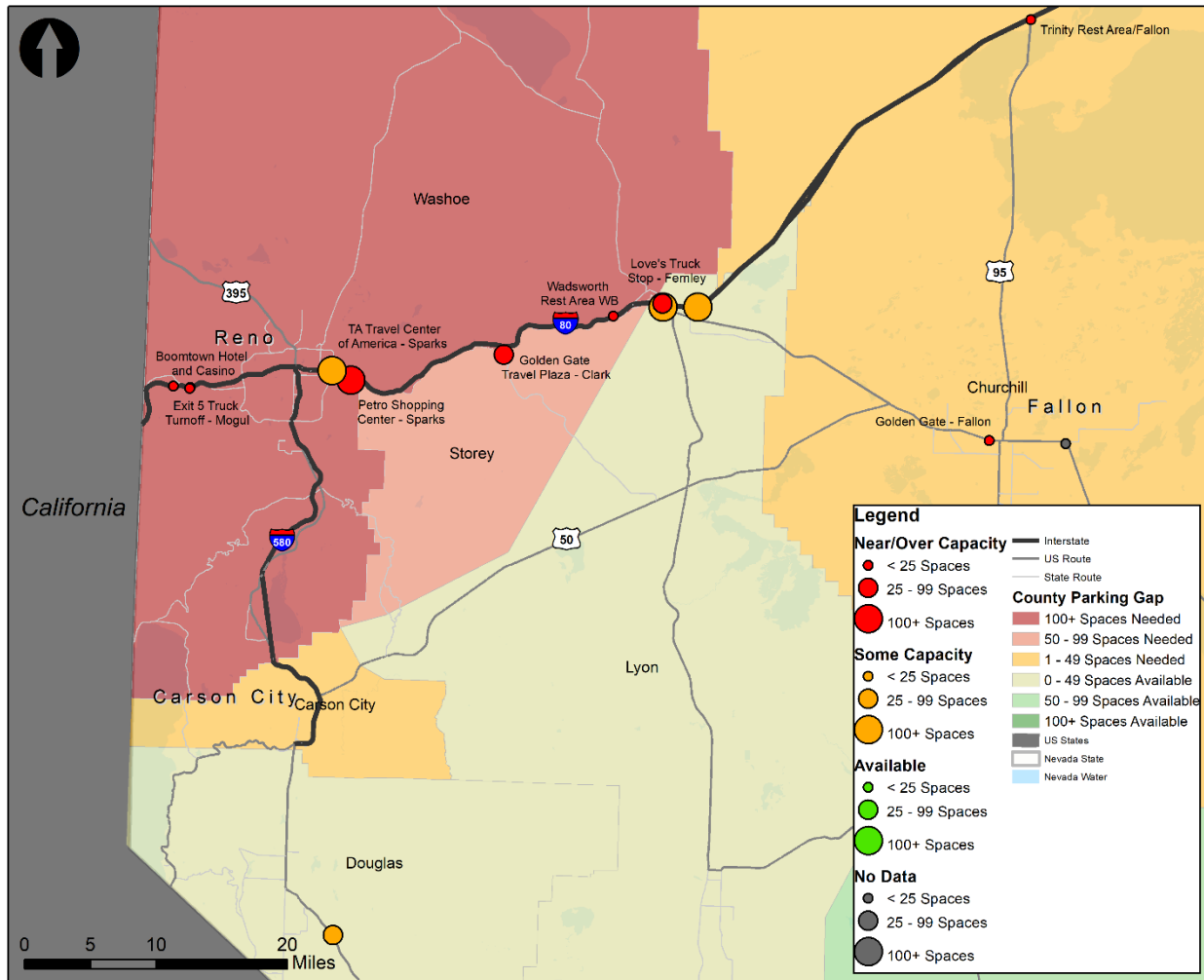


**Figure 6.4 Truck Parking Gap by County and Composite Availability at Authorized Parking Sites—Southern Nevada**



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

**Figure 6.5 Truck Parking Gap by County and Composite Availability at Authorized Parking Sites—Northwest Nevada**



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

Beyond physical infrastructure, there is also a technology and information gap to assist long-haul drivers with finding parking. Of the nearly 4,400 authorized private parking spaces in Nevada, availability information for approximately half is maintained and updated by the parking facilities themselves by visual inspection and publicized through the “Park My Truck” application developed by NATSO.<sup>21</sup> These facilities include:

- Pilot Travel Center (West Wendover).
- Petro North Las Vegas (Speedway Boulevard).
- Flying J (Winnemucca).
- Petro Sparks (Sparks).
- Petro Wells (Wells).
- Pilot Travel Center (North Las Vegas).
- TA (Mill City).
- TA (Sparks).
- Flying J Travel Plaza (Wells).
- TA Las Vegas (Blue Diamond Road).
- Pilot Travel Center (Fernley).

<sup>21</sup> The TruckerPath application provides utilization data for a wider range of parking locations, but the data is based on crowd-sourced information, is not updated on a regular basis, and is much less accurate and detailed about the number of spaces available.

None of the public parking locations in Nevada are equipped with truck counters or space detection technology which would notify drivers of available spaces.

## 6.2 Emergency Truck Parking Gap

The need to accommodate truck parking during unforeseen events—especially winter weather closures of the Donner Pass on I-80 in California—was repeatedly mentioned by stakeholders during this study. The decision to close this vital artery is made by authorities in California and Nevada and impacts travelers in both states on either side of the pass. This is especially true for trucks as there are few if any authorized locations to park between Reno and Donner Pass, and the truck parking capacity in Washoe County is already reaching capacity during normal conditions.

To better assess the impact of a closure of I-80 on truck parking in Nevada, ATRI conducted an additional analysis using truck GPS data in northwest Nevada during a closure of Donner Pass on March 16, 2018.<sup>22</sup> Truck GPS data at parking locations in northwest Nevada on the 16<sup>th</sup> was compared to the average counts obtained during the ATRI Utilization Analysis which included March 17-30 as one of the two-week periods.

Sites on I-80 west of Sparks all saw a higher number of trucks parked using both ATRI raw truck GPS counts and the expanded multi-unit truck counts using the utilization methodology discussed in Section 5. These sites include the Mogul/Verdi truck pull-off area, the Boomtown Casino, and the Petro and TA Travel Centers in Sparks. Counts at all four locations were higher than average during every hour of the day with the exception of 9 p.m. at the Petro-Sparks. Utilization rates compared to capacity are shown in Figure 6.6.

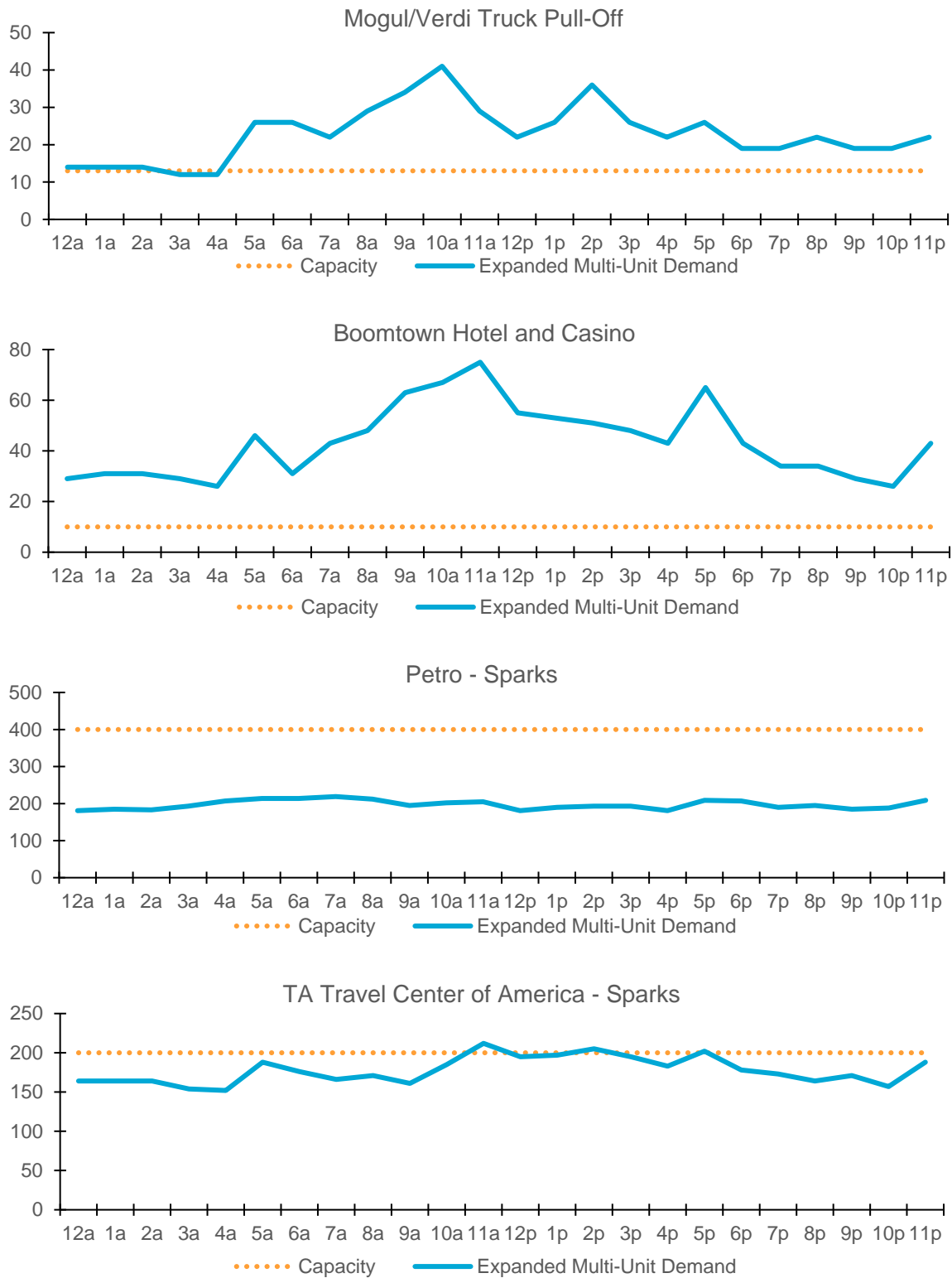
Other sites in the vicinity of the closure including the Wa She Shu Travel Plaza on US 395 south of Carson City, the Flying J, Loves, and Pilot in Fernley, the Golden Gate in Clark, and the Wadsworth Rest Area (WB), saw a mixed utilization pattern. At all of these sites, some hours saw higher than average utilization rates while others were lower and there was no universal pattern observed by hour of day. This makes it difficult to tell if the truck demand at these locations were higher due to the closure on I-80 and other mountain passes, or if these days just represent the “high” end of the average seen over the following two weeks.

Finally, ATRI also analyzed truck speeds on March 16<sup>th</sup>, 2018 using six 4-hour windows. Trucks were identified based on their speed (between 0 and 70 miles per hour). Figure 6.7 shows the location and speed of trucks in the region during the closure. The east side of Sparks and the areas of I-80 near Verdi both show a large number of trucks either stopped or moving very slowly during much of the day. This corresponds with the increase in truck parking utilization at truck stop locations in these area. Some of the low speed pings appear to be located on or adjacent to the Interstate, indicating that trucks may be stopping on the roadside during inclement weather events.

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<sup>22</sup> <https://www.sacbee.com/news/weather/article205481994.html>.

**Figure 6.6 Utilization and Capacity—Select Truck Parking Locations (I-80) on March 16, 2018**



Source: ATRI, Analysis by Cambridge Systematics, 2018.

Figure 6.7 ATRI GPS—Truck Location and Speed March 16, 2018 (Clockwise starting upper left)



Source: ATRI.



## Appendix A Origin-Destination Matrix

The following tables contain a matrix with the distribution of trucks stopping for 4-8 hours (A.1), 8 or more hours (A.2) or trucks exiting the state through one of the border regions without stopping (A.3). Values are derived from ATRI aggregated data for the month of October 2017.

### A.1 Truck Trip Counts for 4–7.99 Hour Stops

Zones	DESTINATIONS																											volumes for same origin									
	Churchill 32001	Clark 32003	Douglas 32005	Elko 32007	Esmeralda 32009	Eureka 32011	Humboldt 32013	Lander 32015	Lincoln 32017	Lyon 32019	Mineral 32021	Nye 32023	Pershing 32027	Storey 32029	Washoe 32031	White Pine 32033	Vegas NW 32103	Vegas NE 32104	Vegas SW 32105	Vegas SE 32106	Carson City 32510	Northeast Border 90000	West Border 90001	East Border 90002	Northwest Border 90003	Southeast Border 90004	South Border 90005	I-80 (West Border) 99990	I-80 (East Border) 99991	I-15 (West Border) 99992	I-15 (East Border) 99993	US 95 (North Border) 99994	US 93 (South Border) 99995				
Churchill 32001	31			1	1	1	2			5	2	3	2	3	23																					74	1%
Clark 32003		488		6					5	4	4					8	21	193	60	65																854	6%
Douglas 32005			17											3	58						3														81	1%	
Elko 32007	4	8		450		19	39	9	4	38	2	3	22	14	101	15	1	10		3															742	6%	
Esmeralda 32009					2					1	1				3	2	9																		18	0%	
Eureka 32011	2			38		18	11			9	1		1	4	11	1																			96	1%	
Humboldt 32013	8		1	26		3	147	4		21	3	18	11	64							2													308	2%		
Lander 32015	1			21	1		9	23		5	1	2	2	3	10																				78	1%	
Lincoln 32017	1	2		2					13			1				4		8	1	3															35	0%	
Lyon 32019	11	1	1	28		8	17	7		199	7	5	12	57	124			3		1	4														485	4%	
Mineral 32021	4			1	1		8			9	41	8	3	4	24			2		1	1														107	1%	
Nye 32023		2			2	2	1	2		8	1	62		5	15	2	3	32	8	2															147	1%	

Zones	Churchill 32001	Clark 32003	Douglas 32005	Elko 32007	Esmeralda 32009	Eureka 32011	Humboldt 32013	Lander 32015	Lincoln 32017	Lyon 32019	Mineral 32021	Nye 32023	Pershing 32027	Storey 32029	Washoe 32031	White Pine 32033	Vegas NW 32103	Vegas NE 32104	Vegas SW 32105	Vegas SE 32106	Carson City 32510	Northeast Border 90000	West Border 90001	East Border 90002	Northwest Border 90003	Southeast Border 90004	South Border 90005	I-80 (West Border) 99990	I-80 (East Border) 99991	I-15 (West Border) 99992	I-15 (East Border) 99993	US 95 (North Border) 99994	US 93 (South Border) 99995	volumes for same origin				
Pershing 32027	1			15			9	2		11	2		68	7	35																					150	1%	
Storey 32029			3				4			30	2	1	2	235	145		1																			423	3%	
Washoe 32031	11		20	32		5	15	3		68	5	2	14	130	1,667			1			7															1,980	15%	
White Pine 32033	1	8		11	1	2	1	1	2		2	3			1	71		22	3	6																135	1%	
Vegas NW 32103		35		1					1			2		2			165	248	36	81																571	4%	
Vegas NE 32104		165		3	4				5		2	12			2	11	110	1,022	86	172																	1,594	12%
Vegas SW 32105		48		1					1			5			2	3	30	124	309	130																	653	5%
Vegas SE 32106		54		3						2		6			1	3	38	289	117	542																	1,055	8%
Carson City 32510	1		2							3			1	3	37						17																64	0%
Northeast Border 90000				39		5	3	1	1	1			1		3	19					2																75	1%
West Border 90001	4		11	3		1	4	1		9	14	9	3	14	97																						170	1%
East Border 90002	1					2			1	1					1	3																					9	0%
Northwest Border 90003		1	1				1		1	10	1	2	1	38	71																						127	1%
Southeast Border 90004																																					0	0%
South Border 90005	1	16						1								1		18	6	10																	53	0%



Zones	Churchill 32001	Clark 32003	Douglas 32005	Elko 32007	Esmeralda 32009	Eureka 32011	Humboldt 32013	Lander 32015	Lincoln 32017	Lyon 32019	Mineral 32021	Nye 32023	Pershing 32027	Storey 32029	Washoe 32031	White Pine 32033	Vegas NW 32103	Vegas NE 32104	Vegas SW 32105	Vegas SE 32106	Carson City 32510	Northeast Border 90000	West Border 90001	East Border 90002	Northwest Border 90003	Southeast Border 90004	South Border 90005	I-80 (West Border) 99990	I-80 (East Border) 99991	I-15 (West Border) 99992	I-15 (East Border) 99993	US 95 (North Border) 99994	US 93 (South Border) 99995	volumes for same origin		
I-80 (West Border) 99990	10	1	1	39		7	24	3		88			20	76	492				1		1														763	6%
I-80 (East Border) 99991	2			179		18	23	11		36	1		22	1	31	9																			333	2%
I-15 (West Border) 99992		237		1					1	1	1	6	1		3	48	363	166	141																969	7%
I-15 (East Border) 99993		250		4							1	3	1		3	25	277	51	77																692	5%
US 95 (North Border) 99994				1			22			2	1		9		6																				41	0%
US 93 (South Border) 99995		41									1	18		2	1		53	188	63	130															497	4%
volumes for same destination	94	1,357	57	905	12	91	340	68	35	557	92	161	203	612	3,025	156	497	2,809	907	1,366	35	0	0	0	0	0	0	0	0	0	0	0	0	0	13,379	
	1%	10%	0%	7%	0%	1%	3%	1%	0%	4%	1%	1%	2%	5%	23%	1%	4%	21%	7%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			

## A.2 Truck Trip Counts for 8-10 Hour Stops

ORIGINS	DESTINATIONS																												volumes for same origin									
	Churchill 32001	Clark 32003	Douglas 32005	Elko 32007	Esmeralda 32009	Eureka 32011	Humboldt 32013	Lander 32015	Lincoln 32017	Lyon 32019	Mineral 32021	Nye 32023	Pershing 32027	Storey 32029	Washoe 32031	White Pine 32033	Vegas NW 32103	Vegas NE 32104	Vegas SW 32105	Vegas SE 32106	Carson City 32510	Northeast Border 90000	West Border 90001	East Border 90002	Northwest Border 90003	Southeast Border 90004	South Border 90005	I-80 (West Border) 99990	I-80 (East Border) 99991	I-15 (West Border) 99992	I-15 (East Border) 99993	US 95 (North Border) 99994	US 93 (South Border) 99995					
Churchill 32001	18			4			1		3	2		1		4	1					1																35	1%	
Clark 32003		254				1		2				4	1		5	9	38	18	16																		348	6%
Douglas 32005			15											2	17					3																37	1%	
Elko 32007	2	6		174		10	22	2	5	39		2	17	5	48	7		2	1																	342	6%	
Esmeralda 32009								1		1		2			3					4																11	0%	
Eureka 32011				10		3	5	1		1	1	1		1	6																					29	1%	
Humboldt 32013	4	1		27			82	3		9	8		7	4	54	1																				200	4%	
Lander 32015				6			4	12		3					6				1																	32	1%	
Lincoln 32017		4															1	4																		15	0%	
Lyon 32019	3	1	1	47	2	4	24	4		83	3	12	18	12	54		1	1																		270	5%	
Mineral 32021	2						3		1	4	25	5	2	4	14		1																			61	1%	
Nye 32023	1	7		2	1		2			4	5	32		1	12	4	1	17	7	1																97	2%	
Pershing 32027	1			20		1	6	1		6	1		32		28	2																				98	2%	

Zones	Churchill 32001	Clark 32003	Douglas 32005	Elko 32007	Esmeralda 32009	Eureka 32011	Humboldt 32013	Lander 32015	Lincoln 32017	Lyon 32019	Mineral 32021	Nye 32023	Pershing 32027	Storey 32029	Washoe 32031	White Pine 32033	Vegas NW 32103	Vegas NE 32104	Vegas SW 32105	Vegas SE 32106	Carson City 32510	Northeast Border 90000	West Border 90001	East Border 90002	Northwest Border 90003	Southeast Border 90004	South Border 90005	I-80 (West Border) 99990	I-80 (East Border) 99991	I-15 (West Border) 99992	I-15 (East Border) 99993	US 95 (North Border) 99994	US 93 (South Border) 99995	volumes for same origin			
Storey 32029	1		2	3			2			18		1	1	93	36			1																		158	3%
Washoe 32031	1	4	6	11		1	12	2		21	5	3	15	19	478			1	2	1	2															584	10%
White Pine 32033	4	5		8		3						1			2	26		19		3																71	1%
Vegas NW 32103		20							1	2		1					52	50	8	20																154	3%
Vegas NE 32104	1	40		5				1	2	3	2	7			2	6	16	299	29	38																451	8%
Vegas SW 32105		34										6					7	18	131	31																227	4%
Vegas SE 32106		20	1	4						1	1	1					4	64	31	141																268	5%
Carson City 32510	6									2				1	9						14															32	1%
Northeast Border 90000	1	3		56		3	4		4	1		2	3		2	19		3		1																102	2%
West Border 90001	1		6	1			6			13	18	5	7	10	42						2															111	2%
East Border 90002						3		2		1						6																				12	0%
Northwest Border 90003	1				1					10				8	34						2															56	1%
Southeast Border 90004																																				0	0%
South Border 90005		9							1		1	2			1			8	1	1																24	0%
I-80 (West Border) 99990	8			31		7	25	4		77	1	2	34	41	182			1			5															418	7%

Zones	Churchill 32001	Clark 32003	Douglas 32005	Elko 32007	Esmeralda 32009	Eureka 32011	Humboldt 32013	Lander 32015	Lincoln 32017	Lyon 32019	Mineral 32021	Nye 32023	Pershing 32027	Storey 32029	Washoe 32031	White Pine 32033	Vegas NW 32103	Vegas NE 32104	Vegas SW 32105	Vegas SE 32106	Carson City 32510	Northeast Border 90000	West Border 90001	East Border 90002	Northwest Border 90003	Southeast Border 90004	South Border 90005	I-80 (West Border) 99990	I-80 (East Border) 99991	I-15 (West Border) 99992	I-15 (East Border) 99993	US 95 (North Border) 99994	US 93 (South Border) 99995	volumes for same origin					
I-80 (East Border) 99991	3			121	1	10	13	11		15	1	1	9	2	26	5																				218	4%		
I-15 (West Border) 99992		198							4			9				2	30	138	56	77																	514	9%	
I-15 (East Border) 99993		154		5						1	1	2					16	97	20	21																	317	6%	
US 95 (North Border) 99994	2	1		1			36			7	1		6		5	1																					60	1%	
US 93 (South Border) 99995		27			1		1		1	1	2	9			4	2	31	61	26	59																		225	4%
volumes for same destination	60	788	31	536	6	46	248	44	27	326	78	110	153	203	1,069	87	169	826	330	411	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,577		
	1%	14%	1%	10%	0%	1%	4%	1%	0%	6%	1%	2%	3%	4%	19%	2%	3%	15%	6%	7%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%				

