
Oregon Commercial Truck Parking Study

Final Report

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Prepared for



Prepared by



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EXECUTIVE SUMMARY

BACKGROUND

Truck drivers need regular rest. However, it is more efficient for drivers to travel as far as possible between breaks, which can lead to safety problems. To ensure drivers get the breaks necessary to support safe operation of trucks, the Federal Motor Carrier Safety Administration established Hours of Service regulations. The national growth in trucking and the requirement for regular rest has led to increased demand for truck parking; however, the public and private supply hasn't kept up at a national level.

The Oregon Commercial Truck Parking Study (OCTPS) explores truck parking issues in Oregon. It aims to address commercial parking needs along the six key freight corridors in Oregon with innovative and cost-effective strategies.

STUDY PURPOSE AND GOALS

The OCTPS aimed to achieve three broad goals over the course of the study:

- Assess and address commercial truck parking needs for required rest periods in Oregon to increase safety with practical, innovative and cost-effective strategies that include effective technologies.
- Enhance the economic competitiveness of the state's major freight routes and improve safety.
- Develop the information necessary to support decisions regarding future approaches to truck parking issues in Oregon including determination of the State of Oregon's role in the provision of truck parking.

STAKEHOLDER AND PUBLIC ENGAGEMENT

Study Advisory Committees

A Technical Advisory Committee (TAC) was formed to provide industry insight on study issues. The TAC included representatives from public agencies and business and industry associations involved in the delivery of goods, truck parking and public safety. The TAC met three times at various points in the study and provided feedback on study methodology, results and recommendations. Members of the project team briefed the Oregon Freight Advisory Committee at two points during the study.

Outreach Methodology

An online survey tool gathered opinions from travelers who use truck parking within Oregon. In total, the survey received 729 responses, including 662 online submissions and 67 in-person

surveys. Longer, in-person and phone interviews were conducted with 26 respondents. The vast majority of respondents were truck drivers or dispatchers.

Both survey and interview respondent's identified insufficient truck parking in Oregon, particularly near urban areas. They also provided useful input as to the problems and potential solutions.

BEST PRACTICES REVIEW

A literature review was conducted to learn about the methods, findings, and conclusions of previous truck parking studies. Eleven regional, statewide and local truck parking studies from around the country were summarized, noting the results of outreach efforts (if applicable) and how truck parking needs were evaluated. Several federal studies were also reviewed, including the guidance coming from the National Coalition on Truck Parking. Finally, 16 recent research studies were also reviewed (mostly from the past 5 years) to better understand the cutting edge of truck parking demand modeling, needs evaluation, and technological solutions.

TRUCK PARKING INVENTORY

The Truck Parking Inventory Technical Memorandum (Appendix E) provides an inventory of designated truck parking locations in the study corridors, including rest areas, truck stops and ports of entry. There are approximately 5,500 truck parking spaces at rest areas, truck stops, and ports of entry on the study corridors. Of these, approximately 4,300 are striped and 1,100 are unstriped. There are 914 striped spaces at rest areas, about 4,400 at truck stops, and 154 at ports of entry.

CURRENT DEMAND ANALYSIS

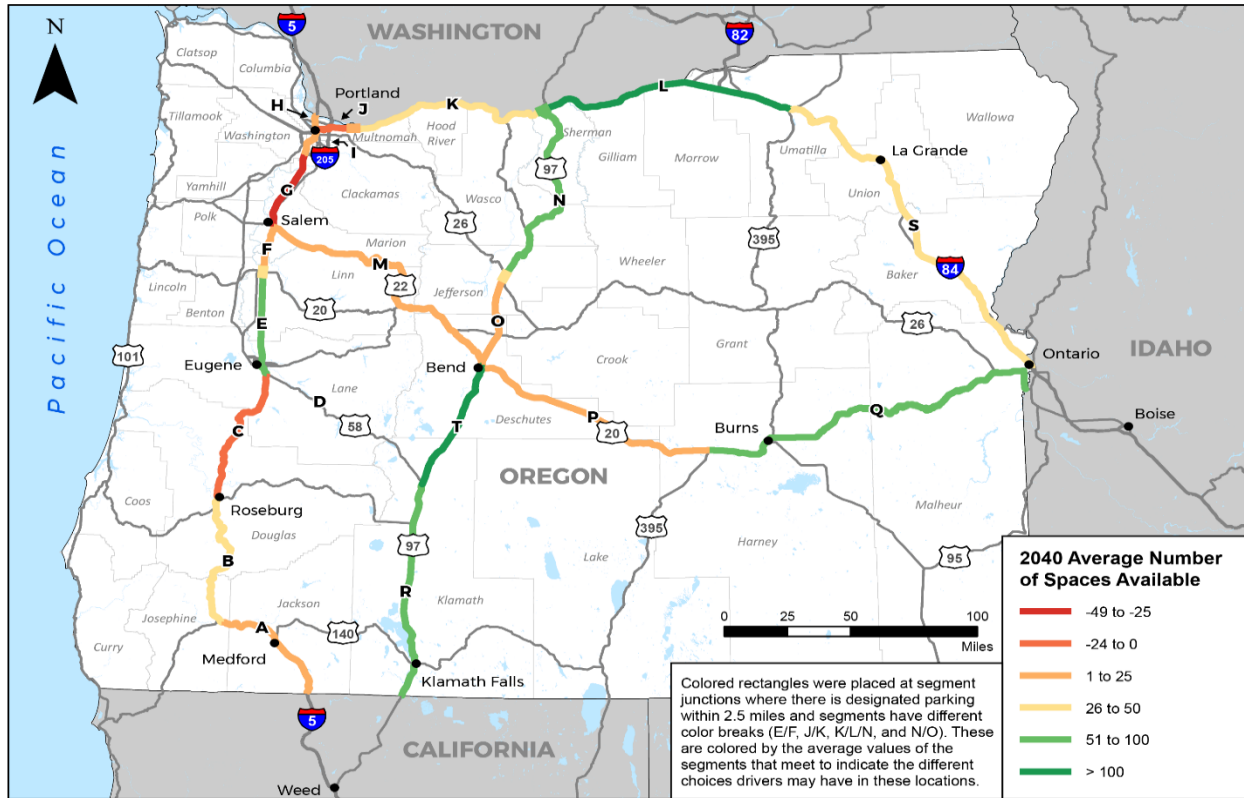
The Current Demand Analysis Technical Memorandum (Appendix F) expanded the parking demand observed in truck GPS data using observations from video recordings and reports from a leading truck parking application. This analysis allowed for parking demand to be measured in all the rest areas and truck stops statewide and to be compared against existing capacity to identify corridors where shortfalls are likely. Undesignated parking refers to parking at locations where it is not permitted, such as highway shoulders, interchanges, etc. Based on GPS data, high demand locations for undesignated parking were also identified.

FUTURE PARKING DEMAND

The Future Demand Analysis Technical Memorandum (Appendix G) estimated truck parking demand in 2040 using the baseline results described in the Current Demand Analysis Technical Memorandum (Appendix F). The results indicate the number of parking spaces that need to be added to the corridors in order to avoid future shortfalls. Truck parking demand was forecast by

escalating current parking demand by the growth rate in the Oregon Statewide Integrated Model.¹ Figure ES-1 shows the areas where, by 2040, on average, the increase in truck parking demand is expected to overcome the supply of parking.

Figure ES-1: 2040 Average Number of Spaces Available (Supply minus Demand) Weekdays at Midnight



TRUCK PARKING SOLUTIONS

A breakdown of recommendations from the federal, state and regional truck parking plans reviewed in the Literature Review Technical Memorandum (Appendix C) yielded six key strategies:

- Data and Technology Deployment
- Creative Use of Right-of-Way / Public Capacity Expansion
- Expansion using public-private partnerships
- Policy and Regulations
- Coalitions and Institutional Oversight
- Public and Private Outreach

¹ <https://www.oregon.gov/ODOT/Planning/Documents/Statewide-Integrated-Model-Vers2-5.pdf>

Site-specific and statewide solutions were identified to meet the forecasted needs across the state in the Strategy and Recommendations Memorandum (Appendix H). They were prioritized according to the following criteria:

- Effectiveness at addressing identified needs
- Cost
- Private resource utilization
- Ease of implementation/previous success

NEXT STEPS

As a next step, the State of Oregon should develop an implementation plan for this study in order to identify the more specific tasks needed to implement the study. In some cases, feasibility studies and proof-of-concept pilots may be appropriate to determine effectiveness, limitations and projected costs of implementing specific recommendations under consideration. Pilot programs for low-cost solutions—such as expanding rest areas with existing rights-of-way, re-designing/re-marking rest areas to better utilize existing footprints or increasing participation in existing truck parking web applications—could speed implementation.

1. BACKGROUND, PURPOSE AND GOALS

1.1 NATIONAL TRUCK PARKING PROBLEM

Truck drivers need regular rest. However, it is more efficient for drivers to travel as far as possible between breaks, which can lead to safety problems. In order to ensure drivers get the breaks necessary to support safe operation of trucks, the Federal Motor Carrier Safety Administration (FMCSA) established Hours of Service (HOS) regulations. The national growth in trucking and the requirement for regular rest, has led to increased demand for truck parking but the public and private supply hasn't kept up at a national level.

In 2009, a young truck driver, Jason Rivenburg, was robbed and killed while resting in his truck in an undesignated parking lot. In 2012, "Jason's Law" was established to provide a "national priority on addressing the shortage of long-term parking for commercial motor vehicles on the National Highway System (NHS) to improve the safety of motorized and non-motorized users and for commercial motor vehicle operators."²

A national survey conducted in 2015 as part of Jason's law identified truck parking shortages during the evening and night time hours, particularly in high-freight locations such as urban and Ports and during weather events. It also found a lack of funding for truck parking projects and enforcement, among many other things.³ Jason's Law requires all states to conduct an inventory of existing truck parking, assess the volume of commercial motor vehicles in the state, and measure the adequacy of commercial motor vehicle parking facilities in the state. The Oregon Commercial Truck Parking Study (OCTPS) explores truck parking issues within six key freight corridors in Oregon and aims to address commercial parking needs along these corridors with innovative and cost-effective strategies.

² United States Public Law 112-141 Section 1401.

³ ops.fhwa.dot.gov/freight/infrastructure/truck_parking/jasons_law/truckparkingsurvey

Hours of Service Rules

As of 2012 these rules were made more stringent and included the following requirements:

- **11-Hour Driving Limit:** May drive a maximum of 11 hours after 10 consecutive hours off duty.
- **14-Hour Limit:** May not drive beyond the 14th consecutive hour after coming on duty, following 10 consecutive hours off duty. Off-duty time does not extend the 14-hour period.
- **Rest Breaks:** May drive only if 8 hours or less have passed since end of driver's last off-duty or sleeper berth period of at least 30 minutes. Does not apply to drivers using either of the short-haul exceptions.
- **60/70-Hour Limit:** May not drive after 60/70 hours on duty in 7/8 consecutive days. A driver may restart a 7/8 consecutive day period after taking 34 or more consecutive hours off duty.

In May 2020, FMCSA announced its intention to publish a final rule on hours of service that makes four key revisions to the existing HOS rules. These changes were published in the Federal Register on June 1 and will become effective on September 29, 2020 (<https://www.federalregister.gov/documents/2020/06/01/2020-11469/hours-of-service-of-drivers>):

- The 30-minute break rule, which requires a break after no more than eight hours of consecutive driving, can now be satisfied by the on duty/not driving status, rather than off duty status. That means a driver's "break" could be satisfied by stopping to fuel the truck, for instance.
- The sleeper berth rules will now allow drivers to split their required 10 hours off duty into two periods.
- The new rule changes the adverse driving conditions exception by extending by two hours the maximum window during which driving is permitted. The new rule allows the workday to be extended to as much as 16 hours in the case of adverse conditions such as extreme weather or congestion.
- The agency will change the short-haul exception available to certain commercial drivers by lengthening the drivers' maximum on-duty period from 12 to 14 hours and extending the distance limit within which the driver may operate from 100 to 150 air miles.

1.2 PRIOR STUDIES IN OREGON

In 2018 ODOT and FHWA published a research study titled *Truck Parking: An Emerging Safety Hazard to Highway Users*.⁴ It included an extensive literature review and completed a survey of agencies in several states. The study also used a stated-preference survey to understand the factors causing truck drivers to park on ramps, shoulders, interchanges, and other facilities. Through statistical modeling, the study found the following factors were important - driver characteristics (particularly years of experience), trip characteristics, parking difficulty, real-time information availability, and parking features. It also completed a safety assessment and estimated future truck parking demand on US-97. It called for a more detailed state-wide supply and demand analysis.

⁴ Hernandez and Anderson

1.3 STUDY PURPOSE AND GOALS

The OCTPS aimed to achieve three broad goals over the course of the study:

- Assess and address commercial truck parking needs for required rest periods in Oregon to increase safety with practical, innovative and cost-effective strategies that include effective technologies.
- Enhance the economic competitiveness of the state’s major freight routes and improve safety.
- Develop the information necessary to support decisions regarding future approaches to truck parking issues in Oregon including determination of the State’s role in the provision of truck parking.

More specifically, the study scope elements included the following objectives intended to deliver study goals:

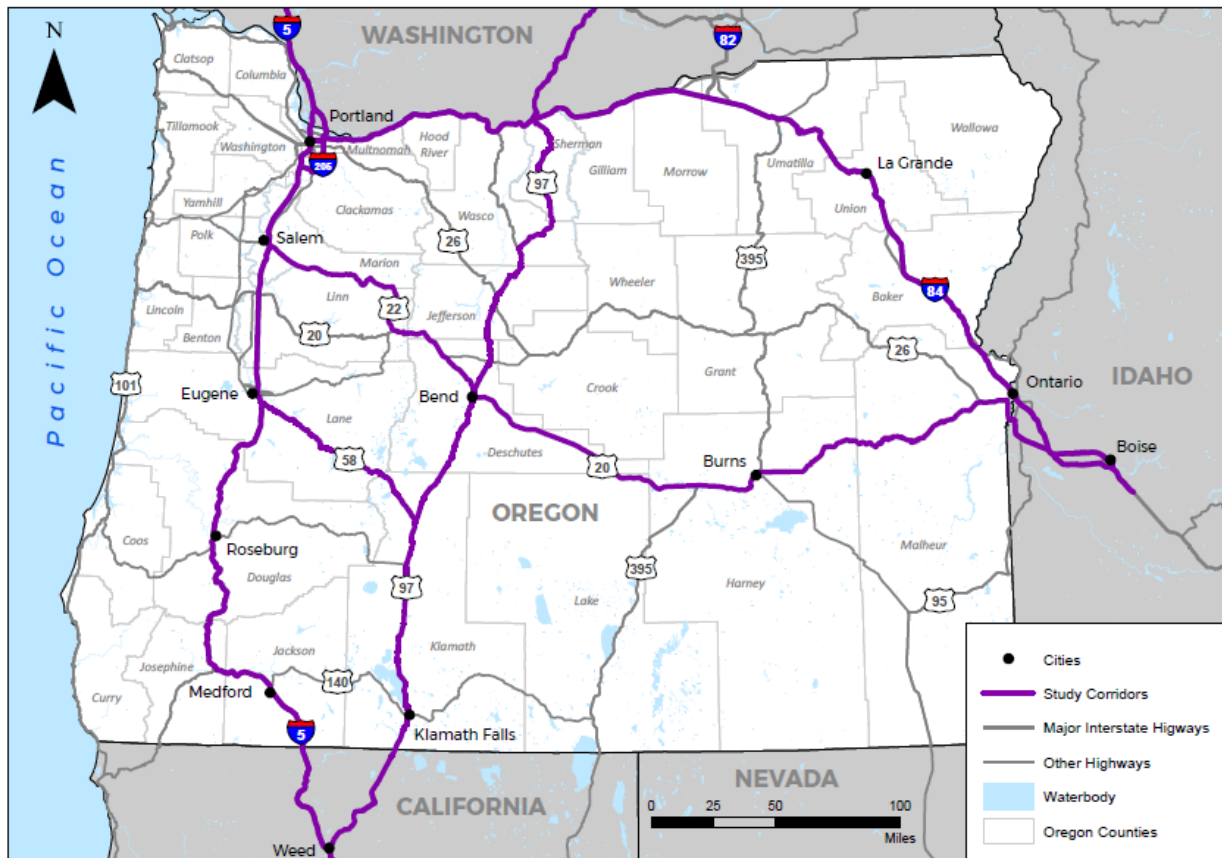
- Measure current truck parking capacity and demand on the Study corridors, including legal and undesignated sites, and identify the gaps in truck parking locations today.
- Gather opinions of truck drivers, company officials of motor carriers, shippers, state agencies and private truck stop operators on parking location decisions, shortages and other issues.
- Estimate future capacity and demand for truck parking and identify priority locations or gaps where truck parking will be an issue (e.g. rest stops, private truck stops, exit ramps, shoulders and local streets).
- Identify types of cost-effective solutions and potential federal programs to improve truck parking facilities and services including, but not limited to, support to private development and public-private-partnerships, effective technology, signage, and/or provision of additional parking locations.

