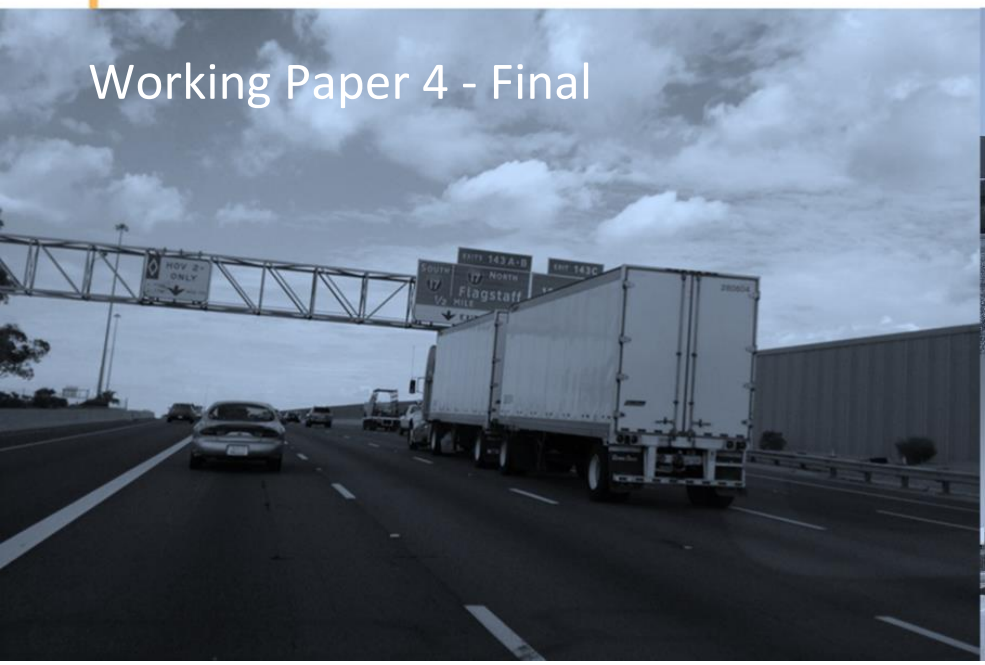
Working Paper 4 - Final



Arizona Truck Parking Study

Working Paper 4: Truck Parking Needs and Solutions

Prepared for:
Arizona Department of Transportation

Prepared by:
CPCS

Solutions for growing economies

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Acknowledgments

The CPCS Team would like to thank the Arizona Department of Transportation, the Arizona Truck Parking Advisory Group, and other stakeholders consulted in the development of this report.

Opinions

Unless otherwise indicated, the opinions herein are those of the author and do not necessarily reflect the views of ADOT or the State of Arizona.

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Acronyms / Abbreviations

AADTT	ANNUAL AVERAGE DAILY TRUCK TRAFFIC
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
ADOT	ARIZONA DEPARTMENT OF TRANSPORTATION
API	APPLICATION PROGRAM INTERFACE
APMA	ARIZONA PETROLEUM MARKETERS ASSOCIATION
ATCMTD	ADVANCED TRANSPORTATION AND CONGESTION MANAGEMENT TECHNOLOGIES DEPLOYMENT
ATRI	AMERICAN TRANSPORTATION RESEARCH INSTITUTE
BUILD	BETTER UTILIZING INVESTMENTS TO LEVERAGE DEVELOPMENT TRANSPORTATION GRANTS
ELD	ELECTRONIC LOGGING DEVICES
DOT	DEPARTMENT OF TRANSPORTATION
GPS	GLOBAL POSITIONING SYSTEM
HOS	HOURS OF SERVICE
MAASTO	MID AMERICA ASSOCIATION OF STATE TRANSPORTATION OFFICIALS
MAG	MARICOPA ASSOCIATION OF GOVERNMENTS
MAP-21	MOVING AHEAD FOR PROGRESS IN THE 21ST CENTURY ACT
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
NACS	NATIONAL ASSOCIATION OF CONVENIENCE STORES
NATSO	NATIONAL ASSOCIATION OF TRUCK STOP OPERATORS
NCTP	NATIONAL COALITION ON TRUCK PARKING
NHFP	NATIONAL HIGHWAY FREIGHT PROGRAM
OOIDA	OWNER OPERATOR INDEPENDENT DRIVERS ASSOCIATION
P3	PUBLIC-PRIVATE PARTNERSHIP
RFP	REQUEST FOR PROPOSAL
ROW	RIGHT OF WAY
STIP	STATE TRANSPORTATION IMPROVEMENT PROGRAM
TA	TRAVEL CENTERS OF AMERICA
TPIMS	TRUCK PARKING INFORMATION AND MANAGEMENT SYSTEM
US	UNITED STATES
VMS	VARIABLE MESSAGE SIGNS

Executive Summary

The objective of this Working Paper is to identify, prioritize, and match the truck parking issues identified in previous steps with solutions. To that end, this Working Paper leverages the findings of Phase I of the Arizona Truck Parking Study and applies a prioritization process to identify the most critical truck parking issues in Arizona. This Working Paper ultimately provides the Arizona Department of Transportation (ADOT) and statewide truck parking stakeholders with actionable steps to advance truck parking improvements statewide.

Categorizing Truck Parking Solutions

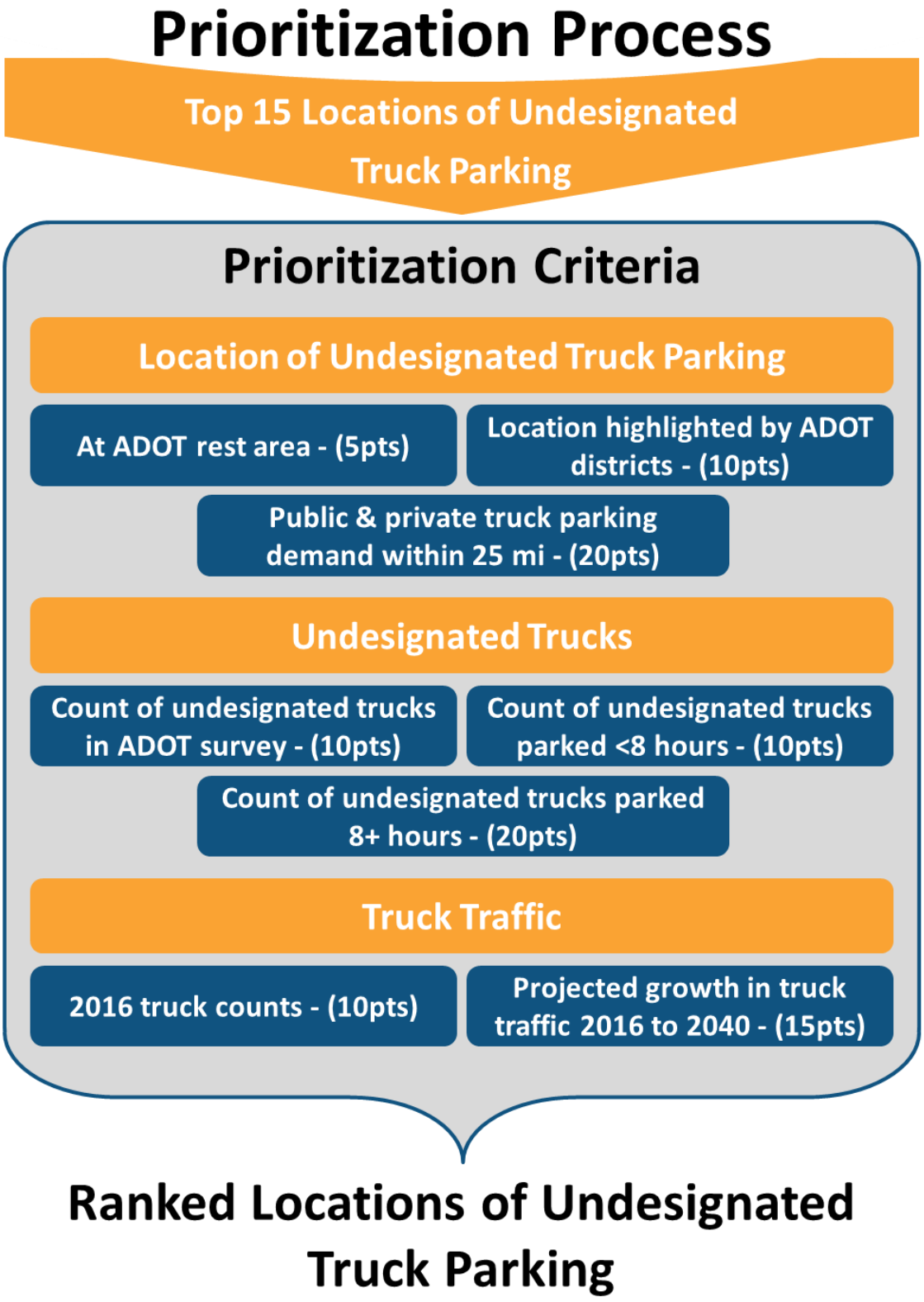
In line with these objectives, this paper organizes truck parking solutions into two broad categories: projects and policies. While not mutually exclusive, the following definitions classify solutions into projects and policies:

- **Capital Projects:** Projects involve the construction of truck parking spaces or installation of equipment to add capacity or improve truck parking safety or operations. Examples of projects include developing truck parking capacity, information systems, or partnering with other public or private sector organizations. The timeframe required to implement any given project can vary widely, depending on the complexity of the project, funding, design and construction, and other factors.
- **Policies:** Policies are actions by ADOT to improve truck parking operations, safety, or planning through institutional policies, actions, or programs. Examples include integrating truck parking into the project design and development process, collecting performance measures at rest areas, and assisting local jurisdictions address truck parking issues. Policies position ADOT to identify, advocate for, and advance truck parking projects and opportunities. Additionally, policies also empower other stakeholders to advance truck parking through data sharing or partnership.

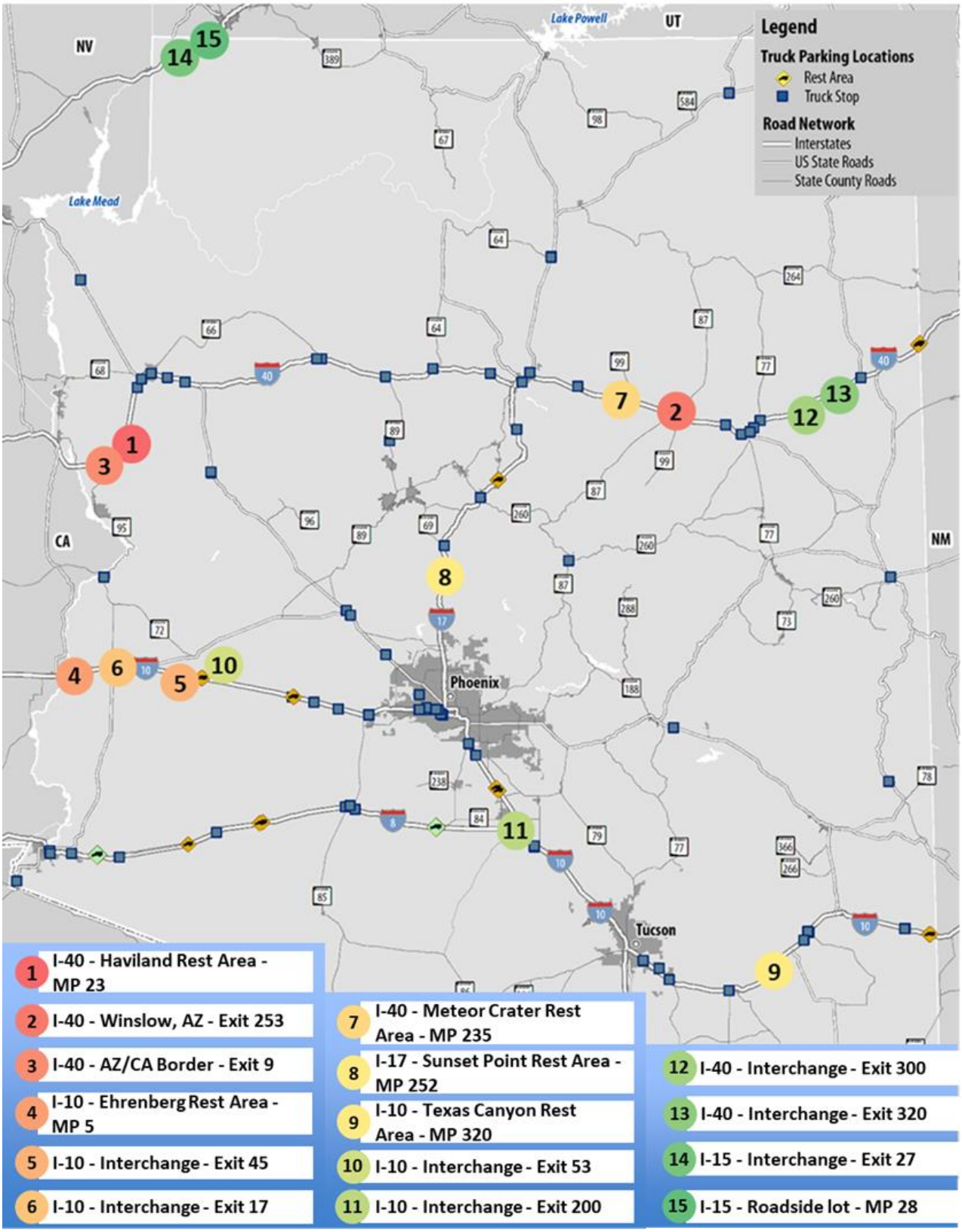
Identifying and Prioritizing Truck Parking Issues

Before solutions could be identified, the team used a data-driven approach to identify truck parking behavior statewide, including where trucks are using on/off ramps, highway shoulders, vacant lots, and local roads for truck parking (undesignated truck parking). The top 15 locations of undesignated truck parking were identified and prioritized using the criteria and associated weights displayed in ES-1. The output of the prioritization process is a ranked list of locations with undesignated truck parking (ES-2) that will help guide where ADOT applies the $10 million in National Highway Freight Program (NHFP) funding it allocated in the Arizona State Freight Plan to improve truck parking.

ES-1: Truck Parking Prioritization Process



ES-2: Top 15 Locations of Undesignated Truck Parking



Matching Solutions to Locations of Undesignated Truck Parking

Following the output of the prioritization process (ES-2), the project team grouped the ranked locations of undesignated truck parking geographically. The project team then used data and criteria from the prioritization process to identify the cause of undesignated truck parking at each location and identified potential solutions. The following geographic clusters were used to identify the cause of undesignated truck parking and identify potential opportunities:

- **I-10 Arizona/California Border:** Locations ranked 4th, 5th, 6th, and 10th
- **I-40 Arizona/California Border:** Locations ranked 1st and 3rd
- **I-17 North of Phoenix:** Location ranked 8th
- **I-10 Near Casa Grande:** Location ranked 11th
- **I-10 at Texas Canyon:** Location ranked 9th
- **I-40 East of Flagstaff:** Locations ranked 2nd and 7th
- **I-40 East Arizona:** Locations ranked 12th and 13th
- **I-15 Arizona/Utah Border:** Locations ranked 14th and 15th

ES-3 summarizes the location, availability of nearby truck stops, and the opportunities to implement expansion and/or information solutions for each geographic cluster of undesignated truck parking locations. A comparison across locations with truck parking spaces available nearby (insufficient information) demonstrates that there is available capacity/parking at truck stops, but not at rest areas. This finding suggests that an information solution must incorporate information from truck stops or position variable message signs (VMS) so that truck drivers can stop at alternative locations if ADOT rest stops are full. The inclusion of truck stops in an information solution will require ADOT to conduct outreach with private operators to assess their interest in participating in a Truck Parking Information and Management System (TPIMS).

Similarly, many of the opportunities for expansion involve Public-Private Partnership (P3). While P3s hold the promise of saving ADOT money in the long-term through reduced operation and maintenance costs, developing these agreements will take time. Lastly, the projects identified in ES-3 highlight that truck parking needs exceed the $10 million in NHFP funding available for truck parking projects.

ES-3: Truck Parking Expansion and Information Opportunities in Arizona

Rank	Location	Truck Parking Spaces within 25mi (Number of Spaces)	Expansion Opportunities	Information Solutions
I-40 Arizona/California Border				
1	Haviland Rest Area Ramps: I-40 (MP 23)	360+ spaces at 6 locations. Truck stops at exits 9, 44, and 48. Availability at: Exit 44: Crazy Fred's Truck Stop (50) Exit 48: TA (115)-limited availability	**Haviland Rest Area (MP 23): Expansion Opportunity** Eastbound: 7 existing truck parking spaces and opportunity for: 15 additional spaces (22 total) - $2.8m (~$195k/space + land) Westbound: 7 existing truck parking spaces and opportunity for: 15 additional spaces (22 total) - $2.8m (~$195k/space)	Interstate Oasis Program with nearby truck stops. TPIMS at Haviland Rest Area.
3	I-40 Exit 9: Ramps & Vacant Lot			
I-10 Arizona/California Border				
4	Ehrenberg Rest Area Ramps: I-10 (MP 5)	800+ spaces at 11 locations. Truck stops at exits 1, 5, 17 19, and 45. Availability at: Exit 5: Sunmart (100) Exit 19: Arco Truck Stop (25) Exit 45: Pride Travel Stop (150) Exit 45: Zip Travel Center (20)	**Ehrenberg Rest Area (MP 5): Unsuitable for Expansion** Land surrounding the rest area is unsuitable for expansion **Bouse Wash Rest Area (MP 53): Expansion Opportunity** Eastbound: 12 existing truck parking spaces and opportunity for: 6 spaces (18 total) without ramp realignment (funded 2020) 13 spaces (25 total) with ramp realignment - $2m (~$285k/space) Westbound: 12 existing truck parking spaces and opportunity for: 6 spaces (18 total) without ramp realignment (funded 2020) 10 spaces (22 total) with ramp realignment - $1.5m (~$375k/space) **Exit 17:** Facilitate discussion and provide data for the consideration of a new TA truck stop in Quartzsite (NATSO highlighted a members interest in developing a truck stop in Quartzsite) **Exit 45:** Explore the use of a construction staging area within the interchange as a parking only location	Interstate Oasis Program with nearby truck stops. TPIMS at Ehrenberg and Bouse Wash Rest Areas.
5	I-10 Exit 45: Ramps & Vacant Lot			
6	I-10 Exit 17: Ramps near Quartzsite			
10	I-10 Exit 53: Ramps & Vacant Lot			
I-40 East of Flagstaff				
2	I-40 Exit 253: Parking in Vacant Lots in Winslow	310+ spaces at 5 locations. Limited availability at nearby truck parking locations.	**Meteor Crater Rest Area (MP 23): Formalize Overflow** Meteor Crater Eastbound and Westbound have overflow lots that are currently covered with millings and are unmarked Pave and stripe the overflow lots formalizing 15 spaces on each side - $3m (~$100k/space) **Exit 253:** Facilitate discussion and provide data about the redevelopment of a vacant truck stop in Winslow	Limited availability of truck parking within the area limits the opportunity for an information solution
7	Meteor Crater Rest Area Ramps: I-40 (MP 235)			

I-17 North of Phoenix				
8	Sunset Point Rest Area Ramps: I-17 (MP 252)	Almost 60 spaces at 2 locations. Limited availability at nearby truck parking locations.	**Sunset Point Rest Area (MP 252): Unsuitable for Expansion** Land surrounding the rest area is unsuitable for expansion Facilitate discussion and provide data for private truck stop (NATSO highlighted a members interest in developing a truck stop on I-17)	Limited truck parking availability nearby limits the opportunity for an information solution
I-10 at Texas Canyon				
9	Texas Canyon Rest Area Ramps: I-10 (MP 320)	410+ spaces at 5 locations. Truck stops at exits 302, 322, and 340. Availability at: Exit 322: Shell (20) Exit 302: Loves (125)	**Texas Canyon Rest Area (MP 320): Unsuitable for Expansion** Land surrounding the rest area is unsuitable for expansion Facilitate discussion and provide data for private truck stop (NATSO highlighted a members interest in developing a truck stop on I-10 west of Tucson)	Interstate Oasis Program with nearby truck stops. TPIMS at Texas Canyon Rest Area.
I-10 Near Casa Grande				
11	I-10 Exit 200: On/Off Ramps Near Casa Grande	1,040+ spaces at 9 locations. Truck stops at exits 200, 203, and 208. Availability at: Exit 200: Pride (50) & Petro (175) Exit 203: TA (234) & Circle K (25) Exit 208: Flying J (350) & Pilot (145)	**Sacaton Rest Area (MP 182): Expansion Opportunity** Eastbound: 17 truck parking spaces and opportunity for 8 additional spaces Westbound: 15 truck parking spaces and opportunity for 9 additional spaces The concentration of private truck parking near Sacaton makes the expansion of the rest area a low priority	Interstate Oasis Program with nearby truck stops.
I-40 East Arizona				
12	I-40 Exit 300: Ramps	390+ spaces at 5 locations. Truck stops at exits 277, 283, 292, 325, and 333. Availability at: Exit 292: Hopi Travel Center (150) Exit 325: Navajo Travel Center (60) Exit 333: Mobil (50)	No ADOT rest areas within 25 miles of Exit 300 and 320	Interstate Oasis Program with nearby truck stops.
13	I-40 Exit 320: Ramps			
I-15 Arizona/Utah Border				
14	I-15 Exit 27: Ramps & Vacant Lot	There are no truck parking locations on I-15 in Arizona.	ADOT could formalize roadside truck parking that occurs at milepost 28 (Westbound on I-15) Additional study would be required to assess the right-of-way and identify the cost of developing a parking only location	Work with Nevada and Utah to inform drivers about truck parking locations on I-15 near the Arizona border.
15	I-15 (MP 28): Roadside Gravel Lot			

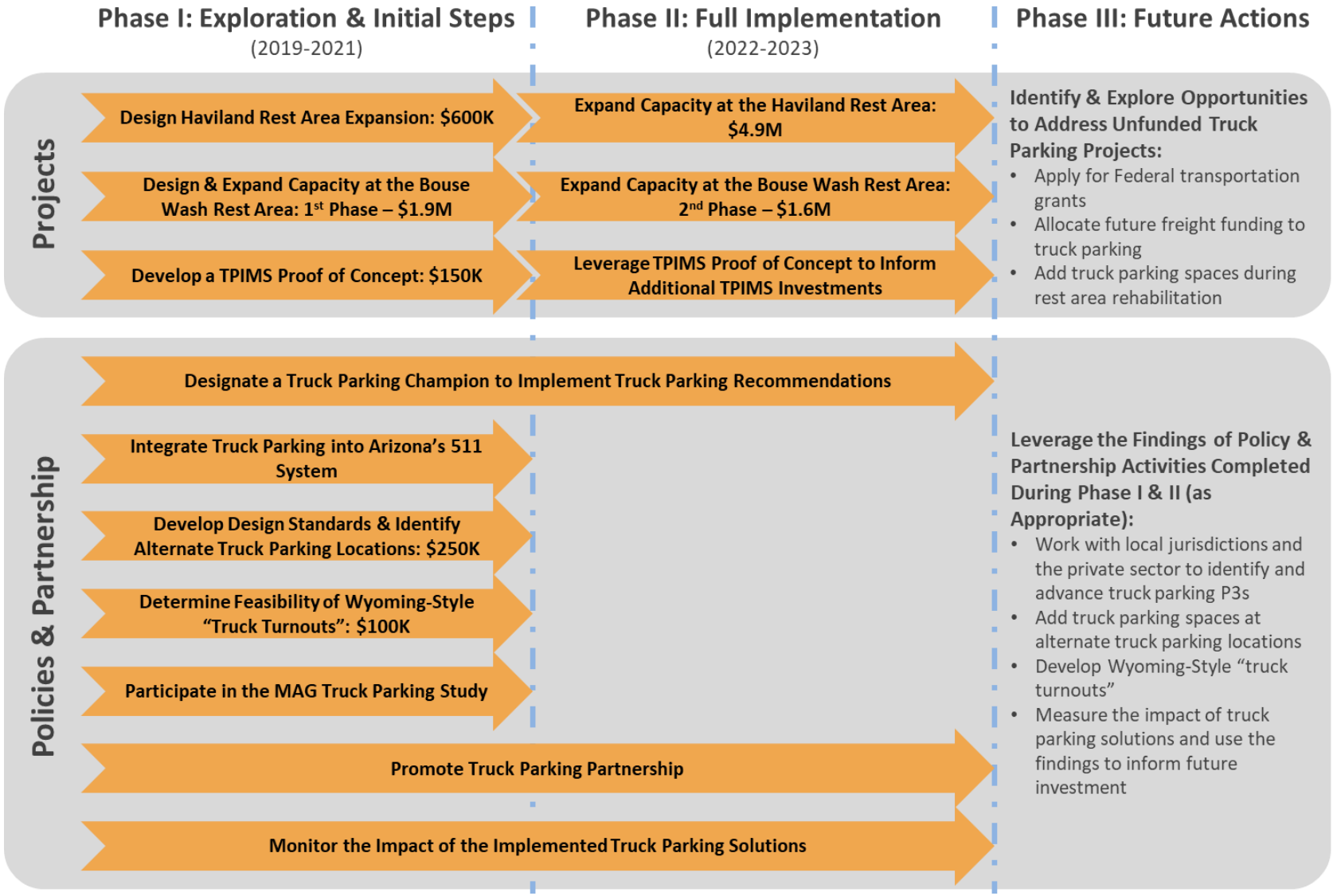
Implementation Plan

In order to match the implementation timelines of truck parking solutions and the statutory requirement to spend the NHFP funds by 2023 ($3 million allocated in 2020 and $7 million allocated in 2022), the project team proposes a three-phase implementation plan:

- **Phase I: Exploration and Initial Steps –** Phase I will quickly begin implementation where projects and policies allow and to set the stage for Phase II: Full Implementation. Phase I coincides with the 2020 allocation of $3 million in NHFP funding.
- **Phase II: Full Implementation –** Using the findings from Phase I, ADOT will continue implementation of truck parking projects and policies. Phase II coincides with the allocation of $7 million in NHFP funding.
- **Phase III: Future Actions –** Using the information, performance measures, and opportunities identified in Phases I and II, ADOT should explore opportunities to address locations of undesignated truck parking that exceeded the NHFP funding currently allocated to truck parking. Phase III is associated with long-term activities that would require funding beyond what has been allocated by the NHFP.