A.3 Truck Trip Counts for Trips Ending at a Border Zone

ORIGINS	DESTINATIONS																												volumes for same origin																					
	Churchill 32001	Clark 32003	Douglas 32005	Elko 32007	Esmeralda 32009	Eureka 32011	Humboldt 32013	Lander 32015	Lincoln 32017	Lyon 32019	Mineral 32021	Nye 32023	Pershing 32027	Storey 32029	Washoe 32031	White Pine 32033	Vegas NW 32103	Vegas NE 32104	Vegas SW 32105	Vegas SE 32106	Carson City 32510	Northeast Border 90000	West Border 90001	East Border 90002	Northwest Border 90003	Southeast Border 90004	South Border 90005	I-80 (West Border) 99990			I-80 (East Border) 99991	I-15 (West Border) 99992	I-15 (East Border) 99993	US 95 (North Border) 99994	US 93 (South Border) 99995															
Churchill 32001																						2	65	2	22							100	14	4	1	31	3	244	0%											
Clark 32003																							10	8	7	1	1	312	5	15	3,648	3,325	4	653	7,989	14%														
Douglas 32005																																							545	1%										
Elko 32007																																									3,386	6%								
Esmeralda 32009																																											24	0%						
Eureka 32011																																												301	1%					
Humboldt 32013																																													1,583	3%				
Lander 32015																																														278	0%			
Lincoln 32017																																														97	0%			
Lyon 32019																																															2,576	5%		
Mineral 32021																																															431	1%		
Nye 32023																																																444	1%	
Pershing 32027																																																	1,009	2%

Zones	Churchill 32001	Clark 32003	Douglas 32005	Elko 32007	Esmeralda 32009	Eureka 32011	Humboldt 32013	Lander 32015	Lincoln 32017	Lyon 32019	Mineral 32021	Nye 32023	Pershing 32027	Storey 32029	Washoe 32031	White Pine 32033	Vegas NW 32103	Vegas NE 32104	Vegas SW 32105	Vegas SE 32106	Carson City 32510	Northeast Border 90000	West Border 90001	East Border 90002	Northwest Border 90003	Southeast Border 90004	South Border 90005	I-80 (West Border) 99990	I-80 (East Border) 99991	I-15 (West Border) 99992	I-15 (East Border) 99993	US 95 (North Border) 99994	US 93 (South Border) 99995	volumes for same origin				
Storey 32029																																				1,512	3%	
Washoe 32031																																					8,352	15%
White Pine 32033																																					355	1%
Vegas NW 32103																																					983	2%
Vegas NE 32104																																					8,532	15%
Vegas SW 32105																																					2,364	4%
Vegas SE 32106																																					2,694	5%
Carson City 32510																																					156	0%
Northeast Border 90000																																					104	0%
West Border 90001																																					774	1%
East Border 90002																																					56	0%
Northwest Border 90003																																					132	0%
Southeast Border 90004																																					24	0%
South Border 90005																																					1,750	3%
I-80 (West Border) 99990																																					2,287	4%

Zones	Churchill 32001	Clark 32003	Douglas 32005	Elko 32007	Esmeralda 32009	Eureka 32011	Humboldt 32013	Lander 32015	Lincoln 32017	Lyon 32019	Mineral 32021	Nye 32023	Pershing 32027	Storey 32029	Washoe 32031	White Pine 32033	Vegas NW 32103	Vegas NE 32104	Vegas SW 32105	Vegas SE 32106	Carson City 32510	Northeast Border 90000	West Border 90001	East Border 90002	Northwest Border 90003	Southeast Border 90004	South Border 90005	I-80 (West Border) 99990	I-80 (East Border) 99991	I-15 (West Border) 99992	I-15 (East Border) 99993	US 95 (North Border) 99994	US 93 (South Border) 99995	volumes for same origin		
I-80 (East Border) 99991																						1	1	9	9		20	231		5	500	8	4	788	1%	
I-15 (West Border) 99992																						5	280	1	12		154	676	14		2,735	14	26	3,917	7%	
I-15 (East Border) 99993																						1	1	68	5		50	13	463	2,117			48	244	3,010	5%
US 95 (North Border) 99994																						3	12	2	1			13	3	5		25			64	0%
US 93 (South Border) 99995																						3	6			20	113	17	11	34		261	2		467	1%
volumes for same destination	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	213	3,905	230	1,661	24	1,961	12,978	5,386	13,849	11,284	982	4,755	57,228		
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%	0%	3%	0%	3%	23%	9%	24%	20%	2%	8%			





## Appendix B      ATRI Truck GPS Utilization

This appendix contains the data used by ATRI to develop utilization rates and charts showing utilization rates at facilities identified as overcapacity. For a discussion of methodology used in this analysis, see Section 5.1.1.

### B.1      ATRI Truck GPS Utilization Data

The table on the following page shows the 59 locations analyzed by ATRI, the maximum and average “raw” truck counts based on the four two-week count times, the base and modified expansion factors. Expansion factors were developed to “step up” the ATRI raw counts since ATRI’s GPS data does not cover every truck utilizing parking in Nevada. The ATRI database includes between 15% and 50% of all Class 6-8 trucks, depending on roadway type. Nationwide, ATRI’s raw data sample is between 800,000 and 1,000,000 vehicles, of which approximately 89% are “18 wheelers.” In order to more accurately determine utilization, an expansion factor is needed to extrapolate the ATRI parked vehicle counts to an estimate of the full population of parked trucks in the study area.

A review of the expansion factors developed by ATRI based on NDOT data produced some results which do not appear to match stakeholder input from truck stop operators and other data identified in this study such as the Park My Truck application.<sup>23</sup> It is difficult to determine the exact cause of this issue—a number of factors including the base NDOT truck counts, the percent of trucks captured by ATRI, specific travel patterns in these areas during the count periods, and other issues may play a role. Because of this, the study team took a broader look at the expansion factors used in each corridor in an attempt to produce more consistent data. The truck parking locations were categorized as rural or urban and linked to the appropriate highway. Thus, the Pilot Travel Center in Winnemucca is classified as I-80 Rural, the Petro in Sparks as I-80 Urban, the Moapa Travel Center as I-15 Rural, etc. Modified expansion factors were then developed that “smoothed” the values across similar highway segments and eliminated expansion factors that produced abnormal results.

Of the four locations with the highest expansion factor (8.664), three are located on rural stretches of I-80 (Pilot and Loves in Fernley and Wadsworth Rest Area) and one is classified as I-80 urban (Golden Gate in Clark). For the modified expansion factor, the three rural locations instead use the same expansion factor used for I-80 east of Fernley (another I-80 rural segment) of 3.421. The Golden Gate in Clark expansion factor was modified to match that developed for the other I-80 urban locations and applied to parking sites in Sparks and Verdi (2.854).

Similarly, expansion factors in the Las Vegas metro area (I-15 urban) ranged from 4.397 for the Fiesta Henderson Hotel and Casino to 7.639 for the Loves Travel Stop in North Las Vegas. In addition, the value used to derive the expansion factor for parking for the Loves Travel Stop relied on 2017 average NDOT truck counts—a less reliable source of data than the NDOT counter stations which could provide daily data. To remedy this, all I-15 urban locations in the Las Vegas area used the same expansion factor (4.896) which provided expanded truck counts which matched stakeholder input. All other expansion factors developed by ATRI remained as provided. Table B.1 on the following page shows the sites sampled, the initial “base”

<sup>23</sup> Specifically, high expansion factors (above 8x) developed for truck parking locations between approximately Clark and the western side of Fernley as well as some urban Las Vegas expansion factors.

expansion factor, and the “modified” expansion factor used in the Site Profiles in Section B.3 and in future technical memos.

One final note about the methodology for this exercise is important. The average expanded multi-unit truck count derived was calculated by averaging the expanded multi-unit count from the four two-week time periods, each of which used a separate expansion factor based on the ATRI and NDOT counts within the period. The modified expanded multi-unit truck count is based on the average “raw” truck counts from the four two-week periods multiplied by the single modified expansion factor. This produces slightly different results even when no modification was made to the expansion factor at a site as the base expanded count is derived using four different expansion factors (one for each two-week period) while the modified approach uses a single expansion factor.

**Table B.1 ATRI Utilization Analysis Site Expansion Factors**

Site	Location	Supply	Maximum Raw Count	Average Raw Count	Base Expansion Factor	Modified Expansion Factor
Petro Shopping Center (Sparks)	I-80 Urban	400	81.0	61.7	2.854	2.854
Morton's Truck Stop	I-15 Urban	225	23.2	17.7	4.896	4.896
Petro Center/Speedway @ Apex	I-15 Urban	207	70.9	49.6	4.896	4.896
TA Travel Center of America (Sparks)	I-80 Urban	200	53.1	42.2	2.854	2.854
Flying J (Fernley)	I-80 Rural	100	42.6	29.4	3.421	3.421
Hoover Dam Lodge Truck Parking	US93 Rural	200	13.4	8.0	1.814	1.814
TA Travel Center of America (Mill City)	I-80 Rural	152	29.5	19.8	3.069	3.069
Wild West Truck Stop	I-15 Urban	150	14.2	9.0	5.431	4.896
TA Travel Center (Vegas)	I-15 Urban	144	40.7	33.0	5.431	4.896
Whiskey Petes/Flying J (Primm)	I-15 Rural	125	50.8	36.4	4.265	4.265
Pilot and Rainbow Truckers Lounge (Wendover)	I-80 Rural	225	42.3	27.4	3.461	3.461
Moapa Travel Center (Moapa Valley of Fire)	I-15 Rural	105	30.1	20.8	2.689	2.689
Flying J Travel Center (Winnemucca)	I-80 Rural	70	22.7	16.4	3.069	3.069
Gold Strike Truck Plaza/Shell Station/Terrible Herbst	I-15 Rural	100	21.1	13.1	4.265	4.265
Virgin River Truck Stop	I-15 Rural	100	16.6	10.3	2.689	2.689
Pilot (Fernley)	I-80 Rural	100	26.9	20.8	8.664	3.421
Pilot, Flying J, TA Petro, Loves (Wells)	I-80 Rural	380	64.6	48.2	3.461	3.461
Stagecoach Hotel and Beatty	US95 Rural	105	4.9	2.9	2.664	2.664
Loves (Fernley)	I-80 Rural	94	32.8	25.4	8.664	3.421
Pilot Travel Center (Winnemucca)	I-80 Rural	85	23.2	17.3	3.069	3.069

Site	Location	Supply	Maximum Raw Count	Average Raw Count	Base Expansion Factor	Modified Expansion Factor
Pilot Travel Center (Vegas)	I-15 Urban	80	25.4	18.5	4.896	4.896
Loves Travel Stop (North LV)	I-15 Urban	80	31.5	24.2	7.639	4.896
Flying J Travel Center (Battle Mountain)	I-80 Rural	70	16.6	9.5	3.226	3.226
Golden Gate (Clark)	I-80 Urban	51	11.3	7.9	8.664	2.854
Roady's Golden Gate - Lovelock	I-80 Rural	50	9.4	5.8	3.421	3.421
The Orleans Casino Parking	I-15 Urban	45	5.4	2.9	5.431	4.896
Maverick Truck Stop	I-15 Urban	40	0.9	0.3	4.896	4.896
Pilot (Carlin) and Carlin Ramp	I-80 Rural	50	20.3	13.5	3.461	3.461
Roady's Golden Gate - Hawthorne	US95 Rural	50	11.4	7.8	3.206	3.206
Cannery Casino and Hotel	I-15 Urban	35	5.4	2.5	4.896	4.896
Fiesta Henderson Hotel and Casino	I-15 Urban	30	4.6	2.5	4.397	4.896
Wa She Shu Travel Plaza	US395 Rural	30	3.8	2.6	2.182	2.182
Terribles Truck Stop	US95 Rural	30	3.4	2.0	4.397	4.397
Southern Nevada Rest Area	US95 Rural	30	0.9	0.5	4.397	4.397
Valmy Rest Area	I-80 Rural	28	4.9	2.7	3.226	3.226
Amargosa Valley group	US95 Rural	60	6.2	3.9	2.230	2.230
NOIL and DPF Filter	I-15 Urban	22	1.2	0.3	4.896	4.896
Cosgrave Rest Area	I-80 Rural	25	3.5	2.2	3.069	3.069
Pequop Rest Area	I-80 Rural	20	3.8	2.3	3.461	3.461
R Place and Loves Ely	US93 Rural	68	17.3	12.2	1.857	1.857
Texaco - Tonopah	US95 Rural	20	6.2	3.8	2.664	2.664
Trinity and Overflow lot	I-80 Rural	24	6.9	4.8	3.421	3.421
Orovada Rest Area	US95 Rural	12	1.5	0.8	1.480	1.480
MP 96 Truck Turnout (I-80)	I-15 Rural	20	6.1	4.2	2.689	2.689
Mormon Mesa Truck Turnout (I-15)	I-15 Rural	20	9.9	7.4	2.689	2.689
Boomtown	I-80 Urban	10	10.1	5.2	2.854	2.854
Schelbourne Rest Area	US93 Rural	10	2.2	1.4	3.474	3.474
Ash Springs group	US93 Rural	15	2.4	1.5	1.212	1.212
Barton's	US93 Rural	10	2.0	1.1	3.547	3.547
Golden Gate - Fallon	US95 Rural	10	1.8	1.0	3.206	3.206
Beowawe Rest Area	I-80 Rural	17	6.6	4.6	3.226	3.226
Mogul/Verdi Truck Turnout	I-80 Urban	13	5.8	3.2	2.854	2.854
Luning Rest Area	US95 Rural	6	2.6	1.6	3.206	3.206

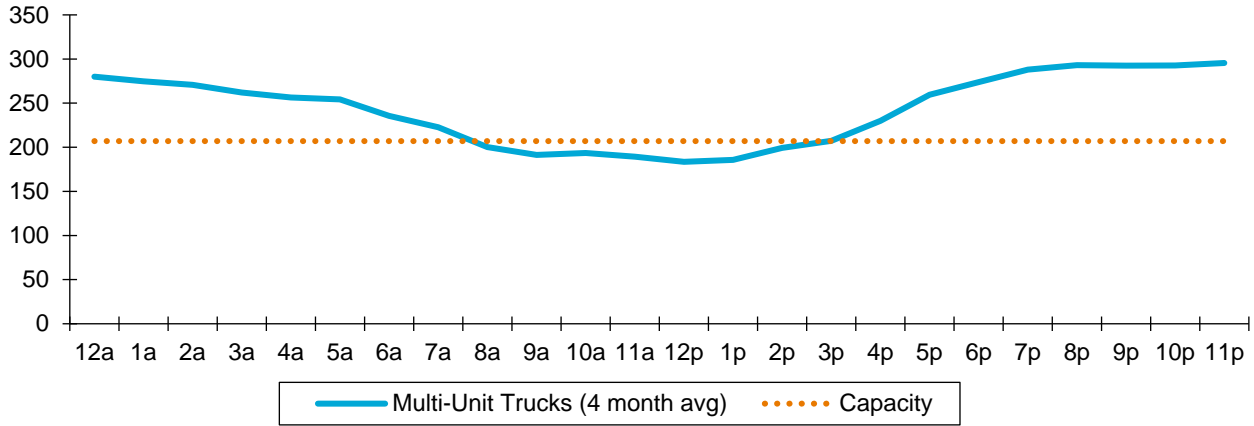
Site	Location	Supply	Maximum Raw Count	Average Raw Count	Base Expansion Factor	Modified Expansion Factor
Wadsworth Rest Area	I-80 Rural	8	2.6	1.5	8.664	3.421
Golconda (roadside and Salt and sand pad)	I-80 Rural	15	8.0	4.3	3.226	3.226
Four Seasons and Old Tribal truck Stop	US95 Rural	45	2.1	0.9	3.206	3.206
Sunnyside Rest Area - Nye County (SR 318)	US93 Rural	15	2.6	1.6	2.169	2.169
US 6 @ SR 360 group	US95 Rural	12	2.0	1.1	2.664	2.664

Source: ATRI, 2018.

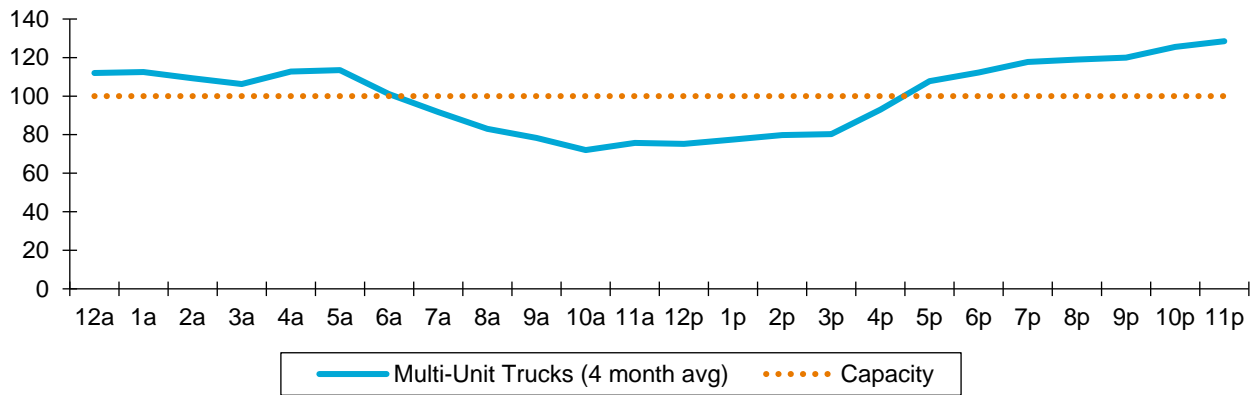
## B.2 ATRI Truck GPS Utilization—Base Expansion Factors

The following 16 graphs show locations where demand exceeds capacity at some point during the day. This information is based on the average of four two-week counts at each site and the expansion factors developed by ATRI.

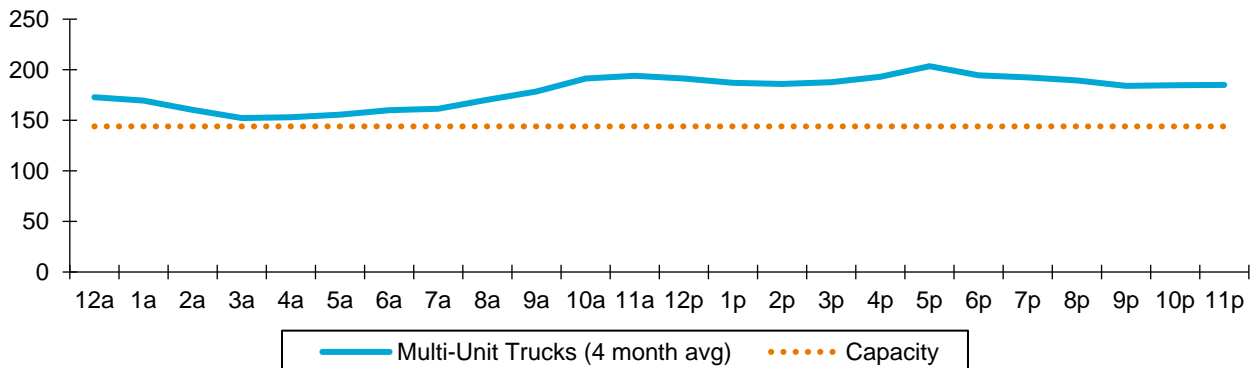
**Petro Center/Speedway—I-15**



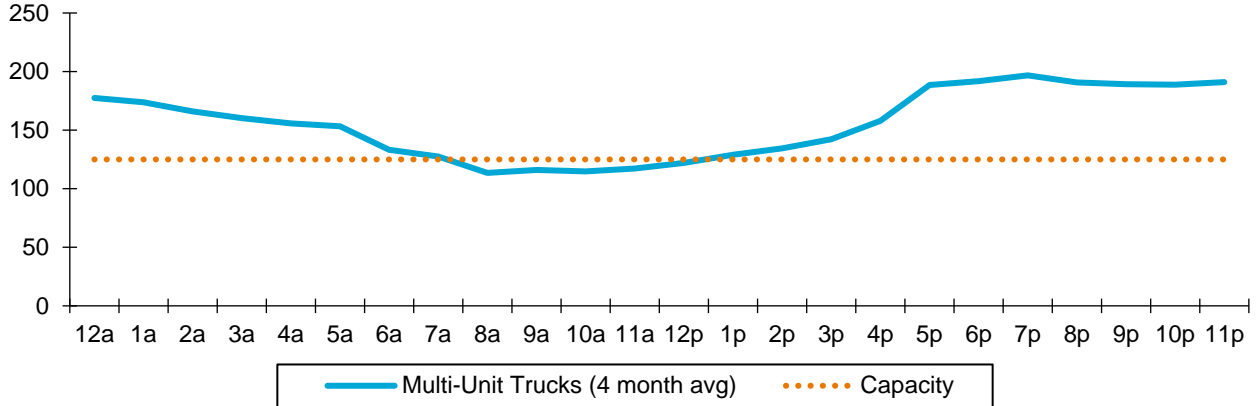
**Flying J Travel Center (Fernley)—I-80/US 95**



