



CALIFORNIA STATEWIDE TRUCK PARKING STUDY

February 2022

Acknowledgments

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Caltrans Project Team

- » Rebecca Light, Contract Manager
- » Alison Nealon, Contract Manager
- » Eric Fredericks, Freight Integration Manager
- » Riley Keller, Freight Planning Branch Chief

Caltrans Staff

- » Danny Arellano, District 8
- » Reyna Baeza-Oregel, District 8
- » Drew Battles, District 2
- » Ihar Blazeovich, Permit Issuance Branch
- » Lori Butler, Design
- » Victor Cardenas, District 10
- » Nieves Castro, Transportation Planning
- » Yu-Jen Chen, District 12
- » Ronnie Escobar, District 8
- » Jamaica Gentry, District 6
- » Matt Hanson, Research, Innovation & System Information
- » Mark Heckman, District 9
- » Irene Hou, District 12
- » Leela Immadisetty, Division of Rail and Mass Transportation
- » Simranjeet Kaur, District 6
- » Corby Kilmer, District 5

- » Alec Kimmel, District 6
- » Yatman Kwan, Sustainable Freight Planning
- » Zeron Jefferson, Division of Rail and Mass Transportation
- » Brendan Latimer, District 12
- » Edward Lincoln, District 3
- » Jose Marquez-Chavez, District 11
- » Kelly McClendon, District 5
- » Deborah McKee, District 3
- » Jeffrey Morneau, Sustainable Freight Planning
- » Sheridan Nansen, District 5
- » Cameron Oakes, District 4
- » Kalin Pacheco, Data Analytics Services
- » Melina Pereira, District 11
- » Jeff Pietrzak, District 3
- » Jannette Ramirez, Sustainability Program
- » Amarjit Randhawa, Commercial Vehicle Enforcement Facilities
- » Hector Rangel, District 6
- » Suresh Ratnam, District 1
- » Shawn Rizzutto, District 11
- » Michael Robinson, District 10
- » Chris Schmidt, District 11
- » Narayan Selwal, Commercial Vehicle Enforcement Facilities
- » James Shankel, District 7
- » Jennifer Synhorst, Investment Planning
- » Barby Valentine, District 11, and Sustainability Program
- » Rena Vergara, District 8
- » Steven Vo, Data Analytics Services
- » Khanh Vu, Pavement Management
- » James Williamson, Statewide Safety Roadside Rest Area Program

Truck Parking Technical Advisory Committee (TPTAC)

The TPTAC was established in 2017. For the duration of this study, the TPTAC served as the stakeholder technical advisory committee advising on the direction of the Study.

State and Federal Agencies

- » Arizona Department of Transportation
- » California Air Resources Board
- » California Energy Commission
- » California Governor's Office of Business and Economic Development
- » California Highway Patrol
- » California State Transportation Agency
- » California Transportation Commission
- » Federal Highway Administration
- » Nevada Department of Transportation
- » Oregon Department of Transportation
- » United States Environment Protection Agency

Local Government

- » City of Fremont
- » City of Oakland
- » Gateway Cities Council of Governments
- » Oakland Department of Transportation
- » Port of Los Angeles
- » Port of Oakland
- » Port of San Diego
- » San Diego Association of Governments
- » Southern California Association of Governments

Truck Services Advocacy Organizations

- » California Trucking Association
- » Harbor Trucking Association
- » NATSO
- » Women in Trucking

Private Sector

- » AB Trucking
- » ACT Trucking
- » Apex Logistics LLC
- » Dean Taylor Consulting
- » DW Thornburg
- » Envase Technologies
- » ESA
- » Fleenor Brothers
- » Foster Farms
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- » KKW Trucking
- » KLX LLC Transportation
- » Majestic Realty Co.
- » OMSS
- » Rollin' B, LLC
- » SecurSpace
- » SoCal Edison
- » Streetline
- » Tioga Group
- » Velocity Vehicle Group

Consultant Team

- | | |
|---|---|
| <ul style="list-style-type: none"> » Cambridge Systematics » American Transportation Research Institute » Arellano Associates, LLC | <ul style="list-style-type: none"> » Sutra Research » WSP USA, Inc. |
|---|---|

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The Truck Parking Challenge

Why Truck Parking Matters

With the Ports of Long Beach, Los Angeles, and Oakland, California is home to three of the largest ports in the country. Making adequate truck parking is a priority to maintain vital landside connections that facilitate the movement of goods from these high-traffic ports to the rest of the country.






The safe and efficient movement of freight in California depends on adequate and strategically located truck parking. Hours-of-service (HOS) regulations created by the Federal Motor Carrier Safety Administration (FMCSA) require truck operators to stop and rest at defined intervals. However, parking shortages can lead truck operators to stop at an unsafe location or stop before they are required, cutting into the driver's wages.

77% of California communities
DEPEND EXCLUSIVELY
on **TRUCKS** to move their goods.¹
There are
717,840
TRUCKING JOBS
in California, which means that
TRUCKING JOBS make up
1 in 21 JOBS in the State.

Why Drivers Need to Park

Drivers must adhere to federal and state HOS regulations that place specific time limits on driving and rest intervals. They are essential workers, as well as our friends and neighbors, who need to take personal breaks for rest and safety. In addition, drivers almost always need to park and wait for delivery windows at shippers and receivers, and sometimes are impacted by unexpected road closures or congestion.

The need for parking can generally be grouped under the categories summarized below.

 <p>10-hour Federally Mandated Rest Break</p> <p>Long-haul drivers are on the road days and sometimes weeks at a time traveling across the country. They need safe places to rest for their federally mandated 10-hour breaks.</p>	 <p>30-minute Federally Mandated Break</p> <p>As part of the federally mandated 30-minute breaks, the driver must be off-duty, meaning that they are relieved of all responsibilities and will not have to move the truck for any reason.</p>	 <p>Time off (Federally Mandated)</p> <p>Independent drivers don't have a company facility to provide parking during time off. They are done with their work week and need a place to park their truck while off-duty.</p>	 <p>2+ Hour Staging</p> <p>Truck drivers picking up and delivering freight at manufacturing plants, warehouses and distributions centers, border crossings, and seaports/airport "drayage" need a place to park to await the window of time to pick up, deliver, or cross the border.</p>	 <p>Emergency Road Closures</p> <p>Drivers may be impacted by an incident that has either closed or severely congested the roadway, and they need a place to park.</p>
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Federally Mandated Breaks

Driver Fatigue



Truck driving can often lead to driver fatigue, leading drivers to seek the nearest available parking. According to a FMCSA study, **driver fatigue contributes to 13 percent of large truck involved crashes.¹**

Federal Hours of Service Requirements



Drivers legally cannot exceed certain drive times per day to avoid becoming overworked and fatigued. These breaks include 30-minute and 10-hour breaks daily, and a weekly 36-hour reset (time off). Electronic Logging

Devices synchronize with a vehicle engine to automatically record driving time. **The driver's HOS are now recorded exactly to the minute/second, so as they approach a break/rest requirement, they are legally required to park at the nearest feasible location or risk being fined.**

¹ <https://www.fmcsa.dot.gov/safety/research-and-analysis/large-truck-crash-causation-study-analysis-brief>.

Need a Place to Wait (2+ Hour Staging)

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

Near Shippers and Receivers



Often a truck will arrive to pick-up or deliver a load only to be turned away from the facility for a short period of time because the facility is not prepared for the truck (e.g., all the loading docks are occupied). Many shippers and receivers have short delivery windows, creating a need for the driver to remain nearby in order to respond immediately when the facility is ready. In the absence of designated parking facilities or parking availability the driver may have no other option but to park in an undesignated area. A 2014 FMCSA study and 2015 study conducted by JB Hunt showed **an average lost time of one to two hours per pick-up and delivery.**²

Congestion



Drivers often arrive at a facility the evening before a morning appointment and take their mandated 10-hour rest break as close to their customer as possible to avoid the delays and uncertainty associated with morning congestion.

Near International Border Crossings



International border crossing processing requirements (inspections, document checks, etc.) cause bottlenecks for vehicular traffic, and wait times can vary drastically. **Trucks will often compensate for longer travel times by crossing at irregular hours and coordinating a rest period in the receiving country, thereby generating parking demand near international border crossings.**

Near Seaports



Freight activity at seaports is one of the largest generators of truck traffic, especially drayage carriers that transport containers to and from the port and local warehousing districts. Larger drayage carriers have company facilities nearby for accommodating their fleet and driver parking needs. However, **smaller drayage carriers and owner-operators may need parking accommodations near the port.**

For Trailer and Container Storage



Trucks carrying **multiple trailers are sometimes required, either legally or logistically, to drop trailers that another driver picks up later.** This situation requires a unique form of parking—secure storage lots for trailers.

Need a Place to Park during Unplanned Events

Road Closures (Mountain Passes)



Road closures are the most obvious unplanned events that generate a need for parking, particularly along mountain passes where an alternate route might not be available.

The demand for parking on heavily trafficked roads can be large and occur all at once at the location nearest to the road closure.

² <https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/mission/advisory-committees/mcsac/81096/mcsac-detention-times.pdf>.

Consequences of Lack of Parking

As freight activity and the vehicles that move goods and services have become an increasing part of our daily lives, the associated truck parking has moved closer to residential communities. In response to citizen complaints about noise and traffic, some municipalities have banned truck parking altogether, often creating more truck traffic, not less, as truck drivers circle looking for parking, thus reducing the competitiveness and failing to meet time-definite delivery needs of many businesses. There is little argument that freight intensive land uses generate truck activity, but through appropriate planning and policy such as proactive land use best practices, most community concerns can be mitigated. Inadequate truck parking impacts the truck drivers and the communities they serve, as summarized below.

Safety

From 2014–2018, there were a total of **1,626 crashes in California involving a parked truck**, 131 of which involved at least one fatality. This is not accounting for the crashes that may relate to driver fatigue or distraction as they search for parking.

Time and Money

On average, **truck drivers lose 9,300 revenue-earning miles a year, or \$4,600 annually** due to lack of truck parking at the time and location needed.³

Drivers that park in undesignated and unsafe parking areas risk theft of cargo, equipment, and the driver's personal belongings.

Preservation of Roadways

Truck parking shortages lead to **trucks parking on highway shoulders and ramps**, causing safety hazards and **damaging the pavement**.

Tough Decisions

Drivers are often faced with the tough choice of whether to **park in an undesignated location or continue driving to** find safe, legal parking when they are exhausted and/or approaching their HOS regulations. This increases the stress on truck drivers which is a major issue with truck driver retention and contributes to the truck driver shortage.