Phasing the implementation plan will allow ADOT to make incremental improvements to truck parking while developing projects, implementing policies, and soliciting private sector interest in partnership. Figure 4-14 is a synthesis of the implementation plan's three phases and the associated projects and policies that will be completed during each phase. Phases I and II allocate $9.5 million of the $10 million in NHFP funds. The remaining $500,000 in funding is expected to be available as a contingency or to acquire land needed at Haviland, cover additional costs identified in the project design phase, and/or monitor project outcomes. Additionally, Phase III builds upon the findings of Phases I and II to identify and explore opportunities to address locations of undesignated truck parking that exceeded the NHFP funding currently allocated to truck parking.

ES-4: Arizona Truck Parking Implementation Plan



Note: $9.5 million of the $10 million in NHFP funding is allocated above. The remaining $500,000 in funding is expected to be available as a contingency or to acquire land needed at Haviland, cover additional costs identified in the project design phase, and/or monitor project outcomes.

Phase I: Exploration and Initial Steps

The project team recommends that ADOT implement the following projects and policies during Phase I: Exploration and Initial Steps:

Policies

- **Designate a truck parking champion**: The champion will be the primary driver and point of contact for the implementation plan.
- **Participate in the Maricopa Association of Governments (MAG) truck parking study**: The MAG truck parking study focuses specifically on urban truck parking needs, which was outside of the scope of this study. Therefore, ADOT should participate in the MAG truck parking study to foster collaboration on truck parking issues and solutions in the Phoenix region.
- **Integrate truck parking information into Arizona's 511 system:** Integrating truck parking in Arizona's 511 system will improve access to truck parking information online and over the phone.
- **Develop design standards and identify alternate truck parking locations**: The Arizona Truck Parking Study identified an opportunity to upgrade roadside table tops, brake check areas, and safety pullouts to provide parking only locations (no amenities), where feasible and safe. Developing design standards and potential locations to upgrade will position ADOT to make future improvements, potentially adding parking-only truck parking spaces. Explore the potential for an "adopt-a-highway" approach for private entities to adopt roadside parking areas for trash pick-up and potentially for partial amenities – $250,000.
- **Determine feasibility of Wyoming-Style "Truck Turnouts"**: Determine if developing new Wyoming-Style Truck Turnouts is possible in Arizona and identify safe locations along major freight corridors – $100,000.
- **Monitor the impact of implementation:** Monitor truck parking as solutions are implemented, such as conducting industry outreach to identify new and emerging truck parking issues or establish annual performance measures to assess changes to truck parking.
- **Promote truck parking partnership:** Assist public and private stakeholders, as appropriate and allowed under law, assess the construction and expansion of truck stops by supporting cities and local governments with data and guidance to advance opportunities for P3s and to inform cities and local governments about truck parking.

Projects

- **Design the Haviland Rest Area expansion:** Undertake design and explore the acquisition of land for the expansion of truck parking at the eastbound and westbound Haviland Rest Areas – $600,000.
    - Expanding both sides of the Haviland Rest Area has a planning level cost of $5.5 million (design and construction) plus the cost of land for the eastbound expansion.
- **Design and expand capacity at the Bouse Wash Rest Area:** Undertake design for ramp realignment and truck parking expansion of the eastbound and westbound Bouse Wash Rest Areas. Expand truck parking spaces at the eastbound (priority) or

westbound side of the Bouse Wash Rest Area, as project timelines and funding allow – $1.9 million.

  - Bouse Wash is scheduled for rehabilitation in 2020, as timing and funding allow, ADOT will leverage the scheduled rehabilitation project to develop the design and add truck parking spaces. The remaining truck parking spaces will be funded in 2022 during Phase II. Expanding both sides of the Bouse Wash Rest Area has a planning level cost of $3.5 million (design and construction).

- **Develop a TPIMS Proof of Concept:** A TPIMS proof of concept will compare and assess the pros and cons of the various technologies used to implement a TPIMS, positioning ADOT to implement a TPIMS in the future – $150,000.

The projects identified in Phase I address clusters of undesignated truck parking at the I-40 Arizona/California Border (locations ranked 1st and 3rd) and I-10 Arizona/California Border (locations ranked 4th, 5th, 6th, and 10th). Additionally, the policies implemented in Phase I will form the basis for ADOT to explore projects throughout the state during Phase II and Phase III.

Phase II: Full Implementation

Using $7 million in funding allocated in 2022, Phase II continues the projects initiated during Phase I, namely expanding the Bouse Wash Rest Areas and Haviland Rest Areas, as well as, continuing to advance truck parking policies and partnerships.

Policies

- **Continue the work of the truck parking champion**: The champion will be the primary driver and point of contact for the implementation plan.
- **Continue to monitor the impact of implementation:** Continue to monitor truck parking as solutions are implemented and incorporate findings into the implementation plan.

Projects

- **Expand capacity at the Haviland Rest Area:** Phase II supplements the $600,000 allocated in 2020 for design to complete the Haviland expansion – $4.9 million.
- **Expand capacity at the Bouse Wash Rest Area:** Phase II supplements the $1.9 million allocated to design and expand eastbound and westbound Bouse Wash Rest Areas in 2020 to complete the expansion – $1.6 million.
- **Leverage TPIMS proof of concept:** Use the findings of the TPIMS proof of concept to identify additional sources of funding, such as State funding or Federal Grants, for implementing a TPIMS on a corridor or statewide basis.
- **Promote truck parking partnership:** Continue to assist public and private stakeholders, as appropriate and allowed under law, assess the construction and expansion of truck stops by supporting cities and local governments with data and guidance to advance opportunities for P3s and to inform cities and local governments about truck parking.

Phases I and II allocate $9.5 million of the $10 million in NHFP funds. The remaining $500,000 in funding is expected to be available as a contingency or to acquire land needed at Haviland, cover additional costs identified in the project design phase, and/or monitor project outcomes.

Phase III: Future Actions

Phase III: Future Actions leverages the findings of Phases I and II to identify and explore opportunities to address locations of undesignated truck parking that exceeded the NHFP funding currently allocated to truck parking. Therefore, Phase III activities could run concurrently with Phases I and II, depending on funding availability and the results of implementation, such as promoting truck parking partnership.

An example of potential future actions includes ADOT working with cities, local governments, truck stop operators, and industry associations such as the NATSO to identify and advance P3s, as appropriate and legally feasible. Specific locations highlighted by NATSO and the project team include US 93 Northwest of Phoenix, I-10 West of Phoenix, I-10 West of Tucson, and I-17 North of Phoenix. Similarly, Quartzsite and Winslow both had truck stops interested in establishing a truck parking location. The results of ADOT's outreach in Phases I and II will identify next steps and ADOT's role, in the development of new and expanded truck stops in the future.

Similarly, the output of the Phase I policy that develops design standards and identifies alternate truck parking locations will position ADOT to provide parking only locations at roadside table tops, brake check areas, safety pullouts, and Wyoming-Style "Truck Turnouts," where feasible and safe. Specifically, ADOT could allocate funding to upgrade roadside table tops, brake check areas, and safety pullouts or develop Wyoming-Style "Truck Turnouts" independent of or in conjunction with projects on the roadways adjacent to these locations.

ADOT's TPIMS proof of concept is another source of Phase III implementation actions. Specifically, ADOT should continue to apply for grants to expand the TPIMS to additional locations, as appropriate. ADOT should implement sensors at rest stops where the data could warn truck drivers to stop early. Maps and data developed during the Arizona Truck Parking Study should guide the prioritization of static or dynamic signs. Specifically, ADOT should use ES-3, in conjunction with the maps developed in this study, to guide where a VMS could be used to help the truck drivers to decide where to park.

1 Introduction

1.1 Background and Objectives

The Arizona State Freight Plan identified inadequate truck parking facilities as a major issue affecting the safety and efficiency of freight movement in Arizona. A lack of adequate truck parking often prompts truck drivers to park on highway shoulders, entrance or exit ramps, vacant property, or local surface streets. These parking behaviors can negatively impact highway safety, infrastructure condition, public safety, and quality of life.

The objective of this project is to use the findings from Phase 1 to provide an in-depth analysis of the truck parking issues and provide recommendations to enable the Arizona Department of Transportation (ADOT) and its stakeholders to develop strategies to address inadequate truck parking.

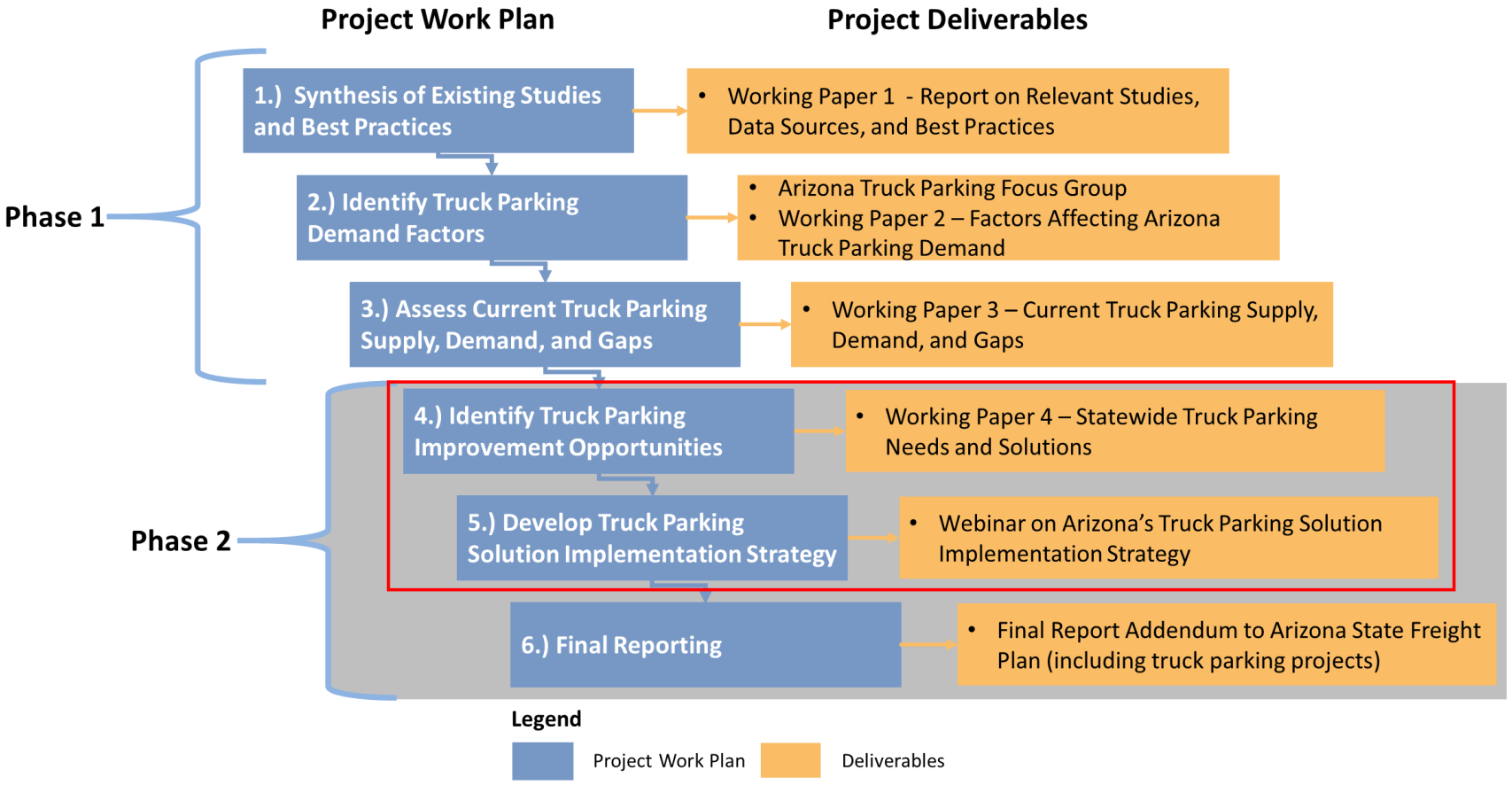
This study assesses current truck parking conditions and identifies gaps between truck parking supply and demand, defines infrastructure and policy needs, and proposes potential capacity and technology solutions.

Through the use of crowdsourced truck parking data and consultations with the trucking industry, law enforcement, and truck stop operators, this study will identify where trucks are parking in Arizona and how the ELD mandate may impact Arizona. Ultimately, the study will identify the gap between the supply and demand for safe truck parking spaces, associated infrastructure and policy needs, and potential capacity and technology solutions to resolving them.

1.2 Project Structure

The Arizona Truck Parking Study is developed in two broad phases, with six work tasks (Figure 1-1). The present Working Paper is part of Phase 2 and is the output of Task 4: Identify Truck Parking Improvement Opportunities. The findings of this Working Paper were presented to the Truck Parking Stakeholders Group via webinar on March 2nd, 2019. The Working Paper was finalized following the comments and input from the Truck Parking Stakeholders Group.

Figure 1-1: Project Work Plan



1.3 Purpose of this Working Paper

The purpose of this Working Paper is to identify the supply, demand, and gaps in truck parking. In order to identify these factors, this Working Paper answers the following key questions:

Truck Parking Needs and Solutions

- What are potential capacity and technology solutions to the truck parking needs?
- What are the order of magnitude costs of the solutions?
- What are the risks and opportunities associated with each proposed solution?

Truck Parking Needs and Prioritization

- What are the statewide truck parking needs, including capacity (infrastructure), operations, maintenance, safety, institutional or other needs?
- Given available data, what is the best way to prioritize truck parking solutions?
- Which truck parking solutions are most critical or pressing?

Truck Parking Implementation

- What are the opportunities with the highest potential for P3 arrangements?
- Given available resources and project readiness, which projects should be advanced in the near term and which projects should be considered for medium-term?
- What other steps could ADOT and the trucking industry take toward alleviating truck parking needs statewide?
- What are the recommended next steps to continue the Department's Truck Parking efforts?

This Working Paper provides ADOT an opportunity to review the potential solutions to address truck parking issues in Arizona and comment on this component part of what will become the final report.

1.4 Limitations

Some of the findings in this report are based on the analysis of third-party data. While CPCS makes efforts to validate data, CPCS cannot warrant the accuracy of third-party data.

2 Truck Parking Solutions

2.1 Introduction to Truck Parking Solutions

Truck parking solutions can be organized into projects and policies. While not mutually exclusive, the following definitions are used to classify solutions:

- **Capital Projects:** Projects involve the construction of truck parking spaces or installation of equipment to add capacity or improve truck parking safety or operations. Examples of projects include developing truck parking capacity, information systems, or partnering with other public or private sector organizations. The timeframe required to implement any given project can vary widely, depending on the complexity of the project, funding, design and construction, and other factors.
- **Policies:** Policies are actions by ADOT to improve truck parking operations, safety, or planning through institutional policies, actions, or programs. Examples include integrating truck parking into the project design and development process, collecting performance measures at rest areas, and assisting local jurisdictions to address truck parking issues. Policies position ADOT to identify, advocate for, and advance truck parking projects and opportunities. Additionally, policies also empower other stakeholders to advance truck parking through data sharing or partnership.

The remainder of this chapter outlines the potential solutions that ADOT could implement to address truck parking issues in the State.

2.2 Truck Parking Solutions – Projects

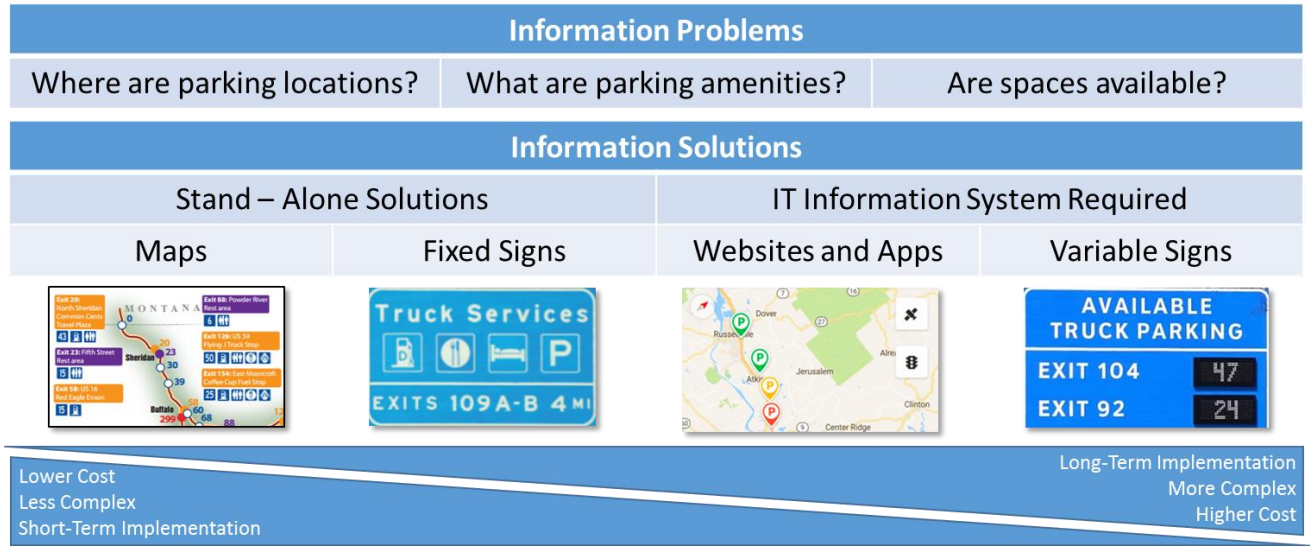
This section is organized by truck parking solutions that address information or capacity. In addition to describing each solution, this section highlights approaches used in other states and potential opportunities for application in Arizona.

2.2.1 Information Solutions

The emergence of undesignated parking prior to actual shortages is a product of truck driver's decision-making processes and a lack of information about the availability of truck parking. With greater knowledge of nearby parking facilities and parking availability, drivers are better able to fully utilize available spaces, reducing undesignated truck parking activity. The information solutions presented here seek to improve the quality and timeliness of information available to truck drivers with the goal of routing them to available parking.

Figure 2-1 displays the tradeoffs between information solutions. Namely, cost, complexity, and the speed of implementation. The information solutions identified in this section are arranged according to their cost.

Figure 2-1: Information Solutions Continuum



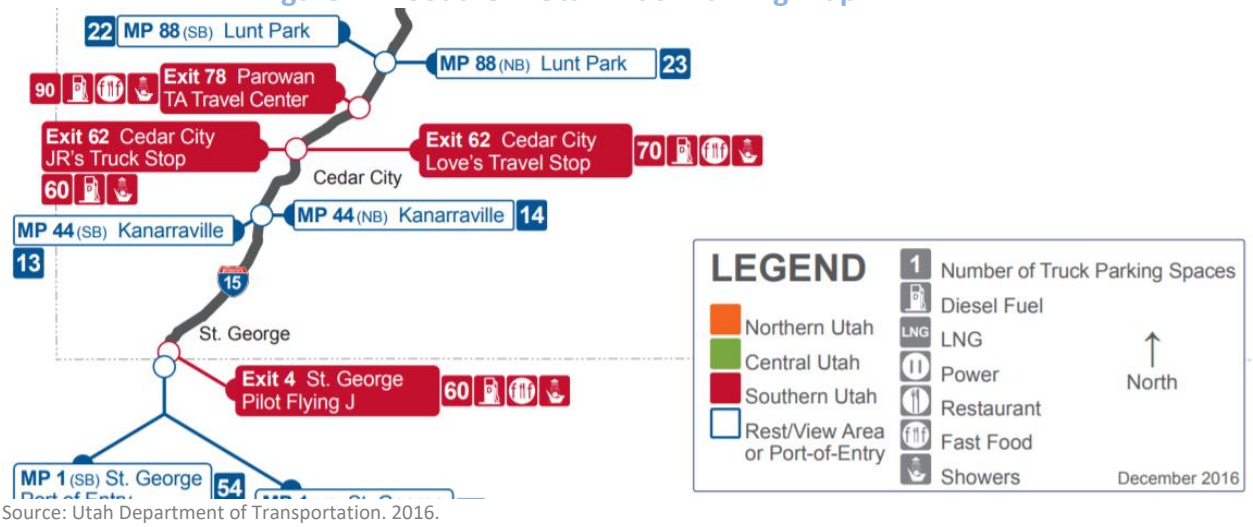
Source: CPCS

Truck Parking Maps

Truck parking maps are a low cost and effective method of providing truck drivers with information about trucking facilities. Figure 2-2 and Figure 2-3 provide examples of truck parking maps from Utah and Wyoming. Notable features of the maps are as follows:

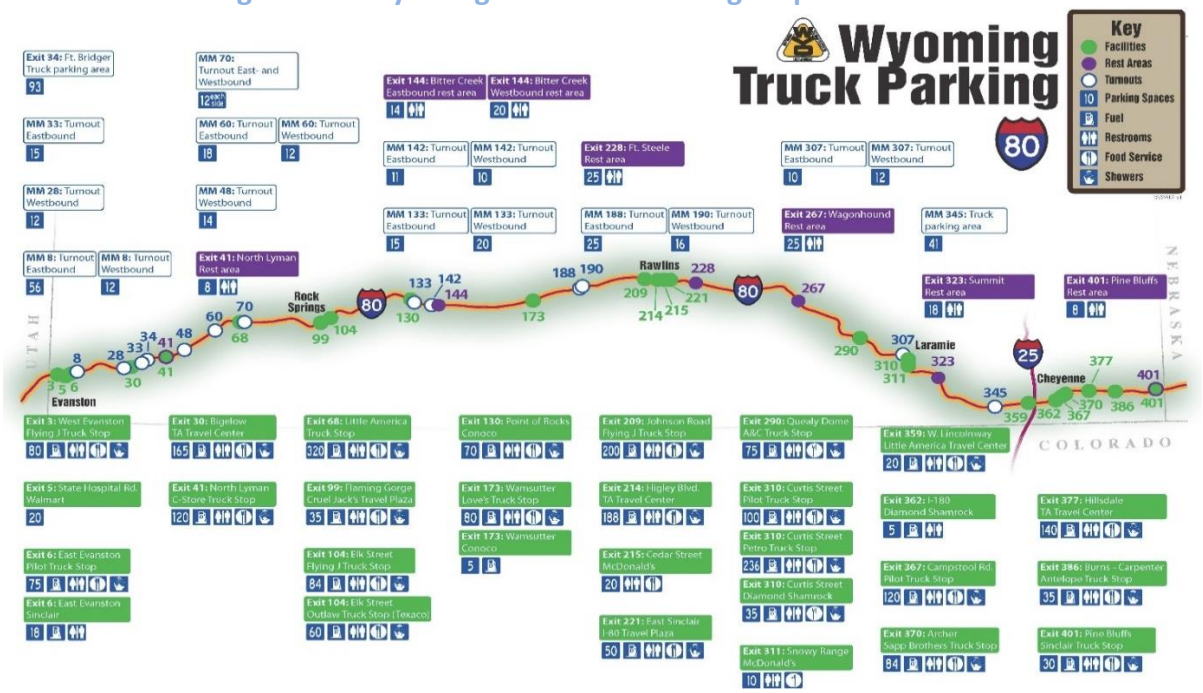
- Include both public and private truck parking facilities
- List amenities, mileposts, and number of truck parking spaces
- Include parking only truck parking facilities (Wyoming)
- Develop statewide and corridor specific maps

Figure 2-2: Southern Utah Truck Parking Map



Source: Utah Department of Transportation. 2016.

Figure 2-3: Wyoming DOT Truck Parking Map of I-80



Source: Wyoming Department of Transportation. 2016.

Truck parking maps have the benefit of being very low cost and quick to implement relative to other information solutions. Some states develop an electronic version of their truck parking map for users to access online, whereas others print and distribute hard copies to the trucking community at rest areas and other locations frequented by truck drivers.

While truck parking maps are relatively low cost and fast to develop, to be of greatest use, information will have to be updated periodically to reflect changing conditions. As maps become outdated, electronic versions and parking websites can be easily updated. Because truck parking maps do not show the real-time availability of truck parking, they are best suited to rural areas with adequate parking.

Opportunity for Implementation in Arizona

The opportunity for implementing a truck parking map in Arizona is high. Arizona already maintains a rest area map and an interactive map online, but does not currently provide a map specific to truck parking.

Developing a truck parking specific map and including it online would remove the potential for truck drivers to assume that all ADOT rest areas have truck parking or the same amenities. Currently only some of the parking-only locations are included on ADOT's rest area map. For example, the Ligurta table top is not included on Arizona's rest area map, but other roadside table tops are currently listed. ADOT should add all no- or low-amenity truck parking locations (parking only), show the amenities offered, and include the locations for safety pull offs such as brake check areas to maximize the use of the map.

Static Parking Signs

Static roadside signs, such as the example from Florida shown in Figure 2-4, are another low-cost option to provide drivers with information on the location of truck parking. Like maps, static sign options are best suited for rural areas with adequate parking, but where truck drivers may not have insufficient information about parking locations and amenities. Static signs placed along roadways or at rest areas where undesignated truck parking occurs should describe the location and amenities available at the next truck stop or rest area.

