Appendix A

Stakeholder Survey Results

WASHINGTON STATE **JOINT TRANSPORTATION COMMITTEE**

TRUCK PARKING ACTION PLAN

Stakeholder Survey Results

prepared by

WSP USA, Inc.

under subcontract to

Cambridge Systematics, Inc.

NOVEMBER 2021

Washington State Joint Transportation Committee
Truck Parking Action Plan

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1.0 Introduction

The Washington State Joint Transportation Committee is sponsoring the development of a Truck Parking Action Plan. The Action Plan will include specific recommendations for immediate next steps for near-term and lasting change in the availability of truck parking. This is applicable to both short-haul and long-distance commercial vehicle drivers who require accommodations for parking commercial vehicles, obtaining services (food, restrooms, lodging, etc.), and complying with federal rest requirements.

The Action Plan is building on previous work. Truck parking issues in Washington state have been identified through a literature review of several documents including the *Washington State Truck Parking Study, 2016, Washington State Freight System Plan, 2017,* and *Washington State Truck Parking Workshop 2021* among other freight parking documentation from across the country.

As part of the development of the Truck Parking Action Plan, an industry-focused survey was conducted using the MetroQuest platform to collect feedback on truck parking issues and strategies to address near and long-term truck parking needs. The survey was used to validate and supplement industry-focused surveys that were conducted during previous truck parking studies.

The report presents the results of the survey in four parts:

1. Mapping areas of concern
2. Rating potential strategies
3. Allocating resources to potential strategies
4. Demographics of survey respondents

The survey was distributed to the project's stakeholder list, which included freight and logistics companies as well as other industry associations. The survey was also featured in industry publications and programs including Overdrive and Land Line Now, which respectively cater to owner-operators.

Participants could take the survey online from September 16, 2021 to October 4, 2021. During this time, there were 136 participants to the survey website (a number of whom visited the site more than once). A total of 3,168 data points and 48 comments were received. Of the total respondents, 82% participated via the web while 18% participated via mobile device.

2.0 Key Findings

The vast majority of survey respondents were involved in the trucking industry and most (59%) are truck drivers. Participants also represent a variety of company sizes and range of operations.

The survey respondents are familiar with the state as 44% park in the state three or more times weekly with 34% parking at a favorite spot and only 11% parking at company locations. Respondents also indicated they typically carry or drive several different types of vehicles and loads.

The vast majority (79%) of respondents identified a lack of parking as an issue in the mapping question. Their parking needs are mainly for both 10-hour breaks (36%) and for logistical staging (27%). Lack of parking was identified in or near urban areas at passes and borders (particularly with Oregon).

In terms of strategies that could address truck parking issues, “Add more parking spaces” and “Delivery hours” (which included requiring shippers to provide parking spaces) were the most popular of the five proposed strategies. Each strategy included several sub-strategies that were also rated. The highest rated sub-strategy was “Build dedicated truck parking facilities (with basic amenities) in/near logistics centers, seaports, ports of entry.” Other sub-strategies that were rated highly were “Expand safety rest areas” and “Require shippers and receivers to allow parking on-site for staging.” The lowest-rated strategy was “Paid parking.”

Participants were also asked how they would allocate resources among eight broad strategies. The most popular strategy was “Expand truck parking at rest areas.” Participants allocated the least amount of resources to “Paid reservation system for truck stops.”

These results validate previous surveys and outreach that there is a truck parking problem in Washington State. Solutions to be considered should include expanding or building new truck parking facilities, allowing parking at shipping and receiving facilities, and expanding delivery hours (which includes allowing drivers to park on-site at shippers and receivers).

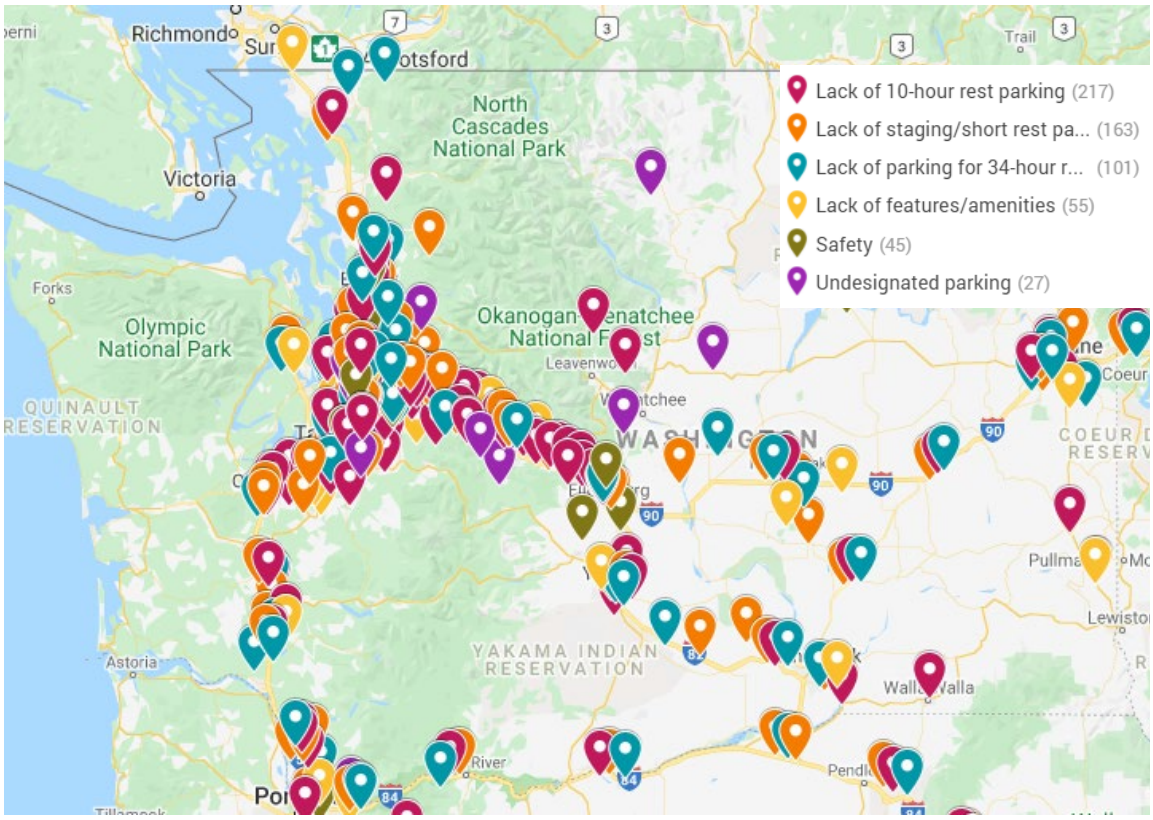
3.0 Location of Truck Parking Issues

Survey participants were asked to place at least three markers on a map of Washington State to identify locations of truck parking issues. Six types of markers represent the following issues:

- Lack of staging/short rest parking
- Lack of 10-hour rest parking
- Lack of parking for 34-hour rest
- Undesignated parking
- Safety
- Lack of features/amenities

Each participant was asked follow-up questions to understand the parking issues in the specific location, such as why parking was needed at that location and what was the purpose of parking. Participants could also provide general comments. Figure 3.1 shows the location of each comment or truck parking marker. This same information is also displayed on Google Map allowing the viewer to zoom in on particular areas of interest and select individual markers to view comments and survey responses: Google Map of Truck Parking Markers in Greater Washington State Area.

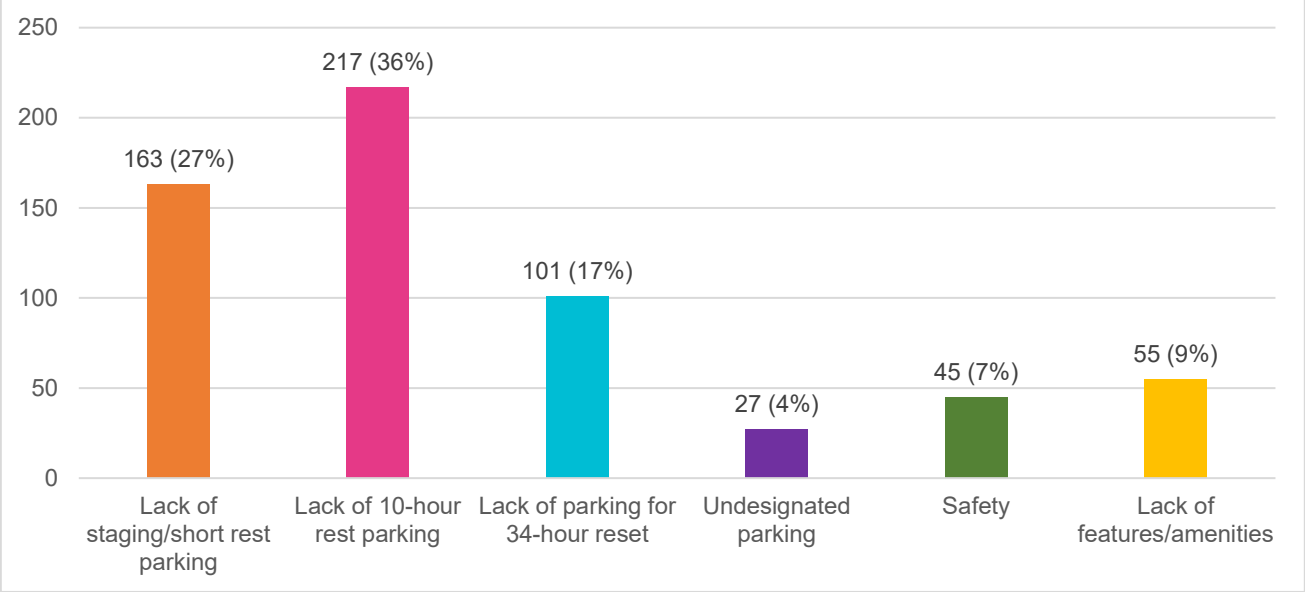
Figure 3.1 Truck Parking Markers in Greater Washington State Area



A total of 608 markers were placed on the map (Figure 3.1) and one general comment was provided. Consistent with previous studies, the bulk of the markers are in or near urban areas (particularly Seattle/Tacoma), at mountain passes, and borders (particularly with Oregon), in that order.

Figure 3.2 shows how the markers were distributed among the identified issues. Also, consistent with previous studies, the vast majority (79%) of markers placed represented lack of parking, with "Lack of 10-hour rest parking" representing the most popular response (36%). Most of the remaining markers represented lack of amenities and safety. Very few markers were placed for undesignated parking. The results reinforce the conclusion that lack of truck parking is the most significant issue for respondents.

Figure 3.2 Distribution of Map Markers

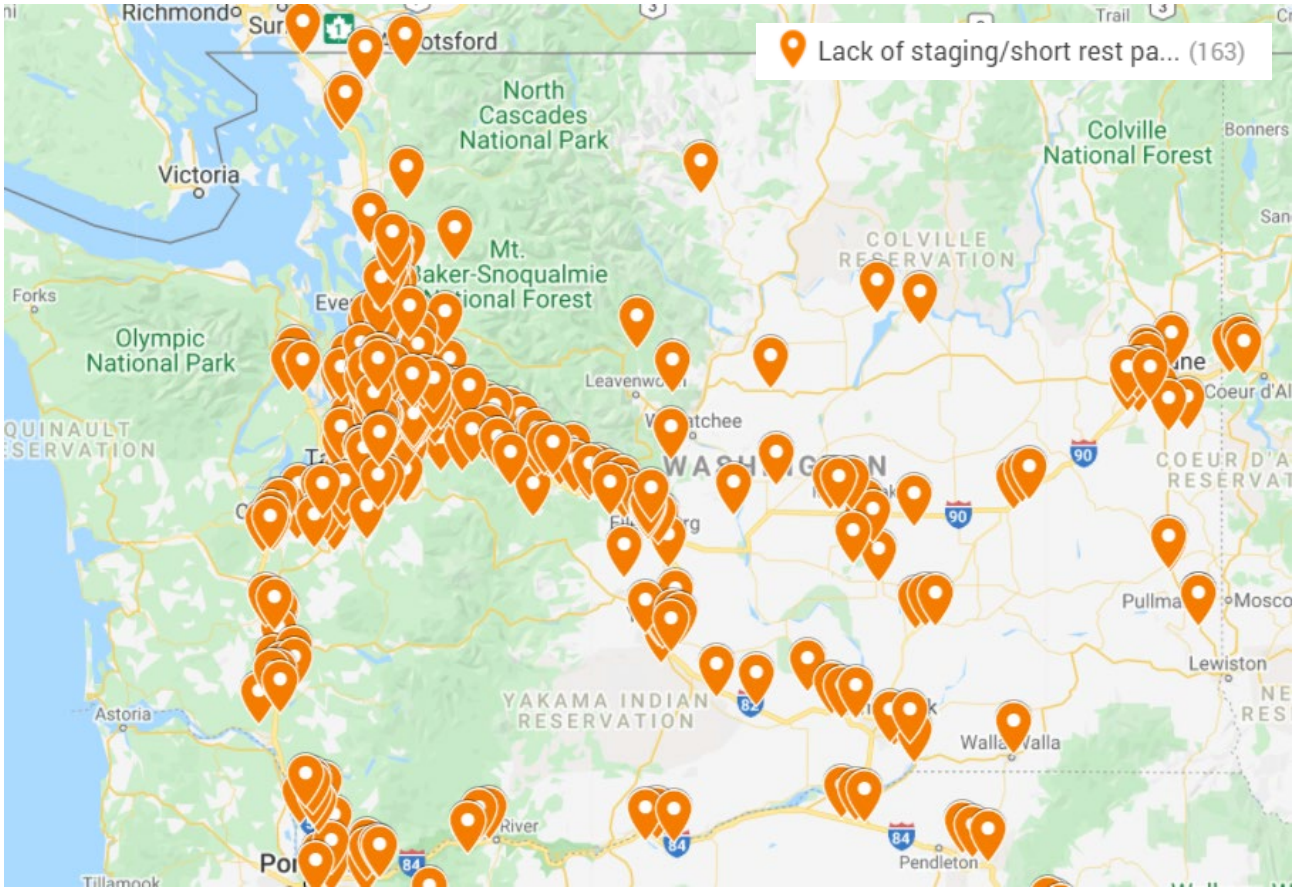


Participants were given the opportunity to provide more detail on the nature of the issue. Responses to these follow-up questions are presented in the following sub-sections.

3.1 Lack of Staging/Short Rest Parking

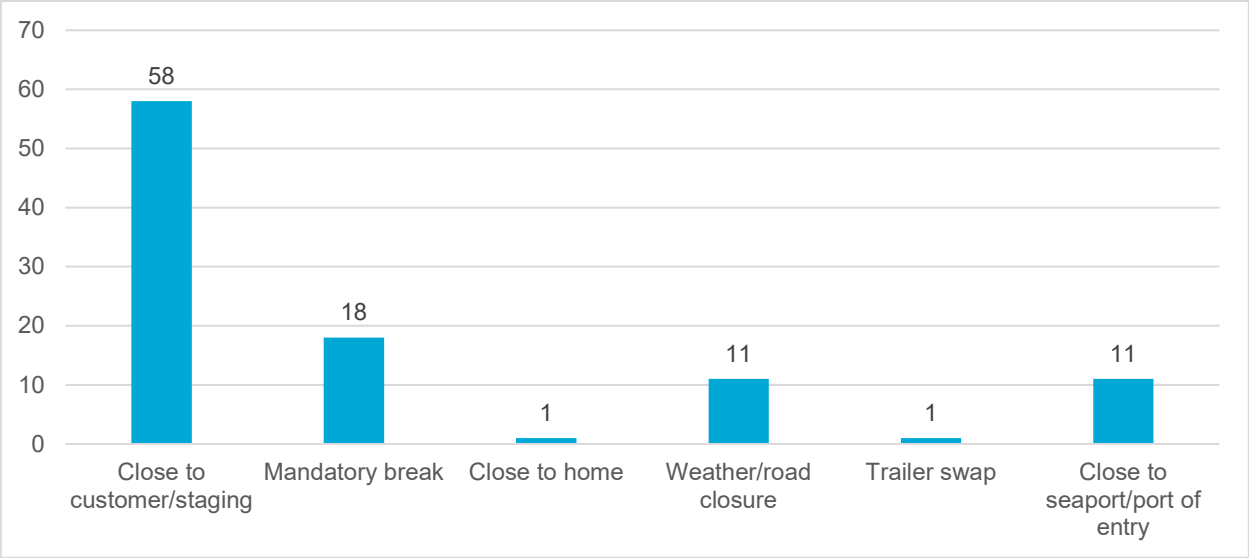
As shown in Figure 3.3, the greatest demand for staging/short term parking is in or near urban areas, particularly in the Puget Sound region. There was additional demand for staging/short term parking along mountain passes and at borders, particularly with Oregon and Idaho.

Figure 3.3 Lack of Staging/Short Rest Parking Map Markers



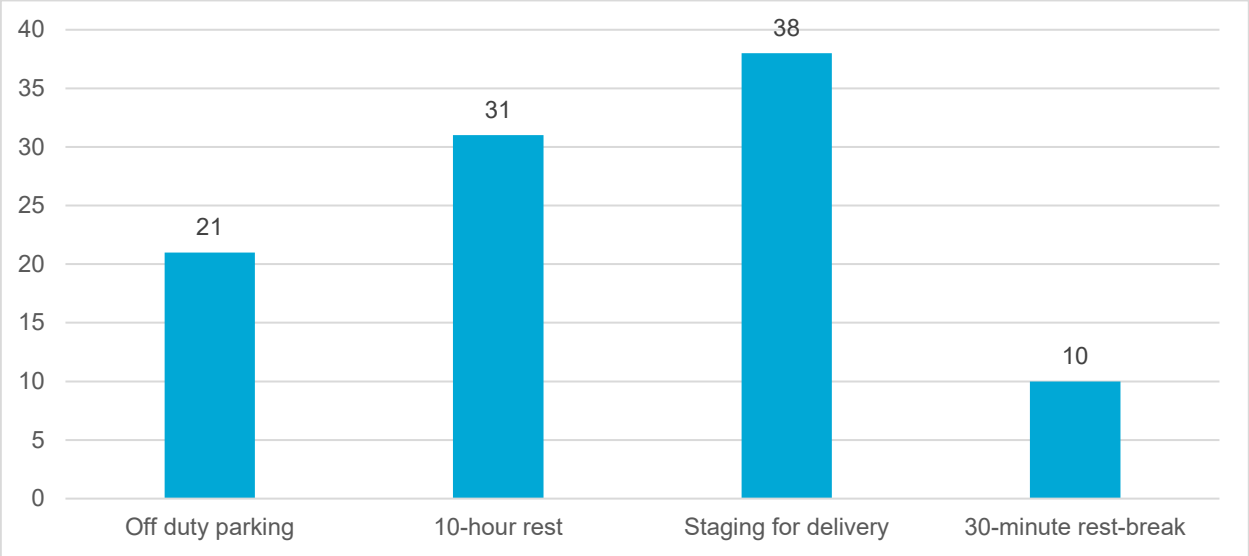
Participants were asked two follow-up questions regarding the lack of staging/short rest parking: “Why is parking needed here?” and “Purpose of parking?”. As shown in Figure 3.4, by far the most common reason (selected by 58 respondents) was that it was close to the customer or staging followed by mandatory break (18 respondents). Eleven respondents indicated that parking was needed due to weather or a road closure and proximity to seaport/port of entry.

Figure 3.4 Why is Parking Needed Here? [Lack of Staging/Short Rest Parking]



Participants were also asked about the purpose of parking at the location they placed the marker. The results, shown in Figure 3.5, demonstrate that most respondents park for "staging for delivery" although "10-hour rest" was selected by 31 respondents, indicating that truck drivers often combine staging and rest breaks when parking.

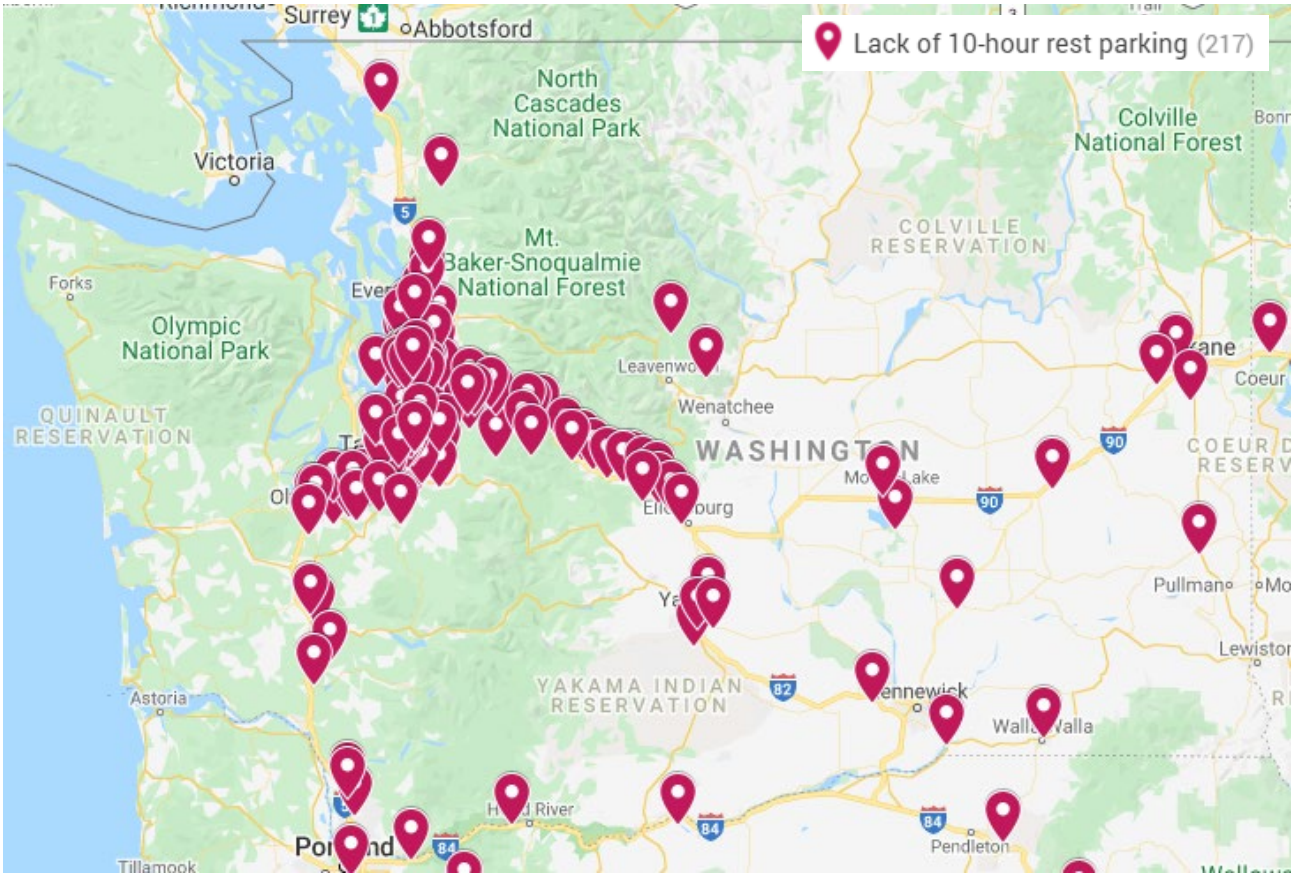
Figure 3.5 Purpose of Parking? [Lack of Staging/Short Rest Parking]



3.2 Lack of 10-hour Rest Parking

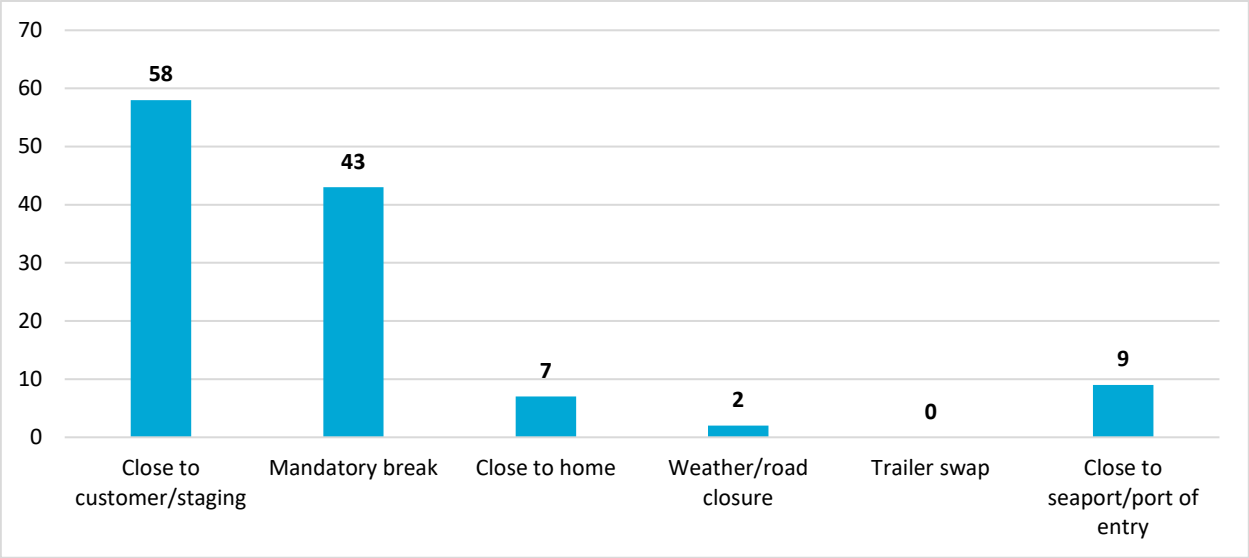
Similar to 'Lack of Staging/Short Rest Parking,' the majority of the locations identified for 'Lack of 10-hour Rest Parking' were placed in or near urban areas, particularly in the Puget Sound region, along the mountain passes and at borders particularly with Oregon (see Figure 3.6).

Figure 3.6 Lack of 10-hour Rest Parking Map Markers



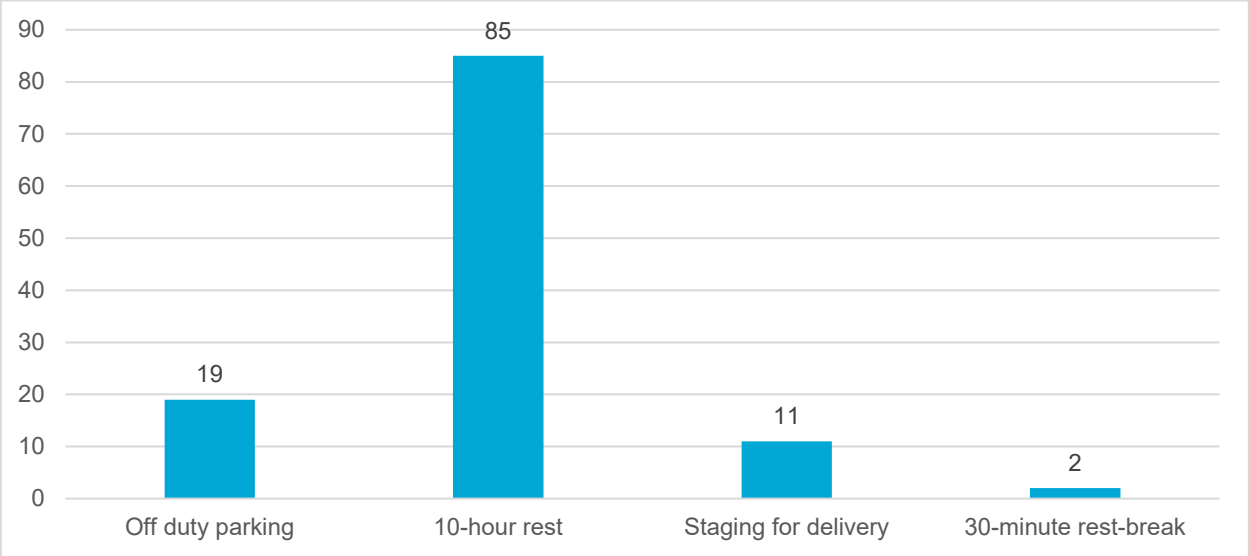
As shown in Figure 3.7, the majority (49%) of respondents indicated parking was needed at that location because it was close to the customer or staging. Of total respondents, 36% said parking was needed for a mandatory break. These responses reinforce the finding that truck drivers look for parking close to customers, even for longer rest-breaks.

Figure 3.7 Why is Parking Needed Here? [Lack of 10-hour Rest Parking]



Participants were also asked about the purpose of parking at the location they placed the marker (Figure 3.8). As expected, the vast majority of respondents said they parked at that location for “10-hour rest,” although some responded, “off duty parking” and “staging for delivery.” Only 2% parked at that location for a ”30-minute rest-break.”