1.4 STUDY CORRIDORS

As Jason’s Law requires an inventory of all truck parking in each state, the study corridors must include substantially all major freeways (interstate as well as state highways) in Oregon that are served by public rest areas and/or private truck stops. As the need for long-term truck parking is primarily associated with significant volumes of long-haul trucks, the first criterion for the selection of OCTPS corridors was a designation as an Oregon Highway Plan (OHP) freight route. OHP freight routes are the highways in the state with annual truck tonnages that are moderate to high and provide connectivity to significant freight generating areas of Oregon. Therefore, the first scan of the OHP freight routes looked at the corridors that are over hundred miles long with over 500 trucks per day. Four study corridors were drafted using the above criteria Interstate 5 (I-5), Interstate 84 (I-84), US Route 20/Oregon Route 22 (US20/OR22) from Salem

to the Idaho border, and US Route 97 (US97). A review of other freight routes that may carry significant volumes of long-haul freight yielded two further study corridors - Interstate 205 (I-205) and Oregon Route 58 (OR58). The study area for each corridor extends 50 miles into adjacent states (Washington, Idaho, and California). Figure 1 shows the location of these freight-important corridors within Oregon.

Figure 1: OCTPS Study Corridors



1.5 REPORT ORGANIZATION

The rest of this report is organized as follows:

- Chapter 2 – Stakeholder and Public Engagement: This chapter provides a description of the study team and summarizes the results of outreach and stakeholder engagement efforts undertaken as part of the study.
 - The OCTPS Feedback Summary document (Appendix B) provides more details on the results of the outreach efforts described in this chapter.
- Chapter 3 – Best Practices Review: This chapter expands on the existing literature around truck parking through a review of federal, state, and local truck parking plans. A description of the OCTPS study methodology is also included in this chapter.

- The Literature Review Technical Memorandum (Appendix C) provides more details on the best practices summarized in this chapter.
- The Methodology and Data Assessment Technical Memorandum (Appendix D) provides more details on the analysis methodology for estimation of current and future truck parking demand along study corridors.
- Chapter 4 – Truck Parking Inventory: This chapter describes the methodology used to build an inventory of designated truck parking locations in the study corridor.
 - The Truck Parking Inventory Technical Memorandum (Appendix E) provides more details on the parking inventory summarized in this chapter.
- Chapter 5 – Current Demand Analysis: This chapter summarizes the methodology and results of the supply and demand analysis.
 - The Current Demand Analysis Technical Memorandum (Appendix F) provides more details on the analysis summarized in this chapter.
- Chapter 6 – Future Parking Demand: This chapter summarizes the methodology and results of the future supply and demand analysis that estimated truck parking demand in 2040.
 - The Future Demand Analysis Technical Memorandum (Appendix G) provides more details on the analysis summarized in this chapter.
- Chapter 7 – Strategy and Recommendations: This chapter summarizes the truck parking needs that were identified in previous memoranda, outlines the State’s truck parking goals, and identifies and prioritizes solutions that would help achieve these goals. Top solutions and recommended actions by segment for each study corridor are also provided in this section. Finally, a discussion of public-private partnership strategies and potential state and federal sources of truck parking funding is included.
 - The Strategy and Recommendations Technical Memorandum (Appendix H) provides more details on the study materials described in this chapter.
- Chapter 8 – Next Steps: This chapter briefly describes potential next steps to identify action needed to implement the recommendations from this study.

2. STAKEHOLDER AND PUBLIC ENGAGEMENT

The primary purpose of the public engagement study was to understand public perceptions about the availability and quality of commercial truck parking at public and private locations in Oregon. The study sought feedback particularly from truck drivers on truck parking issues within key freight corridors of the State, including I-5, I-205, I-84, US97, OR 22, US 20/26, and OR 58. The study included questions about capacity, safety and convenience and sought to determine where additional truck parking may be needed. The data collected was intended to help decision makers prioritize future initiatives related to truck parking.

2.1 STUDY ORGANIZATION

2.1.1 Project Management and Study Team

The study team included staff from ODOT's Freight Planning and Transportation Planning and Analysis units, the Motor Carrier Division, Maintenance Districts and consultants. WSP was the prime consultant and was supported by Jeanne Lawson and Associates, Freight Insights, and the American Transportation Research Institute (ATRI). The agency and study project managers met twice monthly throughout the study to review study progress. Members of the larger study team convened as needed to provide input and direction on key deliverables.

2.1.2 Technical Advisory Committee (TAC)

TAC Purpose and Role

A TAC was formed to provide industry insight on study issues. The TAC included representatives from public agencies and business and industry associations involved in the delivery of goods, truck parking and public safety. Appendix A lists the full membership. The TAC met three times at various points in the study and provided feedback on study methodology, results and recommendations.

TAC Meetings

At the first TAC meeting, held in April 2019, the study team presented results from the Literature Review Technical Memorandum (Appendix C), the Data Assessment and Methodology Technical Memorandum (Appendix D), and the Truck Parking Inventory Technical Memorandum (Appendix E). TAC members reviewed the inventory of rest areas and truck stops throughout the state in detail and identified potential additional designated truck parking facilities, including Ports of Entry. Some TAC members highlighted the unreliability of crowd sourced parking information as it relies on estimates from truck drivers selecting among a few categories of occupancy. TAC members also discussed the various factors in selecting truck parking locations, including the importance of specific amenities. Several members noted the difficulty of siting additional truck parking locations in urban areas where they are needed the most

At the second TAC meeting, held in November 2019, the study team presented results from the Survey Feedback Summary, the Current Demand Analysis and the Future Demand Analysis. TAC members discussed the relative importance of different factors truck drivers use in deciding where to park, including both designated and undesignated truck parking locations. They further discussed design of rest areas and various approaches to, and benefits of, real-time parking information to drivers. The group also floated ideas around potential solutions, including regulating undesignated parking, provision of low-development truck parking as well as working with shippers and distributors to provide truck parking.

At the third TAC meeting, held virtually in April 2020, the study team presented results from the Strategy and Recommendations Technical Memorandum. TAC members provided feedback on the detailed segment needs and prioritized solutions. The group discussed the potential benefits of a parking reservation system and public private partnerships.

2.1.3 Oregon Freight Advisory Committee (OFAC)

Members of the project team briefed OFAC at two points during the study. During the first meeting, in April 2019, OFAC reviewed and provided input on the study scope and goals, the literature review, draft methodology, the draft inventory and proposed next steps. OFAC members offered to help with the distribution of the survey and discussed the difficulty of siting truck parking in urban areas, where it is allowed by land use laws. The second meeting, held in January 2020, covered the survey and interview results and current and future truck parking demand. OFAC members provided input on potential solutions and discussed the potential for truck parking at large warehouses, among other strategies. It is expected that OFAC will be presented the final study in July of 2020 along with an implementation plan.

2.1.4 Website

ODOT hosted a webpage for the study which provided an overview of the study, timeline and included all project deliverables. It also included TAC meeting agendas and a link to the survey while it was open.

2.2 OUTREACH METHODOLOGY

In addition to the TAC, OFAC and website, study outreach relied on three key tools:

- **Survey:** The online survey tool was intended to gather opinions from travelers who use truck parking within Oregon. The survey was intended to help supplement the in-person outreach by increasing the geographic breadth of potential participation and make the survey available over a longer time period. The survey questions were formatted to complement the in-person interview questions.
- **Interviews:** The team conducted 26 in-person and phone interviews with key stakeholders familiar with commercial truck parking in Oregon and/or nationally. The interviews provided an opportunity to gather feedback, educate industry leaders about the study process, and

further disseminate survey materials through internal networks to drivers and other relevant contacts.

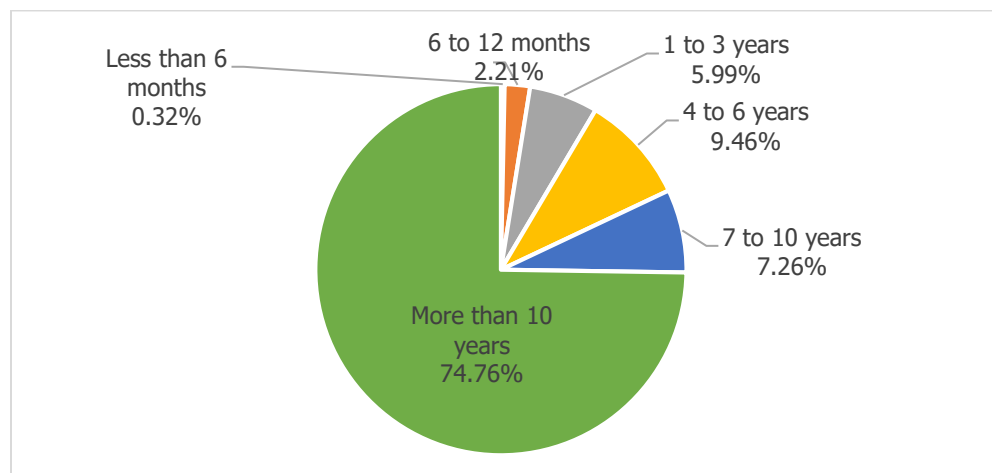
- **Tabling/In-Person Surveys:** Previous outreach has noted the difficulty of collecting freight industry feedback. In accordance with studies recommending best practices for reaching truck drivers, the team conducted in-person surveys at the following locations:
 - Jubitz Travel Center (Portland, I-5)
 - Pilot Travel Center and Grand Central Travel Center (Biggs Junction, I-84)
 - Truck 'N' Travel (Coburg, I-5)
 - 2019 Oregon Truck Driver Championships (Portland)

The design of the survey tool followed a literature review of similar studies and stakeholder surveys. The survey included questions about how, why and when truck drivers choose their parking locations, where they are going, and what amenities they prefer when parking. The survey instrument was also designed to allow respondents to provide corridor-based geographic data that would offer insights into specific problematic corridor segments throughout the state.

In total, the survey received 729 responses, including 662 online submissions and 67 in-person surveys. Longer, in-person and phone interviews were conducted with 26 respondents. The majority of survey respondents (80%) self-identified as truck drivers. The second most common choice was "Dispatcher" (11%). Of interview participants, only about 22% identified as truck drivers, with the other two highest categories being "Truck stop operator/employee" (25%) and "Other" (35%), which primarily included transportation management and planning personnel. Several associations were also interviewed.

Respondents were experienced, with the vast majority having driven a truck for more than 10 years as shown in Figure 2.

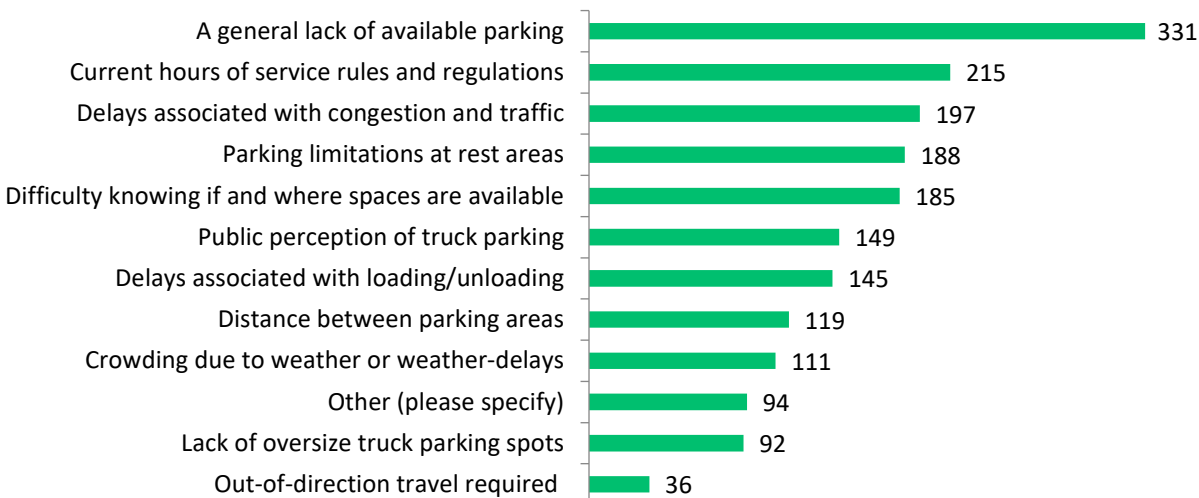
Figure 2: How long have you been driving a truck?



2.3 SURVEY - KEY FINDINGS

Survey respondents were asked to comment on aspects of the state of truck parking in Oregon. They indicated that the main problem with truck parking in Oregon respondents is the lack of availability. This is followed by hours of service rules and travel delays as shown in Figure 3.

Figure 3: What do you think are the main problems and issues with truck parking in Oregon?



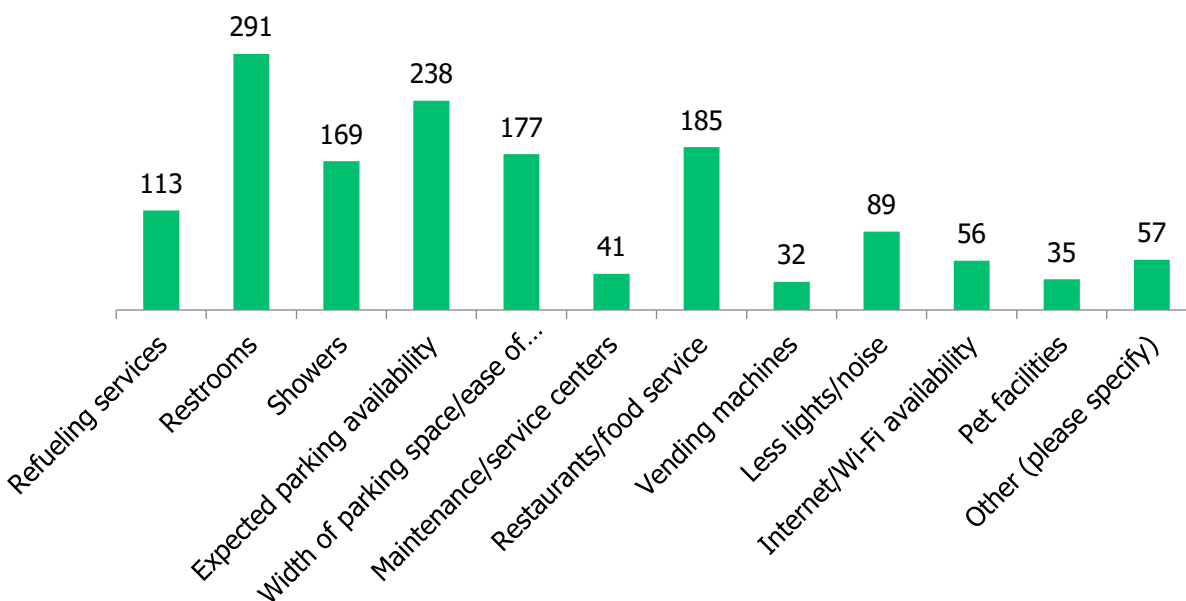
Key themes included:

- **General availability of truck parking in Oregon** - Most respondents identified the general availability of truck parking in Oregon as "Poor" (39.7%) or "Very Poor" (19.1%). Less than 14% of respondents held a positive view regarding parking availability.
 - Lack of available parking for trucks was rated a significant issue in Oregon. The deficiency was particularly pronounced near urban areas, but problematic throughout the state.
 - Rules and regulations surrounding hours of service were a significant issue related to truck parking. Many respondents also viewed delays, both with traffic and loading/unloading, that impact their schedule as an issue.
 - Parking limitations at rest areas, and the difficulty associated with knowing if and where spots are available were also popular problems identified by survey takers.
 - Local regulations and public perception were also identified as issues affecting parking and the ability to create new parking areas.
- **Causes of demand for truck parking** - 60% of respondents said that the number one reason they stop driving is because they are required to do so by hours of service rules. 75% of respondents identified this as one of their top three reasons for stopping. "Personal

safety or cargo safety” was identified by just under half of respondents as one of their top three reasons for stopping. “Cost/rates” was one of the least common reasons for stopping.

- **Locating truck parking spaces in Oregon** - The survey also sought to determine how respondents typically find parking. Most respondents (65%) said that they have “favorite locations” that they visit frequently. Almost 40% said that they use smartphone apps such as “Park my Truck” or “Truckers Path” to find parking. Only a small portion of respondents indicated that they use printed material or that their companies provide parking options.
- **Choice of truck parking stops and rest areas** - When choosing truck stops based on amenities, respondents cited restrooms (80%) and expected parking availability (66%) as the top criteria. Food, ease of vehicle access, and showers were also important factors. Internet/Wi-Fi availability, maintenance centers, facilities for pets, and vending machines were the least common answers. See Figure 4 for full results on this question. Interviewees generally agreed, although they added refueling options as a significant consideration. They also emphasized proximity to the delivery location as a main factor in choosing stop locations.

Figure 4: What amenities do you look for when stopping to rest?



- **Respondent behavior to truck parking issues and availability** - Interviewees said that drivers tend to respond to parking problems by parking on highway ramps or in other undesignated areas. This is often due to HOS rules which either require drivers to plan ahead and often stop short of their hours (impacting utilization) or find themselves having to pull over in unplanned locations for mandatory breaks. Several interviewees believed that some truck drivers may not mind parking in undesignated parking, particularly in rural areas, as they tend to be pretty self-sufficient.