Air and Noise Pollution

Truck drivers searching for parking leads to **unnecessary fuel consumption** and contributes to **air and noise pollution and greenhouse gas (GHG) emissions**. These effects are exacerbated in neighborhoods and cities that experience frequent truck parking in undesignated areas, many of which are equity priority communities (EPCs).

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

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

³ <https://truckingresearch.org/2016/12/13/atri-truck-parking-case-study/>.

Purpose and Overview of the Plan

The *California Statewide Truck Parking Study (CSTPS)* aims to identify and prioritize existing truck parking shortages across the State and propose a range of strategies for providing safe places for truck drivers to park to ensure the safe, efficient movement of goods and reflect local requirements, concerns, and goals.

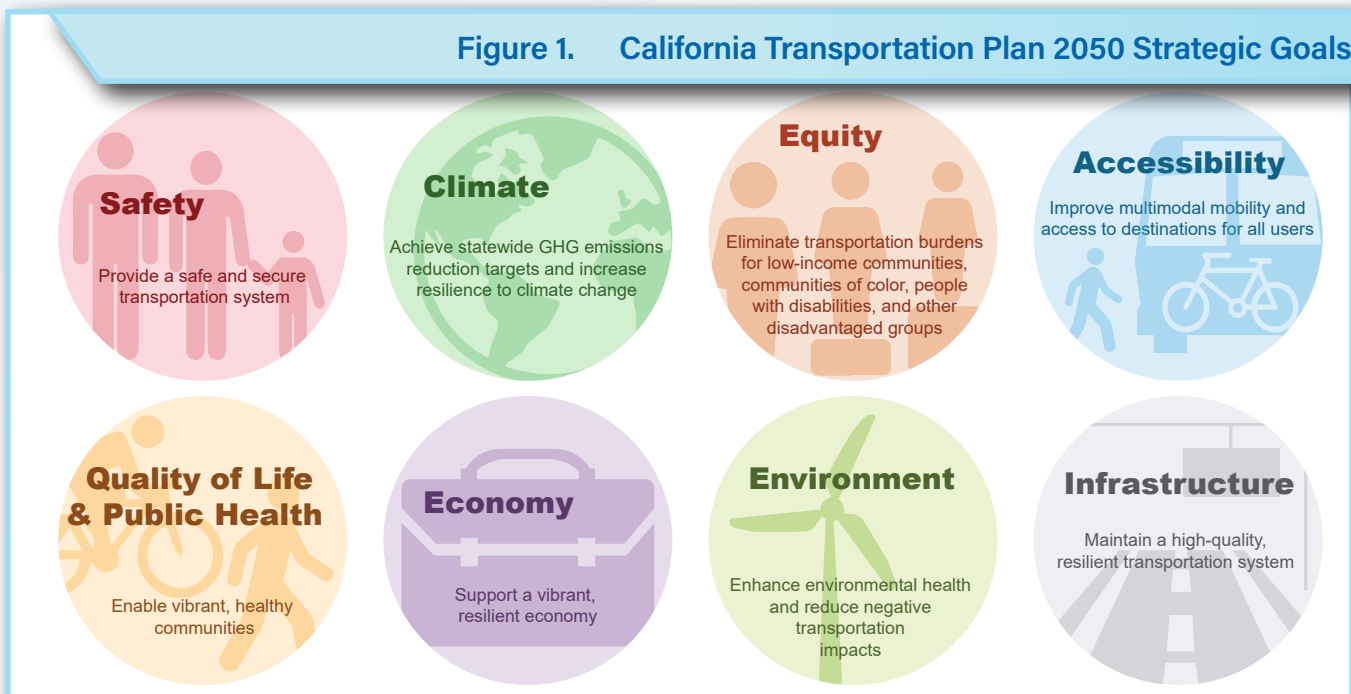
This plan starts by identifying the current truck parking supply in the State. Then, it outlines the truck parking need based on safety, demand, and stakeholder input. Finally, this plan offers strategies that raise awareness for the truck parking challenge while improving safety, increasing freight competitiveness, reducing GHG emissions, and advancing equity.

Data collected during this study indicate that EPCs have a disproportionate share of undesigned truck parking—parking that occurs outside of truck stops, rest areas, and other designated parking facilities. The CSTPS engagement process included equity focus group meetings to gather input on how undesigned truck parking affects EPCs and to explore solutions that are consistent with each community's needs and goals.

Statewide Context

The *California Transportation Plan (CTP) 2050* is the State's long-range transportation plan that establishes an aspirational vision that articulates strategic goals, policies, and recommendations to improve multimodal mobility and accessibility while reducing GHG emissions. As the State's transportation policy guide, the goals and priorities established in the CTP 2050 should align with the CSTPS goals. The CTP 2050 presents eight goals for the State, six of which are supported by the CSTPS strategies put forward in this plan (Figure 1). Additionally, the CSTPS proposes 14 cross-cutting recommendations, which together address each of the goals identified in the CTP 2050 vision.

Figure 1. California Transportation Plan 2050 Strategic Goals



Implementation of the recommended CSTPS strategies and actions would support the following CTP goals by:



Safety

Reducing the number of crashes involving parked trucks.



Quality of Life & Public Health

Providing additional safe and healthy places for truck drivers to park, to reduce undesigned truck parking everywhere and supporting vibrant, healthy communities.



Climate

Reducing GHG emissions generated from trucks searching for a place to park and providing additional electric vehicle (EV) truck charging facilities.



Economy

Improving and expanding an important but often forgotten piece of infrastructure (truck parking facilities) in the goods movement system.



Equity

Reducing the number of undesigned parked trucks in low-income communities, communities of color, and other disadvantaged groups.



Infrastructure

Reducing the number of improvements needed to repair pavement damaged by undesigned truck parking.

Public and Agency Engagement

The CSTPS used a variety of outreach techniques and tools to ensure that key freight stakeholders knew of the plan and had the opportunity to provide input. This section identifies the outreach techniques and tools that the project team utilized to reach out to stakeholders and solicit their feedback.

CSTPS Engagement Activities



1. Truck Parking Technical Advisory Committee (TPTAC):

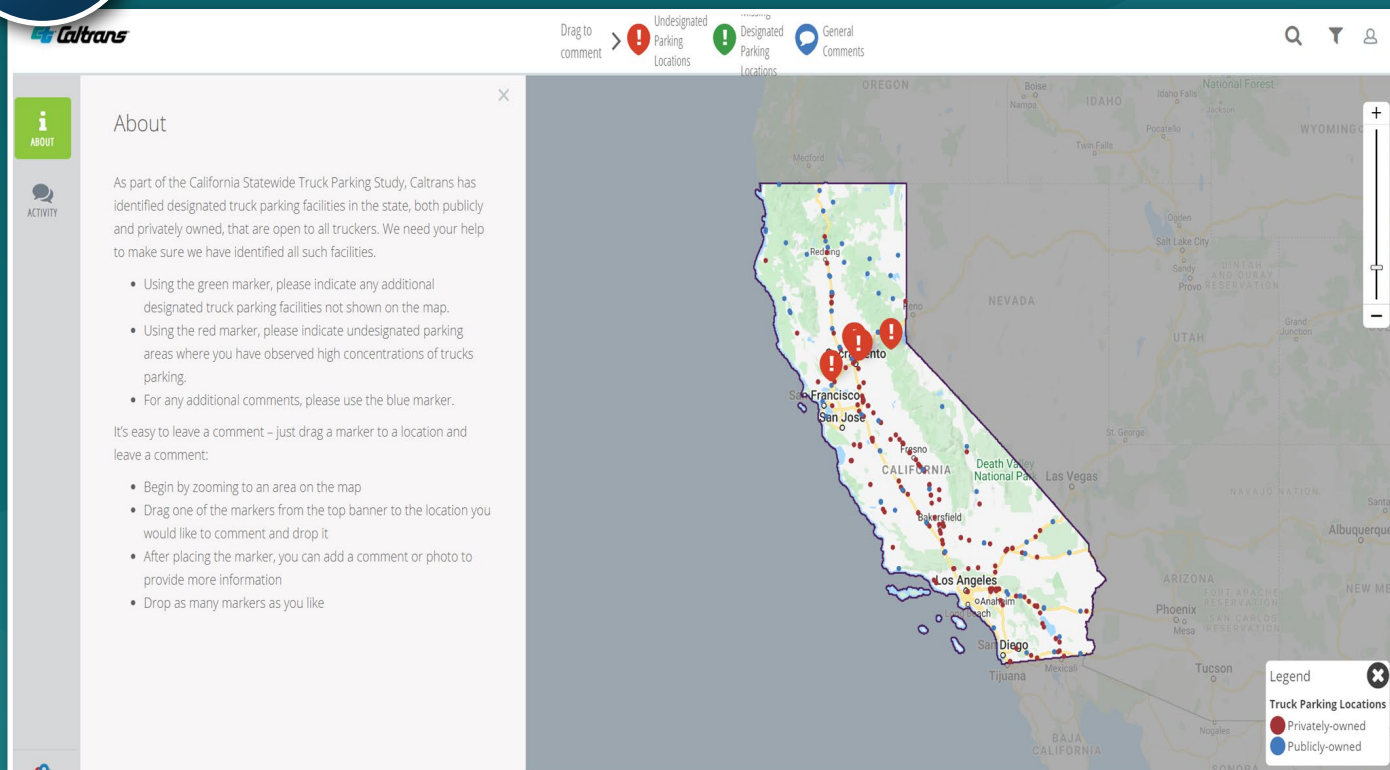
Several years ago, Caltrans formed the Truck Parking TAC comprised of representatives from select public agencies and private industry to help Caltrans address the

challenges associated with truck parking. The TPTAC met approximately every other month during development of the CSTPS to provide the study team with guidance, feedback on initial findings, data (as needed), and comments on draft reports and recommendations. Due to the COVID-19 pandemic, the TPTAC meetings were held virtually. Topics are shown below.





2. Map-based survey: The project team fielded an online mapping survey for gathering feedback on undesignated truck parking locations throughout the State.



3. Focus groups and interviews: In addition to TPTAC meetings, the CSTPS held small-scale discussion-type meetings on specific topics that required more extensive research. Focus group topics included:

- » Layout and siting guidelines for publicly owned truck parking facilities.
- » Local regulatory issues.
- » Parking facility considerations for zero emissions fuels at publicly owned facilities.
- » Truck parking needs and patterns of the agriculture and drayage industries.
- » Equitable distribution of benefits and burdens.