Figure 2-4: Static Sign used in Florida

Source: Florida DOT. 2016.

Static signs have similar drawbacks as static maps, namely that the information may change and they do not inform drivers about the real-time availability of truck parking at nearby facilities. Signs are more expensive than maps and they do not aid truck drivers in advance planning, but they can inform driver decision-making en route. The main goal of static signage is to provide truck drivers with information about their options if they encounter a full rest area. This could spread demand from areas with high utilization to nearby truck stops with low utilization.

The Federal Interstate Oasis Program is an example of using static parking signs to direct truck drivers and roadway users to nearby amenities. The Interstate Oasis Program requires a partnership between the state and private truck stops to direct truck drivers to private truck parking facilities. The program requires potential partnerships to meet the following eligibility criteria:

- The facility may be no more than three miles from an interchange with an Interstate, exceptions are allowed for:
    - Less than three miles if a State law restricts truck travel to lesser distances from Interstates
    - Greater than three miles up to a maximum of 15 miles, for interchanges in rural areas where eligible facilities are not available within three miles
- The facility must be accessible, as determined by an engineering study, for vehicles traveling to, entering, and leaving the facility, as well as returning to the Interstate and continuing in the original direction of travel
- The facility must accommodate, as defined by an engineering study, the safe entry, exit, on-site circulation, and parking of vehicles likely to use the facility
- The facility must have restrooms available to the public 24 hours per day and all year long. Restrooms should be modern, sanitary, have drinking water, and be available at no charge or obligation
- The facility must have public parking spaces for automobiles and heavy trucks. Parking spaces should be well lit and available at no charge or obligation for at least 10 hours. The amount of parking should be sufficient numbers to meet anticipated demand based on traffic volumes, the percentage of heavy vehicles, and other factors in the

AASHTO "Guide for Development of Rest Areas on Major Arterials and Freeways" (2001 or latest edition)

- The facility must provide products and services to the public. These products and services should include a public telephone, food, fuel, oil, and water for motor vehicles
- The facility must have at least one person on duty 24 hours per day and all year long[1]

The Interstate Oasis Program allows for multiple businesses near an interchange to collectively meet the eligibility criteria if they are immediately adjacent to each other and accessible on foot via pedestrian walkways that are compliant with the Americans for Disabilities Act and that do not require crossing a public highway.[2]

Opportunity for Implementation in Arizona

ADOT is empowered by Arizona Revised Statute 28-7058 to implement an Interstate Oasis Program (referred to in statute as a State Certified Rest Area Program). As currently written, the program expires July 1st, 2019. ADOT should work with the legislature to extend this program for future use, as needed.

ADOT should assess truck stop interest in participating in the Interstate Oasis Program. Preliminary outreach and marketing of the program mitigates ADOT's risk of spending time and money implementing a program that may expire in 2019. Additionally, as part of the pilot, ADOT should develop standardize signage in line with the Federal Manual on Uniform Traffic Control Devices (MUTCD) and Arizona's Supplement to the MUTCD. Arizona should also pilot implementing static signs at rest stops where undesignated truck parking occurs and near truck parking locations that tend to have space availability. Static signs inside rest areas would provide truck drivers encountering a full rest area with the information they need to identify the next option to find truck parking. The intended outcome is that fewer drivers choose to park their trucks on rest area shoulders.

Truck Parking Information and Management Systems

Truck Parking Information and Management Systems (TPIMS) automatically collect and communicate parking availability information. There are multiple approaches to implementing a TPIMS, but common approaches involve the installation and monitoring of sensors embedded into each parking space, entrance/exit sensors, or computer-analyzed video camera feeds to calculate the number of spaces available at a parking facility. TPIMS then transmits truck parking availability information to truck drivers via mobile applications, websites, or roadside variable message signs (VMS).

[1] 71 FR 61529
[2] 71 FR 61529

Implementing a TPIMS, specifically identifying the detection and communication technology, will vary based on parking facility layout, climate, and on-site internet connections. For example, automated video cameras can determine parking counts for large areas, but may require a fast internet connection, and may malfunction in low-visibility conditions, such as dust storms. In-pavement sensors work well in a variety of conditions, but cannot be easily moved to accommodate new parking patterns.

The most common communication method is VMS, which displays truck parking availability at upcoming exits. Another common approach is to provide the data on truck parking availability to third parties via an application program interface (API) for use in privately-developed applications.

Providing an API will allow ADOT to amplify the use of the data by allowing the private sector to incorporate the data into cell phone applications, Electronic Logging Devices (ELDs), in-cab systems, and websites.

TPIMS have the benefit of providing real-time information to truck drivers about the availability of truck parking and the ability to archive information about parking utilization over time. However, these systems come with the downside of high costs associated with the installation and maintenance of parking detection infrastructure, as well as the cost of maintaining internet connections and back-end data storage equipment. For example, the 2018 Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) grant application for the I-10 Corridor Coalition (California, Arizona, New Mexico, and Texas) estimated the following costs for implementing the I-10 Truck Parking Availability System:

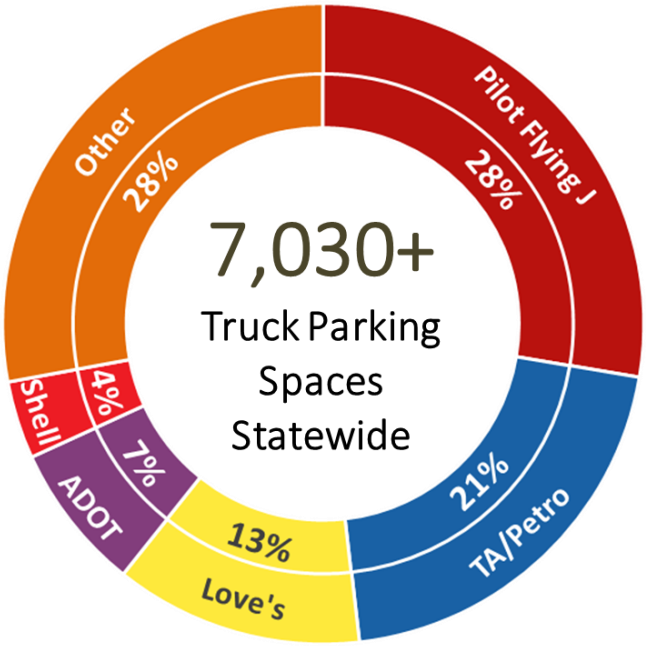
- Truck Parking Availability Sensors: $4,390,000 for 553 spaces at 37 locations (an average of approximately $7,900 per space or $119,000 per location)
- Dynamic Message Signs: $8,030,000 for 78 signs (an average of approximately $103,000 per sign)
- Total Annual Operation and Maintenance Cost: $672,000 annually for all states
- Web and Smartphone Application: $1,280,000[3]

[3] I-10 Corridor Coalition Truck Parking Availability System (2018). Texas Department of Transportation

Additionally, developing and deploying TPIMS takes much longer than maps or static signs. The project timeline outlined in the I-10 grant application sets out a year and a half for the development and deployment of the technology used to identify truck parking availability.

Additionally, as shown in Figure 2-5, the public sector provides only about seven percent of truck parking spaces statewide in Arizona. Therefore, any system that conveys information limited to the availability of truck parking at public rest stops fails to inform drivers about a substantial proportion of truck parking spaces off ADOT property. Some states such as Michigan, Iowa, and others have partially mitigated this information gap by successfully partnering with private truck stops to instrument and provide the availability of truck parking at private truck stops.

Figure 2-5: Operators of Truck Parking Spaces in Arizona

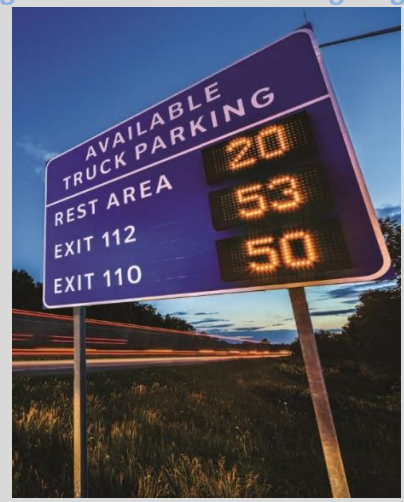


Source: CPCS Analysis of Trucker Path Data

Opportunity for Implementation in Arizona

Previous Working Papers have identified clusters of undesignated truck parking near truck parking facilities with available spaces. Based on the analysis conducted in Phase one of this study, available truck parking spaces in Arizona are concentrated at private truck stops. Therefore, any future TPIMS development in Arizona should focus on integrating private truck stops. Figure 2-6 provides an example of a VMS in Michigan, which includes the number of truck parking spaces available at the upcoming rest area, as well as those that are available at subsequent exits (including private locations). Providing the availability of the upcoming rest area, as well as the availability at subsequent exits provides truck drivers with full information about upcoming truck parking availability. Arizona should also develop an API to make truck parking information available to truck parking applications, in-cab systems, and carrier applications.

Figure 2-6: Variable Message Signs



Source: Source: MAASTO Truck Parking TIGER Proposal

2.2.2 Capacity

While improving information can increase the utilization of truck parking spaces and lead to safer and more productive freight operations, information systems will be inadequate for areas where truck parking demand routinely exceeds supply. In these areas, additional truck parking capacity is often required to meet truck parking demand. Yet, capacity solutions are typically costly to design and build. In addition to the initial construction costs, transportation agencies must also operate and maintain new rest areas.

For example, the operation, maintenance, and rehabilitation of Arizona's rest areas are borne through a public-private partnership (P3). Through the P3, ADOT contracts landscaping, cleaning, and day-to-day maintenance to a private firm. ADOT spends close to $4 million annually in operations and maintenance costs. Outside of the costs of day-to-day operation and maintenance, ADOT spends approximately $3.5 to $4 million to rehabilitate rest areas with two rest stops, as rehabilitation is required.[4]

Capacity solutions can target expanding capacity at public or private truck parking locations. Expanding capacity at public locations is covered in this section of the Working Paper and private sector expansions are covered in the section detailing solutions that utilize the partnership.

Developing or Formalizing Truck Parking at Roadside Facilities

The project team identified undesignated truck parking occurring statewide at different types of roadside facilities including brake check areas, roadside table tops, and areas previously used for staging construction equipment. Outreach with ADOT Districts identified brake check areas as locations where trucks park. Specifically, westbound at milepost 155.5 on I-40 and brake check areas on I-17 (I-17 as a corridor and the location at milepost 280 were specifically mentioned). In addition to mentioning brake check areas, one ADOT district mentioned that brake check areas are not true on/off ramps and therefore do not have design standards. An example of the magnitude of trucks stopping at brake check areas are the 343 trucks that stopped at the scenic view/brake check facility (southbound on I-17 near milepost 313) shown in Figure 2-7. Of the 343 trucks that stopped, 55 parked longer than eight hours during the eight-week GPS sample.

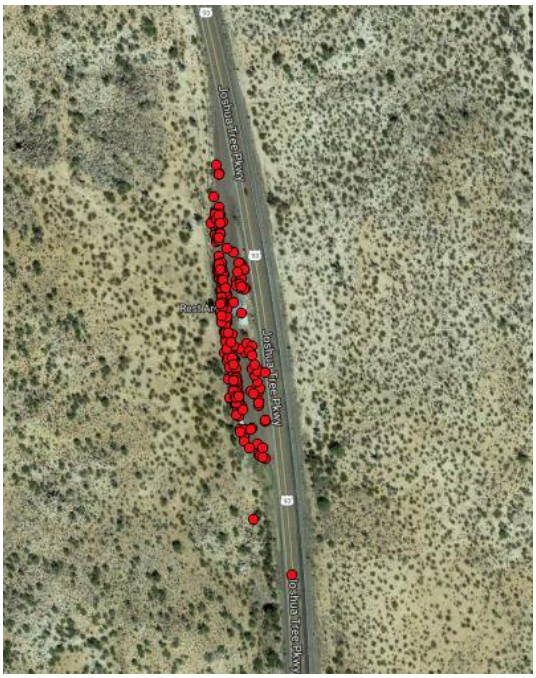
Figure 2-7: Scenic View Brake Check Area on I-17

Source: Imagery ©2018 Google, Map data ©2018 Google

[4]Governor Ducey To Feds: Time To Improve Highway Rest Stops (2017). Office of the Governor Doug Ducey. https://azgovernor.gov/governor/news/2017/11/governor-ducey-feds-time-improve-highway-rest-stops

Similarly, the roadside table top on US 93 (near milepost 171) shown in Figure 2-8 had 217 trucks parked during the eight-week GPS sample with 40 percent parked for over eight hours. The roadside table top has a sign on US 93, but does not have on/off ramps and is not included on ADOT's rest areas map. Conversely, ADOT has other roadside table tops on I-8 that do have on/off ramps and are included on ADOT's Rest Areas Map.

Figure 2-8: Roadside Table Top on US 93



Source: CPCS Analysis of ATRI Data, Imagery ©2018 Google, Map data ©2018 Google

The ADOT districts raised the following concerns with undesignated parking generally and parking at roadside facilities specifically:

- Litter and human waste being left behind
- Trucks impact cultural sites (Petrified Forest National Park)
- Trucks degrading roadway shoulders, the edge of pavement, and damaging signs
- Trucks parking on roadway shoulders are a safety concern
- Millings have been placed in areas where trucks pull off the roadways to limit damage and to keep mud from being tracked onto the roadway, but this creates a truck parking location
- Oversize/overweight trucks have limited places to park
- Arizona Department of Public Safety will not enforce undesignated truck parking without specific "no parking" signs at the location

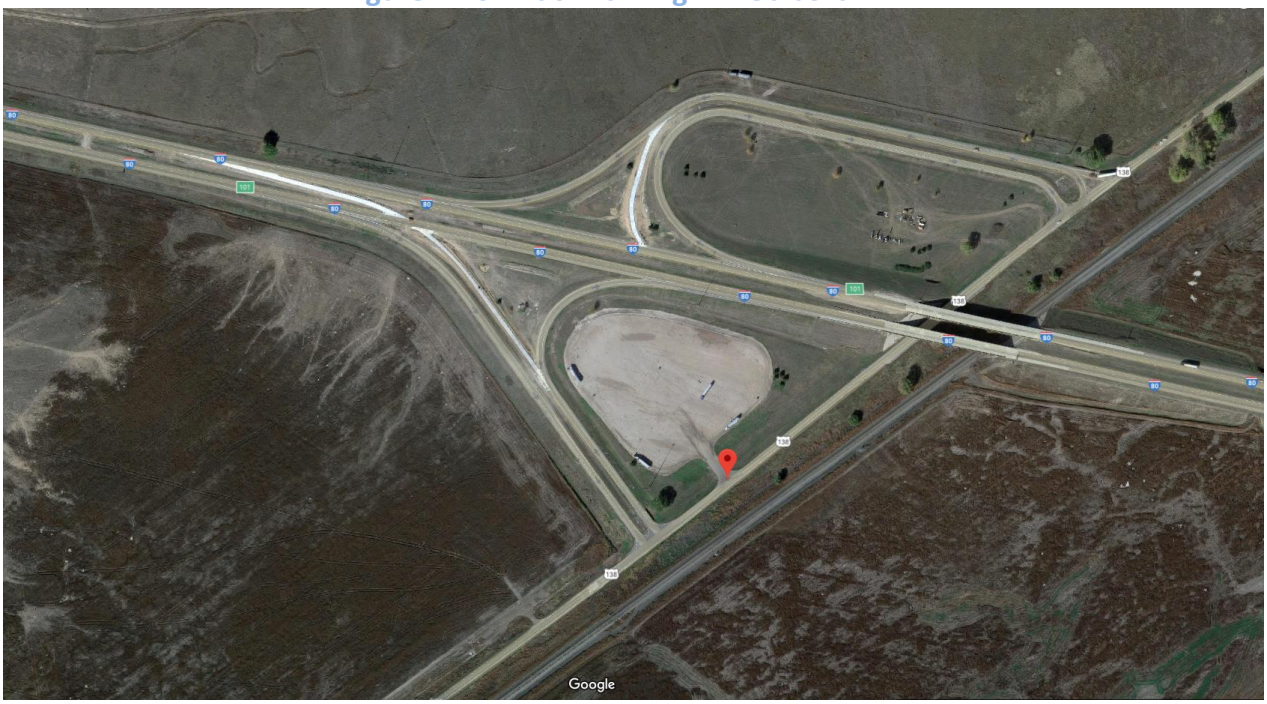
The Wyoming DOT provides an example of how ADOT could formalize roadside facilities. Wyoming develops "turnouts" or parking only locations along major freight corridors (Figure 2-9). Turnouts are a relatively low-cost option for expanding truck parking and can be included in construction plans, thereby integrating the cost and development of truck parking into the project development process. Additionally, Wyoming includes the locations of turnouts on their truck parking maps, showing that they do not include amenities.

Figure 2-9: Wyoming Turnout

Source: Imagery ©2018 Google, Map data ©2018 Google

Figure 2-10 displays an example of a low-cost truck parking in Nebraska state. Instead of putting the truck parking location on the Interstate, its access point was located on US 138. The location does not provide amenities, but it still can help truck drivers take some rest and address capacity constraints at nearby parking locations.[5]

Figure 2-10: Truck Parking in Nebraska



Source: Imagery ©2018 Google, Map Data ©2018 Google

Opportunity for Implementation in Arizona

At a minimum, Arizona should develop a clear policy on long-term truck parking at brake check areas and table tops. Additionally, by specifying design standards and upgrading the on/off ramps at these locations, ADOT will improve the ability of trucks to safely enter and exit these locations. Also, marking truck parking spots could mitigate issues with trucks blocking movement within the table top or brake check area. A specific program to address these upgrades could be developed or upgrades could be implemented incrementally during construction or maintenance.

[5] Nebraska's Interstate 80 Rest Areas

Reopen Closed Rest Areas

Re-opening closed rest areas with either full or partial amenities is a lower cost option relative to constructing a new rest area, although this option will require the state to pay maintenance in the future. ADOT has used this approach in the past, spending $4.6 million to reopen the Mohawk rest area on I-8 in 2017.[6]

Opportunity for Implementation in Arizona

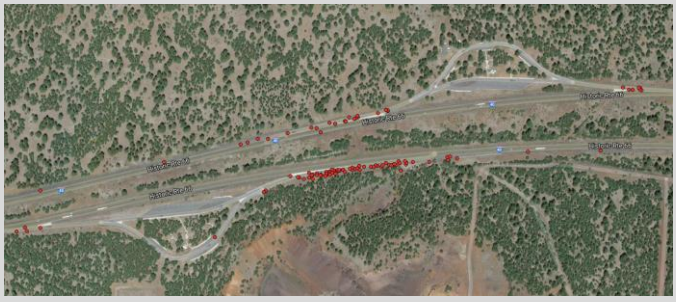
Three rest areas remain closed in Arizona:

- **Mazatzal (Closed in 2009)** – The Mazatzal Rest Area is located at the junction of SR 188 and SR 87. Funds to reopen Mazatzal were included in the 2018-2022 Five-Year Transportation Facilities Construction Program with a total cost of almost $5.1 million, but have been removed from subsequent programs. When open, Mazatzal provided 11 truck parking spaces. During the eight-week truck GPS sample, no trucks were observed using the Mazatzal Rest Area.
- **Christensen Northbound and Southbound (Permanently Closed)** – Located on both sides of I-17, the Christensen Rest Area provided about 22 total truck parking spaces. During the eight-week truck GPS sample, 30 trucks were observed using the on/off ramps for truck parking (Figure 2-11).
- **Parks Eastbound and Westbound (Permanently Closed)** – With rest areas on both Eastbound and Westbound sides of I-40, the Parks Rest Area provided 30 total truck parking spaces. During the eight-week truck GPS sample, 106 trucks were observed using the on/off ramps for truck parking (Figure 2-12).

Figure 2-11: Undesignated Truck Parking at the Christensen Rest Area

Source: CPCS analysis of ATRI Data, Imagery ©2018 Google, Map data ©2018 Google

Figure 2-12: Undesignated Truck Parking at the Parks Rest Area



Source: CPCS analysis of ATRI Data, Imagery ©2018 Google, Map data ©2018 Google

Another option to re-opening closed rest areas or weigh stations is to limit the amenities offered by developing "truck parking only" facilities. For example, the Missouri DOT converted

[6] Mohawk Rest Area on I-8 reopens after eight-year hiatus (2017). Arizona Department of Transportation. https://www.azdot.gov/mobile/media/news/2017/07/24/mohawk-rest-area-on-i-8-reopens-after-eight-year-hiatus

23 decommissioned rest areas and weigh stations to truck parking only facilities, providing paved parking, vault toilets, and lighting. Converting the locations to truck parking only saved the DOT $16,000 per month in water, electricity, maintenance, and cleaning, enabling a 5.2-year payback on the conversion. Since the start of the conversions in 2002, Missouri has increased the number of truck parking spaces by over 94 percent, providing an additional 555 truck parking spaces.[7]

Expand and Optimize Existing Rest Areas

There are opportunities for ADOT to increase truck parking by expanding and optimizing existing rest areas. In many cases, expansion options may be limited by zoning restrictions on adjacent land, high land costs, or difficult topography. Figure 2-13 displays Arizona's rest areas, the number of spaces at each site, the potential for expansion, and the estimated cost based on a 2011 *Arizona Statewide Rest Area Study*. The 2011 study did not include an assessment of the potential for expansion at each rest area and the potential for expansion remains unknown at this time. Appendix A details the known expansion opportunities shown in Figure 2-13.

[7] 2017 Presentation by Cheryl Ball of the Missouri Department of Transportation

Figure 2-13: Expansion Opportunities for ADOT Rest Areas

Rest Area Name	Route	Existing Parking Spaces	Known Expansion Opportunities	Cost (2011)
Mohawk Rest Area EB	I-8	10	Unknown	
Mohawk Rest Area WB	I-8	10	Unknown	
Sentinel Rest Area EB	I-8	12+ (overflow)	7	
Sentinel Rest Area WB	I-8	12	2	
Total		44	9	
Bouse Wash Rest Area EB	I-10	12	13	*$1,554,000
Bouse Wash Rest Area WB	I-10	12	10	*$1,476,500
Burnt Well Rest Area EB	I-10	30	8	*$1,115,000
Burnt Well Rest Area WB	I-10	30	9	*$1,135,000
Ehrenberg Rest Area EB	I-10	15	Insufficient ROW	
Ehrenberg Rest Area WB	I-10	15	Unsuitable for expansion	
Sacaton Rest Area EB	I-10	17	8	$412,000
Sacaton Rest Area WB	I-10	15	9	$563,000
San Simon Rest Area EB	I-10	15	25	$1,776,000+ Land Cost
San Simon Rest Area WB	I-10	15	Unknown	
Texas Canyon Rest Area EB	I-10	21	Unsuitable for expansion	
Texas Canyon Rest Area WB	I-10	19	Unsuitable for expansion	
Total		216		
McGuireville Rest Area NB	I-17	20	Unknown	
McGuireville Rest Area SB	I-17	20	Unknown	
Sunset Point Rest Area	I-17	28	Unsuitable for expansion	
Total		68		
Canoa Ranch Rest Area SB	I-19	20+ (overflow)	18 (Paving overflow)	
Canoa Ranch Rest Area NB	I-19	14+ (overflow)	12 (Paving overflow)	
Total		34		
Meteor Crater Rest Area EB	I-40	33+ (overflow)	3 new + 15 (Paving overflow)	$615,000
Meteor Crater Rest Area WB	I-40	32+ (overflow)	5 new + 15 (Paving overflow)	
Painted Cliffs Rest Area WB	I-40	11	Unsuitable for expansion	
Haviland Rest Area EB	I-40	7	15	$2,059,000+ Land Cost
Haviland Rest Area WB	I-40	7	15	
Total		90		
Statewide Total Truck Parking		**452**		

Source: Arizona Statewide Rest Area Study *Project cost for additional truck and car spaces

The expansion or optimizing of truck parking spaces at existing rest areas could be completed as independent projects or bundled with existing rehabilitation efforts to minimize the time that rest areas are closed. Figure 2-14 displays the rest area projects included in ADOT's most recent Five-Year Transportation Facilities Construction Program. Of the rest areas included in the Five-Year Transportation Facilities Construction Program, Bouse Wash, Sentinel, and Meteor Crater could be expanded to include more truck parking.[8] The potential to expand McGuireville is unknown and Hassayampa does not have truck parking on site.

Figure 2-14: Arizona Rest Areas identified in the 2019 – 2023 Five-Year Transportation Facilities Construction Program

Route (MP#)	Project	Cost (thousands)					
		2019	2020	2021	2022	2023	Summary
Sentinel Rest Area							
I-8 (52)	Design (Water & Waste Water Repairs)			$595			$595
	Construction (Water & Waste Water Repairs)				$5,600		$5,600
Bouse Wash Rest Area							
I-10 (52)	Design	$595					$595
	Rehabilitate Rest Area		$4,200				$4,200
Painted Cliffs and Meteor Crater Rest Areas							
I-40 (235)	Replace Water Pumps, Rehab facilities	$5,950					$5,950
Sunset Point Rest Area							
I-17 (252)	Design (Water & Waste Water Repairs)		$525				$525
	Construction (Water & Waste Water Repairs)			$4,200			$4,200
McGuireville Rest Area							
I-17 (297)	Design Water/Wastewater System and Preservation				$595		$595
	Construct Water/Wastewater System and Preservation					$4,000	$4,000
Hassayampa Rest Area							
US-60 (116)	Rehabilitate Rest Area					$465	$465
Total							**26,725**

Source: 2019 – 2023 State Transportation Board Five-Year Construction Program

Construct New Rest Areas

Construction of new rest areas for truck parking presents the highest-cost option for expanding capacity. Developing a new rest area is most relevant in cases where there are limited alternatives. Currently, the development of the Future I-11 corridor presents a case where ADOT should consider adding a new rest area. The development of the I-11 corridor along US 93 presents an opportunity to include the upgrade of an existing roadside table top

[8] Arizona Department of Transportation (2011). Arizona Statewide Rest Area Study.

or the development of a new rest area to accommodate future demand. Instead of constructing new facilities on existing corridors, ADOT has multiple options for expanding capacity using existing rest areas, making a new rest area a lower priority.