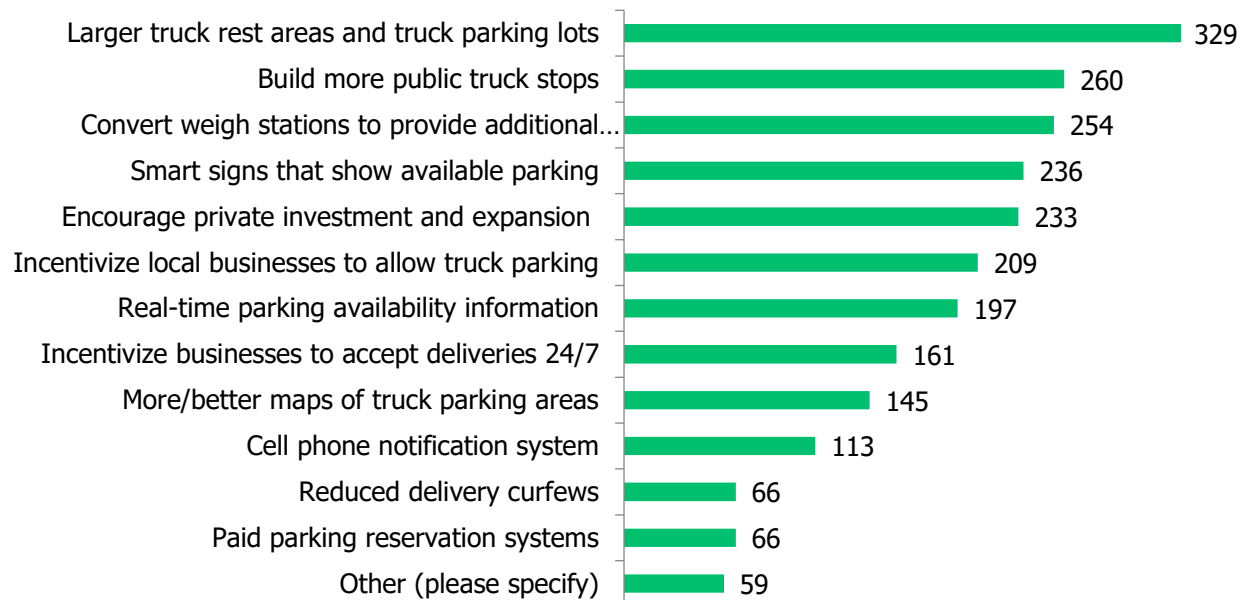
Survey takers were presented with a series of possible solutions for alleviating truck parking issues and asked to identify all that they thought would be helpful:

- The most popular option among survey takers was creating larger truck rest areas and parking lots. All of the methods that involved the creation or expansion of parking space were popular selections among respondents.
- Options such as “paid parking reservation systems”, “cell phone notification system”, and “reduced delivery curfews” were among the least popular of the proposed strategies. Interviewees also favored the expansion of parking areas but were more amenable to paid reservation systems.
- Interviewees also doubted the efficacy of reduced delivery curfews, incentivizing businesses to accept delivery 24/7, and cell phone notifications as methods to relieve parking problems.
- Interviewees tended to offer specific recommendations for incentivizing new parking areas, such as regulatory changes to allow truck parking in more areas and tax breaks for truck stop owners.

Further, survey respondents were asked specific questions on each study corridor segment. Primary inquiries were in relation to:

- Reasons for truck parking demand within the segment
- Main truck parking issues within the segment
- Amount of time spent looking for parking within the segment
- Time-of-day when parking availability is lowest

The Feedback Summary Technical Memorandum details statistical responses to each of the segment-specific questions for all study corridor segments, as well as for system-level survey questions. It also asks about potential solutions. As shown in Figure 5, larger truck rest areas and truck stops both public and private were the most popular solution followed by smart signs that show available parking.

Figure 5: Which of the following strategies make sense to you?

2.4 STAKEHOLDER INTERVIEWS - KEY FINDINGS

The study team also conducted 26 in-person and phone interviews with key stakeholders familiar with commercial truck parking in Oregon and/or nationally. Interview participants included representatives from truck and rest stop operators, ODOT district maintenance staff, State police, freight carriers, industry associations and federal safety regulators, among others. Appendix B, "Feedback Summary" includes the full list of interviewees.

These interviews covered similar questions as the survey. Key findings included the following:

- Interviewees tended to be unsure or feel negatively about the general availability of truck parking. Only approximately 25% of the respondents rated parking availability as "neutral" or better.
- In addition to current HOS rules and regulations, this general lack of availability was perceived as the most common issue with truck parking in Oregon.
- Urban areas and particularly the Portland metro area have the most significant parking problems. Trucks must stop outside these areas to rest and stage before deliveries/pickups. City ordinances and business prohibitions against truck parking in the city near delivery locations keep trucks from using convenient space.
- Drivers tend to park in undesignated or unsafe locations when they can't find parking.
- There are not enough useful parking tools such as online reservation systems or websites with availability information. However, it was also indicated that some drivers do not want to pay for reservations.

- Interviewees also felt that there are not enough incentives to create new parking and there are often cost prohibitive challenges associated. Tax breaks could help counter the cost of improvements, land, design, permitting, maintenance, and zoning restrictions.

3. BEST PRACTICES REVIEW

3.1 LITERATURE REVIEW– FEDERAL, STATE, AND LOCAL TRUCK PARKING PLANS

The Literature Review Technical Memorandum focused on methods and approaches of previous truck parking studies, as well as on their findings and conclusions. Eleven regional, statewide and local truck parking studies from around the country were summarized, noting the results of outreach efforts (if applicable) and how truck parking needs were evaluated. These studies included truck parking plans from Arizona, Virginia, Washington, North Carolina, Atlanta, Wisconsin and others. Emphasis was placed on more recent and comprehensive studies. A review of the Mid America Association of State Highway Officials (MAASTO) Regional Truck Parking Information Management System (TPIMS) was also provided in the memorandum.

Several federal studies were also reviewed, including the guidance coming from the National Coalition on Truck Parking. Finally, sixteen recent research studies were reviewed (mostly from the past 5 years) to better understand the cutting edge of truck parking demand modeling, needs evaluation, and technological solutions.

The purpose of the literature review was to inform the OCTPS about what the studies covered, how they presented the information and what were the recommendations. Lessons learned from peer state truck parking plans and the other plans reviewed were organized according to the relevant tasks in the study and are briefly summarized below.

3.1.1 Truck Parking Inventory

Key lessons learned for the truck parking inventory task included the following:

- Previous studies used a wide range of information to identify the locations and amenities of designated and undesignated truck parking facilities, including:
 - Designated: Jason’s Law Inventory, State DOT Maintenance District staff, Trucker Path, Trucker’s Friend, National Truck Stop Directory, Park my Truck, driver interviews and surveys, Google Earth, etc.
 - Undesignated: State DOT Maintenance District Staff, ATRI’s truck GPS records (manual or automated cluster analysis), law enforcement officers, parking citations, driver interviews and surveys, Google Earth, etc.
- Undesignated roadside locations include shoulders, ramps, access roads to rest areas, weigh stations, and mountain chain-up areas.
- Many commercial establishments permit overnight truck parking on their private parking lots (e.g. Wal-Mart, Home Depot, vacant lots)

- The most important amenities for truck drivers to be considered in the inventory were proximity to route, showers/restroom, parking spaces, refueling services, width of parking spaces/ease of access, restaurant, internet, laundry, and service centers.

Figure 6: Undesignated Parking Near a Truck Parking Stop



3.1.2 Current and Future Parking Demand

Key takeaways for the current and future truck parking demand tasks included the following:

- Many studies used the FHWA model published in 2002 to estimate truck parking demand. These formulas describe the hours of truck parking demanded along a corridor as a function of truck volumes and other factors. The main limitation of this approach is the reliance on previously estimated parameters that are typically not validated with local data. In addition, the HOS regulations have changed since 2002; for example, the standard work shift lengthened from ten to eleven hours.
- Another approach, which has been implemented in Arizona, uses data from a crowd-sourced truck parking application to describe truck parking demand. These apps only offer a few categories of level of occupancy. While it could be helpful to identify those parking facilities that are full more often – it is not precise. Another significant limitation of this approach is that data from truck parking applications does not adequately capture parking at undesignated locations. This represents a significant blind-spot, particularly in high volume corridors where parking lots are often full.
- Some states used video evidence to calculate GPS parking demand expansion factors. This approach has the advantage of considering truck parking in both designated and undesignated locations, for any reason. It also has the ability to provide great detail on parking patterns, throughout the day and throughout the year, in addition to describing

parking along specific corridors or regions. The main disadvantage with this approach is that it only considers trucks instrumented with GPS recorders, which is estimated at approximately 80% of all class 7/8 trucks on the road.

- Truck volume forecasts should be ascertained from the Oregon Statewide Integrated Model (SWIM) while current truck volumes are better obtained from traffic counts. Transearch routed data should be used to estimate proportion of short haul vs. long haul truck volumes.

These approaches are further detailed in Table 1 of the Methodology and Data Assessment Technical Memorandum. The methodology that was selected for this study is discussed in Section 3.2 below.

3.2 STUDY METHODOLOGY

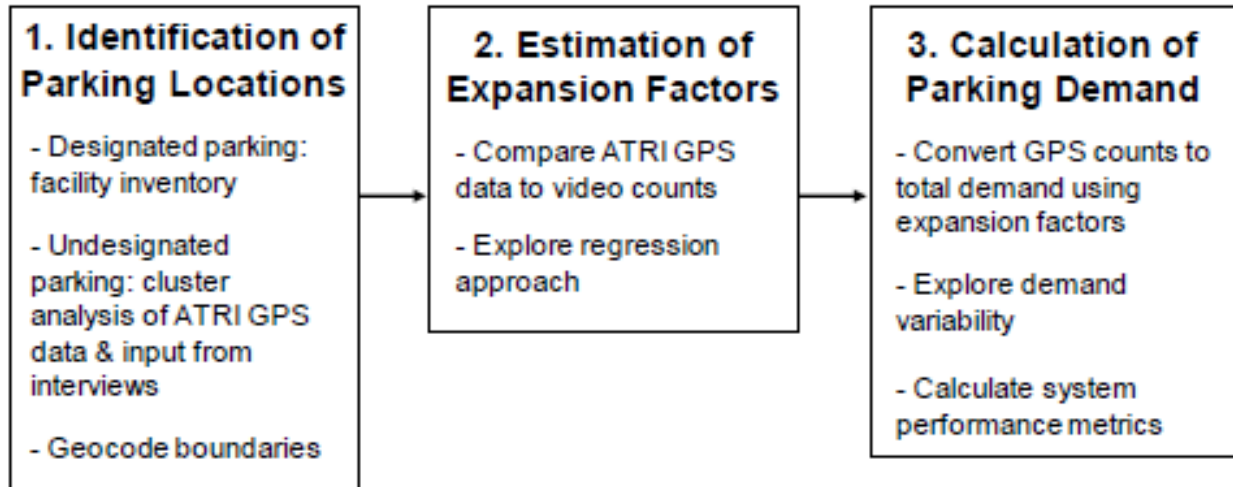
The Methodology and Data Assessment Technical Memorandum (Appendix D) built upon the findings of the Literature Review Technical Memorandum (Appendix C) and detailed the analysis methodology for estimation of current and future truck parking demand along study corridors. This estimate was then compared against existing truck parking capacity to identify shortfalls and inform proposed investments that would improve truck operations in the state.

The study approach proposed in the Methodology and Data Assessment Technical Memorandum is outlined below (Figure 7).

- First, the locations where trucks are parking were identified and geocoded in GIS. Designated parking locations were obtained from the truck parking inventory task completed as part of the study. Geocoding the off-ramps and on-ramps to these facilities were also completed as trucks tend to park at these locations when lots are full.
- For undesignated parking, ATRI's truck GPS data was analyzed to identify clusters of parking along the project corridors that appear to represent undesignated truck parking. These locations were geocoded as well. A set of ATRI's truck GPS data covered 16 weeks in the past year (4 weeks per quarter) for all trucks traveling less than 25 mph in Oregon (within a 10-mile buffer of the state's boundary). An algorithm was developed to process this data to identify stopped trucks.
- The next step involved the estimation of expansion factors, by comparing the ATRI's truck GPS data to video evidence at certain parking facilities. Six rest stops were recorded for 24 hours and four rest stops were recorded for 48 hours. These videos were processed, noting how parking utilization fluctuated throughout the day. A regression approach was utilized for calculating the expansion factors. This regression approach was chosen as it was deemed to generate better results than the simple comparison of averages used in previous studies.

- Finally, total parking demand along the corridors was calculated by counting the GPS records in the designated and undesignated parking locations, using the expansion factors to estimate how many trucks were represented in real-life.

Figure 7: Overview of Approach to Truck Parking Demand Estimation



A variety of system metrics were also proposed based on this demand analysis:

- **Supply Metrics**
 - Average supply of parking spaces per centerline mile of highway
 - Average supply of parking spaces per type, and amenities offered
- **Demand Metrics**
 - Average peak period parking demand per centerline mile of highway
 - Average peak period parking demand per parking type, per major amenities available
 - Average peak period parking demand for peak day of the week per centerline mile of highway
 - 95th percentile peak period parking demand
 - Proportion of facilities with 100% utilization
 - Average demand for undesignated parking per centerline mile of highway (to identify unmet needs)
 - Average time spent parking per time spent driving
- **System Performance Metrics**
 - Average shortfall of peak parking demand per centerline mile of highway, in 2019
 - Average shortfall of peak parking demand per centerline mile of highway, in 2040
 - Average shortfall of peak parking demand per roadway segment, in 2019
 - Average shortfall of peak parking demand per roadway segment, in 2040
 - Average time spent looking for overnight parking per roadway segment

4. TRUCK PARKING INVENTORY

As mentioned earlier, MAP-21 Section 1401 (Jason’s Law) requires an inventory of existing truck parking for each state, assessment of the volume of commercial trucks in each state, and a measurement of the adequacy of commercial truck parking facilities in each state. The Truck Parking Inventory Technical Memorandum (Appendix E) provided an inventory of designated truck parking locations in the study corridors, including rest areas, truck stops and Ports of Entry (POE). The POE that have designated truck parking spaces that can be used for complying with hours-of-service regulations.

4.1 METHODOLOGY

The methodology for developing a statewide inventory of the three types of designated truck parking locations (rest areas, private truck stops, and Ports of Entry) is detailed in this subsection.

4.1.1 Rest Areas

Information on ODOT-owned rest areas was gathered from the ODOT/Travel Information Council (OTIC) Management, ODOT Maintenance Districts and Improvement of Roadside Rest Areas Agreement No. 32,946 Exhibit D. This information was supplemented by a desktop survey using current aerial maps and confirmed by the Rest Area Program and Contracts Manager at OTIC on March 19, 2019. An attempt was made to include unstriped and/or unofficial truck parking spaces at the facilities, although these are denoted separately within the inventory. Counts for all unstriped/unofficial truck parking spaces at rest areas were provided by ODOT. If there were distinct rest areas depending on the direction of travel, then the facilities were counted separately (e.g., if there is a northbound facility and a separate southbound facility directly across the highway, each facility is included separately in the inventory). There are 39 rest areas when counting rest areas in each direction of travel.

4.1.2 Truck Stops

A list of privately owned truck stops on major highways was provided by ODOT’s Motor Carrier Transportation Division (revised September 4, 2018). Truck stops within the study area from this list were included in the inventory. The project team consulted available online resources including third-party sources and truck stop websites (see Appendix E, “Truck Parking Inventory” (Table A-3) and aerial maps to gather the information on the 62 sites for the inventory.

The truck parking spaces reported on available online resources were not always consistent. Therefore, the following sequential methodology was used to determine the number of truck parking spaces at each privately owned truck stop.

- If a truck stop’s website indicates that there is designated truck parking, and that is consistent with the number reported by third-party sites, then it was assumed that the reported number is accurate. If a truck stop’s website is inconsistent with the third-party sites, striped parking spaces were counted on an aerial map. The number counted from the aerial map was used.
- If a truck stop’s website did not indicate that there is designated truck parking, but all third-party sites reported a consistent number of truck parking spaces, then it was assumed that the third-party sites are accurate.
- If all consulted sources provided inconsistent data, striped truck parking spaces were counted on an aerial map.
- If there was no data available online, striped truck parking spaces were counted on an aerial map.
- If there was a paved or unpaved area for parking use without striped parking spaces, estimates of truck parking spaces available based on third-party sites or from an aerial map were included in a separate column.
- Representatives of truck stop facilities were contacted where significant questions remained.