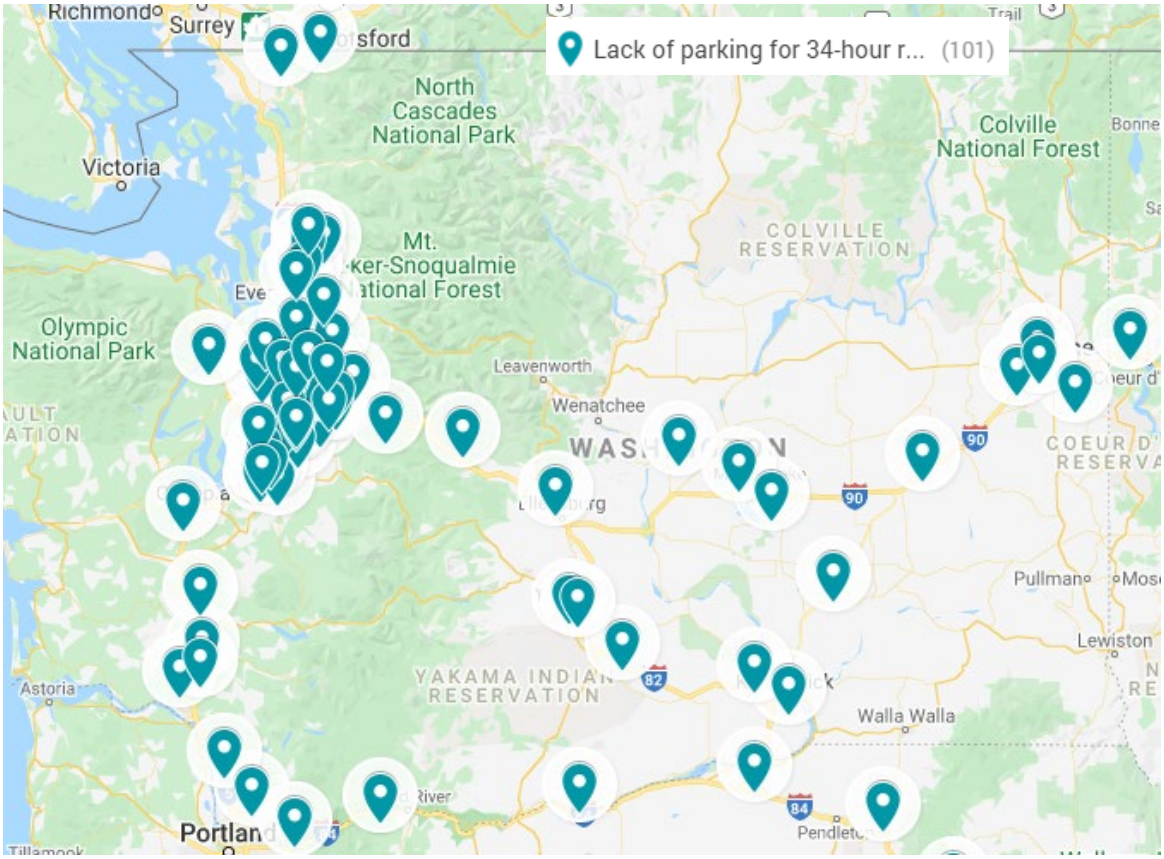
Figure 3.8 Purpose of Parking? [Lack of 10-hour Rest Parking]



3.3 Lack of Parking for 34-hour Rest

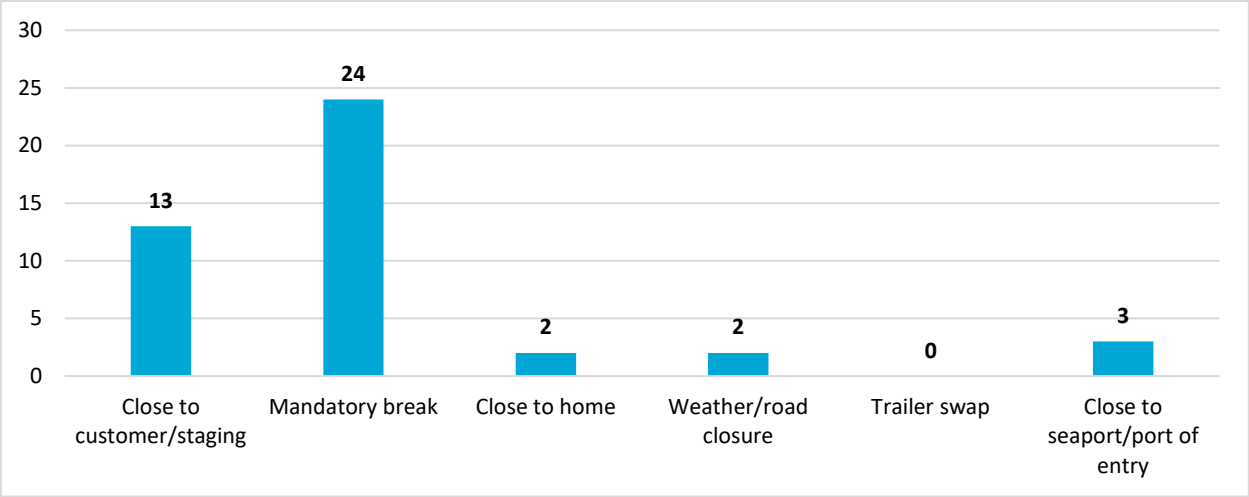
Consistent with other truck parking studies, the greatest demand for 34-hour rest parking is in or near the urban areas where owner-operator truck drivers live and need a place to park their truck when at home. (Figure 3.9).

Figure 3.9 Lack of Parking for 34-hour Rest Map Markers



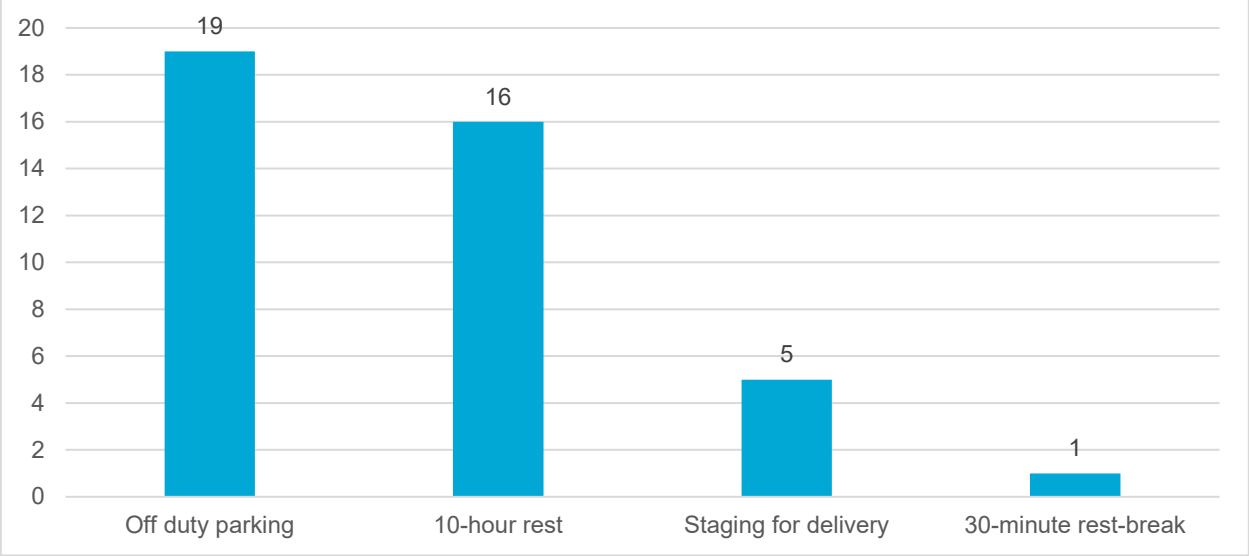
Participants were asked two follow-up questions regarding the lack of 34-hour rest parking: “Why is parking needed here?” and “Purpose of parking?”. As shown in Figure 3.10, 24 respondents said that it was due to a mandatory break while 13 respondents said it was close to the customer or staging.

Figure 3.10 Why is Parking Needed Here? [Lack of 34-hour Rest Parking]



Participants were also asked about the purpose of parking at the location they placed the marker. The results, shown in Figure 3.11, demonstrate that nearly all respondents park for "off duty parking" and "10-hour rest."

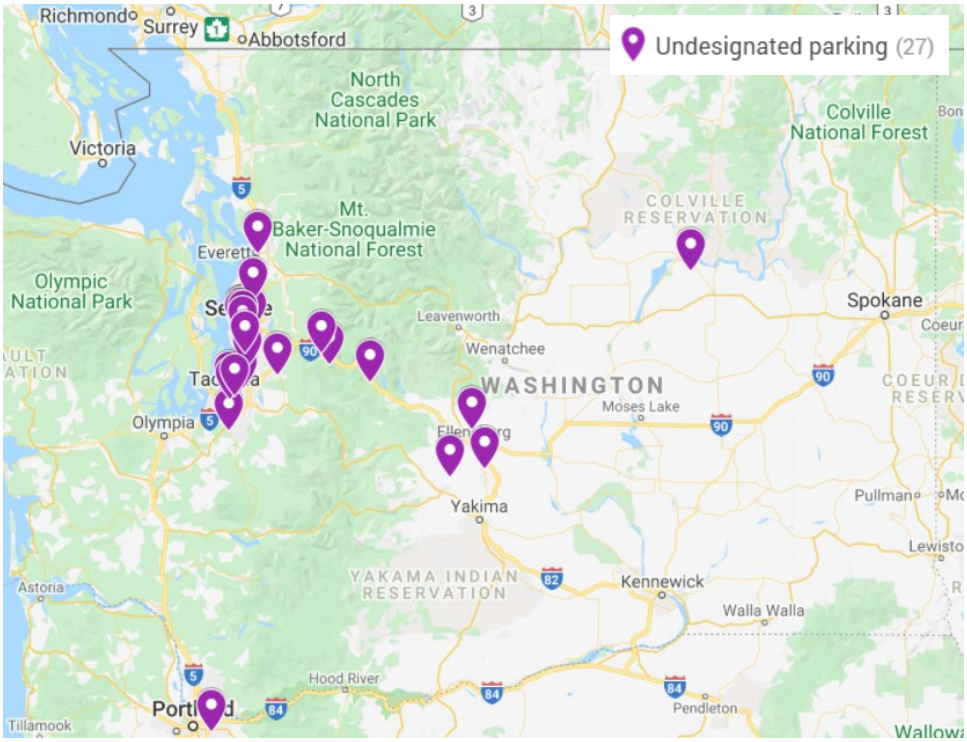
Figure 3.11 Purpose of Parking? [Lack of 34-hour Rest Parking]



3.4 Undesignated Parking

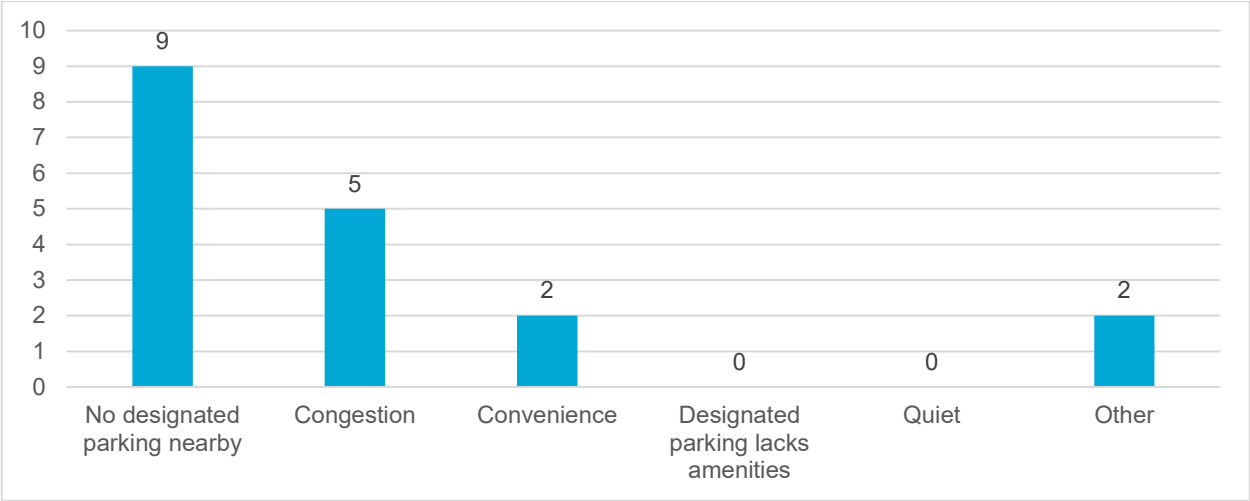
Of the 27 map markers placed for 'Undesignated Parking', the majority are placed in or near urban areas in the Puget Sound region. (Figure 3.12).

Figure 3.12 Undesignated Parking Map Markers



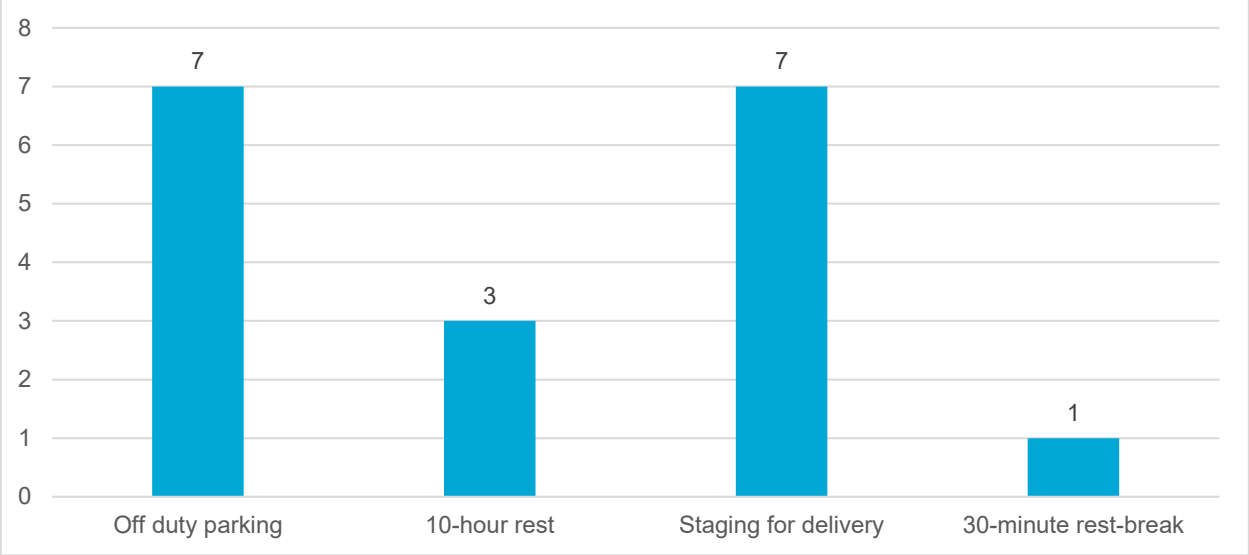
Participants who identified undesignated parking locations indicated that a lack of designated parking and congestion were the main reasons for parking there (Figure 3.13).

Figure 3.13 Why Are You Parking Here? [Undesignated Parking]



Drivers parking in undesignated parking most often cited “off duty parking” and “staging for delivery” (Figure 3.14).

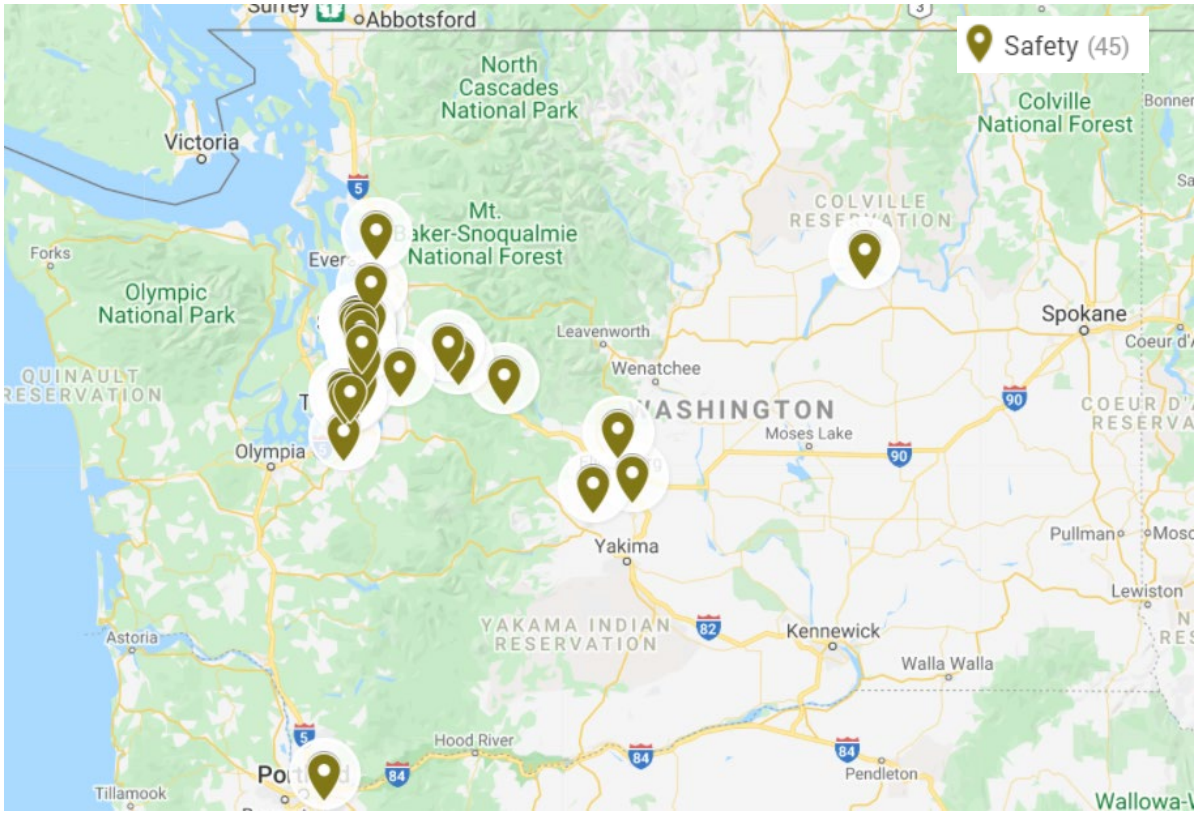
Figure 3.14 Purpose of Parking? [Undesignated Parking]



3.5 Safety

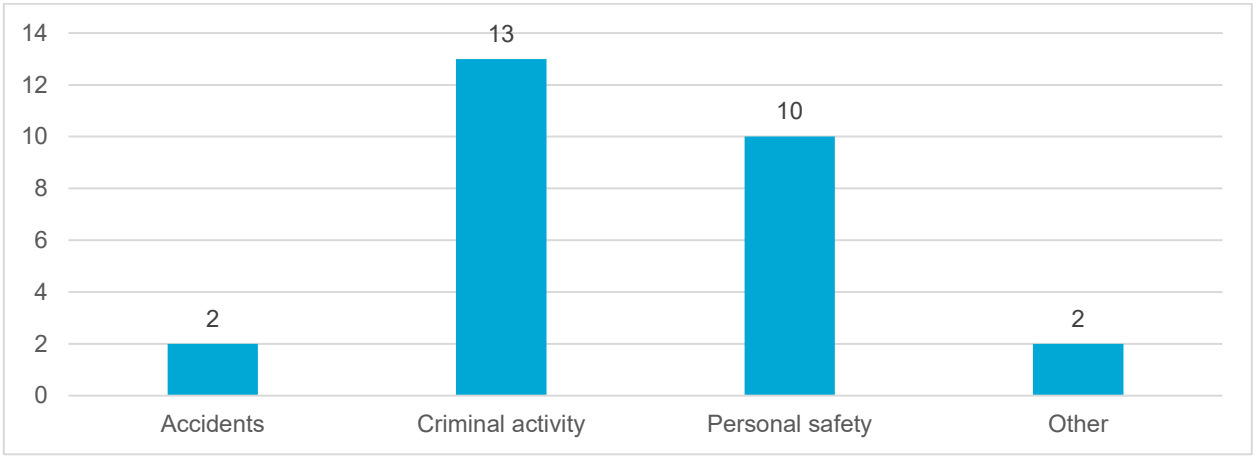
As shown in Figure 3.15, safety issues were identified in or near urban areas, particularly in the Puget Sound region. A few markers were also placed around central Washington with one at the Oregon border.

Figure 3.15 Safety Map Markers



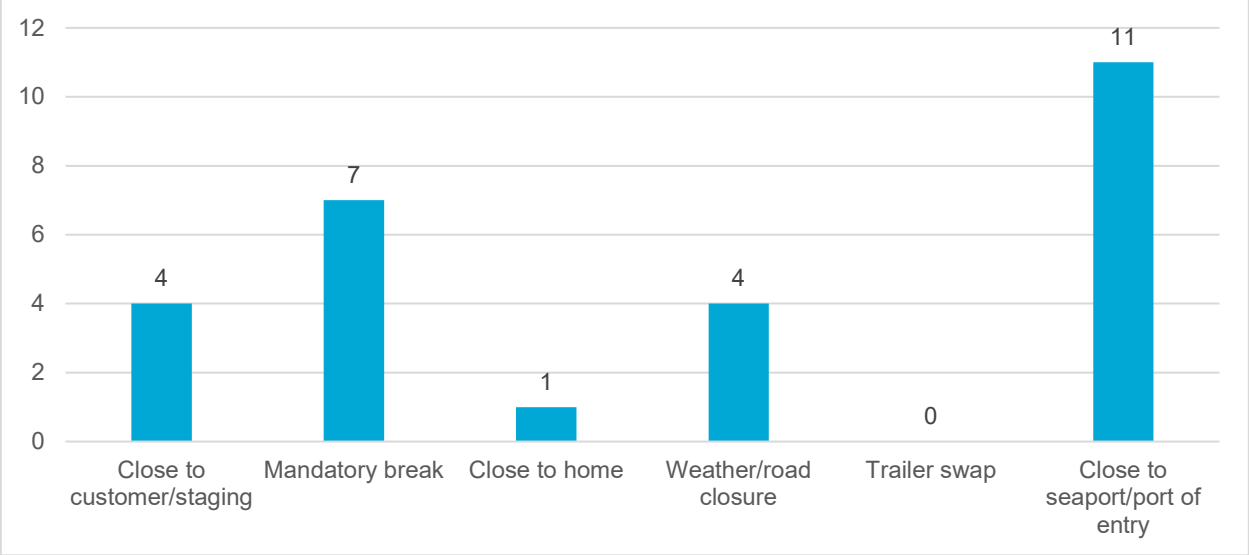
Participants who placed safety markers were asked “What are the safety/security issues?” and “Why do you need to park here?”. As shown in Figure 3.16, “criminal activity” and “personal safety” were the most frequently cited issues.

Figure 3.16 What Is the Safety/Security Issue?



The majority (41%) of respondents said that they parked at unsafe locations because it was “close to seaport/port of entry” while 26% indicated it was for a “mandatory break” (Figure 3.17).

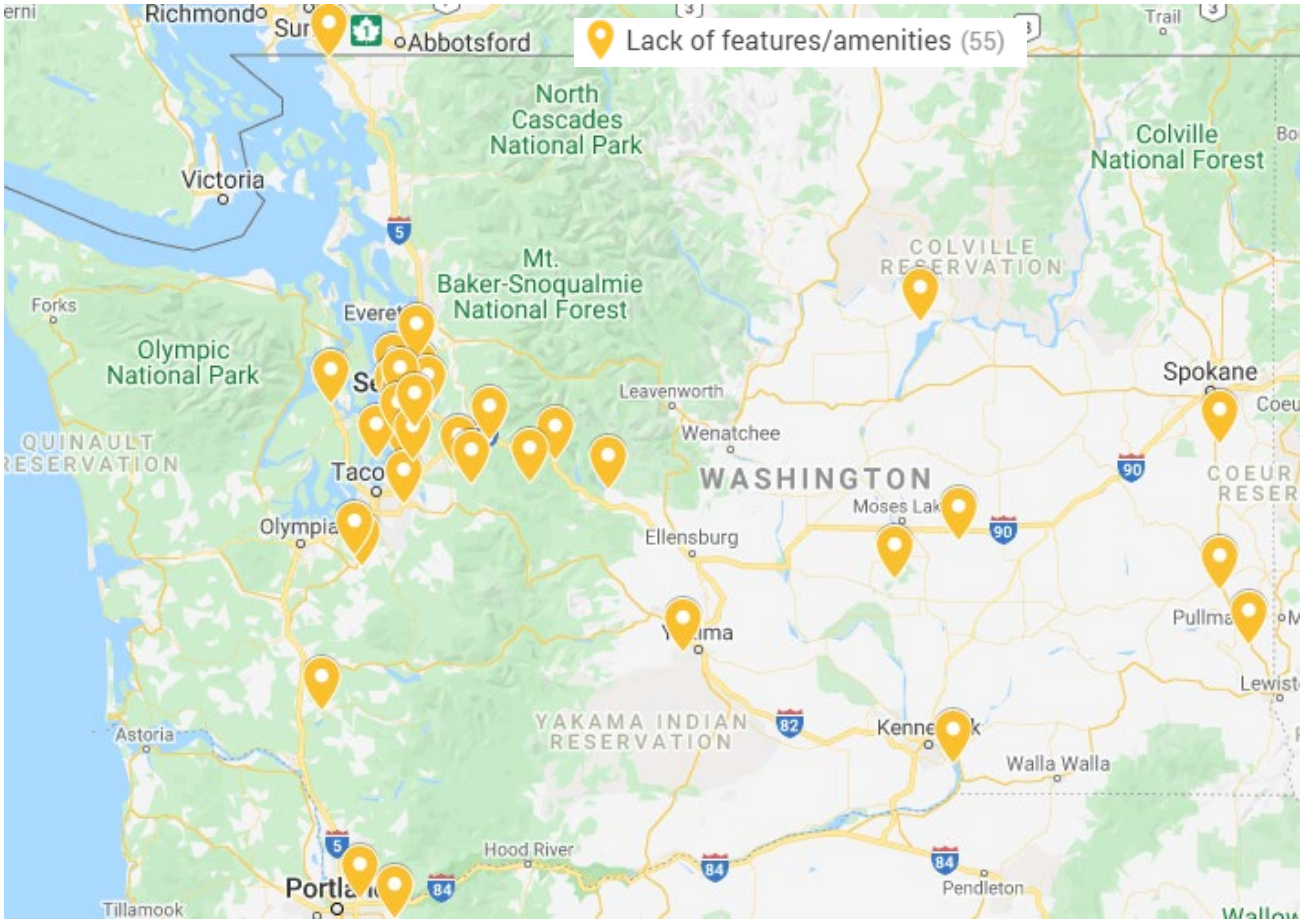
Figure 3.17 Why Do You Need to Park Here?



3.6 Lack of Amenities

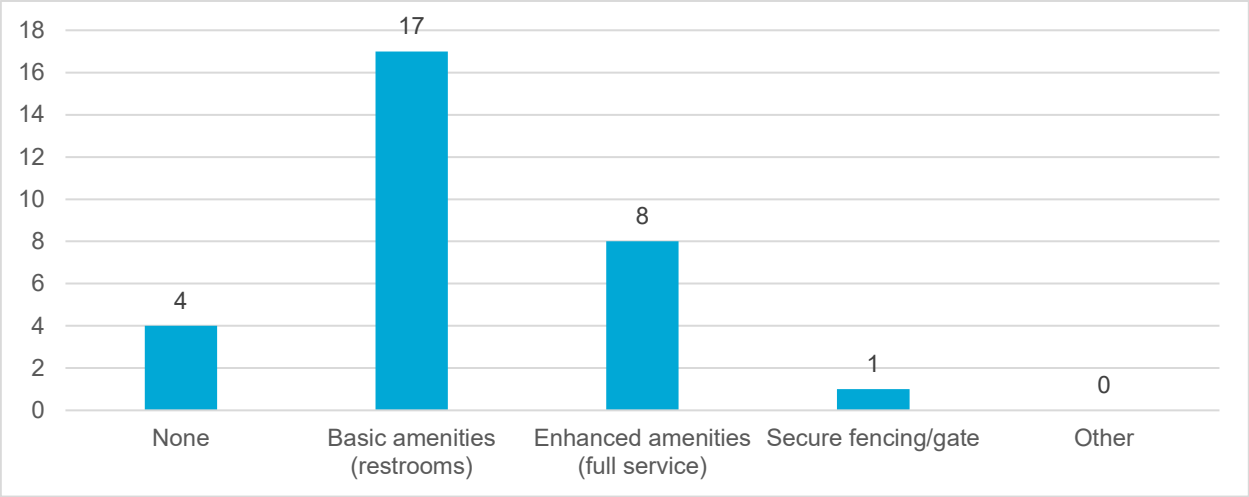
As shown in Figure 3.18, a lack of amenities was identified in and near urban areas, particularly in the Puget Sound region, as well as in locations at the borders of Oregon, Idaho and Canada. There were also markers identified along major interstate and freeway corridors, such at I-90, I-82 and US 195.

Figure 3.18 Lack of Amenities Map Markers



Participants who placed markers indicating a lack of amenities were asked were asked one follow-up question: “What features are lacking?”. Of the responses received, the majority (57%) cited the location was lacking basic amenities, such as restrooms (Figure 3.19).

Figure 3.19 What Features Are Lacking?



One general comment was also received in this section of the survey. The comment was “Tacoma.” (Possibly noting broadly where the participant has experienced a lack of amenities.)

4.0 Potential Strategies

Participants were asked to rate potential strategies on how well they thought each one would alleviate truck parking issues. Five main strategies were set forth and each strategy included several sub-strategies that were also rated.

The participants were asked to rate strategies on a scale of one (least beneficial) to five (most beneficial). Participants could also include a comment about each sub-strategy. In total, the strategies received 1,700 ratings as well as 46 comments.

Table 4.1 represents the average score for each strategy, which was calculated by adding up the ratings and dividing them by the number of inputs for each strategy or sub-strategy. The higher the average score, the more beneficial the strategy or sub-strategy in the view of participants. “Adding more parking spaces” and “Delivery hours” (which also included requiring shippers or receivers to provide parking on-site) received the highest score, followed by “Better utilize existing parking” and “On-street parking.” The lowest rated strategy was “Paid parking.”

Table 4.1 Potential Strategies Ranked by Average Score

Strategies	Average Score
Add more parking spaces	4.2
Delivery hours	4.2
Better utilize existing parking	3.8
On-street parking	3.6
Paid parking	2.6

The following sections describe the survey results for each of these strategies and the associated sub-strategies in the same order as shown in Table 1.