Partnering within the DOT and with other State Agencies

A different approach to partnership is working with another public sector agency to identify potential sites for truck parking. For example, in Minnesota the DOT and Department of Natural Resources entered into a partnership to construct and operate highway rest area facilities at two state park visitor centers. The facilities were adjacent to a major regional truck route and included truck parking. Figure 2-15 displays one of the welcome center/rest area locations.

Figure 2-15: Brainerd Lakes Welcome Center

Source: Imagery ©2018 Google, Map Data ©2018 Google

Similarly, the weigh stations used by the Enforcement and Compliance Division could support limited overnight truck parking. Other DOTs have used this approach, including Maryland, which allows truck parking when the weigh station is closed. This approach is not without its challenges, including truck drivers apprehension about parking at weigh stations because they perceive there is an increased chance for inspection and Enforcement and Compliance may need the truck parking spaces if they need to place a truck out of service.

Public-Private Partnership to Expand Truck Parking

P3s take a variety of forms and states are increasingly trying new and innovative approaches to develop additional truck parking by leveraging private capital. Specifically, P3 arrangements may enable transportation agencies to shift near and long-term operations and maintenance costs to the private sector while achieving the immediate goal of increasing truck parking capacity.

To incentivize private sector participation, states often fund improvements to state land adjacent to truck parking facilities lease private land to expand truck parking adjacent or near to a private truck stop, or fund construction or improvement of access roads. Under this model, both parties benefit: private operators save on land and/or construction costs, while state DOTs shift maintenance costs to the private operator. Additionally, the state does not need to provide amenities on site, due to the close proximity of the truck parking spaces to the private truck stop. For example, Wyoming DOT built 43 truck parking spaces adjacent to a truck stop, expanding the availability of truck parking without providing the amenities required at a rest area. The total cost for the 43 truck parking spaces was approximately $916,000.[9]

Cities throughout the U.S. provide additional examples of developing truck parking in partnership with the private sector or leveraging existing private sector truck parking locations.

- **Weed, California:** the city leased two vacant lots and designated 30 truck parking spaces so truck drivers have a place to park. The city developed these lots to address trucks parking in undesignated areas. The parking lots do not have amenities on-site but are adjacent to truck stops and businesses.[10]
- **Elmira, New York:** Elmira developed truck parking to address trucks parking in residential areas. Elmira charges $5 per night, $30 weekly, or $50 monthly for parking.[11]
- **Decatur, Illinois:** in May 2018, Decatur approved $750,000 development agreement with Love's Travel Stop and Country Store. The city expenditures will be used to make needed roadway improvements that connect to the new Love's Travel Stop and Country Store. If Love's does not build the truck stop by May 2019, it must pay the roadway construction costs.[12]

[9] National Coalition on Truck Parking: Working Group Products (2018).
[10] Truckers love Weed; Weed loves truckers
[11] City of Elmira, N.Y., solves truck parking problem
[12] Lisi, T, (2018). Herald Review. "Decatur council approves Love's truck stop using up to $750,000 in local gas tax proceeds."

The examples of cities successfully developing truck parking at a local level demonstrate the use of economic or livability benefits to overcome objections to expanding truck parking.

The approach used in Decatur, IL exemplifies the use of public incentives to building new private truck stops. The National Coalition on Truck Parking (NCTP) highlighted the importance of tax incentives such as accelerated depreciation, low-interest financing, or removing cost-prohibitive road improvement requirements as other means to incentivize truck parking at private truck stops.[13]

The following methods could be used to identify P3 opportunities for truck parking in Arizona:

- **Public sector leads outreach:** In this case, the transportation agency identifies the locations of potential truck parking partnerships, and solicit interest in a truck parking P3.
- **Integrate trade associations:** The transportation agency works with industry associations such as NATSO (truck stop operators), the state petroleum marketing associations such as the Arizona Petroleum Marketers Association (APMA), and the National Association of Convenience Stores (NACS) to identify opportunities for partnership.
- **Request for Proposal (RFP):** The transportation agency develops and publically solicits private sector interest in truck parking partnerships through an open call for partnership proposals. Appendix B provides an example of a solicitation from Pennsylvania DOT to develop a commercial truck parking P3.

NATSO reported that their members are exploring four new truck stops in Arizona: 1.) US 93 Northwest of Phoenix, 2.) I-10 West of Phoenix, 3.) I-10 West of Tucson, and 4.) I-17 North of Phoenix. Each of the new truck stops NATSO members are considering could present an opportunity for ADOT to leverage a P3 to address a truck parking need.

[13] Federal Highway Administration (2017). National Coalition on Truck Parking: Activity Report, 2015-2016. United States Department of Transportation.

Opportunity for Implementation in Arizona

There are several opportunities for ADOT to consider for a truck parking P3. The following opportunities were identified during the development of the Arizona Truck Parking Study:

TA in Quartzsite: NATSO cited the cost of infrastructure as the reason that a private truck stop operator has stopped the development of a truck stop in Quartzsite. A review of Quartzsite Town Council Meeting Minutes and La Paz County Parcel Data found that TA has been exploring building a truck stop on the parcel outlined in red in Figure 2-16. According to a November 2016 meeting, TA approached Quartzsite for a tax abatement of $250,000 to address the cost of the roundabout. ADOT could lead outreach to the ADOT district, city, and TA to identify options for a P3.[14] Developing a P3 with TA has the potential to add many more truck parking spaces than ADOT could otherwise develop at a public rest area.

Figure 2-16: Potential TA Truck Stop in Quartzsite

Source: Imagery ©2018 Google, Map Data ©2018 Google

Former Pilot in Winslow: Figure 2-17 displays a vacant lot where a Pilot Truck Stop previously operated. Trucks continued to park on site until January 2018, when barricades were placed at the entrances to block trucks from using the vacant lot. According to Winslow City Council meetings, the owners of the site are seeking a buyer to redevelop the location into a truck stop. Interested parties toured the site in early 2018.[15]

Figure 2-17: Truck Parking using a Vacant Lot in Winslow, Arizona

Source: CPCS analysis of ATRI Data, Imagery ©2018 Google, Map data ©2018 Google

The vacant lots presented above are an opportunity for ADOT to assist in the development of private truck parking spaces. Partnerships between ADOT, the private sector, and the local community will be critical to successfully advancing any of these opportunities.

[14]Minutes: Regular Meeting of the Common Council Minutes. Town of Quartzsite. November 22, 2016.
[15] Winslow City Council Meeting. Recording of Town Meeting. January 09, 2018.

Rest Area Sponsorship

Federal legislation limits the ability of states to allow commercial activities at rest areas within the Interstate ROW. This limit on commercial activity constrains state options for generating revenue at their rest areas to offset the cost of operation and maintenance. One successful approach to generating revenue is rest area sponsorship. Multiple states, including in Arizona, have successfully obtained rest area sponsorships. As shown in Figure 2-18, GEICO has sponsored 14 ADOT rest areas as safe phone zones. The partnership with GEICO started in 2014.

Figure 2-18: Arizona Rest Area Sponsorship

Source: ADOT

ADOT has pursued other sponsorship arrangements, but Federal legislation (23 U.S.C. 111(b)) limits commercial activity within the Interstate ROW to the following:

- Advertising within a facility at the rest area, so long as the advertising is not legible from the main traveled way
- Promoting tourism
- Tickets for historical or tourism-related events or attractions
- Travel information
- Vending machines for food, drink, and other appropriate items, but priority must be afforded to blind vendors

Opportunity for Implementation in Arizona

ADOT should continue to leverage partnerships to sponsor rest areas and monitor other successful approaches used in other states to generate revenue through rest area sponsorship.

2.3 Truck Parking Solution – Policies

Truck parking policies position ADOT to advance truck parking incrementally and typically at a low cost. The following provides examples of truck parking policies developed in other states.

2.3.1 Designate a Truck Parking Champion

Truck parking involves both public and private stakeholders and often lacks a single champion to communicate truck parking issues, needs, and advance truck parking initiatives. Designating a truck parking champion provides internal and external partners with a single point of contact for exploring and advancing truck parking within the state. Examples of activities a truck parking champion would undertake include:

- **Advocate for truck parking:** truck parking involves the private sector and all levels of state government. A truck parking champion serves as a public facing point of contact to explore public and private issues and opportunities related to truck parking. The truck parking champion also maintains and conducts outreach with district offices, cities, truck stop operators, rest area managers, internal DOT divisions, and the trucking industry, as needed.
- **Advancing the understanding of truck parking within the public sector:** truck parking investments and issues are often identified by and affect local jurisdictions, but impact the wider state. Therefore, an important role for the truck parking champion is to educate city and district planners about state initiatives, resources, and goals to ensure opportunities to advance truck parking are not missed. Additionally, the truck parking champion should promote truck parking as a critical topic in local planning efforts.
- **Implement recommendations:** a truck parking champion is uniquely placed to advance ongoing truck parking initiatives and alter course as needed.

Opportunity for Implementation in Arizona

ADOT's allocation of $10 million to advance statewide truck parking highlights a very distinct implementation role for a truck parking champion. ADOT should leverage the data and opportunities identified in the Arizona Truck Parking Study to implement truck parking recommendations and leverage the momentum resulting from ADOT's investments. The ADOT truck parking champion should use existing or develop new relationships with ADOT districts, divisions, and groups throughout the organization chart (Rest Areas, Enforcement and Compliance, Maintenance, Planning, Transportation Systems Management and Operations, and P3, among others).

While ADOT's truck parking champion will be from the DOT, the champion must work closely with the private sector and external public agencies. To date, ADOT has worked very closely with the Arizona Trucking Association (ATA) to validate the findings of this study, in fact ATA serves as a champion for the trucking industry on truck parking issues in Arizona. Similarly, the truck parking champion may need to work with local governments to expand truck parking and other state agencies like the Department of Public Service.

2.3.2 Build Truck Parking into the Project Design and Prioritization Processes

The 2015 Jason's Law Report identified a lack of resources as an impediment to creating truck parking. Additionally, State DOT's highlighted that truck parking has a difficult time competing with other projects for funding. Absent specifically designated funding, such as ADOT's $10 million of National Highway Freight Program Funding (NHFP), building truck parking into project design and prioritization will better enable truck parking to compete with other project types.

Examples of approaches include assigning points to projects that improve truck parking as part of the project or using monetization factors from recent grant applications to present the merits of truck parking projects. The *Kansas Statewide Freight Network Truck Parking Plan* provides an example of monetizing truck parking projects.[16] Additionally, the Better Utilizing Investments to Leverage Development (BUILD) Transportation Grants program is another resource for the factors to monetize truck parking projects.

Opportunity for Implementation in Arizona

The Arizona Truck Parking Study identified multiple locations of undesignated truck parking at roadside facilities that do not have on/off ramps. Incorporating the locations identified in this report into the project development process, would enable project designers to integrate upgrades to on/off ramps at roadside table tops, brake check areas, and areas used to stage construction equipment. Additionally, incorporating an assessment of truck parking during the design of large projects, such as the Future I-11 corridor, would position ADOT to address truck parking issues as part of the overall project development process.

2.3.3 Position Truck Parking for Federal Grant Opportunities

Truck parking projects have a history of receiving funding through Federal grants. For example, the 2005 transportation authorization Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users' developed and funded a $34 million Truck Parking Facilities Pilot Program. More recently, transportation agencies have used discretionary grant programs such as BUILD and ATCMTD to fund truck parking projects. State DOTs throughout the U.S. have been awarded grants for expanding truck parking and implementing a TPIMS.

Opportunity for Implementation in Arizona

ADOT's experience applying for an ATCMTD grant is a good example of positioning the state for Federal Grant Opportunities. ADOT should continue to look for opportunities to supplement state funding for truck parking with Federal grants. ADOT can position for Federal grants for by using the information included in this study and insights gathered during implementation to identify project options, opportunities, and projects.

[16] Kansas Turnpike Authority (2016). Kansas Statewide Freight Network Truck Parking Plan. Kansas Department of Transportation.

2.3.4 Land Use and Policy

The American Planning Association recommends that municipalities should set standards for and require loading zones at new developments and provide locations for truck drivers to get rest.[17] While this is a local issue, the most concentrated demand for truck parking is often in urban areas. State DOT's could help municipalities by putting local truck parking within a statewide context, providing examples and guidance related to ordinances, assisting with industry outreach, and identifying solutions. Assisting municipalities understand and respond to truck parking issues is a low-cost policy approach and could result in better access to truck parking statewide. State's may encounter opposition to truck parking requirements and locations from developers and local residents.

Opportunity for Implementation in Arizona

Arizona municipalities are impacted by truck parking shortages within their jurisdictions. Collecting relevant ordinances and approaches will position ADOT to provide technical assistance on truck parking needs and issues.

The most frequently cited example of truck parking ordinances are municipalities in the Lehigh Valley, Pennsylvania. Specifically, the Township of Lower Macungie, a member of the Lehigh Valley Planning Commission, has developed truck parking requirements for industrial land uses. Specifically, Chapter 27 Part 23 and Part 24 of the Township of Upper Macungie Code requires industrial land uses have truck parking spaces used to stage trucks based on the number of loading docks. Additionally, warehouses, distribution centers, wholesalers, and storage land uses must provide an on-site lounge and truck parking for truck drivers on site.

ADOT have the opportunity to use the data, solutions, and other resources developed in this report to assist municipalities with truck parking issues.

2.3.5 Monitor and Revisit

The supply and demand for truck parking will change over time due to changes in regulations, truck traffic, truck parking supply, technology, and the implementation of improvements. To keep pace with changes and to assess the outcomes of investments (project specific), ADOT should continue to monitor the factors that affect truck parking and periodically update truck parking supply and demand estimates (statewide).

The eight state Mid America Association of State Transportation Officials (MAASTO) TPIMS project identified the following performance measures to measure the impacts of the project:

- Are drivers utilizing TPIMS to inform their parking decisions?
- Have driver-perceived parking shortages declined?

[17] American Planning Association (2016). APA Policy Guide on Freight.

- Are truck parking facilities more safe and secure?
- Is there a reduction in illegal or informal parking?
- Is there a reduction in fatigue-related crashes?
- Is there a decline in the average time spent looking for parking?
- Is the system meeting its performance requirements for accuracy?[18]

In addition monitoring project specific outcomes, periodically monitoring and revisiting truck parking supply, demand, and issues on a statewide will help transportation agencies identify new and emerging issues and opportunities. Transportation agencies can monitor truck parking through informal means such as periodic outreach to public and private sector stakeholders. Conversely, transportation agencies can implement more formal approaches, such as updating their statewide truck parking study on a regular basis or incorporating truck parking into their state freight plans

Opportunity for Implementation in Arizona

ADOT's allocation of $10 million to implement truck parking solutions provides an opportunity to monitor truck parking as solutions are implemented. Monitoring approaches include periodically conduct listening sessions with industry stakeholders to identify new and emerging truck parking issues. A more formalized approach would be annual performance measures to assess changes in truck parking. Annual performance measures using data, such as Trucker Path or industry surveys will help ADOT understand where truck parking solutions are making an impact, new or emerging issues, and next steps.

2.4 Private Sector Solutions

The policies and operations of trucking companies also affect truck parking, for example, the timing of pick-up and deliveries affects when and where trucks need truck parking for staging. The following provides examples of private sector solutions and are provided as information only:

- Trucking Companies
  - Provide resources (data and assistance) to aid drivers searching for truck parking
  - Add parking at hubs for company drivers
  - Subsidize truck parking reservation costs
  - Include truck parking as a factor when negotiating fuel agreements
- Drivers
  - Integrate tools to assist drivers in their route planning and decision-making

[18] Presentation to the North/West Passage Freight Task Force by Davonna Moore

- Shippers/Receivers
    - Add truck parking and amenities on site. Unilever provides truck parking spots at Unilever distribution centers that drivers can use after dropping off their trailer.[19]

Private sector solutions are directed by individual firms, therefore, there may be no role for the public sector beyond encouraging or incentivizing private sector solutions.

[19] National Coalition on Truck Parking Activity Report 2015-2016

3 Prioritizing Arizona's Truck Parking Issues

3.1 Introduction

The goal of the issue identification and prioritization process is to identify the locations on Arizona's roadways with the most pressing truck parking issues now as well as those that are likely to persist in the future. The project team identified Arizona's truck parking issues using a combination of truck GPS data, truck driver surveys, and industry consultations. Truck GPS data enabled the team to pinpoint the location of trucks using on/off ramps, highway shoulders, vacant lots, and local roads for truck parking (undesignated truck parking). Truck driver surveys and industry consultations were used to validate the findings of the truck GPS data and to solicit input on the most significant truck parking issues in Arizona, as well as potential solutions to address those issues.

3.2 Top Industry Issues

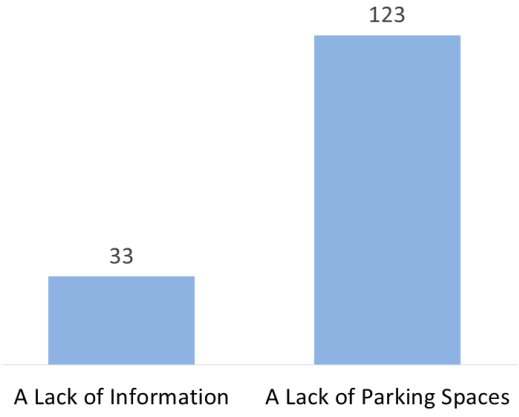
The project team identified the top concerns of the trucking industry through meetings with the Truck Parking Stakeholders Group, consultations with managers and trucking industry executives, and a survey of truck drivers.

The survey of truck drivers found that the availability of truck parking has gotten worse in Arizona. When surveyed, 72 percent of respondents said that truck parking has gotten worse in the last three years, 23 percent said it stayed the same, and 5 percent said it improved.

Other critical findings from the survey of truck drivers are as follows:

- As shown in Figure 3-1, 123 (79 percent) truck drivers identified a lack of truck parking spaces as the primary cause of truck parking problems, compared to 33 (21 percent) citing a lack of information
- About 49 percent of truck drivers reported having the hardest time finding truck parking in urban areas, 42 percent reported difficulties everywhere

Figure 3-1: Cause of Truck Parking Issues in Arizona



- When asked about the specific locations of truck parking issues, Phoenix, Tucson, Flagstaff, I-10 between Phoenix and the California border, and I-17 were the most frequently cited locations

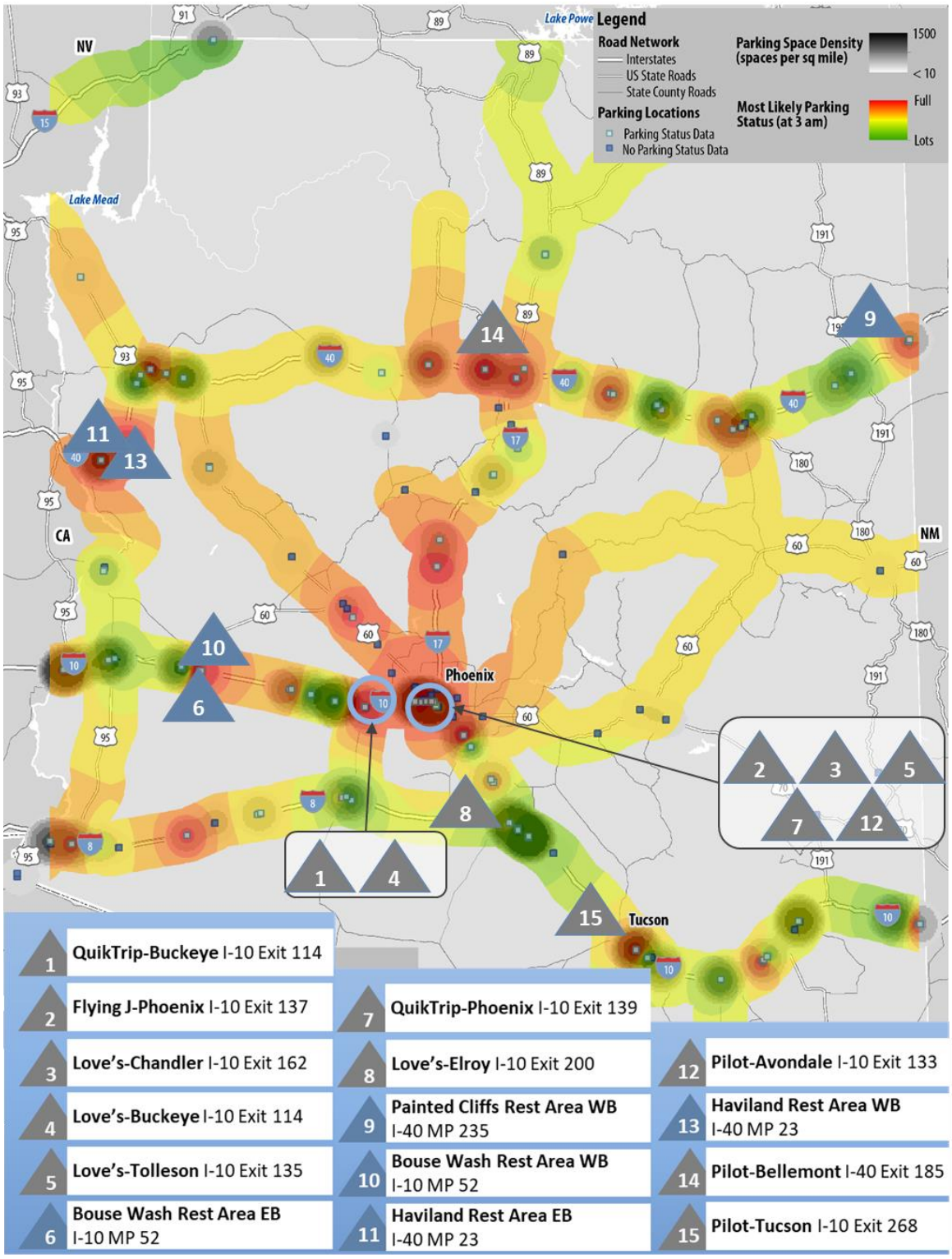
Truck drivers and consultations with industry executives highlighted a lack of truck parking near warehouses and distribution centers (staging) as an issue in Arizona. Truck drivers try to get as close as possible to their origin or destination to position for their pick up or drop off appointments. Additionally, many origins and/or destinations of freight are located in urban areas, particularly Phoenix, where the increasing cost of land, concentration of trucks in a small geographic area, and increasing concerns about the impact of congestion on travel time further complicate finding solutions to truck parking issues.

3.3 Public and Private Truck Parking Utilization

Figure 3-2 displays the top 15 truck parking locations with the heaviest utilization from midnight to five am (overnight utilization), which coincides with the most difficult time to find truck parking in Arizona. Figure 3-2 highlights Phoenix as the region with the heaviest utilization in Arizona, with private truck stops shown in blue and rest areas shown in gray. Maricopa County has seven of the top fifteen truck parking locations with the highest overnight utilization. Outside of Maricopa County, ADOT's rest areas make up five of the remaining eight locations with the highest overnight utilization. Specifically, ADOT rest areas at Bouse Wash (Rank 6 and 10), Painted Cliffs (Rank 9), and Haviland (Rank 11 and 13) are included among the truck parking locations with the highest overnight utilization.

Figure 3-2: Top 15 Truck Stops or Rest Areas with the Highest Overnight Utilization

CPCS Solutions for growing economies



3.4 Undesignated Truck Parking

Truck GPS data from the American Transportation Research Institute (ATRI) was used to identify and map the location and total duration of trucks stopping in Arizona during four separate two-week periods in 2017. The project team identified almost 810,000 stops over a half hour in duration totaling almost five million hours of parking. The project team clustered and validated the stop events to identify undesignated truck parking. Undesignated stops were those using on/off ramps, roadway shoulders, or vacant lots.