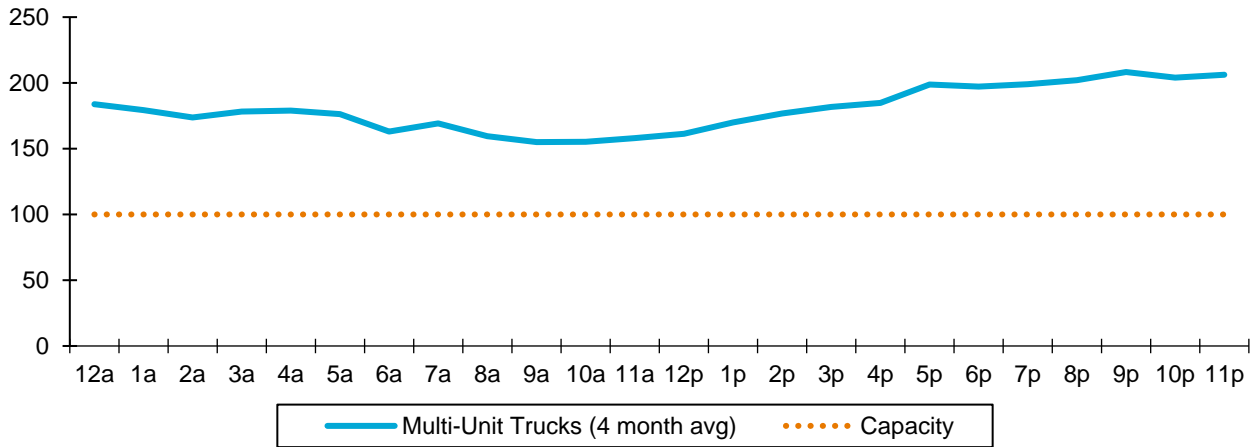
**TA Travel Center (Las Vegas)—I-15**



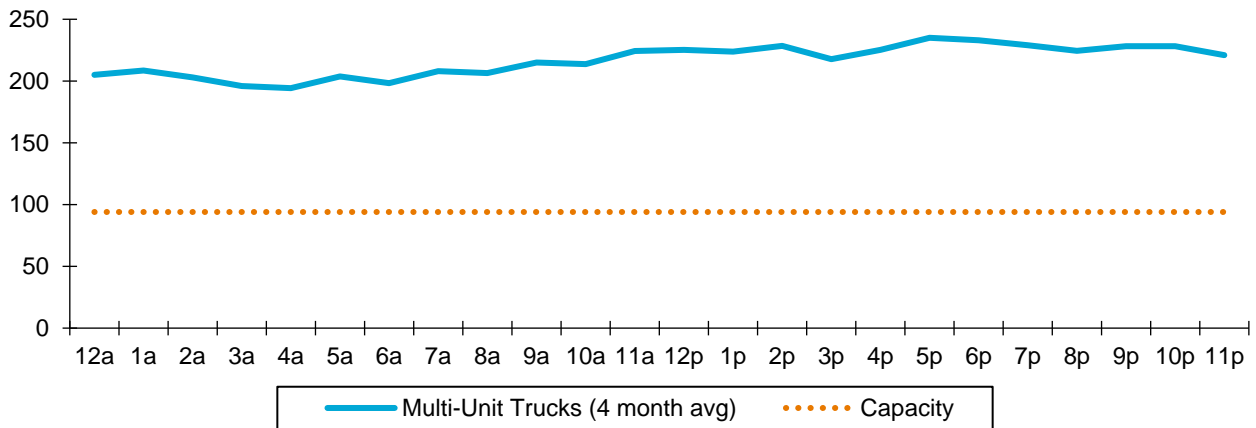
**Whiskey Petes/Flying J (Primm)—I-15**



**Pilot Travel Center (Fernley)—I-80**

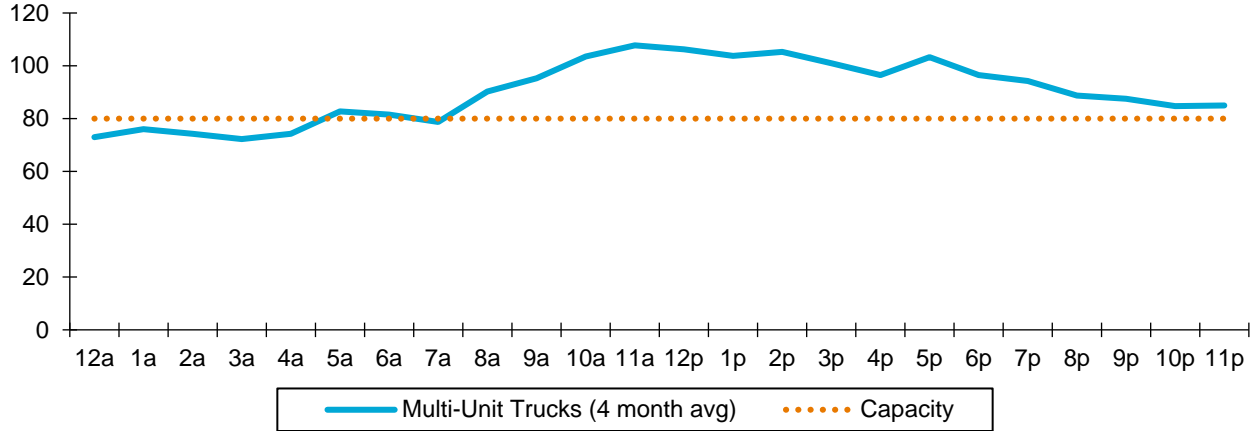


**Loves (Fernley)—I-15/US 95**

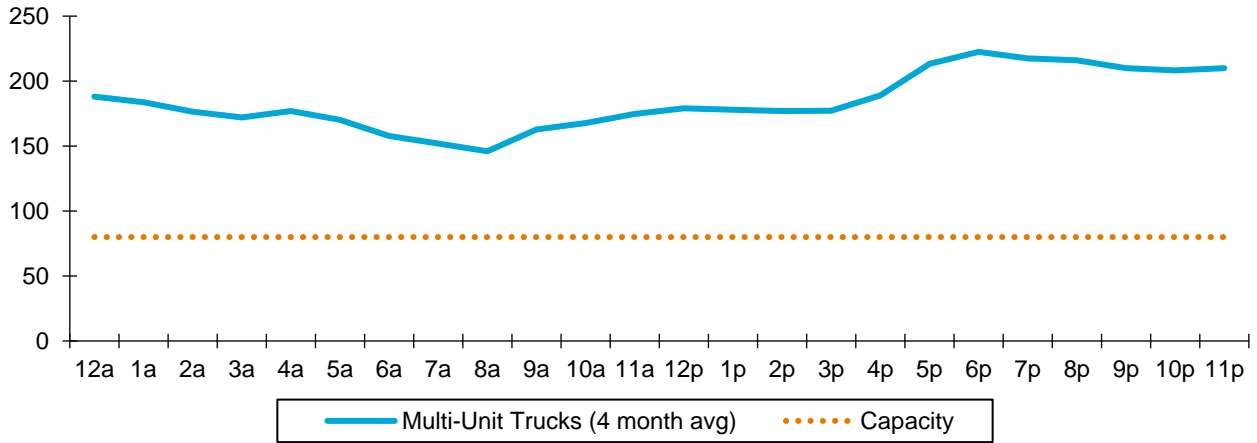




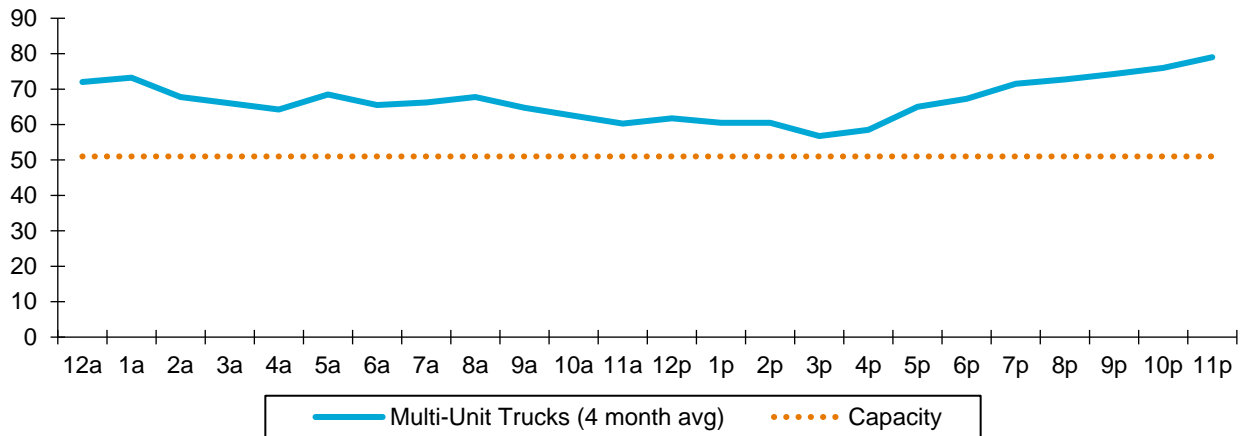
**Pilot Travel Center (Las Vegas)—I-15**



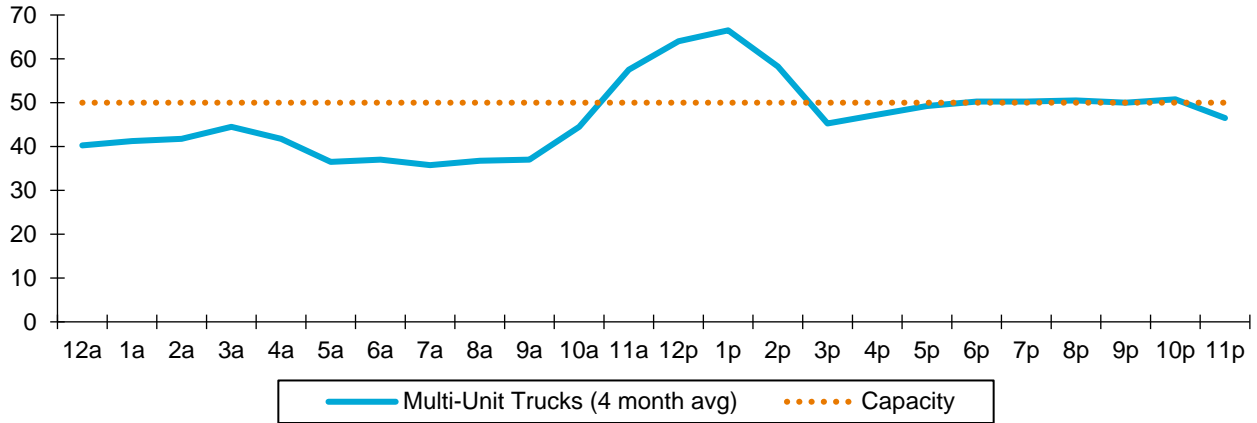
**Loves Travel Stop (North LV)—I-15**



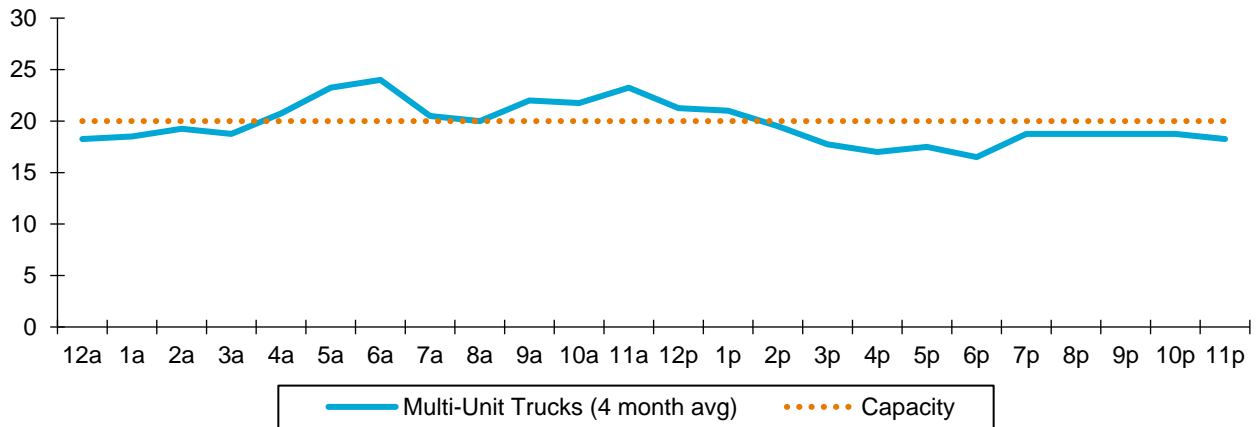
**Golden Gate Travel Plaza (Clark)—I-80**



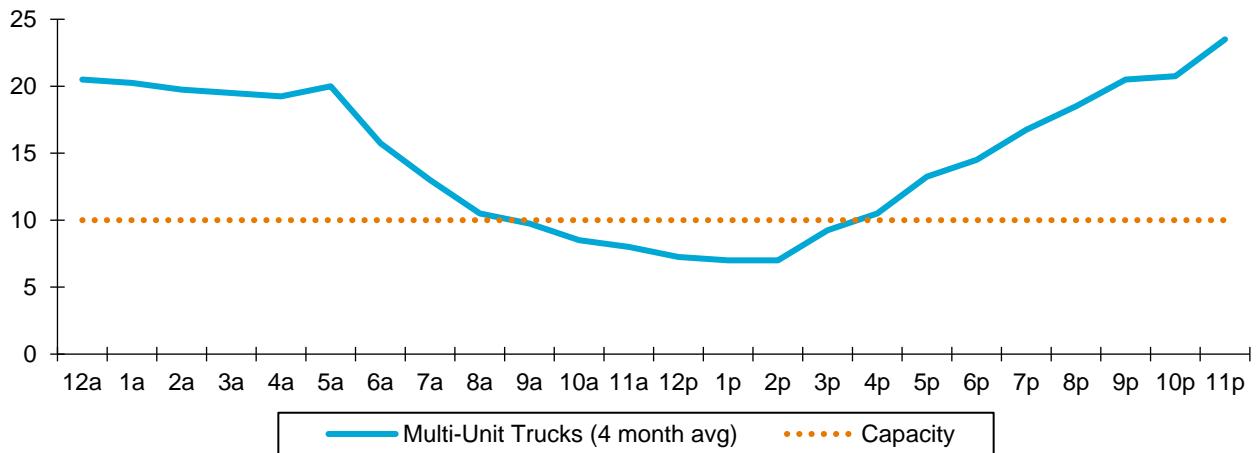
**Pilot (Carlin) and Carlin Ramp—I-80**



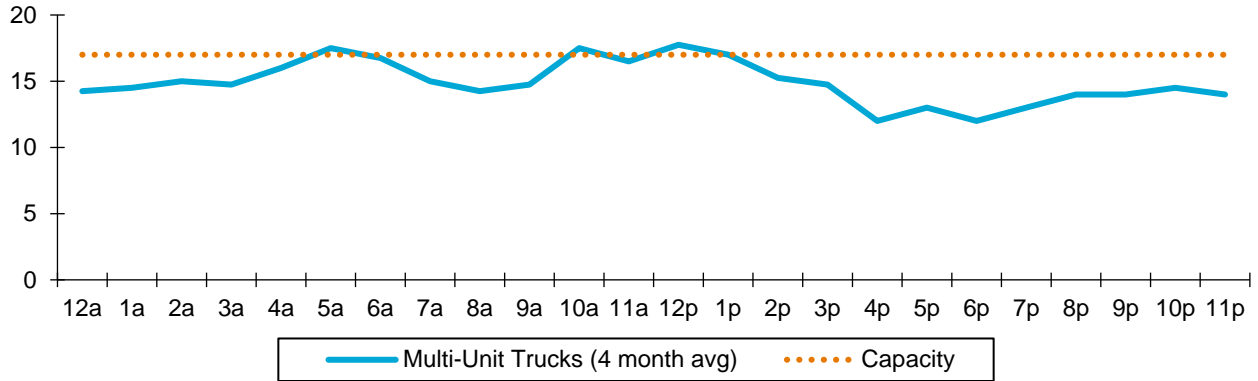
**Mormon Mesa—I-15**



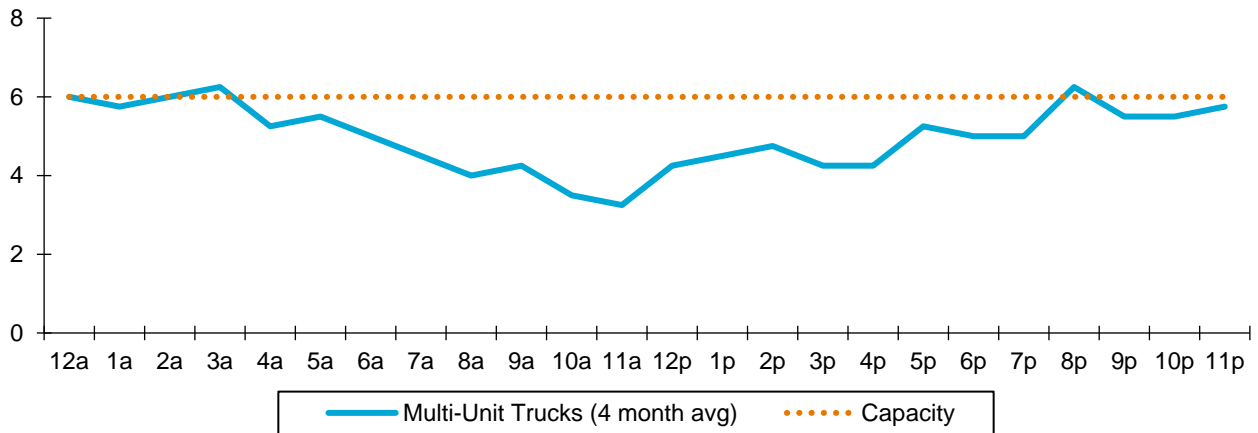
**Boomtown Hotel and Casino—I-80**



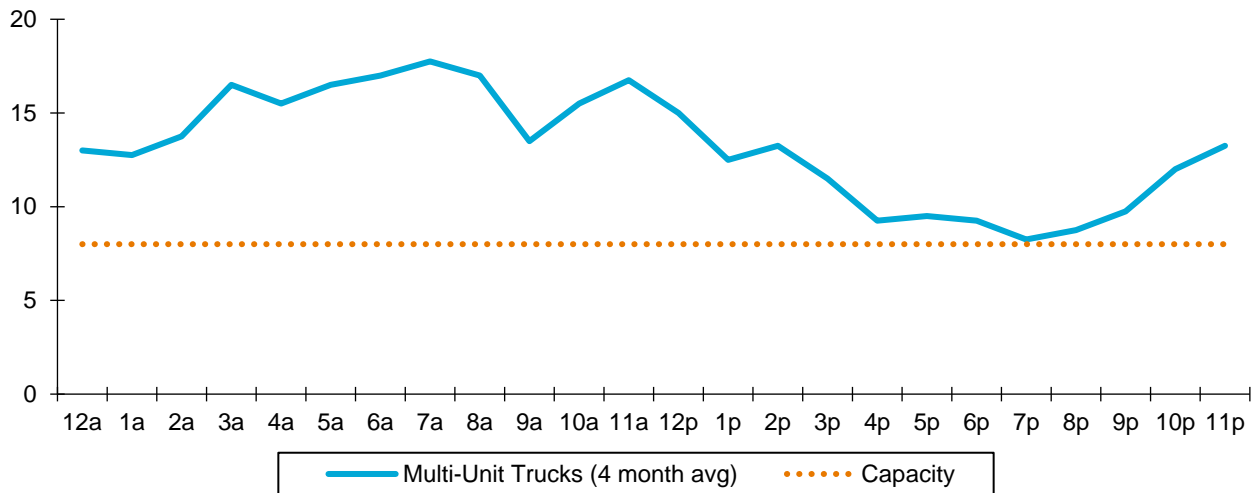
**Beowawe Rest Area—I-80**

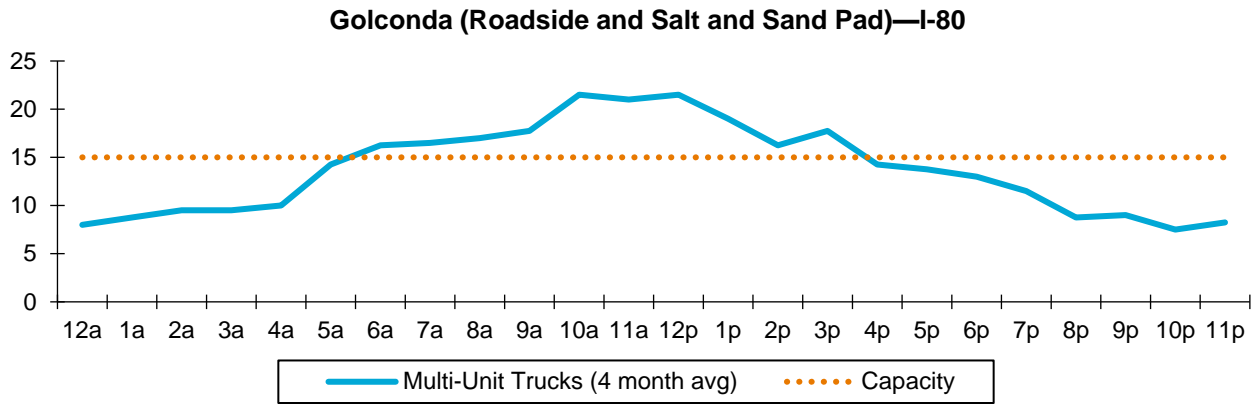


**Luning Rest Area—US 95**



**Wadsworth Rest Area—I-80 WB**





## B.3 ATRI Truck GPS Utilization Rate—Modified Expansion Factors and Site Profiles

This section provides site profiles for the 59 locations identified in this study for a more detailed utilization analysis and surveyed by ATRI. A utilization graph based on the modified ATRI expansion factors (see section B.1), list of amenities, and information gathered from stakeholders, field reviews, and mobile application data is included for each. Note that some of the site profiles include unauthorized truck parking sites and were included to better gauge demand at these locations. Their inclusion in the Appendix is not an endorsement of their use.

Profiles are arranged in the following order:

1. I-15 from southwest to northeast.
2. I-515.
3. I-80 from west to east.
4. US 95 from south to north.
5. US 93 from south to north.
6. US 395.
7. US 6.