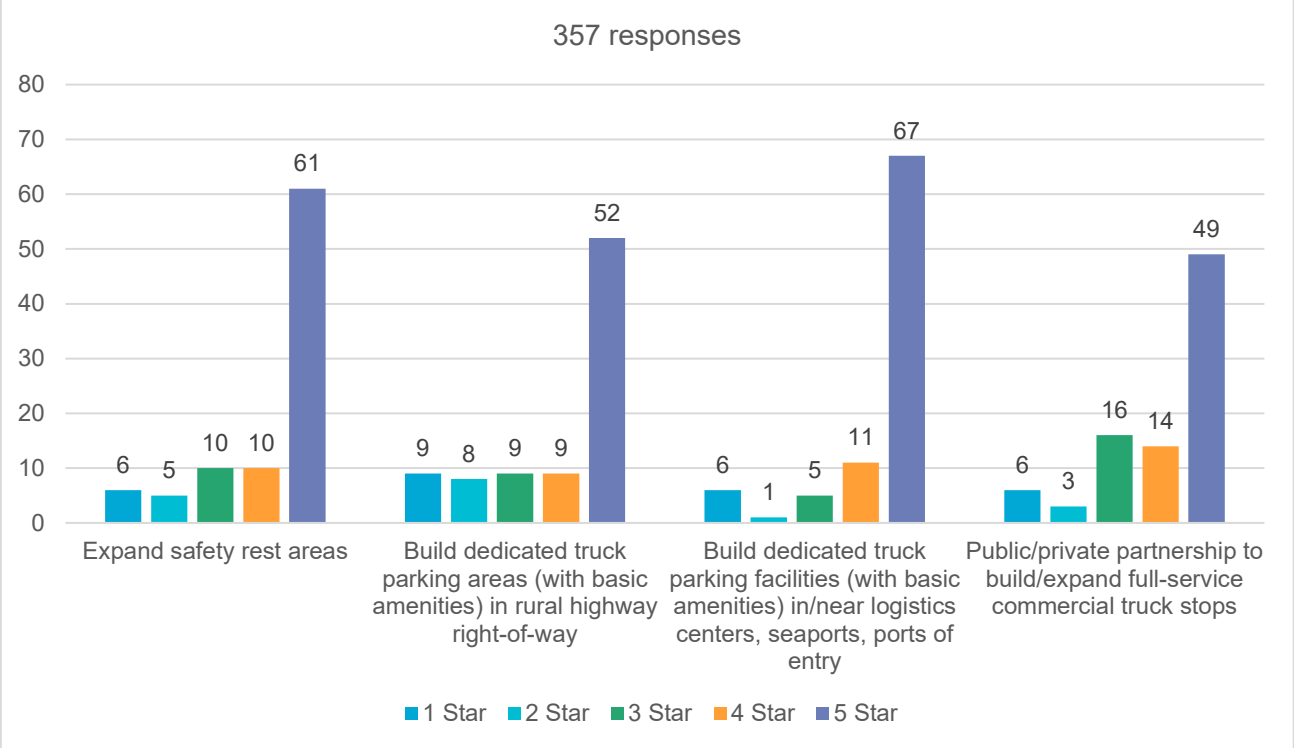
4.1 Add More Parking Spaces

“Add more parking spaces” was tied as the highest ranked of all the strategies. As shown in Table 4.2 and Figure 4.1, the highest rated sub-strategy was to “Build dedicated truck parking facilities (with basic amenities) in/near logistics centers, seaports, ports of entry.” This was actually the highest rated sub-strategy among all sub-strategies ranked by participants. The second highest sub-strategy in this group was “Expand safety rest areas.” “Public/private partnerships to build/expand full-service commercial truck stops,” and “Build dedicated truck parking areas (with basic amenities) in rural highway right-of-way” were also highly rated sub-strategies by participant. The results suggest that the participants believe all these sub-strategies would be worth pursuing or exploring further.

Table 4.2 Add More Parking Spaces – Sub-strategies Ranked by Average Score

Item	Average Score
Build dedicated truck parking facilities (with basic amenities) in/near logistics centers, seaports, ports of entry	4.5
Expand safety rest areas	4.3
Public/private partnerships to build/expand full-service commercial truck stops	4.1
Build dedicated truck parking areas (with basic amenities) in rural highway right-of-way	4.0

Figure 4.1 Add More Parking Spaces – Sub-strategy Rated



Comments provided by participants on this strategy and associated sub-strategies indicate a high level of need and support for building additional, safe truck parking spaces in general. Concerns expressed about challenges associated with this strategy include land costs and community opposition.

4.2 Delivery Hours

"Delivery hours" was also the highest ranked of all the strategies. As shown in Table 4.3 and Figure 4.2, the highest rated sub-strategy by average score was "Require shippers and receivers to allow parking on-site for staging," followed closely by "Require shippers and receivers to allow parking on-site for overnight parking," "Incentivize businesses to accept deliveries 24/7," and "Longer delivery hours." The results suggest that the participants believe all these sub-strategies would be worth pursuing or exploring further.

Table 4.3 Delivery Hours – Sub-strategies Ranked by Average Score

Item	Average Score
Require shippers and receivers to allow parking on-site for staging	4.3
Require shippers and receivers to allow parking on-site for overnight parking	4.2
Incentivize businesses to accept deliveries 24/7	4.2
Longer delivery hours	4.2

Figure 4.2 Delivery Hours – Sub-strategies Rated

Comments provided by participants on this strategy and associated sub-strategies demonstrate a high level of support for requiring shippers and receivers to allow parking on-site for both staging and rest parking. The comments were also supportive of longer delivery hours. Respondents felt these strategies would promote safety and efficiency. There were some concerns expressed about challenges associated with obtaining support of property owners for requiring additional parking. Better Utilize Existing Parking

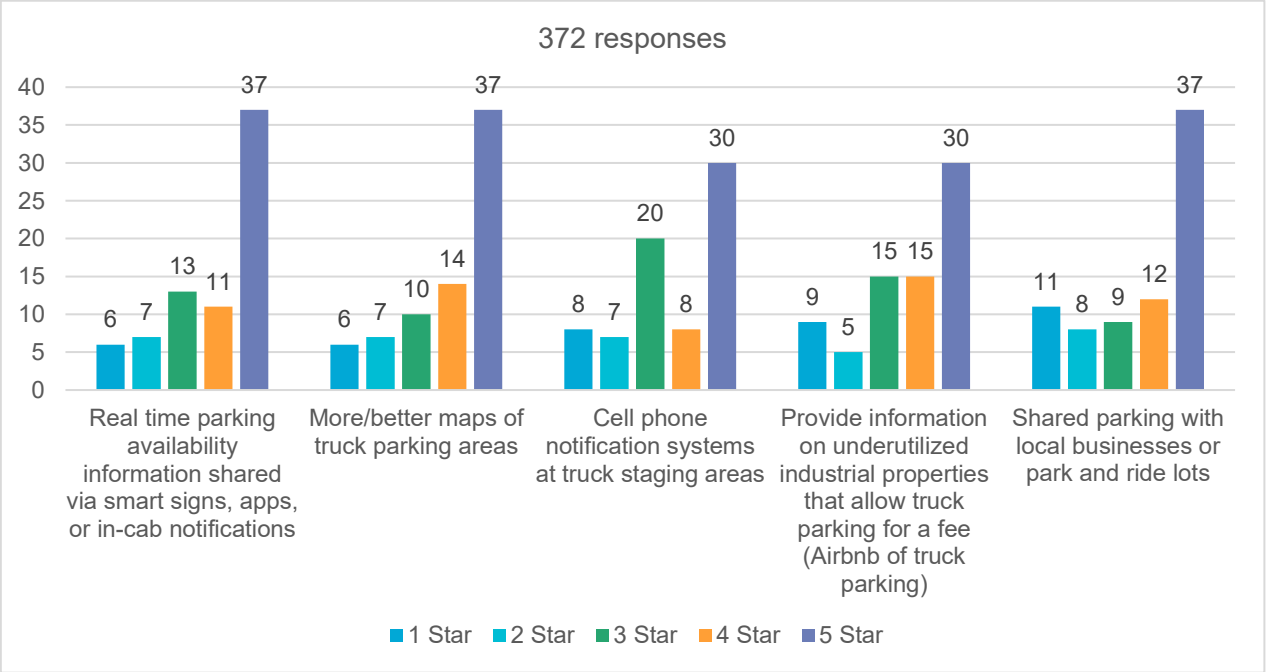
4.3 Better Utilize Existing Parking

“Better utilize existing parking” was the third-highest ranked strategy (Table 4.4). This strategy also includes five sub-strategies that were also rated by participants (Figure 4.3).

Table 4.4 Better Utilize Existing Parking – Sub-strategies Ranked by Average Score

Item	Average Score
Real-time parking availability information shared via smart signs, apps, or in-cab notifications	3.9
More/better maps of truck parking areas	3.9
Provide information on underutilized industrial properties that allow truck parking for a fee (Airbnb of truck parking)	3.7
Shared parking with local businesses or park and ride lots	3.7
Cell phone notification systems at truck staging areas	3.6

Figure 4.3 Better Utilize Existing Parking – Sub-strategy Rated



As shown in Table 4.4 and Figure 4.3, the highest rated sub-strategies for better utilizing existing parking, by average score, were “Real-time parking availability information shared via smart signs, apps, or in-cab notifications” and “More/better maps of truck parking area.” These sub-strategies were followed closely in terms of average score by two sub-strategies, “Provide information on underutilized industrial properties that allow truck parking for a fee (Airbnb of truck parking)” and “Share parking with local businesses or park and ride lots.”

Comments provided by participants on this strategy and associated sub-strategies were mixed with some supportive of these sub-strategies and others not. Those supportive of the strategy liked the idea of smart signs as well as providing information on underutilized industrial properties that allow truck parking for a fee. Individual commenters expressed concerns about specific sub-strategies such as cell phone notification systems, use of park and rides, and paid parking. On-Street Parking

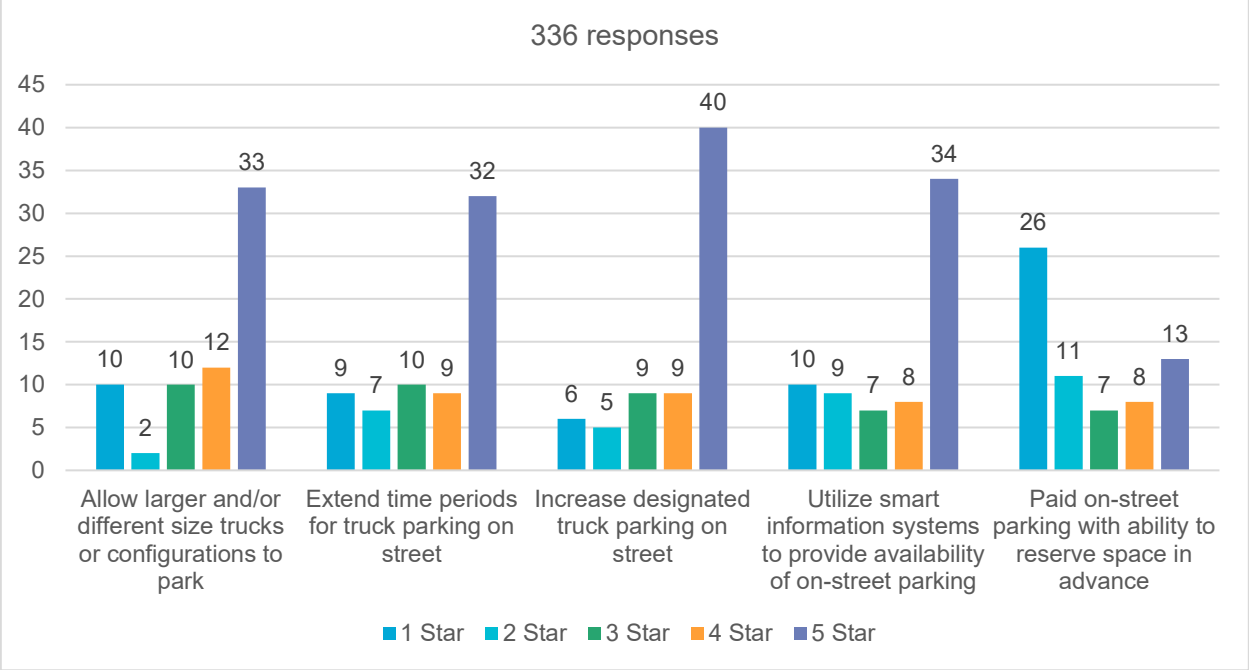
4.4 On-Street Parking

"On-street parking" was the fourth-highest ranked strategy (Table 4.5). This strategy includes five sub-strategies that were rated by participants (Figure 4.4).

Table 4.5 On-Street Parking – Sub-strategies Ranked by Average Score

Item	Average Score
Increase designated truck parking on streets	4.0
Allow larger and/or different size trucks or configurations to park	3.8
Extend time periods for truck parking on streets	3.7
Utilize smart information systems to provide availability of on-street parking	3.7
Paid on-street parking with ability to reserve space in advance	2.6

Figure 4.4 On-Street Parking – Sub-strategies Rated



As shown in Table 4.5 and Figure 4.4, the highest rated sub-strategy by average score was "Increase designated truck parking on streets." The second highest sub-strategy in this group was "Allow larger and/or different size trucks or configurations to park." The lowest rated sub-strategy was "Paid on-street parking with ability to reserve space in advance."

Comments provided by participants on this strategy and associated sub-strategies were mixed with some supportive of this strategy and others not. Paid Parking

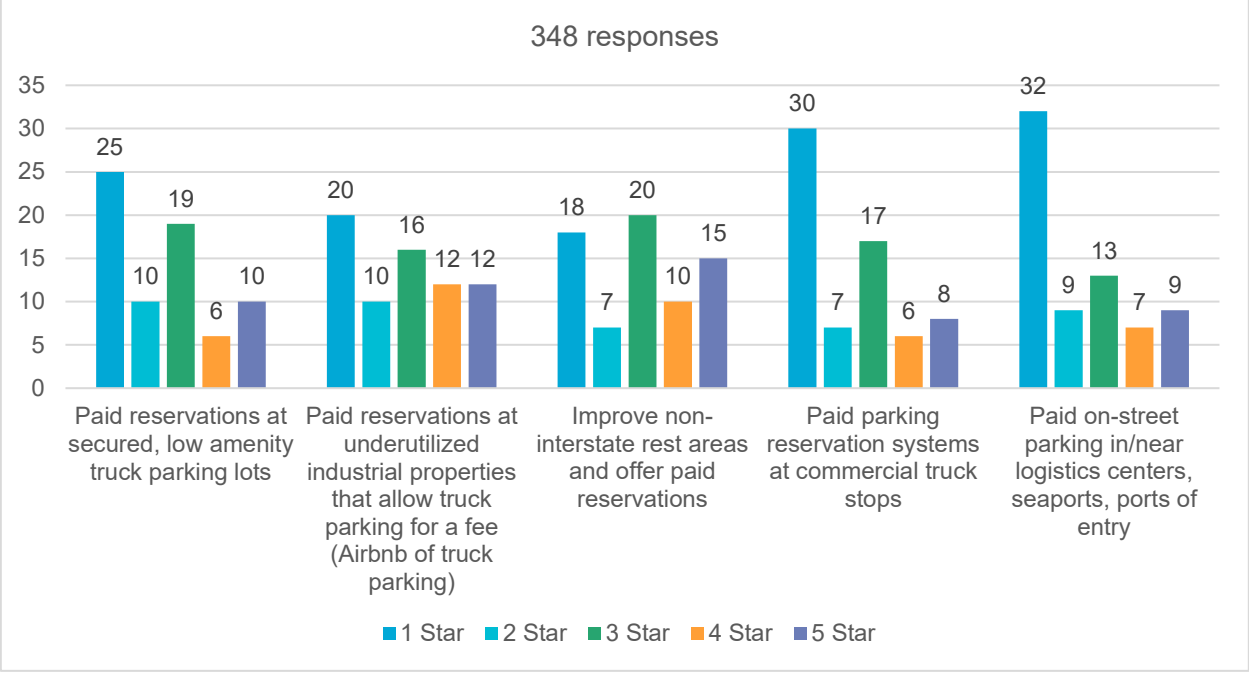
4.5 Paid Parking

The lowest ranked strategy was “Paid parking.” This strategy included five sub-strategies that were rated by participants. As depicted in Table 4.6 and Figure 4.5, the sub-strategies in this grouping received some of the lowest scores of all sub-strategies. The lowest rated sub-strategies, “Paid parking reservation systems at commercial truck stops” and “Paid on-street parking in/near logistics centers, seaports, ports of entry,” received average scores of 2.3. None of the paid-parking ideas appeared popular among drivers, while the idea of paid on-street truck parking and paid reservation systems at commercial truck stops were the most unpopular.

Table 4.6 Paid Parking – Sub-strategies Ranked by Average Score

Item	Average Score
Improve non-interstate rest areas and offer paid reservations	3.0
Paid reservations at underutilized industrial properties that allow truck parking for a fee (Airbnb of truck parking)	2.8
Paid reservations at secured, low amenity truck parking lots	2.5
Paid parking reservation systems at commercial truck stops	2.3
Paid on-street parking in/near logistics centers, seaports, ports of entry	2.3

Figure 4.5 Paid Parking – Sub-strategies Rated



Comments provided by participants on this strategy and associated sub-strategies demonstrate a lack of support for paid parking.

5.0 Resource Allocation

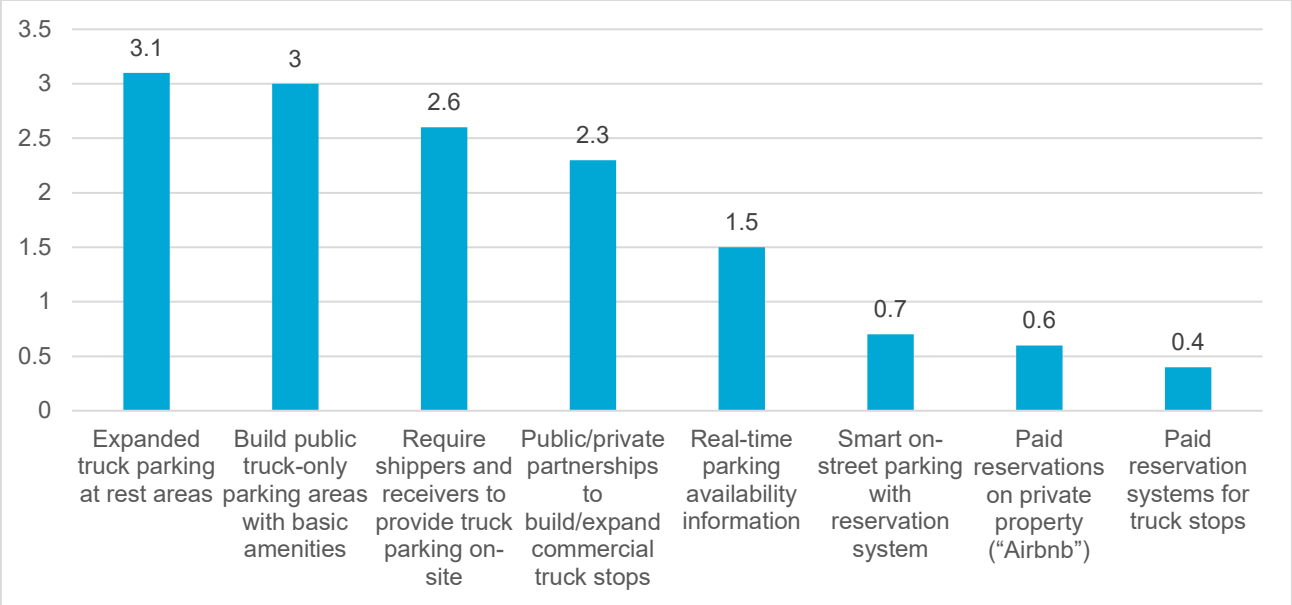
Survey participants were asked how they would allocate resources to potential strategies should additional funding became available. Participants were given 15 chips to distribute between eight potential strategies. They could allocate anywhere from 0 to all 15 chips into a given strategy. In total, 384 responses were received as well as one general comment.

Table 5.1 and Figure 5.1 present the average number of chips participants allocated to each strategy. Strategies with higher average scores were favored by participants.

Table 5.1 Average Score of Chips Allocated to Potential Strategies

Strategy	Average Score
Expand truck parking at rest areas	3.1
Build public truck-only parking areas with basic amenities	3.0
Require shippers and receivers to provide truck parking on-site	2.6
Public/private partnerships to build/expand commercial truck stops	2.3
Real-time parking availability information	1.5
Smart on-street parking with reservation system	0.7
Paid reservations on private property (“Airbnb”)	0.6
Paid reservation systems for truck stops	0.4

Figure 5.1 Average Number of Chips Allocated to Potential Strategies

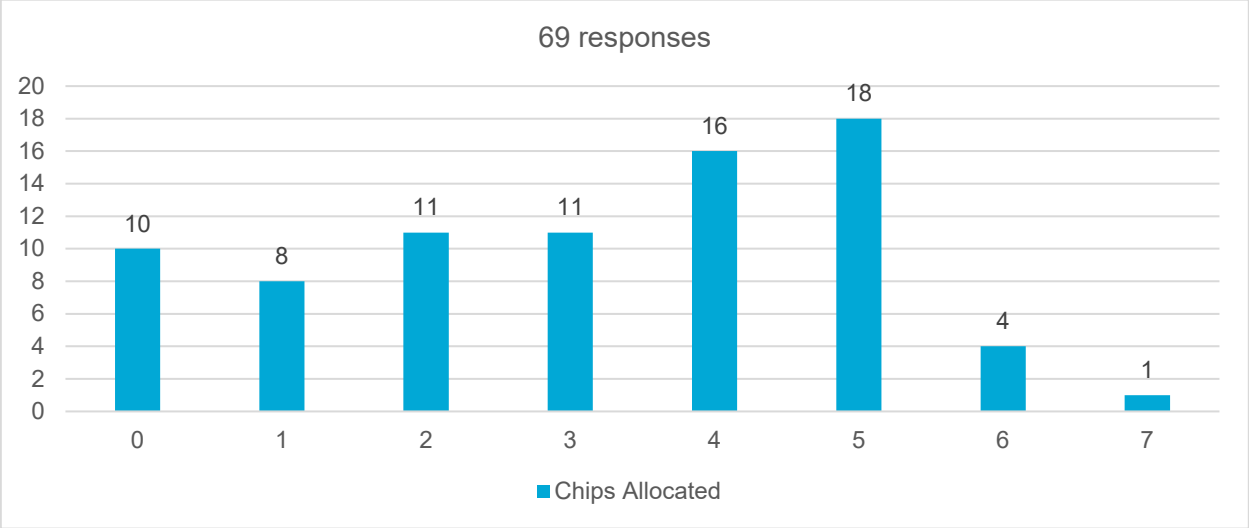


The following sections describe the survey results for each of these strategies in the same order as shown in Table 5.1.

5.1 Expand Truck Parking at Rest Areas

"Expand truck parking at rest areas" received the greatest number of responses and had the highest average score. As shown in Figure 5.2, 18 respondents (23%) allocated five chips to this strategy closely followed by 16 respondents (20%) assigning four chips. The results suggest that the participants believe this strategy would be worth pursuing or exploring further.

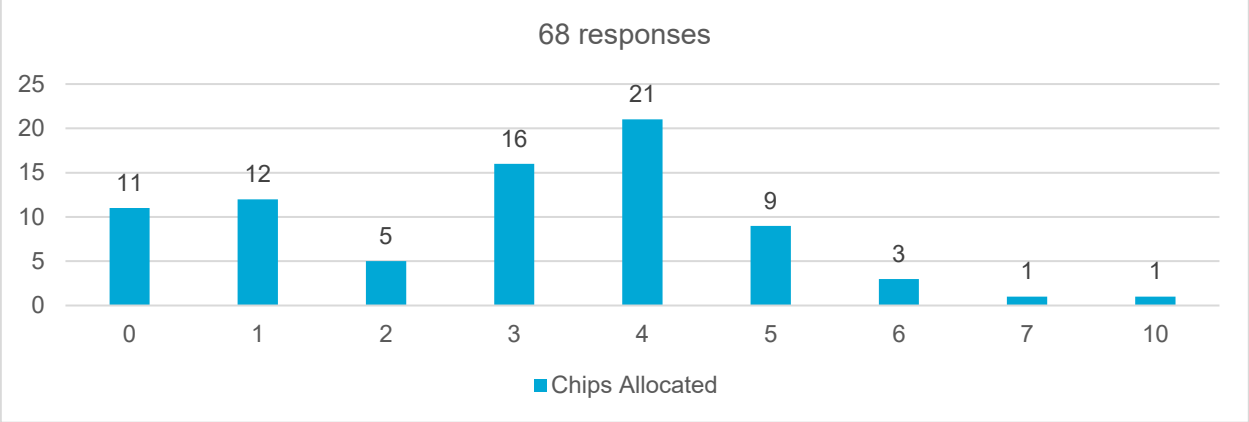
Figure 5.2 Expand Truck Parking at Rest Areas – Chip Allocation



5.2 Build Public Truck-Only Parking Areas with Basic Amenities

"Build public truck-only parking areas with basic amenities" received 68 total responses and had the second highest average score. As shown in Figure 5.3, 21 respondents (27%) gave four chips to this strategy, closely followed by assigning three chips (20%). Participants had a wide range of responses to this strategy, including 11 respondents (14%) giving zero chips up to one respondent (1%) giving 10 chips to this particular strategy, demonstrating that it isn't universally liked.

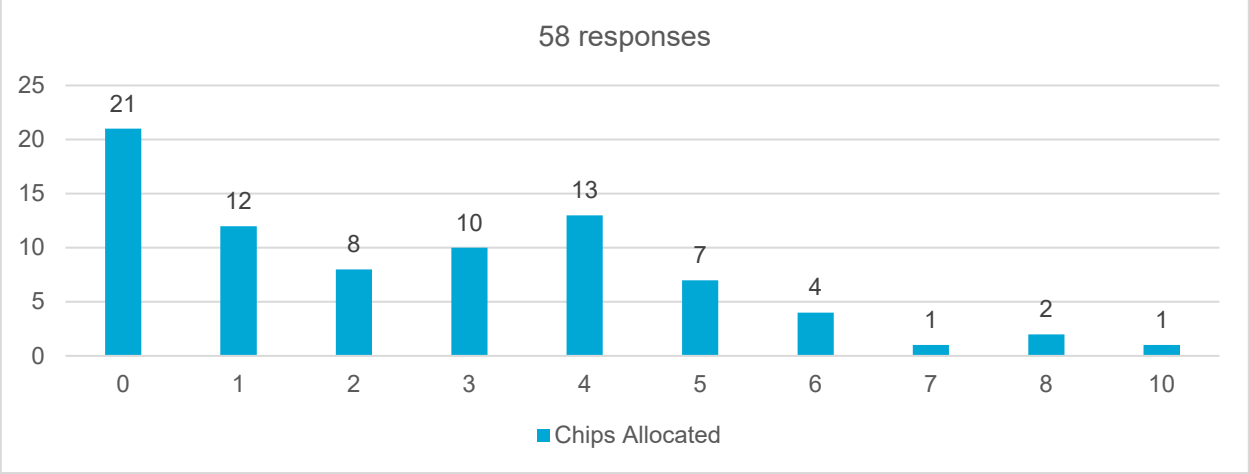
Figure 5.3 Build Public Truck-Only Parking Areas with Basic Amenities – Chip Allocation



5.3 Require Shippers and Receivers to Provide Truck Parking On-Site

The majority (54%) of chips given to the strategy ranged from one to four chips, indicating moderate interest in committing resources to this strategy. Five or more chips were given to this strategy 19% of the time while the remaining 27% of chips given were of a zero value (Figure 5.4).

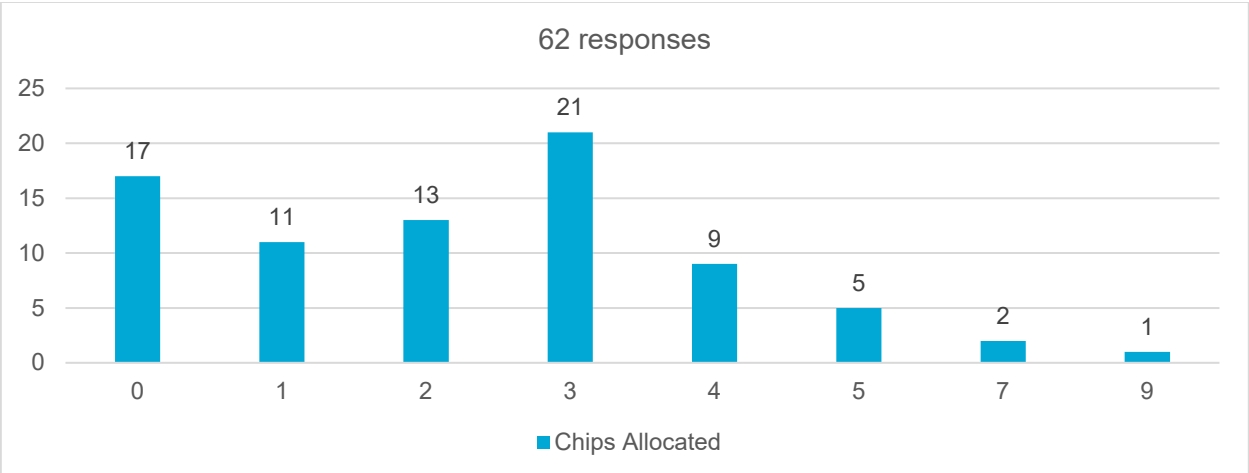
Figure 5.4 Require Shippers and Received to Provide Truck Parking On-Site – Chip Allocation



5.4 Public/Private Partnerships to Build/Expand Commercial Truck Stops

As shown in Figure 5.5, 21 respondents (27%) allocated three chips to this strategy, followed by 17 respondents (22%) assigning zero chips and 13 respondents (16%) assigning two chips to this strategy. Five or more chips were given to this strategy eight times (10%). The range of allocations indicates that there were mixed feelings about "Public/Private Partnerships to Build/Expand Commercial Truck Stops," with some liking it moderately and others not at all.

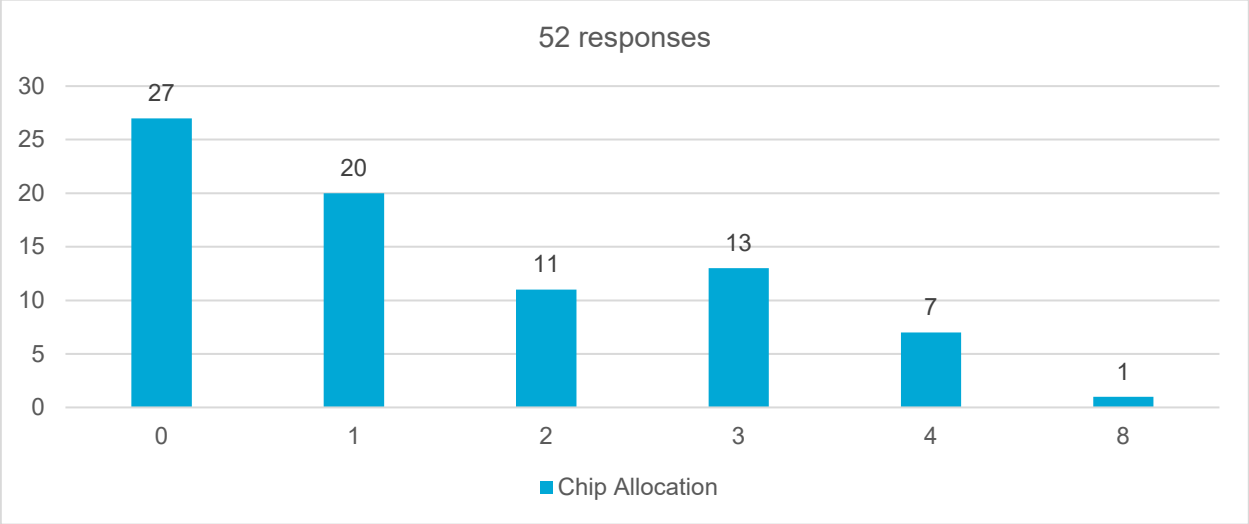
Figure 5.5 Public/Private Partnerships to Build/Expand Commercial Truck Stops – Chip Allocation



5.5 Real-Time Parking Availability Information

While eight chips were given to this strategy one time, the majority (59%) of responses were either assigning zero or one chip to this strategy. Of the responses, 39% assigned two to four chips to this strategy (Figure 5.6). Responses indicate that the majority didn't want to allocate resources to this strategy while a substantial minority thought it was worth investing in.