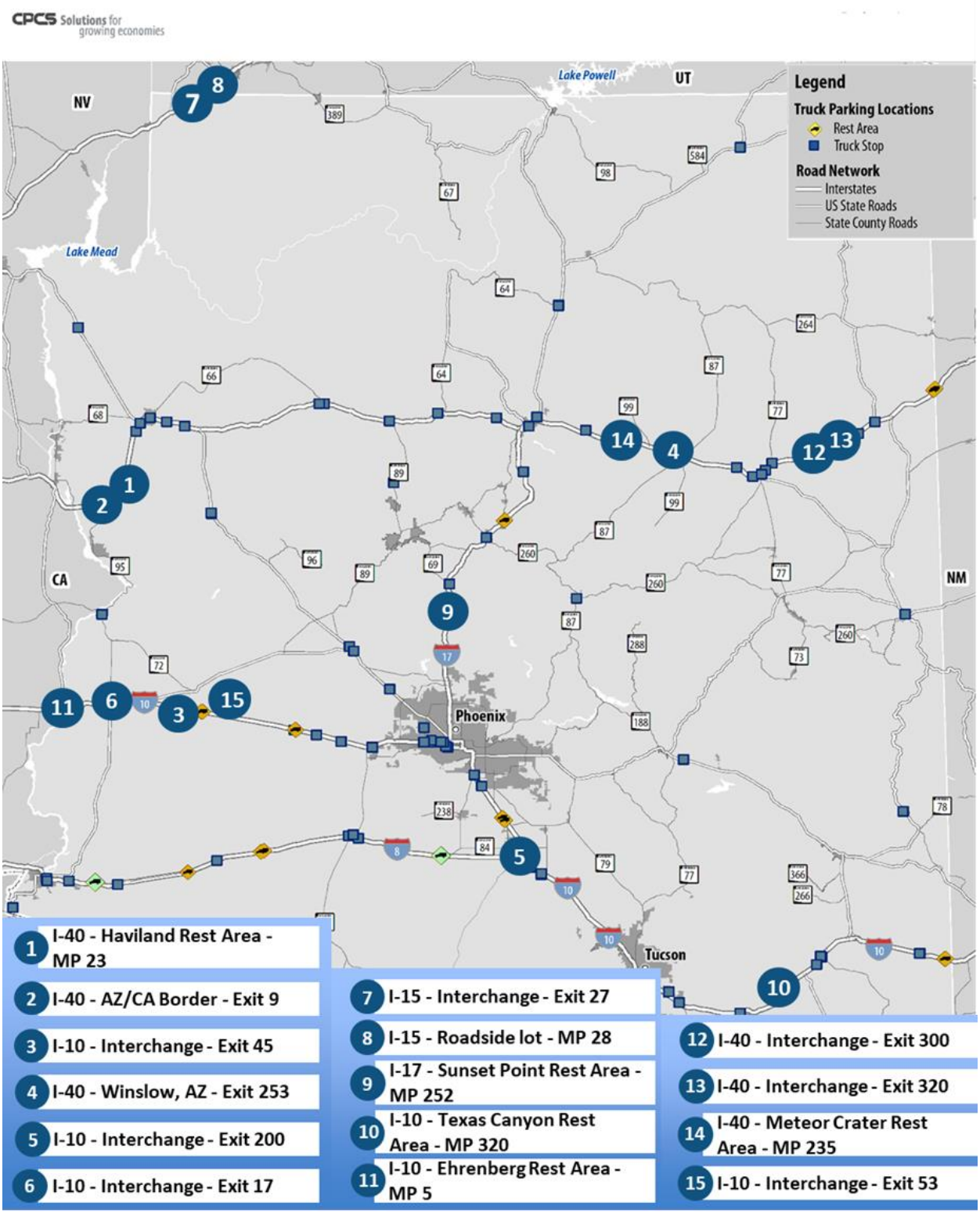
Figure 3-3 displays the top 15 locations of undesignated truck parking based on the number of trucks. Many of the top 15 locations of undesignated truck parking occur in relatively close proximity, specifically near the Arizona/California border on I-10 and I-40. Additionally, a comparison of Figure 3-2 and Figure 3-3 reveals many of the truck parking locations with the highest overnight utilization coincide with undesignated truck parking.

The following undesignated truck parking locations occur at ADOT rest areas:

- **Ref 1 Haviland Rest Area:** over 1,000 trucks parked in undesignated areas for over a half hour, 225 of which parked for over eight hours. Most trucks parked along the on/off ramps and in areas not designated for trucks, including the side of I-10.
- **Ref 9 Sunset Point Rest Area:** over 350 trucks parked in the entrance and exit to the rest area, as well as the on/off ramps used to access the Sunset Point Rest Area. About 21 percent of undesignated trucks parked over eight hours.
- **Ref 10 Texas Canyon Rest Area:** almost 340 trucks used the on/off ramps for truck parking during the eight weeks of GPS data. Of the trucks parking in undesignated portions of the rest area, 96 of trucks parked over eight hours.
- **Ref 11 Ehrenberg Rest Area:** 330 trucks parked in undesignated locations during the eight-week GPS sample, more than half of which were parked longer than eight hours.
- **Ref 14 Meteor Crater Rest Area:** 289 stops were in undesignated locations. About 32 percent of undesignated stops were over eight hours.

While not at an ADOT rest area, reference numbers 3 and 15 represent undesignated truck parking activity at on and off ramps near the Bouse Wash Rest Area. Bouse Wash also had undesignated truck parking at the rest area, but the magnitude did not reach the top 15 locations.

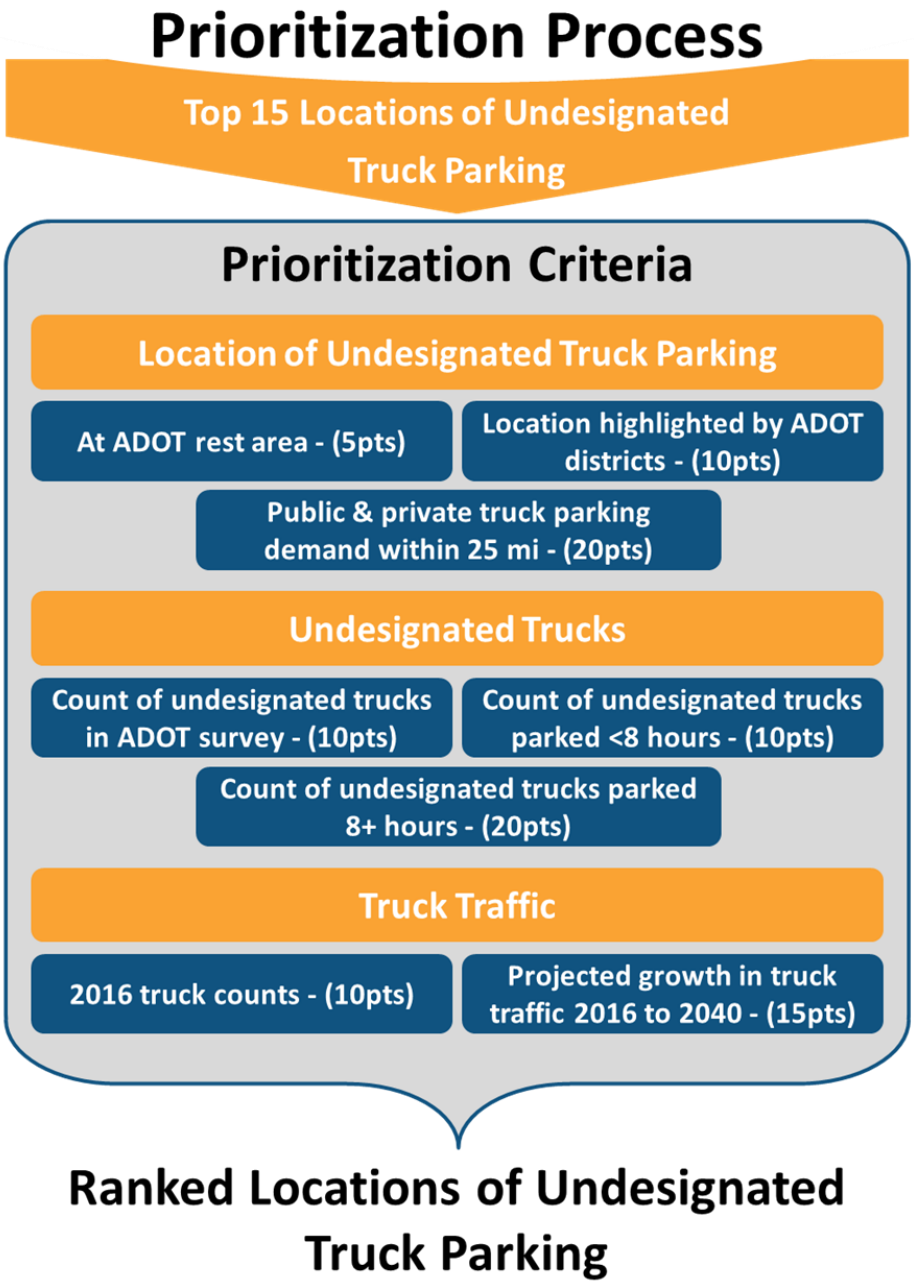
Figure 3-3: Top 15 Undesignated Truck Parking Locations



3.5 Prioritizing Undesignated Truck Parking Locations

Figure 3-4 displays the prioritization process developed to rank undesignated truck parking locations. The prioritization process started with the top 15 locations of undesignated truck parking, each of these locations was assessed against prioritization criteria. The output of the prioritization process is a ranked list of locations with undesignated truck parking that will help guide where ADOT applies the $10 million in NHFP it allocated to improve truck parking in the Arizona State Freight Plan.

Figure 3-4: Truck Parking Prioritization Process



3.6 Prioritization Criteria

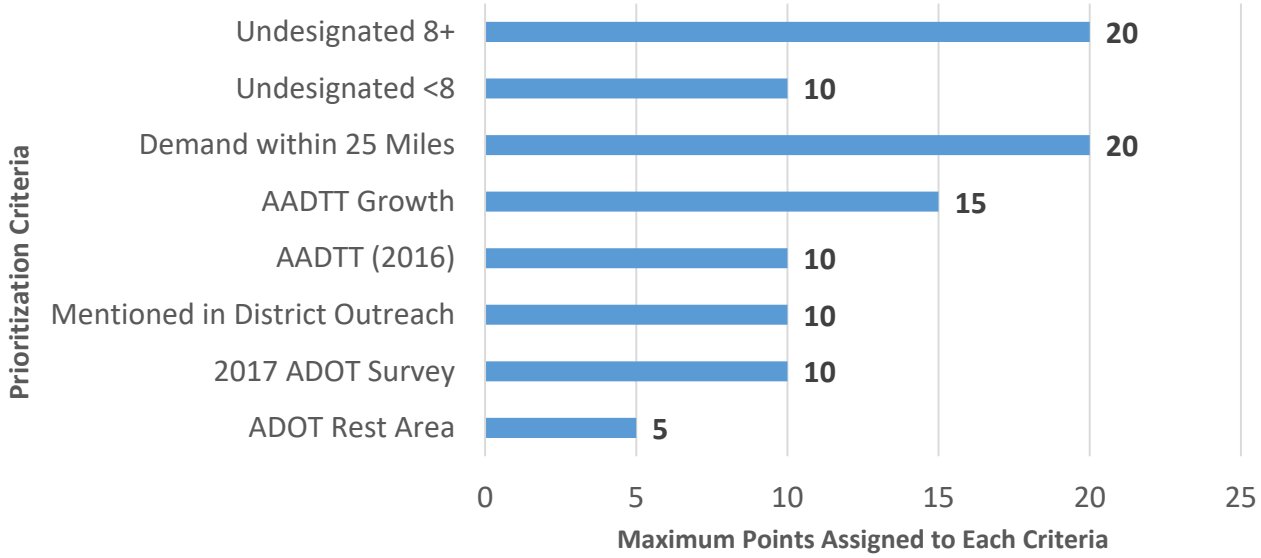
The prioritization process used eight criteria to prioritize undesignated truck parking locations in Arizona. The majority of criteria are scaled between the highest and the lowest value for each criterion. Practically, scaling means the location with the highest value for a specific criterion receives all potential points and the lowest value receives zero points. Values falling between the lowest and highest values receive points based on their score for the criterion relative to the minimum and the maximum. The following variables and scoring criteria were used to prioritize the top 15 undesignated truck parking locations:

- **Number of Undesignated trucks parked for less than eight hours:** count of trucks parked for less than eight hours at each location. Short breaks are used for staging prior to pick-up and drop-off as well as complying with Hours of Service (HOS) Rules.
    - **Scoring:** Scaled value based on the number of trucks parked less than eight hours
- **Number of Undesignated trucks parked eight-plus hours:** count of trucks parked for more than eight hours at each location. Long breaks coincide with the HOS regulation that drivers must get at least ten consecutive hours off duty to be able to drive for 11-hours or be on duty for 14-hours.
    - **Scoring:** Scaled value based on the number of trucks parked over eight hours
- **Annual Average Daily Truck Traffic (AADTT)-2016:** The number of trucks traveling on the nearest major roadway adjacent to the location of the truck parking location.
    - **Scoring:** Scaled value based on the 2016 AADTT
- **Projected AADTT Growth (2016-2040):** The forecasted growth in truck travel near each location from 2016 to 2040.
    - **Scoring:** Scaled value based on the projected growth in AADTT from 2016-2040
- **Location is at an ADOT rest area:** The location identified occurs at an ADOT rest area.
    - **Scoring:** five points assigned for locations at ADOT rest areas and zero for all others
- **Mentioned in District outreach:** The location was mentioned in outreach with ADOT districts. Values were assigned based on how directly the location was mentioned in district consultations:
    - Specific location: 10 points
    - Area and infrastructure type: 7 points
    - Corridor and infrastructure type: 5 points
    - Corridor only: 3 points
    - Not mentioned: 0 points
- **Undesignated truck parking identified in ADOT survey:** The number of undesignated trucks parked at ADOT rest areas in ADOT's March 2017 survey
    - **Scoring:** Average number of truck parked along shoulders of rest areas

- **Demand for truck parking at nearby truck parking locations:** The weighted average of the demand for truck parking at locations 25 miles away from each location.
    - **Scoring:** Scaled value based on the weighted demand for truck parking at each location

Each of the criteria noted above was weighted to prioritize locations that had high levels of undesignated truck parking, is located in areas with high demand for truck parking, and had high levels of current and projected future truck traffic. The project team presented the prioritization process, criteria, and weights assigned to each criterion to the Truck Parking Stakeholders Group for their comment. Figure 3-5 displays the criteria and their respective weights.

Figure 3-5: Prioritization Criteria Weights



3.7 Prioritization Results

Figure 3-6 and Figure 3-7 show the results of the prioritization process for each of the top 15 locations of undesignated truck parking. Figure 3-6 displays the output of the scoring and weighting of each criterion.

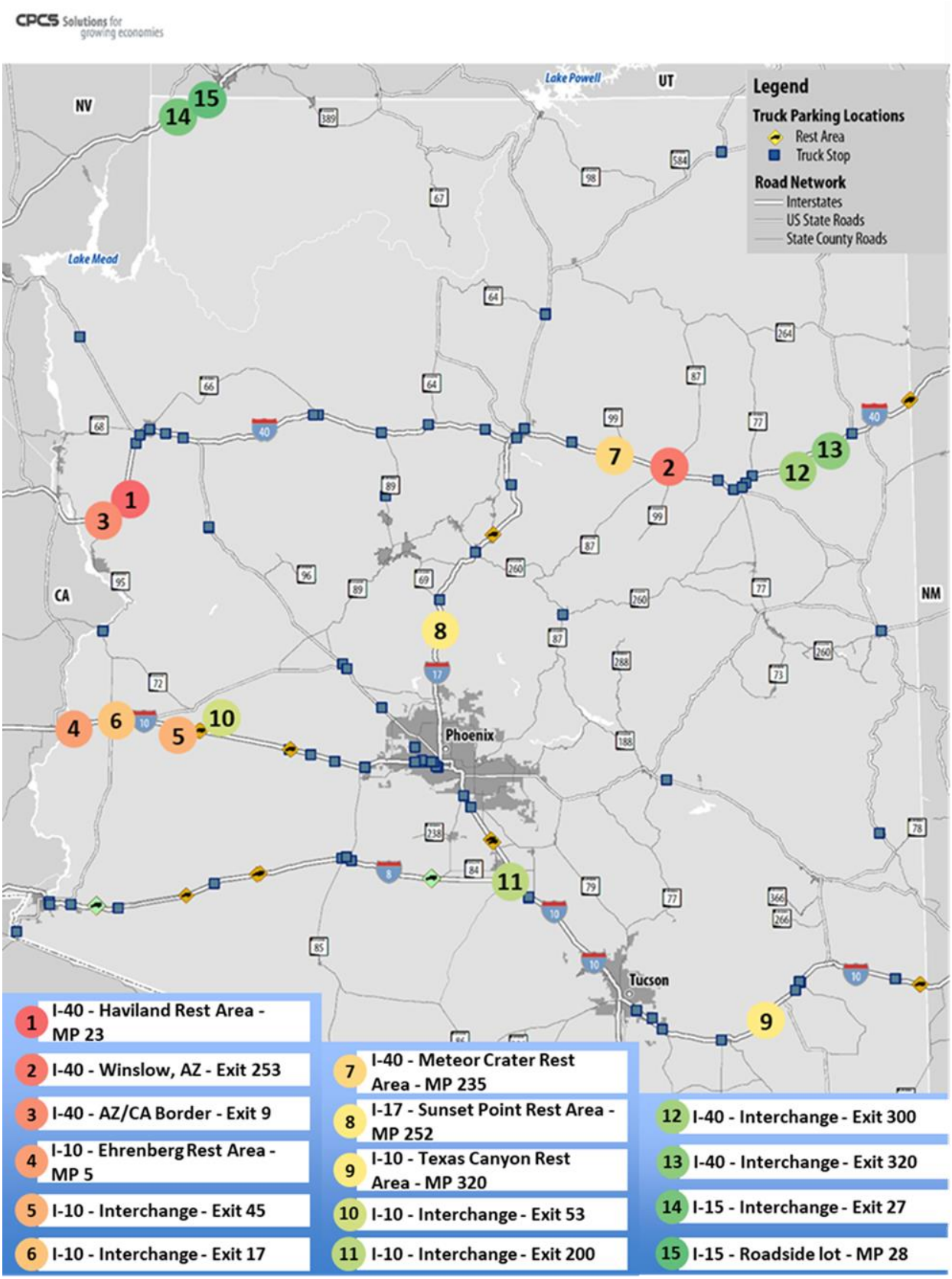
Figure 3-6: Truck Parking Prioritization Output

Rank	Route	Milepost	Undesignated Trucks Parking <8 Hours	Undesignated Trucks Parking 8+ Hours	2016 Truck Counts	2016-2040 Truck Growth	ADOT Rest Area	District Outreach	2017 ADOT Survey	Demand within 25 Miles	Total Score	Reference Number (Figure 3-3)
1	I-40	23	10.0	17.1	2.6	15.0	5	3	8	17.4	78.1	1
2	I-40	253	4.0	19.4	4.3	13.2	-	10	-	18.0	69.0	4
3	I-40	9	7.8	20.0	3.9	13.9	-	3	-	19.5	68.0	2
4	I-10	5	0.0	12.1	6.9	10.9	5	7	4	16.8	62.8	11
5	I-10	45	6.5	15.0	9.4	11.7	-	5	-	12.1	59.8	3
6	I-10	17	1.4	19.2	5.4	10.9	-	5	-	16.8	58.7	6
7	I-40	235	0.5	6.2	4.1	13.2	5	5	5	17.4	56.4	14
8	I-17	252	1.8	4.6	10.0	2.0	5	3	6	20.0	52.4	9
9	I-10	320	1.2	6.4	0.0	8.5	5	7	8	15.6	51.7	10
10	I-10	53	0.7	1.5	9.1	11.7	-	5	-	12.4	40.5	15
11	I-10	200	3.9	10.9	7.4	2.0	-	3	-	12.8	39.9	5
12	I-40	300	1.9	0.0	3.6	13.2	-	5	-	16.1	39.7	12
13	I-40	320	1.4	1.4	3.2	13.2	-	5	-	12.5	36.7	13
14	I-15	27	1.0	19.3	5.5	0.0	-	10	-	0.0*	35.7	7
15	I-15	28	1.1	9.3	5.5	0.0	-	10	-	0.0*	25.8	8

Source: CPCS analysis of ADOT, ATRI, Trucker Path, and district consultations

* No public or private truck parking locations were located in Arizona near locations ranked number 14 and 15.

Figure 3-7: Output of the Prioritization Process



4 Matching Solutions to Issues and Sequencing

4.1 Introduction

Following the prioritization process, the project team clustered undesignated truck parking locations geographically and analyzed whether the capacity or information was the most likely cause.

Clustering undesignated truck parking locations geographically provides context and sets the stage to identify solutions that address a lack of capacity or information at all locations. For example, increasing truck parking at one location could reduce undesignated truck parking nearby. The following clusters were used to identify the cause of undesignated truck parking and potential opportunities:

- **I-10 Arizona/California Border:** Locations ranked 4, 5, 6, and 10
- **I-40 Arizona/California Border:** Locations ranked 1 and 3
- **I-17 North of Phoenix:** Location ranked 8
- **I-10 Near Casa Grande:** Location ranked 11
- **I-10 at Texas Canyon:** Location ranked 9
- **I-40 East of Flagstaff:** Locations ranked 2 and 7
- **I-40 East Arizona:** Locations ranked 12 and 13
- **I-15 Arizona/Utah Border:** Locations ranked 14 and 15

4.2 Identifying the Cause: Capacity vs. Information

The project team used the data from the prioritization process to identify the cause of the undesignated truck parking locations in a particular geographic area. Figure 4-1 provides a simplified version of the prioritization scores for each cluster of undesignated truck parking locations. Each scoring category is formatted to display the highest values in red and lowest in green to put the scores for each undesignated truck parking location in context. Additionally, higher scores are associated with undesirable outcomes. For example, high scores in the "Total Undesignated" criterion means there are more undesignated trucks parking at the truck parking location. Similarly, the high scores for "Demand within 25 Miles" translate to nearby truck parking locations frequently being full.

Figure 4-1: Simplified Prioritization Scoring for Clusters of Undesignated Truck Parking

Rank	Milepost	Total Undesignated	2016 Truck Counts	2016-2040 Truck Growth	District Outreach	2017 ADOT Survey	Demand within 25 Miles	Total Score
I-40 Arizona/California Border								
1	23	27.1	2.6	15	3	8	17.4	78.1
3	9	27.8	3.9	13.9	3	0	19.5	68
I-10 Arizona/California Border								
4	5	12.1	6.9	10.9	7	4	16.8	62.8
5	45	21.5	9.4	11.7	5	0	12.1	59.8
6	17	20.6	5.4	10.9	5	0	16.8	58.7
10	53	2.2	9.1	11.7	5	0	12.4	40.5
I-40 East of Flagstaff								
2	253	23.4	4.3	13.2	10	0	18	69
7	235	6.7	4.1	13.2	5	5	17.4	56.4
I-17 North of Phoenix								
8	252	6.4	10	2	3	6	20	52.4
I-10 at Texas Canyon								
9	320	7.6	0	8.5	7	8	15.6	51.7
I-10 Near Casa Grande								
11	200	14.8	7.4	2	3	0	12.8	39.9
I-40 East of Arizona								
12	300	1.9	3.6	13.2	5	0	16.1	39.7
13	320	2.8	3.2	13.2	5	0	12.5	36.7
I-15 Arizona/Utah Border								
14	27	20.3	5.5	0	10	0	0*	35.7
15	28	10.4	5.5	0	10	0	0*	25.8
Max Score		**30**	**10**	**15**	**10**	**10**	**20**	**100**

Source: CPCS analysis of ADOT, ATRI, Trucker Path, and district consultations

* No public or private truck parking locations were located in Arizona near undesignated truck parking location ranked 14 and 15.

Note: Whether the undesignated truck parking location occurred at an ADOT rest area was not included in Figure4-1.

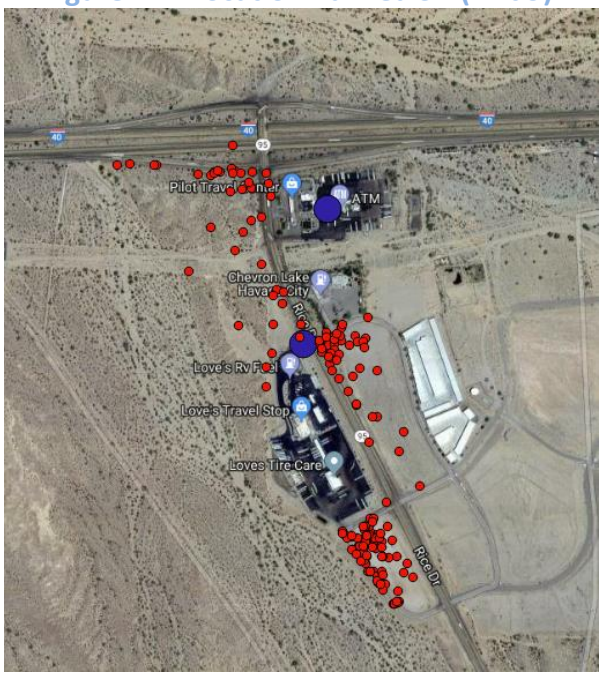
The remainder of this section assesses each cluster of undesignated truck parking using the outputs of the prioritization process (Figure 4-1) and identifies the potential for the application of a capacity and/or information solution.

4.2.1 I-40 Arizona/California Border: Locations Ranked 1st and 3rd

There are limited opportunities for an information solution to address the I-40 Arizona/California Border cluster of undesignated truck parking, but the potential increases as I-40 approaches Kingman. In particular, Crazy Fred's Truck Stop (Exit 44) with 50 truck parking spaces has availability at night. The next location with some availability is a TA in Kingman (Exit 48) with 115 truck parking spaces.

Figure 4-2 displays undesignated truck parking occurring at the undesignated truck parking location ranked third (Exit 9). Trucks park on the eastbound ramp from I-40 and in vacant lots adjacent to the truck stop. The parcel of land to the west of the truck stop is owned by the state land trust and is currently unleased.