4.1.3 Ports of Entry (POE)

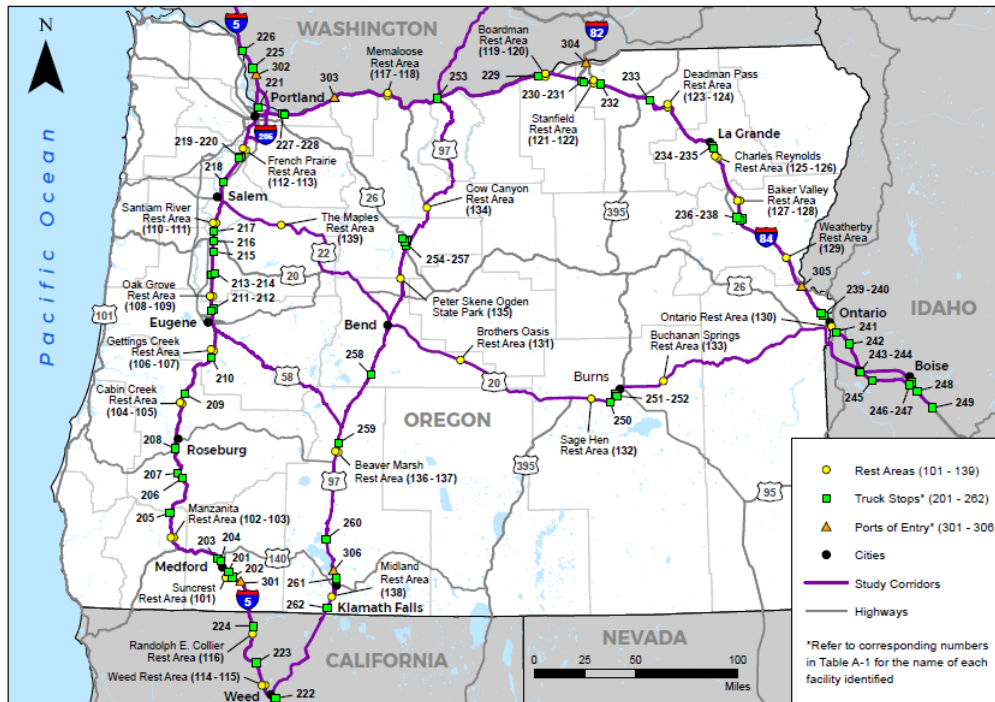
A list of POEs in or near the study corridors was provided by the ODOT Freight Planning unit. The Woodburn POE was not included in the inventory because it has no truck parking spaces. The POE at Ridgefield, WA was added to the inventory following input at the Technical Advisory Committee (TAC) Meeting on April 1, 2019. Information on amenities and services available to drivers were obtained by telephone calls to each POE. Most of the 5 POEs have two static scales, weigh-in-motion scales with automated vehicle identification systems, a truck inspection building and several parking spaces or areas for truck parking.

4.2 KEY FINDINGS

Figure 8 depicts the truck parking facilities (rest areas, truck stops and POE) within the study corridors. As shown in Figure 8, there are a total of 109 facilities consisting of 39 rest areas, 62 truck stops and 6 POE. Most of the truck parking facilities are located on I-5 and I-84. There are no truck parking locations on I-205 or OR58.

Most of the truck stops are located in the urban areas while the rest areas are located in the rural areas. This is primarily due the nature of Oregon land use laws that allow very little commercial development in rural areas. POE are typically located near state borders. Appendix E, “Truck Parking Inventory Technical Memorandum” provides detailed truck parking inventory.

Figure 8: Oregon Truck Parking Inventory Map

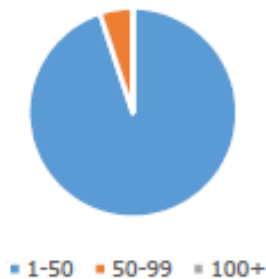


There are approximately 5,500 truck parking spaces at rest areas, truck stops, and ports of entry on the study corridors. Of these approximately 4,300 are striped and 1,100 are unstriped. There are 914 striped spaces at rest areas, about 4,400 at truck stops, and 154 at ports of entry.

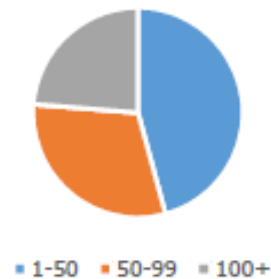
As shown in Figure 9, on average, the truck stops have a lot more truck parking than rest areas. Most of the rest areas have less than 50 truck parking spaces but 14 truck stops have over 100 truck parking spaces (including striped and unstriped/unofficial). Most facilities with unstriped/undesigned truck parking have less than 50 such spaces.

Figure 9: Breakdown of Number of Truck Parking Spaces by Rest Area and Private Truck Stop

Number of Truck Parking Spaces (Rest Areas)



Number of Truck Parking Spaces (Truck Stops)



Truck stops offer several more amenities or services than the other parking location types. They nearly all have fuel, restrooms, convenience markets, and cell phone service. Most have a restaurant, laundry facilities, and parking lot lighting. None of the rest areas provide fuel, showers, a convenience market, restaurant, laundry machines, repair facilities, idle-reduction, or truck wash. However, all (or nearly all) of the rest areas have basic amenities such as restrooms, drinking fountains, cell phone service, vending machines and parking lot lighting. Appendix E, "Truck Parking Inventory Technical Memorandum" also includes a complete inventory of amenities and services at each facility.

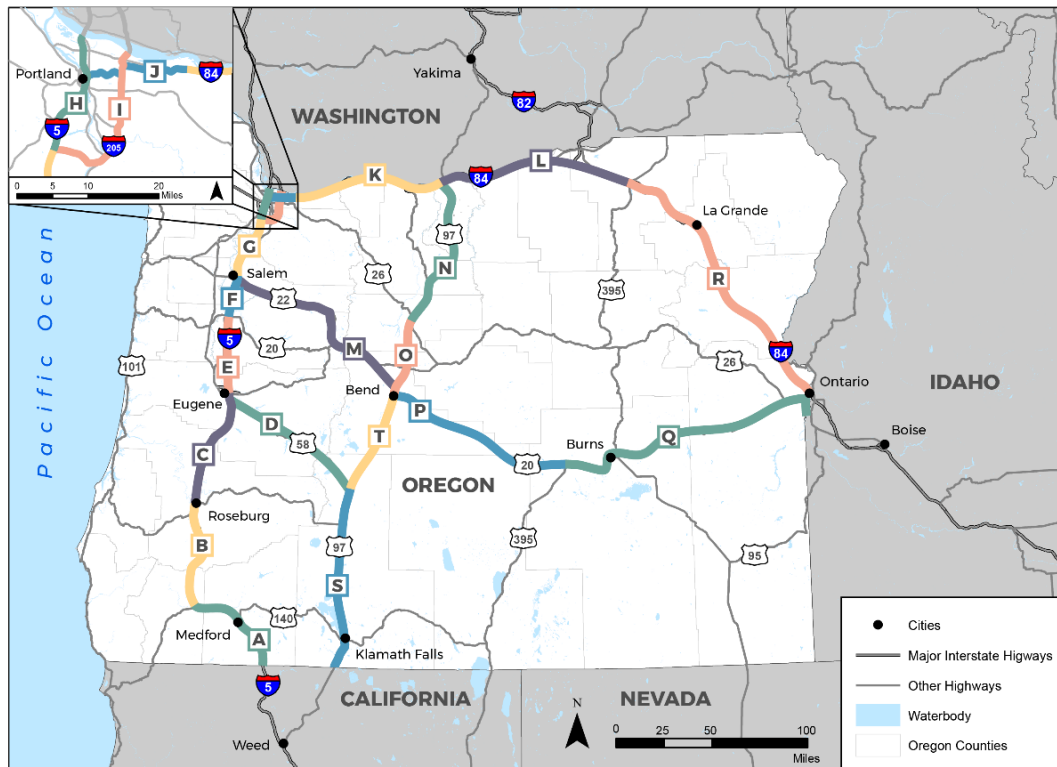
5. CURRENT DEMAND ANALYSIS

The Current Demand Analysis Technical Memorandum detailed the results of the demand analysis completed utilizing the approach described in the Methodology and Data Assessment Technical Memorandum. This approach relies on expanding the parking demand observed in truck GPS data using observations from video recordings and reports from a leading truck parking application. This is necessary given that the truck GPS data available to this study only covers a subset of trucks, and the representativeness of this subset might vary by corridor or type of parking facility. This allows for parking demand to be measured in all the rest areas and truck stops statewide and compared against existing capacity to identify corridors where shortfalls are likely.

5.1 METHODOLOGY

The methodology used to estimate truck parking demand is described in detail in the Methodology and Data Assessment Technical Memorandum. In brief, the five study corridors were divided into study segments (Figure 10) and locations where trucks are parking were identified and geocoded in GIS. Designated parking locations were obtained from the truck parking inventory technical memorandum.

Figure 10: Study Segments



For undesignated parking, ATRI's truck GPS data was analyzed to identify clusters of parking along the study corridors that appear to represent undesignated truck parking. These locations were geocoded as well. Next, expansion factors were estimated by comparing these truck GPS data to observations from video and a parking application at certain facilities. A regression model was used to estimate the set of expansion factors for the truck GPS data that best replicate observations.

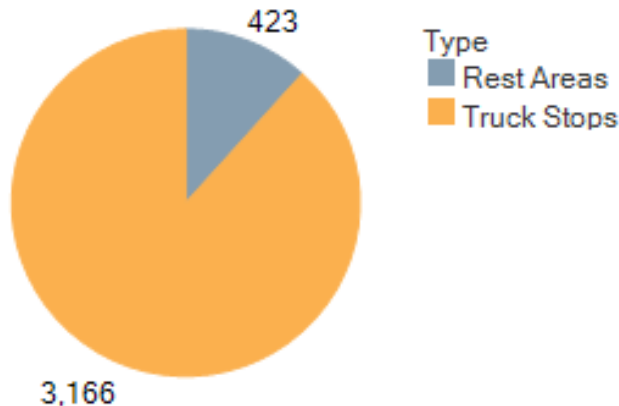
Total parking demand along the corridors was then calculated by counting the GPS records in the designated and undesignated parking locations, using the expansion factors to estimate how many trucks are represented in real-life. Variability in demand was described throughout the day, week, and year.

5.2 KEY FINDINGS

5.2.1 Designated Parking

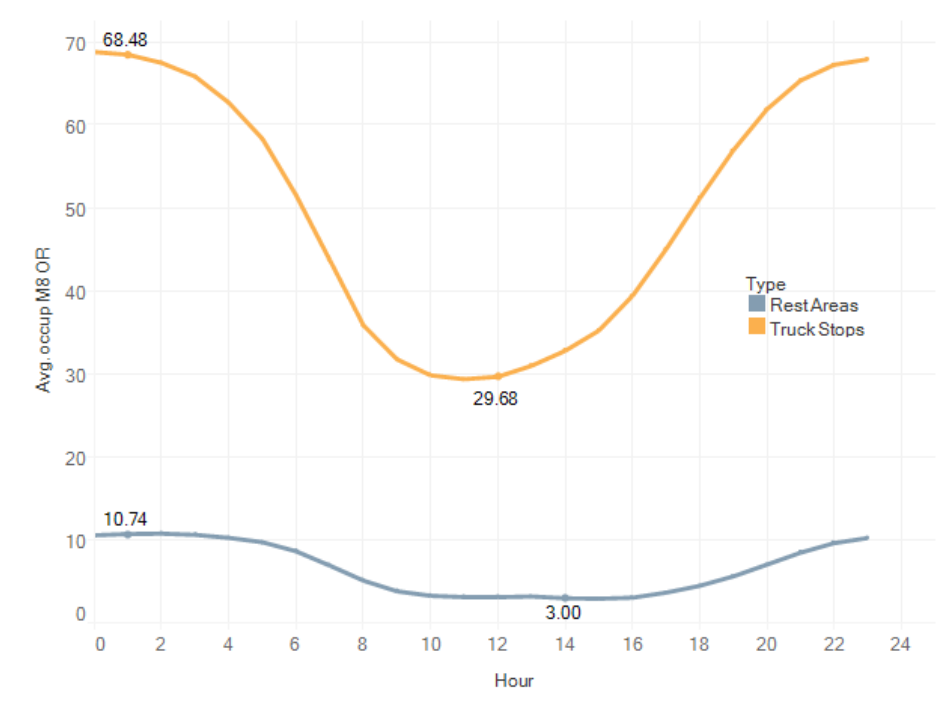
As shown in Figure 11, on an average weekday at midnight (roughly when demand peaks), there are 3,166 trucks parked at truck stops and 423 trucks parked in public rest areas, accommodating for 88 percent and 12 percent of parking demand, respectively.

Figure 11: Total Weekday Midnight Occupancy in Oregon



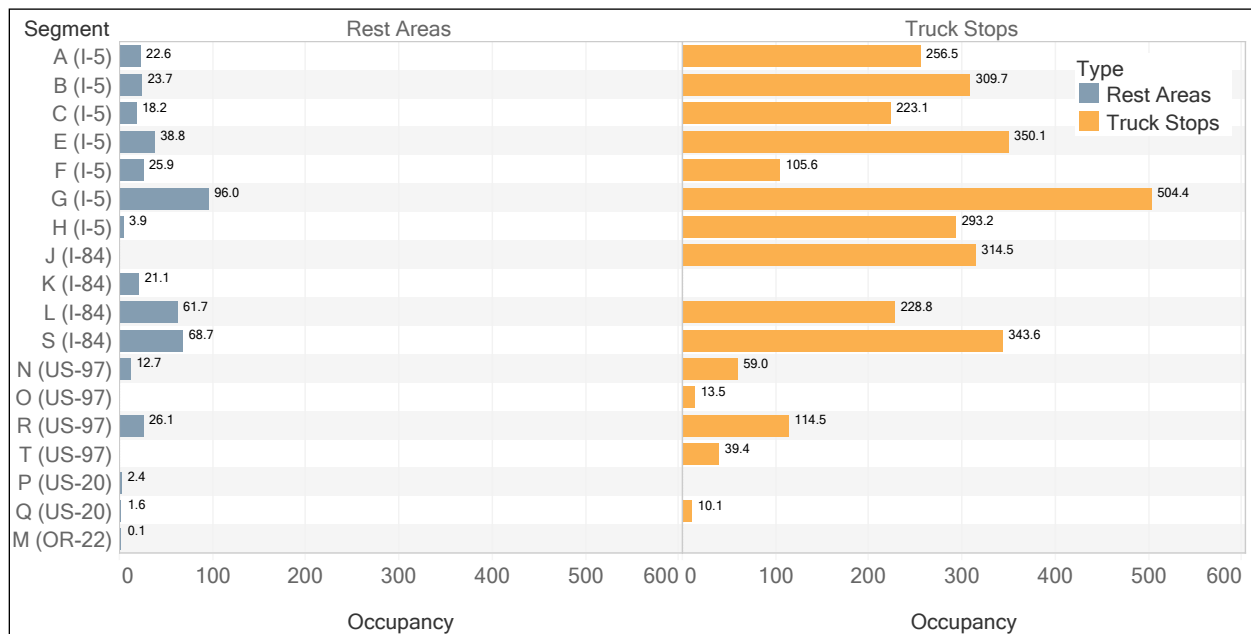
As expected, demand for truck parking peaks from 11pm to 1am (see Figure 12). Demand for the average truck stop reaches a maximum of 68 during this time, and decreases to 30 during the day time, from 11am to 12pm. The average rest area was found to have a maximum demand of 11 at midnight and decrease to 3 at 2 pm.

Figure 12: Average Occupancy per Facility throughout the Day



Demand for truck parking is concentrated unevenly throughout the state. Figure 13 breaks down the demand into 18 segments along the study corridors. Segments D and I were not included in the following discussion because no parking facilities were identified on these corridors.

Figure 13: Average Weekday Midnight Occupancy per Segment

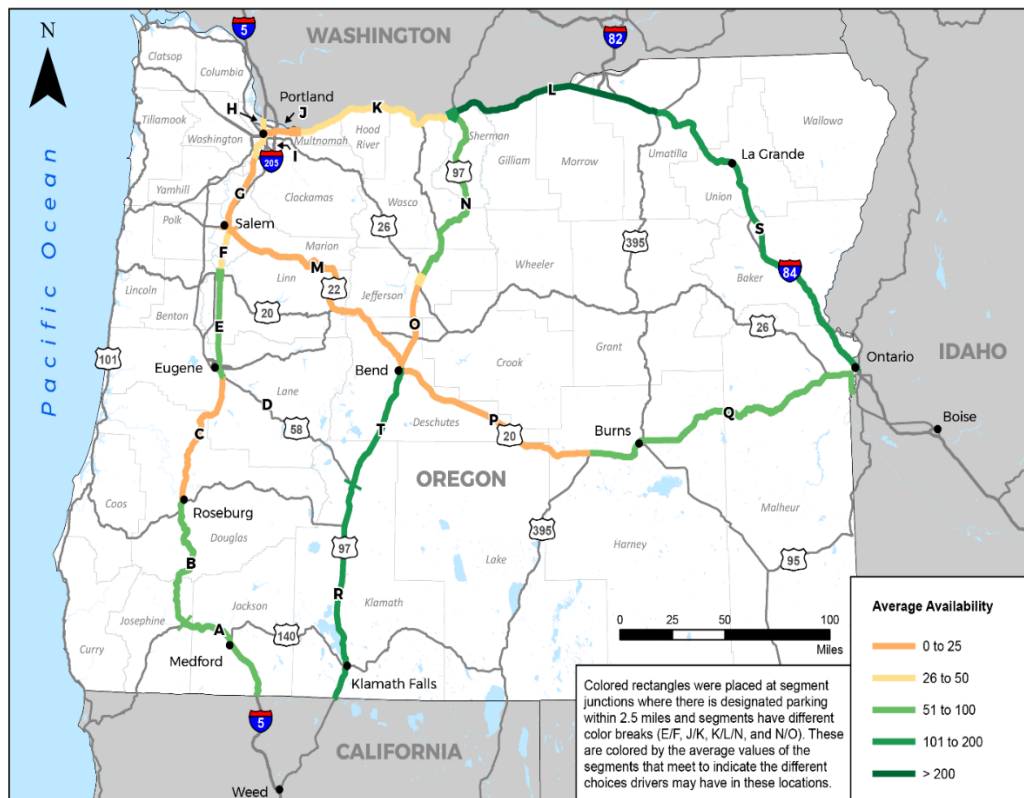


As expected, the segment with the highest average midnight demand is Segment G, which spans between Salem and Portland on I-5. Truck stops on this segment on average accommodate 504 trucks, and rest areas accommodate 96. On Segment G, demand can reach 140 in rest areas and 609 in truck stops.