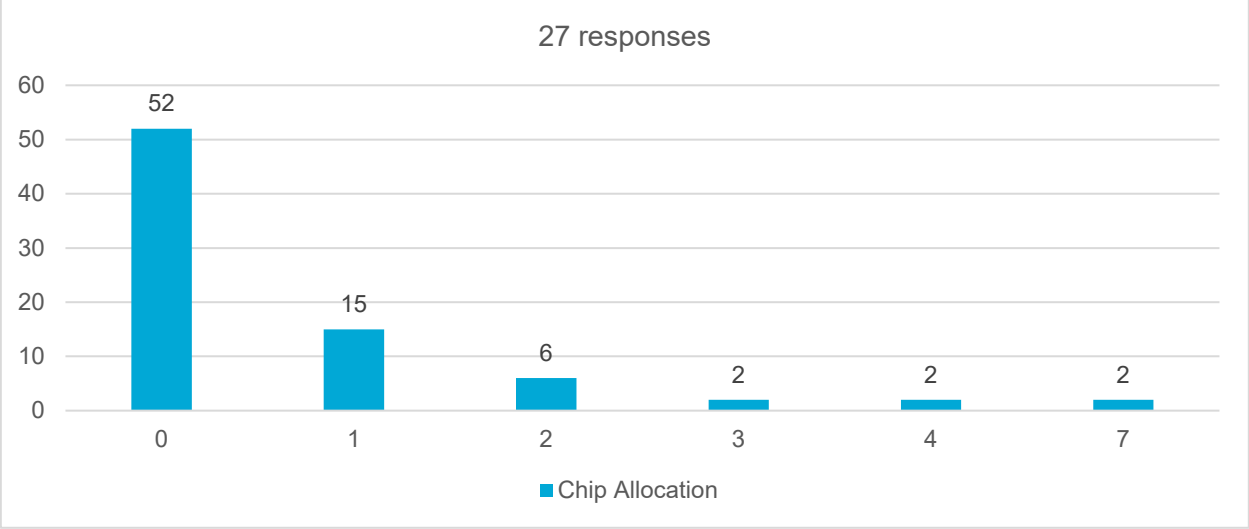
Figure 5.6 Real-time Parking Availability Information – Chip Allocation



5.6 Smart On-Street Parking with Reservation System

As shown in Figure 5.7, the majority (66%) of responses gave zero chips to the strategy of "Smart on-street parking with reservations system." Fifteen respondents (19%) gave one chip followed by six respondents (8%) giving two chips.

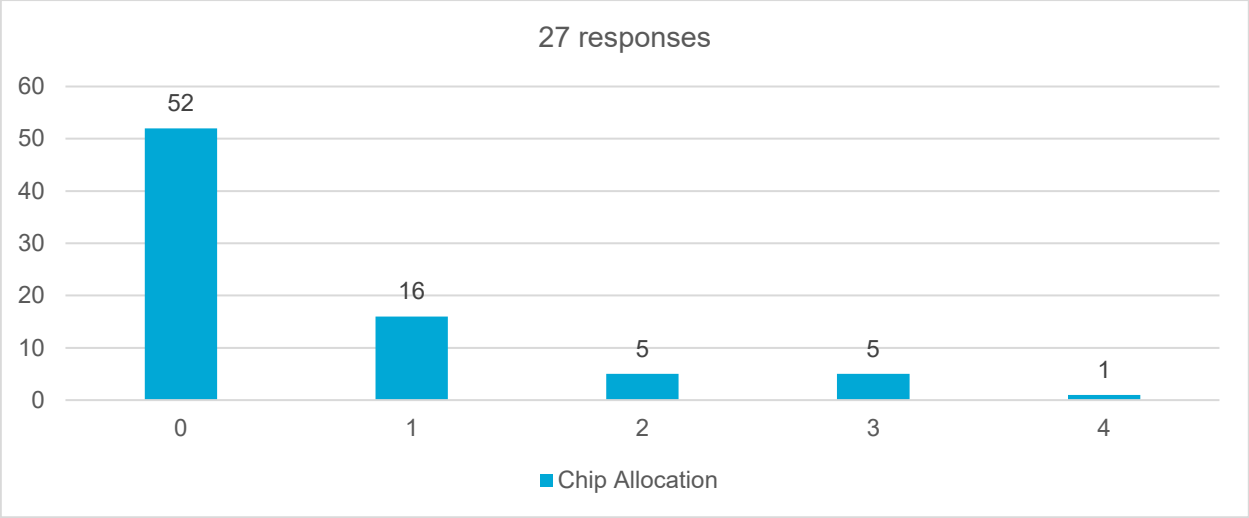
Figure 5.7 Smart On-Street Parking with Reservation System – Chip Allocation



5.7 Paid Reservations on Private Property ("Airbnb")

The majority (66%) of responses gave zero chip to this strategy. Of total responses, 20% assigned one chip to this strategy while 14% of the responses assigned two to four chips to this strategy (Figure 5.8).

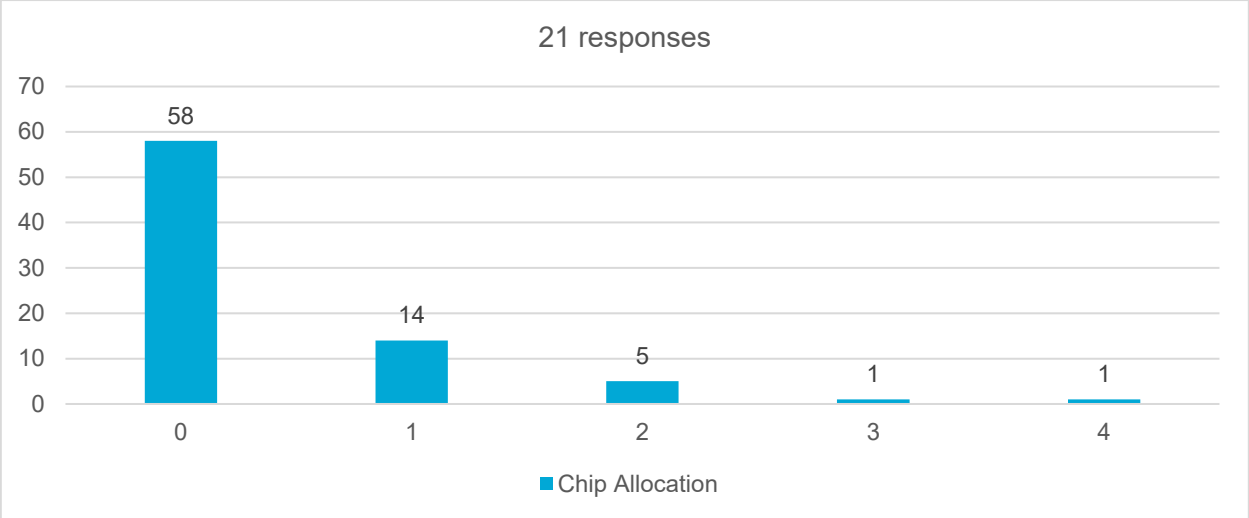
Figure 5.8 Paid Reservations on Private Property ("Airbnb") – Chip Allocation



5.8 Paid Reservation Systems for Truck Stops

"Paid reservation systems for truck stops" received the lowest number of responses and had the lowest average score of all the strategies proposed. As shown in Figure 5.9, 58 respondents (73%) gave zero chips to this strategy. Fourteen respondents (18%) assigned one chip and five respondents (6%) assigned two chips.

Figure 5.9 Paid Reservation Systems for Truck Stops – Chip Allocation



One general comment was also received in this section of the survey:

- Truck capacity in rest areas is too limited even just to stop mid day for a restroom break. It seems many times a high percentage of “truck spots” are taken up by RVs As far as requiring truck parking on industrial property, that should be done through building ordinances and administrated during the permitting process. I don’t see that happening when the builders are financially larger than the state.

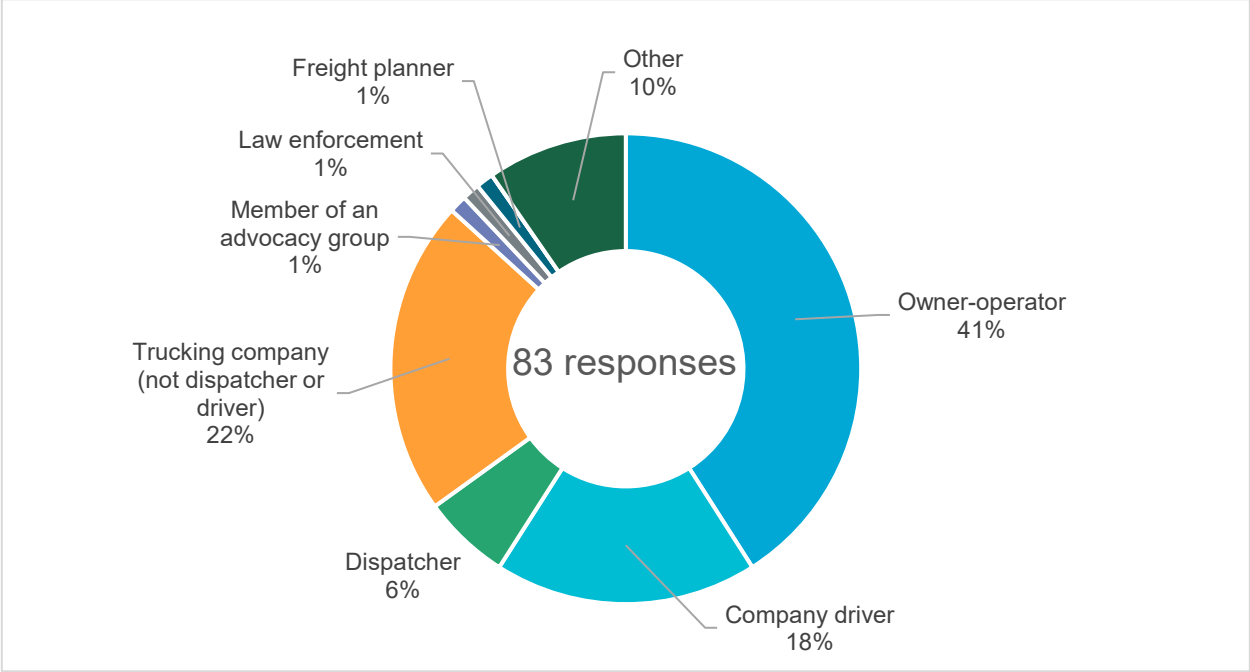
6.0 Demographics and Truck Parking Experience

Participants were asked five questions in order to better understand their truck driving experience and personal backgrounds. They were also asked if they would like to be added to the project's stakeholder list; 43 participants requested to be included.

6.1 How Would You Describe Yourself?

The vast majority of those who participated are involved in the trucking industry. As shown in Figure 6.1, the majority (59%) of survey participants described themselves as truck drivers, followed by 22% who indicated they work for a trucking company (not as a dispatcher or driver). Other participants described themselves as a dispatcher, member of an advocacy group, law enforcement, freight planner or other.

Figure 6.1 How Would You Describe Yourself?

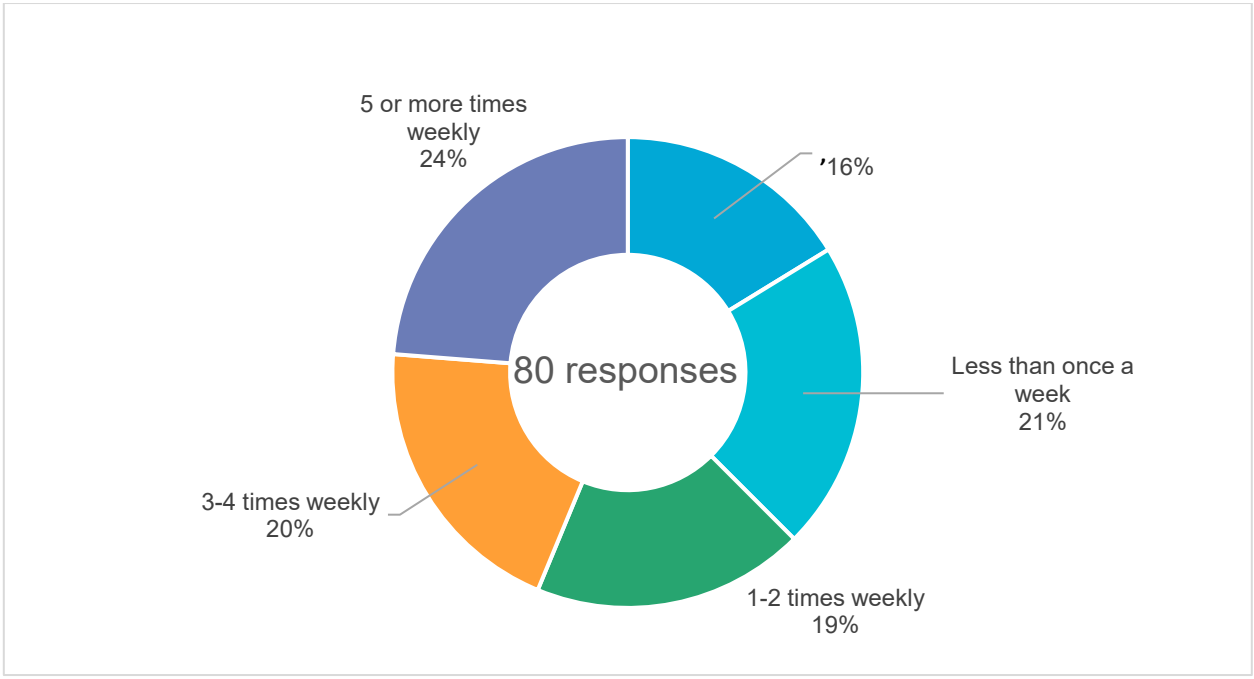


6.2 How Often Do You Typically Need Parking in Washington?

Participants were asked how often they typically need parking in Washington State. They were provided a list of five choices, ranging from “Less than once a week” to “5 or more times weekly.” Participants could also indicate if they were not a truck driver.

As shown in Figure 6.2, most participants park regularly in Washington State. Of the 80 responses, 32 respondents indicated they need parking “Less than once a week” or “One to two times weekly” while 35 respondents said they need parking three or more times weekly. Of those 80 responses, 13 respondents indicated they were not a truck driver.

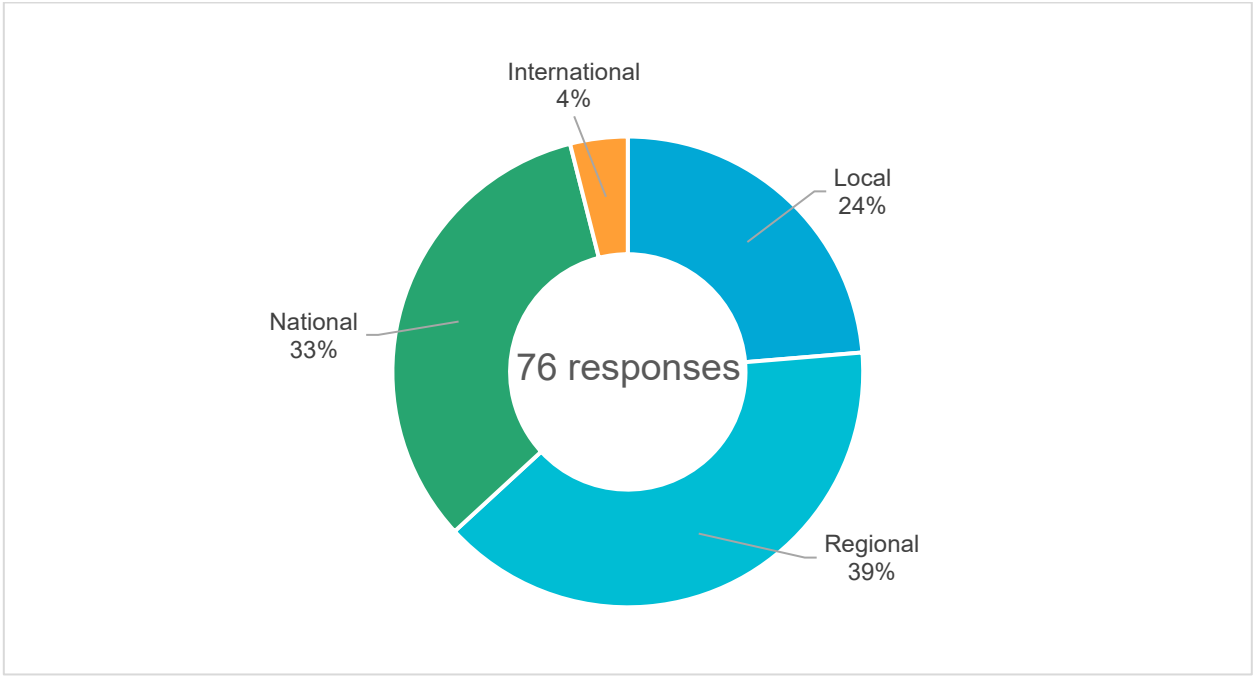
Figure 6.2 How Often Do You Typically Need Parking in Washington State?



6.3 What is Your Usual Range of Operations?

Participants were asked to select their usual range of operations from a list of four choices, ranging from "Local" to "International." As shown in Figure 6.3, survey respondents represent the full range of operations. Just over one-third of the respondents indicated their range of operations as "Regional" while another one-third responded that their usual range of operations is "National." The remaining respondents indicated their range of operations as "Local" (24%) or "International" (4%).

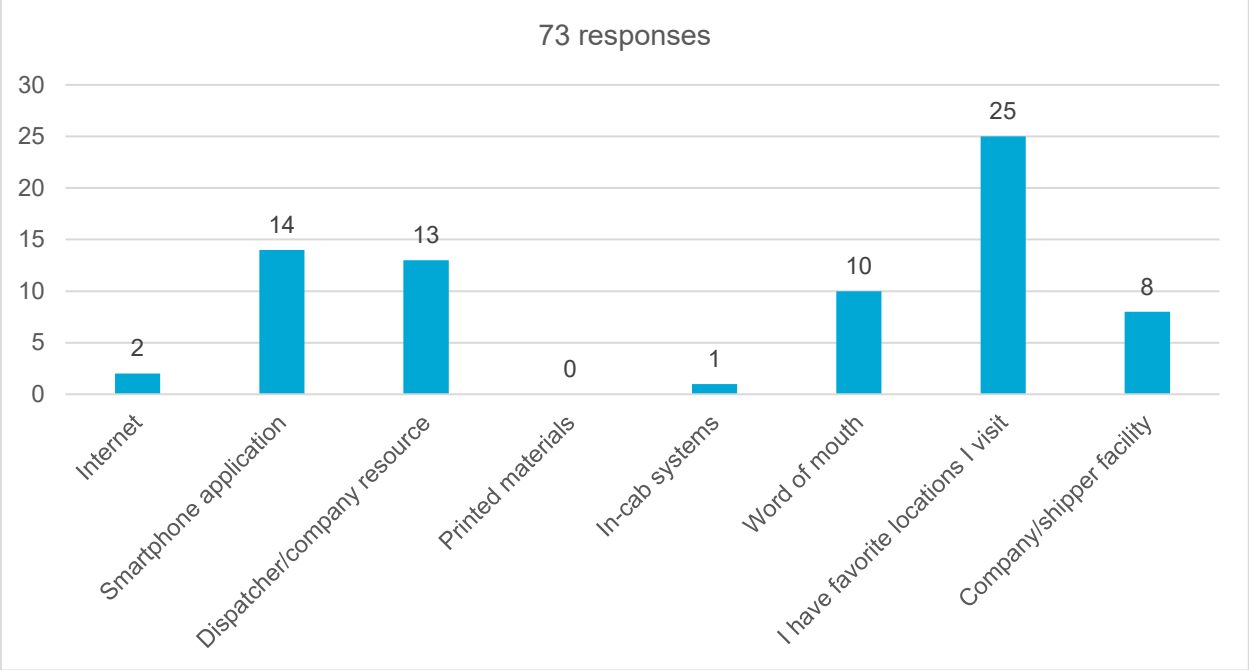
Figure 6.3 What is Your Usual Range of Operations?



6.4 How Do You Typically Locate Parking?

Participants were asked how they typically locate parking. They were provided a list of eight choices with results shown in Figure 6.4. A large number (34%) of participants said they typically park at favorite locations while another sizable group (23%) rely on the technology of smartphone applications, in-cab systems and the internet to locate parking. Respondents indicated they also locate parking through dispatcher/company resource (18%), word of mouth (14%) and company/shipper facility (11%).

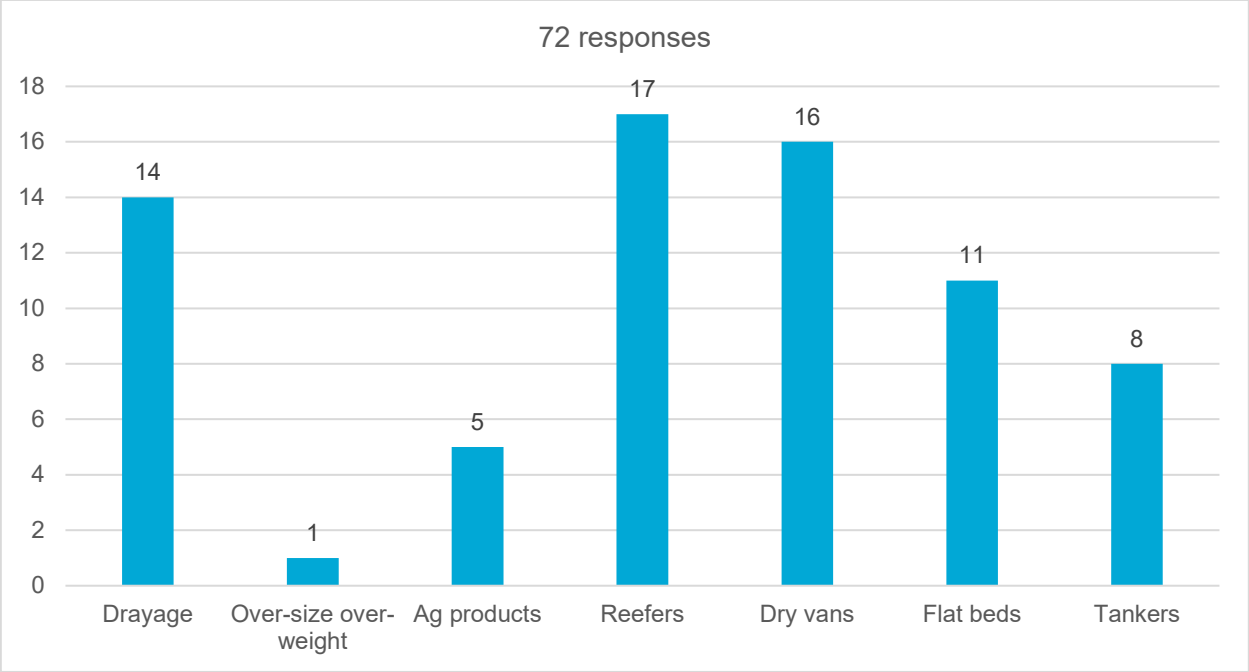
Figure 6.4 How Do You Typically Locate Parking?



6.5 What Type of Loads Do You Typically Carry or Equipment Do You Drive?

Participants were asked what type of loads they typically carry or equipment they drive. They were provided a list of seven choices. As shown in Figure 6.5, survey respondents drive a wide range of truck types. The majority of participants selected “Reefers” (24%), “Dry vans” (22%) and “Drayage” (20%) as the type of loads that they typically carry or equipment they drive. A number of participants said they drive “Flat beds” (15%) while another sizable group said “Tankers” (11%). The least selected responses were “Ag products” (7%) and “Over-size over-weight” (1%).

Figure 6.5 What Type of Loads Do You Typically Carry or Equipment Do You Drive?



Appendix B

Truck Parking Issues and Potential Solutions

WASHINGTON STATE **JOINT TRANSPORTATION COMMITTEE**

TRUCK PARKING ACTION PLAN

Truck Parking Issues and Potential Solutions

prepared by

Cambridge Systematics, Inc.

with

WSP

DECEMBER 2021

Washington State Joint Transportation Committee
Truck Parking Action Plan

Truck Parking Issues and Potential Solutions

prepared by

Cambridge Systematics, Inc.

with

WSP

date

December 2021

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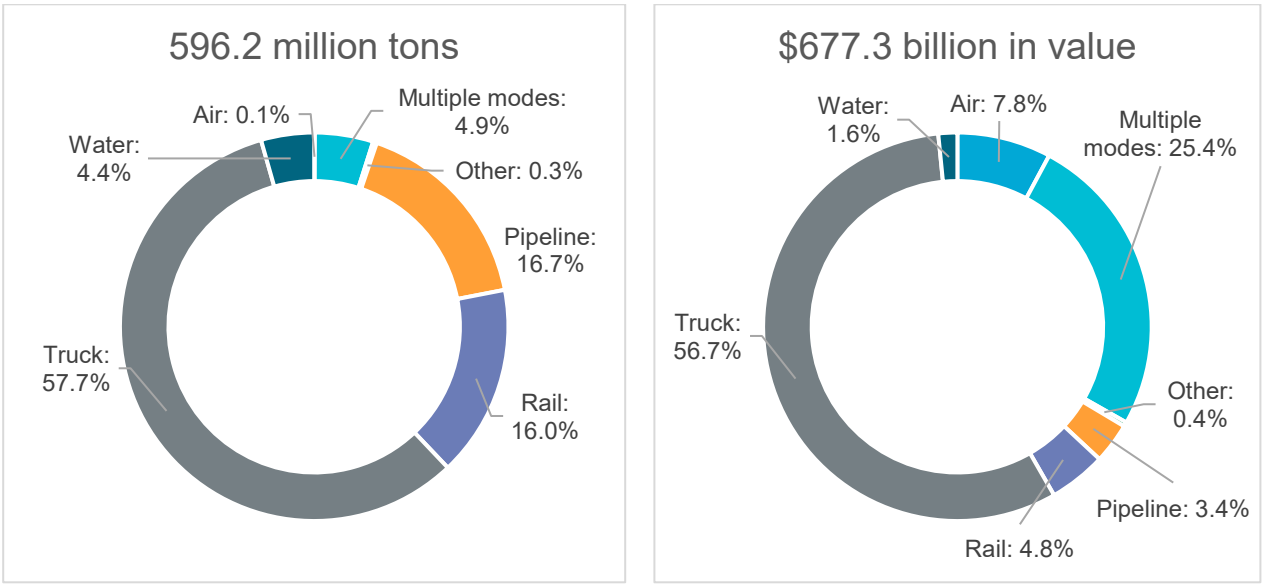
List of Abbreviations

APU	auxiliary power unit
ATIS	Advanced Traveler Information System
ATRI	American Transportation Research Institute
DERA	Diesel Emissions Reduction Act
DOT	Department of Transportation
ELD	electronic logging device
EPA	U.S. Environmental Protection Agency
EV	electric vehicle
FAF	Freight Analysis Framework
FMCSA	Federal Motor Carrier Safety Administration
FRATIS	Freight Advanced Traveler Information System
I-	Interstate-
MAASTO	Mid America Association of State Transportation Officials
MAP-21	Moving Ahead for Progress in the 21st Century
MPO	Metropolitan Planning Organization
OSOW	oversize/overweight vehicles
P3	public-private partnership
ROW	right of way
TIGER	Transportation Investment Generating Economic Recovery
TPF	Truck Parking Facilities
VMT	vehicle miles traveled
WSDOT	Washington State Department of Transportation
ZE	zero emissions

1.0 Introduction

Washington is one of the most freight dependent states in the nation. The State is ranked third in international trade value per capita, behind only to Texas and Louisiana.[1] The abundance of natural resources, proximity to Canada and home to the contiguous 48 states nearest port to South East Asia makes Washington an international hub for freight movement. The state moved over 596 million tons of freight in 2017, valued at over $677 billion, of which trucks transported approximately 58 percent of the freight by weight and 57 percent of the freight by value, as shown in Figure 1.1.[2]

Figure 1.1 Washington State Freight by Mode, 2017



Source: Freight Analysis Framework Data Version 5.1, Prepopulated Summary Tables and Statistics, Federal Highway Administration, https://faf.ornl.gov/faf5/SummaryTable.aspx.
Note: "Other" includes shipments with no domestic mode or an unknown mode.

The quantity of trucks necessary to service the freight demand in the state is substantial, particularly along commercial and industrial corridors. Interstate 5 (I-5), the only north-south interstate spanning the entire state, intersects the heaviest freight activity centers in Washington. I-5 in Tacoma, at milepost 131, is the states' highest truck demand corridor, carrying nearly 15,800 trucks daily.[3] Truck volumes of this magnitude, in a state with a wide variety of urban and rural landscape, require truck parking infrastructure to support the handling and storage of vehicles that are not actively moving loads.

This memo identifies the truck parking issues in the state and presents a range of solutions to ease current constraints and plan for future parking needs.

[1] https://www.census.gov/foreign-trade/statistics/state/index.html

[2] Freight Analysis Framework Data Tabulation Tool (FAF4), http://faf.ornl.gov/fafweb/Extraction1.aspx

[3] Truck volume data on the state highway system is collected and compiled by WSDOT Transportation Data, GIS & Modeling Office.

2.0 Trucking Parking Issues

Truck parking issues in Washington state have been identified through a literature review of several documents including the *Washington State Truck Parking Study, 2016, Washington State Freight System Plan, 2017,* and *Washington State Truck Parking Workshop 2021* among other freight parking documentation from across the country. This section identifies the generators of truck parking demand and associated issues, the consequences of lack of parking, and other influences on truck parking.

2.1 Generators of Truck Parking Demand

Truck drivers need safe places to park, that at a minimum include restrooms, while they rest overnight or for short breaks, wait for their turn to load or unload their truck, and during unplanned road closures such as commonly occurs over mountain passes during heavy snow storms. This section summarizes these needs that drive the demand for truck parking and illustrates locations around the state where that demand is highest.

2.1.1 Need a Place to Rest

Driver Fatigue: Truck driving can often lead to driver fatigue, leading drivers to seek the nearest available parking. A FMCSA study found driver fatigue to be an associated risk factor in 13 percent of large truck involved crashes between April 2001 and December 2003.[4] Subsequent studies determined that the risk for crashes or safety critical events (i.e., hard stops, evasive maneuvers, etc.) increases with driving-time[5] and/or a combination of driving time and work hours,[6] suggesting that fatigue is a factor. A 2009 study found that rest areas are a countermeasure to crashes (both fatigue- and non-fatigue-related) as crash rates were observed to decrease immediately downstream of a rest area while increasing further downstream with greater distance from the rest area.[7] With the increase in truck traffic nationwide and the continued lack of truck parking capacity, this issue is still a serious concern.