# Whiskey Petes/Flying J Authorized (Primm)

I-15, Exit 1



Google Earth Imagery



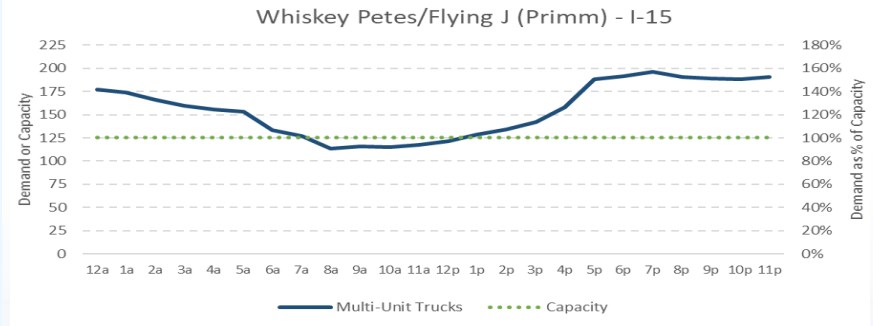
Key ATRI GPS Data

Spaces	125
Public or Private?	Private
Max Raw Truck GPS Count	51
Average Raw Truck GPS Count	36
Expansion Factor	4.265
Expanded Multi-Unit Parking Demand (Range)	114 - 196
Expanded Multi-Unit Parking Demand (Average)	177
Percent Utilization (Range)	91% - 157%
2045 Maximum Projected Demand	335

A sampling of mobile application data indicates this location is commonly near or at capacity and demand is expected to grow due to projected truck volumes on I-15 and trade with California and the Ports of Los Angeles and Long Beach.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	Yes	Yes	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Gold Strike Truck Plaza/Shell Station/Terrible Herbst Cluster Authorized (Jean)



I-15, Exit 12

Google Earth Imagery



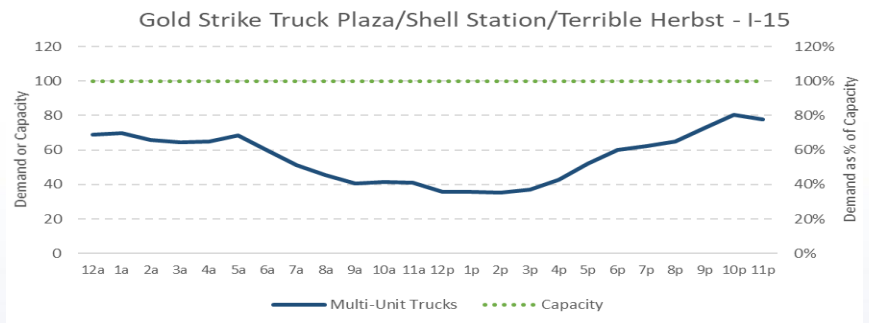
Key ATRI GPS Data

Spaces	100
Public or Private?	Private
Max Raw Truck GPS Count	21
Average Raw Truck GPS Count	13
Expansion Factor	4.265
Expanded Multi-Unit Parking Demand (Range)	35 - 80
Expanded Multi-Unit Parking Demand (Average)	69
Percent Utilization (Range)	35% - 80%
2045 Maximum Projected Demand	137

A sampling of mobile application data shows that this cluster of facilities typically has available space for truck parking and rarely approaches capacity.



Source: Google Earth



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# TA Travel Center Authorized (Las Vegas)

I-15, Exit 33



Google Earth Imagery



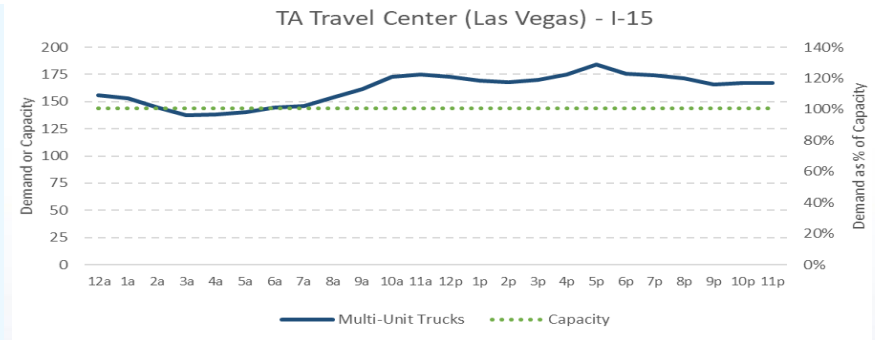
Key ATRI GPS Data

Spaces	144
Public or Private?	Private
Max Raw Truck GPS Count	41
Average Raw Truck GPS Count	33
Expansion Factor	4.896
Expanded Multi-Unit Parking Demand (Range)	138 - 184
Expanded Multi-Unit Parking Demand (Average)	156
Percent Utilization (Range)	96% - 128%
2045 Maximum Projected Demand	314

A sampling of mobile application data, stakeholder input, and field reviews all indicate this location and adjacent additional land and roadside curb is heavily utilized and almost always exceeds capacity. 50 spaces are available for paid reservations, and sell out every night.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Wild West Truck Stop Authorized (Las Vegas)

I-15, Exit 37



## Google Earth Imagery



## Key ATRI GPS Data

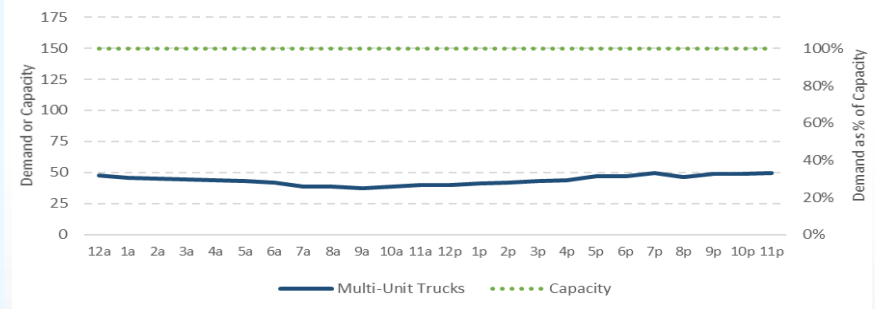
Spaces	150
Public or Private?	Private
Max Raw Truck GPS Count	14
Average Raw Truck GPS Count	9
Expansion Factor	4.896
Expanded Multi-Unit Parking Demand (Range)	38 - 50
Expanded Multi-Unit Parking Demand (Average)	47
Percent Utilization (Range)	25% - 33%
2045 Maximum Projected Demand	84

Field reviews and a sampling of mobile data indicate a wide range of utilization, typically higher than shown in ATRI GPS utilization data.



Source: Cambridge Systematics

Wild West Truck Stop - I-15



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	Yes	Yes	Yes	Yes	Yes	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



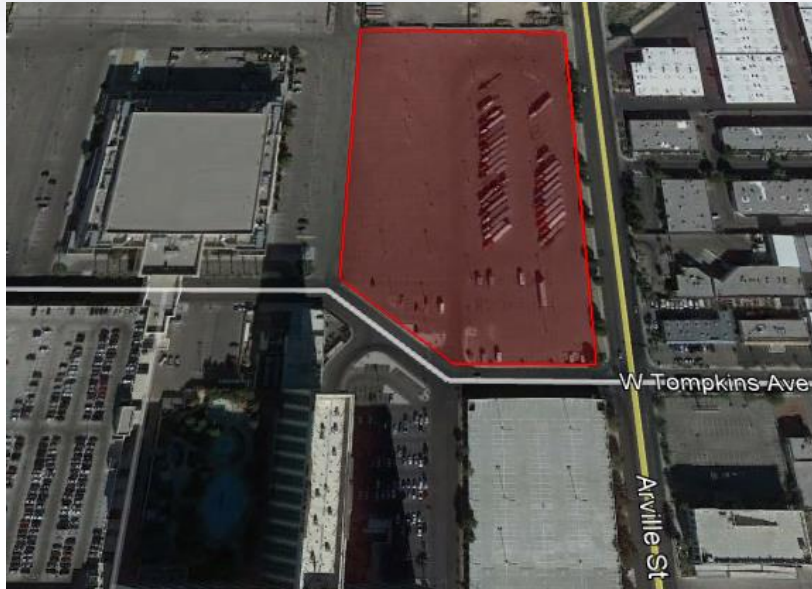


# The Orleans Casino Parking Authorized (Las Vegas)

I-15, Exit 37



## Google Earth Imagery



## Key ATRI GPS Data

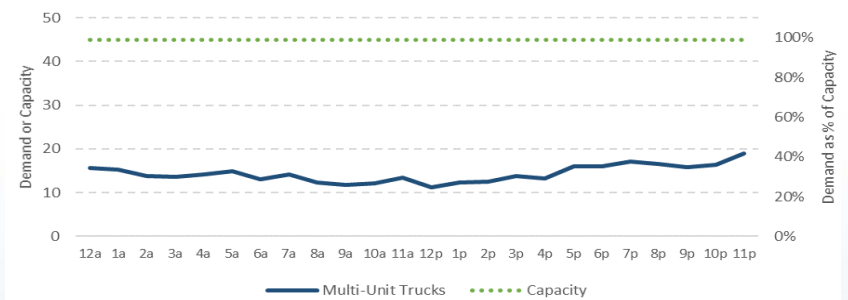
Spaces	45
Public or Private?	Private
Max Raw Truck GPS Count	5
Average Raw Truck GPS Count	3
Expansion Factor	4.896
Expanded Multi-Unit Parking Demand (Range)	11 - 19
Expanded Multi-Unit Parking Demand (Average)	16
Percent Utilization (Range)	25% - 42%
2045 Maximum Projected Demand	32

A sampling of mobile application data shows inconsistent use, although typically at a higher level of utilization than ATRI GPS utilization data indicates.



Source: Google Earth

The Orleans Casino Parking - I-15



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	No	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Morton's Truck Stop Authorized (North Las Vegas)

Location: I-15, Exit 46



## Google Earth Imagery



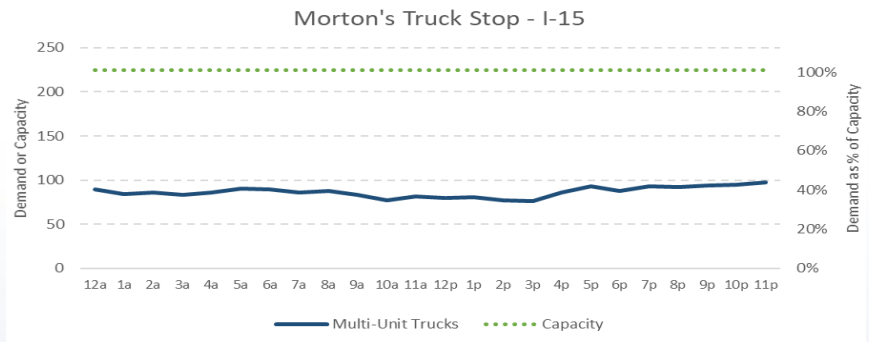
## Key ATRI GPS Data

Spaces	225
Public or Private?	Private
Max Raw Truck GPS Count	23
Average Raw Truck GPS Count	18
Expansion Factor	4.896
Expanded Multi-Unit Parking Demand (Range)	76 - 98
Expanded Multi-Unit Parking Demand (Average)	90
Percent Utilization (Range)	34% - 43%
2045 Maximum Projected Demand	171

A sampling of mobile application data indicates higher utilization rate than ATRI GPS utilization analysis.



Source: Google Earth



## Utilization Analysis

### Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Maverick Truck Stop Authorized (Las Vegas)

I-15, Exit 46



Google Earth Imagery



Key ATRI GPS Data

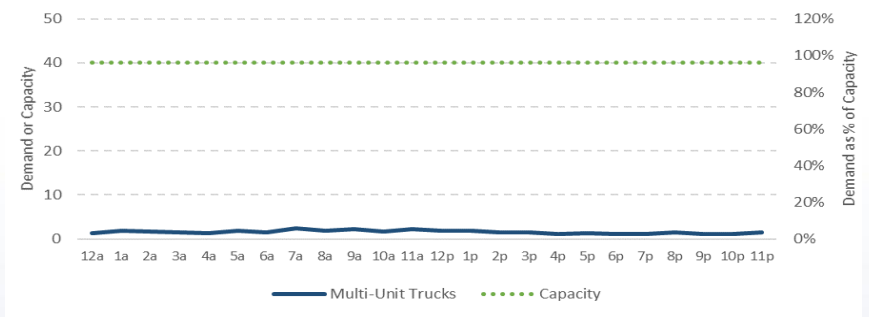
Spaces	40
Public or Private?	Private
Max Raw Truck GPS Count	1
Average Raw Truck GPS Count	0
Expansion Factor	4.896
Expanded Multi-Unit Parking Demand (Range)	1 - 2
Expanded Multi-Unit Parking Demand (Average)	1
Percent Utilization (Range)	3% - 6%
2045 Maximum Projected Demand	4

A sampling of mobile application data shows parking is generally available at this location although at a lower level than indicated by ATRI GPS utilization data.



Source: Google Earth

Maverick Truck Stop - I-15



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# NOIL and DPF Filter Cluster Authorized (North Las Vegas)

I-15, Exit 46



## Google Earth Imagery



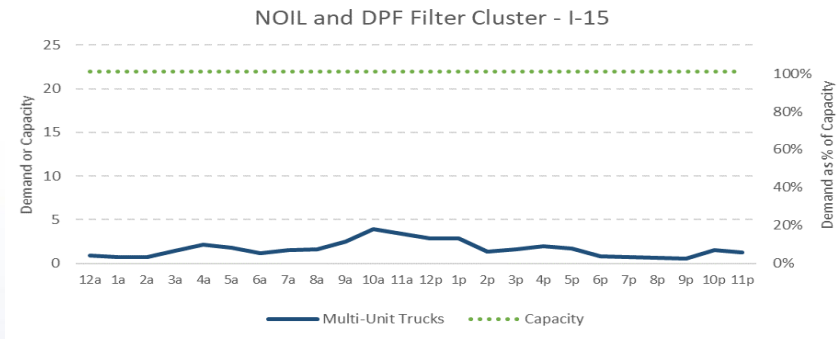
## Key ATRI GPS Data

Spaces	22
Public or Private?	Private
Max Raw Truck GPS Count	1
Average Raw Truck GPS Count	0
Expansion Factor	4.896
Expanded Multi-Unit Parking Demand (Range)	1 - 4
Expanded Multi-Unit Parking Demand (Average)	1
Percent Utilization (Range)	2% - 13%
2045 Maximum Projected Demand	7

A sampling of mobile application data indicates that capacity is available at these two facilities.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	No	Yes	No	No	No	Yes	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Cannery Casino and Hotel Authorized (North Las Vegas)

I-15, Exit 47



Google Earth Imagery



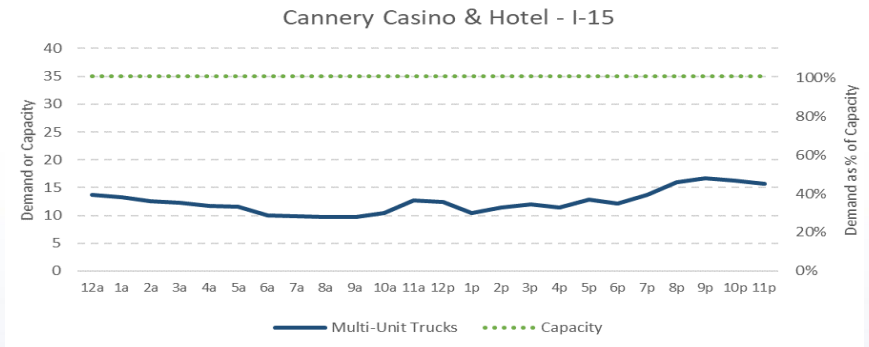
Key ATRI GPS Data

Spaces	35
Public or Private?	Private
Max Raw Truck GPS Count	5
Average Raw Truck GPS Count	3
Expansion Factor	4.896
Expanded Multi-Unit Parking Demand (Range)	10 - 17
Expanded Multi-Unit Parking Demand (Average)	14
Percent Utilization (Range)	28% - 47%
2045 Maximum Projected Demand	29

A sampling of mobile application data indicates available capacity at this facility at most times.



Source: Google Earth



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	No	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Pilot Travel Center Authorized (Las Vegas)

I-15, Exit 48



Google Earth Imagery



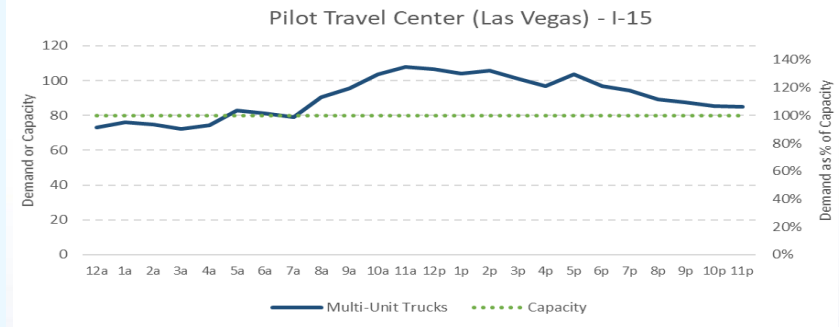
Key ATRI GPS Data

Spaces	80
Public or Private?	Private
Max Raw Truck GPS Count	25
Average Raw Truck GPS Count	18
Expansion Factor	4.896
Expanded Multi-Unit Parking Demand (Range)	72 - 108
Expanded Multi-Unit Parking Demand (Average)	73
Percent Utilization (Range)	90% - 135%
2045 Maximum Projected Demand	189

A sampling of mobile application data shows limited or no capacity available. Stakeholder input and field reviews indicates facility is commonly near or at capacity during all hours of the day.



Source: Cambridge Systematics



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Petro Center @ Speedway Blvd./Apex Authorized (North Las Vegas)

I-15, Exit 54



## Google Earth Imagery



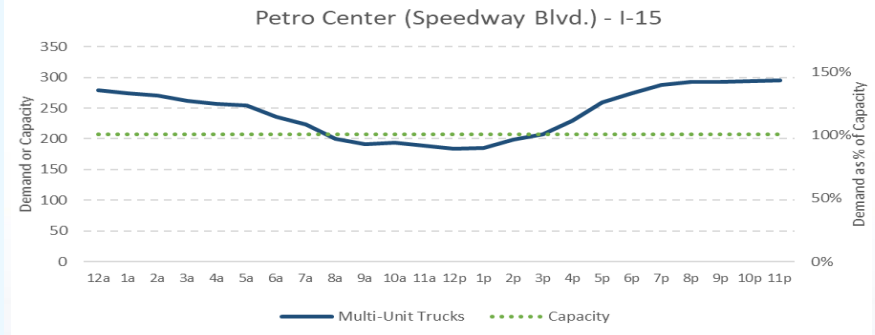
## Key ATRI GPS Data

Spaces	207
Public or Private?	Private
Max Raw Truck GPS Count	71
Average Raw Truck GPS Count	50
Expansion Factor	4.896
Expanded Multi-Unit Parking Demand (Range)	183 - 296
Expanded Multi-Unit Parking Demand (Average)	280
Percent Utilization (Range)	89% - 143%
2045 Maximum Projected Demand	518

Stakeholder interviews, field reviews, and a sampling of mobile application data all indicate this facility is consistently near or at capacity with. Anticipated growth in traffic on I-15 and at the Speedway and Apex Industrial Parks suggest future demand in the area will continue to grow.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Loves Travel Stop Authorized (North Las Vegas)

I-15, Exit 64



## Google Earth Imagery



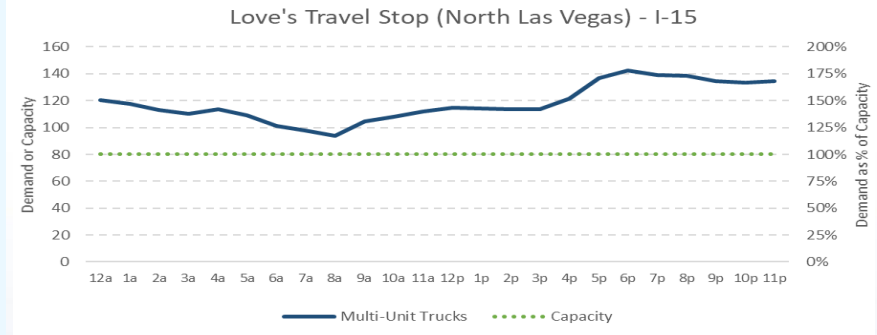
## Key ATRI GPS Data

Spaces	80
Public or Private?	Private
Max Raw Truck GPS Count	32
Average Raw Truck GPS Count	24
Expansion Factor	4.896
Expanded Multi-Unit Parking Demand (Range)	94 - 143
Expanded Multi-Unit Parking Demand (Average)	120
Percent Utilization (Range)	117% - 178%
2045 Maximum Projected Demand	250

A sampling of mobile application data shows infrequent utilization rates. However, stakeholder input and field reviews echo ATRI utilization data and indicate the facility is heavily utilized and is at or near capacity at most times.



Source: Google Earth



## Utilization Analysis

### Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Moapa Travel Center Authorized (Moapa)

I-15, Exit 75



Google Earth Imagery

Key ATRI GPS Data

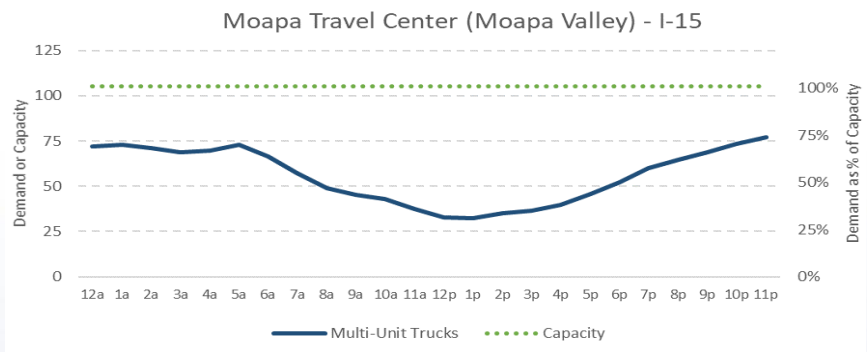


Spaces	105
Public or Private?	Private
Max Raw Truck GPS Count	30
Average Raw Truck GPS Count	21
Expansion Factor	2.689
Expanded Multi-Unit Parking Demand (Range)	32 - 77
Expanded Multi-Unit Parking Demand (Average)	72
Percent Utilization (Range)	31% - 73%
2045 Maximum Projected Demand	135

Field reviews and a sampling of mobile application data indicate available capacity during the majority of operating hours.