GOALS GUIDING THE CSTPS OUTREACH EFFORTS:

1. A transparent, inclusive, and inviting stakeholder engagement effort for gathering valuable input to the Plan.
2. Support from Caltrans Executives, other public agencies, Caltrans District offices, and other partner agencies/entities for plan recommendations and implementation.



Where is California's Truck Parking Supply?

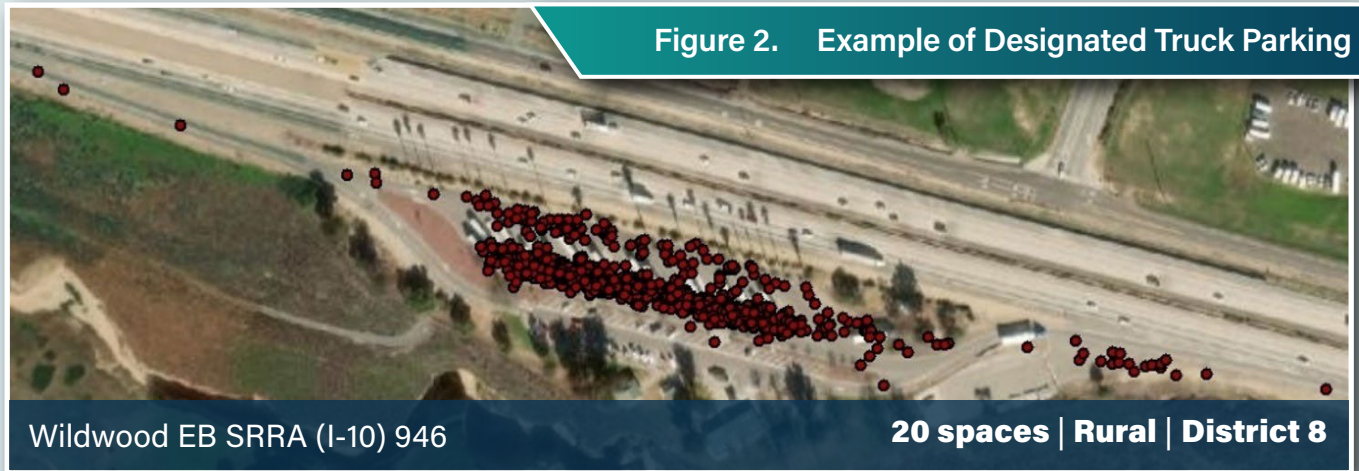
The analysis corridors for this study, for which truck GPS data were collected, are the primary corridors traveled by trucks, nevertheless they represent a small portion of all roadways in the State. Stakeholder input and anecdotal evidence indicates that a large amount of undesignated parking occurs on many other roadways, private land, vacant lots, or other non-roadway locations but that was not quantified as part of this study.

The
**CSTPS ANALYSIS
CORRIDORS**
are a
CUSTOM NETWORK
of **CORRIDORS MOST RELEVANT**
to **COMMERCIAL FREIGHT** in California,
including the
National Highway System within California,
as well as other designated freight networks
and stakeholder identified segments.

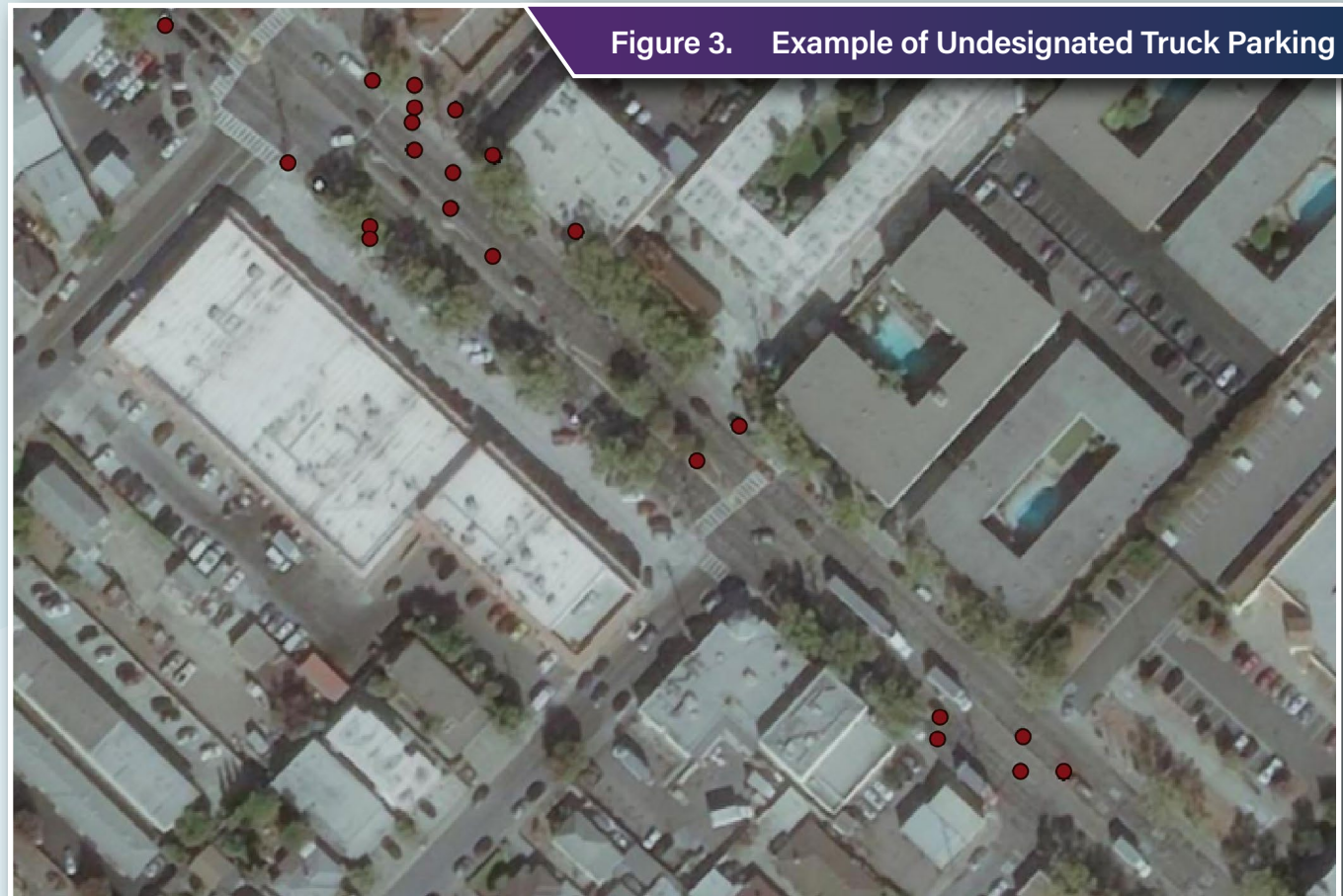
See Figure 8–Figure 12

Two types of truck parking are discussed in this report: **designated** and **undesigned**.

Designated truck parking locations are parking lots where truckers are allowed and encouraged to park, such as truck stops and Safety Roadside Rest Areas (SRRAs).



Undesignated truck parking occurs when a driver parks outside of a dedicated truck parking facility, quantified for the purposes of this study as truck parking within a quarter mile of the analysis corridors right-of-way (ROW).





The total number of spaces comprises the total truck parking capacity in the State. The State has a wide array of truck parking locations including 85 SRRAs owned by the State, and almost 200 commercially owned facilities.

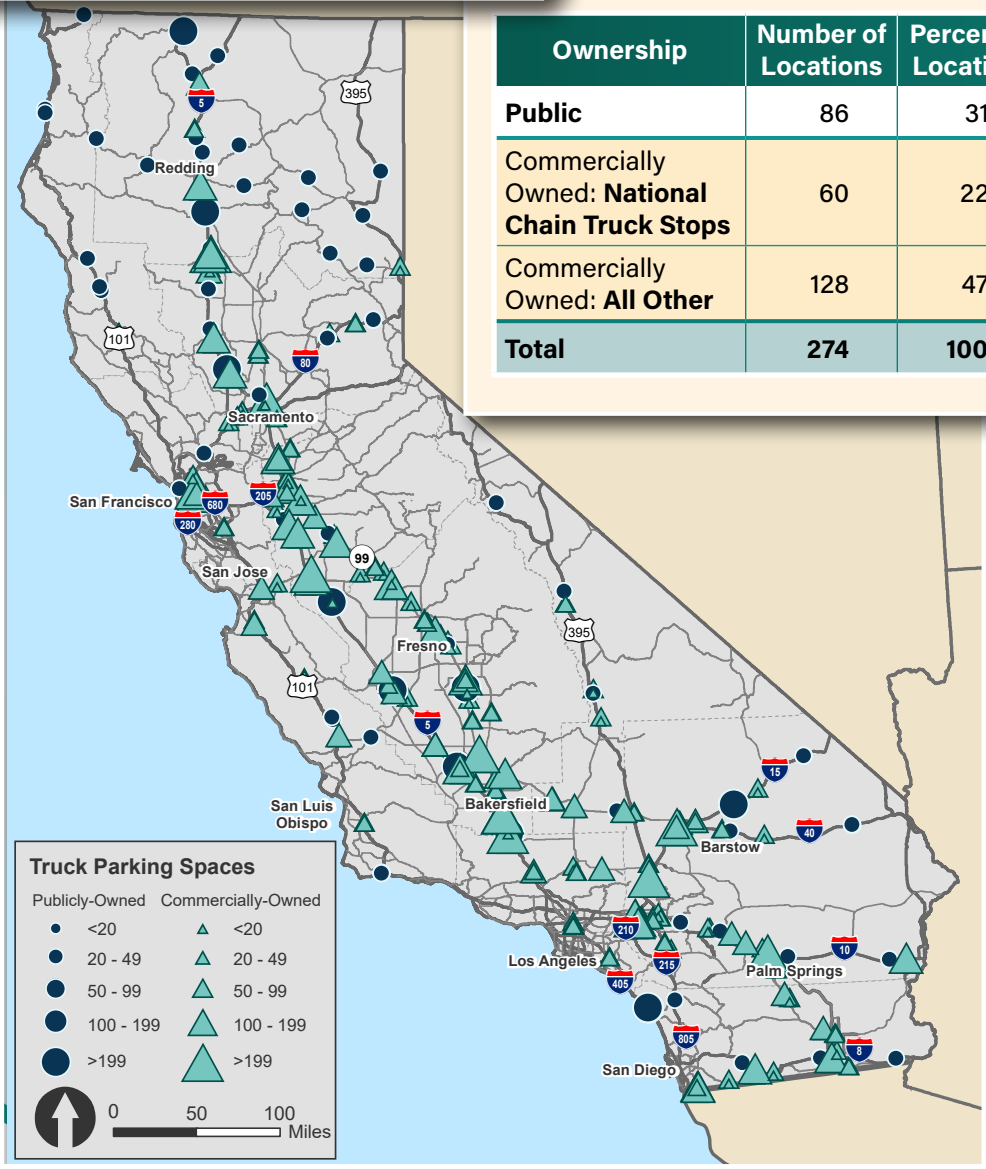
About two-thirds of truck parking sites, and 92 percent of the truck parking spaces, are commercially owned.