Federal and State Hours-of-Service Requirements and Electronic Logging Devices (ELDs): Drivers are legally required to not exceed certain drive times per day to avoid overworking and fatiguing the driver. For example, among other limitations drivers must take a 30-minute break after eight consecutive hours of driving. They must also take 10 consecutive hours off duty after driving the maximum allowed 11 hours within a 14 consecutive hour work window.[8] When a driver has met any of these thresholds, as presented in Table 2.1, they are required to park at the nearest feasible location.

[4] Federal Motor Carrier Safety Administration. Large Truck Crash Causation Study – Analysis Brief. July 2007. Online at: https://www.fmcsa.dot.gov/safety/research-and-analysis/large-truck-crash-causation-study-analysis-brief

[5] Jovanis, P. et al. "Hours of Service and Driver Fatigue: Driver Characteristics Research." (2011) https://rosap.ntl.bts.gov/view/dot/70

[6] Blanco, M. et al. "The Impact of Driving, Non-driving Work, and Rest Breaks on Driving Performance in Commercial Vehicle Operations" (2011), https://vtechworks.lib.vt.edu/handle/10919/55114.

[7] Banerjee, I., et al. "Rest Areas—Reducing Accidents Involving Driver Fatigue" University of California Berkeley Traffic Safety Center and California Department of Transportation, May 2009. https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/final-reports/ca09-1092-finalreport-a11y.pdf.

[8] Federal Motor Carrier Safety Administration (FMCSA), https://www.fmcsa.dot.gov/regulations/hours-service/summary-hours-service-regulations, September 28, 2020.

Table 2.1 Federal and State Hours-of-Service Regulations

Rules and Regulations	Federal or State Law	Description	Applicability
14-Hour Driving Window	Federal	Drivers may work for 14 consecutive hours after being off duty for 10 or more consecutive hours.	Both Interstate and Intrastate Freight
11-Hour Driving Limit	Federal	Drivers may drive 11 hours during their 14-consecutive-hour-period.	Both Interstate and Intrastate Freight
60/70-Hour Duty Limits	Federal	Drivers cannot drive after being on-duty for 60 hours during a seven-day work week or 70 hours for an eight-day work week. A driver may restart a seven-day or eight-day work week after taking 34 or more consecutive hours off duty.	Both Interstate and Intrastate Freight
30-Minute Rest Break	Federal	If more than eight consecutive hours have passed since the last off-duty period, the driver must take an off-duty rest of at least 30 minutes.	Both Interstate and Intrastate Freight
10-Minute Rest Breaks	Washington state	Employers are required to provide a 10-minute paid rest break for every four hours of work time.	Intrastate Freight Only
30-Minute Meal Period	Washington state	Employers must provide a 30-minute meal period for every five hours of work.	Intrastate Freight Only
16-Hour Property Carrying Exception	Washington state	A property-carrying commercial vehicle may extend the 14-hour on-duty period by 2 hours once every seven days, with some exceptions.	Intrastate Freight Only

Source: Table reproduced from the *Washington State Truck Parking Study, 2016*.

Due to the ELD mandate, drivers have less flexibility in complying with hours-of-service regulations. Prior to the ELD mandate, drivers used paper log books to track their duty status (i.e., on- and off-duty hours). These books recorded time in 15-minute bins (e.g., 8:00 – 8:15, 8:15 – 8:30, etc.). An ELD synchronizes with a vehicle engine to automatically record driving time for a more accurate recording of duty status and hours of service. As a result, a driver's hours of service driving time terminates exactly on the minute/second, rather than having the 15-minute time bin originally afforded by the paper log books. In this manner, the ELD mandate likely exacerbates truck parking shortages as drivers no longer have the additional 15-minute time bin to continue to find available truck parking.

Truck drivers are also required to rest for 34 hours after 60 or 70 hours on duty (depending on their work week). Owner-operators drive their own trucks and do not have a company yard to park at during their "34-hour reset" breaks while at home, leaving them few options but to park their truck in or near the residential areas where they live.

2.1.2 Need a Place to Wait

Even if truck drivers are not fatigued and have hours of service remaining in the day, they almost always will need a place to park at the beginning and end points of every trip—when they arrive at their customer's facility, an intermodal facility (rail yard, seaport, airport), or border crossing.

Shipper/Receiver Delivery Windows: Truck drivers often experience delays waiting for a customer to allow them to pick up or drop off goods, referred to as driver detention. It is among the most important issues facing truck drivers. Often times a truck will arrive to deliver or receive trailers only to be turned away from the facility for a short period of time because the facility is not prepared for the truck (e.g., all the loading

docks are occupied). The driver will typically attempt to remain nearby to respond immediately when the facility is ready, and in the absence of designated parking facilities or parking availability will park in an undesignated area.

Driver detention studies have found that many drivers will wait two to three hours to be serviced.[9] One such study done by the American Transportation Research Institute (ATRI) in 2019 found that from 2014 to 2018 detention frequency and length had increased, with a driver reported 27.4 percent increase in delays of six hours or more.[10] A 2014 FMCSA study and 2015 study conducted by JB Hunt showed an average lost time of one to two hours per pick-up and delivery[11].

Seaports: Washington has 11 ports capable of handling ocean-going vessels and 17 barge intermodal facilities on the Columbia-Snake River System each of which can be a major truck traffic generator, especially drayage traffic[12]. Drayage refers to transporting a shipment over a short distance, such as a container from a port to a rail yard in the same metropolitan region, often as the first leg of a longer trip (e.g., from the port to a rail yard to a train traveling cross country). Drayage carriers queue up to enter container port gates, which is a different issue than parking needs outside of the queue lines, and which the ports are effectively addressing. Larger drayage carriers have company facilities nearby for accommodating their fleet and driver parking needs. However, smaller drayage carriers and owner-operators may need parking accommodations in the surrounding warehousing districts.

International Border Crossings: International border crossing processing requirements (inspections, document checks, etc.) cause bottlenecks for vehicular traffic, and wait times can vary drastically and be unpredictable. Trucks will often compensate for longer travel times by crossing at irregular hours and coordinating a rest period in the receiving country, thereby generating parking demand near to international border crossings.[13] In 2020, the Blaine, Washington border crossing was recorded as having the fourth most incoming truck containers in the U.S., with 345.4 thousand incoming containers.[14] Canadian originating trucks are likely to seek parking alternatives on the U.S. side of the border after having had navigated the traffic associated with the port of entry.

Trailer Dropping: Trucks carrying multiple trailers are sometimes required, either legally or logistically, to park and unhitch (or “drop”) trailers which another driver picks up at a later time. This situation requires secure storage lots for trailers.[15] Both Oregon and Idaho have shorter maximum commercial vehicle lengths than Washington, so drivers entering either state will need a safe parking location prior to entering either state if trailer lengths exceed the maximum allowable length.[16] The Washington Truck Parking Study noted that Vancouver, on the Washington-Oregon border, has cited concerns for dropped trailers on city streets.

[9] http://www.dat.com/blog/post/54-of-Drivers-Are-Detained-3-4-Hours-Per-Stop

[10] https://truckingresearch.org/2019/09/04/new-atri-study-quantifies-driver-detention-impacts/

[11] https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/mission/advisory-committees/mcsac/81096/mcsac-detention-times.pdf

[12] https://wsdot.wa.gov/Freight/default.htm

[13] Washington State Truck Parking Study, 2016

[14] https://www.bts.gov/content/us-canadian-border-land-freight-gateways-number-incoming-truck-or-rail-container-crossings

[15] Washington State Truck Parking Study, 2016

[16] https://abouttruckdriving.com/2018/05/26/maximum-commercial-trailer-lengths-state-by-state/

2.1.3 Need Parking for Unplanned Events

Road Closures (Mountain Passes): Road closures, particularly along mountain passes where an alternate route might not be available, creates a sudden and large demand for parking at the location nearest to the road closure. Though road closures can be unpredictable, there are locations where closures are known to happen somewhat regularly. Solutions are challenging because it is difficult to justify building a large parking facility that is only used a handful of times each year. [17]

Congestion: Drivers often will arrive at a facility the evening before a morning appointment and take their mandated 10-hour rest break as close to their customer as possible to avoid morning congestion. ATRI found that two of the top 25 most congested freight-significant locations were in Washington State in Seattle (I-5 at I-90) and Auburn (SR 18 at SR 167)[18]. The findings of the ATRI congestion analysis suggests that the parking demand in Washington is substantial along the congested corridors. Furthermore, stakeholder outreach from the 2016 Washington State Truck Parking Study identified the Puget Sound region as having the highest unmet demand for truck parking.

2.1.4 Areas and Corridors with Highest Demand

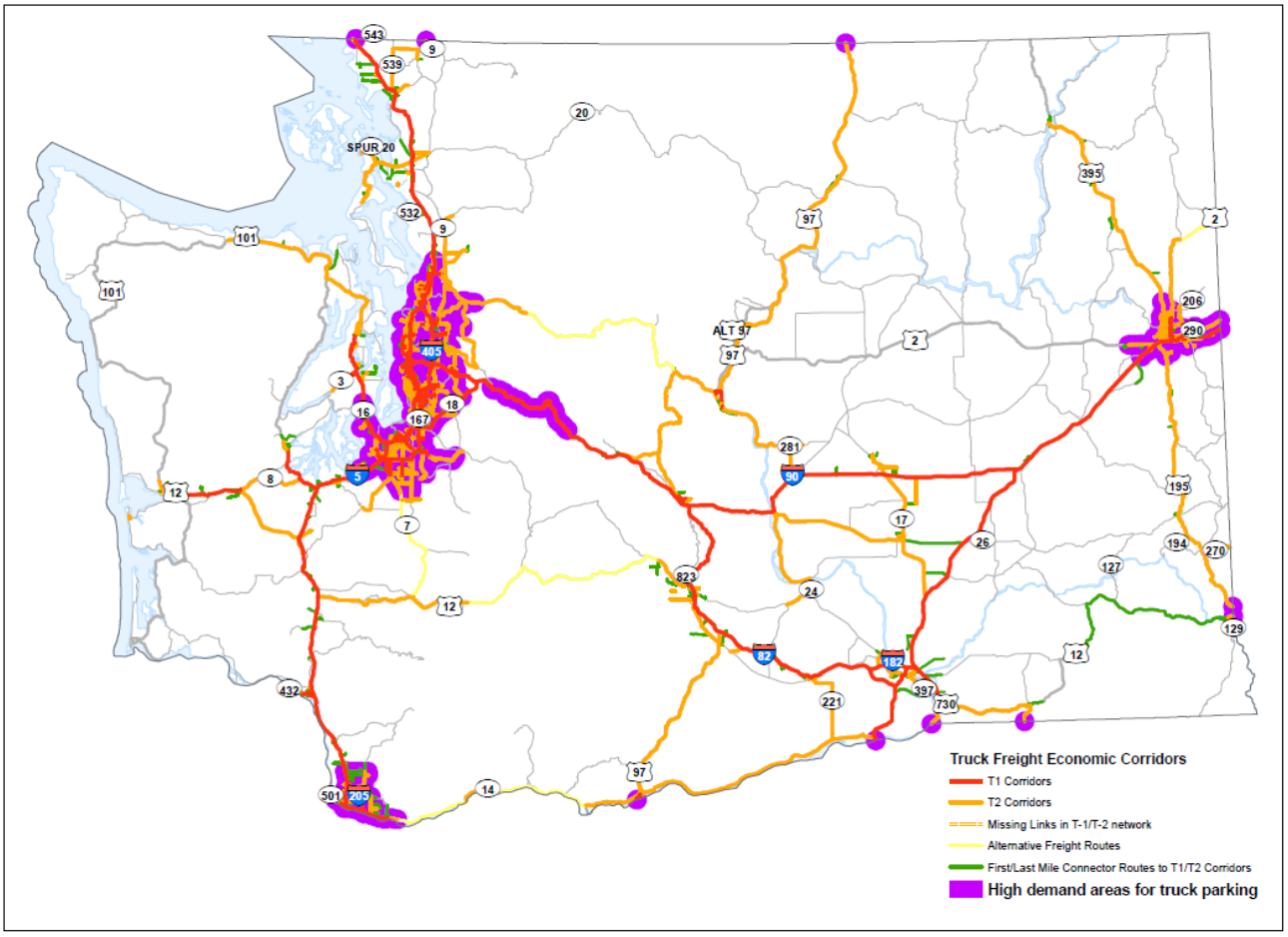
The locations of these generators of truck parking demand in Washington are shown on Figure 2.1. Roadways with high truck volumes, such as interstates and some dense urban corridors, inherently have higher truck parking demand. [19] Cities that have numerous truck traffic generating facilities, such as those on the State Route 167 corridor, experience significant traffic and intensified parking issues.

[17] http://www.wsdot.wa.gov/Freight/truckparking.htm

[18] American Transportation Research Institute, American Trucking Association, 2013

[19] Washington State Truck Parking Study, 2016

Figure 2.1 High Demand Areas for Truck Parking



Note: Figure from *Washington State Truck Parking Study, 2016*.

2.2 Consequences of Lack of Parking

The lack of truck parking spaces at designated facilities can lead to crashes and fatalities, lost time and money as drivers search for parking, pavement damage on highway shoulders and ramps, unfortunate trade-offs to either park in undesignated areas or continue to drive illegally, and air and noise pollution

2.2.1 Safety

Traffic Safety: Undesignated parking can result in disruption of the traffic flow and potentially put the truck and other road users at risk of a traffic incident[20]. Drivers will sometimes use on and off ramps for uninterrupted flow facilities, chain up areas or road shoulders for temporary parking which can result in users of the roadway operating at lower than free flow speeds, thereby reducing the efficiency of traffic progression along the segment. Additionally, parking in these kinds of undesignated areas can result in an unnecessary crash that, while uncommon, are more likely to result in a fatality.[21] For this reason, the Revised Code of

[20] Banerjee, I., et al. "Rest Areas—Reducing Accidents Involving Driver Fatigue" University of California Berkeley Traffic Safety Center and California Department of Transportation, May 2009. https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/final-reports/ca09-1092-finalreport-a11y.pdf.

[21] NCHRP Guide for Reducing Collisions Involving Heavy Trucks 2004 (page V-7)

Washington 47.52.120(e) prohibits parking on the right of way for interstate highways. A study in Texas revealed that 2,315 crashes involving parked trucks occurred during 2013-2017, resulting in 138 fatalities and 997 injuries.[22]

Driver Wellbeing: Drivers that are unable to park safely can get fatigued and possibly be involved in a crash as a result of fatigue[23] [24] [25]. The North Jersey Transportation Planning Authority truck rest stop study referenced a finding that suggested as many as 40 percent of all heavy truck accidents could have fatigue as a contributing factor.[26] Drivers might also suffer long-term health effects from fatigue. [27] Beyond mental wellbeing, parking in undesignated, unsafe, or sometimes illegal areas can put the driver at risk of bodily harm. An FHWA truck parking survey found that 90 percent of drivers struggled to find safe parking at night.[28] Jason's Law was passed in US congress in response to a driver being murdered and the generally unsafe environments created by poor truck parking availability.

In March 2009, a truck driver named Jason Rivenburg was murdered while waiting to deliver a load of milk. He was early for his appointment and the distribution center would not let him park on the property.

"Jason's Law", included in the 2015 Federal Transportation Bill Reauthorization, funds truck parking research and sets standards.

2.2.2 Time and Money

Loss of income: On average, truck drivers lose 9,300 revenue-earning miles a year, or $4,600 annually due to lack of truck parking at the time and location needed[29].

Theft: Theft of drivers' personal belongings or cargo and equipment are possible for drivers that park in undesignated and unsafe parking areas. The National Cooperative Highway Research Program reports that 80 percent of drivers are concerned about robbery, and 10 percent were actually the victims of robbery at rest areas.[30] Additionally, about 90 percent of cargo theft occurs during trailer drops when a driver does not pay close attention to the trailer.[31] Washington has surveyed drivers and found that most crimes against drivers occur in unsecured lot, such as rest areas.[32]

[22] Texas Statewide Truck Parking Study, https://ftp.txdot.gov/pub/txdot/move-texas-freight/studies/truck-parking/final-report.pdf

[23] Federal Motor Carrier Safety Administration. Large Truck Crash Causation Study – Analysis Brief. July 2007. Online at: https://www.fmcsa.dot.gov/safety/research-and-analysis/large-truck-crash-causation-study-analysis-brief

[24] Jovanis, P. et al. "Hours of Service and Driver Fatigue: Driver Characteristics Research." (2011) https://rosap.ntl.bts.gov/view/dot/70

[25] Blanco, M. et al. "The Impact of Driving, Non-driving Work, and Rest Breaks on Driving Performance in Commercial Vehicle Operations" (2011), https://vtechworks.lib.vt.edu/handle/10919/55114.

[26] 174http://www.njtpa.org/planning/regional-studies/completed-studies/the-njtpa-north-jersey-truck-stop-studyrefinement/njtpatruckreststopstudy/njtpaphaseitruckreststopreport

[27] NAP Commercial Motor Vehicle Driver Fatigue, Long-Term Health, and Highway Safety 2016

[28] Jason's Law Truck Parking Survey Results and Comparative Analysis 2015 (page 66)

[29] https://truckingresearch.org/2016/12/13/atri-truck-parking-case-study/

[30] NCHRP Guide for Reducing Collisions Involving Heavy Trucks 2004 (page V-8)

[31] http://www.hubinternational.com/transportation/blog/cargo-theft-prevention-tips/

[32] https://www.trucks.com/2016/08/02/truck-parking-shortage-driver-crime/

2.2.3 Preservation of Roadways

Pavement Damage: Trucks utilizing undesignated parking areas can damage the pavement where they are parked and the roadways enroute to the parking area if they are not designed for truck traffic. This type of damage is commonly found on shoulders of freeway ramps where trucks frequently pull on and off the pavement. [33] The Washington State Department of Transportation (WSDOT) Truck Parking Survey found that drivers do not prefer to park in WSDOT right-of-way (ROW) but will if the circumstance requires it. Regardless of intent, truck parking on undesignated WSDOT ROW results in deterioration of pavement that was not designed to support frequent, heavy loads.

2016 Washington State Truck Parking Study

2.2.4 Tough Decisions

Undesignated Parking or Illegal Driving: Drivers are often faced with the tough choice of whether to park in an authorized location or drive beyond their hours-of-service limits to find safe, legal parking.

2.2.5 Air and Noise Pollution

Neighborhoods and cities that experience frequent truck parking in undesignated areas have a reduced quality of life from air pollution, noise, roadway damage and general roadway navigation space among other issues.[34] Truck idling while parked can lead to excessive fuel consumption and contribute to air pollution and greenhouse gas emissions. [35]According the U.S. Environmental Protection Agency (EPA) estimates, approximately three to four percent of truck emissions are from idling.[36] For this reason, some cities prohibit truck idling. An example is the City of Spokane which restricts idling in its central business district to reduce carbon monoxide concentrations.[37] Trucks can exceed noise ordinances and contribute to noise pollution that can be an issue in undesignated parking areas. [38]

In addition, truck drivers parked in undesignated areas don't have access to necessary facilities, such as bathrooms and garbage receptacles. WSDOT maintenance employees have reported waste in undesignated areas. Cattle manure from moving livestock is also an issue as drivers will sometimes spray off the manure after delivery at undesignated areas or at truck stops not designed to support this type of activity. This can lead to the pollution of nearby water sources and damage the local ecosystem.[39]

2.3 Other Influences on Truck Parking

Cost of Parking: Drivers have noted the cost to park at designated facilities can often be expensive or require certain membership tiers to access, leading them to park in free, undesignated areas instead.

[33] Washington State Truck Parking Study, 2016

[34] Washington State Truck Parking Study, 2016

[35] http://www.afdc.energy.gov/laws/11675

[36] https://wsdot.wa.gov/sites/default/files/2014/09/22/TruckParkingStudyfFinal.pdf

[37] City of Spokane Municipal Code, Section 15.02.040, https://my.spokanecity.org/smc/?Section=15.02.040

[38] http://www.industrialnoisecontrol.com/comparative-noise-examples.htm

[39] Washington State Truck Parking Study, 2016

Additionally, some pay-to-park facilities can have parking term minimums, which may require a driver to pay for several hours of parking when they only need to park short-term to wait for loading space to open at their destination. A facility may also be offering services that are included in the parking cost the driver has no intention of using. WSDOT's Truck Parking Survey found that over half (58 percent) of respondents were unwilling to pay for parking and the remainder preferred use-based fees as opposed to an annual membership.

Vehicle/Load Type Restrictions at Parking Facilities: Not all trucks can be accommodated at all parking facilities. [40] This may be the result of pavement design, turning radii, low clearances or other design restrictions. For example, oversize/overweight (OSOW) vehicles may require larger turning radii than are typically provided at truck parking facilities and are often unable to back into truck parking spaces.

Workforce Shortage: The trucking industry is experiencing a labor shortage as individuals age out of the market and new drivers fail to fill the space. Driver shortages means more work split amongst fewer people leading to the elimination of operational tactics such as team driving, which allows one driver to operate the truck while the other rests thereby increasing overall efficiency. Inversely, the lack of parking creates a hardship for drivers and is a contributing factor to drivers leaving the industry. [41] In an effort to help alleviate the driver shortage, the U.S. Congress is considering legislation to develop an apprenticeship program to encourage younger drivers to enter to the workforce.[42]

Autonomous/Connected Vehicles: Integrating autonomous and connected vehicles into the trucking industry has potential to eliminate the need for truck overnight parking, but carry with them other needs such as maintenance parking and integration with general traffic among other issues.[43] Until shippers and receivers eliminate detention time, trucks will continue to need a place to stage outside the shipper/receiver gates regardless of whether a driver is behind the wheel or not.

[40] Washington State Truck Parking Study, 2016

[41] Washington State Truck Parking Study, 2016

[42] https://www.congress.gov/bill/117th-congress/senate-bill/659

[43] Washington State Truck Parking Study, 2016

3.0 Potential Solutions for Addressing Truck Parking Needs

Solutions for addressing truck parking needs generally include building more parking spaces, better utilizing the infrastructure already in place, and establishing supportive policies and programs. The solutions identified in this section are well documented throughout the truck parking literature, and generally exist in some capacity in the state freight plan. This section serves to describe the nature of the solutions and how they improve truck parking issues in the state.

3.1 Build More Parking Spaces

Increasing the number of truck parking spaces in the state is the most important solution and can be accomplished in a variety of ways by the public sector. Solutions for supporting private sector investments are described under Policies and Programs. All new or expanded parking facilities must include potable water, restrooms and trash receptacles—primary amenities that everyone deserves and needs as a matter of human decency. Other amenities should be considered and included as appropriate such as security measures, lighting, vending machines, and driver lounges. Accommodating OSOW vehicles improves the parking network for more challenging trailer loads and should be integrated wherever possible. [44]

Expand Safety Rest Areas: WSDOT owns and operates the 47 safety rest areas, shown in Figure 3.1, that provide 536 truck parking stalls. Most locations are open 24 hours a day, seven days a week and provide several benefits to truck drivers such as restrooms, vending machines, picnic areas and safe resting locations. WSDOT's Truck Parking Survey found safety rest areas are a preferred stopping location for drivers, second only to truck stops.[45]

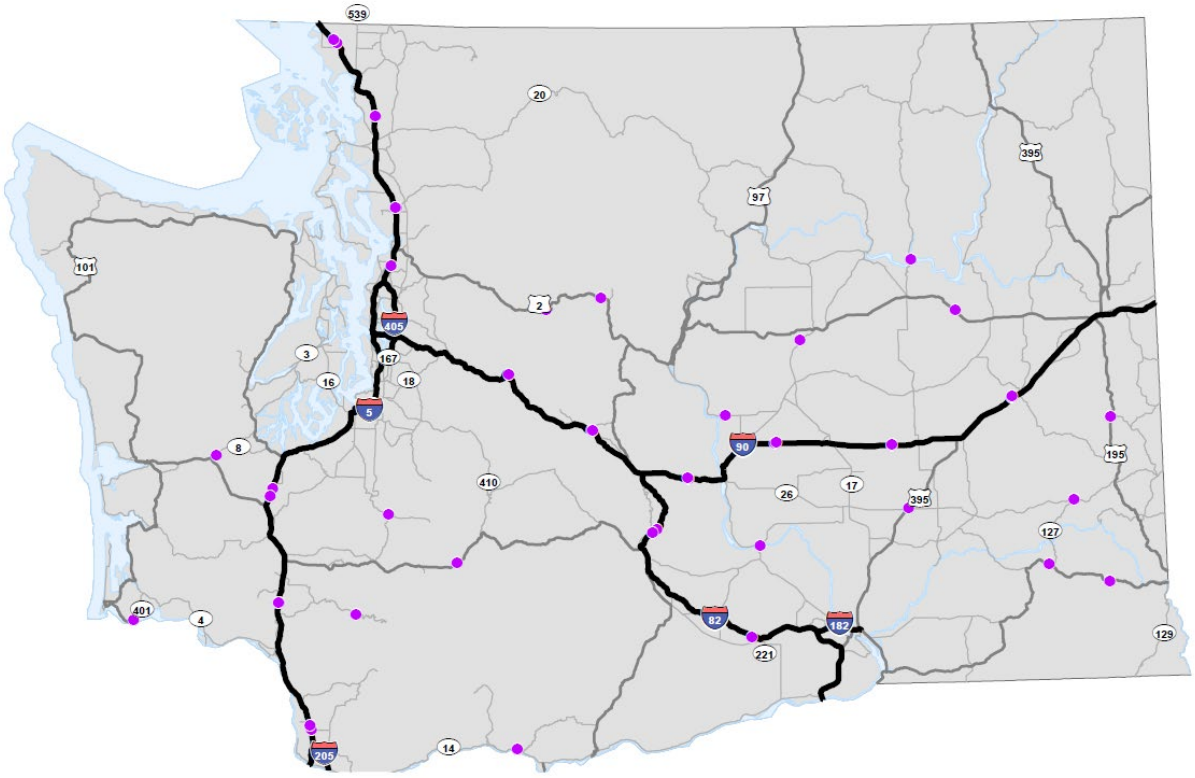
Expanding the number of truck parking spaces at existing facilities, where feasible and demand exists, is typically less costly than constructing new facilities. WSDOT conducted a preliminary assessment of each safety rest area based on its potential for expanded truck parking, and then cross-referenced this potential with the demand for parking indicated in an online survey. Although additional assessment and scoping is needed, a preliminary analysis shows that the following safety rest areas have high potential for truck parking expansion (parking expansion is physically feasible) and are in an area that is a high priority for expansion of truck parking:

- Smokey Point Northbound and Southbound (Interstate 5)
- Indian John Hill Eastbound (Interstate 90)
- Ryegrass Eastbound (Interstate 90)
- Sprague Lake Westbound (Interstate 90)

[44] Washington State Truck Parking Study, 2016

[45] Washington State Truck Parking Study, 2016

Figure 3.1 Washington State Safety Rest Areas



Note: Figure from *Washington State Truck Parking Study, 2016*.

Expand or Allow Parking at Weigh Stations: Weigh stations that include parking allow trucks to consolidate pulling off the main thoroughfare by performing their legally required weigh-in and stopping for rest simultaneously. [46] Weigh stations already have some of the infrastructure to support truck parking (i.e., pavement is designed for trucks, clearance is not a problem, exist on freight corridors, etc.), reducing the initial investment as compared to developing a new site. Currently, Washington State Patrol does not allow truck parking at most weigh stations, but making the spaces available when the weigh station is not operational can give drivers an opportunity to take longer breaks without the conflict of taking up space that would otherwise be used for inspections.

Build Dedicated Truck-only Parking Facilities: Building new parking facilities can take several forms and approaches:

- **Convert Closed Rest Areas or Weigh Stations:** The repurposing of closed rest areas or weigh stations captures the efficiencies of already developed lots. Land at these locations may still be publicly owned and prior investments (grading, entrance/exit ramps, electricity, pavement, etc.) can reduce up-front costs.[47] Missouri DOT has converted 23 obsolete rest areas and weigh stations to parking facilities for trucks, typically with no or minimal amenities (lighting, graded/paved, sometimes a vault toilet). These

[46] Washington State Freight System Plan, 2017

[47] Missouri DOT

conversions supplement private parking facilities in locations with high truck parking demand and insufficient capacity.

- **Build on WSDOT Surplus Real Estate:** In areas where WSDOT has surplus real estate, a minimum of basic parking amenities can be considered in smaller, more frequent lots, or as larger facilities. [48] Cities, metropolitan planning organizations (MPOs) and states have begun to include in their freight planning processes truck parking needs and plans, including incorporating usage of lots and land that would otherwise go unused. Examples include the Boston Region MPO and Massachusetts Department of Transportation, Memphis MPO, Atlanta Regional Commission, Arizona DOT, Maricopa Association of Governments, and North Central Texas Council of Governments among many others.[49] A related strategy that WSDOT can use is when implementing projects on major truck routes, purchase additional land and set it aside for future truck parking.

- **International Borders Parking:** This strategy proposes building new parking facilities or growing existing parking facilities near international border crossings to accommodate vehicles navigating the vehicle port of entry process. [50] Truck parking challenges are often prevalent at border crossings so targeting these locations for investments directly addresses this issue.

- **Basic State-Owned Lots:** Basic State-owned lots are parking facilities with basic amenities, including restrooms and waste receptacles, and are low cost or free to users. [51] Though constructed by city as opposed to state governments, Elmira, NY and Weed, CA provide examples of truck parking built on public lots.[52] The City of Elmira implemented a pay-to-park framework that allowed frequent users to opt into a monthly and annual memberships, but also provide an affordable daily rate at only $5.00.

- **Warehouse, Logistics Centers:** Expanding parking in and around known truck traffic generators, such as warehousing and logistics centers, and sea ports, can support drivers pick-up or delivery of trailers. [53]

3.2 Better Utilize Existing Infrastructure

There are paved areas across the state that are not always in use for their intended purpose and could be made available for truck parking on a limited basis. Several of these are summarized below.