The other segments rounding out the top 5 in terms of demand are: Segment E between Albany and Eugene on I-5; Segment S between the Idaho border and Pendleton in I-84; Segment B between Grants Pass and Roseburg on I-5; and Segment J from Portland to Troutdale on I-84. Some of these segments with high demand are on this list because they are much longer than others.

The demand for truck parking was then compared against the supply of spaces at rest areas and truck stops in the state. The supply of parking spaces was obtained from the truck parking inventory task conducted earlier in this study. The overage, which is defined as the average demand at midnight during a weekday minus the available supply, is then calculated. Negative overage implies the availability of spaces. The higher the overage, the higher the likelihood that available parking capacity is outstripped by demand. Figure 14 visualizes the demand overage or the segments analyzed. From this map it is clear that parking facilities I-5 have less available parking on average than elsewhere in the state.

Figure 14: Average Availability at Midnight (2019)

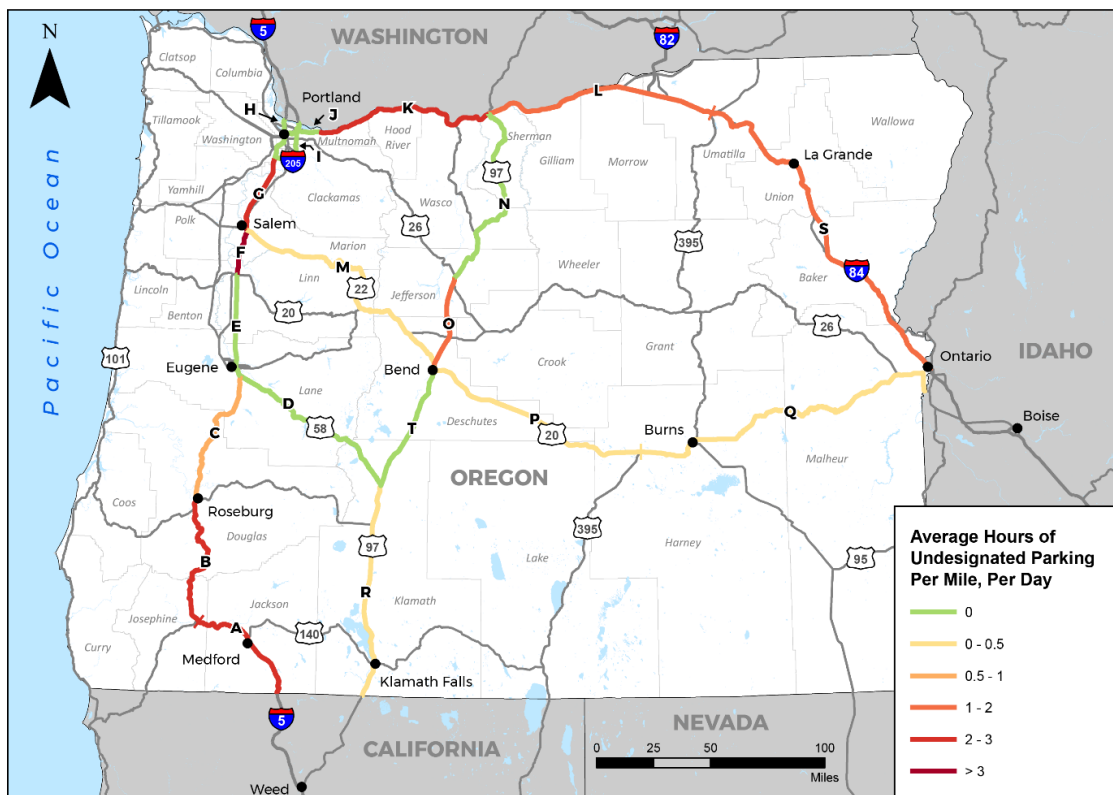


5.2.2 Undesignated Parking

Locations of undesignated truck parking were identified from feedback provided by ODOT, the survey responses of stakeholders, and a cluster analysis of truck GPS data. The study corridors were then manually reviewed to identify places with some truck parking activity in the truck GPS data. If a location was included in any of three sources of information, it was reported as a potential area for undesignated parking. A total of 108 areas were identified throughout the state along the study corridors. Truck parking related to commercial or industrial establishments was excluded to focus on locations where parking is truly undesignated.

The frequency and duration of truck parking at these locations was estimated using the processed truck GPS data. The GPS counts were expanded using the same factors used in the designated parking analysis. On an average weekday 733 trucks park at the undesignated areas identified, accumulating 1,435 hours of parking a day. Figure 15 shows the average hours of undesignated parking for each study segment during weekdays normalized by segment length.

Figure 15: Hours of Undesignated Parking per Mile by Segment

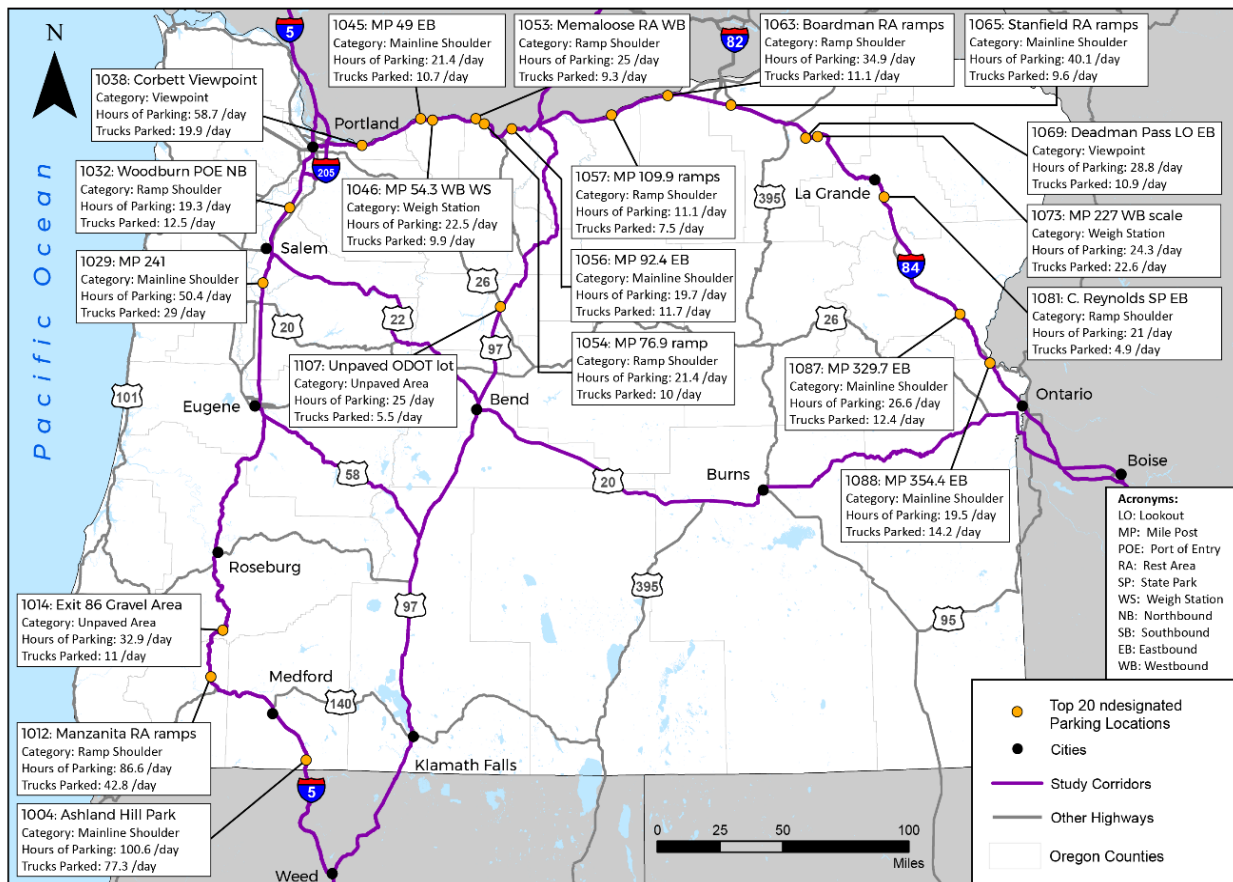


On a per mile basis, the highest rates of undesignated parking occur on Segments A, B, F, and G on I-5. This is likely caused by difficulties in finding parking on I-5 when demand exceeds capacity.

Figure 16 shows the locations with the most undesignated truck parking in the state. The segment with the most undesignated parking is Segment B along I-5 between Grants Pass and

Roseburg. Each day, 115.8 different trucks parked along this segment in the undesignated locations, accumulating 201.9 hours of parking time. Segment A, which is just south of Segment B and connects to the border with California, has the fourth highest prevalence of undesignated parking, accumulating 150 hours of parking time in an average weekday. The designated parking analysis found that both these segments had the second and third highest demand overage in the state, indicating that the demand often outstrips available supply, which helps explain the high degree of undesignated parking. It appears that truckers are having particular difficulty finding parking in this part of I-5. Another explanation for the frequency of undesignated parking in these segments is that they are located roughly between San Francisco and Portland, providing a natural stopping ground for trucks traveling between these two cities.

Figure 16: Top 20 Locations of Undesignated Truck Parking



6. FUTURE PARKING DEMAND

The Future Demand Analysis Technical Memorandum outlined the results of the future demand analysis that estimated truck parking demand in 2040 using the baseline results described in the Current Demand Analysis Technical Memorandum. The results provide an indication of the number of parking spaces that need to be added to the corridors in order to avoid future shortfalls.

6.1 METHODOLOGY

Truck parking demand was forecasted by escalating current parking demand by the growth rate in the Oregon Statewide Integrated Model (SWIM)⁵. This model translates economic forecasts by industry into inbound and outbound commodity flows, and then assigns these flows to the network based on transportation costs faced by users, such as travel time and operating costs. As a result, the model simulates how truck volumes will evolve year-over-year along Oregon's highways.

The Oregon Department of Transportation ran SWIM out to year 2040—the analysis horizon for this study—and forecast truck traffic volumes for the analysis segments. A linear growth rate for years 2019-2040 was then calculated for each segment, summarizing the percentage growth in truck activity forecasted by the model.

The future truck parking demand was estimated by assuming that it grows proportionately to truck volumes. For example, a 20 percent increase in truck volumes on a particular segment was assumed to increase truck parking demand on that segment by 20 percent. It is assumed that growth rates from SWIM are representative of the trucks that use parking facilities.

6.2 KEY FINDINGS

Segment S along I-84 was found to see the largest growth in parking demand between 2019 and 2040, which will result in an additional 118 trucks parked on weekdays during midnight. Segment L, also along I-84, will see the second highest additional parked trucks, at 72. Segment R on US 97 will see the third highest increase in parking demand, a total of 63 additional trucks needing parking by 2040.

By 2040, on average, the increase in truck parking demand is expected to overcome the supply of parking in Segments G, J, and C, which are the three segments identified in the Current Demand Analysis Technical Memorandum as having limited availability in 2019. It is also forecasted that Segment H will reach capacity during this time period, on average.

⁵ <https://www.oregon.gov/ODOT/Planning/Documents/Statewide-Integrated-Model-Vers2-5.pdf>

Figure 17: 2040 Average Availability (Supply minus Demand) Weekdays at Midnight



6.3 STUDY LIMITATIONS

Forecasting truck parking demand is challenging because the need for parking depends on multiple variables. A few key sources of uncertainty in the results presented are discussed below:

- A study of forecasted truck parking demand is inherently sensitive to model accuracy and assumptions. It is possible that the model used to estimate truck parking demand has biases that cause the estimates to over-represent or underrepresent existing and future parking demand. While the model was estimated using an adequate amount of data (achieving statistically significant estimates), unobserved factors could have caused the model to be inaccurate in some segments or parking facility, particularly where no on-the-ground observations were available. However, the model controlled for this by relying on truck GPS data, which was observed at all of the parking facilities considered.
- The amount of freight that needs to be moved in the future has a direct impact on the amount of trucks on the roads and the number of parking spaces needed. Oregon’s SWIM model estimated truck activity growing at an average of 1% per year for the study corridors. This growth rate is smaller than the national growth rate for truck tonnage from

the Freight Analysis Framework, which is 1.2% compounded annually.⁶ Therefore, while the growth rate assumed by SWIM falls in line with other estimates, it is possible that truck activity might grow at a different rate over the next 20 years because of changes in consumption and production patterns. The economy could shift in ways that are not anticipated by the model.

- Moreover, the tons that each truck carry may change, impacting the number of trucks on the roads. For example, heavier or longer trucks could become commonplace, requiring fewer vehicles, or the economics of motor carriers could favor smaller trucks providing greater frequency, which would increase truck volumes. The latter is possible if smaller electric trucks become common, or if e-commerce deliveries, which are made in smaller trucks, continue growing at their current pace. E-commerce is also changing warehousing and distribution decisions, which in-turn could also affect where long-haul trucks travel to.
- The demand forecasts assume that truck drivers need to stop at the same intervals as they do today. Rest requirements today are regulated by the Federal Hours-of-Service regulations, which could be changed in the future⁷. Additionally, changes in enforcement can affect truck parking. In the recent past, hours of service enforcement changed from manual logs to electronic devices, which affected when and where trucks need to park. Relaxing or tightening compliance mechanisms could lead to different truck parking patterns.
- In the medium term and long term, connected and autonomous technologies could affect truck parking needs. For one, the Hours-of-Service regulations could be changed in response to the deployment of technologies that make driving trucks less tiring or safer. In the long term, connected vehicle technologies could enable truck platoons to have a single driver responsible for multiple trailers. The longer vehicle might require less surface area for parking than if the freight were carried in traditional trucks

⁶ <https://ops.fhwa.dot.gov/publications/fhwahop16083/fhwahop16083.pdf>

⁷ On May 14, 2020 the FMCA announced a final rule that would relax several provisions of the current HOS regulations including allowing drivers to split their 10 hours of rest into two time periods. <https://www.trucker.com/regulations/article/21131382/fmcsa-reveals-final-hos-rule>

7. STRATEGY AND RECOMMENDATIONS

The Strategy and Recommendations Technical Memorandum summarized the truck parking needs that were identified in previous memoranda and identified and prioritized solutions that would help achieve the State's goals. These recommendations focused on low-cost strategies that effectively address the identified needs, on a segment-by-segment basis and statewide. The memorandum drew from various memoranda completed as part of this study:

- **Literature Review Technical Memorandum** – The literature review of state, regional and federal truck parking plans completed in 2019 was a source for the list of recommendations and potential solutions evaluated as part of this memorandum.
- **OCTPS Feedback Summary** – The results of this survey were used to confirm truck parking needs and goals and prioritize potential solutions for Oregon.
- **Truck Parking Inventory Technical Memorandum and Current Demand Analysis Technical Memorandum** – An analysis of the supply and demand of truck parking spaces in Oregon was completed as the first step to developing an understanding of truck parking imbalances within the state and to identify specific locations or corridors with high need for capacity expansion or other improvements. Segment-specific or statewide truck parking needs identified as part of the demand analysis will ultimately be matched with the tools evaluated as part of this memorandum. The Methodology and Data Assessment Technical Memorandum detailed the methodology used to complete this truck parking need analysis.

7.1 ROLE OF THE STATE

In general, the primary role of the State Department of Transportation (DOT) is to support the safe and efficient use of the highway system and the economic competitiveness of the state. Regarding truck parking, this includes minimizing the time spent looking for a parking spot, ensuring the safety of the truck driver and passengers of other vehicles, and promoting compliance with hours of service requirements. This not only benefits motor carriers and the broader transportation sector, but also other vehicles on the roads and the community at large, both directly via reduced congestion and other traffic improvements as well as indirectly via induced air quality benefits.

7.2 TRUCK PARKING GOALS

Through a combination of input from ODOT stakeholders via Technical Advisory Committee (TAC) meetings and interviews, a survey of truckers in Oregon, as well as a review of overall study goals, a number of state priorities were identified that are affected by truck parking needs in Oregon. These priorities are categorized into six primary goals:

- Improve safety and security of driver and cargo at parking facilities and on the road.

- Improve roadway safety by reducing the likelihood of crashes involving trucks parked in undesignated locations.
- Improve safety by reducing the likelihood of crashes involving trucks at rest areas.
- Maintain the competitiveness of Oregon’s economy by increasing the utilization of and/or expanding the number of truck parking spaces in high-demand areas.
- Reduce the time required to find safe and legal parking space (public and private).
- Provide truck drivers access to real-time and accurate information about the availability of safe, legal parking places (public and private).