The State owned and maintained SRRAs facilities account for eight percent of truck parking spaces in California. These locations allow drivers to rest, use the restroom, get water, or sleep. Truck drivers in California have access to 86 public parking facilities: 85 SRRAs and one public park and ride facility. These locations are visualized in Figure 4 with circles and symbolized with the number of spaces at each site. The 188 commercially owned facilities are symbolized with triangles. These privately owned locations include large truck parking facilities, fueling stations, and small, privately owned lots.

Figure 4. California Truck Parking Locations

Table 1. Supply by Ownership

Ownership	Number of Locations	Percent of Locations	Number of Spaces	Percent of Spaces
Public	86	31%	1,209	8%
Commercially Owned: National Chain Truck Stops	60	22%	8,496	57%
Commercially Owned: All Other	128	47%	5,328	35%
Total	274	100%	15,033	100%

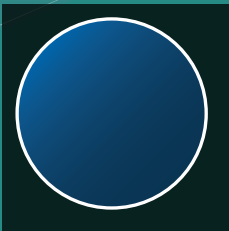


What are California's Truck Parking Needs?

Truck parking needs are identified based on safety, stakeholder, and truck parking demand data, and the intersection of these needs with equity and environmental considerations. The following section details these data and the resulting needs. The full analysis of truck parking demand is documented in **Appendix A: Truck Parking Supply and Demand**.

More detail on truck parking demand can be found in

APPENDIX A:
TRUCK PARKING SUPPLY
AND DEMAND



Crashes are one indicator of truck parking need because without enough truck parking, drivers are likely to park on shoulders, causing safety hazards and crashes.



Stakeholder data is valuable to identify and ground truth about where undesigned parking is occurring.



Proprietary truck GPS data provide information about where trucks are parking and for how long.

Truck Parking Safety

Crashes with parked trucks usually occur when a driver collides with a truck that is stopped for a break. Drivers are mandated to rest at regular intervals and without sufficient parking, drivers often find themselves parking in hazardous locations, such as on the side of roads, highways, or ramps because they have no other options. In the worst cases, these potentially hazardous situations result in a crash that causes a serious injury or fatality.

Over the five-year period **from 2014–2018 there were a total of 1,626 crashes involving a parked truck, 131 of which involved at least one fatality** (Figure 5). Over this timeframe, there has been a steady increase in crashes every year. In 2014 there were 261 crashes involving a parked truck and by 2018, the latest year that data was available for this Study, there were 379 parked truck crashes (Figure 6). Between six and ten percent of crashes involving a parked truck result in a fatality.

Figure 5. Statewide Crashes Involving a Parked Truck, 2014–2018

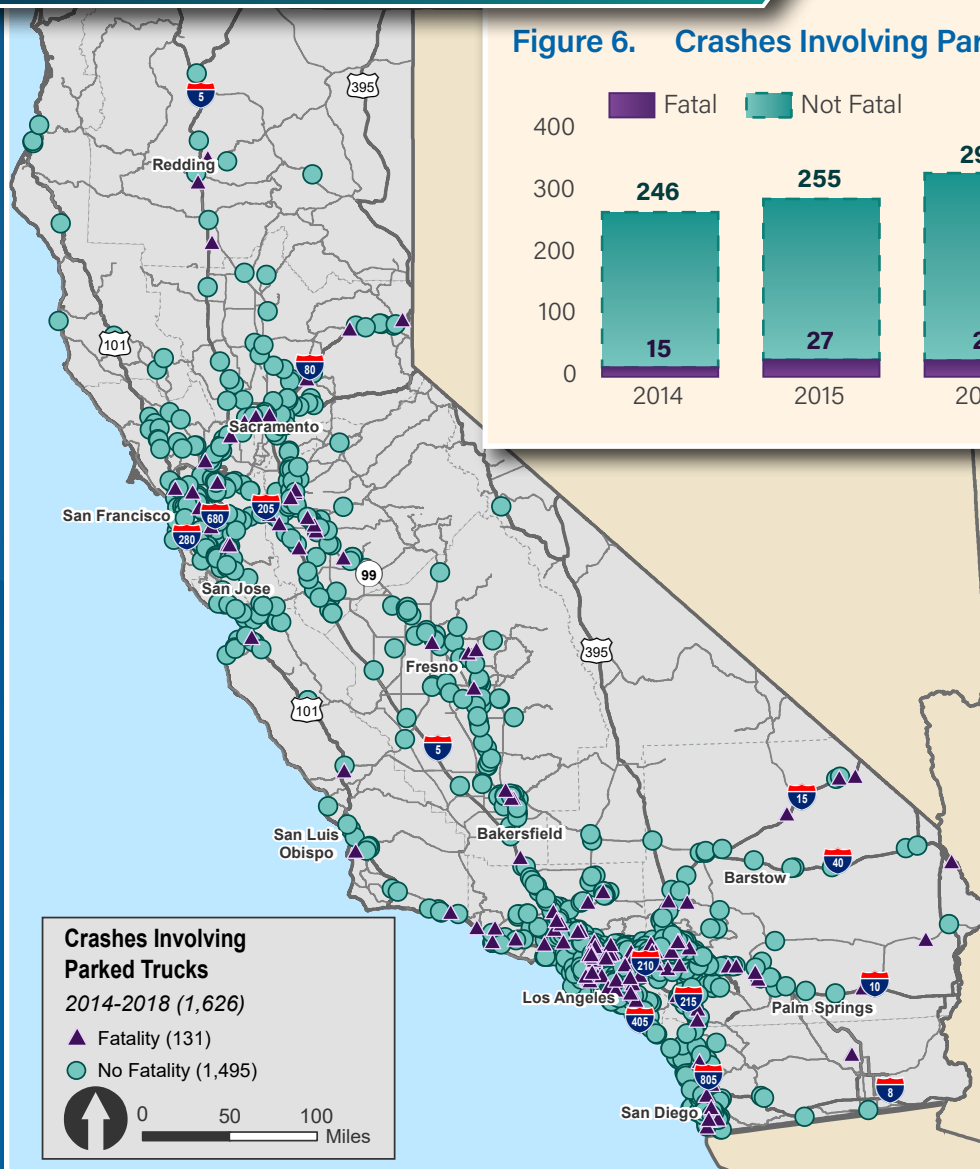
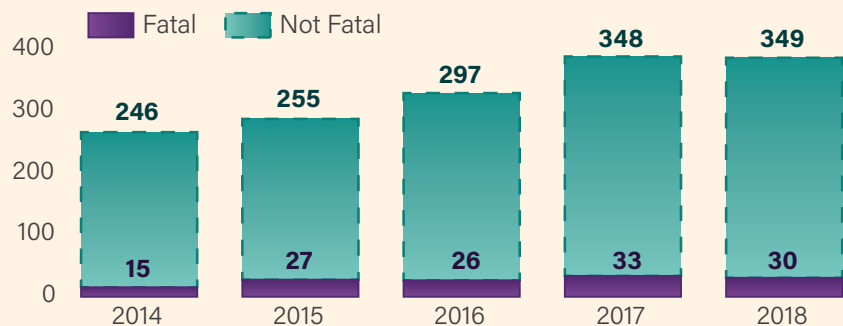


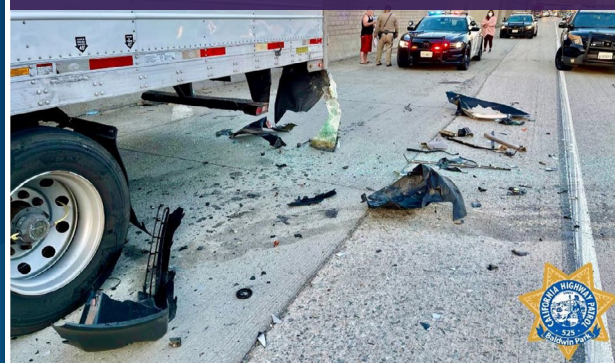
Figure 6. Crashes Involving Parked Trucks



Data from the Transportation Injury Mapping System (2014–2018).

The statewide crash database provides rich information about the primary crash factors and the location and roadway classification of any given crash. **Most crashes involving a parked truck that resulted in at least one fatality were caused by just two primary crash factor violation categories: improper turning and driving under the influence.** Alcohol was involved in 352 crashes; 41 of which resulted in a death. **A majority of crashes occurred in urban areas (1,341).** Crashes involving parked trucks also skewed towards principal arterials and other smaller roadways but **fatalities were more likely to occur on Interstates and U.S. highways.** This is an expected outcome as highways typically have higher speeds, so vehicles involved in the truck crashes were likely traveling at deadlier speeds.

In August 2021 a driver collided into a truck driver parked in the emergency lane on I-10 in Pomona, CA.



Source: CHP Baldwin Park: Accessed on January 2022 from <https://www.facebook.com/CHPBaldwinPark/photos/a.1745393039050105/2977638825825514/?type=3>

Statewide Demand

This Study estimated truck parking demand in California by relying on anonymized truck GPS data from the American Transportation Research Institute (ATRI), collected during a selection of several months in 2019. The data were used to identify where, when and for what duration truckers stopped. Because the ATRI dataset only captures GPS coordinates of approximately 25 percent of trucks on California roadways, the data were expanded to derive estimates of truck parking demand. The data provide detailed information about stop duration, location, travel time, and travel direction before and after making an extended stop, however they underrepresent trucks associated with drayage or with short-haul trips. In some cases, designated sites were not open during the ATRI data collection period or were located under freeways where data capture is not enough to effectively assess demand. If other data were available, demand was estimated using sources such as [Trucker Path](#). **In total, the study estimated 24-hour demand and peak hour demand at 264 of the 274 truck parking locations:**

» **24-Hour Demand.** The average 24-hour demand was derived by taking the total number of trucks parked at a facility, divided by the number of days of data collection, excluding any days that the facility was closed. Reliable closure information was available for the SRRAs but not for commercial locations.