Allow truck parking at large venues lots that are used infrequently: Fairgrounds, open lots, or other public venues that are used infrequently can be designed to accommodate trucks on a temporary (such as during a road closures) or permanent basis. [54] Truck parking at low traffic times in auto-designated and non-traditional areas at public facilities creates additional truck parking supply and efficiencies. The policy development, implementation, and enforcement components of this strategy would be led by the agency responsible for the facility. WSDOT and the representative MPO (if the facility is in an MPO region) would

[48] Washington State Truck Parking Study, 2016

[49] https://ops.fhwa.dot.gov/freight/infrastructure/truck_parking/workinggroups/state_reg_lgov_coord/product/freight_plans.pdf

[50] Washington State Truck Parking Study, 2016

[51] Washington State Truck Parking Study, 2016

[52] https://ops.fhwa.dot.gov/freight/infrastructure/truck_parking/workinggroups/state_reg_lgov_coord/product/requirements.pdf

[53] Washington State Truck Parking Study, 2016

[54] Washington State Truck Parking Study, 2016

support any necessary technical analysis, policy analysis and revisions, and engineering and construction work.

Allow Truck Parking at Chain-Up/off Areas when not in Use: Designing chain-up areas to accommodate truck parking can give added purpose to pull-outs that would otherwise only be used during winter months. In 2013, WSDOT expanded the length and width of the westbound chain-up area on Interstate 90 over Snoqualmie Pass. A 2020 Oregon Commercial Truck Parking Study found truck parking at chain-up areas to be a low-cost, easily implemented solution that was highly effective at improving truck parking availability.[55]

Allow Truck Parking at Park and Ride Lots During Off-hours: Park and ride facilities with underutilized parking, or during off-hours such as overnight, can serve as truck parking facilities if designed to accommodate heavier loads and wider turn radii. [56] There are over 350 park and ride locations within the state, the majority which are located in the Puget Sound region, where truck parking facilities are either at capacity regularly or nonexistent. Most of the park and ride facilities are not owned or operated by WSDOT, so this solution would need to incorporate other governing bodies and agencies.

Allow Curbside Parking in Commercial/Industrial: On-street parking can be safely accommodated in the right context, such as locations with sufficiently wide streets, industrial or commercial land uses, lack of bicycle and pedestrian traffic, and distance from sensitive land uses such as schools. Truck drivers already use these spaces for undesignated parking, and they could be used more efficiently if managed through striping, enforcement, real-time parking availability and other common parking strategies.[57]

Real-Time Parking Availability Information: Real-time parking availability applications on smart devices or changeable message signs can alert drives prior to arrival at a facility if there is any availability and where the next nearest available space is located.[58] Several states have implemented, or are in the process of implementing, truck parking technology that provides drivers advanced notice of open parking spaces including California, Maryland, Tennessee, Colorado, Florida, Michigan, and Minnesota among others. In addition, there are three main coalitions of states that have used truck parking technologies to address truck parking shortage at a regional level – Mid America Association of State Transportation Officials (MAASTO), the I-10 Coalition, and the Eastern Transportation Coalition.[59] [60] [61] WSDOT recently received a $2.3M grant from FMCSA to deploy occupancy detection technology to existing weigh stations and rest areas along I-5 and I-90 (470 stalls at 28 locations), which is necessary to collect the data that support any real-time parking availability applications.

Freight Advanced Traveler Information System (FRATIS): FRATIS refers to freight-specific applications of advanced traveler information systems (ATIS) technologies and operational strategies[62]. ATIS

[55] www.oregon.gov/odot/Projects/Project%20Documents/OCTPS%20PowerPointTAC3%20April%2014%202020%20for%20TAC.pdf

[56] Washington State Truck Parking Study, 2016

[57] I-15 Freight Mobility Enhancement Plan, 2020

[58] Washington State Freight System Plan, 2017

[59] MAASTO. Regional Truck Parking, Truck Parking Information Management Systems. http://www.maasto.net/documents/TPIMS-Summary.pdf

[60] I-10 Coalition, Western Connected Freight Corridor Concept of Operations (ConOps) Study Overview. https://i10connects.com/content/western-connected-freight-corridor-concept-operations-conops-study-overview

[61] Truck'N Park: The I-95 Commercial Truck Parking Location System. http://www.i95truckparking.com/tnp/Home.aspx

[62] USDOT, Research and Innovative Technology Administration Intelligent Transportation System Joint Program Office, Freight Advanced Traveler Information System Concept of Operations, August 2012.

automatically integrate travel data and traffic information from a number of sources and distribute it to users through multiple modes of communication (e.g., 511 telephone systems and web sites, interactive traffic maps, dynamic message signs, etc.) to enable them to make better transportation decisions (e.g., route to reach their destination, time at which they depart to arrive on time, etc.). While ATIS have historically focused on passenger travel, a FRATIS focuses on freight. As many states including Washington have already deployed ATIS, the foundation for FRATIS applications is already in place.

A specific example of a FRATIS application is supplying drivers with route and parking information dependent on the needs of the particular load they are carrying.[63] This would provide drivers with information to plan routes according to their own needs, timelines and requirements and improve efficiency of freight travel. Performance evaluation results from existing FRATIS applications (such as the Port of Oakland's DrayQ mobile app which provides wait times at ports and the Texas Department of Transportation's I-35 Traveler Information During Construction system) suggest that the anticipated improvements of truck utilization are being achieved. [64]

Statewide Truck Parking Maps (online): Accurate and current truck parking maps that are accessible online allow drivers to better plan trips and find the nearest parking facilities.[65] While not as effective as real-time parking availability systems, static maps at least provide drivers information on where to look for parking, hopefully reducing the number of trucks parking in undesignated areas.

3.3 Policies and Programs

3.3.1 Influence Private Sector Investment

Commercial Parking Facilities: Truck drivers overwhelmingly prefer to park at full-service truck stops where they have access to fuel, food, showers, and other supplies and services. Therefore, supporting private investment in truck parking has the dual benefit of providing locations drivers prefer, without public expenditures. Truck stop operators have indicated that the most common obstacles to developing new truck stops are public opposition and permitting requirements (such as off-site access improvements) that are too costly. Where feasible, public agencies could help overcome these and other obstacles. [66]

Create an Awareness Campaign: Educate the general public so they can understand the issues facing the industry, the parking needs and how it impacts their access to goods and services.[67] Responses from the Washington Truck Parking Workshop suggested identifying champions at the state and local levels to bring the truck parking issues to the attention of governing bodies and pursue public support for truck parking solutions. The many challenges facing the trucking industry, including labor shortages and aging workforce among others, overshadow truck parking deficits and the need for safe, reliable parking facilities.

Require, Encourage, or Incentivize Shippers & Receivers to Provide Parking Onsite: Shippers and receivers, as generators of the need for truck parking, can be encouraged or required through policy to

[63] Washington State Truck Parking Study, 2016

[64] https://camsys.com/blog/categories/publications/case-studies/freight-advanced-traveler-information-systems-fratis

[65] Washington State Freight System Plan, 2017

[66] Washington State Truck Parking Study, 2016

[67] Washington State Truck Parking Workshop, 2021

provide parking for trucks servicing their facilities. [68] The Township of Upper Macungie, Pennsylvania, set a national example when it passed a new zoning ordinance in 2017 requiring one off-street truck parking space for every loading dock at new facilities and one staging space for every two docks at warehousing and distribution facilities.[69] Additionally, FHWA is developing a Truck Parking Guidebook that includes an Excel-based tool for estimating parking demand based on development industry and number of employees, so policy requiring onsite parking will have a mechanism to determine parking quantity (release is expected in early 2022).

Airbnb of Truck Parking (Utilize Underutilized Private Property): Private property owners with available space can provide a parking alternative to drivers. [70] There are apps available for the property owners to market their space to drivers and trucking companies, and that manage the financial transactions. This solution is not ubiquitous throughout the state as some counties or localities may have restrictions on commercial parking based on zoning, but public policy encouraging safe and legal parking should be emphasized and private solutions engaged where they are feasible.

3.3.2 Sustainability Strategies

Auxiliary Power Units (APUs)/External Power Source for Idle Reduction: Encourage the use of APUs to reduce truck idling, particularly in air pollution sensitive areas. [71] Equipping truck parking facilities with external power sources also supports reducing truck idling and improve air quality. APUs will require engaging the trucking industry and crafting policy requiring trucks to cut back on idling, but external power sources can be incorporated into publicly owned parking facilities at strategic locations where parking is longer-term.

Zero Emissions (ZE) Fueling/Charging Options: ZE trucks are rapidly being developed to fill the demand for clean trucking. Electric vehicle (EV) trucks are charged most economically over a longer period, such as overnight, necessitating charging infrastructure at truck parking facilities. The North American Council for Freight Efficiency notes that commercial vehicle charging infrastructure is one of the biggest unknowns in zero emission vehicle adoption.[72] Improving infrastructure to support zero emissions commercial vehicles will give the industry reassurance that an electric vehicle will have the resources to operate at a comparable capacity to diesel vehicles. It will also support climate and air quality goals.

3.3.3 Influence Driver Behavior

Parking Enforcement: Enforcement of parking laws for vehicles parked illegally will encourage drivers to seek out proper parking facilities and be conscious of parking laws where they intend to make stops. [73] Some cities that had refrained from ticketing/towing illegally parked vehicles, have reassessed those decisions for the purpose of improving traffic safety and quality of life. Manteca, California recently installed signage along a corridor where illegal parking has historically occurred.[74] Fines start at $64.00. Enforcement of these laws

[68] I-15 Freight Mobility Enhancement Plan, 2020

[69] https://ecode360.com/14517379

[70] I-15 Freight Mobility Enhancement Plan, 2020

[71] Washington State Truck Parking Study, 2016

[72] https://nacfe.org/emerging-technology/electric-trucks-2/amping-up-charging-infrastructure-for-electric-trucks/

[73] Washington State Truck Parking Study, 2016

[74] https://www.mantecabulletin.com/news/local-news/manteca-launches-crackdown-unsafe-moffat-truck-parking/

are key as some truckers will risk getting ticketed if the fining occurrences are few and far between. However, enforcement is only effective in areas where truck parking is available, otherwise trucks just move from one undesignated parking area to another.

Provide Affordable Parking: Drivers often determine whether or not to utilize truck parking facilities based on the cost to park. Fewer barriers to entry would result in drivers being more willing to utilize designated truck parking areas. [75] Again, The City of Elmira, New York implemented a pay-to-park framework that allowed frequent users to opt into a monthly and annual memberships, but also provide an affordable daily rate at only $5.00. The city has found great success, pleasing both truck drivers and the city residents by giving drivers a safe location to park and removing parked commercial vehicles from the city.

3.4 Funding Strategies

Public Private Partnerships: Public-Private Partnerships (P3), especially if they include a revenue stream from paid parking or other services, can reduce development and operations costs for both the public and private partners. The Brainerd Lakes Area Welcome Center in Minnesota is an example of truck parking capacity being funded through a P3.[76] The facility is located along a state route and features a gift shop to help financially support the operating costs of the facility.

Revenues from Pay to Park: Implementing pay-to-park programs and utilizing revenues to support truck parking projects can navigate trucks away from areas like town/city centers and other mixed-use corridors. [77] This process utilizes funds from in-town parking meters and lots as the revenue source for public truck parking away from the mixed-use core. The purpose is to create a safe and vibrant community while also accommodating truck parking such that neither is progressed at the expense of the other.

Grant and Tax Incentives: Creating grant programs and tax incentives to build and maintain parking facilities can make parking more widespread and accessible. [78] For example, the Washington State Department of Revenue offered owners of truck stops and heavy-duty diesel trucks tax incentives for using auxiliary power sources to reduce air and noise pollution while parked. This incentive structure targeted environmental and ecological health, but similar incentives directed at private truck parking facilities or onsite parking can yield improvements in truck parking availability.

Federal Funding: Federal funding sources like the TIGER and DERA can be pursued to offset costs of creating or improving truck parking. [79] Additionally, the FAST Act sections 1109, 1105, 1114, 1106, 1113, 1116 and 6004 are identified in the Washington State Truck Parking Study as leverageable legislations with

[75] Washington State Truck Parking Study, 2016

[76] Ibid.

[77] Washington State Truck Parking Study, 2016

[78] Washington State Truck Parking Study, 2016

[79] Washington State Truck Parking Study, 2016

potential to fund truck parking facilities and/or technologies that support Washington state truck parking goals.[80] [81] [82] [83]

[80] http://www.ecy.wa.gov/programs/air/other/namaps/web_map_intro.htm

[81] http://www.ecy.wa.gov/programs/air/sips/designations/maintenance_areas.htm

[82] https://cms.dot.gov/sites/dot.gov/files/docs/TIGER%202015%20Project%20Fact%20Sheets_0.pdf

[83] https://www.epa.gov/cleandiesel/clean-diesel-national-grants#dera2

4.0 Conclusions

The review of Washington truck parking documentation has identified several key factors contributing to increased parking demand and ultimately straining existing truck parking capacity. Generally, supply chains and logistics patterns result in trucks spending substantial amounts of time in areas of freight-intensive land uses which account for a substantial amount of truck parking need in the state. Driver detention time is often on the order of multiple hours, and while some carriers assess penalties for driver detention, the penalties are not incurred until after the second hour, meaning industry standard detention is in the realm of up to two hours. [84] In addition, because it takes a substantial amount of time to cross international borders, drivers are encouraged to take their federally mandated off-duty time at these locations to improve their productivity. The concentration of 10-hour rest breaks at these locations creates a negative cycle in which drivers take long-term breaks at border crossings due to long processing times and processing times are worsened by increasingly larger numbers of drivers taking rest periods.

The lack of truck parking does not just impact driver productivity, it can also negatively impact the quality of life for neighborhoods, air quality, traffic safety and the wellbeing of the driver. For instance, idling trucks contribute to poor air quality and trucks parked in undesignated locations can limit driver visibility which negatively impacts roadway safety. Improving truck parking availability – through targeted capacity enhancements, policies and programs that limit the need for truck parking, and technologies that improve the utilization of existing capacity – helps to mitigate these negative impacts.

The review of truck parking solutions identified a variety of capacity and non-capacity solutions to address parking shortages. Notably, innovative solutions focused on increasing the utilization of existing capacity that due to lack of information or other factors may be under-used. Information services like mobile phone applications and real time parking availability messaging signs help drivers to find available parking they would not otherwise be aware of. Other solutions included allowing trucks to utilize publicly owned facilities (such as fair grounds and park-and-ride lots) when they are not at peak demand, managing existing curb space for safer and more efficient parking, and converting obsolete rest areas or weigh stations into parking facilities. These types of solutions tend to have lower upfront costs which conserves resources for other truck parking-related priorities.

Washington's unique freight environment means its truck parking solutions need to be innovative and proactive. Washington, as a rapidly growing state with reliance on freight, can become a national best practice for truck parking initiatives and solutions.

[84] Washington State Truck Parking Study, 2016

Appendix C

Truck Parking Feasibility Guide – Siting and Layout Considerations for Dedicated Truck Parking Facilities

WASHINGTON STATE **JOINT TRANSPORTATION COMMITTEE**

TRUCK PARKING ACTION PLAN

Truck Parking Feasibility Guide

Siting and Layout Considerations for Dedicated Truck Parking Facilities

prepared by

WSP USA, Inc.

under subcontract to

Cambridge Systematics, Inc.

NOVEMBER 16, 2021

Washington State Joint Transportation Committee
Truck Parking Action Plan

Truck Parking Feasibility Guide

Siting and Layout Considerations for Dedicated Truck Parking Facilities

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date

November 16, 2021

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Abbreviations

AASHTO	American Association of State Highway Transportation Officials
ADA	Americans with Disabilities Act
BMP	Best Management Practices
HDT	Herringbone Drive-Through
MCS	Megawatt Charging System
RLDG	AASHTO Roadway Lighting Design Guide
SBI	Straight Back-In
TPA	Truck Parking Area
WSDM	WSDOT Design Manual
WSDOT	Washington State Department of Transportation

1.0 Introduction

1.1 Objectives

The layout of a Truck Parking Area (TPA) will need to support all of the following essential design goals.

Safety: Provide for the safe movement of trucks and their drivers. Allow truck drivers to maneuver safely and smoothly into, through, and out of the facility, with adequate clearance around other trucks and clear lines of sight. Allow truck drivers to safely leave their vehicles, walk around them for inspection, and move to and from restrooms and rest areas. Protect the site from intrusion by people who do not belong there. Provide adequate site lighting, maintaining high visibility of directional striping, trucks, infrastructure, and drivers on foot.

Land Use: Make efficient use of land resources. Select sites that are compatible with parking layouts, with shapes that minimize unused area. Select parking slot dimensional parameters that maximize capacity while sustaining all other objectives. Consider service to mix of truck sizes, using “spare” space for smaller trucks or trucks without trailers.

Services: Provide services routinely needed by drivers. Provide restrooms that are comfortable, secure, and readily accessible. Provide green spaces where drivers can stretch their legs and exercise animal companions. Provide outdoor picnic/eating facilities where drivers can enjoy a meal break. Provide telecommunications connections that allow drivers to communicate with employers, customers, coworkers, families, and friends.

Logistics: Provide focused support to truck-based logistics. Consider the relationship between the site and nearby or regional cargo exchange points. Consider, given the nature of cargo exchange points—warehouse, distribution, factory, or intermodal hub—whether drivers are more or less likely to be parking with trailers, and what size trailers are in most common use. Consider whether drivers are in the midst of long-haul transport movements or are near their exchange points.

Zoning: Reflect local and regional zoning and land use plans. Consider the visual, aesthetic, traffic, noise, and overall environmental impacts of truck parking, and select sites where TPA operations will not significantly increase local impacts. Select access points that minimize interference with existing traffic patterns. Include visual breaks between parking and surrounding activities. Design lighting to avoid light pollution and overspill across TPA boundaries.

Access: Provide effective and efficient access to highways and major arterials. Utilize existing truck routing patterns, minimizing diversion from existing primary routes. Provide adequate maneuvering at entry and exit, and allow for a small truck queue if site entry will involve trucks stopping. Provide signage that allows drivers to easily find the site and to easily find their way back to the major highways and to major nearby cargo exchange points.

1.2 Overview

This document is intended to set forth the essential technical requirements for the planning of TPAs, including dimensional requirements for safe truck movement and efficient parking, as well as operational features required to allow a TPA to satisfy the design goals outlined above. The document includes a set of

layout examples intended to demonstrate how these requirements might be expressed within the constraints of real-world sites.

Section 2, *Parking Design and Land Use Density*, sets forth recommendations for the geometric design and layout of truck parking elements.

Section 3, *Services and Service Facilities*, provides recommendations for non-parking elements and facilities.

Section 4, *Logistics, Geography and Access*, provides guidance on the relationship between TPAs and their wider settings.

Appendix A provides dimensional and geometric details for the layout of diagonal or “herringbone” parking slots.

Appendix B presents preliminary dimensional and layout information related charging zero-emissions trucks.

2.0 Parking Design and Land Use Density

2.1 Existing Standards

The Washington Department of Transportation (WSDOT) Design Manual (WSDM) establishes standards governing the design of state highways and freeways in Washington.

WSDM Chapter 1103 establishes the design vehicle as part of design control selection. WSDM identifies WB-67 [WB-20] as the design vehicle to be used for various maneuvering as well as truck parking purposes.

The 2018 Edition of *Geometric Design of Highways and Streets* (the "Green Book") of the American Association of State Highway Transportation Officials (AASHTO) establishes standards governing the design of Federal highways.

Green Book Section 2.8.1 indicates: "The WB-67 [WB-20] truck should generally be the minimum size design vehicle considered for intersections of freeway ramp terminals with arterial crossroads and for other intersections on state highways and industrialized streets that carry high volumes of truck traffic or that provide local access for large trucks, or both." The dimensions and turning pattern for the WB-67 truck are shown in Figure 2.1 on page 2-2, taken from Figure 2-24 in the Green Book.

Key values used for design vehicle are summarized in Table 2.1 on page 2-2. Trucks of the general form of the AASHTO WB-67 truck have become common. This vehicle should be used as the basis of design for TPAs, as WB-67s have become more common and it is more likely to ensure provision of adequate parking space.

Figure 2.1 AASHTO WB-67 Design Vehicle Turning Pattern

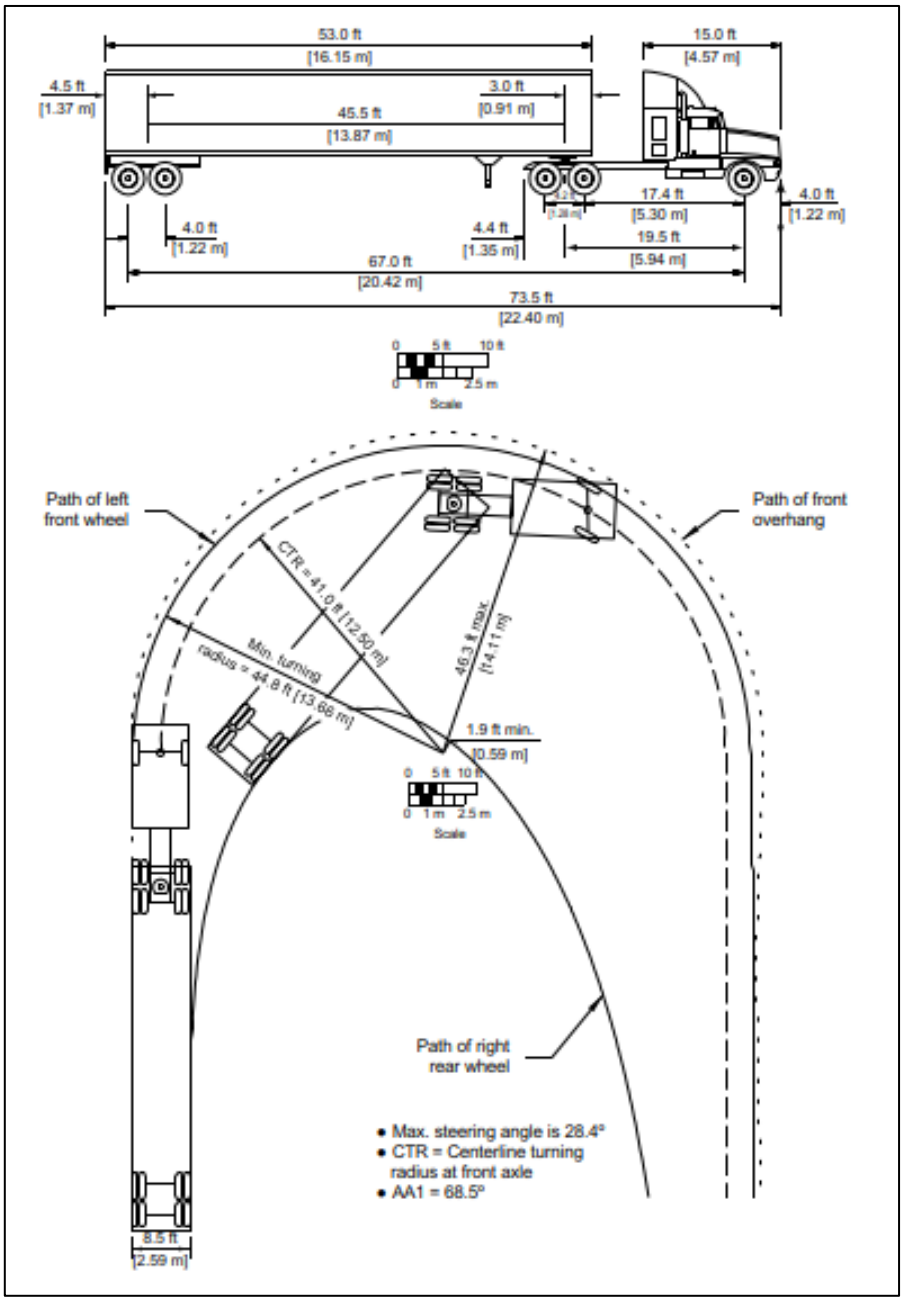
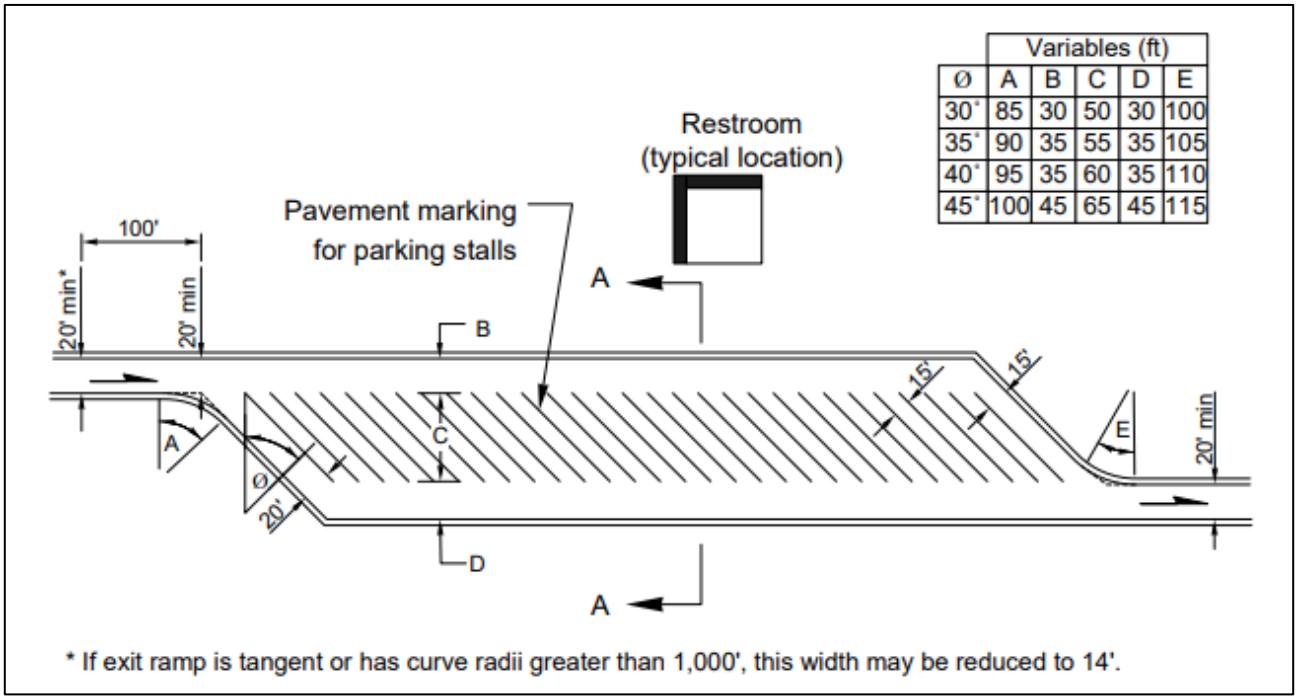


Table 2.1 Design Vehicle Dimensions

Dimension	AASHTO Truck
Trailer Length	53 feet
Trailer and Tractor Width	8.5 feet
Tractor Nose to Kingpin	23.5 feet
Tractor Nose to Trailer Nose	20.5 feet
Kingpin to Rear Truck Centerline	45.5 feet

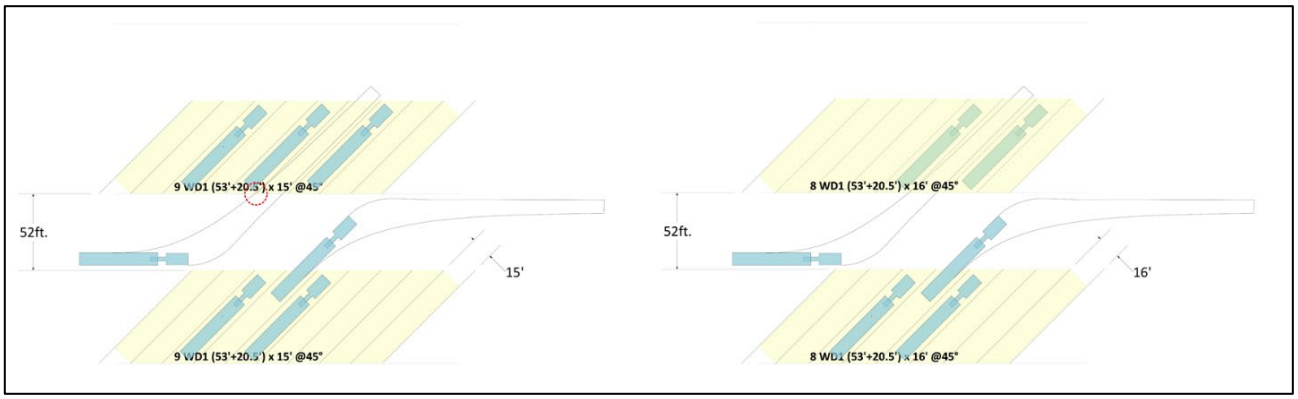
The AASHTO Green Book does not provide specific guidance on the layout of truck parking slots. WSDOT's Design Manual Chapter 1710 Safety Rest Areas Section 1710.05(12) Parking Area Design states that, "Exhibit 1710-5 shows an example of a truck parking area layout. AASHTO's Guide for Development of Rest Areas on Major Arterials and Freeways provides parking area design considerations." Figure 2.2 shows snapshot of Exhibit 1710-5 showing the slot width requirement for truck parking areas. Exhibit 1710-5 shows a slot width of 15 feet. However, further research using turn profiles of WB-67 design vehicle shows that 15 feet slot width is insufficient. Figure 2.3 shows a 15-foot slot width on the left and 16-foot slot width on the right. As can be seen in Figure 2.3, with 15-foot slots, the swept path on slot entry crosses the striping in the adjacent slot, and that's if the driver is perfectly centered. This means the drivers cannot respect the striping. Focusing on driver safety and ease of maneuvering, 16-foot slots should be the minimum for these vehicles.

Figure 2.2 WSDOT Parking Slot Requirement for Trucks



Source: WSDOT Design Manual Chapter 1710, Exhibit 1710-5.