7.3 GENERAL METHODOLOGY

The results of the truck parking demand analysis were used to identify locations where there is insufficient capacity to accommodate forecasted truck parking demand. Needs identified at the segment level focused on categories of demand, such as parking availability with basic amenities (lighting / bathrooms / security), parking with comprehensive amenities (fuel, restaurant, showers, etc.), and parking with services (retail, mechanics, etc.). The results of the demand analysis were then compared with the results of the survey, noting areas of agreement, rendering an assessment of needs across the various segments of the network. Areas of high need were then described and prioritized.

Truck parking solutions from other state, regional and federal truck parking plans detailed in the Literature Review Technical Memorandum are used to populate a toolbox of truck parking solutions and best practices for truck parking management in North America. The solutions are categorized into:

- Data and Technology Deployment
- Creative use of ROW / Public Capacity Expansion
- Expansion using public-private partnerships
- Policy and Regulations
- Coalitions and Institutional Oversight
- Public and Private Outreach

Based on their intended purpose, these tools were then categorized according to the one or more of the truck parking goals identified in Section 7.2 that it was intended to achieve. An evaluation framework using qualitative elements (and quantitative where available) was then developed to prioritize the truck parking solutions. The evaluation framework consisted of the following criteria:

- Effectiveness at addressing identified needs
- Cost
- Private resource utilization
- Ease of implementation/previous success

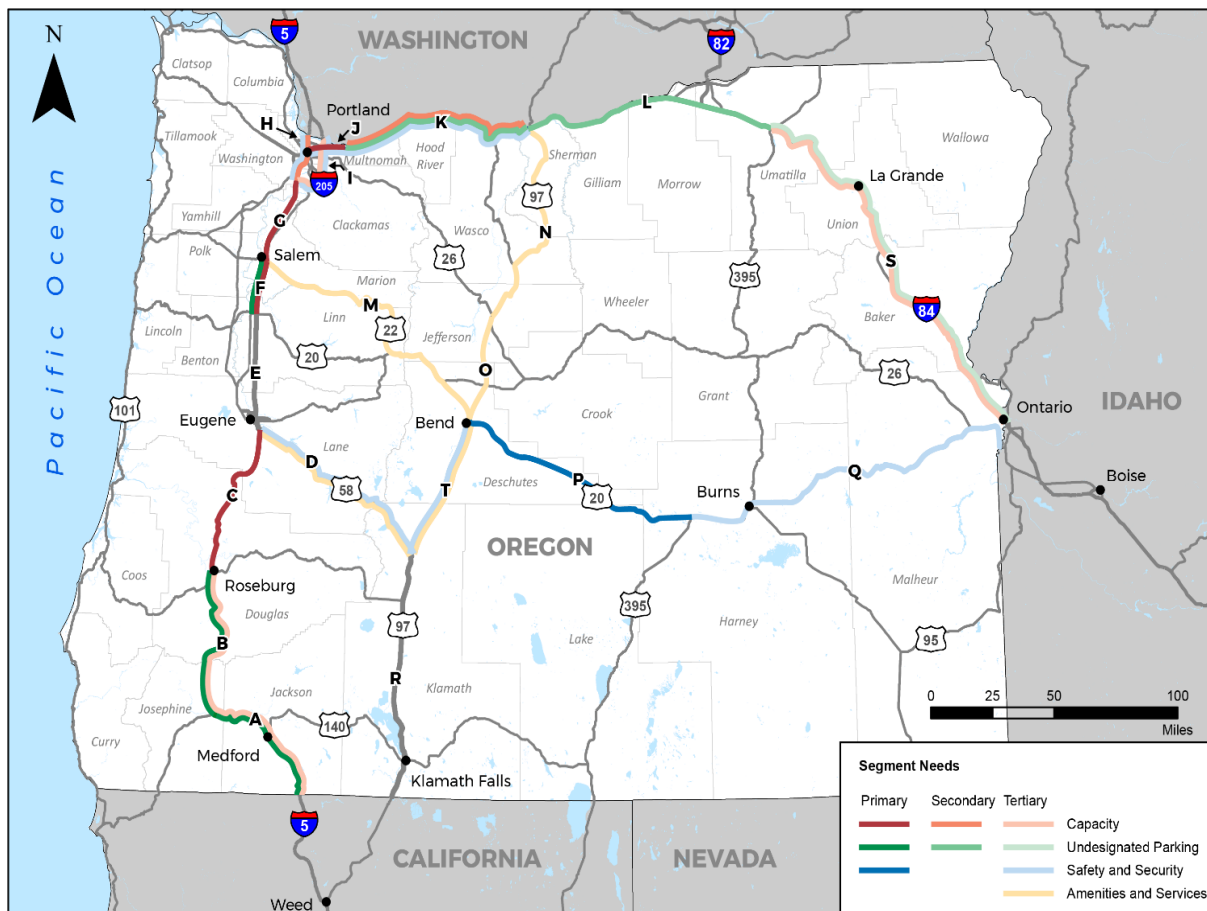
Points were awarded to each strategy along these categories with a high, medium or low score. Strategies that score the highest were then identified as solutions for a given type of need and corridor. The evaluation framework is described in more detail in the Strategy and Recommendations Technical Memorandum (Section 5.1).

7.4 NEEDS ANALYSIS

The Current Demand Analysis Technical Memorandum and the Future Demand Analysis Technical Memorandum identified segments with a supply/demand mismatch of truck parking spaces in 2019 and 2040. These analyses, as well as the results of surveys and interviews and input from stakeholders were considered when defining segment needs. The four areas of need are identified as capacity, undesignated parking, safety and security, and amenities and services were identified. These needs were categorized as Primary, Secondary, and Tertiary, in relation to the priority in which these needs must be addressed.

Figure 18 illustrates these Primary, Secondary and Tertiary needs for each roadway segment.

Figure 18: Segment Needs - Primary, Secondary and Tertiary



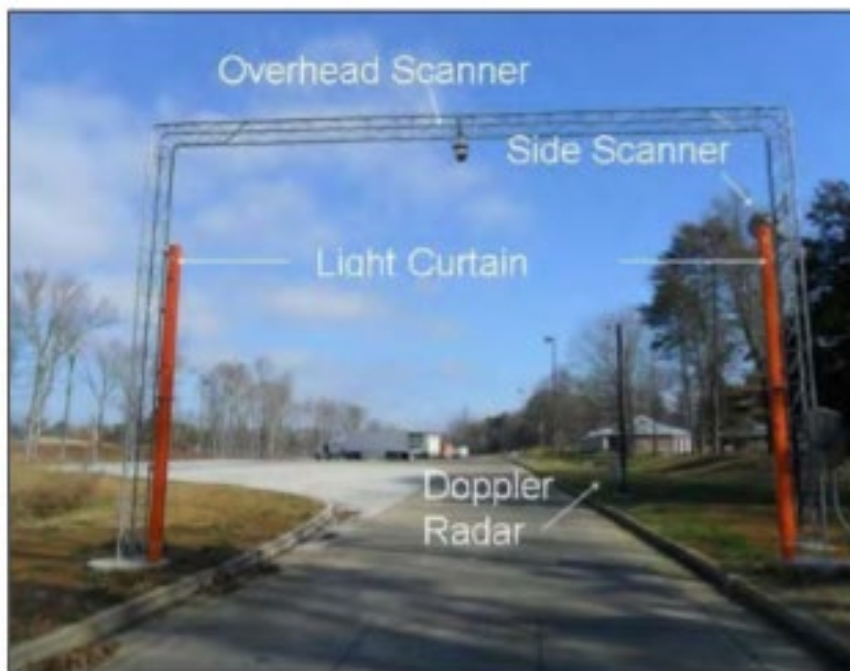
7.5 TOOLBOX OF TRUCK PARKING SOLUTIONS

A breakdown of recommendations from the federal, state and regional truck parking plans reviewed in the Literature Review Technical Memorandum yielded six key strategies:

▪ Data and Technology Deployment

- Primarily utilized to provide real-time communication to truckers on availability and location of truck stops and rest areas.
- Includes sensing technologies such as in-pavement sensors, entry-exit gates, radar, camera systems to determine utilization and availability of parking spaces and communication media such as dynamic message signs, smartphone and web apps and in-cab navigation to disseminate the information to truckers in real time.
- An associated parking reservation system further assists truck drivers in planning their trips in advance and ensures predictability.
- For a lower cost solution, some states also recommend installing static truck parking signage on highways and distributing visor card trucking maps to truckers at trucking conferences and other meets.
- Interoperability with neighboring states should be considered in development of specific solutions in this area.

Figure 19: Smartpark Truck Detection technology

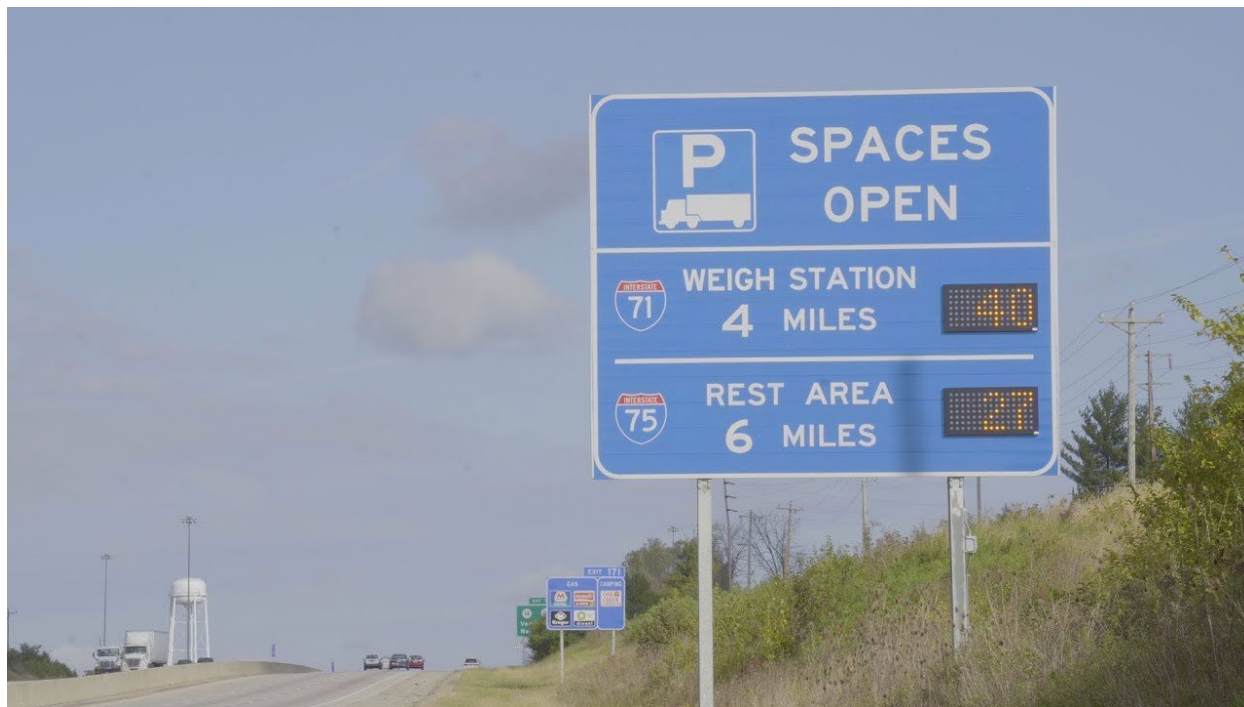


Note: Smartpark Truck Detection technology counts trucks entering the parking facility and is used to determine remaining availability (Tennessee)

- **Creative use of ROW for public truck parking capacity expansion**
 - This would be primarily focused on expanding truck parking spaces on interstate or other segments with significant parking needs.
 - Use of publicly-owned excess ROW at existing rest areas, weigh stations, and other locations on interstates, as well as improving geometrics at existing locations are also recommended.
 - GIS analyses may be completed on urban land parcels to determine viability of conversion into truck parking areas.
- **Capacity expansion through public-private partnerships**
 - , Partnering with private businesses and truck stops to expand parking facilities and coordinate signage is recommended, since improved parking spaces and information was found to be important to drivers.
 - Where public funding is insufficient, cost-sharing agreements for construction and maintenance of parking areas with private partner may be useful. Private partners may also be allowed to set up convenience and food stalls at such facilities to provide revenue incentives for engaging truck parking expansion.
 - Partnering with businesses that are served by freight to explore warehouse and distribution center parking may provide an opportunity to allow for parking required by drivers.
- **Policy and Regulations**
 - Review local, state, and regional policies on truck parking and staging requirements to confirm whether parking expansion is being hampered by regulations.
- **Coalitions and Institutional Oversight**
 - Designate truck parking champions and/or establish truck parking committees within the agency to champion truck parking goals and oversee implementation of truck parking plans and objectives.
 - Participate in a cohesive regional multi-state truck parking coalition with a goal to matching supply and demand, increase roadway safety and policy conformity reduces the time required by drivers to find safe parking spaces. Collaborative initiatives could include multi-state implementations of real-time parking availability systems such as the MAASTO example of a corridor-level Truck Parking Information Management System (TPIMS).
- **Public and Private Outreach**
 - To counteract public perception that leads communities to restrict truck parking, coordinate with MPOs and local governments to develop guidelines and mitigation strategies aimed at easing such public opposition.

Section 4 in the Strategy and Recommendations Technical Memorandum details all the recommendations compiled from the literature review. Figures 19–21 illustrate deployment of truck parking solutions such as truck detection technology, dynamic message signs and real-time parking availability apps respectively.

Figure 20: Dynamic Message Signs



Note: Dynamic message signs are used to display number of available parking spaces at weigh station and rest area.

7.6 PRIORITIZATION METHODOLOGY

These strategies and solutions were first categorized as follows:

- **Site-specific solutions** – These solutions are implemented at specific locations and facilities where supply or utilization is low or where the technology is feasible. Examples include creative use of ROW at rest areas, undesignated parking locations and weigh stations. The costs and resultant benefits are limited to the location where the solution is implemented.
- **Statewide solutions** – These solutions are either implemented at the state level or corridor level and have costs and resultant benefits that impact truck parking across the entire state or corridor. Examples include installing dynamic message signs across entire corridors or developing a statewide truck parking availability mobile application.

In general, site-specific solutions gravitated towards technology deployment at parking locations or public capacity or partnering with private sector. Statewide solutions focused on data and technology deployment such as real-time parking availability dissemination, as well as

policy and regulatory modifications, creative use of ROW and public and private outreach. Based on their intended purpose, these tools were then categorized according to the one or more of the six truck parking goals identified in Section 7.2 and evaluated using the four criteria listed in Section 7.3 on a high/medium/low scale. The complete results of the prioritization and the evaluation scores of each of the identified statewide and site-specific solutions are presented in the Strategy and Recommendations Technical Memorandum (Section 5.2 and Section 5.3 respectively).

7.7 SUMMARY OF TOP SOLUTIONS

Solutions that focused on creative use of ROW or deployment of low-cost technology tended to score the best based on the evaluation framework described in Section 7.3. These top solutions are summarized in Table 1 and are considered the best alternatives for each identified state truck parking goal.