Figure 4-2: Location Ranked 3rd (Exit 9)



Source: Imagery ©2018 Google, Map Data ©2018 Google

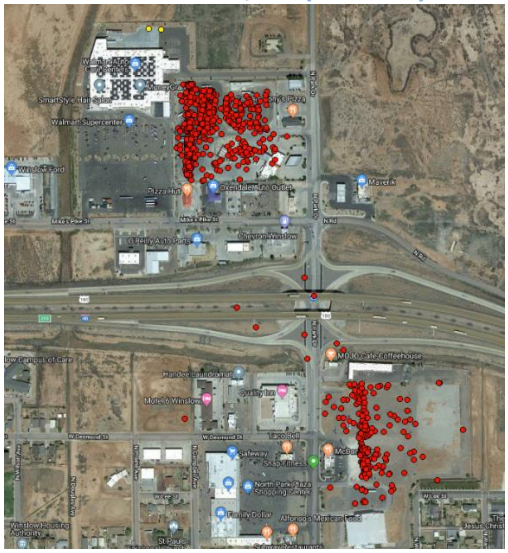
The Haviland Rest Area (milepost 23), Arizona's top-ranked location of undesignated truck parking, was identified in the 2011 *Statewide Rest Area Study* as having the potential for expanded truck parking. The Haviland expansion would add 15 truck parking spaces in both eastbound and westbound directions (currently seven truck parking spaces in each direction). Updated planning level cost estimates from the ADOT Rest Area Manager estimate the cost of expanding Haviland at $5.5 million plus the cost of land for the expansion of the eastbound rest area. The Bureau of Land Management owns the land surrounding Haviland.

The limited availability of truck parking spaces in the first 40 miles of I-40, the significant projected future growth, and the magnitude of undesignated truck parking suggests that capacity is needed, particularly on the eastbound side of I-40. Additional information at the Haviland Rest Area on other truck parking options could also divert some trucks from Haviland to available truck parking near Kingman.

4.2.2 I-40 East of Flagstaff: Locations Ranked 2nd and 7th

Two of the top fifteen truck parking locations are east of Flagstaff, occurring at the Meteor Crater Rest Area (milepost 235) and in Winslow, Arizona (Exit 253). Figure 4-3 displays undesignated truck parking at a vacant mall to the south of I-40 and trucks parked in a former Pilot truck stop to the north. As previously noted, trucks used the vacant truck lot until January 2018, when barricades were placed at the entrances. According to Winslow City Council meeting minutes, the owners of the site are seeking a buyer to redevelop the location into a truck stop. The limited truck parking options around Meteor Crater and Winslow suggests capacity is needed in this area. There is a distinct opportunity to form a partnership to redevelop the truck parking location (interested parties toured the site in early 2018).[20]

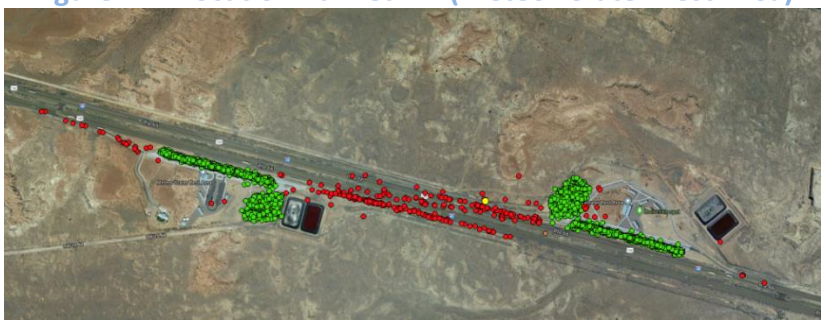
Figure 4-3: Location Ranked 2nd at Winslow, AZ (Exit 253)



Source: Imagery ©2018 Google, Map Data ©2018 Google and CPCS Analysis of ATRI Data

In addition to undesignated truck parking in Winslow, almost 290 trucks used the on/off ramps at the Meteor Crater Rest Area to park (Figure 4-4). Additionally, Meteor Crater is within 14 miles of five interchanges that have an additional 671 undesignated truck parking events. Trucks finding Meteor Crater full have few alternatives, as shown in the high score received for demand within 25 Miles of the rest area (Figure 4-1). Meteor Crater has the potential for expanded capacity through the formalization of the rest areas overflow lots. Specifically paving and striping the overflow lots could improve their use by ensuring an efficient use of space. Updated planning level cost estimates from the ADOT Rest Area Manager estimated that the cost of paving the overflow lots on the eastbound and westbound side of the Meteor Crater Rest Area would cost $1.5 million per side. An estimated 15 spaces could be defined in each overflow lot.

Figure 4-4: Location Ranked 7th (Meteor Crater Rest Area)



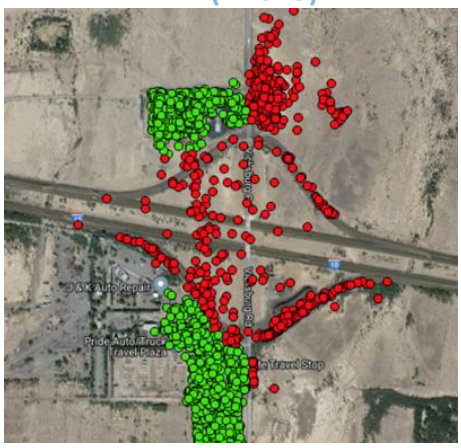
Source: Imagery ©2018 Google, Map Data ©2018 Google and CPCS Analysis of ATRI Data

[20] Winslow City Council Meeting. Recording of Town Meeting. January 09, 2018.

4.2.3 I-10 Arizona/California Border: Locations Ranked 4th, 5th, 6th, and 10th

The I-10 Arizona/California Border presents an opportunity for improvements to both information about truck parking availability and capacity expansion. As drivers get further away from the Arizona/California border, (denoted by increasing milepost number in Figure 4-1) the demand for truck parking decreases as (low relative values in the "Demand within 25 Miles" criterion), which suggests there is available truck parking. The availability of truck parking near locations ranked fifth and tenth is primarily due to the availability of truck parking at the Pride Truck Plaza (150 spaces) and Zip Travel Center (20 spaces) shown in Figure 4-5 (Exit 45).

Figure 4-5: Location Ranked 5th (Exit 45)



Source: Imagery ©2018 Google, Map Data ©2018 Google

Even though the two truck stops shown in Figure 4-5 generally have availability, undesignated truck parking still occurs on the on/off ramps and in a gravel lot across from the Zip Travel Center on the north side of the interchange with I-10 (parcel data shows the gravel lot is not owned by Zip Travel Center). A notable opportunity for truck parking in this area is the parcel to the east of the Pride Truck Plaza is owned by the State Land Trust (currently under lease for grazing). Additionally, the southeast portion of the interchange has been used to stage construction equipment, making it a potential site for a parking only expansion.

The availability of truck parking is more limited around the locations ranked fourth and sixth near the Arizona/California border. Notable truck parking availability near the Arizona/California border is located at the Arco truck stop (Exit 19) in Quartzsite, which has 25 truck parking spaces and a Sunmart (Exit 5) with 100 truck parking spaces. As previously noted there is an opportunity for a P3 in Quartzsite (Exit 17), where TA has land and has explored building a truck stop.

Additionally, ADOT identified six additional spaces that could be added on the eastbound and westbound sides of the Bouse Wash Rest Area (milepost 53) during the scheduled 2020 rehabilitation. The additional spaces are included in the budget for the rehabilitation and were prioritized in response to early findings and stakeholder input during the Arizona Truck Parking Study. The six additional spaces do not require a realignment of the on-ramp displayed in the conceptual plans in Appendix A. Realigning the on-ramps would allow for the addition of 13 spaces and 10 spaces in the eastbound and westbound direction, respectively. Planning level estimates of the cost of adding a ramp realignment and the associated truck parking spaces total $3.5 million in additional funding.

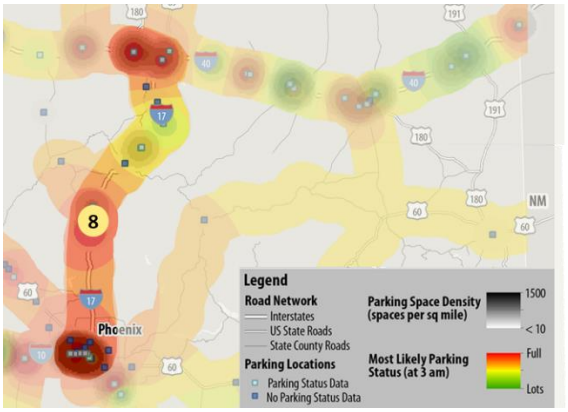
The I-10 Arizona/California Border has challenges with undesignated truck parking, particularly on the eastbound side of I-10. Multiple opportunities have been identified to improve capacity (state land and a construction staging area at Exit 45 and the potential TA P3

in Quartzsite). Additionally, four truck parking locations with almost 300 total spaces have truck parking availability within the area covered by the I-10 Arizona/California Border cluster.

4.2.4 I-17 North of Phoenix: Locations Ranked 8th

The truck parking location ranked eighth occurs at the Sunset Point Rest Area (milepost 252). The Sunset Point Rest Area has 28 truck parking spaces for both directions of traffic. As shown in Figure 4-6, the demand for truck parking on I-17 is very high. Additionally, there are few truck parking locations along this corridor and most are heavily used. Therefore, the best option for addressing undesignated truck parking at the Sunset Point Rest Area is capacity expansion. The 2011 *Statewide Rest Area Study* identified the land surrounding Sunset Point as undevelopable, limiting capacity expansion at the rest area.

Figure 4-6: I-17 Truck Parking Availability at 3am



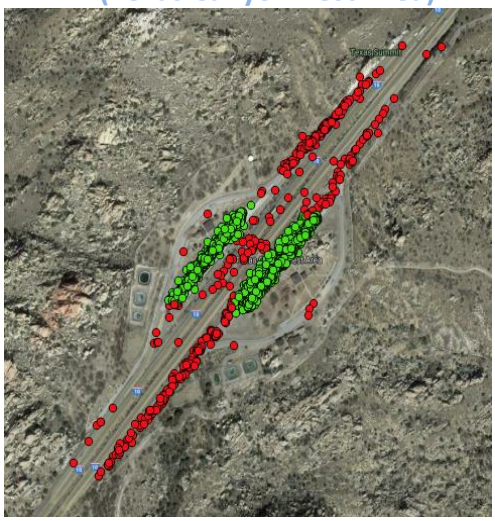
Source: CPCS Analysis of Trucker Path Data

One opportunity to expand truck parking along I-17 north of Phoenix is to explore the potential for a P3 to develop a new truck parking facility. NATSO highlighted I-17 north of Phoenix as an area where one of their members may build a new truck stop.

4.2.5 I-10 at Texas Canyon: Locations Ranked 9th

The Texas Canyon Rest Area is the location of the undesignated truck parking location ranked ninth. Figure 4-7 displays the almost 340 trucks using the on/off ramps during the eight-week truck GPS sample. While Texas Canyon is heavily used, nearby truck parking facilities have capacity. Specifically, to the east of Texas Canyon there is a Shell with 20 spaces 2 miles away (Exit 322) and a TA with 229 spaces 19 miles away (Exit 340). To the west is a Love's with 125 spaces (Exit 302). The Shell to the east and Love's to the west both have capacity to take additional trucks. The proximity of these truck parking locations suggests an information solution could address undesignated truck parking at the rest area.

Figure 4-7: Location Ranked 9th (Texas Canyon Rest Area)



Source: Imagery ©2018 Google, Map Data ©2018 Google

4.2.6 I-10 Near Casa Grande: Locations Ranked 11th

The area around Casa Grande has one of the highest concentrations of truck stops in Arizona. Figure 4-1 displays a relatively low score for demand within 25 miles, meaning there is truck

parking availability within 25 miles of this location. Therefore, an information solution is the best fit for this location.

4.2.7 I-40 East Arizona: Locations Ranked 12th and 13th

The locations ranked 12th and 13th occur at rural on/off ramps on I-40 at exits 300 and 320 respectively. There are four truck parking locations near the location ranked 12th (Exit 300), but the utilization is low at only two of them. The locations with low utilization are the Hopi Travel Center (Exit 292) and the Navajo Travel Center (Exit 325). Together, these locations have 210 truck parking spaces. Similarly, the location ranked 13th (Exit 320) is within 25 miles of the Navajo Travel Center (Exit 325) and near a Mobil (Exit 333) to the east with 50 truck parking spaces. The low utilization of nearby truck stops suggests information solutions should be used to address undesignated truck parking at these locations.

4.2.8 I-15 Arizona/Utah Border: Locations Ranked 14th and 15th

As shown in Figure 4-8, trucks use a gravel lot near I-15, as well as the on/off ramps as truck parking locations. Figure 4-9 displays undesignated truck parking occurring at a roadside gravel lot. There are no private truck parking facilities on I-15 in Arizona, but there are truck parking locations in Nevada and Utah. Therefore, ADOT should work with neighboring states to integrate information about available truck parking in Nevada and Utah. Additionally, ADOT could upgrade the roadside location displayed in Figure 4-9 by adding on/off ramps to improve the safety of trucks entering and exiting traffic.

Figure 4-8: Location Ranked 14th (Exit 27)

Source: Imagery ©2018 Google, Map Data ©2018 Google and CPCS Analysis of ATRI Data

Figure 4-9: Location Ranked 15th (Milepost 28)

Source: Imagery ©2018 Google, Map Data ©2018 Google and CPCS Analysis of ATRI Data

4.2.9 Summary of Capacity and Information Solutions

Figure 4-10 summarizes the clusters of undesignated truck parking locations and synthesizes capacity and information solutions applicable to each cluster. A comparison across locations with information solutions demonstrates that there is available capacity/parking at truck stops, but not at rest areas. This finding suggests that an information solution must include truck stops to be successful. The inclusion of truck stops in an information solution will require ADOT to conduct outreach with private operators to assess their interest in participating in a truck parking solution, such as implementing a TPIMS.

In addition, there may be locations where there are potential opportunities for a P3 to expand capacity. While P3s may hold some potential for saving ADOT money in the long-term through reduced operation and maintenance costs, developing these agreements will take time and may or may not be feasible.

Figure 4-10: Truck Parking Expansion and Information Opportunities in Arizona

Rank	Location	Truck Parking Spaces within 25mi (Number of Spaces)	Expansion Opportunities	Information Solutions
I-40 Arizona/California Border				
1	Haviland Rest Area Ramps: I-40 (MP 23)	360+ spaces at 6 locations. Truck stops at exits 9, 44, and 48. Availability at: • Exit 44: Crazy Fred's Truck Stop (50) • Exit 48: TA (115)-limited availability	**Haviland Rest Area (MP 23): Expansion Opportunity** • Eastbound: 7 existing truck parking spaces and opportunity for: ○ 15 additional spaces (22 total) - $2.8m (~$195k/space + land) • Westbound: 7 existing truck parking spaces and opportunity for: ○ 15 additional spaces (22 total) - $2.8m (~$195k/space)	Interstate Oasis Program with nearby truck stops. TPIMS at Haviland Rest Area.
3	I-40 Exit 9: Ramps & Vacant Lot			
I-10 Arizona/California Border				
4	Ehrenberg Rest Area Ramps: I-10 (MP 5)	800+ spaces at 11 locations. Truck stops at exits 1, 5, 17 19, and 45. Availability at: • Exit 5: Sunmart (100) • Exit 19: Arco Truck Stop (25) • Exit 45: Pride Travel Stop (150) • Exit 45: Zip Travel Center (20)	**Ehrenberg Rest Area (MP 5): Unsuitable for Expansion** • Land surrounding the rest area is unsuitable for expansion **Bouse Wash Rest Area (MP 53): Expansion Opportunity** • Eastbound: 12 existing truck parking spaces and opportunity for: ○ 6 spaces (18 total) without ramp realignment (funded 2020) ○ 13 spaces (25 total) with ramp realignment - $2m (~$285k/space) • Westbound: 12 existing truck parking spaces and opportunity for: ○ 6 spaces (18 total) without ramp realignment (funded 2020) ○ 10 spaces (22 total) with ramp realignment - $1.5m (~$375k/space) **Exit 17:** Facilitate discussion and provide data for the consideration of a new TA truck stop in Quartzsite (NATSO highlighted a members interest in developing a truck stop in Quartzsite) **Exit 45:** Explore the use of a construction staging area within the interchange as a parking only location	Interstate Oasis Program with nearby truck stops. TPIMS at Ehrenberg and Bouse Wash Rest Areas.
5	I-10 Exit 45: Ramps & Vacant Lot			
6	I-10 Exit 17: Ramps near Quartzsite			
10	I-10 Exit 53: Ramps & Vacant Lot			
I-40 East of Flagstaff				
2	I-40 Exit 253: Parking in Vacant Lots in Winslow	310+ spaces at 5 locations. Limited availability at nearby truck parking locations.	**Meteor Crater Rest Area (MP 23): Formalize Overflow** • Meteor Crater Eastbound and Westbound have overflow lots that are currently covered with millings and are unmarked ○ Pave and stripe the overflow lots formalizing 15 spaces on each side - $3m (~$100k/space) **Exit 253:** Facilitate discussion and provide data about the redevelopment of a vacant truck stop in Winslow	Limited availability of truck parking within the area limits the opportunity for an information solution
7	Meteor Crater Rest Area Ramps: I-40 (MP 235)			

I-17 North of Phoenix				
8	Sunset Point Rest Area Ramps: I-17 (MP 252)	Almost 60 spaces at 2 locations. Limited availability at nearby truck parking locations.	**Sunset Point Rest Area (MP 252): Unsuitable for Expansion** • Land surrounding the rest area is unsuitable for expansion • Facilitate discussion and provide data for private truck stop (NATSO highlighted a members interest in developing a truck stop on I-17)	Limited truck parking availability nearby limits the opportunity for an information solution
I-10 at Texas Canyon				
9	Texas Canyon Rest Area Ramps: I-10 (MP 320)	410+ spaces at 5 locations. Truck stops at exits 302, 322, and 340. Availability at: • Exit 322: Shell (20) • Exit 302: Loves (125)	**Texas Canyon Rest Area (MP 320): Unsuitable for Expansion** • Land surrounding the rest area is unsuitable for expansion • Facilitate discussion and provide data for private truck stop (NATSO highlighted a members interest in developing a truck stop on I-10 west of Tucson)	Interstate Oasis Program with nearby truck stops. TPIMS at Texas Canyon Rest Area.
I-10 Near Casa Grande				
11	I-10 Exit 200: On/Off Ramps Near Casa Grande	1,040+ spaces at 9 locations. Truck stops at exits 200, 203, and 208. Availability at: • Exit 200: Pride (50) & Petro (175) • Exit 203: TA (234) & Circle K (25) • Exit 208: Flying J (350) & Pilot (145)	**Sacaton Rest Area (MP 182): Expansion Opportunity** • Eastbound: 17 truck parking spaces and opportunity for 8 additional spaces • Westbound: 15 truck parking spaces and opportunity for 9 additional spaces The concentration of private truck parking near Sacaton makes the expansion of the rest area a low priority	Interstate Oasis Program with nearby truck stops.
I-40 East Arizona				
12	I-40 Exit 300: Ramps	390+ spaces at 5 locations. Truck stops at exits 277, 283, 292, 325, and 333. Availability at: • Exit 292: Hopi Travel Center (150) • Exit 325: Navajo Travel Center (60) • Exit 333: Mobil (50)	No ADOT rest areas within 25 miles of Exit 300 and 320	Interstate Oasis Program with nearby truck stops.
13	I-40 Exit 320: Ramps			
I-15 Arizona/Utah Border				
14	I-15 Exit 27: Ramps & Vacant Lot	There are no truck parking locations on I-15 in Arizona.	ADOT could formalize roadside truck parking that occurs at milepost 28 (Westbound on I-15) Additional study would be required to assess the right-of-way and identify the cost of developing a parking only location	Work with Nevada and Utah to inform drivers about truck parking locations on I-15 near the Arizona border.
15	I-15 (MP 28): Roadside Gravel Lot			

4.3 Stakeholder Input on Truck Parking Projects and Policies

The projects identified by the Arizona Truck Parking Study exceed the $10 million in NHFP funding allocated to improving truck parking in Arizona. Therefore, the project team solicited input from the Truck Parking Advisory Group to identify how public and private sector stakeholders rank each of the projects identified near locations of undesignated truck parking. The project team developed three tables soliciting input on: 1.) The allocation of funding between capacity and information projects (Figure 4-11); 2.) The rank of capacity and information projects one (highest) through seven (lowest) (Figure 4-12); and 3.) The rank of truck parking policy priorities (Figure 4-13). In addition to participating in meetings and webinars throughout this study, the project team provided resources to the Arizona Truck Parking Advisory group, including Figure 4-10 and a presentation that included information about each project, to provide relevant context to the survey.

Seven responses to the survey were received, three from ADOT stakeholders and four from the trucking industry. On average, the public sector felt capacity and information solutions should each receive half of the funding, whereas the trucking industry indicated 77 percent of funds should be spent on capacity and 23 percent on information. The preferences of the trucking industry matched the results of a survey of truck drivers conducted during phase 1 of the Arizona Truck Parking Study, where drivers were asked to identify the primary cause of truck parking problems in Arizona. In total, 79 percent of truck drivers indicated a lack of capacity was the primary cause of truck parking problems in Arizona and 21 percent indicated a lack of information was the primary cause.

Figure 4-11 displays the table that survey respondents used to indicate the allocation of funds to capacity and information, as well as the combined public and private recommendation for the allocation of funds.

Figure 4-11: Allocation of Funding to Capacity and Information Projects

Project Type	Project Examples and Cost	Percent of Funds
Increase Truck Parking Capacity (Provide More Spaces)	• Adding truck parking spaces costs $1.5m to $2.8m per rest area side or ~$195k to $375k per space* • Formalizing overflow lots cost about ~$100k per space or $1.5m per rest area side	63%
Truck Parking Information and Management System (TPIMS)	• A TPIMS costs $300k-$500k per rest area side • The minimum cost of a TPIMS pilot is $2m • The benefit to cost ratio of the I-10 TPIMS was estimated as providing $4.7 to $5.6 of benefits for each dollar spent	37%
	Total	100%

*Note: A rest area side is one directional side (e.g. eastbound or westbound)

When asked to rank specific projects, the survey respondents ranked the projects in the following order:

1.) Eastbound Haviland Rest Area - $2.8m plus the cost of land
2.) Eastbound Bouse Wash Rest Area - $2m
3.) TPIMS – $2m minimum for TPIMS pilot
4.) Tie: Westbound Bouse Wash Rest Area – $1.5m
    Tie: Westbound Haviland Rest Area – $2.8m
6.) Eastbound Meteor Crater Rest Area – $1.5m
7.) Westbound Meteor Crater Rest Area – $1.5m

A comparison of ADOT and trucking industry responses displayed the trucking industry favoring expansion at Bouse Wash over the Haviland rest areas and a lower priority for the TPIMS project. Figure 4-12 displays the table that survey respondents used to rank projects and the result of the survey.

Figure 4-12: Rank Projects by Highest Priority

Project (Current Capacity)	Additional Spaces	Project Cost (Cost/Space)	Stakeholder Preference Rank 1 (Highest) to 7 (Lowest)
Haviland Rest Area Expansion – Location Ranked 1st in the Truck Parking Study			
Eastbound (7 spaces)	15	$2.8m (~$195k/space + land)	1st
Westbound (7 spaces)	15	$2.8m (~$195k/space)	4th (Tie)
Bouse Wash Rest Area Expansion-Currently Programmed – Near Location Ranked 10th in the Truck Parking Study			
Eastbound (12 spaces)	6	No need to Rank, Currently Programmed for 2020	
Westbound (12 spaces)	6	No need to Rank, Currently Programmed for 2020	
Bouse Wash Rest Area Expansion Ramp Realignment – Near Location Ranked 10th in the Truck Parking Study			
Eastbound (12 spaces)	13*	$2.0m (~$285k/space)	2nd
Westbound (12 spaces)	10*	$1.5m (~$375k/space)	4th(Tie)
Meteor Crater Rest Area Paving and Striping – Location Ranked 7th in the Truck Parking Study			
Eastbound (33 spaces)	Formalize 15 Existing Overflow Spaces	$1.5m (~$100k/space)	6th
Westbound (32 spaces)		$1.5m (~$100k/space)	7th
****TPIMS Pilot – Locations Ranked 1st, 4th, 9th, and Near 10th in the Truck Parking Study**			
TPIMS Pilot – Add Sensors to Rest Areas and Install Dynamic Signs 5-20 miles before a Rest Area. Signs display Truck Parking Availability at nearby Rest Areas to Improve the Availability of Information and Enable Truck Drivers to Make more Informed Decisions about when to Stop and Look for Truck Parking.		$300k-$500k per rest area side Benefit to Cost Ratio of 4.7-5.6	3rd

*Realigning the on-ramp will add seven spaces to the eastbound side and four spaces to the westbound side of the Bouse Wash Rest area, in addition to the spaces already planned and programmed in 2020. The total number of spaces after ramp realignment would be 25 on the eastbound side and 22 on the westbound side.

**Estimated from I-10 Corridor Coalition Advanced Transportation and Congestion Management Technologies Deployment Grant Application. Cost per side of the rest area, assuming two variable message signs per location. Total cost varies based on the number of spaces and the technology used to count trucks.

When asked about specific policies to advance, the survey respondents ranked the policies in the following order:

1.) Integrate Truck Parking Information into Arizona 511
2.) Formalize Table Tops and Brake Check Areas
3.) Develop Wyoming-Style "Truck Turnouts" or Truck Parking only Locations along Major Freight Corridors
4.) Update ADOT Rest Areas Map and Develop Truck Parking Version
5.) Develop Nebraska-Style Truck Parking Areas using Interchange Right-of-Way

The largest difference between ADOT and trucking industry respondents is the trucking industry ranked Wyoming-style truck turnouts second compared to fourth for ADOT. Similarly, ADOT respondents ranked an updated ADOT rest areas map as second and the trucking industry ranked it fifth.