Truck parking demand is typically highest overnight, and facilities often are at or over capacity during these hours. Statewide, **the peak hour for truck parking is from 12:00 a.m. to 1:00 a.m.,** though the peak time varies by location. In some locations, there is a persistent problem throughout the day. Other locations only fill up once drivers stop for a long break, typically overnight.

» **Peak Hour Demand.** Peak hour demand is calculated by first identifying the statewide peak hour when most trucks are stopped at the same time, and then totaling the trucks parking at a given designated location during that time.



Demand at Designated Locations

Of the 264 total sites with demand data, about half are nearing, at, or over capacity (Table 2 and Figure 7).

Most districts have a mix of full and available truck parking sites, and the most utilized sites are in both urban and rural regions. Note that “Has Availability” is defined as anything under 70 percent utilization at the peak hour. If a location falls in the “Has Availability” category, it may be a well-used and active facility at peak hour but not completely full. The majority of the 84 public truck parking sites with capacity data are at or over capacity (56 percent). More detail on each public SRRA is in **Appendix B: Safety Roadside Rest Area**.

More detail on each public SRRA can be found in

APPENDIX B:
SAFETY ROADSIDE REST
AREA PROFILES

Figure 7. Demand at Designated Locations

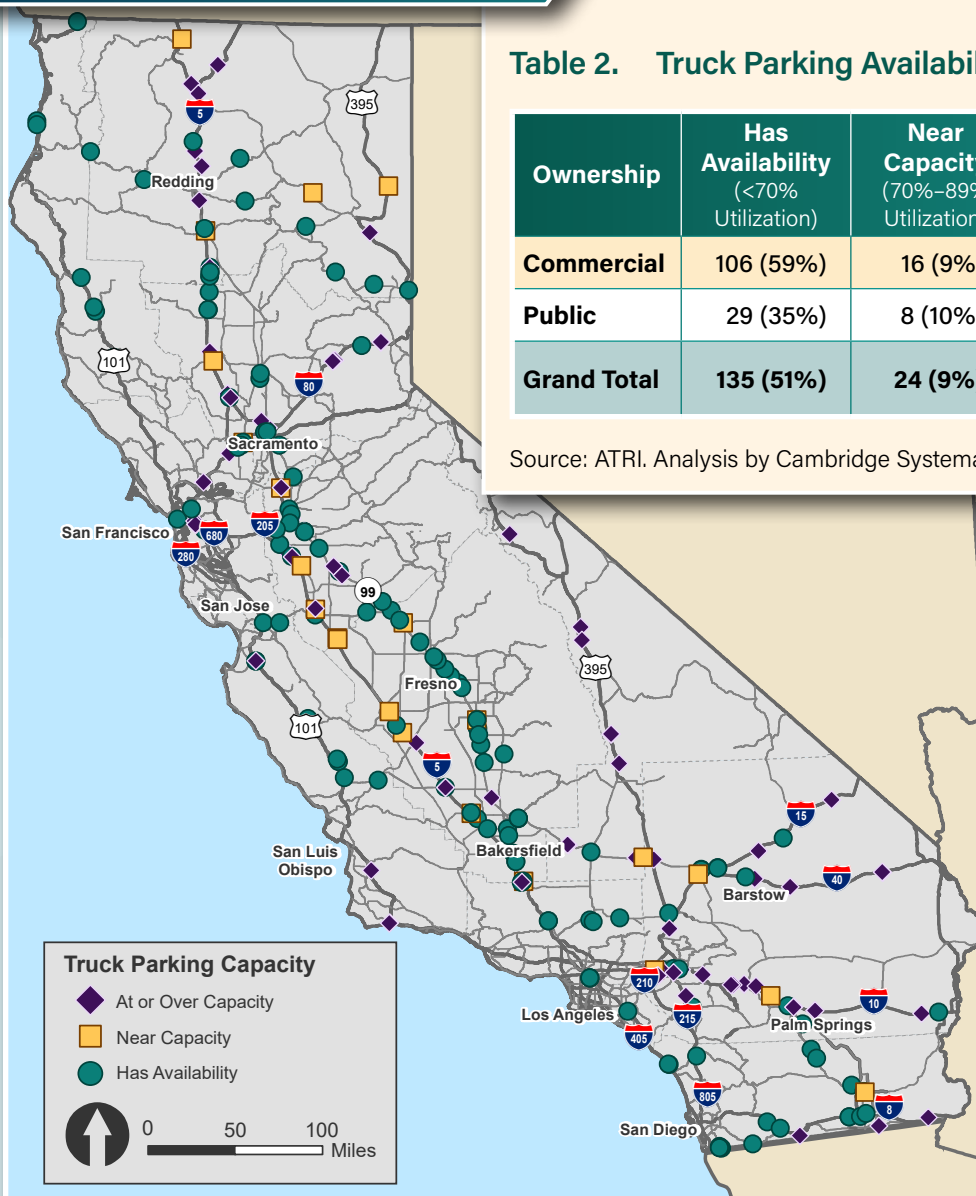


Table 2. Truck Parking Availability at Designated Locations

Ownership	Has Availability (<70% Utilization)	Near Capacity (70%–89% Utilization)	At or Over Capacity (≥90% Utilization)	Total
Commercial	106 (59%)	16 (9%)	58 (32%)	180 (100%)
Public	29 (35%)	8 (10%)	47 (56%)	84 (100%)
Grand Total	135 (51%)	24 (9%)	105 (40%)	264 (100%)

Source: ATRI. Analysis by Cambridge Systematics (2021).

Source: ATRI. Analysis by Cambridge Systematics (2021).

Demand by Ownership

Of the nearly 26,000 trucks parking per day in designated lots in California, 21,000 (81 percent) trucks per day park at the commercially owned sites (Table 3). Public sites make up 31 percent of all sites in the State and 19 percent of the statewide daily demand. During the peak hour (12:00 to 1:00 a.m.) there is 108 percent utilization at public sites and 103 percent at national chain truck stops, indicating that there are not enough spaces for the number of trucks parking at the lots that are most desirable—those with amenities, ease of access, and in key locations.

Table 3. Demand at Designated Locations by Ownership

Ownership	24-Hour Demand	Percent of 24-Hour Demand (12:00 to 1:00 a.m.)	Peak Utilization (Peak Demand/Supply)
Public	4,816	19%	108%
Commercially Owned: National Chain Truck Stops	16,382	64%	103%
Commercially Owned: Other	4,208	17%	42%
Total	25,840	100%	81%

Source: ATRI. Analysis by Cambridge Systematics (2021).

Demand at Undesignated Locations

Undesignated parking, or truck parking outside of a dedicated truck parking facility, introduces safety and security risks for drivers as well as the traveling public. Parking on the CSTPS network corridors, much of which is Caltrans Right of Way, is the focus of this study. Additional undesignated parking occurs on local streets, private land, vacant lots, or other non-roadway locations which is not included in this study.

The largest concentrations of undesignated truck parking occur in Los Angeles and Ventura County (District 7) and the Inland Empire (District 8) where more than 3,000 trucks are stopping at the peak hour. The district with the highest number of trucks stopped on the ROW is District 8 with nearly one-third of all undesignated truck parking in the State. District 7 also has over 1,200 trucks stopping at the peak hour but notably this region has a high concentration of CSTPS analysis corridor miles. Northern California from the Bay Area, through Sacramento and the I-80 corridor to Nevada also have concentrations of undesignated parking.

Table 4. Demand at Undesignated Locations by District

District	Peak Demand (12:00 to 1:00 a.m.)
1 - North Coast	17
2 - Redding	191
3 - Sacramento	635
4 - Bay Area	528
5 - Central Coast	94
6 - Central Valley	488
7 - Los Angeles	1,227
8 - Inland Empire	1,786
9 - Eastern Sierra	55
10 - Stockton	487
11 - San Diego	437
12 - Orange County	156
Total	6,101

Source: ATRI. Analysis by Cambridge Systematics (2021).

Public and Agency Input

In addition to analysis of GPS data, this study also relied on stakeholder input to understand and locate truck parking needs. Stakeholders such as the California Highway Patrol (CHP), regional and local governments, and community-based organizations tend to have on-the-ground knowledge about key problem areas or needs that may not surface in quantitative data. Therefore, stakeholder input is a key complement to the other truck parking need data used in the CSTPS, such as GPS records of where truckers stop.

Stakeholder truck parking need analysis draws on three sources: **the Social Pinpoint Stakeholder survey, 2019 CHP truck parking citations, and an informal 2018 CHP survey of officers.**

CHP Citations and Survey

The CHP is responsible for maintaining a safe environment for commercial vehicle travel on California highways. CHP has a specific office for commercial vehicle safety and enforcement. One component of maintaining a safe environment is citing drivers parked illegally in undesignated locations. CHP issues commercial vehicle citations for truck parking violations across the State. CHP also has data from a survey of its commercial vehicle safety and enforcement officers asking them to indicate areas where they have observed higher concentrations of undesignated truck parking. Together, these data shed light on the State's truck parking need.

The CSTPS analysis of citation data shows that there are concentrations of citations in urban centers throughout the State and across the



Source: Courtesy of Chris Yarzab—<https://www.flickr.com/photos/chrisyarzab/12706899804>, CC BY-SA 2.0 license.

Inland Empire region (District 8). Fresno and Bakersfield have a high concentration of citations in addition to the Bay Area and the larger LA and Orange County region. It's worth noting that citations are not a perfect proxy for undesignated parking since officers have discretion to decide whether or not to cite a driver for an infraction.

Stakeholder Identified Undesignated Parking

Stakeholders are an important source of information about undesignated parking. Often their observations and pinpoints are in locations where problems have become more severe because they are based on resident complaints or high-profile issues that have been brought to the attention of municipal staff.

Through our online survey platform, we received a total of 225 comments regarding undesignated parking locations throughout the State. Of the 225 comments, 210 were pointing to problematic locations and only 15 comments were about locations with no identified problems. In addition to locating points on a

map where undesignated truck parking frequently occurs, stakeholders commented on different types of truck parking (storage, overnight, etc.) and the type of location (side of the road, median, residential etc.).