Table 1: Summary of Top Solutions for Truck Parking

Tool / Solution	Oregon Goal(s)	Effective in Addressing Oregon Goal	Cost	Private Resource Utilization	Ease of Implementation	Solution Score
Real-time parking availability communication utilizing web or smartphone app - ODOT to push availability data to private apps such as Park My Truck	Provide truck drivers access to real-time and accurate information about the availability of safe, legal parking places (public and private)	High	Low	High	High	36
Camera sensors to determine parking space usage	Provide truck drivers access to real-time and accurate information about the availability of safe, legal parking places (public and private)	High	Low	Medium	High	33
Explore warehouse parking partnerships and/or requirements with private vendors for end-of-trip parking and staging	<p>Maintain the competitiveness of Oregon’s economy by increasing the utilization of and/or expanding the number of truck parking spaces in high-demand areas.</p> <p>Reduce the time required to find safe and legal parking space (public and private)</p>	High	Low	High	Medium	33

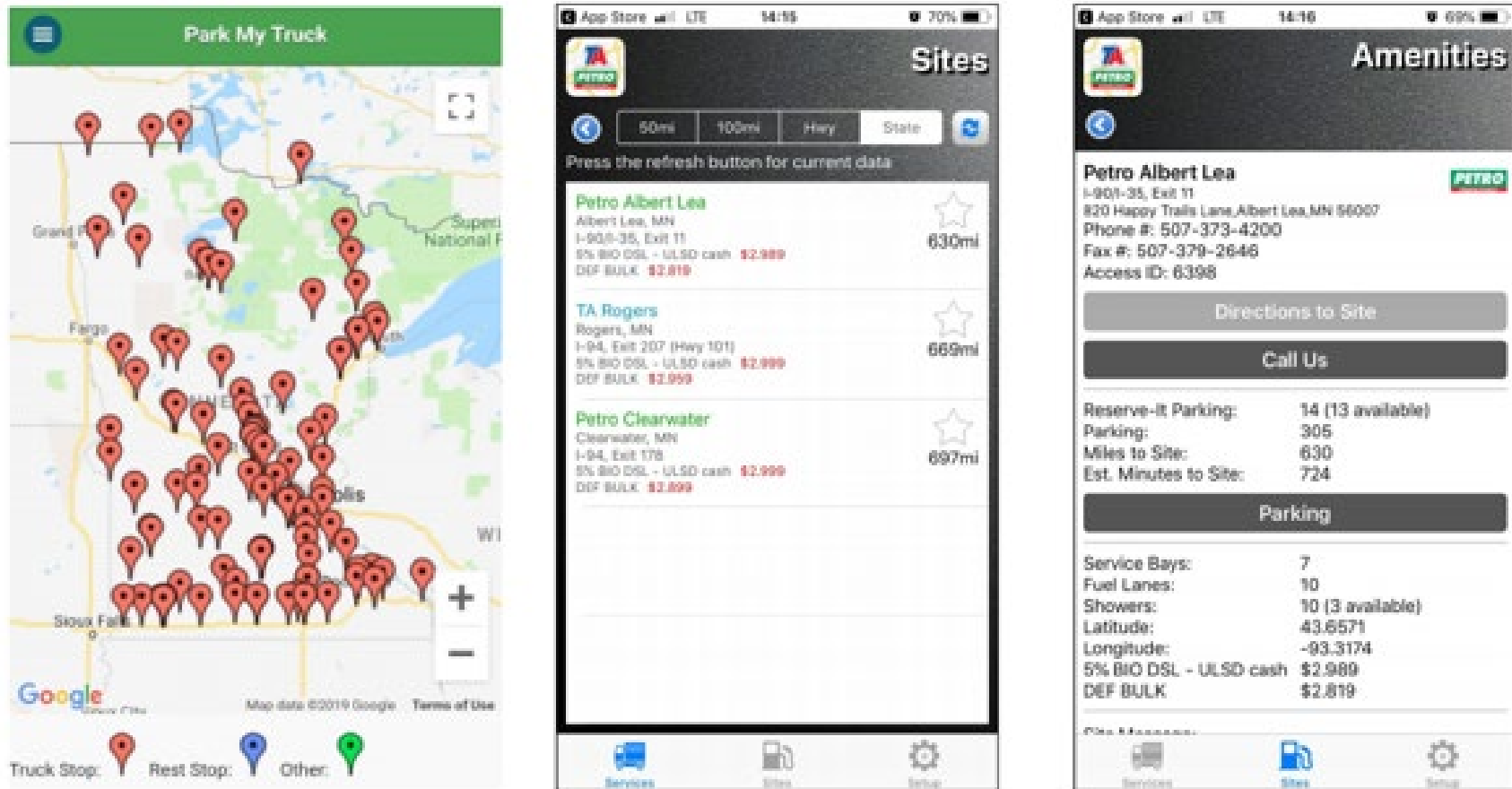
Table 1: Summary of Top Solutions for Truck Parking (continued)

Tool / Solution	Oregon Goal(s)	Effective in Addressing Oregon Goal	Cost	Private Resource Utilization	Ease of Implementation	Solution Score
Develop revised design standards for rest areas	<p>Improve roadway safety by reducing the likelihood of crashes involving trucks parked in undesignated locations.</p> <p>Improve safety by reducing the likelihood of crashes involving trucks at rest areas</p>	High	Low	Low	High	30
Identify alternate truck parking locations such as closed weigh stations, chain-up areas, excess shoulders and safety pullouts	Maintain the competitiveness of Oregon’s economy by increasing the utilization of and/or expanding the number of truck parking spaces in high-demand areas.	High	Low	Low	High	30
Improved/expanded truck parking areas using excess ROW, rest areas and other locations on interstates, improved geometrics and capacity expansion	<p>Maintain the competitiveness of Oregon’s economy by increasing the utilization of and/or expanding the number of truck parking spaces in high-demand areas</p> <p>Improve safety by reducing the likelihood of crashes involving trucks at rest areas</p>	High	Low	Low	High	30

Table 1: Summary of Top Solutions for Truck Parking (continued)

Tool / Solution	Oregon Goal(s)	Effective in Addressing Oregon Goal	Cost	Private Resource Utilization	Ease of Implementation	Solution Score
Investigate expanding parking via public private partnerships - utilizing excess ROW owned by state near private facilities and entering cost-sharing agreements for construction and maintenance of parking areas.	<p>Maintain the competitiveness of Oregon’s economy by increasing the utilization of and/or expanding the number of truck parking spaces in high-demand areas.</p> <p>Reduce the time required to find safe and legal parking space (public and private)</p>	High	Low	High	Low	30
Surveillance cameras, improved lighting and/or night-time surveillance patrol by Oregon State Police to enhance security onsite	Improve security and safety of driver and cargo at parking facilities.	High	Medium	Medium	High	30
Coordinate with MPOs and RPOs to develop guidelines and mitigations strategies aimed at easing public opposition to private sector parking facilities	<p>Maintain the competitiveness of Oregon’s economy by increasing the utilization of and/or expanding the number of truck parking spaces in high-demand areas</p> <p>Reduce the time required to find safe and legal parking space (public and private)</p>	Medium	Low	Medium	High	30

Figure 21: Sample Apps (Park My Truck and TruckSmart) Interfaces Used to Help Drivers Find Rest Stops and Travel Centers and Inform Parking Availability



7.8 RECOMMENDED ACTIONS

The solutions identified above are matched to the prioritized needs statewide and by segment presented in Section 7.4 to yield recommended actions as shown in the following section.

7.8.1 Recommended Actions - Statewide

1. Place high importance on interoperability with other states when implementing improvements that will disseminate real-time information about parking availability.
2. A parking reservation system further assists truck drivers in planning their trips in advance and ensures predictability. Many truck drivers spend over an hour looking for a spot and/or park earlier to ensure they get a spot. This hurts efficiency and as such many trucks try to stay east of Portland.
3. Work with Metropolitan Planning Organizations (MPO) and cities to address truck parking in MPO freight plans and Transportation System Plans.
4. Develop materials to educate the public and elected officials about the importance of truck parking in freight transportation and industrial development.
5. Consider developing policies and regulations that could limit or prohibit truck parking in certain areas on ODOT ROW to increase safety
6. Consider development of a coalition with neighboring states in order to address truck parking issues on I-5.
7. Develop a Truck Parking Information Management System (TPIMS) to better address commercial vehicle parking needs throughout the state.

Table 2: Recommended Actions: I-5

Segment	Segment Needs	Issues	Suggested Solutions
<p>H (I-5) from I-205 to WA border (20 miles long)</p>	<p>Primary: None Secondary: Capacity Tertiary: Safety & Security</p>	<p>Secondary: Limited parking availability in this segment – 50% of survey respondents indicated parking spaces are never available. Limited availability of parking in the Portland metro area may mean that truck’s park just outside of the Portland metropolitan area where parking availability is perceived to be greater. This may mean that the demand analysis underestimates truck parking needs in this segment.</p>	<ul style="list-style-type: none"> ▪ Work with the Jubitz truck stop to determine if real-time parking info needs to be more accessible. If so, determine what type of assistance ODOT can provide. ▪ Work with WA state to provide real-time parking information for the truck stops on I-5 in the Vancouver/Portland area. ▪ Investigate public private partnerships with other businesses to see how the state can help businesses that operate and develop private truck parking facilities.
		<p>Tertiary: Approximately 40% of respondents indicated that truck parking was not safe or secure in this segment.</p>	<ul style="list-style-type: none"> ▪ Investigate perception of unsafe conditions at stops in this segment and determine whether installation of surveillance cameras/improved lighting/fencing/signage is feasible and/or addresses the problem.
<p>G I-5 from I-205 to Salem (35 miles long)</p>	<p>Primary: Capacity Secondary: None Tertiary: None</p>	<p>Primary: This segment sees the highest truck parking demand in the state, is running at capacity, and is projected to have a shortfall of spaces in 2040. Because truck parking in the Portland metro area is so limited, this segment and others just outside of the Portland metropolitan area may see outside demand compared to the number of origins and destinations.</p>	<ul style="list-style-type: none"> ▪ Investigate possibility of expanding the French Prairie Rest Area (utilizing excess ROW, restriping, improved geometrics). ▪ Investigate the provision of real-time parking information for the rest area using dynamic message signs, smartphone apps or websites. ▪ Investigate creation of a public-private partnership to work with Aurora Flying J and Aurora TA truck stops to see how ODOT can help with parking demand. ▪ Work with Aurora Flying J and Aurora TA truck stops to determine if real-time parking info needs to be more accessible. If so, determine what type of assistance ODOT can provide.

Table 2: Recommended Actions: I-5 (continued)

Segment	Segment Needs	Issues	Suggested Solutions
<p>F I-5 from Salem to Albany (21 miles long)</p>	<p>Primary: Undesignated Parking Capacity</p> <p>Secondary: None</p> <p>Tertiary: None</p>	<p>Primary: Undesignated parking at the Santiam Rest area and the highway shoulders may partly be due to insufficient spaces at the rest area and Albany’s Love truck stop. However, safety and convenience could be other reasons for undesignated parking.</p>	<ul style="list-style-type: none"> ▪ Increase truck parking capacity through expansion and other improvements to the Santiam River rest area (utilizing excess ROW, restriping, improved geometrics). ▪ Consider managing and improving the undesignated truck parking in and around the rest areas. Consider expanding the undesignated parking using excess ROW, if available, and making it into designated parking. ▪ Investigate the provision of real-time parking information for the rest area using dynamic message signs, smartphone apps or websites. ▪ Investigate creation of a public-private partnership with Albany’s Love truck stop to see how ODOT can help with parking demand. ▪ Work with Albany’s Love truck stop to determine if real-time parking info needs to be more accessible. If so, determine what type of assistance ODOT can provide.
<p>E I-5 from Albany to Eugene (45 miles long)</p>	<p>Primary: None</p> <p>Secondary: None</p> <p>Tertiary: None</p>		

Table 2: Recommended Actions: I-5 (continued)

Segment	Segment Needs	Issues	Suggested Solutions
<p>C I-5 from Eugene to Roseburg (64 miles long)</p>	<p>Primary: Capacity Secondary: None Tertiary: None</p>	<p>Primary: Most spaces in this segment are at the Rice Hill Pilot which is estimated to operate close to capacity. There are two rest areas, Gettings Creek and Cabin Creek in the segment.</p>	<ul style="list-style-type: none"> ▪ Work with the Rice Hill Pilot truck stop to determine if real-time parking info needs to be more accessible. If so, determine what type of assistance ODOT can provide. ▪ Investigate potential to expand truck parking capacity at/near Rice Hill Pilot using excess ROW or identify alternate truck parking locations using public private partnerships or other means. ▪ Increase truck parking capacity in the two rest areas if they are not usually full during peak hours utilizing excess ROW, restriping, improved geometrics).
<p>B I-5 from Roseburg to Grants Pass (68 miles long)</p>	<p>Primary: Undesignated Parking Secondary: None Tertiary: Capacity</p>	<p>Primary: Undesignated parking at Manzanita Rest Area is the primary concern in this segment even though, on average, there are 63 spaces available at 4 truck stops and the rest area. Undesignated parking may be occurring due to several reasons including safety and convenience.</p> <p>Tertiary: Only 26 spaces are projected to be available in this segment in 2040. Parking availability should be tracked as there is potential for capacity constraints in the future.</p>	<ul style="list-style-type: none"> ▪ Manage and/or increase undesignated truck parking in the rest area utilizing excess ROW. Determine if restriping and improving access to rest area will reduce the likelihood of collisions and sideswipes. ▪ Review access and parking design issues at rest area, develop and implement revised design standards, if warranted. ▪ Investigate the provision of real-time parking information for the rest area using dynamic message signs, smartphone apps or websites. ▪ Work with the truck stops to determine if real-time parking info needs to be more accessible. If so, determine what type of assistance ODOT can provide. <p>▪ Track availability trends at rest areas/truck stops in this segment to ascertain likelihood of adding capacity in the future.</p> <ul style="list-style-type: none"> ▪ Review infrastructure improvements required at closed rest area at milepost 82 as well as the closed weigh station near Roseburg to investigate potential for reopening them as a cost-effective method for expanding parking capacity.

Table 2: Recommended Actions: I-5 (continued)

Segment	Segment Needs	Issues	Suggested Solutions
<p>A I-5 from Grants Pass to CA border (56 miles long)</p>	<p>Primary: Undesignated Parking</p> <p>Secondary: None</p> <p>Tertiary: Capacity</p>	<p>Primary: Undesignated parking at Ashland Hill park is the primary concern even though on average there are 51 spaces available at 3 truck stops and one small rest area. Most utilized undesignated parking location in the state. Parking is primarily on the NB direction along a wide paved shoulder after a long steep upgrade. Many truck drivers stop here to rest and check their brakes. Further, there may be seasonal weather-related parking needs in this segment as closures over the Siskiyou would be expected to affect parking demand.</p>	<ul style="list-style-type: none"> ▪ Consider managing and/or increasing undesignated truck parking in the area near Ashland Hill park utilizing excess ROW.
	<p>Tertiary: Parking demand may exceed capacity in the future. More than 25% of respondents take more than 1 hour to find parking in this segment. Further, there may be seasonal weather-related parking needs in this segment as closures over the Siskiyou would be expected to affect parking demand.</p>	<ul style="list-style-type: none"> ▪ Work with the truck stops to determine if real-time parking info needs to be more accessible. If so, determine what type of assistance ODOT can provide. ▪ Work with CA state to help provide real-time parking information for rest areas/truck stops in this corridor. Track availability trends at rest area/truck stops in Medford and Phoenix to ascertain likelihood of requiring additional capacity in the future. 	

Table 3: Recommended Actions: I-84

Segment	Segment Needs	Issues	Suggested Solutions
<p>J I-84 from I-5 to Troutdale (16 miles long)</p>	<p>Primary: Capacity</p> <p>Secondary: None</p> <p>Tertiary: Safety & Security</p>	<p>Primary: This segment is the primary connection to Portland from the east -as such limited parking availability in this segment – 40% of respondents indicated parking spaces are never available.</p> <p>Tertiary: Approximately 40% of respondents indicated that truck parking was not safe or secure in this segment. High winds are a problem, especially with empty trucks</p>	<ul style="list-style-type: none"> ▪ Work with the Jubitz truck stop to determine if real-time parking info needs to be more accessible. If so, determine what type of assistance ODOT can provide. ▪ Some portion of the demand here is truck drivers trying to pre-position themselves further out in the Gorge due to lack of predictability in parking spots closer to Portland. As such, drivers in this segment would benefit from a parking reservation system that increases travel reliability of their trip. ▪ Investigate creation of a public-private partnership with other businesses to work with the truck stops to see how ODOT can help with parking demand. ▪ Existing truck stops operate in a constrained footprint, therefore consider use excess ODOT ROW to identify alternate parking locations near existing stops. ▪ Investigate the possibility of better managing or providing real-time parking info at the Cascade Locks POE at MP45 as they have 19 spaces. ▪ Investigate public private partnerships with warehouse or distribution centers near the segment. ▪ Work with truck stops to determine if installation of surveillance cameras/improved lighting, signage is feasible and/or solves the problem.

Table 3: Recommended Actions: I-84 (continued)

Segment	Segment Needs	Issues	Suggested Solutions
<p>K I-84 from Troutdale to US97 (86 miles long)</p>	<p>Primary: None Secondary: Undesignated Parking, Capacity Tertiary: Safety & Security</p>	<p>Secondary: This segment has no truck stops and ranks second in terms of undesignated parking hours, with Corbett Viewpoint being the most used location. Trucks park at the viewpoint area and on the shoulders of the access road. The segment also has capacity constraints with only 25 designated spaces available on average in 2040. Per TAC, drivers often park in this segment to pre-position for the trips into and out of the Portland metro area in this segment.</p>	<ul style="list-style-type: none"> ▪ Provide or improve real-time parking information for rest area and truck stops in this segment to improve utilization. ▪ Investigate if capacity constraints at the Memaloose Rest area are a major cause of undesignated parking in this area (currently can only fit 10 trucks in westbound direction). If there are capacity constraints, then consider expanding the rest area using excess ROW if available. If the capacity constraints are not the issue, then manage and improve the undesignated truck parking in and around the rest area. Consider expanding the undesignated parking using excess ROW if available. ▪ At viewpoint consider better managing the undesignated truck parking with signage, striping and lighting to increase safety. If warranted, investigate the possibility of providing e additional parking at or near the viewpoint using excess ROW if available.
		<p>Tertiary: Approximately 40% of respondents indicated that truck parking was not safe or secure in this segment. High winds are a problem, especially with empty trucks</p>	<ul style="list-style-type: none"> ▪ Investigate cause of safety concerns in this segment by working with the OSP, ODOT maintenance districts, OTA and others.