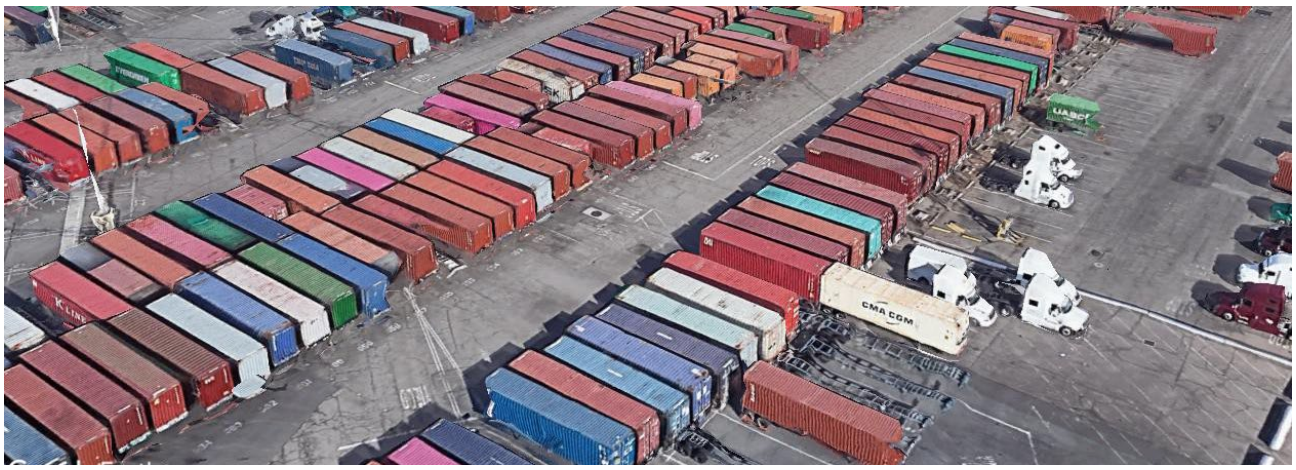
Figure 2.3 Slot Width Analysis, 15-ft (left) and 16-ft (right)



2.2 Parking Slot Type

The highest parking density is achieved by using Straight Back-In (SBI) slots. Many maritime and intermodal facilities use this configuration with slots 10 feet wide, as shown in Figure 2.4 on page 2-4. Loading docks at factories, warehouses, retail facilities, and distribution centers use this configuration with slots ranging from 15 to 20 feet wide, depending on the building's interior layout. Truck stops use this configuration with slots ranging from 10 to 12 feet wide. Truckers are adept at backing into and pulling out of such spaces. SBI slots provide the highest parking density and offer the lowest per-slot development cost.

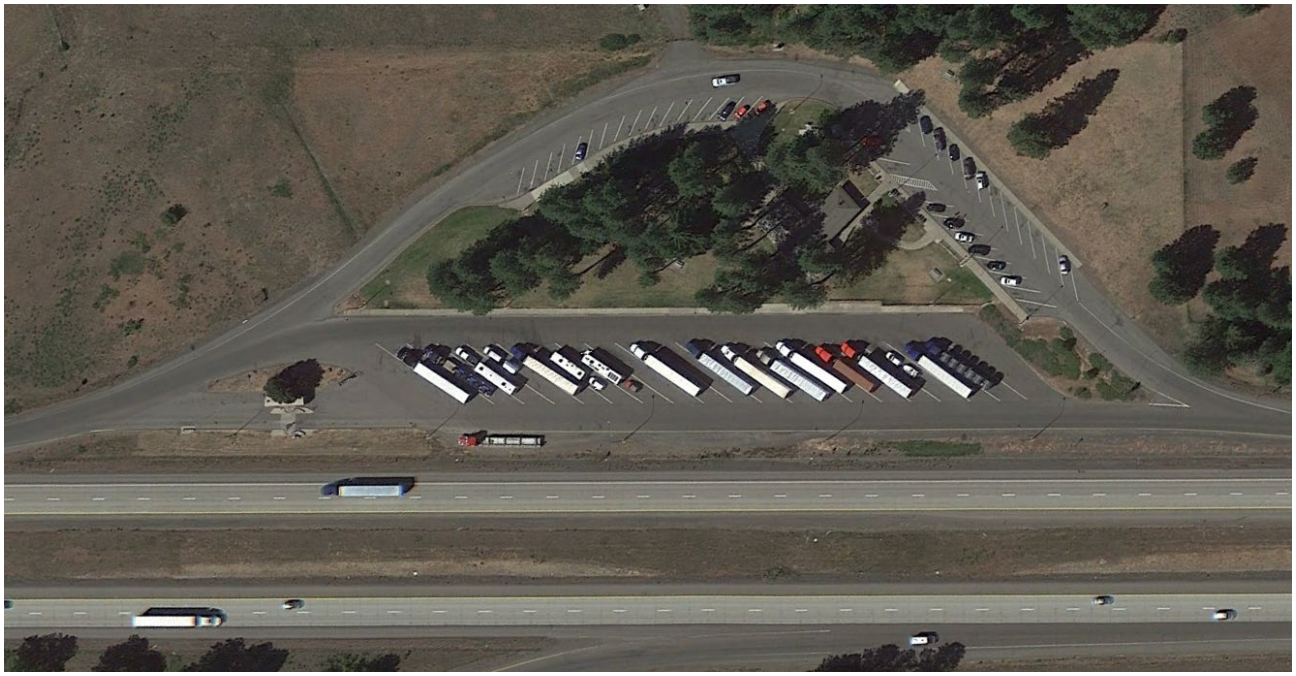
Figure 2.4 Straight Back-In Parking in a Marine Terminal



Source: Google Earth

While truck drivers are adept at using SBI slots, they are not preferred. Driver surveys routinely find a preference for Herringbone Drive-Through (HDT) slots. The slots are at an acute angle to the access aisle, typically 45 degrees. The truck enters from one end of the slot and departs through the far end, never having to back up. This configuration is easier for the drivers and reduces the incidence of collisions between moving and parked trucks, and is a major incentive for using a TPA. Highway rest areas use HDT slots for long vehicles, including trucks, buses, and long recreational vehicles because they are easier and safer to enter and exit, as shown in Figure 2.5 on page 2-5. HDT parking density is about 50% of SBI parking density and per-slot development costs are proportionally higher. However, the difference in development cost is greatly outweighed by the life-cycle values of safety and trucker efficiency.

Figure 2.5 Herringbone Drive-Through Slots at Interstate Rest Area



Indian John Hill Rest Area; Source: Google Earth

Truck stops and rest stops are routinely used by truck drivers to inspect their vehicles. The driver typically walks around the vehicle, thumping tires to make sure they are fully inflated, verifying load stability and security, and making sure no damage has occurred. It is reasonable to assume that drivers will be on foot around their vehicles in TPAs. With SBI slots, the driver of a maneuvering truck has limited rearview visibility of the parking slot and may be backing into an area where another driver is on foot. With HDT slots, by contrast, the driver has clear forward visibility of the entire parking slot and the edges of adjacent slots, allowing intelligent response to the presence of other drivers on foot.

As trucks maneuver into and out of parking slots, their vehicles sweep out a path as shown in Figure 2.1 on page 2-2. As the turning angle sharpens, the swept path is wider. Using HDT slots minimizes the swept path and greatly reduces the chances for collisions between adjacent vehicles, on both entry and exit.

HDT slots are recommended for TPAs to maximize usage, driver efficiency, and safety.

2.3 Herringbone Drive-Through Dimensions

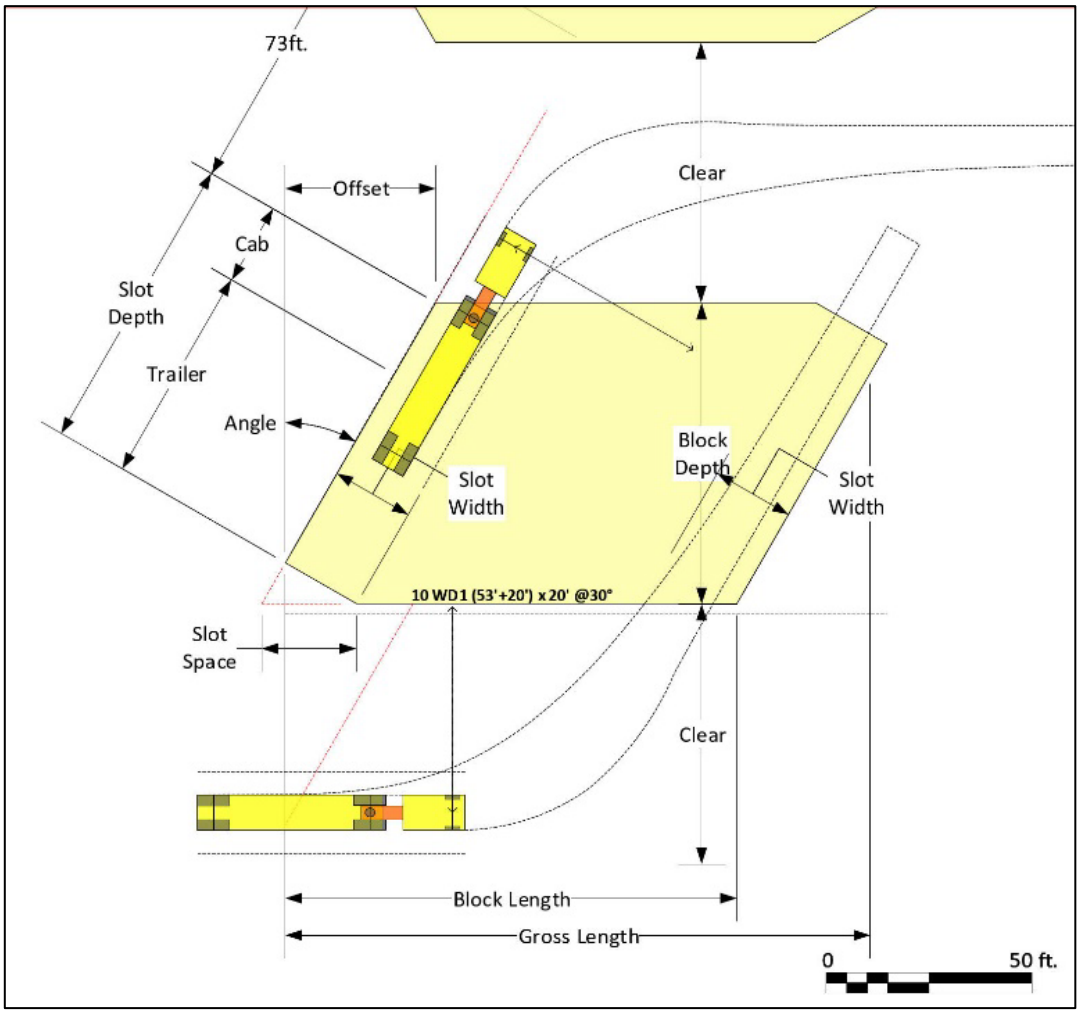
Laying out HDT parking areas is somewhat more complicated than laying out SBI parking. Because of the angling of the parking slots, trigonometry is involved in determining how parking slots will fit into the site and how trucks will flow into and out of them. Appendix A presents the essential mathematical structure of HDT parking slots and parking rows as a reference for the site planning engineer.

2.4 WB-67 Swept Paths

As a truck turns, the edges of the truck sweep out a path that must be kept clear of obstacles, as shown in Figure 2.1 on page 2-2. The parking slot needs to be wide enough to allow a truck to avoid hitting trucks parked next to it as it enters or leaves it. As shown below, the parking slots need to be 16 feet wide.

Figure 2.6 shows the paths swept by the AASHTO WB-67 truck as it enters or leaves a herringbone parking block of angle = 60°, assuming a Slot Width of 16 feet as indicated in Table 2.2 on page 2-7. The dimension of 73 feet is sufficient to allow a truck to enter or leave a slot without its swept path hitting an adjacent vehicle or the vehicles in adjacent slots.

Figure 2.6 Paths Swept by AASHTO WB-67 Truck



As can be seen in Figure 2.6, the path swept by the truck as it enters or exits the parking slot remains within the slot's recommended 16-foot width.

2.5 Slot Density

Table 2.2 shows the relationship between stall dimensions and overall truck parking slot density for a range of different slot configurations, assuming a row length of 40 single-truck parking slots.

Table 2.2 HDT Dimensions and Density, 40-Slot Blocks, AASHTO WB-67

Slot Depth (ft)	Slot Width (ft)	Angle (deg)	Density (t/acre)	Relative Density	Description
74	16	45	19.5	1.00	WB-67 Herringbone
		30	21.1	1.08	30 degrees
		40	20.1	1.03	40 degrees
		50	18.9	0.97	50 degrees
	12	0	32.6	1.67	Straight Back-In

Using the AASHTO WB-67 standard, with 74-foot trucks in 16-foot slots at a 45° angle, parking density is 19.5 trucks per acre. Changing the herringbone angle over a range of 30° to 50° has only a modest impact on density. The final row in the table shows the density for SBI slots 12 feet wide, similar to the arrangement commonly used in commercial truck stops. This configuration has about twice the density of the 74-foot / 45° herringbone but is not recommended for TPAs. Other angles can be used, but 45° is the most common in use at rest areas and freight terminals, and so should be the most familiar to truck drivers.

A 45° herringbone angle is recommended unless overall site area would be more effectively used at a different angle. In any case, the angle should not be less than 35° to sustain smooth, safe vehicle movement.

2.6 Access, Layout, & Circulation

Because truck drivers will be leaving their rigs to use service facilities in the TPA, it is advisable to include a clearly striped walkway along the noses of the tractors. The walkway should be a minimum of 6 feet wide, allowing a pedestrian to dodge a hazard while staying within the striped area.

HDT parking rows are usually laid out in pairs in order to conserve circulation space. There are two ways for trucks to circulate through such paired rows. Figure 2.7 shows trucks arriving from outside the row pair and departing along a shared lane between the rows. Figure 2.8 shows the reverse, with trucks arriving along a shared access lane and departing outside the row pair. Both layouts show pedestrian walkways along the fronts of the parking slots. Both layouts are viable, providing alternative approaches to site utilization and pedestrian circulation.

Figure 2.7 HDT Circulation, Outside-In

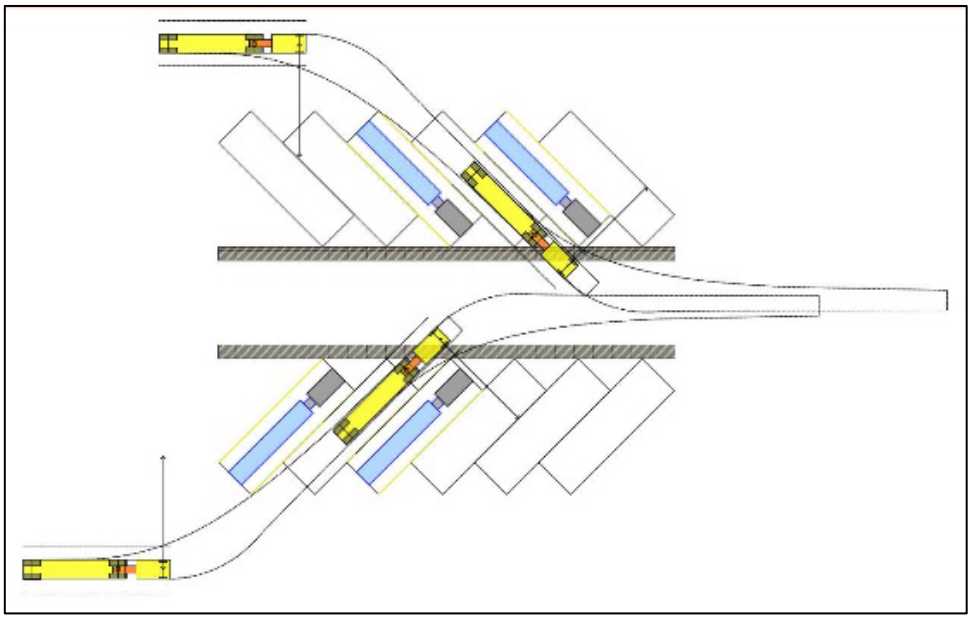
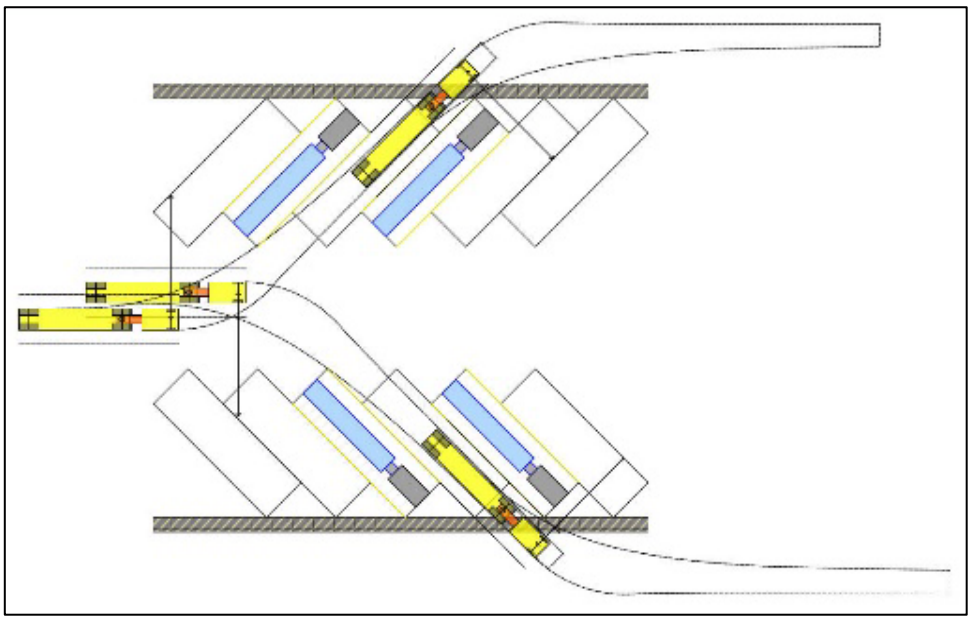


Figure 2.8 HDT Circulation, Inside-Out



3.0 Services and Service Facilities

3.1 General

Truck parking areas are intended for use by truckers taking mandatory rests. They may also be used by truckers awaiting access to a nearby destination facility, or awaiting a new assignment at a nearby origin facility.

TPAs are not intended to supplement or replace the services provided by commercial truck stops, which may provide fuel, food, showers, restrooms, truck servicing, sleeping quarters, and other services on a commercial basis. This document focuses on TPAs in the public space, leaving the planning of commercial sites to private entities that can better judge their needs.

Parking durations at TPAs are expected to range from minutes to a few hours, not more than a day. The TPA must be equipped to provide essential services to truckers consistent with such durations.

3.2 Security

In response to Jason's Law, one of the driving forces for the creation of TPAs is to provide a secure environment where truckers can rest.

At the very least, a TPA should have a perimeter security fence that deters casual pedestrian access to the site.

Control of truck access to the TPA is a major planning and design consideration. The safety, security, and utility of TPAs are maximized if access is limited to truckers who need them. Allowing passenger vehicles, buses, and recreational vehicles into TPAs will increase the risk of pedestrian and vehicular accidents as well as theft and other criminal activity. Control options include:

- **Soft Control:** Access control can be achieved with a combination of 1) an ordinance limiting TPA access; 2) signage advising approaching vehicles of access limitations; and 3) enforcement of the ordinance by citations or other actions. Such soft control of access would not require major infrastructure and would not affect the design of the site.

- **Control Recording:** Soft access control can be augmented by capturing the image and license tag of any vehicle attempting to enter the TPA. This would require installation of imaging and recording equipment, activated by a ground loop, weight sensor, or another instrument. Having a record of entries and exits would assist in access enforcement.

- **Hard Control:** Access control can also be achieved by installation of an access gateway that: 1) can only be opened by truckers that are permitted to use the facility; and 2) can be opened by any trucker needing to use the facility. The challenge is establishing a trucker access system that limits access without excluding those who need it. Given interstate commerce laws, the access system would have to be usable by any trucker in the country, making use of any state- or region-based truck identification, such as a radio-frequency toll tag, impractical. Charging for access may be impractical or contrary to state or Federal regulations. Using vehicle front axle weight would not allow differentiation between truck

> tractors and laden inter-city buses. In summary, hard control of access is probably not practicable without installation of a monitored or staffed control point.

3.3 Control of Use

TPA planning and design should reflect permitted uses of the parking area (e.g., whether it is for short-term staging or rest versus overnight parking for rest). If a TPA is near a major logistics hub, such as a marine terminal, rail yard, or distribution complex, truckers may be tempted to use the facility for short-term storage of their trailers. Allowing unattended trailer parking may limit the utility of the TPA as a trucker rest or holding area and may add to a number of risks, including theft, hazardous material spillage, smuggling, and trafficking. Prohibiting trailer parking will require robust detection and enforcement.

3.4 Lighting

The AASHTO Green Book, Section 3.6.3 on Lighting, references the AASHTO *Roadway Lighting Design Guide* (RLDG). Section 8.6 of the RLDG, on Parking Areas, states:

> An average maintained lighting level of 1.0 foot-candle (11 lux) with a uniformity ratio of 4:1 should be used over all parking facilities.

Section 8.7 of the RLDG, on Activity Areas, states:

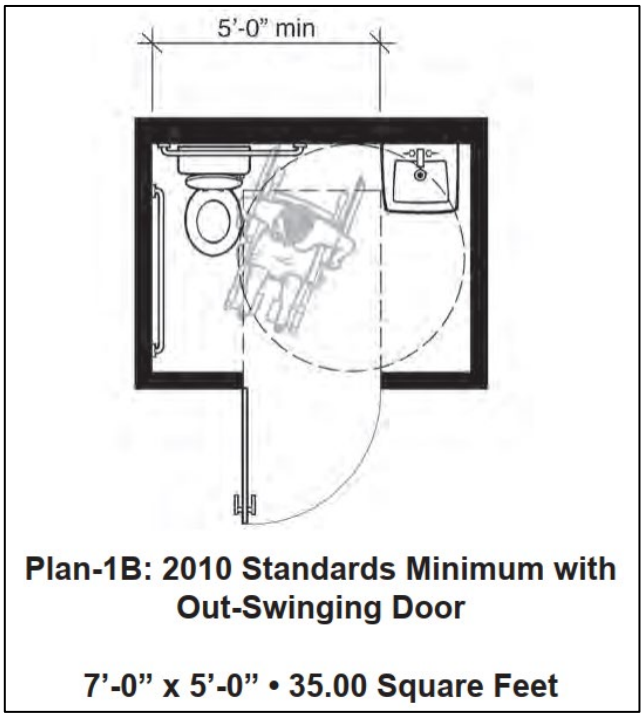
> It is recommended that the main walkways around the structures and major walkways leading to and from the parking facilities be lighted to 1.0 average maintained foot-candle (11 lux) with a 4:1 uniformity.
>
> Those walks leading to the shelter table, picnic tables, dog walks, etc., should be lighted to 0.5 average maintained foot-candle (5 lux) utilizing a 6:1 or better uniformity ratio.

Lighting designed to these standards will allow drivers to see where they are going and allow pedestrians to see moving and stationary obstacles, while minimizing external impacts.

3.5 Toilet Facilities

TPAs should have toilet facilities compliant with local, state, and Federal regulations. The 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design should apply. Figure 3.1 shows the minimum dimensions of a single accessible toilet room with a swing-out door, with interior dimensions of 7 feet by 5 feet. A minimum of 40 square feet of building area should be budgeted for each toilet room.

Figure 3.1 2010 ADA Plan 1B Toilet Room



Source: Guidance on the 2010 ADA Standards for Accessible Design, USDOJ, 15 Sept 2010

Given the likely isolation of TPAs, the personal security of facility users should be of paramount importance in restroom design. TPA restrooms should be in fixed, permanent structures, should be properly plumbed for water and for effluent discharge to an enclosed sewer system, and should be ventilated and climate-controlled for the comfort of the users.

Restroom facilities should be sized based on the number of parking slots in the TPA. 29 CFR 1910.141(c)(1)(i) for Toilet Facilities sets forth minimum sizing based on user population, as summarized in Table 3.1.

Table 3.1 Minimum Required Water Closets

Parking Slots	Water Closets
1 to 15	1
16 to 35	2
36 to 55	3
56 to 80	4
81 to 110	5
111 to 150	6
Over 150	+1 per 40

3.6 Communications Services

TPAs should be provided with “blue light” call boxes to support ready access to 911 and associated emergency services.

Based on surveys, truck drivers strongly desire access to wireless communications, both cellular and Wi-Fi. In order to provide reliable cellular service, TPAs should be sited close enough to cellular communications antennae to support a minimum sustained signal strength of -85 dBA, approximately equivalent to “three bars” of signal strength on most mobile phones. As most smartphones rely on 4G and 5G protocols, these should be available at the site.

Based on surveys, truckers wish to use the Internet for a wide range of services and activities, for both commercial and personal purposes. It is recommended that TPAs provide broadband and Wi-Fi capabilities, as truckers are reliant on constant connectivity.

3.7 Open Space

Based on surveys, truckers may be accompanied by pets or service animals. It is recommended that TPAs have some open space where animals can be exercised, equipped with disposal supplies and units for keeping the area clean.

Based on surveys, truckers will likely want to take meal breaks at TPAs. It is recommended that TPAs have some outdoor picnic tables where truckers can socialize and enjoy their meals outside the confines of their trucks.

As an element of good planning and depending on the setting of the TPA, boundary landscaping should be considered to provide a visual buffer between the TPA and adjacent residential or commercial sites.

3.8 Runoff Water Quality

The State of Washington has regulations requiring treatment of stormwater for the removal of pollutants to ensure water quality of receiving waters. WSDOT has specific design requirements for permanent Best Management Practices (BMP) designed to treat stormwater from impervious surfaces. Guidance is provided in the following documents:

- WSDOT Highway Run-off Manual
- WSDOT Hydraulics Manual
- WSDOT Statewide NPDES Permit

The BMPs can often be incorporated into landscape buffer areas within parking lots, but sizing and locating the BMPs should be considered early in the design, as adequate space must be reserved for them on the downstream side of the TPA.

3.9 Zero Emission Fueling

Because only a few minutes are needed to fuel a truck with diesel, if needed, separate facilities can be provided for truck parking and fueling. Zero emission fuels (ZEF), and in particular electric vehicle charging is most affordable when done over an extended period of time, typically overnight, to fully charge a heavy-duty truck. Therefore, the best opportunity to fuel the vehicle is during a driver's mandate 10-hour rest break—merging truck parking and fueling needs at the same location. As ZEF for heavy-duty trucks become more prevalent, facilities that only provide basic services such as parking and restrooms, will need to consider incorporation of overnight charging.

As noted in Section 2.1 on this memo, WSDOT required stall width for truck parking is 16 feet. This space is sufficient for a conventional truck parking stall. However, for this space is not sufficient for providing charging station to charge electric trucks. A stall with truck parking and electric charging station will require stall width of 20 feet.

A hypothetical layout of fueling lanes installed with the Megawatt Charging System (MCS) was developed by the Charging Interface Initiative (CharIN) for commercial electric vehicles. The MCS specification requires that the charging dispenser be placed on the left side of the vehicle so that the connector can be inserted into an inlet located behind the driver's door placed at approximately at hip height. The placement of the conduits and electrical supply equipment, and truck egress for entry to and exit from the lane will vary across different types and sizes of charging stations, with an illustrative case in Appendix B.

4.0 Logistics, Geography and Access

4.1 Logistics

The siting, planning, and design of a TPA should reflect how truckers will want to incorporate a TPA into their work, which will in turn will depend on how the TPA location relates to logistics end points.

Logistics end point *types* include:

- **Manufacturing,** consuming raw materials and parts and generating finished goods, frequently handled by different truck services, likely involving large trucks in each direction, frequently supporting just-in-time goods movements.
- **Warehouse,** consuming and generating the same materials and/or finished goods, handled by the same or different trucks for inbound and outbound movements, likely involving large trucks.
- **Distribution,** consuming unit loads and generating mixed loads for regional movements, frequently using different trucks, likely involving both large long-haul trucks and small regional distribution trucks.
- **Retail,** consuming finished goods with minimal trip generation, frequently using smaller trucks suitable for urban or suburban roads systems and smaller goods movement quantities.
- **Residential,** consuming finished goods with minimal trip generation, frequently using larger trucks as well as smaller trucks suitable for urban or suburban roads systems and smaller goods movement quantities.
- **Intermodal,** consuming and generating goods transferred to and from trains, ships, aircraft, or barges, serving facilities with working hours that are not consistent with long-haul trucking hours.

4.2 Geography

Logistics end point *locations* can be classified as:

- **Urban:** Inside the fully developed urban core, with negligible uncommitted open space, with limited arterial roads, requiring the use of smaller trucks and having very limited space for parking.
- **Suburban:** On the edge of the urban area, with some uncommitted open space, with ample access to major arterials and highways.
- **Exurban:** Near to but separated from the urban area, with ample open space, with access to a few arterial roads and highways.

TPAs will also have a role far from logistics end points, serving primarily as long-haul rest stops. These would typically be described as:

- **Interurban:** Far from urban areas, with ample open space, with access to highways but not necessarily to major arterial roads.

Each logistics end point type is found with higher or lower frequency in each geography, as roughly summarized in Table 4.1 on page 4-2. Manufacturing and retail/residential are more urban centered to leverage workforce availability, supply inter-dependence, and customer base. Distribution and warehousing take up a good deal of space, making them more common in suburban and exurban areas.

Intermodal rail yards tend to be very large. Many older urban areas have older rail hubs. New rail hubs tend to be exurban, where land is available and rail mainlines are accessible.

Most intermodal port facilities are in the hearts of major urban areas, as many urban areas originated around harbors and port facilities.

Table 4.1 Geography of Logistics

	Geography			
Logistics	**Urban**	**Suburban**	**Exurban**	**Interurban**
Manufacturing	High	High	Low	
Warehouse	Low	High	High	
Distribution		High	High	Low
Retail / Residential	High	High	Med	
Intermodal Rail	Low	Low	Med	High
Intermodal Port	High	Med		

High: Logistics of this type are commonly housed in this geography.
Low: Logistics of this type are rarely housed in this geography.
Med: Between High and Low.

4.3 Access

TPAs can be designed for access via:

- **Freeway or Highway Ramp:** Medium-speed approach with limited turning.
- **Arterial Road "Curb Cut":** Low-speed approach, typically through a sharp or right-angle turn on entry and/or exit.