“ A lot of times drivers will go into LONG BEACH/ WILMINGTON/CARSON and do PICK UP (hazard materials or other loads) and there is NO PLACE TO PARK - driver(s) will drive toward INLAND EMPIRE (40-60 MIN) to find a parking place. ”

Comment received through Social PinPoint Map

Gap Between Truck Parking Supply and Demand

The shortage or surplus of truck parking is the difference between the number of spaces at designated truck parking sites and the demand for parking across the State on the CSTPS analysis corridors and at designated sites. The gap between supply and demand is presented at a high level in this section and in more detail in **Appendix A: Truck Parking Supply and Demand**, and in **Appendix C: Caltrans District Profiles**.

More detail on the gap between supply and demand can be found in

APPENDIX C:
CALTRANS DISTRICT

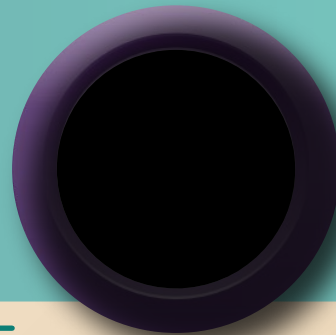
How to calculate the truck parking gap:

SUPPLY – DEMAND = GAP

**Demand at
Designated Sites**



**Undesignated Demand
on the CSTPS Corridors**



The district level gaps are important to show how truck parking supply is meeting demand at a regional level, but more localized surpluses and shortages exist within every district. The Statewide shortage is approximately 3,400 spaces, however a designated parking facility with a surplus capacity may not correlate to an area with demand, therefore this broad-brush assessment of shortages and surpluses at the State and district levels are only general indicators of need and likely underestimate the full scope of the truck parking need.

There is a shortage in most districts, indicating that at the busiest time of day there is not enough parking for all the trucks that need to park across much of the State. In some districts the shortage as a percent of the total truck parking supply in a given district is over 100 percent, indicating that the shortage of spaces is greater than the total number of spaces currently available. A large percent of the gap is accounted for in District 3, District 4, District 7 and District 8. Even in some districts with less long-haul trucking activity, like District 12 (Orange County), there are shortages because there are few designated spaces. In some districts where there is a small shortage of truck spaces, such as District 5, there are specific areas where more truck parking is needed.

Table 5. Peak Hour Truck Parking Shortage or Surplus by District

District	Parking Supply ¹	Total Parking Demand (Designated and Undesignated)	Peak Hour Shortage or Surplus	Shortage or Surplus as a Percentage of Supply
1 – North Coast	87	20	67	77%
2 – Redding	1,220	1,096	124	10%
3 – Sacramento	1,032	1,601	(569)	-55%
4 – Bay Area	983	1,491	508	-52%
5 – Central Coast	334	371	(37)	-11%
6 – Central Valley	3,249	2,797	452	14%
7 – LA	661	1,532	(871)	-132%
8 – Inland Empire	3,671	5,538	(1,867)	-51%
9 – Eastern Sierra	448	476	(28)	-6%
10 – Stockton	2,020	2,310	(290)	-14%
11 – San Diego	1,185	938	247	21%
12 – Orange County	35	157	(122)	-350%
Total	14,925	18,329	(3,404)	-

Truck parking shortages in the table are highlighted and shown in **bold**.

Source: ATRI. Analysis by Cambridge Systematics (2021).

¹ As indicated, a few of the designated truck parking sites do not have utilization data. For the purposes of this table, parking supply only includes spaces of designated truck parking sites that have a utilization estimate.

WILL FULLY CONNECTED AND AUTONOMOUS TRUCKS CHANGE TRUCK PARKING DEMAND?

A sketch-level analysis conducted in 2020 postulates that demand for parking in rural areas could decrease because rest breaks will not be needed. However, 2+ hour staging demand in and around urban centers would likely remain unchanged due to continued delays accessing shipper/receiver facilities.⁴

⁴ Texas Department of Transportation. 2020. Current and Forecasted Truck Parking Needs Assessment Memo.

Where are California's Truck Parking Needs Greatest?

A combination of truck parking demand, safety (crashes) and stakeholder feedback was used to quantify the need for truck parking within **CSTPS analysis corridors**. The study analysis corridors were first divided into 1- to 10-mile segments and each of the above three factors were then summarized by segment and combined into a single score using a weighted formula as described below.

Prioritized Demand Factor

To estimate the demand for truck parking within each segment, the total number of trucks parked at designated and undesignated locations within the segment at the statewide peak hour, was subtracted from the total number of designated truck parking spaces. The shortage or surplus was then normalized by dividing it by the segment length. For example, a 10-mile segment with 20 designated truck parking spaces, 23 trucks parking at designated locations, and 7 trucks parking in the ROW (undesignated parking) would have a shortage of 10 spaces, or one space per mile.

Figure 8 shows the results of this analysis. Note that all segments shown in color (green, yellow, or red) have a truck parking supply gap. The colors indicate how severe the need is compared to all segments in the State. **While urbanized areas like Los Angeles, Sacramento, and the Bay Area have some of the highest clusters of need, every Caltrans District includes corridors with high unmet parking demand.**

Figure 8. Prioritized Demand Factor

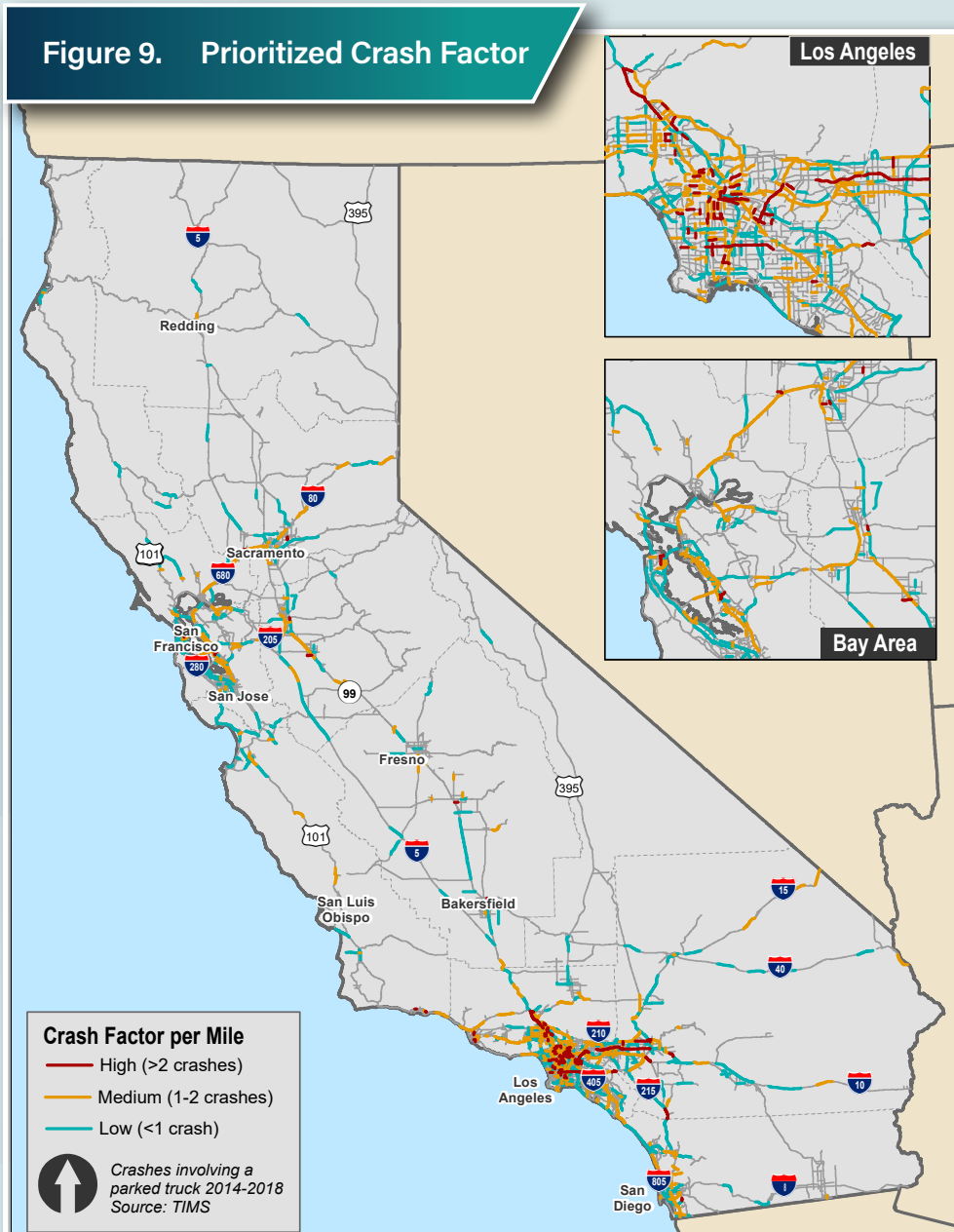


Data from the Transportation Injury Mapping System (2014-2018).

Prioritized Crash Factor

The Prioritized Crash Factor uses the crash analysis described in Chapter 3 to serve as a proxy for safety in the combined analysis. The crashes are weighted so that fatal crashes are given the most importance, followed by serious injuries. Other crashes receive the lowest weight. The crash points for each segment are totaled and divided by the length of the segment to normalize the values. Low crash segments represent less than one crash per mile, medium segments represent between one and two crashes per mile, and high segments are greater than two crashes per mile (Figure 9). Segments with a high number of crashes are generally concentrated in urbanized areas, especially in LA County. It should be noted that these data only show where crashes occurred, not areas where they *could* occur.

Figure 9. Prioritized Crash Factor



Prioritized Stakeholder Factor

The third factor that is integrated into the combined analysis is the *Prioritized Stakeholder Factor* which provides anecdotal data on undesignated parking in California from key stakeholders. This factor is calculated with single points for undesignated parking comments from Social Pinpoint survey data and single points for CHP citations. The highest-ranking segments have over five comments and/or citations and the lowest segments have less than three but both CHP datasets were aggregated at the county level so county boundaries have a strong influence in the resulting segment rankings. This is apparent in Figure 10 where segments inside Los Angeles and Riverside Counties have the highest rankings.