Source: Cambridge Systematics



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# MP 96 (I-15) Truck Turnout Authorized (Moapa Valley)

I-15, MP 96



Google Earth Imagery



Key ATRI GPS Data

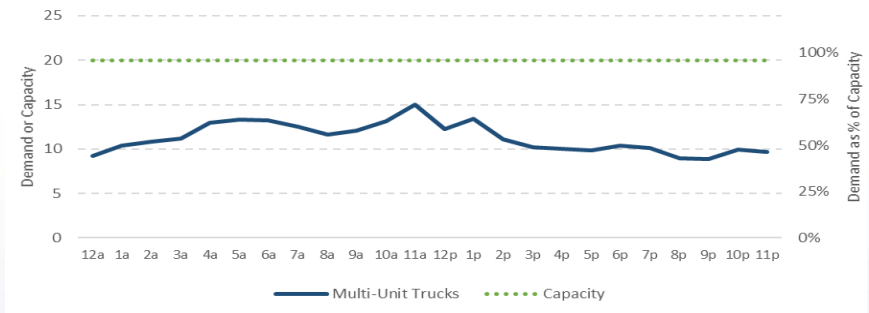
Spaces	20
Public or Private?	Public
Max Raw Truck GPS Count	6
Average Raw Truck GPS Count	4
Expansion Factor	2.689
Expanded Multi-Unit Parking Demand (Range)	9 - 15
Expanded Multi-Unit Parking Demand (Average)	9
Percent Utilization (Range)	44% - 75%
2045 Maximum Projected Demand	26

A sampling of mobile application data shows some availability at this location at most times.



Source: Google Earth

MP 96 Truck Turnout - I-15



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Mormon Mesa Truck Turnout Authorized (Mesquite)

I-15, MP 110



## Google Earth Imagery



## Key ATRI GPS Data

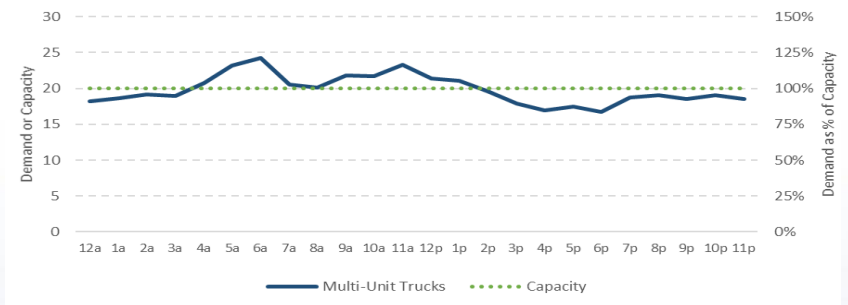
Spaces	20
Public or Private?	Public
Max Raw Truck GPS Count	10
Average Raw Truck GPS Count	7
Expansion Factor	2.689
Expanded Multi-Unit Parking Demand (Range)	17 - 24
Expanded Multi-Unit Parking Demand (Average)	18
Percent Utilization (Range)	84% - 121%
2045 Maximum Projected Demand	42

A sampling of mobile application data along with stakeholder input indicates this facility is commonly near or at capacity.



Source: Cambridge Systematics

Mormon Mesa Truck Turnout - I-15



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	No	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Virgin River Truck Stop Authorized (Mesquite)

I-15, Exit 122



## Google Earth Imagery



## Key ATRI GPS Data

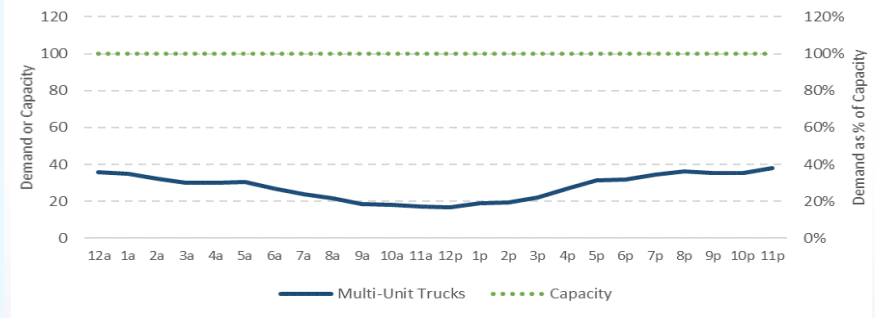
Spaces	100
Public or Private?	Private
Max Raw Truck GPS Count	17
Average Raw Truck GPS Count	10
Expansion Factor	2.689
Expanded Multi-Unit Parking Demand (Range)	17 - 38
Expanded Multi-Unit Parking Demand (Average)	36
Percent Utilization (Range)	17% - 38%
2045 Maximum Projected Demand	67

A sampling of mobile application data indicates this facility has available capacity. All spaces require a modest fee, which might discourage some drivers from parking here.



Source: Google Earth

Virgin River Truck Stop - I-15



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Fiesta Henderson Hotel and Casino Authorized (Henderson)

I-515, Exit 61



## Google Earth Imagery



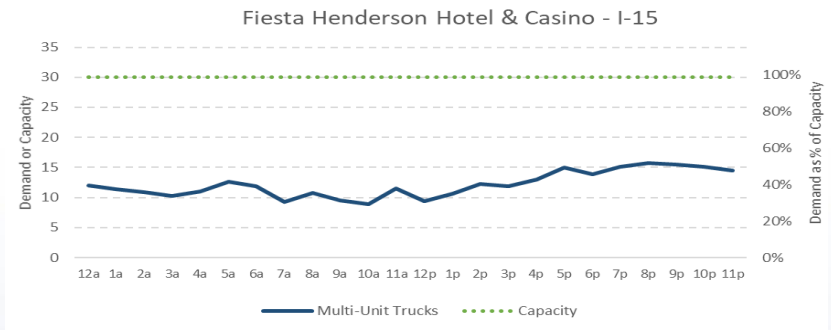
## Key ATRI GPS Data

Spaces	30
Public or Private?	Private
Max Raw Truck GPS Count	5
Average Raw Truck GPS Count	2
Expansion Factor	4.896
Expanded Multi-Unit Parking Demand (Range)	9 - 16
Expanded Multi-Unit Parking Demand (Average)	12
Percent Utilization (Range)	29% - 52%
2045 Maximum Projected Demand	24

A sampling of mobile application data indicates a variable level of utilization with spaces generally available, although fewer spaces than ATRI data indicates.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	No	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Boomtown Hotel and Casino Authorized (Reno)

I-80, Exit 4



## Google Earth Imagery



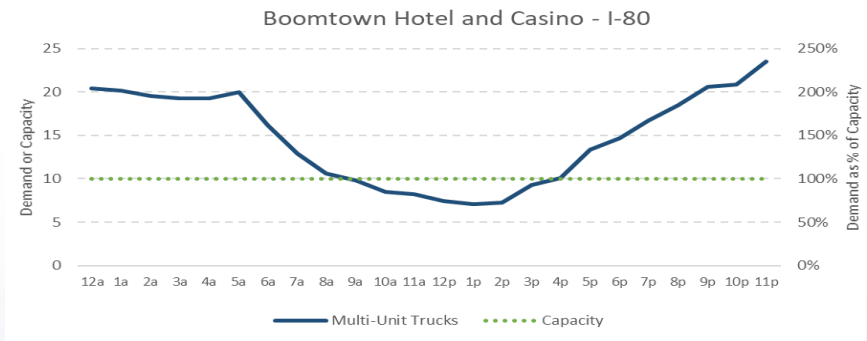
## Key ATRI GPS Data

Spaces	10
Public or Private?	Private
Max Raw Truck GPS Count	10
Average Raw Truck GPS Count	5
Expansion Factor	2.854
Expanded Multi-Unit Parking Demand (Range)	7 - 24
Expanded Multi-Unit Parking Demand (Average)	20
Percent Utilization (Range)	71% - 235%
2045 Maximum Projected Demand	38

A sampling of mobile application data generally shows more available parking than indicated by ATRI GPS utilization data. Stakeholders indicate this location is well-used by drivers.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	No	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Mogul/Verdi Truck Turnout Authorized (Reno)

I-80, MP 5/7



## Google Earth Imagery



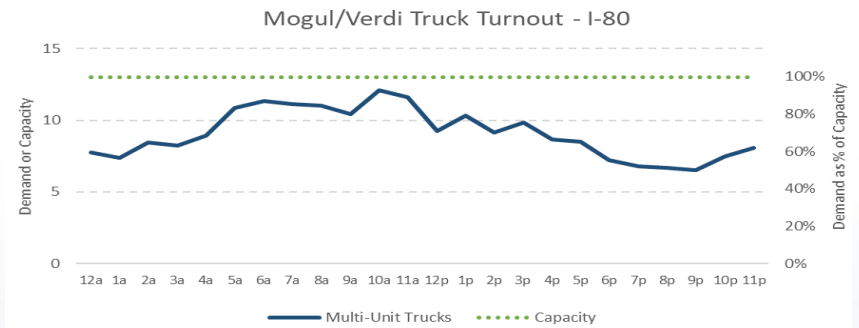
## Key ATRI GPS Data

Spaces	13
Public or Private?	Public
Max Raw Truck GPS Count	6
Average Raw Truck GPS Count	3
Expansion Factor	2.854
Expanded Multi-Unit Parking Demand (Range)	7 - 12
Expanded Multi-Unit Parking Demand (Average)	8
Percent Utilization (Range)	50% - 93%
2045 Maximum Projected Demand	20

A sampling of mobile application data shows variable usage at this location. Stakeholders indicate that any available truck parking west of Reno is heavily used, especially during I-80 closures.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	No	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# TA Travel Center of America Authorized (Sparks)

I-80, Exit 19



## Google Earth Imagery



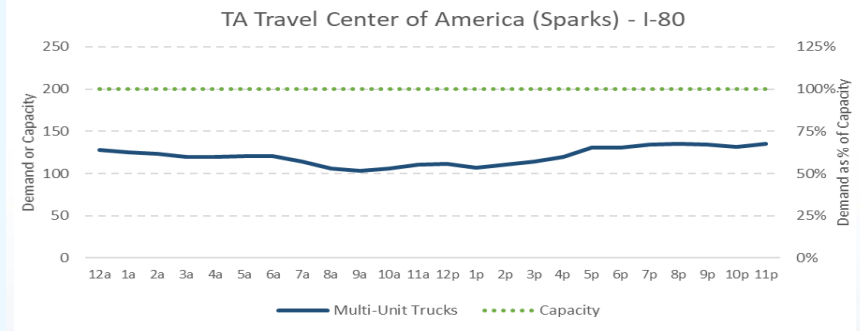
## Key ATRI GPS Data

Spaces	200
Public or Private?	Private
Max Raw Truck GPS Count	53
Average Raw Truck GPS Count	42
Expansion Factor	2.854
Expanded Multi-Unit Parking Demand (Range)	103 - 136
Expanded Multi-Unit Parking Demand (Average)	128
Percent Utilization (Range)	52% - 63%
2045 Maximum Projected Demand	219

A sampling of mobile application data shows this location has some capacity but variable depending on specific day and time. The site is a critical location during winter closures of I-80 at Donner.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Petro Shopping Center Authorized (Sparks)

Location: I-80, Exit 21



## Google Earth Imagery



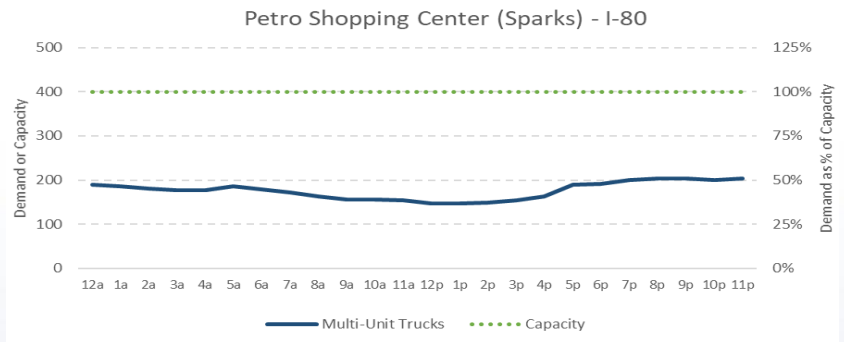
## Key ATRI GPS Data

Spaces	400
Public or Private?	Private
Max Raw Truck GPS Count	81
Average Raw Truck GPS Count	62
Expansion Factor	2.854
Expanded Multi-Unit Parking Demand (Range)	147 - 204
Expanded Multi-Unit Parking Demand (Average)	189
* Percent Utilization (Range)	37% - 51%
2045 Maximum Projected Demand	330

A sampling of mobile application data shows limited capacity available (less than 70 spaces) at most times. This facility has the largest capacity in Nevada. ATRI GPS utilization analysis included any vehicles parking in an empty lot south of E. Greg St. Site is a critical location during winter closures of I-80 at Donner Pass.



Source: Cambridge Systematics



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Golden Gate Travel Plaza Authorized (USA Parkway)

I-80, Exit 32



Google Earth Imagery



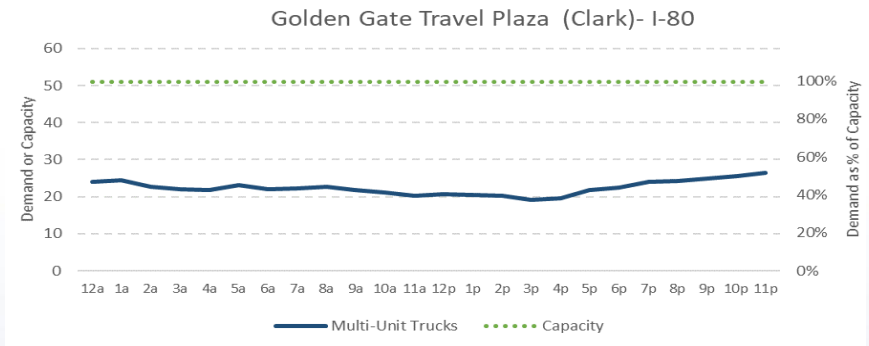
Key ATRI GPS Data

Spaces	51
Public or Private?	Private
Max Raw Truck GPS Count	11
Average Raw Truck GPS Count	8
Expansion Factor	2.854
Expanded Multi-Unit Parking Demand (Range)	19 - 26
Expanded Multi-Unit Parking Demand (Average)	24
Percent Utilization (Range)	37% - 52%
2045 Maximum Projected Demand	43

A sampling of mobile application data shows heavy usage and limited available capacity. Stakeholder input also indicates that this site is heavily used both for long-haul parking and for staging/short-term parking serving the distribution centers in the Tahoe Reno Industrial Center.



Source: Cambridge Systematics



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Wadsworth Rest Area Authorized (Fernley)

I-80, MP 42



Google Earth Imagery



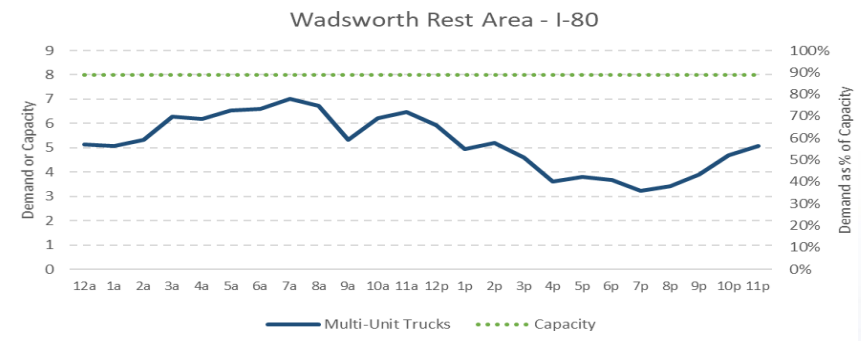
Key ATRI GPS Data

Spaces	8
Public or Private?	Public
Max Raw Truck GPS Count	3
Average Raw Truck GPS Count	2
Expansion Factor	3.421
Expanded Multi-Unit Parking Demand (Range)	3 - 7
Expanded Multi-Unit Parking Demand (Average)	5
Percent Utilization (Range)	40% - 88%
2045 Maximum Projected Demand	11

Stakeholder input and a sampling of mobile application data indicate this site is often near capacity. This facility is a critical location during winter closures of I-80 at Donner Pass. NDOT is in the planning stages to expand and enhance amenities at the site.



Source: Cambridge Systematics



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Pilot Travel Center Authorized (Fernley)

I-80, Exit 46



Google Earth Imagery



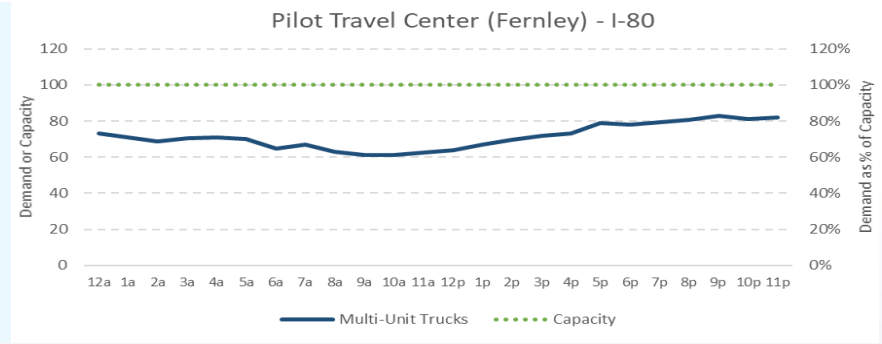
Key ATRI GPS Data

Spaces	100
Public or Private?	Private
Max Raw Truck GPS Count	30
Average Raw Truck GPS Count	21
Expansion Factor	3.421
Expanded Multi-Unit Parking Demand (Range)	61 - 83
Expanded Multi-Unit Parking Demand (Average)	73
Percent Utilization (Range)	61% - 83%
2045 Maximum Projected Demand	134

A sampling of mobile application data shows some capacity (typically above 25%) available throughout the day.



Source: Cambridge Systematics



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	Yes	No	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Loves Travel Stop Authorized (Fernley)

I-80, Exit 46



Google Earth Imagery



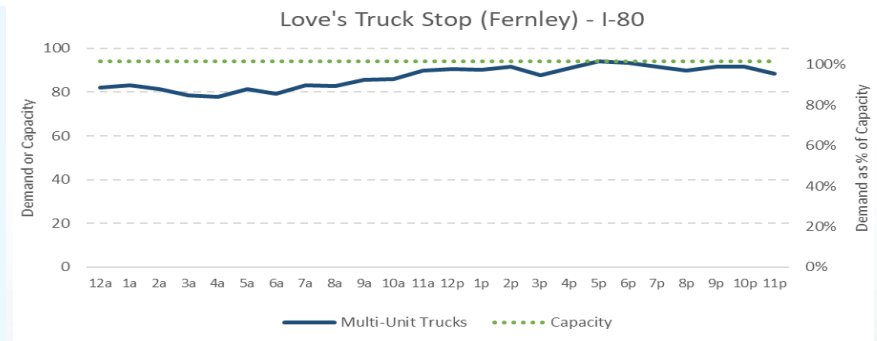
Key ATRI GPS Data

Spaces	94
Public or Private?	Private
Max Raw Truck GPS Count	33
Average Raw Truck GPS Count	25
Expansion Factor	3.421
Expanded Multi-Unit Parking Demand (Range)	78 - 94
Expanded Multi-Unit Parking Demand (Average)	82
Percent Utilization (Range)	83% - 100%
2045 Maximum Projected Demand	152

A sampling of mobile application data shows an inconsistent utilization pattern. Of the three locations available in Fernley, the Loves appears to have the highest utilization rate.



Source: Cambridge Systematics



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Flying J Travel Center Authorized (Fernley)

I-80, Exit 48



Google Earth Imagery



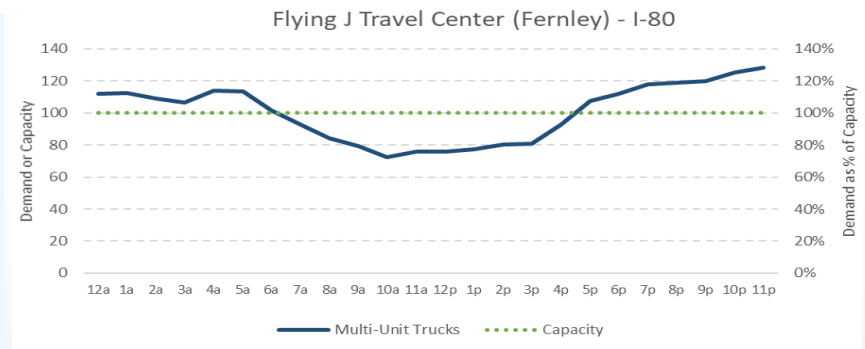
Key ATRI GPS Data

Spaces	100
Public or Private?	Private
Max Raw Truck GPS Count	43
Average Raw Truck GPS Count	29
Expansion Factor	3.421
Expanded Multi-Unit Parking Demand (Range)	72 - 128
Expanded Multi-Unit Parking Demand (Average)	112
Percent Utilization (Range)	72% - 128%
2045 Maximum Projected Demand	209

Stakeholder input and a sampling of mobile application data indicate this location has some capacity available. The overflow lot to the west of Truck Inn Way was originally developed by NDOT.