Figure 4-13: Truck Parking Policy Priorities

Policy	Explanation	Stakeholder Preference Rank 1 (Highest) to 5 (Lowest)
Formalize Table Tops and Brake Check Areas	Develop design standards and upgrade roadside table tops, brake check areas, and safety pullouts as parking only locations, where feasible and safe	2nd
Develop Wyoming-Style "Truck Turnouts" or Truck Parking only Locations along Major Freight Corridors	Develop design standards and identify locations for new Wyoming-Style "Truck Turnouts" or truck parking only locations along major freight corridors, where feasible and safe	3rd
Develop Nebraska-Style Truck Parking Areas using Interchange Right-of-Way	Develop design standards and identify locations for Nebraska-Style truck parking only locations along major freight corridors, where feasible and safe	5th
Update ADOT Rest Areas Map and Develop Truck Parking Version	Update ADOT's rest areas map to include the number of truck parking spaces and develop a truck parking version that only incudes locations with truck parking spaces	4th
Integrate Truck Parking Information into Arizona 511	Integrate truck parking information into Arizona's 511 system to improve access to truck parking information online and over the phone	1st

4.4 Implementation Plan

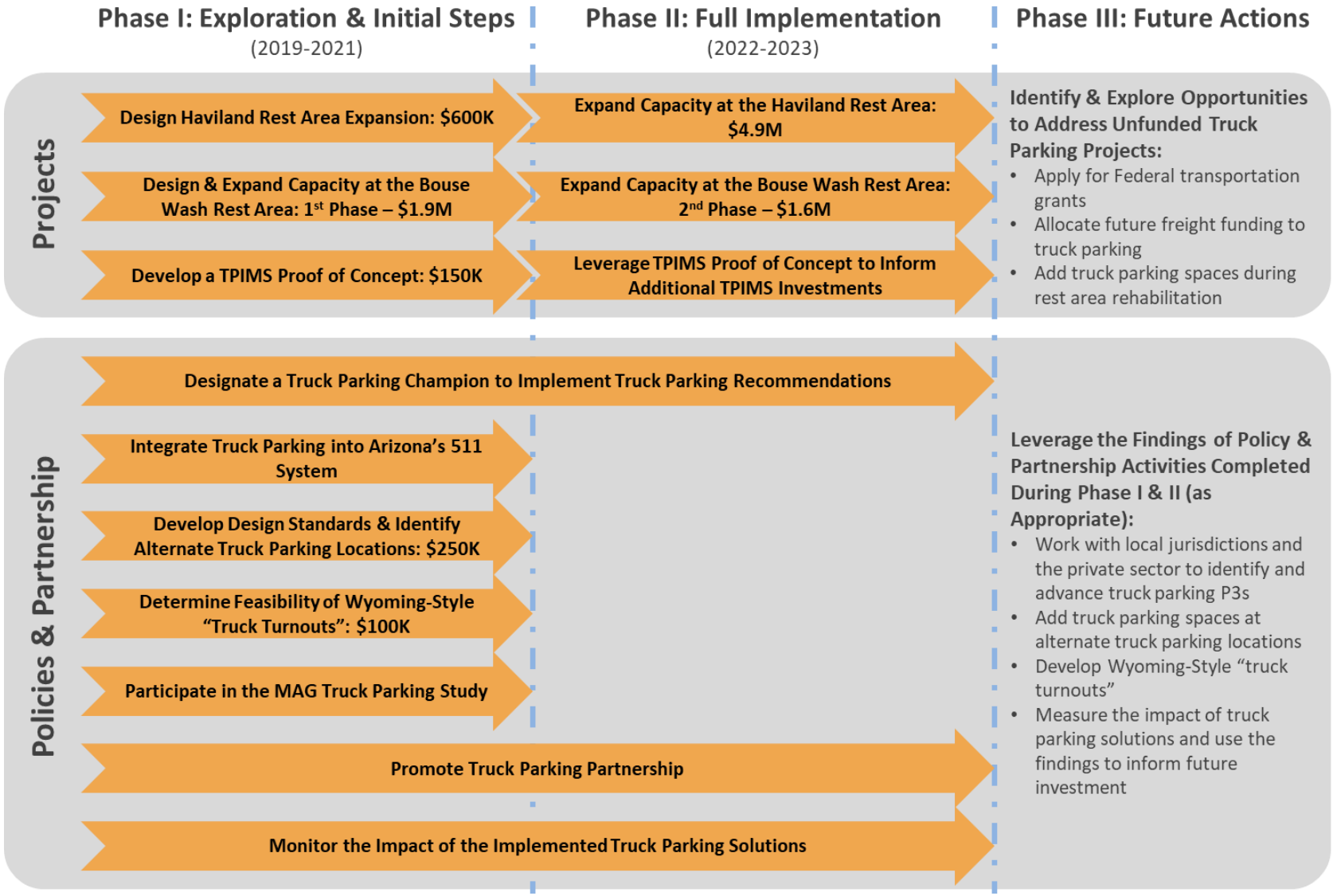
The truck parking policies in Figure 4-13 and the recognition that many existing truck parking locations, such as the Sunset Point Rest Area, have constrained truck parking capacity and are unable to be expanded, highlight the need to implement truck parking solutions beyond those that are funded by the $10 million in NHFP funding. Therefore, In order to match the implementation timelines of truck parking solutions and the statutory requirement to spend

the NHFP funds by 2023 ($3 million allocated in 2020 and $7 million allocated in 2022), the project team proposes a three-phase implementation plan:

- **Phase I: Exploration and Initial Steps –** Phase I will quickly begin implementation where projects and policies allow and to set the stage for Phase II: Full Implementation. Phase I coincides with the 2020 allocation of $3 million in NHFP funding.
- **Phase II: Full Implementation –** Using the findings from Phase I, ADOT will continue implementation of truck parking projects and policies. Phase II coincides with the allocation of $7 million in NHFP funding.
- **Phase III: Future Actions –** Using the information, performance measures, and opportunities identified in Phases I and II, ADOT should explore opportunities to address locations of undesignated truck parking that exceeded the NHFP funding currently allocated to truck parking. Phase III is associated with long-term activities that would require funding beyond what has been allocated by the NHFP.

Phasing the implementation plan will allow ADOT to make incremental improvements to truck parking while developing projects, implementing policies, and soliciting private sector interest in partnership. Figure 4-14 is a synthesis of the implementation plan's three phases and the associated projects and policies that will be completed during each phase. Phases I and II allocate $9.5 million of the $10 million in NHFP funds. The remaining $500,000 in funding is expected to be available as a contingency or to acquire land needed at Haviland, cover additional costs identified in the project design phase, and/or monitor project outcomes. Additionally, Phase III builds upon the findings of Phases I and II to identify and explore opportunities to address locations of undesignated truck parking that exceeded the NHFP funding currently allocated to truck parking.

Figure 4-14: Arizona Truck Parking Implementation Plan



Note: $9.5 million of the $10 million in NHFP funding is allocated above. The remaining $500,000 in funding is expected to be available as a contingency or to acquire land needed at Haviland, cover additional costs identified in the project design phase, and/or monitor project outcomes.

4.4.1 Phase I: Exploration and Initial Steps

The project team recommends that ADOT implement the following projects and policies during Phase I: Exploration and Initial Steps:

Policies

- **Designate a truck parking champion**: The champion will be the primary driver and point of contact for the implementation plan.
- **Participate in the Maricopa Association of Governments (MAG) truck parking study**: The MAG truck parking study focuses specifically on urban truck parking needs, which was outside of the scope of this study. Therefore, ADOT should participate in the MAG truck parking study to foster collaboration on truck parking issues and solutions in the Phoenix region.
- **Integrate truck parking information into Arizona's 511 system:** Integrating truck parking in Arizona's 511 system will improve access to truck parking information online and over the phone.
- **Develop design standards and identify alternate truck parking locations**: The Arizona Truck Parking Study identified an opportunity to upgrade roadside table tops, brake check areas, and safety pullouts to provide parking only locations (no amenities), where feasible and safe. Developing design standards and potential locations to upgrade will position ADOT to make future improvements, potentially adding parking-only truck parking spaces. Explore the potential for an "adopt-a-highway" approach for private entities to adopt roadside parking areas for trash pick-up and potentially for partial amenities – $250,000.
- **Determine feasibility of Wyoming-Style "Truck Turnouts"**: Determine if developing new Wyoming-Style Truck Turnouts is possible in Arizona and identify safe locations along major freight corridors – $100,000.
- **Monitor the impact of implementation:** Monitor truck parking as solutions are implemented, such as conducting industry outreach to identify new and emerging truck parking issues or establish annual performance measures to assess changes to truck parking.
- **Promote truck parking partnership:** Assist public and private stakeholders, as appropriate and allowed under law, assess the construction and expansion of truck stops by supporting cities and local governments with data and guidance to advance opportunities for P3s and to inform cities and local governments about truck parking.

Projects

- **Design the Haviland Rest Area expansion:** Undertake design and explore the acquisition of land for the expansion of truck parking at the eastbound and westbound Haviland Rest Areas – $600,000.
    - Expanding both sides of the Haviland Rest Area has a planning level cost of $5.5 million (design and construction) plus the cost of land for the eastbound expansion.

- **Design and expand capacity at the Bouse Wash Rest Area:** Undertake design for ramp realignment and truck parking expansion of the eastbound and westbound Bouse Wash Rest Areas. Expand truck parking spaces at the eastbound (priority) or westbound side of the Bouse Wash Rest Area, as project timelines and funding allow – $1.9 million.
    - Bouse Wash is scheduled for rehabilitation in 2020, as timing and funding allow, ADOT will leverage the scheduled rehabilitation project to develop the design and add truck parking spaces. The remaining truck parking spaces will be funded in 2022 during Phase II. Expanding both sides of the Bouse Wash Rest Area has a planning level cost of $3.5 million (design and construction).
- **Develop a TPIMS Proof of Concept:** A TPIMS proof of concept will compare and assess the pros and cons of the various technologies used to implement a TPIMS, positioning ADOT to implement a TPIMS in the future – $150,000.

The projects identified in Phase I address clusters of undesignated truck parking at the I-40 Arizona/California Border (locations ranked 1st and 3rd) and I-10 Arizona/California Border (locations ranked 4th, 5th, 6th, and 10th). Additionally, the policies implemented in Phase I will form the basis for ADOT to explore projects throughout the state during Phase II and Phase III.

4.4.2 Phase II: Full Implementation

Using $7 million in funding allocated in 2022, Phase II continues the projects initiated during Phase I, namely expanding the Bouse Wash Rest Areas and Haviland Rest Areas, as well as, continuing to advance truck parking policies and partnerships.

Policies

- **Continue the work of the truck parking champion**: The champion will be the primary driver and point of contact for the implementation plan.
- **Continue to monitor the impact of implementation:** Continue to monitor truck parking as solutions are implemented and incorporate findings into the implementation plan.

Projects

- **Expand capacity at the Haviland Rest Area:** Phase II supplements the $600,000 allocated in 2020 for design to complete the Haviland expansion – $4.9 million.
- **Expand capacity at the Bouse Wash Rest Area:** Phase II supplements the $1.9 million allocated to design and expand eastbound and westbound Bouse Wash Rest Areas in 2020 to complete the expansion – $1.6 million.
- **Leverage TPIMS proof of concept:** Use the findings of the TPIMS proof of concept to identify additional sources of funding, such as State funding or Federal Grants, for implementing a TPIMS on a corridor or statewide basis.
- **Promote truck parking partnership:** Continue to assist public and private stakeholders, as appropriate and allowed under law, assess the construction and expansion of truck stops by supporting cities and local governments with data and guidance to advance opportunities for P3s and to inform cities and local governments about truck parking.

Phases I and II allocate $9.5 million of the $10 million in NHFP funds and positions ADOT to advance truck parking in the future, as resources are available.

4.4.3 Phase III: Future Actions

Phase III: Future Actions leverages the findings of Phases I and II and could run concurrent to Phases I and II, depending on funding availability and the results of implementation. An example of potential future actions includes ADOT working with cities, local governments, truck stop operators, and industry associations such as the NATSO to identify and advance P3s, as appropriate and legally feasible. Specific locations highlighted by NATSO and the project team include US 93 Northwest of Phoenix, I-10 West of Phoenix, I-10 West of Tucson, and I-17 North of Phoenix. Similarly, Quartzsite and Winslow both had truck stops interested in establishing a truck parking location. The results of ADOT's outreach in Phases I and II will identify next steps and ADOT's role, in the development of new and expanded truck stops in the future.

Similarly, the output of the Phase I policy that develops design standards and identifies alternate truck parking locations will position ADOT to provide parking only locations at roadside table tops, brake check areas, safety pullouts, and Wyoming-Style "Truck Turnouts," where feasible and safe. Specifically, ADOT could allocate funding to upgrade roadside table tops, brake check areas, and safety pullouts or develop Wyoming-Style "Truck Turnouts" independent of or in conjunction with projects on the roadways adjacent to these locations.

ADOT's TPIMS proof of concept is another source of Phase III implementation actions. Specifically, ADOT should continue to apply for grants to expand the TPIMS to additional locations, as appropriate. ADOT should implement sensors at rest stops where the data could warn truck drivers to stop early. Maps and data developed during the Arizona Truck Parking Study should guide the prioritization of static or dynamic signs. Specifically, ADOT should use Figure 4-10, in conjunction with the maps developed in this study, to guide where a VMS could be used to help the truck drivers to decide where to park.

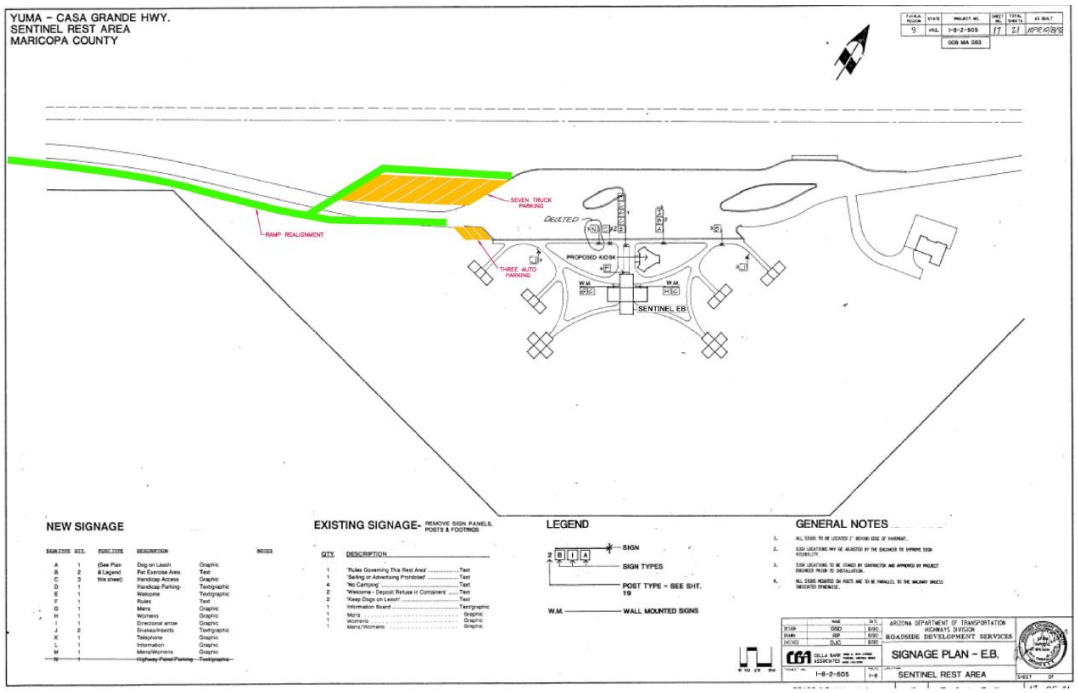
4.5 Next Steps

The final steps for the Arizona Truck Parking Study are to solicit comment on the projects and implementation approach and develop a final report that synthesizes the findings of the two-phase Arizona Truck Parking Study.