Figure 10. Prioritized Stakeholder Factor

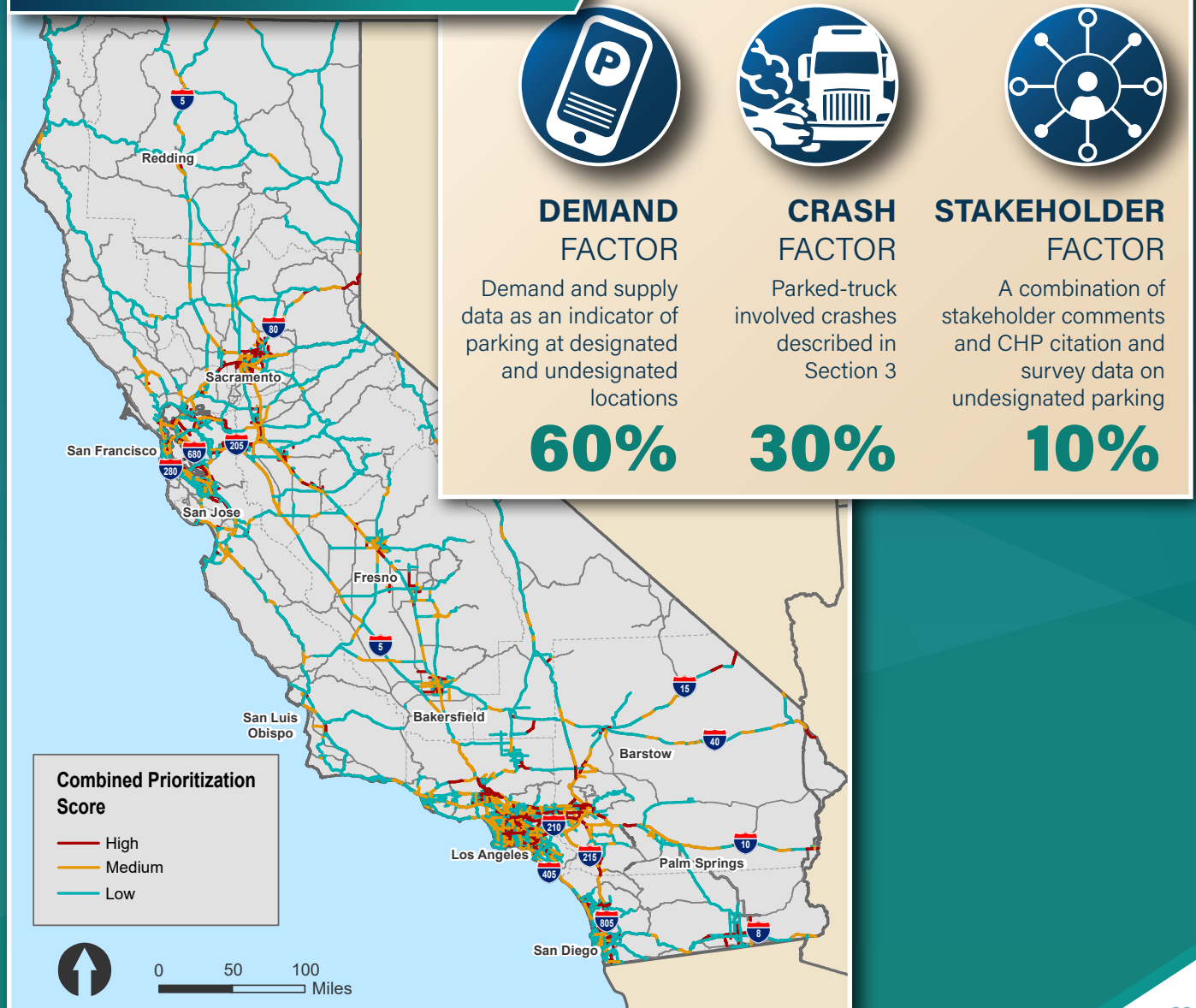


Combined Prioritized Score

The *Combined Prioritized Score* looks at all three factors (demand, crash, and stakeholder) for a comprehensive view of truck parking needs in the State. The *Prioritized Demand Factor* is the most reliable indicator of need, both in terms of truck parking demand and safety, and therefore it is weighted at 60 percent. The *Prioritized Crash Factor* is weighted at 30 percent since it is a supplemental indicator of safety and does not capture every aspect of parking safety. The anecdotal data from the Prioritized Stakeholder Factor was weighted at 10 percent. Figure 11 maps the results of these combined scores—red segments are areas of the highest (top 20 percent) need, yellow segments indicate areas of medium need (next 20 percent), and teal segments are areas of lower need (bottom 60 percent).

Every color on the map indicates some need for truck parking, and this analysis showed some level of need throughout all areas of the State. **Urbanized areas such as Sacramento, San Francisco, Los Angeles, Bakersfield, and San Diego have large clusters of the highest need segments, but every Caltrans district has some segments with the highest need.** Other areas that stand out are near the border with Mexico and other states.

Figure 11. Comprehensive Prioritized Need Score



Equity and Environmental Considerations

While this analysis provides a high-level view of truck parking need, it can also be overlaid with other spatial data to investigate overlaps in need. One of the most used tools to understand where EPCs are located in the State is the CalEnviroScreen tool, which accounts for pollution burden and population characteristics to score every census tract in California. In total more than 40 percent of the segments intersect SB 535 communities. Table 6 shows that a greater portion of high and medium truck parking need segments fall in SB 535 Disadvantaged Communities. While 55 percent of high-need segments and 57 percent of medium-need segments intersect SB 535 communities, 45 percent of high need segments and 43 percent of medium segments intersect the rest of California (Figure 12).

Figure 12. Comprehensive Prioritized Need Segments Overlaid with CalEnviroScreen Communities

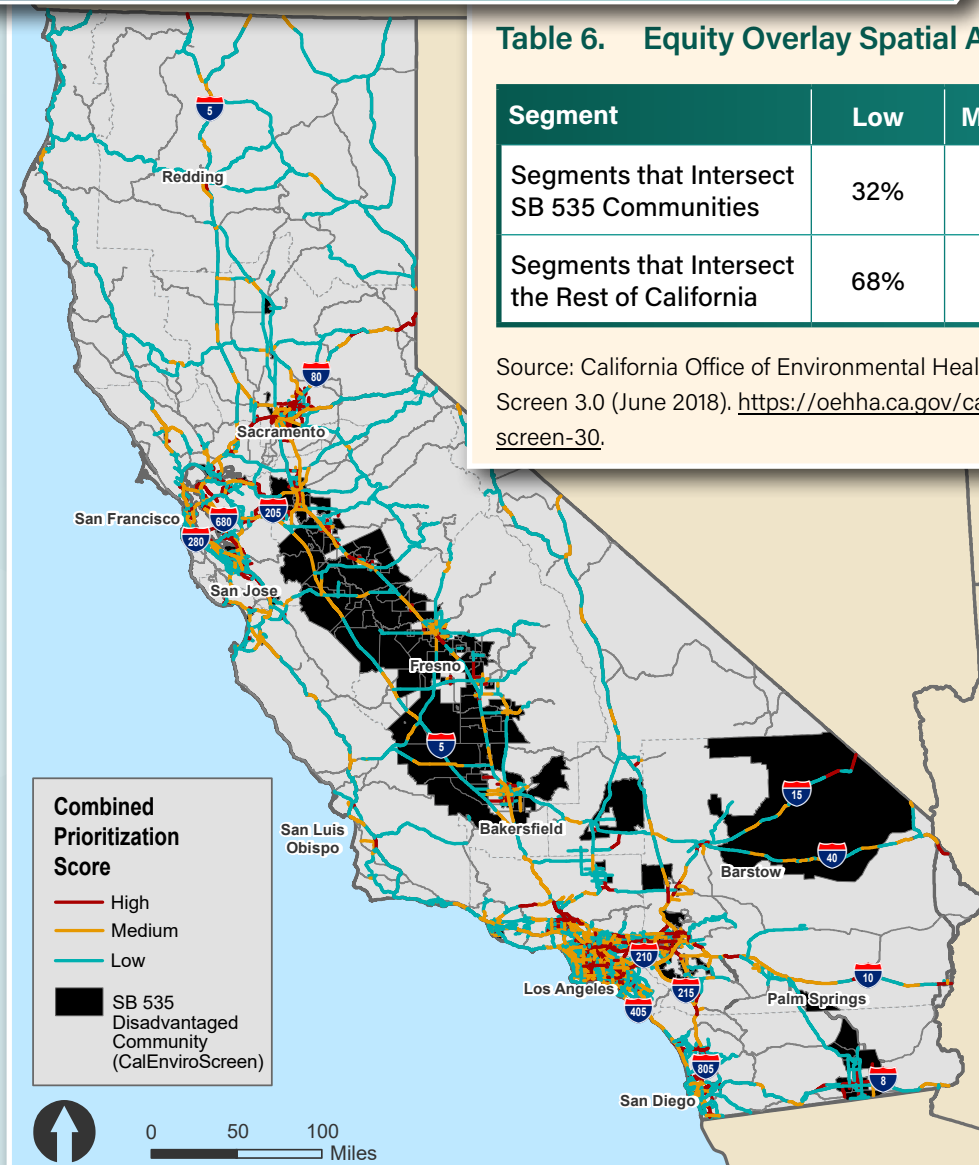


Table 6. Equity Overlay Spatial Analysis

Segment	Low	Medium	High	Total
Segments that Intersect SB 535 Communities	32%	57%	55%	100%
Segments that Intersect the Rest of California	68%	43%	45%	100%

Source: California Office of Environmental Health Hazard Assessment, CalEnviroScreen 3.0 (June 2018). <https://oehha.ca.gov/calenviroscreen/report/calenviro-screen-30>.

Truck Parking—Equity Considerations

In January of 2022, Caltrans did targeted outreach with transportation and community leaders from Southern California, the San Francisco Bay Area, San Diego, and the San Joaquin Valley to discuss truck parking concerns and strategize potential implementation actions to address equity. These regions were identified because of the high truck parking demand in EPCs.

The goal of this outreach was to gain valuable input from these communities to better understand local truck parking concerns and to inform strategies for enhancing the truck parking supply consistent with community values and needs. The project team shared an overview of the State's truck parking needs and challenges and then lead a discussion about strategies and implementation actions. The conversation asked the participants to consider the following for each truck parking strategy:



Who would this benefit?



How could the impacts be mitigated?



Who would be negatively impacted?



What are the implementation considerations?