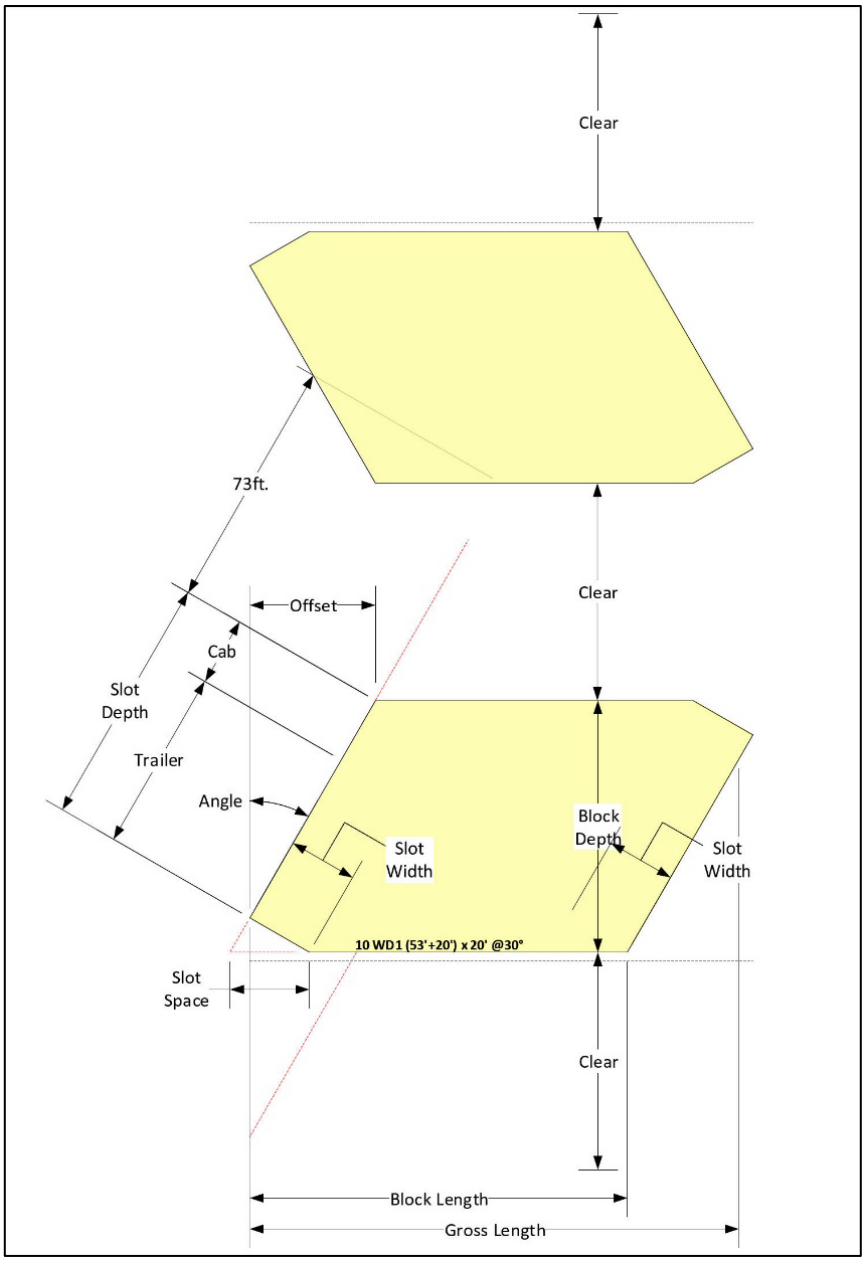
The ability to add new entry and exit ramps on an existing freeway depends on the proximity of existing interchanges and arterial crossings. Establishing freeway connections for a TPA in an urban or suburban setting will typically constrain the size of the facility. Even in exurban settings, the spacing of arterial road crossings, whether at an interchange or grade-separated, may limit the size of a freeway TPA. Freeway TPAs will most likely be limited to interurban sites.

Urban settings, with limited open space and limited arterial road access, will make for difficult and limited TPA development. Urban TPAs may be viable on areas that have limited utility for urban development, such as spaces under highway or rail viaducts.

Appendix A. Herringbone Drive-Thru Slot Geometry

The key elements of the geometry for HDT parking slots are shown in Figure A.1.

Figure A.1 Herringbone Geometry for AASHTO WB-67 Truck



The key elements driving slot geometry and parking density are:

- **Angle:** The angle between the parking slot and a line normal to the access aisle.
- **Slot Depth:** The distance between the front and back lines of the parking slot.
- **Slot Width:** The distance between the side lines of the parking slot.

Slot Depth is the sum of:

- **Box Length:** Distance between the trailer's front and back walls.
- **Cab Length:** Distance between the tractor front bumper and the trailer front wall.

The truck's swept path is narrower for shorter box lengths and smaller turning angles.

The Offset value is from the end of the parking block to the tip of the first parking slot. The triangular space formed by this offset can be used for light standards or other utility installations.

$$Offset = Slot\ Depth \times sin(Angle)$$

Slot Space is the distance between parallel slots, measured parallel to the access lane.

$$Slot\ Space = \frac{Slot\ Width}{cos(Angle)}$$

The Gross Length of the parking block will be driven by the geometry of the overall site. The number of slots that will fit within a given Gross Length is given by:

$$NSlots = 1 + int\left[\frac{Gross\ Length - Offset - Slot\ Depth\ \times sin(Angle)}{Slot\ Space}\right]$$

The parking Block Length, measured as shown, is given by:

$$Block\ Length = \ Slot\ Width \times cos(Angle) + (NSlots - 1) \times Slot\ Space$$

The parking Block Depth, measured as shown, is given by:

$$Block\ Depth = Slot\ Depth \times cos(Angle) + Slot\ Width \times sin(Angle)$$

The "Clear" distance between parallel blocks is a function of angle and swept path. Figure A.1 has one fixed dimension, **73 feet**, measured from the nose of the slot to the face of the next block, *parallel* to the slot axis. This seemingly arbitrary value is based on experience in the design of terminals that rely on parking 45-foot trailers, including marine and intermodal rail terminals.

The Clear distance between adjacent blocks is thus given by:

$$Clear = 73\ ft \times cos(Angle)$$

Total Block Spacing is:

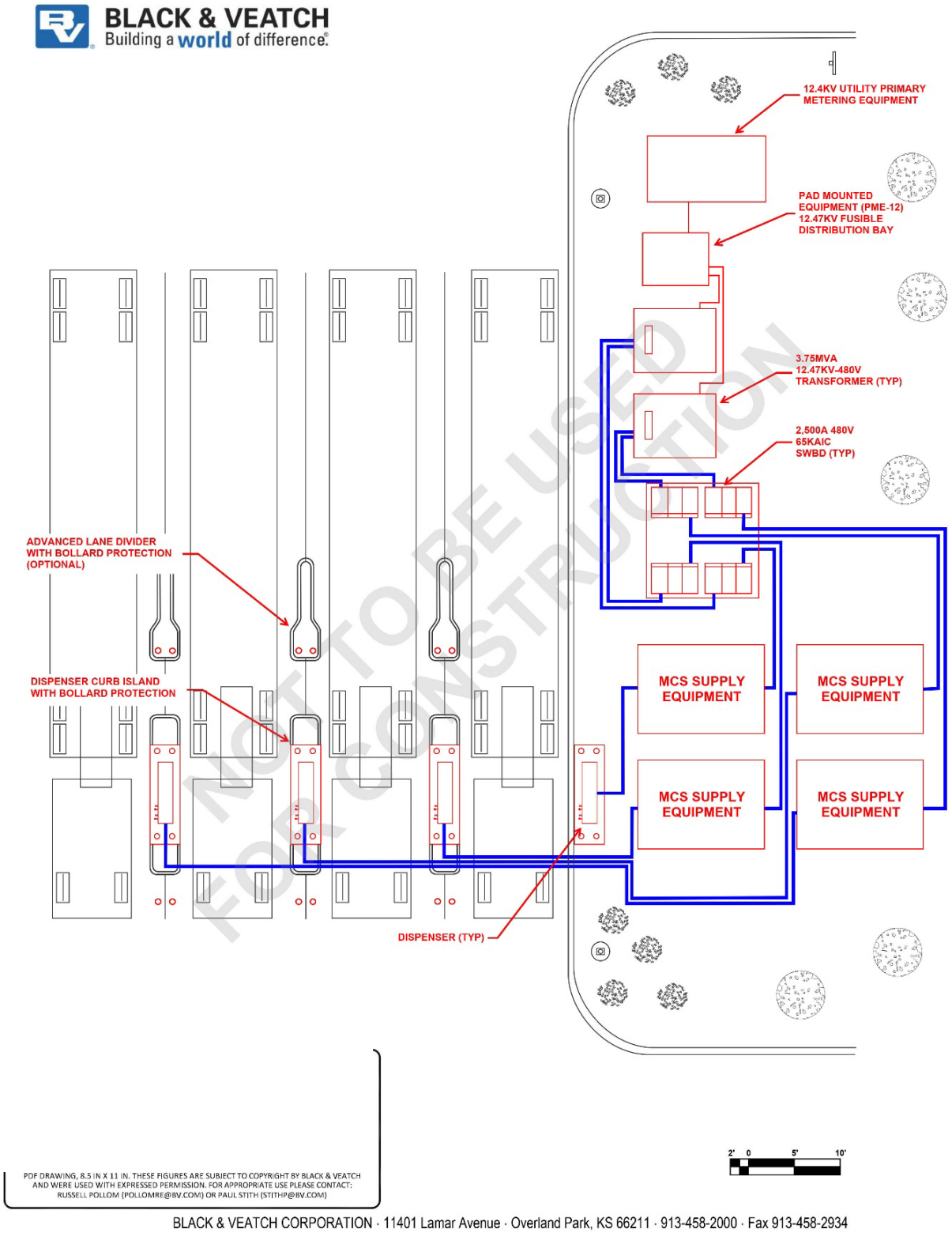
$$Block\ Spacing = Block\ Depth + Clear$$

Appendix B. Zero Emission Fueling Illustrative Case

The following figure was prepared by Black & Veatch for Charging Interface Initiative (CharIN) of the Megawatt Charging System (MCS) Task Force. These figures are subject to copyright by Black & Veatch, and were used with expressed permission. For appropriate use please contact: Contact Russell Pollom (pollomre@bv.com) or Paul Stith (stithp@bv.com).

This figure does not reflect the constraints or requirements of any specific site, nor is research and development reached a point at which a design standard can be established. The relationship between electrical gear and charging stations will, in any case, be site dependent.

Figure B.2 Potential Configuration of MCS Installation



Appendix D

Partnership Pilot Program Screening Tool

1.1 Partnership Pilot Program Screening Tool

WSDOT is likely to have a variety of potential opportunities to address truck parking challenges in partnership with either the private sector or other public sector entities. These partnership concepts typically vary with respect to the purpose, location, structure, costs, and potential funding sources, so it is often challenging to compare opportunities using similar metrics and advance a clear approach that aligns with organizational priorities and resources.

To advance an effective Innovative Partnership Action Plan, both in the short-term and the long-term, it is important for WSDOT to have a consistent and flexible tool to assess the feasibility of potential partnerships through the lens of different priorities and considerations. Other jurisdictions use similar tools to assess a range of potential partnerships across sectors and functions and find it to be an effective way to support a list of priority projects.

Such a tool provides an annotated checklist of both high-level and detailed-level considerations to optimize the potential for a successful partnership approach and ultimate delivery of the project. Going forward, it is intended that this tool will serve as an ongoing reference guide for WSDOT and its partners to evaluate and develop potential truck parking partnerships.

1.2 Partnership Pilot Program Screening Tool

This screening tool is broad enough to be used in a variety of contexts and should also provide more detailed-level considerations that can support informed decision-making. This screening tool is flexible enough to use for potential partnerships that may not necessarily be defined as formal “Public-Private Partnerships,” which may be less common in the freight context. Potential partnerships that may not be formal P3s may include, but are not limited to long-term property leases, joint development agreements, targeted financial assistance for specific initiatives, and other types of collaborative initiatives between various parties to enhance truck parking infrastructure.

This tool provides a high-level description of the proposed partnership approach including the potential contractual partners or types of contractual partners, and may also consider what type of contractual arrangement is under consideration and potential entities or agencies that would serve as less formal (non-contractual) partners, which may include private sector entities and/or other public agencies, potentially at the local or regional levels, and the potential roles of these partners.

Table 1-1 – Description of Screening Framework

Summary Information	
High-Level Partnership Description	The potential concept of using public funds to develop the basic infrastructure (access, water, electricity) for a site that can be leased to a private sector that will construct a commercial rest-stop and secure parking facility in a location adjacent to a major shipping hub (for example, a port).
Potential Contractual Partners	The implementing public sector entity would identify a private sector entity, potentially through an RFP process, that would enter a long-term lease for further build-out and long-term management of the property.
Potential Other / Non-Contractual Partners	The local jurisdiction where the facility would be located and adjacent site owners that maybe impacted by the proximity to the commercial rest-stop facility.

1.3 Screening Factors

The following Screening Factors are the criteria by which each Screening Scenario is evaluated. Each factor identifies aspects of the potential partnership that are critical for achievement of WSDOT's goals.

- **Policy Goals:** For instance, WSDOT's core goals include an increase in truck parking. Other ancillary goals may arise on a project-by-project basis.
- **Organizational Capacity:** WSDOT's internal technical ability must match the required oversight and management of the partnership. The greater the oversight and procurement effort required (e.g. design-build-finance-operate-maintain) the greater the needs are for WSDOT's capacity.
- **Legal:** WSDOT could determine if other parties – if interested, might be able to help with the development or implementation of the proposal. If no such parties are found, WSDOT could decide to pursue potential regulatory changes.
- **Public Support:** External support for any partnership lowers risk of pushback during project conception and implementation. This includes both the private sector participants and public stakeholders such as elected officials.
- **Risk Allocation:** Every partnership will have a unique risk distribution. For each project, WSDOT will need to determine its risk tolerance and what project elements it would like to keep in-house and which elements it is comfortable allocating to the private sector (or another public agency).
- **Financial Viability:** WSDOT has potential access to various local, state, and federal funding sources. These sources, together with potential private partner contributions can assist in funding/financing the capital and operating costs for a proposed project.

The Screening Tool also includes several sub-factors for each of the Screening Factors, to help ensure the appropriate level of details for consideration. These are outlined in the table below, along with the potential considerations that can help to determine the level of readiness.

Table 1-2 – Screening Factors Considerations

Screening Factors	Potential Considerations
Policy Goals	
How well does the proposed partnership address specific truck parking policy goals?	In general, this would focus on partnerships that increase the amount of truck parking facilities in areas of greatest need. However, ancillary goals, such as the provision of services that make certain parking facilities more attractive, may also be considered. Moreover, competing considerations such as land use, environmental impacts and equity considerations will need to also be considered.
Can the partnership address specific truck challenges that have been identified through planning activities?	Workshops, such as this Washington State Truck Parking Workshop, highlighted some specific challenges and can help to ensure a more targeted approach to the identification of specific solutions. Alignment with goals or principles can also help to secure more extensive support for a partnership initiative.
Organizational Capacity	
Are there internal champions for the specific partnership within the implementing public entity?	Potential internal champions would be individuals that would have the authority and ability to take ownership over advancement of key elements of the partnership,

	potentially in both the short-term and the long-term, depending on the duration of the partnership approach .
Does the implementing public entity have access to sufficient internal and external technical resources to successfully manage the partnership in the public interest?	Depending on the needs of the partnership, this may include internal and external expertise in a variety of disciplines, including but not limited to: land use planning, site development, real estate transactions, contract development and management, cost estimating, revenue analysis, procurement, project management, and negotiations. If the appropriate level of expertise is not available internally, the need will be to identify potential resources and vehicles to secure external expertise.
Has the implementing public entity established guidelines and regulations for procuring and managing the partnership?	Implementation of partnership can have a stronger likelihood of success if there are existing guidelines, processes, and templates that are applicable and already commonly used in the organization. If that is not the case, there may also be examples of guidelines and regulations from elsewhere that could be customized for the specific partnership needs.

Screening Factors	Potential Considerations
Legal	
Is there legal authority to pursue the proposed partnership?	Depending on the proposed partnership, a range of potential contractual arrangements may be considered. In some cases, these may be explicitly permitted and common under existing legal frameworks. In other cases, it may not be as straightforward and may require additional legal due diligence. Under 23 U.S.C. 111 facilities located within Interstate ROW, such as rest areas or designated truck parking facilities, are not permitted to charge fees for goods or services. Therefore, a private party operating a truck parking facility within the SHS ROW would not have a revenue stream to recover costs.
Are there certain legal structures that would be more appropriate for the partnership?	Depending on the types of legal structures that are permitted, there may be a range of potential options. The legal structures and tools that most efficiently and directly address the specific challenges and needs of the partnership are typically the ones that are most appropriate to implement.
Who (individuals/positions) would need to provide approval for this potential partnership, and what would be the parameters?	In some cases, the decision-making and approvals processes are internal to the organization and manageable. In other cases, additional external reviews and approvals may be needed, which could impact the feasibility of the proposed partnership.
Public Support	
Can sufficient support from the appropriate local and regional stakeholders be achieved to pursue the project?	Like a wide range of other infrastructure projects, engagement of local communities, businesses, organizations, and other impacted parties is critical to ensure that concerns and even opposition is resolved or at least addressed sufficiently such that proceeding with development of the project is reasonable and feasible.
Can sufficient political support be achieved for delivering the project?	Depending on the types of external reviews and approvals that may be needed for the potential partnership, it may be more necessary to identify and align political support for the initiative.
Risk Allocation	
Would the partnership provide cost effective opportunities for appropriate allocation of key risks between the partners?	It is important to consider whether a partnership can help create greater overall efficiencies than other implementation strategies. Efficiencies can often be achieved if certain roles are allocated to parties that have the unique ability implement the specific project components in a faster and/or less costly manner.
What would be key responsibilities that the implementing public entity could retain? What are the associated risks?	In an assessment of potential responsibility and risk allocation to the public sector, it is important to identify those roles that fit most squarely in the public sector's areas of expertise and capability. Depending on the project, this may include responsibilities for certain environmental processes, third party coordination, and management of governmental approvals.

Screening Factors	Potential Considerations
What would be the key responsibilities that the implementing public entity would seek to allocate to a partner? What are the associated risks?	In an assessment of potential responsibility and risk allocation to the private sector, it is important to identify those roles that fit most squarely in the private sector's (or another public agency's) areas of expertise and capability. Depending on the project, this may include responsibilities for certain revenue-generating features, operational strategies, and coordination between various private contractors.
Financial Viability	
What are the near term and long-term cost requirements?	It is important to achieve a realistic estimate of the anticipated costs to all potential partners relatively early in the process. This could include, but is not limited to, the costs of permitting, financing, design, construction, operations, and maintenance.
Would the results of the partnership's efforts potentially include scenarios that could involve revenue generation?	This is particularly critical for projects that lack sufficient support from existing sources and may be a major go / no-go factor for projects that could not advance without new additional funding sources. This could include, but is not limited to funding from rentals, fees, sales, and advertisements, depending on the specific elements of the partnership. Under 23 U.S.C. 111 facilities located within SHS ROW, such as rest areas or designated truck parking facilities, are not permitted to charge fees for goods or services. Therefore, a private party operating a truck parking facility with the Interstate ROW would not have a revenue stream to recover costs.
Are there federal, state, or local funding sources that can support the cost requirements?	Depending on the type of partnership and the types of infrastructure investments involved, the funding needs may align with the eligibility for certain federal, state, or local sources (or a combination of these public sources). Since funding availability and eligibility for various programs is ever-changing, a current understanding of both near-term and long-term resources is important for this sub-factor.
Would the potential partner be responsible for providing any funding sources that can support the cost requirements?	In addition to existing sources (such as federal, state, or local funding) or new sources (such as revenues from rentals, fees, sales, and advertisements) it may be possible for certain partnership opportunities to attract potential investors. If this is the case for a partnership, it will also be important to determine what a potential investor would want in exchange for their upfront funding contribution, such as certain long-term fees or revenue-sharing arrangements.

As illustrated below, the partnership can be rated against each factor and sub-factor as either Promising (green), Neutral (yellow), or Potentially Challenging (red), depending on an initial assessment of the key factors and considerations.

Promising: In general, this rating can be assigned to factors in which the proposed partnership concept appears to have more strengths overall and faces very few weaknesses or challenges in that particular factor category. For instance, a partnership that is "promising" in the factor category of "Public Support" has been observed to have extensive and active community support and is expected to raise very few concerns from a political perspective. It is more likely that the partnership will have a strong natural base of public support from the outset. However, this does not necessarily mean that this is an "easy" factor category for the partnership. In most cases, some resources should be dedicated to ensure that this "promising" status is sustained throughout the life of the initiative, In fact, a partnership that is particularly "promising" in the area of "Public Support" may be able to leverage this strength to counteract weaknesses or challenges in other factor areas, such as "Financial Viability."

Neutral: In general, this rating can be assigned to factors in which the proposed partnership concept appears to have a balanced set of strengths and relatively manageable weaknesses or challenges. For instance, a partnership that is "neutral" in the factor category of "Public Support" may have minimal initial active community support, but also does not appear to have significant community opposition. In some cases, it may be perceived as a relative blank slate from the "Public Support" perspective, particularly for projects that may not attract significant community or political attention. While some resources should be dedicated to ensure that this "neutral" status does not take a negative turn into the "potentially challenging" zone, it is less likely that there will be significant community or political opposition.

Potentially Challenging: In general, this rating can be assigned to factors in which the proposed partnership concept appears to already have significant weaknesses or face major challenges to implementation. For instance, a partnership that is "potentially challenging" in the factor category of "Public Support" may have already attracted significant negative community or political attention. Assignment of "potentially challenging" to "Public Support" during the screening process would reflect an early understanding that significant resources will be necessary to overcome specific community or political challenges. The use of "potentially" in this rating is purposeful in that it indicates that the dedication of significant time and energy may be effective in helping the partnership to overcome certain weaknesses and the community or political opposition can potentially be reduced over time.

For specific partnership projects, this use of a simple set of ratings can inform a high-level screening, comparison and prioritization between different types of projects. In a resource-constrained environment, such a Screening Tool can be critical to ensure that existing resource capacity can be leveraged in an optimal manner across the full portfolio of potential partnerships, helping to ensure that less time and energy is wasted on initiatives that are generally more "challenging" across the board. A simple table, as illustrated below, could be used to visually prioritize candidate partnerships.

It is important to note that, while this tool can help inform decisions regarding the allocation of resources to projects that might have greater potential of success, it can be equally important for identifying strengths, weaknesses and potential mitigation measures that may improve the overall prospects of certain projects. The relatively ratings for a partnership may change over the life of the initiative, depending on the resources that have been dedicated to ensuring that certain strengths are amplified and certain challenges are addressed in an effective manner.

Table 1-3 – Example High-Level Screening

Screening Factors	Project A	Project B	Project C	Project D	Project E	Project F	Project G
Policy Goals	🟡	🟢	🟢	🟢	🟢	🔴	🟡
Organizational Capacity	🟡	🟡	🟡	🟢	🟢	🔴	🔴
Legal	🟢	🟡	🟡	🟢	🟢	🔴	🔴
Public Support	🟡	🟡	🟢	🟢	🟡	🔴	🟡
Risk Allocation	🟡	🟢	🟢	🟡	🟢	🟡	🔴
Financial Viability	🔴	🟡	🟡	🟢	🟡	🔴	🟡
Initial Prioritization for Implementation Based on Feasibility	5	4	3	1	2	7	6

The following scenarios demonstrate *how* the Screening Tool can be used for specific opportunities in the future, similar to those detailed below. These represent several hypothetical partnership examples that may be commonly encountered.

1.4 Example Scenario

Below is an example of a scenario whereby truck parking is developed on a publicly owned parcel adjacent to an existing commercial truck parking facility.

Table 2-4 – Example Scenario

Scenario Information	
High-Level Partnership Description	This project scenario uses public funds to construct additional parking on a private parcel adjacent to the commercial truck stop, which could include clearing and paving the parcel, installing lighting, and other on-site and off-site improvements. This parcel could then be maintained by the private owner of the adjacent truck parking facility who would benefit from the additional truckers using their facilities (food, gas, showers, etc).
Potential Contractual Partners	Contractual partners include private owners of the parcel and the adjacent truck parking facility that maintain the publicly constructed truck parking on their parcel of land.
Potential Other / Non-Contractual Partners	Potential other non-contractual partners could include local jurisdiction where the facility would be located or additional, adjacent site owners that maybe impacted by the proximity and the increased traffic to the commercial truck facility.
Examples	In Weed, California two municipal truck-only parking lots were leased and constructed by the City of Weed totaling 30 spaces beside a Pilot truck parking facility. Drivers have access to the amenities offered at several nearby restaurants and a Pilot Travel Center. The parking is free up to 72 hours and potentially longer with special permission from the City of Weed. In Wamsutter, Wyoming the Wyoming Department of Transportation developed 43 truck parking spaces adjacent to an existing truck stop that offers food and shelter. This project has reduced negative economic impacts stemming from improvised truck parking throughout Wamsutter. In Fernley, Nevada, the Nevada Department of Transportation (NDOT) leased a parcel of land adjacent to a commercial truck stop, for a token amount, and built a truck parking lot on the parcel. NDOT operated and maintained the adjacent parking lot for a short time before turning it over to the new owner of the truck stop after it was sold. The new owner now maintains the NDOT built parking lot.

Screening Factors	Narrative Detail	Preliminary Evaluation	Recommendations for Next Steps
Policy Goals			
How well does the proposed partnership address specific truck parking policy goals?	The partnership supports the creation of more secure off-street parking opportunities for trucks, with no ongoing O&M costs.	Promising/ Neutral 	Identify specific policy goals that may be emphasized by the use of publicly owned land and the off-loading of maintenance via private

			partnership, potentially via contractual requirements.
Can the partnership address specific truck challenges that have been identified through planning activities?	The partnership will remove some of the trucks parked in undesignated areas because no designated parking exists where it's needed.	Promising/ Neutral 	Conduct additional assessment of local truck parking needs to confirm that the proposed approach can solve for the most critical challenges.
Organizational Capacity			
Are there internal champions for the specific partnership within the implementing public entity?	At this point in the process, a specific champion or champions may not be identified for this development of a parcel adjacent to an existing truck parking facility initiative, but it will be important for ensuring that the initiative is implemented as effectively as possible.	Neutral 	Work with internal staff to confirm how this initiative may align with existing agency goals and responsibilities, in an effort to identify certain key champions that would be focused on eliminating internal and external barriers to implementation.
Does the implementing public entity have access to sufficient internal and external technical resources to successfully manage the partnership in the public interest?	The public agency has the expertise to manage the design and construction portion.	Neutral 	Determine the coordination that would likely be required between various departments of the implementing public entity (i.e. real estate and construction). Identify external resources that could assist with coordination and/or supplement current staffing.
Has the implementing public entity established guidelines and regulations for procuring and managing the partnership?	While specific guidelines may not exist, it is possible that there are guidelines and regulations for related types of initiatives which can help support development of targeted guidelines.	Neutral 	Determine if the public agency has guidelines / regulations that could be applied directly or modified for this specific initiative.
Legal			
Is there legal authority to pursue the proposed partnership?	Assuming that the implementing public entity has the ability to partner with the private sector for maintenance of public property by the private sector, this should be possible.	Promising 	Assign legal staff to confirm that the legal authority exists. If it is not entirely clear for this specific initiative, determine what might be needed to clarify the legal authority as soon as possible.
Are there certain legal structures that would be more appropriate for the partnership?	If the legal authority exists, there may already be examples of legal structures, such as certain	Promising	Assign legal staff to identify any similar legal structures.

	maintenance agreements, that are most appropriate from the perspective of the implementing public entity.		
Who (individuals/positions) would need to provide approval for this potential partnership, and what would be the parameters?	This project would likely require local planning approval to confirm use of site and legal approval of the contractual agreement between the public entity and the private counterparty.	Neutral 	Assign staff to reach out to local area planners and legal staff to develop a potential contractual agreement.
Public Support			
Can sufficient support from the appropriate local and regional stakeholders be achieved to pursue the project?	Assuming that the initiative addresses key truck parking challenges that are potentially concerning to local and regional stakeholders, there could be significant support for the initiative. One potential concern may relate to the specific siting of the property and the potential perceived impacts on adjacent properties or local communities, likely citing concern of increased traffic and noise. If this emerges as a potential issue, it will be critical to focus significant outreach efforts on the adjacent property and community stakeholders.	Promising/ Neutral 	Conduct outreach to key stakeholders and communities to determine their potential level support for the initiative. If there are initial stakeholder concerns, begin to formulate strategies for addressing these.
Can sufficient political support be achieved for delivering the project?	In many ways, this could align with the local and regional support. If it appears that there is positive local and regional interest in the initiative, political support may follow. Even with local and regional support, internal and external decision-makers may have not prioritized or fully understood the initiative and delay needed approvals.	Promising/ Neutral 	Work with internal staff to prepare regular staff reports and briefing materials about the initiative. As the initiative progresses, staff will share increasingly detailed levels of information with key-decision makers.
Risk Allocation			
Would the partnership provide cost effective opportunities for appropriate allocation of key risks between the partners?	The partnership could allocate project risks through an advantageous maintenance agreement. The maintenance agreement could delegate maintenance responsibilities to the private partner with control mechanisms to enforce key performance indicators required by the public entity.	Promising 	Work with staff to determine risk transfer opportunities and appetite. After determining the desired risk allocation, take a survey of all viable publicly owned parcels and engage outreach activities to receive early feedback and gauge private interest in the initiative.
What would be key responsibilities that the implementing public entity could retain? What are the associated risks?	The public entity could be responsible for providing initial funding, enforcing the terms of the agreement, while maintaining ownership of the underlying property. Unanticipated costs may affect the public	Promising 	Conduct technical due diligence and financial analysis using conservative assumptions and

	entity's ability or willingness to provide additional funding for the project.		adjust scope as needed to fit within the public entity's budget.
What would be the key responsibilities that the implementing public entity would seek to allocate to a partner? What are the associated risks?	The private partner would be responsible for all aspects of operating and maintaining the parking facility, increasing services and staff to accommodate the larger customer base as needed as well as the maintenance of the adjacent parcel. Poor performance can reduce the amount of revenues of the private partner.	Promising 	Develop contract requirements and specifications and share with potential private partners for feedback.
Financial Viability			
What are the near term and long-term cost requirements?	Near term, the upfront investment in property infrastructure will be significant including onsite paving, lighting, and restrooms installed; and potentially costly off-site interchange ramp improvements. Long term, costs for this initiative should be low as all maintenance responsibilities would be allocated to the private partner.	Promising/ Neutral 	Conduct a survey of all publicly owned parcels adjacent to truck parking facilities and conduct an initial assessment of the potential magnitude of infrastructure investment costs that may be needed for the parcel.
Would the results of the partnership's efforts potentially include scenarios that could involve revenue generation?	This partnership is unlikely to generate revenue for the public entity. However, a reservation fee could be charged to user of the truck parking facility if this is something in which the private partner could be interested and already does for the existing truck parking facility, and which would be needed to maintain the additional lot.	Potentially Challenging 	Conduct private sector outreach activities to receive early feedback and gauge industry interest in the initiative and the additional gate fee sharing arrangement.
Are there federal, state or local funding sources that can support the cost requirements?	Potential federal funding sources include: Surface Transportation Block Grants, National Highway Freight Program, or Highway Safety Improvement Program National Highway Performance Program.	Neutral/ Potentially Challenging 	Assign staff to determine if this project would be eligible for any federal funding programs
Would the potential partner be responsible for providing any funding sources that can support the cost requirements?	Under the current suggested scenario, the potential private partner would not provide any funding sources.	Neutral 	Conduct private sector outreach activities to receive early feedback and gauge industry interest in the initiative and the additional potential private funding of the project.