Source: Cambridge Systematics



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	Yes	No	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Trinity Rest Area Authorized and Trinity Overflow Cluster Unauthorized (Fallon)

I-80, Exit 83



## Google Earth Imagery



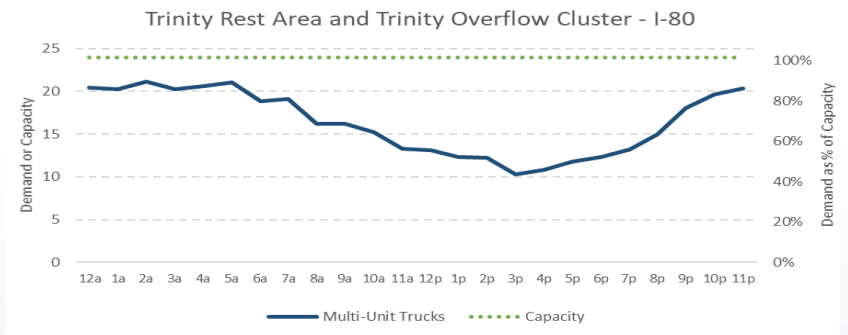
## Key ATRI GPS Data

Spaces	24
Public or Private?	Public
Max Raw Truck GPS Count	7
Average Raw Truck GPS Count	5
Expansion Factor	3.421
Expanded Multi-Unit Parking Demand (Range)	10 - 21
Expanded Multi-Unit Parking Demand (Average)	20
Percent Utilization (Range)	43% - 88%
2045 Maximum Projected Demand	34

A sampling of mobile application data shows variable amounts of parking available with utilization often approaching capacity. Stakeholders indicate this is a well-used parking area that is particularly important during closures of I-80 at Donner Pass. NDOT is in the planning stages to expand and enhance amenities at the site.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Roady's Golden Gate Authorized (Lovelock)

I-80, Exit 106



## Google Earth Imagery



## Key ATRI GPS Data

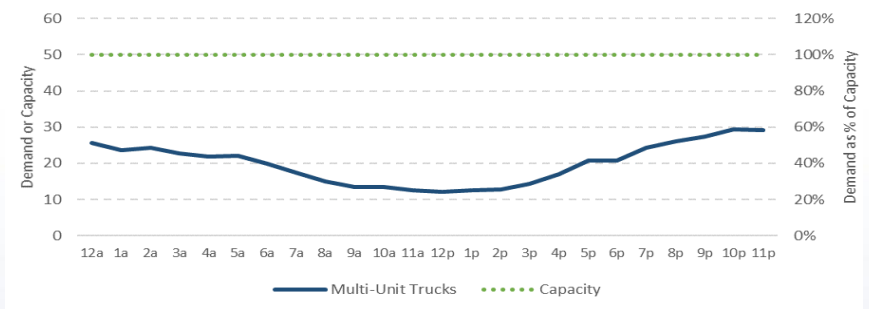
Spaces	50
Public or Private?	Private
Max Raw Truck GPS Count	9
Average Raw Truck GPS Count	6
Expansion Factor	3.421
Expanded Multi-Unit Parking Demand (Range)	12 - 29
Expanded Multi-Unit Parking Demand (Average)	26
Percent Utilization (Range)	24% - 59%
2045 Maximum Projected Demand	48

A sampling of mobile application data shows available capacity at most times with occasional periods with higher usage.



Source: Google Earth

Roady's Golden Gate (Lovelock) - I-80



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	No	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# TA Travel Center of America Authorized (Mill City)

I-80, Exit 149EB/151WB



## Google Earth Imagery



## Key ATRI GPS Data

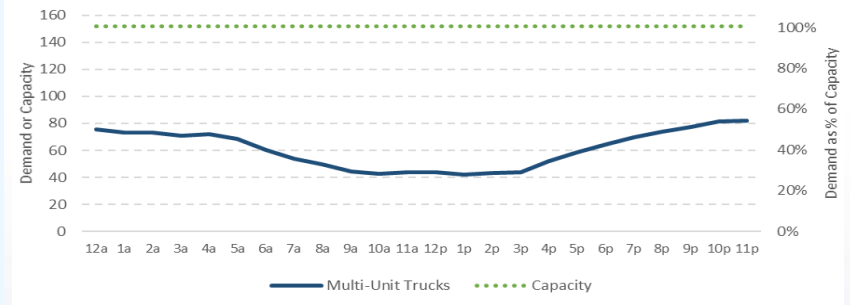
Spaces	152
Public or Private?	Private
Max Raw Truck GPS Count	30
Average Raw Truck GPS Count	20
Expansion Factor	3.069
Expanded Multi-Unit Parking Demand (Range)	42 - 82
Expanded Multi-Unit Parking Demand (Average)	75
Percent Utilization (Range)	28% - 54%
2045 Maximum Projected Demand	133

A sampling of mobile application data indicates a large amount of capacity is available at this site.



Source: Google Earth

TA Travel Center of America (Mill City) - I-80



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Cosgrave Rest Area Authorized (Winnemucca)

I-80, Exit 158



Google Earth Imagery

Key ATRI GPS Data

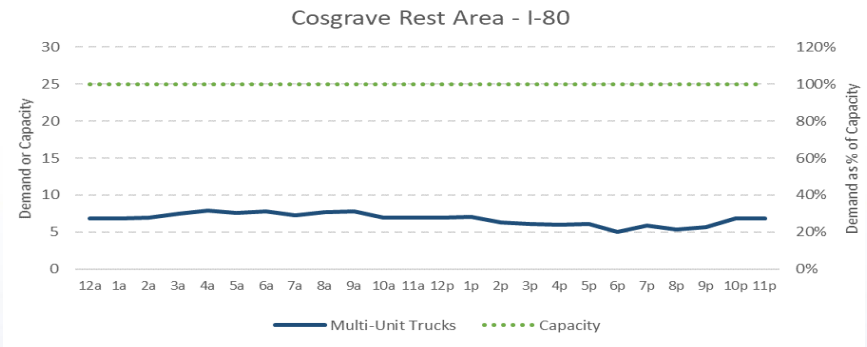


Spaces	25
Public or Private?	Public
Max Raw Truck GPS Count	4
Average Raw Truck GPS Count	2
Expansion Factor	3.069
Expanded Multi-Unit Parking Demand (Range)	5 - 8
Expanded Multi-Unit Parking Demand (Average)	7
Percent Utilization (Range)	20% - 32%
2045 Maximum Projected Demand	13

A sampling of mobile application data shows that this facility often has excess capacity available.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Pilot Travel Center Authorized (Winnemucca)

I-80, Exit 173



## Google Earth Imagery

## Key ATRI GPS Data

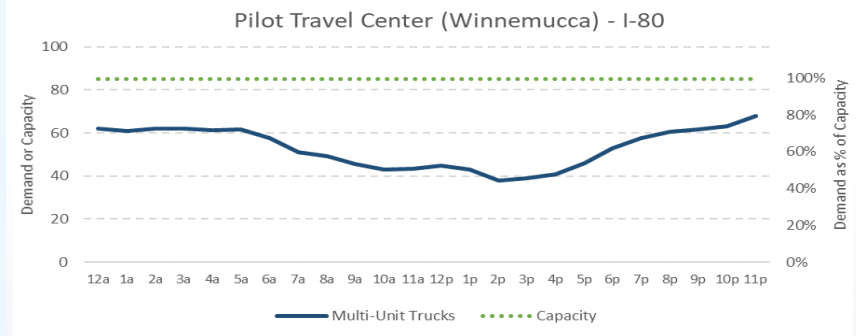


Spaces	85
Public or Private?	Private
Max Raw Truck GPS Count	23
Average Raw Truck GPS Count	17
Expansion Factor	3.069
Expanded Multi-Unit Parking Demand (Range)	38 - 68
Expanded Multi-Unit Parking Demand (Average)	62
Percent Utilization (Range)	45% - 80%
2045 Maximum Projected Demand	111

A sampling of mobile application data shows some capacity available at this facility during most operating hours.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Flying J Travel Center Authorized (Winnemucca)

I-80, Exit 176



## Google Earth Imagery



## Key ATRI GPS Data

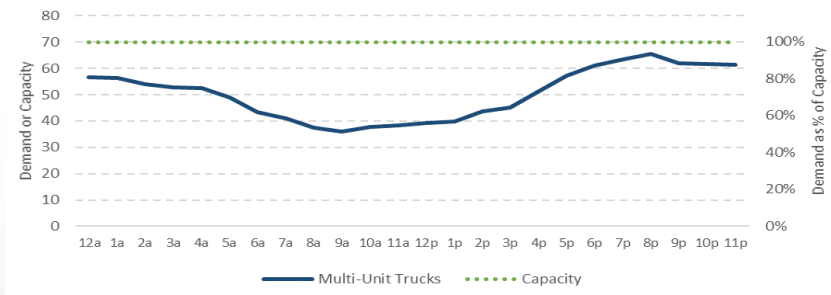
Spaces	70
Public or Private?	Private
Max Raw Truck GPS Count	23
Average Raw Truck GPS Count	16
Expansion Factor	3.069
Expanded Multi-Unit Parking Demand (Range)	36 - 65
Expanded Multi-Unit Parking Demand (Average)	57
Percent Utilization (Range)	51% - 93%
2045 Maximum Projected Demand	107

A sample of mobile application data shows lower usage rates than ATRI utilization data with sufficient capacity (approximately 50%) available at most times of the day.



Source: Cambridge Systematics

Flying J Travel Center (Winnemucca) - I-80



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Golconda Truck Turnout Cluster Authorized (Golconda)

I-80, MP 200



Google Earth Imagery



Key ATRI GPS Data

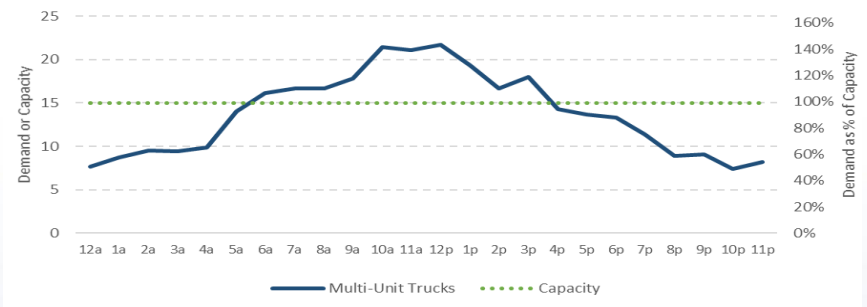
Spaces	15
Public or Private?	Public
Max Raw Truck GPS Count	8
Average Raw Truck GPS Count	4
Expansion Factor	3.226
Expanded Multi-Unit Parking Demand (Range)	7 - 22
Expanded Multi-Unit Parking Demand (Average)	8
Percent Utilization (Range)	50% - 145%
2045 Maximum Projected Demand	36

A sampling of mobile application data and stakeholder input indicate that this site is often near or at capacity.



Source: Google Earth

Golconda Truck Turnout Cluster - I-80



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	No	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Valmy Rest Area Cluster Authorized (Valmy)

I-80, Exit 216



## Google Earth Imagery



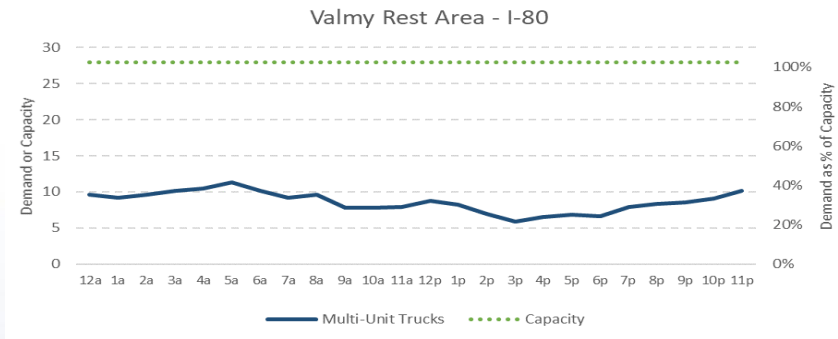
## Key ATRI GPS Data

Spaces	28
Public or Private?	Public
Max Raw Truck GPS Count	5
Average Raw Truck GPS Count	3
Expansion Factor	3.226
Expanded Multi-Unit Parking Demand (Range)	6 - 11
Expanded Multi-Unit Parking Demand (Average)	10
Percent Utilization (Range)	21% - 41%
2045 Maximum Projected Demand	19

A sampling of mobile application data shows low levels of truck utilization at this cluster.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Flying J Travel Center Authorized (Battle Mountain)

I-80, Exit 229EB/231WB



## Google Earth Imagery



## Key ATRI GPS Data

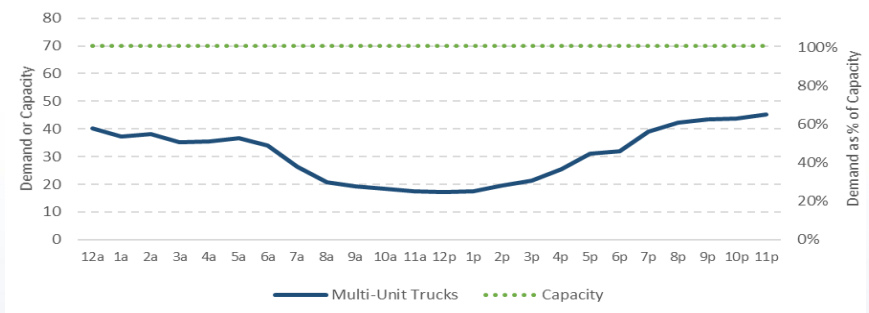
Spaces	70
Public or Private?	Private
Max Raw Truck GPS Count	17
Average Raw Truck GPS Count	10
Expansion Factor	3.226
Expanded Multi-Unit Parking Demand (Range)	17 - 45
Expanded Multi-Unit Parking Demand (Average)	40
Percent Utilization (Range)	24% - 65%
2045 Maximum Projected Demand	74

A sampling of mobile application data shows inconsistent capacity with large amounts of parking available at most times.



Source: Google Earth

Flying J Travel Center (Battle Mountain) - I-80



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Beowawe Rest Area Authorized (Beowawe)

I-80, MP 258



Google Earth Imagery



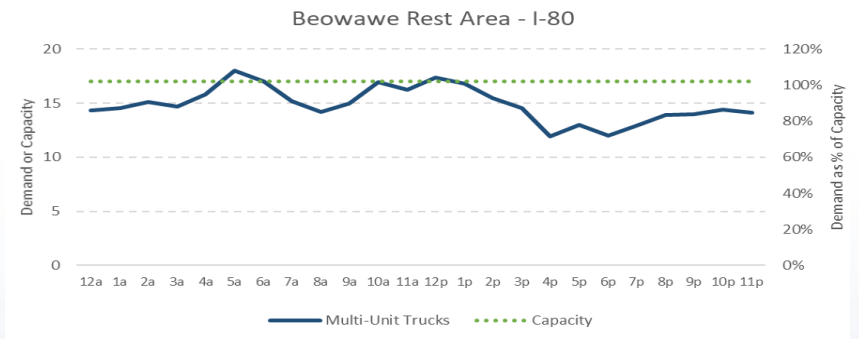
Key ATRI GPS Data

Spaces	17
Public or Private?	Public
Max Raw Truck GPS Count	7
Average Raw Truck GPS Count	5
Expansion Factor	3.226
Expanded Multi-Unit Parking Demand (Range)	12 - 18
Expanded Multi-Unit Parking Demand (Average)	14
Percent Utilization (Range)	70% - 106%
2045 Maximum Projected Demand	29

A sampling of mobile application data along with stakeholder input indicate this site is frequently near or at capacity. NDOT is in the planning stages to expand and enhance amenities at the site.



Source: Cambridge Systematics



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Pilot Authorized and Carlin Ramp Unauthorized Cluster (Carlin)

I-80, Exit 280



Google Earth Imagery



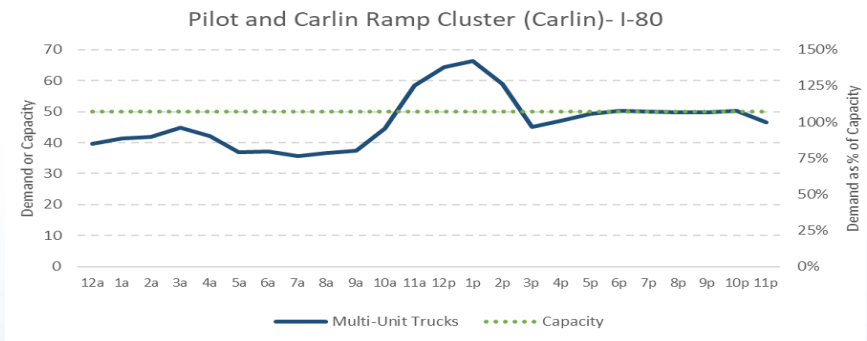
Key ATRI GPS Data

Spaces	50
Public or Private?	Private
Max Raw Truck GPS Count	20
Average Raw Truck GPS Count	14
Expansion Factor	3.461
Expanded Multi-Unit Parking Demand (Range)	36 - 66
Expanded Multi-Unit Parking Demand (Average)	40
Percent Utilization (Range)	71% - 133%
2045 Maximum Projected Demand	109

A sampling of mobile application data indicates that this facility is commonly near or at capacity. Stakeholder's indicate that the shoulder of 10<sup>th</sup> St. is a common location for loads to transfer between vehicles. Carlin is the mid-point between Salt Lake City and Reno.



Source: Google Earth



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	Yes	No	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Pilot/Flying J, TA Petro, Loves Cluster Authorized (Wells)

I-80, Exit 352



## Google Earth Imagery



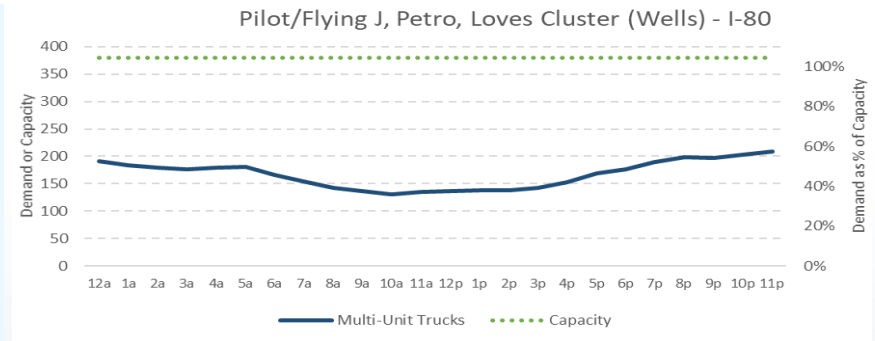
## Key ATRI GPS Data

Spaces	380
Public or Private?	Private
Max Raw Truck GPS Count	65
Average Raw Truck GPS Count	48
Expansion Factor	3.461
Expanded Multi-Unit Parking Demand (Range)	131 - 208
Expanded Multi-Unit Parking Demand (Average)	192
Percent Utilization (Range)	47% - 74%
2045 Maximum Projected Demand	341

A sampling of mobile application data shows sufficient capacity (approximately 50%) at this cluster of three truck parking locations. The Loves facility (southwest corner) has the lowest available capacity of the three sites.



Source: Google Earth



## Utilization Analysis

### Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Pequop Rest Area Authorized (Wells)

I-80, Exit 373



Google Earth Imagery



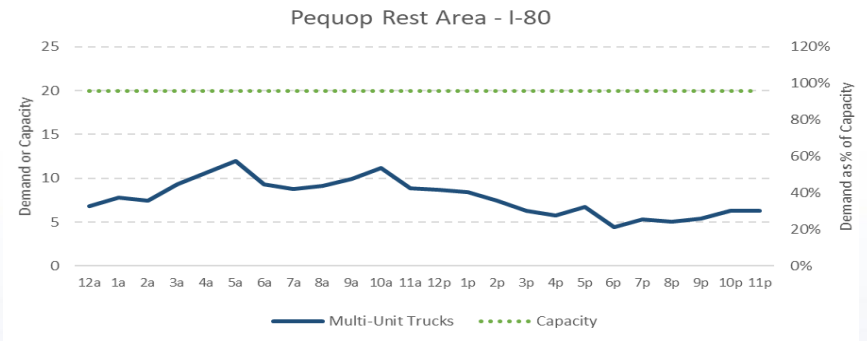
Key ATRI GPS Data

Spaces	20
Public or Private?	Public
Max Raw Truck GPS Count	4
Average Raw Truck GPS Count	2
Expansion Factor	3.461
Expanded Multi-Unit Parking Demand (Range)	4 - 12
Expanded Multi-Unit Parking Demand (Average)	7
Percent Utilization (Range)	22% - 60%
2045 Maximum Projected Demand	19

A sampling of mobile application data indicates this facility typically has capacity available for additional truck parking.



Source: Google Earth



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Pilot and Rainbow Truckers Lounge Authorized (Wendover)

I-80, Exit 410



Google Earth Imagery



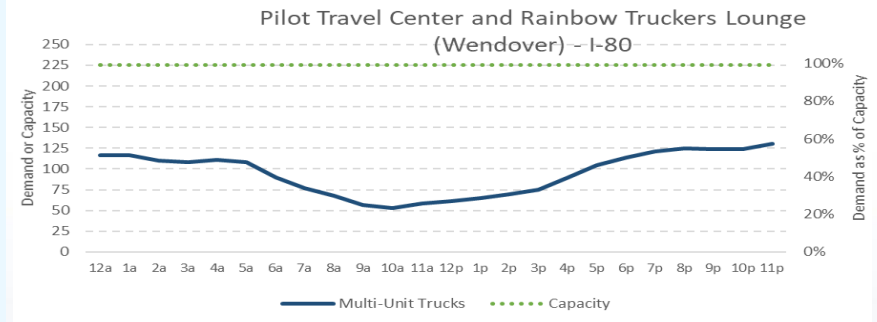
Key ATRI GPS Data

Spaces	225
Public or Private?	Private
Max Raw Truck GPS Count	42
Average Raw Truck GPS Count	27
Expansion Factor	3.461
Expanded Multi-Unit Parking Demand (Range)	53 - 130
Expanded Multi-Unit Parking Demand (Average)	117
Percent Utilization (Range)	24% - 58%
2045 Maximum Projected Demand	213

A sampling of mobile application data indicates sufficient capacity (over 50%) available at most times.