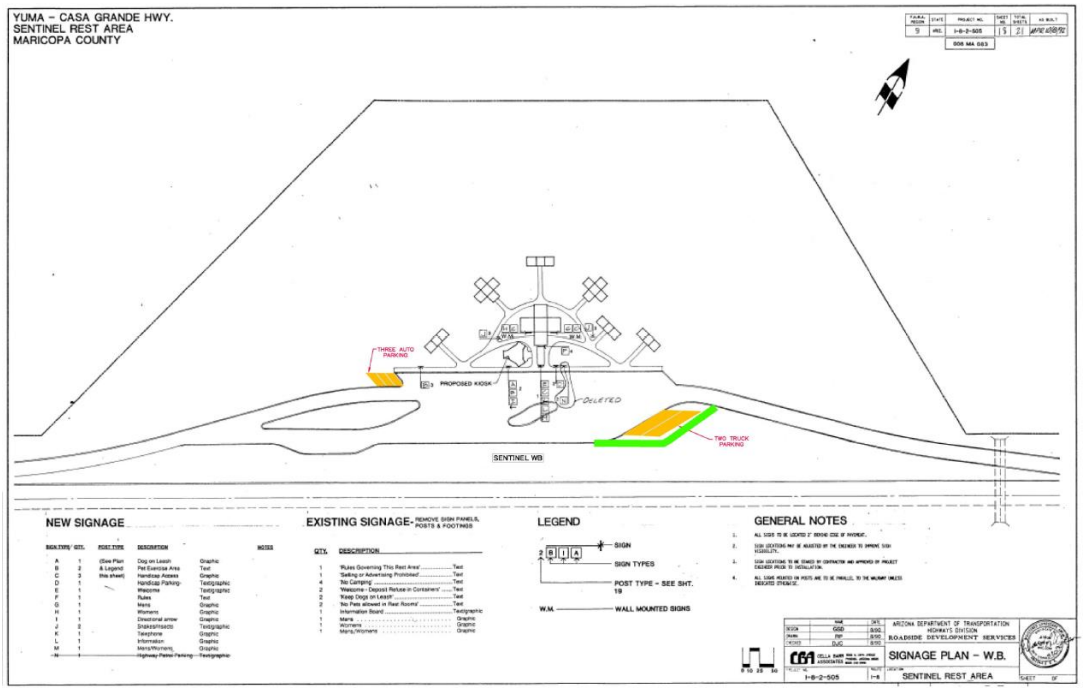
Appendix A

4.5.1 Sentinel Rest Area

Eastbound

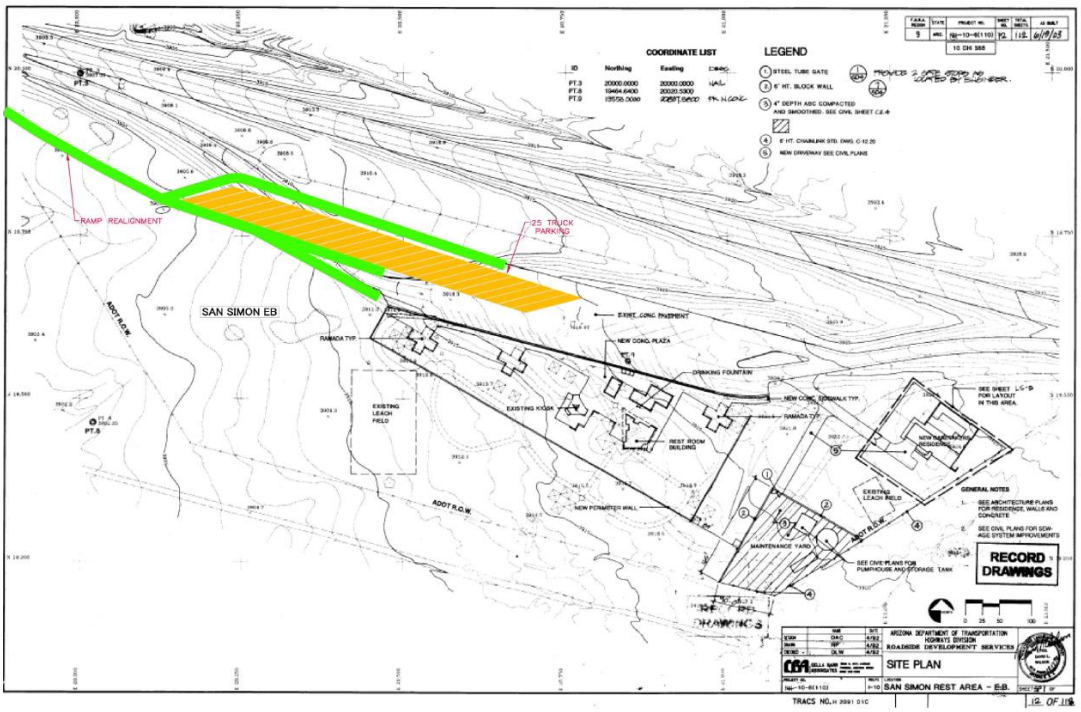


Westbound



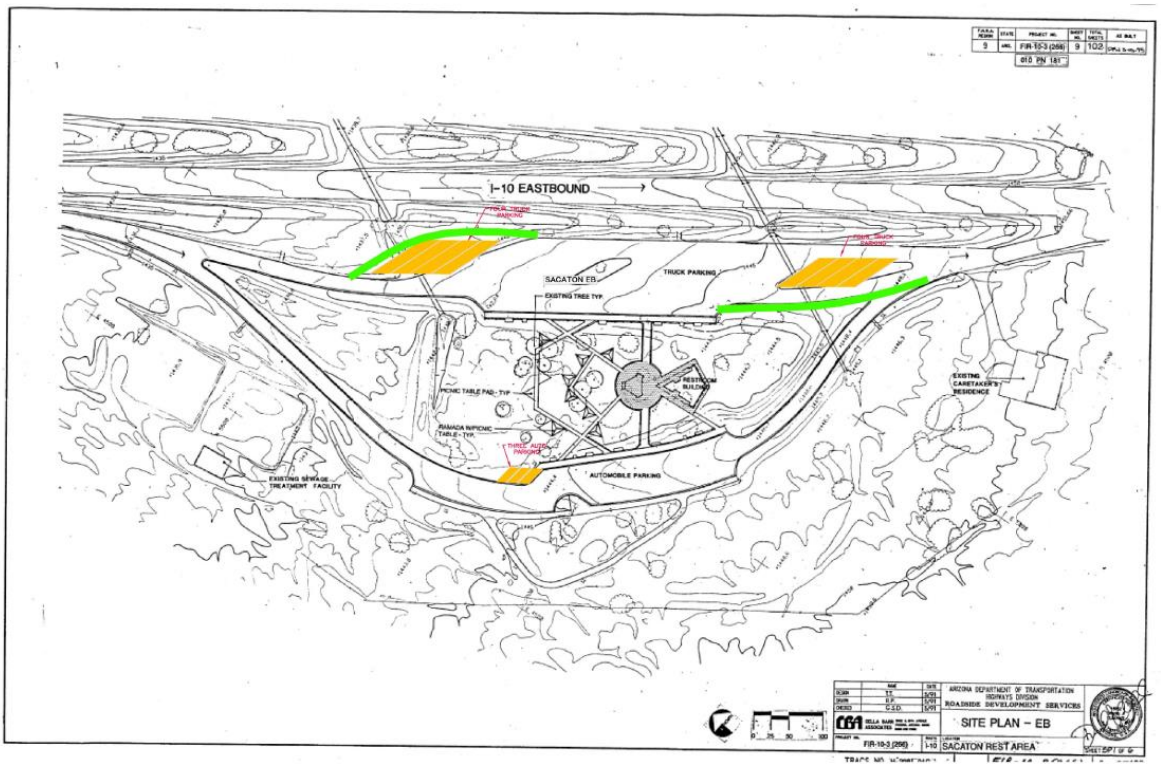
4.5.2 San Simon Rest Area

Eastbound



4.5.3 Sacaton Rest Area

Eastbound



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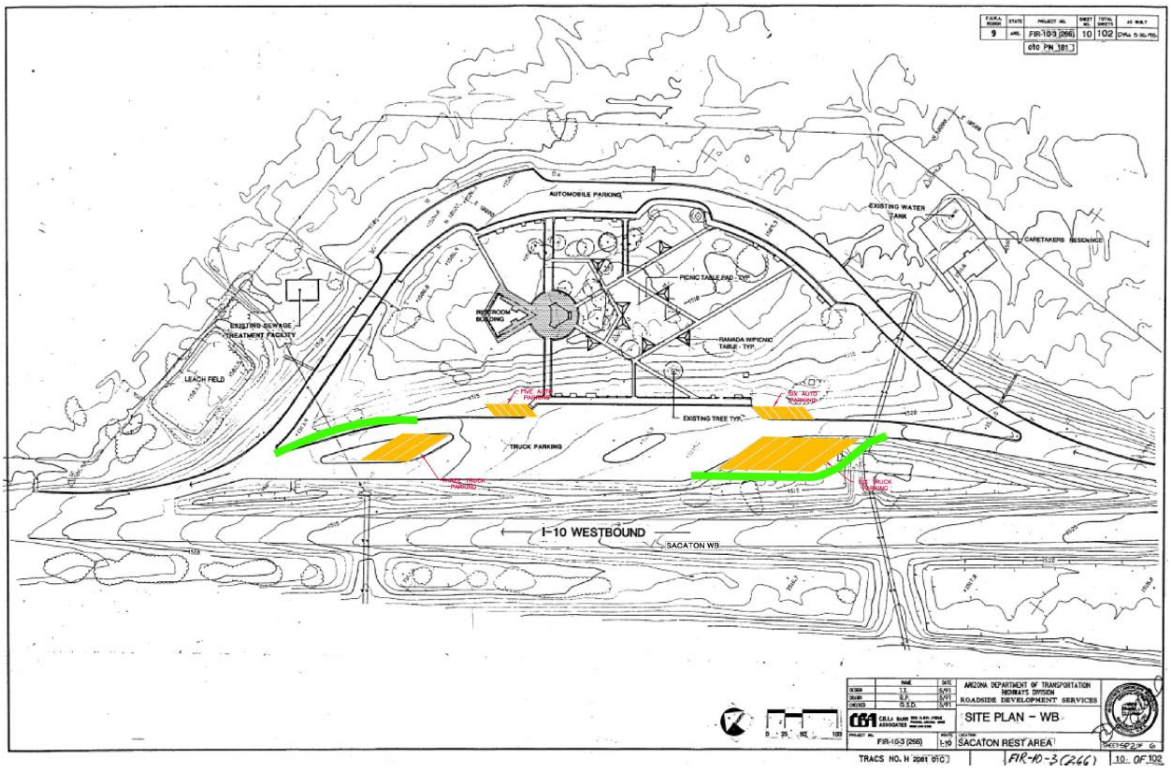
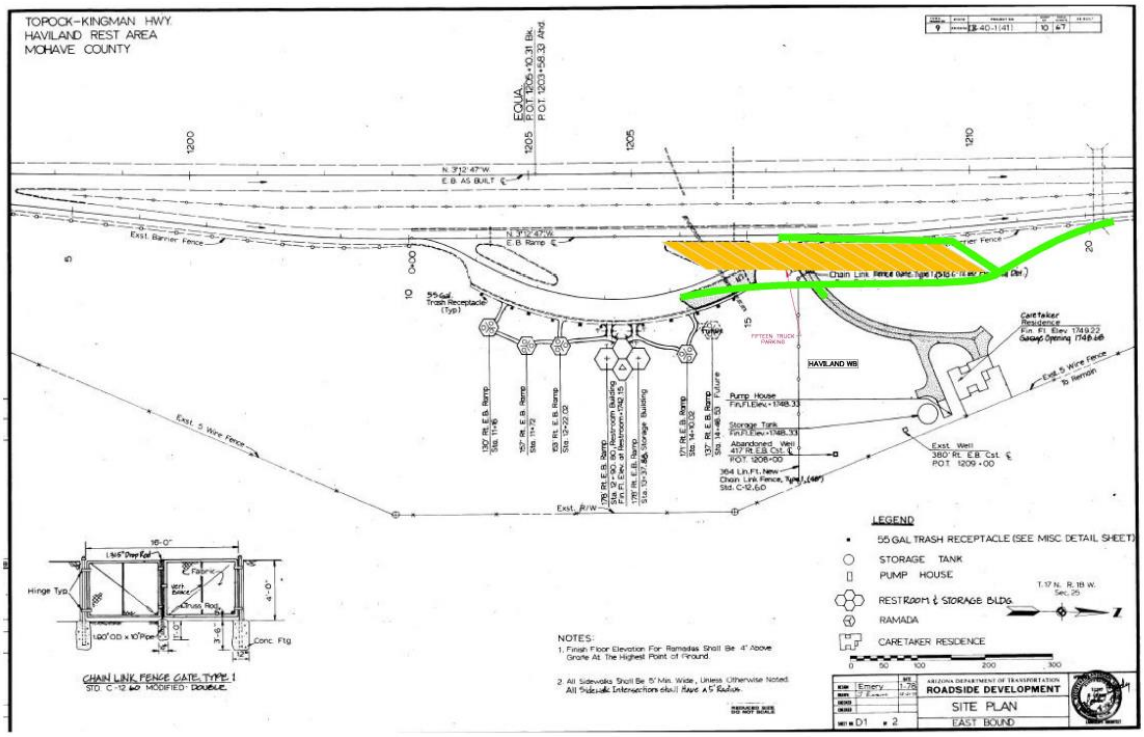
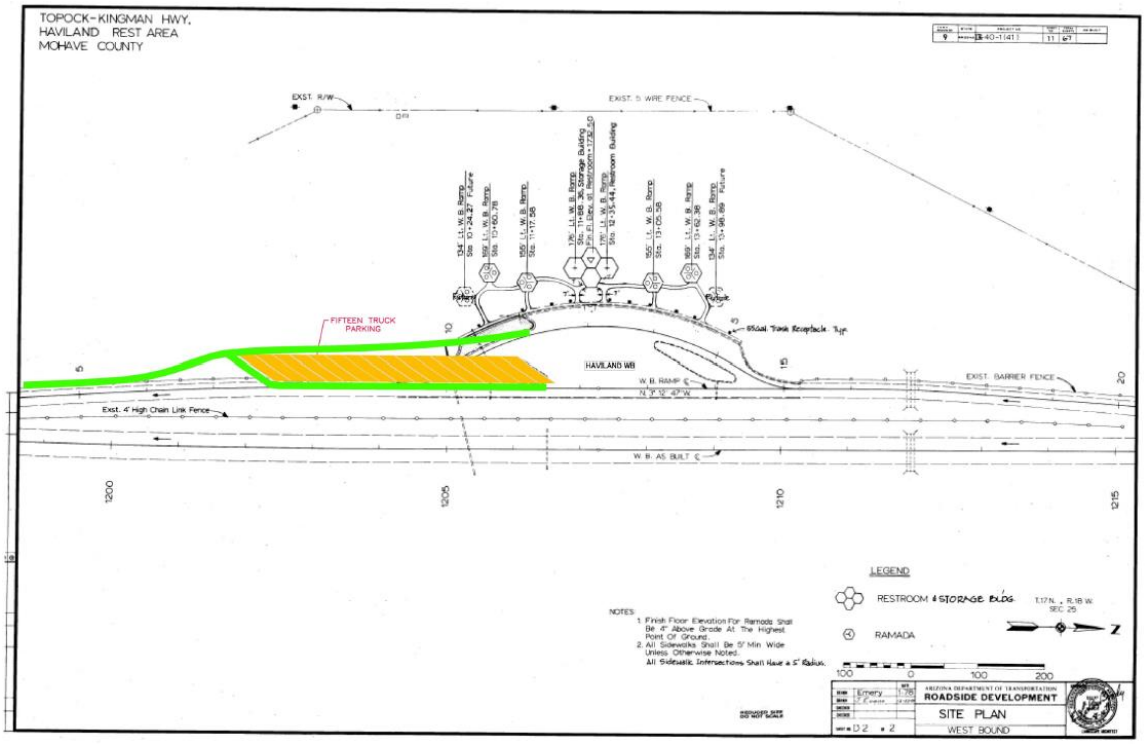


4.5.4 Haviland Rest Area

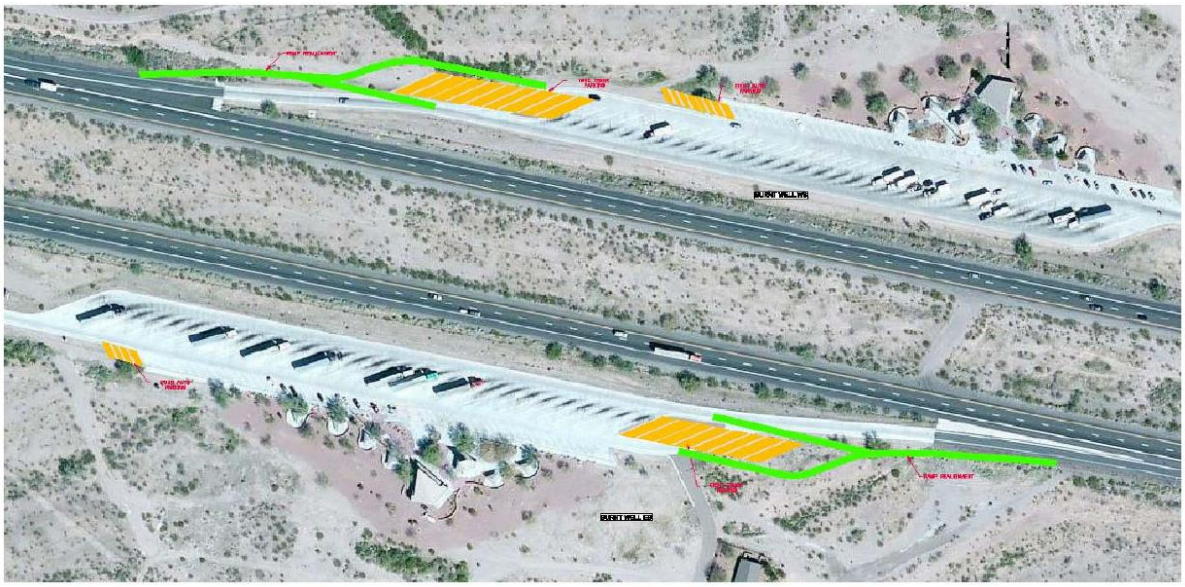
Eastbound



Westbound

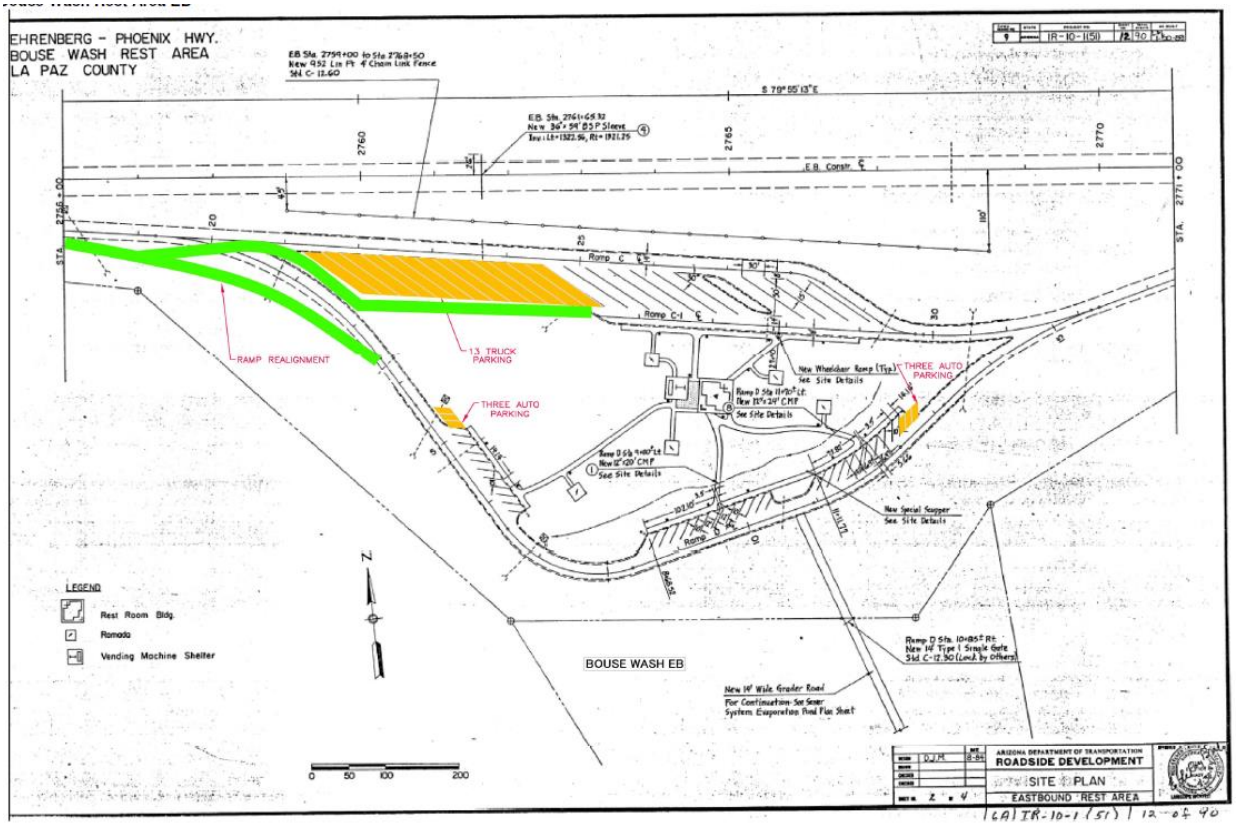


4.5.5 Burnt Well Rest Area

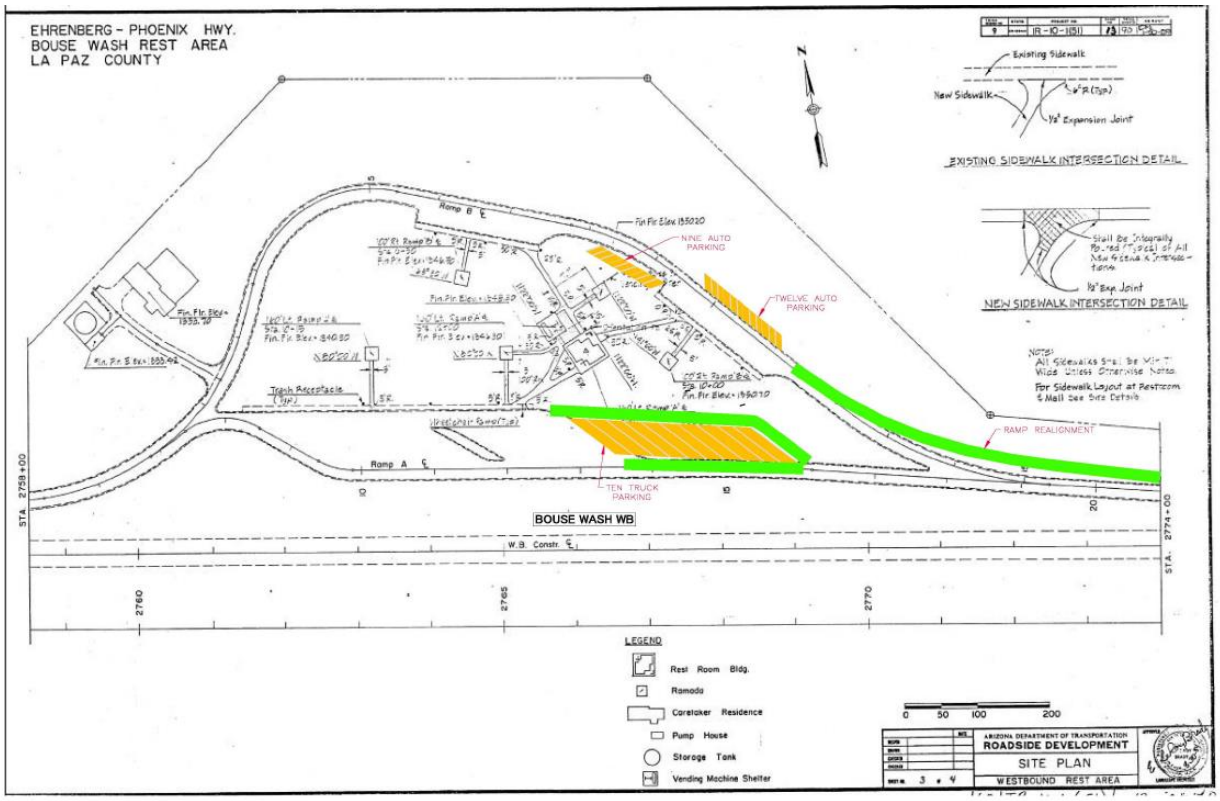


4.5.6 Bouse Wash Rest Area

Eastbound



Westbound


EHRENBERG - PHOENIX HWY.
BOUSE WASH REST AREA
LA PAZ COUNTY
EXISTING SIDEWALK INTERSECTION DETAIL
NEW SIDEWALK INTERSECTION DETAIL
NINE AUTO PARKING
TWELVE AUTO PARKING
RAMP REALIGNMENT
TEN TRUCK PARKING
BOUSE WASH WB
LEGEND
Rest Room Bldg.
Ramada
Caretaker Residence
Pump House
Storage Tank
Vending Machine Shelter
ROADSIDE DEVELOPMENT
SITE PLAN
WESTBOUND REST AREA

4.5.7 Texas Canyon Rest Area

Eastbound

4.5.8 Canoa Ranch Rest Area

Southbound

Northbound

4.5.9 Meteor Crater Rest Area

Eastbound

Appendix B

PART I

GENERAL INFORMATION

I-1 Purpose

The purpose of this Request for Information ("RFI") is to create an opportunity for entities (hereinafter "responding entities") to provide feedback, information and materials for the deliberative decision-making of the Pennsylvania Department of Transportation ("PennDOT") to consider the development of truck parking, collectively, to serve commercial freight transportation needs. PennDOT is looking to gather feedback and information related to development, design, construction, implementation, maintenance, operation and commercialization of truck parking facilities and facilities which directly impact the flow of information to those directly impacted by truck parking. This RFI is intended solely to obtain such information to assist PennDOT on an administrative level in the evaluation of delivery and procurement options and the further development of a financial plan for potential P3 procurement development.

I-2 Issuing Office

PennDOT's Private Public Partnerships Office has issued this RFI on behalf of the Commonwealth. The sole point of contact in the Commonwealth for the RFI shall be the Issuing Officer, Kathryn Tartaglia, PennDOT, Private Public Partnerships Office, Commonwealth Keystone Building, 400 North Street, 5th Floor, Harrisburg, PA 17120, RA-pdP3ForPA@pa.gov. Please refer all inquiries to the Issuing Officer.

Electronic version of the written response (in a searchable format) may be sent via email to RA-pdP3ForPA@pa.gov. Five (5) paper copies and one electronic copy of the responses must be submitted on or before December 12, 2018. Responses should include the name and address of the respondent and the phrase "P3 Office Request for Information – P3 Commercial Truck Parking" clearly indicated in the subject line of the email accompanying the electronic copy of the response and /or on the outside of a sealed envelope containing the five (5) paper copies and one electronic copy of the written response.

Note:

Responding Entities are solely responsible for ensuring that PennDOT's Issuing Office receives RFI by the specified delivery date and time. PennDOT shall not be responsible for any delays in delivery beyond the control of PennDOT, including those caused by weather; difficulties experienced by couriers or delivery services; misrouting of packages by courier of delivery services; or improper, incorrect, or incomplete addressing of deliveries and other occurrences.

Due to increased security requirements in the Commonwealth's mail processing operation, all incoming mail to the Keystone Building is routed, scanned, and sorted at an off-site

location prior to delivery. This includes overnight deliveries. Be aware when submitting response documents via overnight delivery services that there is no guarantee that response documents will be received in the Issuing Office when required. The Issuing Office reserves the right to reject or accept late submissions to this RFI. Receipts for all hand-delivered packages must be obtained and signed by the Issuing Officer or their designee to verify date and time of delivery.

If the Issuing Office is closed on the RFI Due Date because of inclement weather, natural disaster, or any other cause, the submission deadline will be automatically extended until 1:00 p.m. Eastern Time the next Commonwealth business day on which the Issuing Office is open unless the Issuing Office notifies the public otherwise. If the Issuing Office is not available, the responding entity should obtain a signed receipt showing date and time of delivery from the 5th floor receptionist. The hour of submission of responses shall remain the same.

I-3 Response Instructions

Responding entities are asked to complete and submit ***Attachment A, Response Template.*** Responding entities may submit additional information that they determine to be relevant.

This RFI is for information purposes only; it does not initiate a formal procurement process or present a commitment to issue a Request for Qualifications (RFQ), a Request for Proposals (RFP), or any solicitation. Responding to this RFI is not a prerequisite to future participation in the procurement process and those who respond (or do not respond) will be treated impartially in any subsequent procurement process related to the Project. The Commonwealth will not pay for the preparation of any response or information submitted to the Commonwealth or for the Commonwealth's use of such information. The Commonwealth may, in its sole discretion, use information provided in response to the RFI. It is not, however, obligated to use any information so received.

To the extent that information to be provided in response to this RFI may be considered as divulging a responding entity's intellectual property including copyrights and trade secrets or confidential proprietary information ("CPI"), the following shall apply:

A. Confidential Information. CPI or trade secrets are not necessarily required to be submitted to PennDOT.

B. Commonwealth Use. All material submitted with the response to this RFI shall be considered the property of the Commonwealth of Pennsylvania and may be returned only at the Issuing Office's option. The Commonwealth, including PennDOT, shall have the right to use any or all ideas not protected by intellectual property rights that are presented in any submission in response to this RFI, regardless of whether or not the relevant

responder participates in an RFQ and/or RFP process in the future, if applicable, and regardless of whether the relevant ideas become part of or are incorporated in the Project. Notwithstanding any copyright designations contained in a submission in response to this RFI, the Commonwealth shall have the non-exclusive right to reproduce and to distribute responses internally and to comply with public record or other disclosure requirements under the provisions of any Commonwealth or United States statute or regulation, or rule or order of any court of competent jurisdiction.

C. Public Disclosure. This RFI is the first step in PennDOT's determination of whether to continue the Project through a P3 procurement and selection process. All materials submitted by respondents under this RFI will be subject to: (i) Pennsylvania's P3 Law; (ii) Pennsylvania Right-to-Know Law (*see* 65 P.S. § 67.101 et seq. ("RTKL")); and (iii) and any other laws and regulations applicable to the disclosure of documents submitted under this RFI. If a submission contains CPI, information protected by intellectual property rights or trade secrets, the respondent shall submit a signed written statement to this effect with the submission in accordance with 65 P.S. § 67.707(b) in order to support a claim for exempt information under 65 P.S. § 67.708(b)(11) from public records requests under the RTKL. ***Attachment B – CPI and Trade Secret Form***, is attached hereto and should be utilized for any designations.

In addition to the interplay between Sections 707(b) and 708(b)(11) of the RTKL, records protected by a privilege, federal or state law or regulations or judicial order or decree are exempt from the presumption that a record in PennDOT's possession is a "public record." 65 P.S. §§ 67.305 and 67.102. Furthermore, conflicting federal or state law, *e.g.* the Pennsylvania Uniform Trade Secret Act set forth at 12 Pa. C.S. §§ 5301 through 5308, is preeminent to the RTKL. 65 P.S. § 67.3101.1.

Each person submitting information in response to this RFI should familiarize itself with the provisions of the P3 Law and the RTKL and should make its own determination as to whether any of the information submitted in response to the RFI will be subject to public disclosure at some point during or after the process. In no event shall PennDOT or any of its representatives, consultants, or employees be liable to a responding entity for the disclosure of any materials or information submitted in response to this RFI.

I-4 Background

Pennsylvania, geographically, is centered between the large consumer markets of Boston, New York City, Philadelphia, Baltimore and Washington D.C. Continued population growth in these cities and nationwide yields an increase in demand for goods and materials. Traditional retail and e-commerce stressed by demand are obligated by the consumer market to supply businesses with product to stock their shelves or deliver purchases directly

to the customer within a very short window of time. The transportation infrastructure available in Pennsylvania further reinforces the Keystone State and its role in supply chain logistics to reach these destinations inside five to seven hours. The result is an upsurge in freight warehouses positioned along various points of the delivery corridors, an increase in truck traffic throughout the Commonwealth and, consequentially, a need for truck parking facilities to serve the truck drivers for this industry.

Truck parking in Pennsylvania is lacking in available capacity, poorly located or information about open spaces is unreliable. Shortfalls in parking capacity in heavily-traveled corridors may exceed triple the amount of available parking spaces. As drivers reach their daily Hours of Service limits, the options for a safe area for commercial drivers to rest are limited and those drivers are pressed to park on highway on/off-ramps, the back of empty parking lots, or even along the shoulder of a highway.

To this end, the future does not offer relief. Warehouse development is increasing across the Commonwealth annually which, in turn, is increasing the demand for truck parking at the currently available parking locations. During the early morning hours, trucks overflow already packed rest stops onto highway ramps and shoulders. With no action, this problem will only increase placing the commercial drivers at further risk to park at unsafe locations or continue to drive beyond their daily limits to find reputable parking but placing the truck drivers at risk as well as other vehicles on the roadway.

Federal and state regulations and policies have made it progressively difficult for PennDOT alone to satisfy the capacity demands necessary to meet the needs of the commercial trucking industry. Operation and maintenance costs associated with rest areas coupled with critical infrastructure needs and budget constraints has lowered the priority for truck parking.

To change this narrative, PennDOT is exploring opportunities for public-private partnerships for truck parking facilities delivered at a statewide, district, county and municipalities level, and with more innovative and efficient solutions.

I-5 Meetings

Responding entities shall indicate whether they are willing to participate in a face-to-face meeting with PennDOT to provide additional feedback, information and materials that may assist PennDOT personnel in their decision-making. If a responding entity is willing to participate in a face-to-face meeting, it will be solely responsible for all costs associated with travel and attendance. Meetings will be scheduled as soon as possible following the submission deadline, and as a general guideline, subject to change, within four (4) weeks of that deadline. PennDOT reserves the right to meet with any or all responding entities that indicates that they are willing to participate in a face-to-face meeting.

ATTACHMENT A – RESPONSE TEMPLATE

Number	Topic	Response
1.	What is the private sector's role in solving the truck parking problem, including issues related to public awareness?	
2.	How can the Commonwealth best encourage partnerships within the freight industry to supply truck parking solutions?	
3.	Truck parking technology (mobile applications, roadway signage, reservation systems, etc.) – What are they doing well? How are they underperforming?	
4.	What are the primary elements needed in a successful truck parking area? What is needed to attract truck drivers to privately owned/operated parking facilities?	
5.	How could a truck appointment system or staging areas help reduce short term parking demand?	
6.	Truck parking facilities have substantial costs to build, operate and maintain. Considering the spectrum of services that could be offered, what is the best way to be fair to both facility owners and truck drivers to cover these costs?	
7.	What is the public sector's role (state and local) in solving the truck parking problem?	
8.	How can the Commonwealth best help local governments consider truck parking in their plans and land use regulations?	
9.	Are there truck parking initiatives in surrounding states that could be successful in Pennsylvania? Would the creation of a multistate, connected approach be beneficial to the truck parking solution?	
10.	How could truck-only parking facilities with amenities and security operate along interstates while maintaining compliance with federal and state statutes and regulations?	
11.	What incentives can the Commonwealth offer to facilitate private sector participation in a truck parking P3?	

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