Table 3: Recommended Actions: I-84 (continued)

Segment	Segment Needs	Issues	Suggested Solutions
<p>L I-84 from US97 to Pendleton (105 miles long)</p>	<p>Primary: None Secondary: Undesignated Parking Tertiary: None</p>	<p>Secondary: Undesignated parking at the Arlington Viewpoint, Stanfield and Boardman rest areas should be addressed. Lack of designated parking spaces does not seem to be main cause of undesignated parking. Could be occurring due to several reasons including safety and convenience. There may be weather-related issues that contribute to seasonal parking.</p>	<ul style="list-style-type: none"> ▪ Provide or improve real-time parking information for rest areas and truck stops in this segment to improve utilization. ▪ Investigate the reasons for undesignated parking. If capacity constraints at the rest areas are a major cause of undesignated parking in this segment, consider expanding the rest areas using excess ROW if available. If capacity constraints are not the issue, then manage and improve the undesignated truck parking. Consider expanding the undesignated parking using excess ROW, if available.
<p>S I-84 from Pendleton to Idaho border (169 miles long)</p>	<p>Primary: None Secondary: None Tertiary: Undesignated Parking, Capacity</p>	<p>Tertiary: Significant undesignated parking at rest areas such as Deadman Pass and Reynolds Rest Areas. Lack of current spaces at the truck stops and rest areas does not seem to be the main cause of undesignated parking. However, there may be seasonal weather-related parking needs in this segment. Projected decline in availability in the future due to significant expected traffic growth.</p>	<ul style="list-style-type: none"> ▪ Provide or improve real-time parking information for rest areas and truck stops in this segment to improve utilization. ▪ Investigate the possibility of better managing or providing real-time parking info at the Farewell Bend POE at MP353 (36 spaces) and the weigh station at MP227. ▪ Manage and/or increase undesignated truck parking in the rest area utilizing excess ROW if available. ▪ Consider developing a winter truck parking strategy to provide parking for trucks that can't travel on the highway due to poor weather conditions. ▪

Table 4: Recommended Actions: US97

Segment	Segment Needs	Issues	Suggested Solutions
<p>N US97 from I-84 to Madras (93 miles long)</p>	<p>Primary: None Secondary: None Tertiary: Amenities & Services</p>	<p>Tertiary: Approximately 60% of respondents indicated that services are inadequate. There are however some services in Shaniko, Grass Valley and Moro.</p>	<ul style="list-style-type: none"> ▪ Investigate the signage in this segment to determine if there needs to be additional signage indicating miles to towns or services. ▪ Investigate which amenities and services are deficient at the Cow Canyon rest area and truck stops and how the state can help improve amenities
<p>O US97 from Madras to Bend (42 miles long)</p>	<p>Primary: None Secondary: None Tertiary: Amenities & Services</p>	<p>Tertiary: Approximately 60% of respondents indicated that services are inadequate on this segment. There are however some services in Terrebonne and Redmond.</p>	<ul style="list-style-type: none"> ▪ Investigate the signage in this segment to determine if there needs to be additional signage indicating miles to towns or services. ▪ Investigate which amenities and services are deficient at the Peter Skene Ogden State Park rest area and truck stops and how the state can help them with improving amenities.
<p>T US97 from Bend to OR58 (58 miles long)</p>	<p>Primary: None Secondary: None Tertiary: Safety & Security, Amenities & Services</p>	<p>Tertiary: Approximately 70% of respondents indicated that services are inadequate on this segment and 40% indicated parking was not safe or secure.</p>	<ul style="list-style-type: none"> ▪ Investigate the signage in this segment to determine if there needs to be additional signage indicating miles to towns or services. ▪ Investigate cause of safety concerns in this segment with the OSP, local law enforcement, OTA and ODOT maintenance districts ▪ Work with the truck stop to see if installation of surveillance cameras/improved lighting is feasible and/or solves the problem.
<p>R US97 from OR58 to CA border (96 miles long)</p>	<p>Primary: None Secondary: None Tertiary: None</p>		

Table 5: Recommended Actions: Segments not on I-5, I-84, US97

Segment	Segment Needs	Issues	Suggested Solutions
<p>D OR58 from I-5 to US97 (86 miles long)</p>	<p>Primary: None Secondary: None Tertiary: Safety & Security, Amenities & Services</p>	<p>Tertiary: Approximately 70% of respondents indicated that services are inadequate on this segment and 40% indicated segment was not safe or secure. The main cause is likely the lack of any designated parking facility in this segment.</p>	<ul style="list-style-type: none"> ▪ The city of Oakridge has indicated a desire to provide more truck services in their city. Work with the city to determine if truck parking could be accommodated in the city. ▪ Investigate cause of safety concerns in this segment with the OSP, local law enforcement, OTA and ODOT maintenance districts ▪ Manage and/or increase undesignated truck parking in the segment utilizing excess ROW and provide lighting, striping, fencing to improve safety. Because there is currently no rest area in this segment, adding one would benefit truck drivers as well as drivers of passenger vehicles on this facility that provides one of these few connections between US 97 and I-5 and access to unique recreational areas.
<p>I I-205 from I-5 to WA border (28 miles long)</p>	<p>Primary: None Secondary: None Tertiary: Capacity, Safety & Security</p>	<p>Tertiary: Approximately 50% of respondents indicated parking spaces are never available and 40% indicated segment was not safe or secure. The main cause is the lack of any designated or undesignated parking in this segment. Because I-205 is used primarily by trucks seeking to bypass the Portland area and through-traffic may be more likely to park at truck stops and rest areas on I-5 in OR and WA. This may mask the true demand for parking within the metro area.</p>	<ul style="list-style-type: none"> ▪ Investigate public private partnerships to see how the state can help businesses that operate and develop private truck parking facilities. ▪ Explore warehouse parking partnerships and/or requirements with private vendors for end-of-trip parking and staging. <ul style="list-style-type: none"> – In general, parking facilities in segments that are just outside the Portland metro area see outsized demand from trucks driving to/from Portland, as these facilities have or are perceived to have greater availability and/or reliability of parking. As such, any solutions devised must consider that segment demand may not be representative of O/D traffic in that segment. ▪ Provide real-time parking information using dynamic message signs, smartphone apps or websites to let truckers know where the parking and services are as they approach the metro area and improve parking utilization. ▪ Work with WA state to develop a coordinated approach to addressing truck parking on the I-205 corridor.

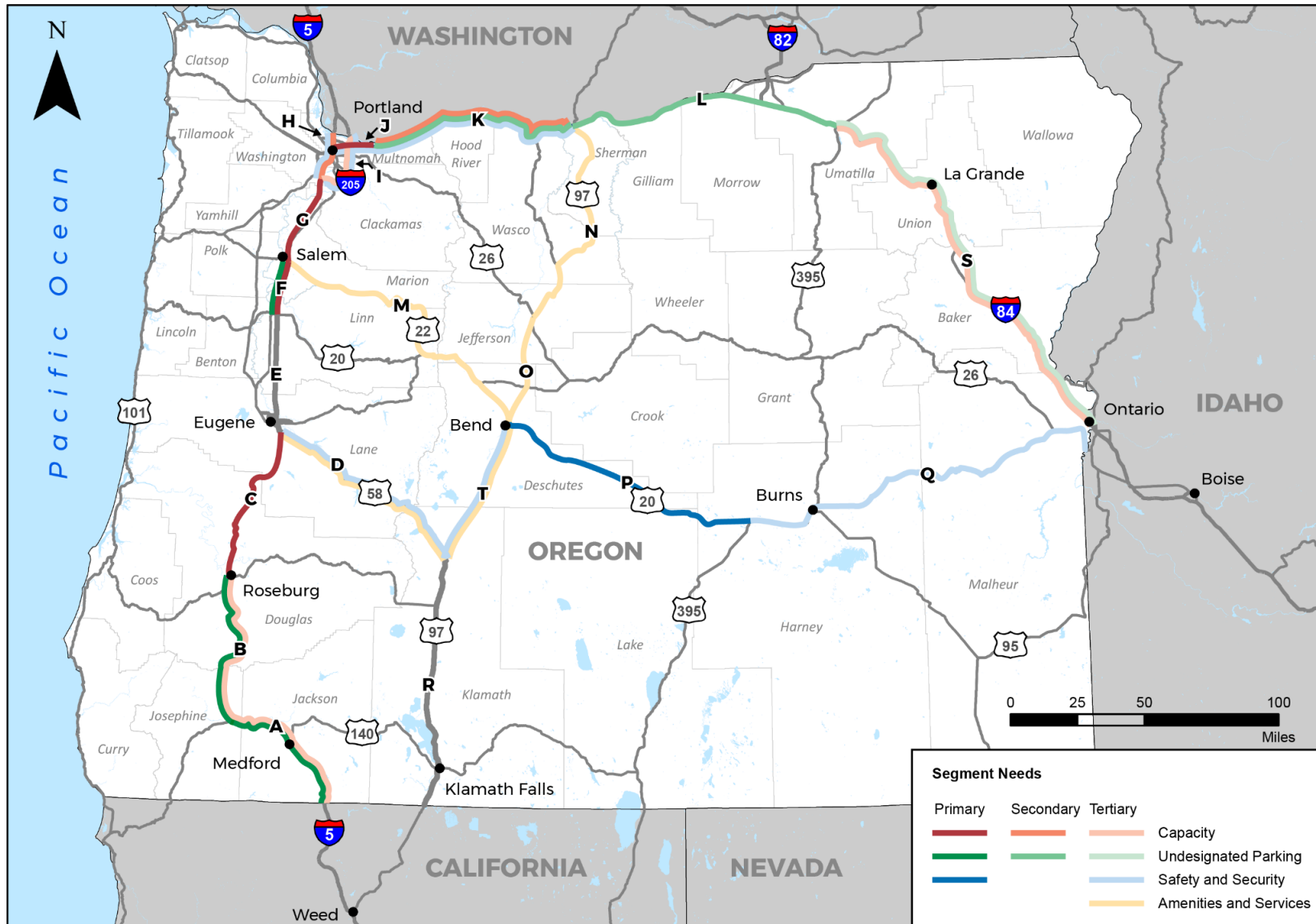
Table 5: Recommended Actions: Segments not on I-5, I-84, US97 (continued)

Segment	Segment Needs	Issues	Suggested Solutions
<p>M OR22/US20 from I-5 to US97 (126 miles long)</p>	<p>Primary: None Secondary: None Tertiary: Amenities & Services</p>	<p>Tertiary: This segment has low truck traffic volumes and only 1 rest area with 15 parking spaces even though it is one of the longest segments. 35% of respondents indicated that they routinely spend more than 1 hourly looking for parking.</p>	<ul style="list-style-type: none"> ▪ Provide real-time parking information using dynamic message signs, smartphone apps or websites to let truckers know where the parking and services are as they approach the metro area and improve parking utilization. ▪ Investigate the signage in this segment to determine if there needs to be additional signage indicating miles to towns or services.
<p>P US20 from US97 to US395 (104 miles long)</p>	<p>Primary: Safety & Security Secondary: None Tertiary: None</p>	<p>Primary: This is the only segment where safety & security was rated as a primary need. Approximately 60% of respondents indicated that truck parking was not safe or secure, one of the highest responses to this question in the survey. This is a rural segment that carries a small volume of trucks, with only one small rest area (Brothers Oasis) in over 100 miles.</p>	<ul style="list-style-type: none"> ▪ Investigate cause of safety concerns in this segment with the OSP, local law enforcement, OTA and ODOT maintenance districts. ▪ Manage and/or increase undesignated truck parking in the segment utilizing excess ROW and provide lighting, signage, striping, fencing to improve safety.

Table 5: Recommended Actions: Segments not on I-5, I-84, US97 (continued)

Segment	Segment Needs	Issues	Suggested Solutions
<p>Q US20 from US395 to ID border (160 miles long)</p>	<p>Primary: None Secondary: None Tertiary: Safety & Security</p>	<p>Tertiary: While this segment represents low truck volumes, the lack of parking facilities in the middle of this segment may be causing trucks to park in undesignated parking areas or drive a long distance to reach the next parking facility. 40% of respondents indicated that parking was not safe or secure on this segment.</p>	<ul style="list-style-type: none"> ▪ Investigate cause of safety concerns in this segment with the OSP, local law enforcement, OTA and ODOT maintenance districts. ▪ Manage and/or increase undesignated truck parking in the segment utilizing excess ROW and provide lighting, signage, striping, fencing to improve safety. ▪ Provide real-time parking information using dynamic message signs, smartphone apps or websites to let truckers know where the parking and services are as they approach the metro area and improve parking utilization.

Figure 22: Truck Parking Needs by Segment



7.9 FUNDING

Funding will be essential to the implementation of many of the recommended truck parking solutions. Historically, ODOT has not set aside any funding for truck parking improvements. This chapter discusses various federal and state sources as well as public private partnership strategies. It draws from the work of the National Truck Parking Coalition as well as efforts in other states.

7.9.1 Federal Funding Sources

Formula Programs

Truck parking is eligible under the following federal programs that provide funding by formula to states⁸:

- Surface Transportation Block Grant – for the construction of truck parking on Federal-aid highways.
- National Highway Freight Program - truck parking facilities and real-time traffic, parking, roadway condition, and multimodal transportation information systems are all eligible activities. Must be on the national highway freight network
- Highway Safety Improvement Program – truck parking can be funded under this program if it is consistent with the State Strategic Highway Safety Plan
- National Highway Performance Program – highway safety, including truck parking, is eligible if it supports meeting national performance goals.
- Congestion Mitigation and Air Quality Improvement Program (CMAQ) – truck stop electrification systems are eligible under the federal guidelines if they primarily benefit a non-attainment or maintenance area. This use is not eligible under Oregon state guidelines, so would necessitate an exception.

Discretionary Grants

Truck parking is eligible under the following federal competitive grant programs:

- **Infrastructure for Rebuilding America (INFRA) Grants** cover up to 60 percent of total project costs for critical freight and highway projects. Highway freight projects on the National Highway freight Network, highway projects on the NHS and other specified intermodal projects. In 2016, the state of Colorado received a \$9 million grant under the predecessor program (Fast Lane) for a Truck Parking Information Management System (TPIMS).
- **Better Utilizing Investments to Leverage Development (BUILD) Grant** funds are intended to support innovative projects that generate economic development and improve

⁸ Eligibility of Title 23 Federal Funds for Commercial Motor Vehicle Parking, USDOT Memorandum from Martin C. Knopp, October 18, 2018.

access to reliable, safe and affordable transportation. Under the predecessor program (TIGER), MAASTO obtained a \$25 million grant for its TPIM system.

- **Diesel Emissions Reduction Act (DERA) program** makes funds available for diesel emissions reduction, including installing emission reduction systems (See 42 U.S.C 16132). Seventy percent of the DERA appropriation is used for national competitive grants and rebates that use certified diesel emission reduction technologies. Thirty percent of the appropriation is allocated to States to fund programs for clean diesel projects.⁹

CMAQ and DERA-eligible truck idle reduction project types include:

- Verified Onboard Idle Reduction Technologies
- Truck Stop Electrification (TSE) and Electrified Parking Spaces (EPS)

For more information on emission reduction grant programs and examples of their successful application to idle reduction technologies see the Emissions Reduction Grant Program Fact Sheet.¹⁰

7.9.2 State Funding

State gas tax and other state sources could potentially fund truck parking projects. However, projects would need to be eligible under the various programs and would need to compete with numerous other priorities.

7.9.3 Public Private Partnerships

Since most of the truck parking in Oregon is located in private truck stops, working with the private sector could be beneficial in addressing the truck parking problem.. Some examples are provided below:

- Under a collaborative venture in Fernley, Nevada that could serve as a model for this type of relationship, the Nevada Department of Transportation has entered into an agreement to build a new truck parking lot adjacent to a Flying J truck stop off I-80, with the truck stop providing litter control and basic maintenance of the site¹¹.
- In another P3, the Brainerd Lakes Area Welcome Center in Minnesota Figure 23 is sited in the middle of a highway right of way. The site, which is operated as a rest area includes 30 truck parking spaces, bathrooms and vending machines. A gift shop helps support the operating costs of the facility.¹²

⁹ Emissions Reduction Grant Program Fact Sheet, National Coalition on Truck parking, 2018, p 1.

¹⁰ Emissions Reduction Grant Program Fact Sheet, National Coalition on truck parking, 2018.

¹¹ Activity Report, National Coalition on Truck Parking, 2015-2016, p. 18.

¹² Final Report, I-95 Corridor Coalition National Coalition on Truck Parking Synthesis, April 2019.

Figure 23: The Brainherd Lakes Area Welcome Center in Minnesota

- Virginia DOT invited the private sector to sponsor any of the 43 Virginia rest areas and welcome centers to defray the costs of operation. Florida DOT pursued a similar sponsorship program for its TPAS message signs.¹³
- The Interstate Oasis Program created under SAFETEA-LU allows states to partner with private operators who provide basic rest area services in exchange for online highway signing and official designation near an Interstate highway but not within the right-of-way. Oases exist in Connecticut, Illinois, Idaho, Pennsylvania, Ohio, and Utah.¹⁴

¹³ Final Report, I-95 Corridor Coalition National Coalition on Truck Parking Synthesis, April 2019.

¹⁴ Ibid.

8. NEXT STEPS

Prioritized needs and solutions were reviewed with relevant ODOT stakeholders at the final TAC meeting. Final priorities were identified and the study team matched solutions to areas of the particular needs. Recommended actions, drawn from the toolbox of prioritized solutions and matched to existing needs statewide and in each of the segments, are presented in section 7.8 of this report.

As a next step, the State should develop an implementation plan for this study in order to identify the more specific tasks needed to implement the study. In some cases, feasibility studies and proof-of-concept pilots may be appropriate to determine effectiveness, limitations and projected costs of implementing specific recommendations under consideration. Pilot programs for low-cost solutions, such as expanding rest areas with existing ROW, redesign/remarketing of rest areas to better utilize existing footprint or increasing participation in existing truck parking web applications, could speed implementation.