Source: Google Earth



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Southern Nevada Rest Area Authorized (CA Border)

US 95, MP 3



Google Earth Imagery



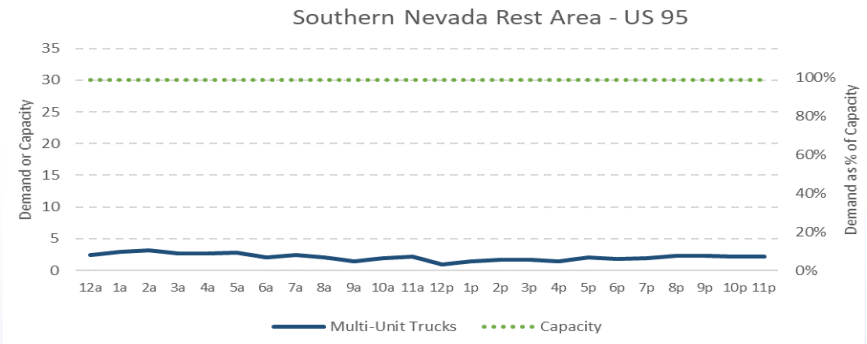
Key ATRI GPS Data

Spaces	30
Public or Private?	Public
Max Raw Truck GPS Count	1
Average Raw Truck GPS Count	0
Expansion Factor	4.397
Expanded Multi-Unit Parking Demand (Range)	1 - 3
Expanded Multi-Unit Parking Demand (Average)	2
Percent Utilization (Range)	3% - 10%
2045 Maximum Projected Demand	5

A sampling of mobile application data shows low truck parking utilization rates at most times.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Terribles Truck Stop Authorized (Searchlight)

US 95, MP 20



Google Earth Imagery



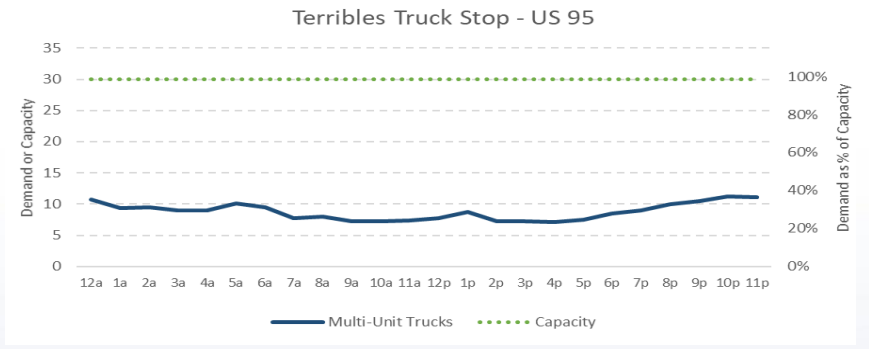
Key ATRI GPS Data

Spaces	30
Public or Private?	Private
Max Raw Truck GPS Count	3
Average Raw Truck GPS Count	2
Expansion Factor	4.397
Expanded Multi-Unit Parking Demand (Range)	7 - 11
Expanded Multi-Unit Parking Demand (Average)	11
Percent Utilization (Range)	24% - 37%
2045 Maximum Projected Demand	17

A sampling of mobile application data shows that the majority of truck spaces are available at most times with short stretches of higher utilization.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Amargosa Valley Cluster Authorized (Amargosa Valley)

US 95, MP 30



Google Earth Imagery

Key ATRI GPS Data

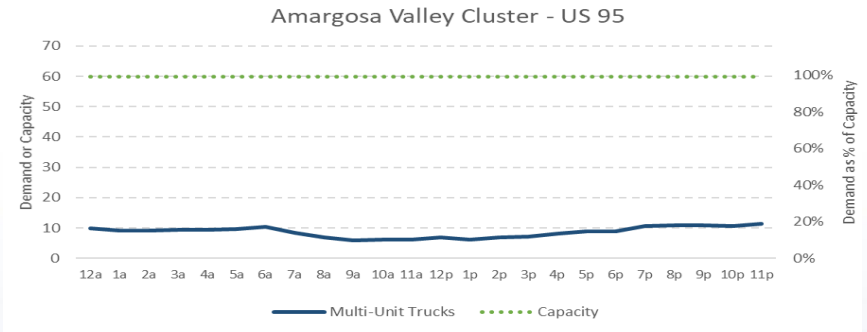


Spaces	60
Public or Private?	Public/Private
Max Raw Truck GPS Count	6
Average Raw Truck GPS Count	4
Expansion Factor	2.230
Expanded Multi-Unit Parking Demand (Range)	6 - 11
Expanded Multi-Unit Parking Demand (Average)	10
Percent Utilization (Range)	10% - 19%
2045 Maximum Projected Demand	17

A sampling of mobile application data shows consistently low levels of truck parking utilization at this cluster of four separate parking areas. Three parking areas are authorized (1 public, 2 private) and the area shown at the far left of the above image is unauthorized parking.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	No	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Stagecoach Hotel and Casino Authorized & Beatty Unauthorized Cluster (Beatty)

US 95, MP 60



Google Earth Imagery



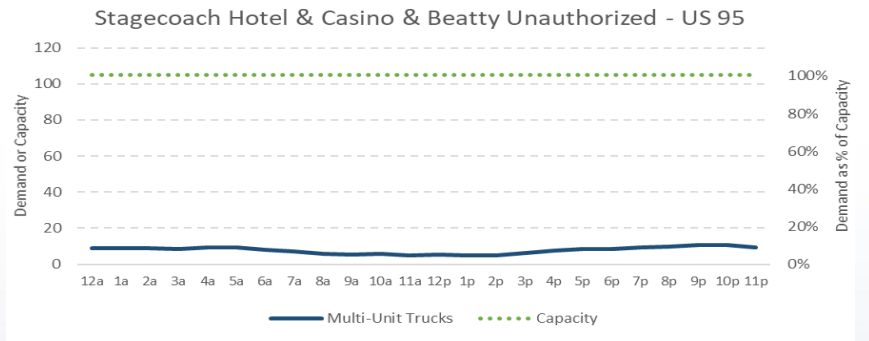
Key ATRI GPS Data

Spaces	105
Public or Private?	Private
Max Raw Truck GPS Count	5
Average Raw Truck GPS Count	3
Expansion Factor	2.664
Expanded Multi-Unit Parking Demand (Range)	5 - 11
Expanded Multi-Unit Parking Demand (Average)	9
Percent Utilization (Range)	5% - 10%
2045 Maximum Projected Demand	15

A sampling of mobile application data indicates that there is significant capacity available at this location.



Source: Google Earth



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	No	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Texaco Authorized (Tonopah)

US 95, MP 108



Google Earth Imagery



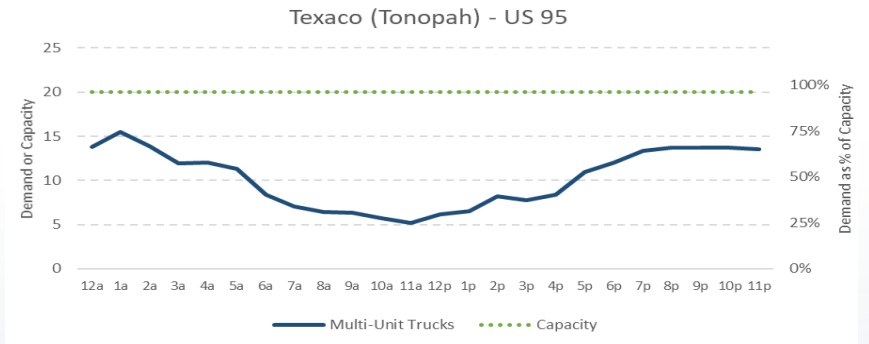
Key ATRI GPS Data

Spaces	20
Public or Private?	Private
Max Raw Truck GPS Count	6
Average Raw Truck GPS Count	4
Expansion Factor	2.664
Expanded Multi-Unit Parking Demand (Range)	5 - 15
Expanded Multi-Unit Parking Demand (Average)	14
Percent Utilization (Range)	26% - 77%
2045 Maximum Projected Demand	22

A sampling of mobile application data shows some capacity available at most times.



Source: Google Earth



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Luning Rest Area Authorized (Luning)

US 95, MP 25



## Google Earth Imagery



## Key ATRI GPS Data

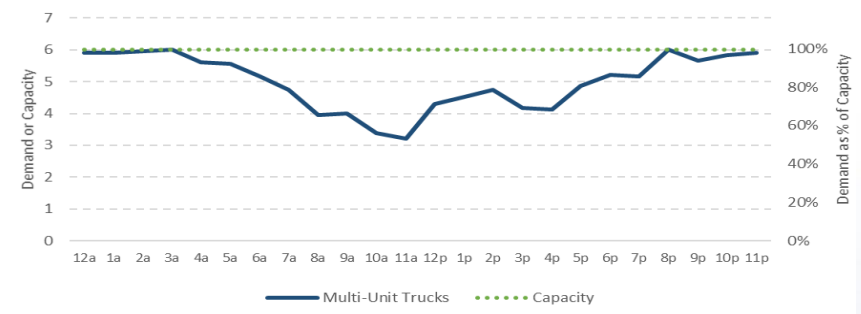
Spaces	6
Public or Private?	Public
Max Raw Truck GPS Count	3
Average Raw Truck GPS Count	2
Expansion Factor	3.206
Expanded Multi-Unit Parking Demand (Range)	3 - 6
Expanded Multi-Unit Parking Demand (Average)	6
Percent Utilization (Range)	53% - 100%
2045 Maximum Projected Demand	9

A sampling of mobile application data indicates this site is frequently at or near capacity.



Source: Google Earth

Luning Rest Area - US 95



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Roady's Golden Gate Authorized (Hawthorne)

US 95, MP 50



Google Earth Imagery



Key ATRI GPS Data

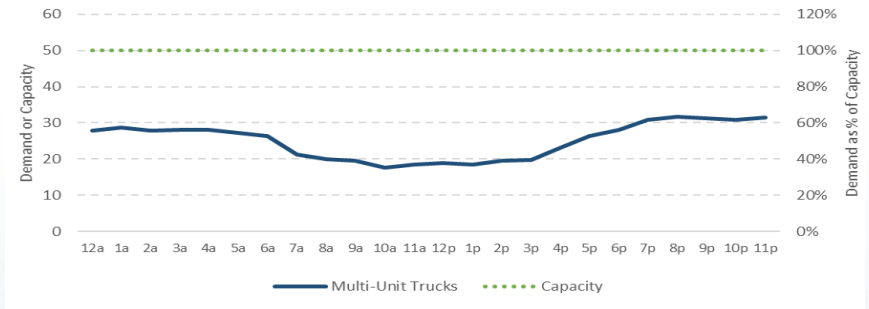
Spaces	50
Public or Private?	Private
Max Raw Truck GPS Count	11
Average Raw Truck GPS Count	8
Expansion Factor	3.206
Expanded Multi-Unit Parking Demand (Range)	18 - 32
Expanded Multi-Unit Parking Demand (Average)	28
Percent Utilization (Range)	35% - 63%
2045 Maximum Projected Demand	46

A sampling of mobile application data shows some capacity available at most times.



Source: Cambridge Systematics

Roady's Golden Gate (Hawthorne) - US 95



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	No	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Four Seasons Authorized and Old Tribal Truck Stop (closed) Cluster (Schurz)

US 95, MP 82



Google Earth Imagery



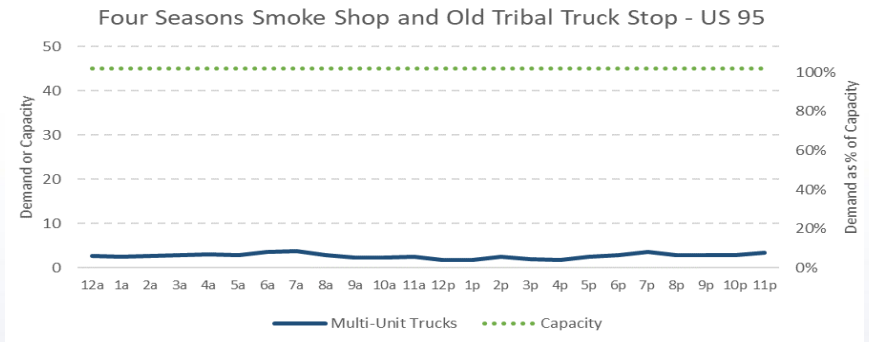
Key ATRI GPS Data

Spaces	45
Public or Private?	Private
Max Raw Truck GPS Count	2
Average Raw Truck GPS Count	1
Expansion Factor	3.206
Expanded Multi-Unit Parking Demand (Range)	2 - 4
Expanded Multi-Unit Parking Demand (Average)	3
Percent Utilization (Range)	4% - 8%
2045 Maximum Projected Demand	5

A sampling of mobile application data shows parking available at the Four Seasons Smoke Shop at most times.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	No	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Golden Gate Authorized (Fallon)

US 95, Exit 113



Google Earth Imagery



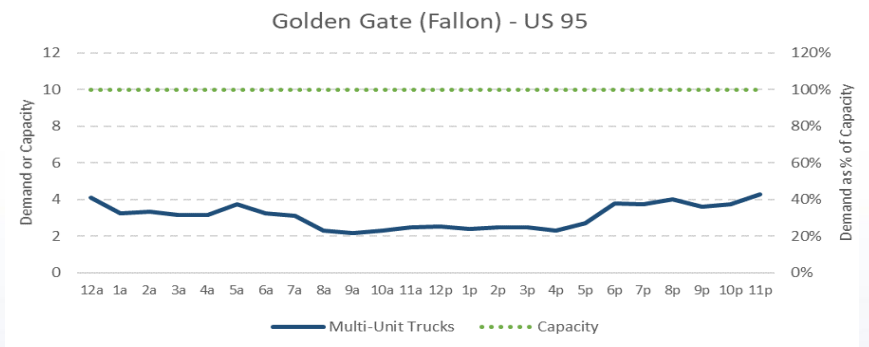
Key ATRI GPS Data

Spaces	10
Public or Private?	Private
Max Raw Truck GPS Count	2
Average Raw Truck GPS Count	1
Expansion Factor	3.206
Expanded Multi-Unit Parking Demand (Range)	2 - 4
Expanded Multi-Unit Parking Demand (Average)	4
Percent Utilization (Range)	22% - 43%
2045 Maximum Projected Demand	6

A sampling of mobile application data indicates that this facility is often near or at capacity and has a higher utilization rate than indicated by ATRI data.



Source: Google Earth



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	No	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Orovada Rest Area Authorized (Orovada)

US 95, MP 41



Google Earth Imagery



Key ATRI GPS Data

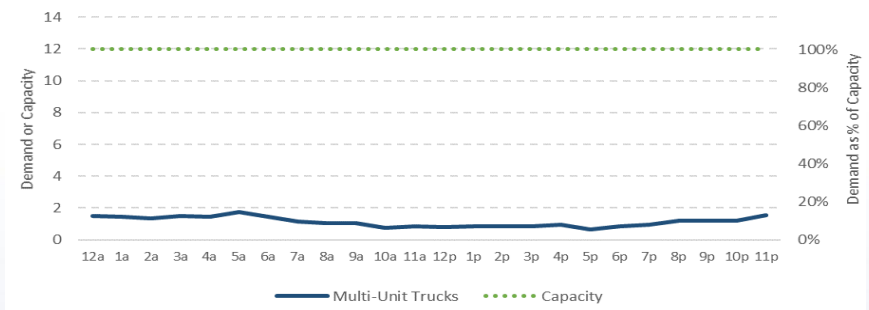
Spaces	12
Public or Private?	Public
Max Raw Truck GPS Count	1
Average Raw Truck GPS Count	1
Expansion Factor	1.480
Expanded Multi-Unit Parking Demand (Range)	1 - 2
Expanded Multi-Unit Parking Demand (Average)	1
Percent Utilization (Range)	5% - 15%
2045 Maximum Projected Demand	3

A sampling of mobile application data indicates that parking is generally available at this location.



Source: Google Earth

Orovada Rest Area - US 95



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Hoover Dam Lodge Truck Parking Authorized (Boulder City)

US 93, MP 3



## Google Earth Imagery



## Key ATRI GPS Data

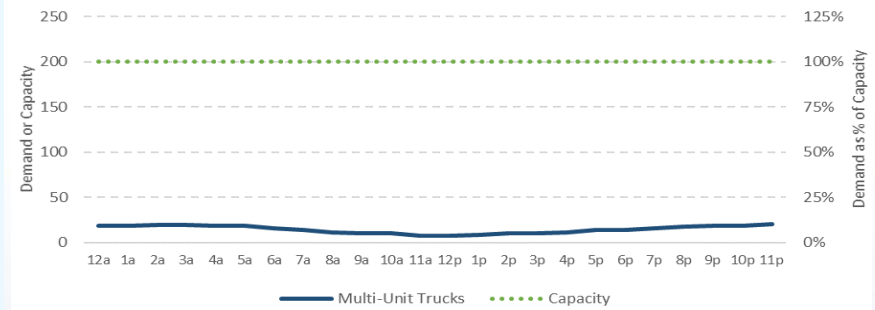
Spaces	200
Public or Private?	Private
Max Raw Truck GPS Count	13
Average Raw Truck GPS Count	8
Expansion Factor	1.814
Expanded Multi-Unit Parking Demand (Range)	8 - 20
Expanded Multi-Unit Parking Demand (Average)	19
Percent Utilization (Range)	4% - 10%
2045 Maximum Projected Demand	20

Stakeholder input, field reviews, and a sampling of mobile application data indicate this location is infrequently utilized. Most of the site is a graded dirt lot.



Source: Cambridge Systematics

Hoover Dam Lodge Truck Parking - US 93



## Utilization Analysis

### Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Ash Springs Cluster Authorized and Unauthorized (Ash Springs)

US 93, MP 45



Google Earth Imagery



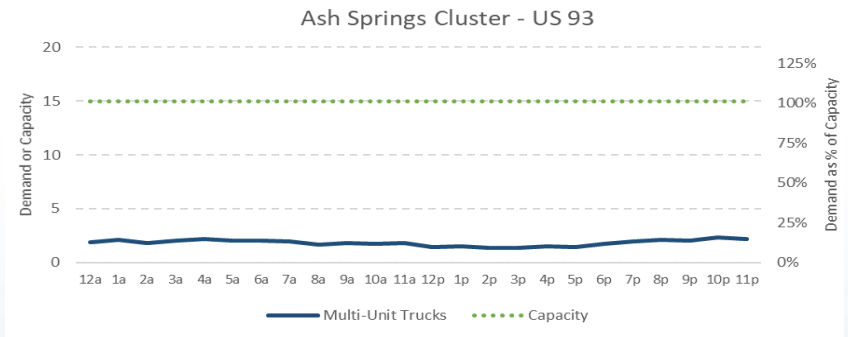
Key ATRI GPS Data

Spaces	15
Public or Private?	Public/Private
Max Raw Truck GPS Count	2
Average Raw Truck GPS Count	2
Expansion Factor	1.212
Expanded Multi-Unit Parking Demand (Range)	1 - 2
Expanded Multi-Unit Parking Demand (Average)	2
Percent Utilization (Range)	9% - 16%
2045 Maximum Projected Demand	3

A sampling of mobile application data shows variable utilization but spaces are typically available. This cluster consists of one authorized location and unauthorized parking along US 93.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	No	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Sunnyside Rest Area Authorized - Nye County (SR 318)

SR 318, MP 70



Google Earth Imagery



Key ATRI GPS Data

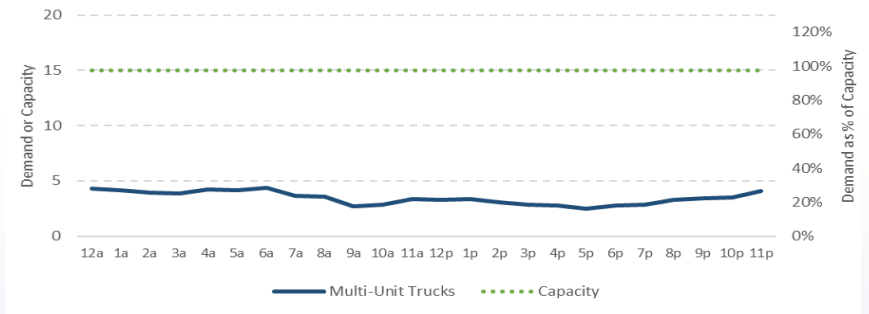
Spaces	13
Public or Private?	Public
Max Raw Truck GPS Count	2
Average Raw Truck GPS Count	2
Expansion Factor	2.169
Expanded Multi-Unit Parking Demand (Range)	3 - 4
Expanded Multi-Unit Parking Demand (Average)	4
Percent Utilization (Range)	17% - 29%
2045 Maximum Projected Demand	7

No known information.



Source: Google Earth

Sunnyside Rest Area - Nye County - US 93



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# R Place Food Depot and Loves Cluster Authorized (Ely)

US 93, MP 41



Google Earth Imagery



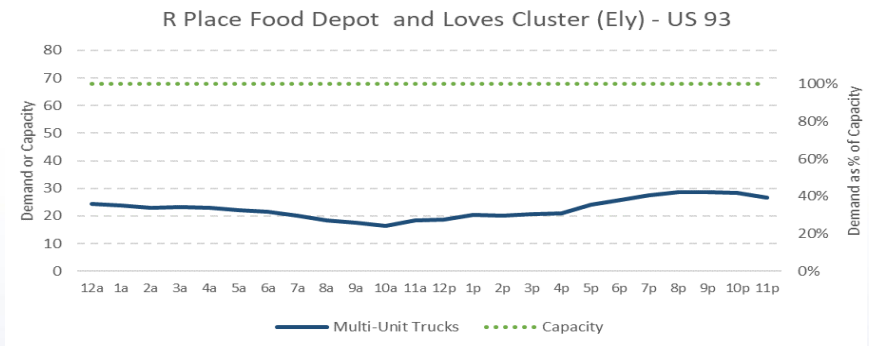
Key ATRI GPS Data

Spaces	68
Public or Private?	Private
Max Raw Truck GPS Count	17
Average Raw Truck GPS Count	12
Expansion Factor	1.857
Expanded Multi-Unit Parking Demand (Range)	16 - 29
Expanded Multi-Unit Parking Demand (Average)	25
Percent Utilization (Range)	24% - 42%
2045 Maximum Projected Demand	51

A sampling of mobile application data indicates heavier usage than ATRI GPS utilization data. This cluster typically has some capacity available, with the Loves facility more heavily utilized than the R Place Food Depot.



Source: Google Earth



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	Yes	Yes	No	Yes	No	No	Yes

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Schelbourne Rest Area Authorized (Ely)

US 93, MP 93



## Google Earth Imagery



## Key ATRI GPS Data

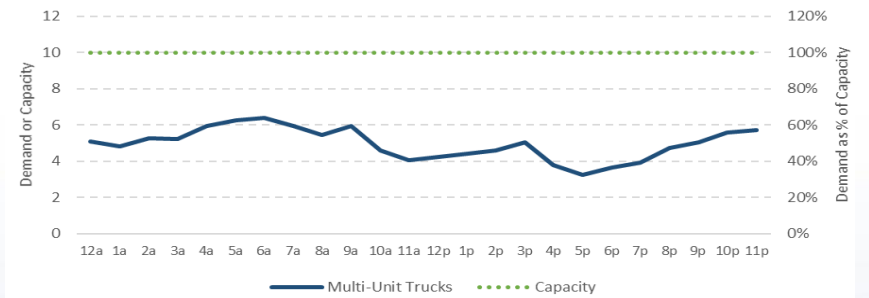
Spaces	10
Public or Private?	Public
Max Raw Truck GPS Count	2
Average Raw Truck GPS Count	1
Expansion Factor	3.474
Expanded Multi-Unit Parking Demand (Range)	3 - 6
Expanded Multi-Unit Parking Demand (Average)	5
Percent Utilization (Range)	32% - 64%
2045 Maximum Projected Demand	13

Very limited mobile application data indicates spaces are available at this location.



Source: Google Earth

## Schelbourne Rest Area - US 93



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	Yes	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.



# Barton's Club Authorized (Jackpot)

US 93, MP 141



Google Earth Imagery

Key ATRI GPS Data

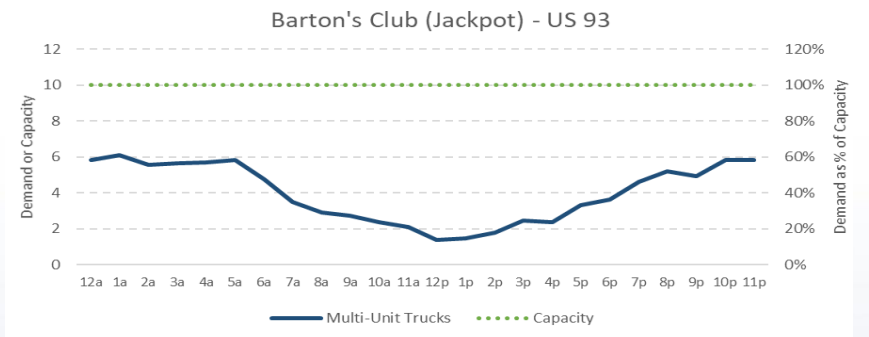


Spaces	10
Public or Private?	Private
Max Raw Truck GPS Count	2
Average Raw Truck GPS Count	1
Expansion Factor	3.547
Expanded Multi-Unit Parking Demand (Range)	1 - 6
Expanded Multi-Unit Parking Demand (Average)	6
Percent Utilization (Range)	14% - 61%
2045 Maximum Projected Demand	10

A sampling of mobile application data shows variable utilization with parking typically available.



Source: Google Earth



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	No	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# Wa She Shu Travel Plaza Authorized (Gardnerville)

US 395, MP 18



## Google Earth Imagery



## Key ATRI GPS Data

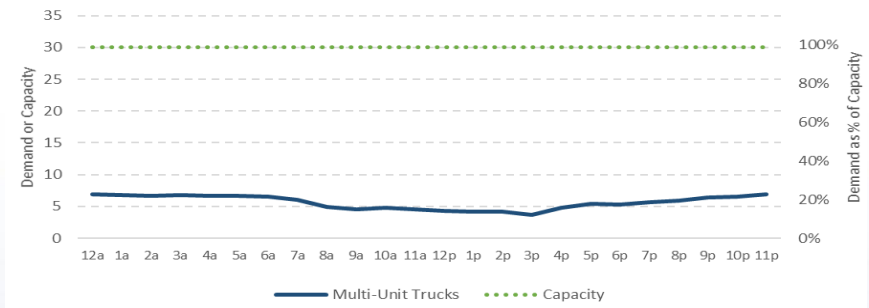
Spaces	30
Public or Private?	Private
Max Raw Truck GPS Count	4
Average Raw Truck GPS Count	3
Expansion Factor	2.182
Expanded Multi-Unit Parking Demand (Range)	4 - 7
Expanded Multi-Unit Parking Demand (Average)	7
Percent Utilization (Range)	12% - 23%
2045 Maximum Projected Demand	11

A sampling of mobile application data shows that the site utilization is inconsistent. The facility often has excess capacity but can occasionally approach capacity.



Source: Google Earth

Wa She Shu Travel Plaza - US 395



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
Yes	Yes	No	Yes	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.





# No Virginia St. and Park and Ride Cluster Unauthorized (Cold Springs/Reno)

US 395, Exit 80



Google Earth Imagery



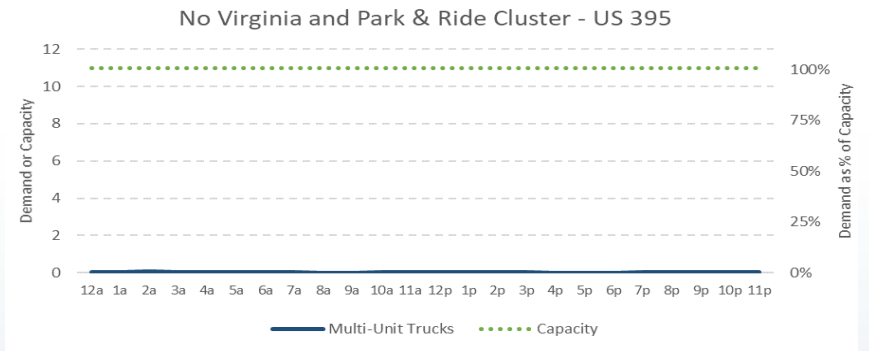
Key ATRI GPS Data

Spaces	11
Public or Private?	Public
Max Raw Truck GPS Count	0
Average Raw Truck GPS Count	0
Expansion Factor	1.276
Expanded Multi-Unit Parking Demand (Range)	0 - 0
Expanded Multi-Unit Parking Demand (Average)	0
Percent Utilization (Range)	0% - 1%
2045 Maximum Projected Demand	0

Stakeholder input indicates that growing commercial and warehousing uses in the US 395 corridor are increasing the need for truck parking. In addition, occasional high winds can close US 395 north of Reno, creating an additional need for temporary emergency parking.



Source: Google Earth



## Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	No	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.

# US 6 @ SR 360 Cluster Unauthorized (Dyer)

US 6, MP 12



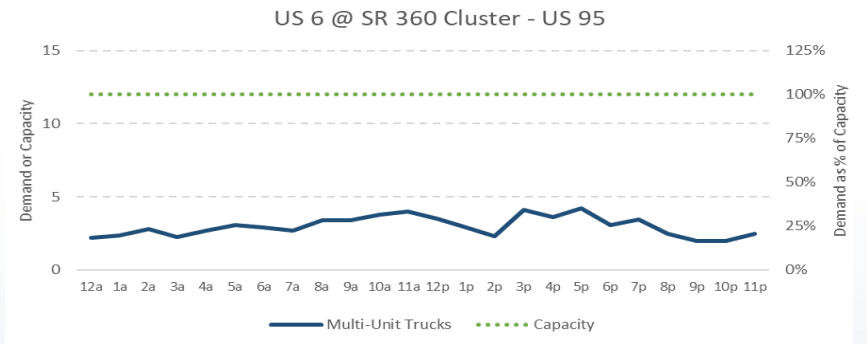
Google Earth Imagery



Key ATRI GPS Data

Spaces	12
Public or Private?	Public
Max Raw Truck GPS Count	2
Average Raw Truck GPS Count	1
Expansion Factor	2.664
Expanded Multi-Unit Parking Demand (Range)	2 - 4
Expanded Multi-Unit Parking Demand (Average)	2
Percent Utilization (Range)	16% - 35%
2045 Maximum Projected Demand	16

This cluster contains two unauthorized parking areas. There is no capacity data available from mobile applications. Stakeholder input from this study shows a desire for more truck parking between California and US 95. Results from a study of US 395 and US 6 in eastern California (Caltrans District 9) also indicates that there are few truck parking options on US 6 in California and unauthorized parking in the US 6 corridor is common.



Utilization Analysis

## Amenities

Fuel	Restrooms	Showers	Food	Repairs	Scales	Laundry	Truck Wash	WiFi
No	No	No	No	No	No	No	No	No

\*Some locations from the utilization analysis are a cluster of individual sites. If any location in the cluster has the amenity, it is marked "Yes" here.

## Appendix C FHWA Demand Methodology

This section provides an overview of the inputs and calculations used to derive truck parking demand in Nevada utilizing the FHWA approach. This is based on three related studies:

- FHWA—Study of Adequacy of Commercial Truck Parking Facilities—Technical Report (2002). Referenced as “FHWA.”
- Pennsylvania State Transportation Advisory Committee—Truck Parking in Pennsylvania (2007). Referenced as “Pennsylvania STAC.”
- Virginia DOT—Virginia Truck Parking Study (2015). Referenced as “Virginia DOT.”

The Pennsylvania STAC and Virginia DOT models are based on the original FHWA approach but update some of the variables based on changes in FMCSA hours of service (HOS) regulations since 2002.

The model used to calculate truck parking demand requires 5 key user inputs. These inputs were all included in the original FHWA study:

- Truck AADT (AADTT).
- Corridor Length (L).
- Corridor Speed Limit or Average Speed (S).
- Percent of Trucks making short-haul trips (SH).
- Percent of Trucks making long-haul trips (LH).

The core equation for estimating truck parking demand (D) is shown below.

$$D = THT \times P_{avg} \quad (1)$$

Truck Hours Traveled (THT) is calculated based on:

$$THT = AADTT \times (L/S) \quad (2)$$

The more time trucks require to transit a corridor (L/S) and the more trucks in the corridor (AADTT), the higher the probability that they will need to stop at some point during that trip.

The average parking duration ( $P_{avg}$ ) was expanded in the original FHWA study to include a number of additional parameters including:

- Hours of Service limitations (updated by the Pennsylvania STAC and Virginia DOT studies).
- Variation in truck parking characteristics for long-haul (LH) and short-haul (SH) trips. SH trips can be made within a single day under hours-of-service regulations in place in 2002.

- Ratio of SH trips to LH trips. Parking duration is used as a surrogate. Based on observations and estimates of the percent of trucks that are parked for less than three hours (SH) versus those parked for more than three hours (LH), the original FHWA study used a 36% SH to 64% LH split for urban segments (defined as within 200 miles of a city with a population of 200,000 or more) and a 7% SH to 93% LH split for rural segments. The Pennsylvania STAC model used a 79% SH to 21% LH split while Virginia DOT used a 65% SH to 35% LH split. This study uses the FHWA methodology with a 36% SH to 64% LH split.
- Time required for loading/unloading, staging, and other activities that occur while the driver is “on-duty” but off the roadway network.
- Demand for parking at public vs. private rest areas. This study does not differentiate between the types of parking available.
- Peak parking factors for long-haul and short-haul trucks. This determines the percent of daily parking demand that occurs during peak hours. Pennsylvania STAC and Virginia DOT both used 3 A.M to 4 a.m. as the peak parking hour. This study uses the same periods as the peak parking hour.

These parameters are further discussed in the sections below.

## C.1 Short-Term Parking Demand

Each of the key freight corridors were analyzed separately. To calculate short-term parking demand, the following steps were used for each corridor:

1. **Calculate average 4+ axle AADTT.** NDOT produces truck classification counts each year for highway segments in the state. Many of the count locations registered a large number of 2-axle trucks. These vehicles are most likely service vehicles or local delivery vehicles which are unlikely to generate significant demand for truck parking. Large, 4-axle (or more) trucks require more space to park and are the main users of truck parking facilities (both authorized and unauthorized) in the state according to stakeholder outreach and the ATRI truck driver survey. For this reason, this study uses the average 4+ axle truck count as the AADTT.
2. **Calculate buffer AADTT.** The average AADTT value was multiplied by a 15% “buffer” to account for variances in the average daily truck traffic. This approach was used in the original FHWA study but not in the Pennsylvania STAC and Virginia DOT studies. This analysis includes the buffer to help account for daily and seasonal variances in the corridor.

For the short-term parking demand calculation, the total daily truck volume is used instead of the short-haul percent because both short-haul and long-haul trucks need to stop for short periods of time (bathroom, fuel, etc.).

3. **Calculate segment length (L).** This was taken from Google Maps.
4. **Calculate segment speed (S).** The average speed in each corridor is an estimate based on known speed limits and highway operating conditions (e.g., geography, volume, traffic control, etc.).



Using equation 2, multiplying the buffer AADTT by the corridor length divided by corridor speed produces a truck-hours-traveled for the corridor.

5. **Calculate truck hours parked.** Using a truck parking/operating ratio of 5 minutes parked to 55 minutes of travel per hour, taken from the original FHWA study, the truck-hours-traveled is multiplied by 0.083.
6. **Calculate daily short-term truck stops.** All three studies used a value of 0.367 hours (22 minutes per hour) for the median short-term parking duration. This means that a driver would theoretically make a short-term parking stop once every 4 hours for 22 minutes. The total truck hours parked is multiplied by 0.367.
7. **Calculate peak parking demand (short-haul).** The utilization rate for trucks parked for less than 3 hours during the peak period of parking demand (between 3 a.m. and 4 a.m.) was estimated as 2.11% in the Pennsylvania STAC model. This value was used in the Virginia DOT model as well. Multiplying the daily truck stops by this value produces a peak parking demand for short-haul trips. This is the maximum demand for short-term parking in each corridor.

## C.2 Long-Term Parking Demand

To calculate long-term parking demand, the following steps were used for each segment:

1. **Calculate long-haul trip 4+ axle AADTT.** Based on the NDOT truck classification counts, this study uses the average 4+ axle (or more) truck count as the AADTT in each corridor. However, only some trips in each corridor will require trucks to stop for long periods of rest. The average 4+-axle AADTT was multiplied by the percent of trucks making long-haul trips (LH). For this model, a value of 64% was used, consistent with the FHWA model.
2. **Calculate buffer AADTT.** The AADTT provided in step 1 was then multiplied by a 15% “buffer” to account for variances in the average daily truck traffic. This approach was used in the original FHWA study but not in the Pennsylvania STAC and Virginia DOT studies. This analysis includes the buffer to help account for daily and seasonal variances in the corridor.
3. **Calculate segment length (L).** This was taken from Google Maps.
4. **Calculate segment speed (S).** The average speed in each corridor is an estimate based on known speed limits and highway operating conditions (e.g., geography, volume, traffic control, etc.).

Using equation 2, multiplying the buffer AADTT by the corridor length divided by corridor speed produces a truck-hours-traveled for each segment.

To derive long-term parking activity, a number of additional factors were considered. All three studies use a similar approach, though the Pennsylvania STAC and Virginia DOT approaches are updated to account for changes in FMCSA HOS restrictions since the 2002 FHWA study. Table C.1 is taken from the Pennsylvania STAC model.



**Table C.1 Long-Haul Truck Parking Demand—HOS Related Variables**

Variable	Description	Derivation/Source
F <sub>D</sub>	Driving hours permitted in a daily on-duty window	11 out of 14, or 0.786 (FMCSA Regulations)
OD <sub>8</sub>	Maximum on-duty hours permitted 8 over consecutive days	70 (FMCSA)
DR <sub>8</sub>	Maximum driving hours permitted over 8 consecutive days	55 (OD <sub>8</sub> X F <sub>D</sub> )
H <sub>T</sub>	Total hours in 8-day period	192 (24 X 8)
H <sub>H</sub>	Avg. hours at home (off-duty and away from truck) for long-haul truckers in 8-day period	42 (2002 FHWA Study)
H <sub>R</sub>	Average hours with truck (on-duty or off-duty) for long-haul truckers in 8-day period	150 (H <sub>T</sub> –H <sub>H</sub> )
D%	Fraction of time on the road (on-duty and driving) for long-haul truckers in 8-day period	0.367 (DR <sub>8</sub> / H <sub>R</sub> )
P%	Fraction of time long-haul truckers must be off-duty and/or parked under FMCSA regulations	0.633 (1–D%)
P	Parking Ratio (hours parked for FMCSA regulations for every hour driving)	1.725 (P% / D%)

Source: Pennsylvania STAC Truck Parking in Pennsylvania.

- Calculate truck hours parked.** This is found by multiplying the truck hours traveled by the parking ratio.
- Calculate daily long-term parking stops.** All three studies adopted a median long-term parking value of 435 minutes or 7.25 hours. This represents the estimated typical parking duration for trucks that park for extended periods of time to meet FMCSA requirements. The value is calculated by multiplying the truck hours parked by 7.25 hours.
- Calculate the peak parking demand (long-haul).** Similar to the peak parking demand (short-haul), the daily parking stops is multiplied by a utilization rate for trucks parked for more than 3 hours during the peak period of parking demand (between 3 a.m. and 4 a.m.). A value of 45.33% was used in Pennsylvania STAC and Virginia DOT models. Multiplying the Daily Truck Stops by this value produces a peak parking demand for long-haul trips.

Finally, to calculate total truck parking demand, the peak parking demand for short-haul and long-haul trips are summed.

One final note is that the FHWA methodology included a differentiation between public and private parking facilities and the desirability of each option. However, trying to differentiate between demand for a public truck parking space and demand for a private truck parking space with the level of specificity available in the model is not feasible. Although surveys indicate truck drivers prefer private truck parking facilities with amenities such as showers, food, and fuel, they will use any safe parking location they can find when necessary. In addition, the rural nature of many of these corridors makes the business case to build private parking difficult, rendering the distinction irrelevant. Neither the Pennsylvania STAC nor the Virginia DOT models used this variable and this study also declined to make the distinction.

## Appendix D Park My Truck and TruckerPath Application Data

The following table shows parking utilization data pulled from the Park My Truck smartphone application on 12/18/2018 through 12/21/2018 at locations identified through the ATRI utilization analysis as overcapacity. Parking availability was also observed for the TA Sparks (Sparks) with 200 spaces and TA Mill City with 152 spaces which were not identified by ATRI as lacking capacity but are included and updated in the Park My Truck application. The TA Sparks had at minimum 25 spaces available, and the TA Mill City had more than 100 spaces available at all observed times.

**Table D.1 Park My Truck Availability Data**

Site	Parking Spaces	Time Observed							
		12/18/2018 (7 a.m.)	12/18/2018 (10 p.m.)	12/19/2018 (5 a.m.)	12/19/2018 (10 p.m.)	12/20/2018 (5 a.m.)	12/20/2018 (10 p.m.)	12/21/2018 (5 a.m.)	12/21/2018 (10 p.m.)
Pilot Travel Center (West Wendover)	120	54	52	35	62	39	63	43	62
Petro Wells (Wells)	250	67	78	64 <sup>1</sup>	74 <sup>1</sup>	64 <sup>1</sup>	74 <sup>1</sup>	64 <sup>1</sup>	78 <sup>1</sup>
Flying J Travel Plaza (Wells)	200	86	83	57	100	63	101	68	99
Petro North Las Vegas (Speedway Blvd)	207	19	9 <sup>1</sup>	10	15 <sup>1</sup>	13*	14 <sup>1</sup>	14 <sup>1</sup>	36 <sup>1</sup>
Pilot Travel Center (North Las Vegas)	80	35	33	10	40	25	54 <sup>1</sup>	27	40
TA Las Vegas (Blue Diamond Road)	144	6	0 <sup>1</sup>	0	0 <sup>1</sup>	0	0*	2	3 <sup>1</sup>
Flying J Fuel Stop (Winnemucca)	70	45	44	30	52	33	53	36	52
Pilot Travel Center (Fernley)	100	51	42	28	50	31	51	34	49
Petro Sparks (Sparks)	400	19	43 <sup>1</sup>	19	52 <sup>1</sup>	43 <sup>1</sup>	71 <sup>1</sup>	40 <sup>1</sup>	55 <sup>1</sup>

<sup>1</sup> Indicates data may be up to 2 hours older than the time observed.

The following table shows truck parking availability from the TruckerPath application between December 18, 2018 and December 21, 2018.

**Table D.2 TruckerPath Truck Parking Availability Data**

Site	12/18 Capacity	Time of Data	12/19 Capacity	Time of Data	12/20 Capacity	Time of Data	12/21 Capacity	Time of Data
Whiskey Petes/Flying J (Primm)	Some Spots	6:30 A.M	Lot is Full	2:00 a.m.	Some Spots	Midnight	Some Spots	5:00 a.m.
Whiskey Petes/Flying J (Primm)	Lot is Full	10:30 P.M	Lots of Spots	3:00 p.m.	Lots of Spots	2:00 p.m. Wednesday	Some Spots	6:00 p.m.
TA Travel Center (Las Vegas)	Lot is Full	3:30 a.m.	Lot is Full	10:00 p.m.	Some Spots	11:00 p.m.	Some Spots	5:00 p.m.
Pilot Travel Center (Las Vegas)	Lot is Full	3:30 a.m.	Lot is Full	5:00 p.m.	Lot is Full	2:00 a.m.	Lot is Full	8:00 p.m.
Petro Center/Speedway @ Apex	Lots of Spots	7:00 A.M	Lots of Spots	4:00 a.m.	Lot is Full	1:00 a.m.	Some Spots	11:00 p.m.
Loves Travel Center (North Las Vegas)	Lots of Spots	7:00 a.m.	Some Spots	3:00 a.m.	Some Spots	10:00 p.m.	Some Spots	11:00 p.m.
Mormon Mesa (I-15)	Lots of Spots	3:30 a.m.	Some Spots	8:00 a.m. Tuesday	Lots of Spots	Midnight	Some Spots	11:00 p.m.
Boomtown (Verdi)	Unknown		Some Spots	4:00 a.m.	Lots of Spots	2:00 p.m. Wednesday	Lots of Spots	7:00 p.m.
Golden Gate (Clark)	Lots of Spots	12:30 a.m.	Lots of Spots	5am Tues	Some Spots	1:00 p.m. Wednesday	Some Spots	6:00 p.m.
Wadsworth Rest Area	Lots of Spots	1:30 a.m.	Lots of Spots	5am Tues	Lot is Full	Midnight	Lots of Spots	1:00 a.m. Thursday
Pilot (Fernley)	Some Spots	6:30 a.m.	Some Spots	4:00 a.m.	Some Spots	1:00 a.m.	Lots of Spots	11:00 p.m.
Loves (Fernley)	Lot is Full	9:30 p.m.	Lot is Full	8:00 p.m.	Lots of Spots	5:00 p.m.	Some Spots	9:00 p.m.
Flying J (Fernley)	Some Spots	6:30 a.m.	Some Spots	Midnight	Lots of Spots	11:00 p.m.	Some Spots	9:00 p.m.
Beowawe Rest Area	Some Spots	6:30 a.m.	Some Spots	4:00 a.m.	Lots of Spots	9:00 p.m.	Some Spots	9:00 p.m.
Pilot (Carlin) and Carlin Ramp	Some Spots	6:30 p.m.	Lot is Full	2:00 a.m.	Some Spots	4:30 a.m.	Some Spots	4:00 p.m.