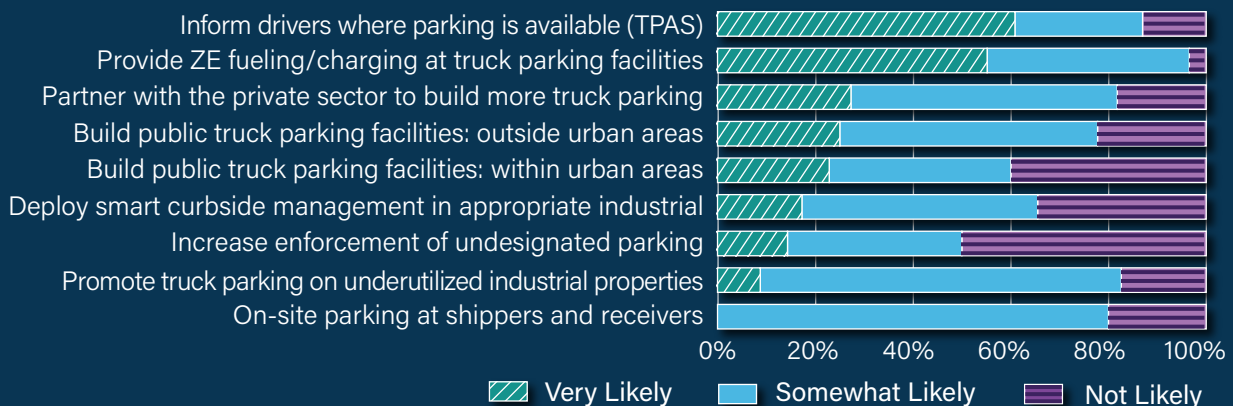
A key takeaway from the EPC focus groups and interviews was that the concerns and strategy considerations that are priorities for EPCs are similar to those in all other communities. Still, the EPC focus groups provided valuable input towards potential implementation of truck parking strategies in EPCs and across the State, described at a high-level below and in more detail in **Appendix D: Truck Parking Strategies and Implementation Plan**.

What we Heard

1. Stakeholders have a strong preference for **truck parking with zero-emission infrastructure**.
2. There is a need for **financial support for truck parking enforcement**.
3. **Truck parking facilities should offer amenities** for the convenience of truckers so that truckers do not have to drive around communities searching for food, water, bathrooms, and other basic needs.
4. **Facilities that depend on trucks to bring and deliver goods, should make truck parking available** especially outside of warehouse operating hours.

Figure 13. Stakeholder Feedback on Truck Parking Strategies

How likely are these strategies to be implemented in your community or your agency's jurisdiction?



Priority Truck Parking Regions and Corridors

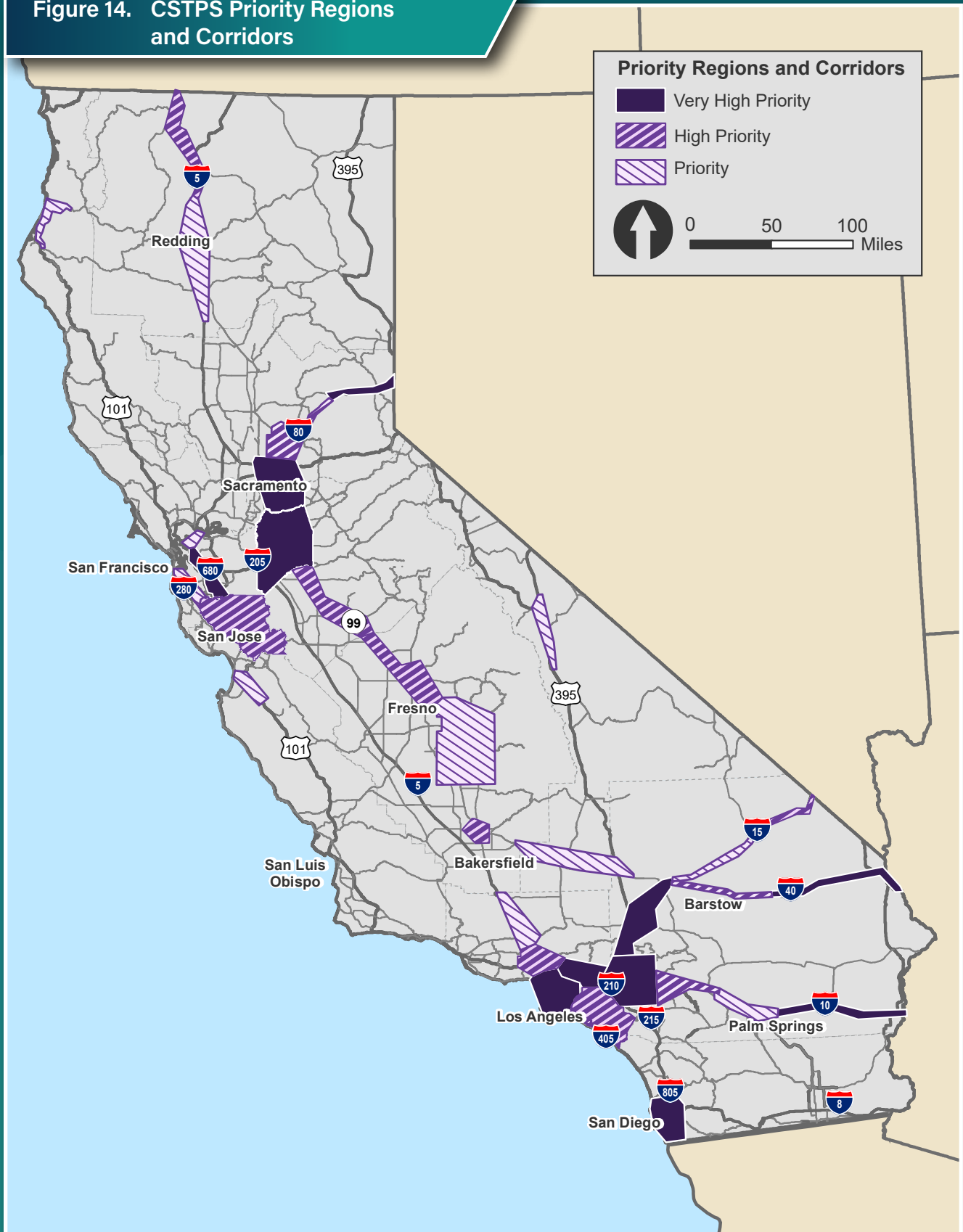
Corridors with the greatest need for truck parking were grouped together into priority regions and corridors, each approximately 30 miles or less across. **In all, 33 regions and corridors were identified with a combined deficit of approximately 5,000 spaces during the peak hour.** The regions and corridors are grouped into priority, high priority, or very high priority categories based on the shortage of truck parking and other local conditions. Figure 14 shows the locations and categorization of the selected priority regions and corridors.

The regions and corridors that are designated as Very High Priority range from a deficit of more than 1,000 spaces to about 150 spaces. On average across the Very High Priority regions and corridors, there is between one and three spaces needed per CSTPS network mile (Table 7).

Table 7. Very High Priority Regions and Corridors

Region/ Corridor (ID)	Spaces	Peak hour Utilized Spaces	Peak hour Undesignated Trucks	Peak Hour Deficit	Deficit Per Network Mile
I-80 Corridor Truckee (D3-1)	58	48	175	-165	-2
Sacramento (D3-3)	356	309	372	-325	-1
Oakland (D4-3)	810	862	268	-320	-1
West Covina (D7-3)	0	0	231	-231	-1
Los Angeles (D7-4)	85	7	881	-803	-1
I-40 Corridor Needles (D8-2)	18	55	145	-182	-2
I-15 Corridor Victorville (D8-5)	975	1,084	131	-240	-1
Inland Empire (D8-6)	1,660	1,577	1,126	-1,043	-2
I-10 Corridor Blythe (D8-9)	128	97	256	-225	-3
San Joaquin County (D10-1)	897	878	352	-333	-1
San Diego (D11-1)	509	166	437	-94	-0.2

Figure 14. CSTPS Priority Regions and Corridors



Toolbox of Strategies for Addressing California's Truck Parking Needs

Despite the various challenges that create barriers to implementing truck parking solutions, there are several strategies available to address truck parking needs. The CSTPS proposed **strategies are grouped into three broad categories: increasing capacity (adding spaces)**, better utilizing existing infrastructure, and supportive policies and programs. Table 8 lists the strategies under each category and indicates the truck parking needs it satisfies.

A full description of each strategy along with implementation and equity considerations are provided in **Appendix D: Truck Parking Strategies and Implementation Plan.**

More detail on the strategies
can be found in

APPENDIX D:
TRUCK PARKING
STRATEGIES AND
IMPLEMENTATION PLAN

Table 8. Strategies to Accommodate Truck Parking Needs

Category	Strategy	10-Hour Rest	2+ Hour Staging	30-Minute Break	Emergency Parking	Time Off
Strategies to Increase Truck Parking Capacity	Expand Safety Roadside Rest Areas	✓	-	✓	✓	-
	Build Dedicated Truck Parking Facilities within Highway Right of Way	✓	-	✓	✓	-
	Build Dedicated Truck Parking Facilities Near Shippers and Receivers	✓	✓	✓	✓	✓
	Add Truck Parking at Existing or New Commercial Vehicle Enforcement Facilities	✓	-	✓	✓	-
	Partner with the Private Sector	✓	✓	✓	✓	✓
Strategies to Better Utilize Existing Infrastructure for Truck Parking	Deploy Smart Curbside Management Techniques	-	✓	✓	-	-
	Promote Truck Parking on Unused Industrial Properties (Airbnb of Truck Parking)	✓	✓	-	-	✓
	Allow Trucks to Park in Auto-Designated Parking Lots during Off-hours	✓	-	-	✓	-
	Allow Emergency Truck Parking at Large Parking Lots when not In Use	-	-	-	✓	-
	Develop a Truck Parking Availability System (TPAS)	✓	✓	✓	✓	✓
	Install Static Signs indicating upcoming locations for truck parking (pre-TPAS).	✓	✓	✓	✓	-
Policy and Program Strategies in Support of Truck Parking	Provide ZEF at Truck Parking Facilities	✓	-	✓	✓	-
	Promote On-Site Parking at Shippers and Receivers	✓	✓	-	-	-
	Collect Truck and Car Utilization Data at SRRAs	✓	-	✓	✓	-
	Integrate Truck Parking Needs into Agency Roadway Project Development Processes	✓	✓	✓	✓	-
	Consider Truck Parking Needs Prior to the Purchase or Sale of Right-Of-Way	✓	✓	✓	✓	-
	Re-assess Public Facility Closures in High Demand Areas	✓	✓	✓	✓	-
	Increase Enforcement of Undesignated Parking, Especially in Areas with Available Truck Parking	✓	✓	✓	✓	✓
	Create an Awareness Campaign on the Importance of Truck Parking	✓	✓	✓	✓	✓

Strategies to Increase Truck Parking Capacity

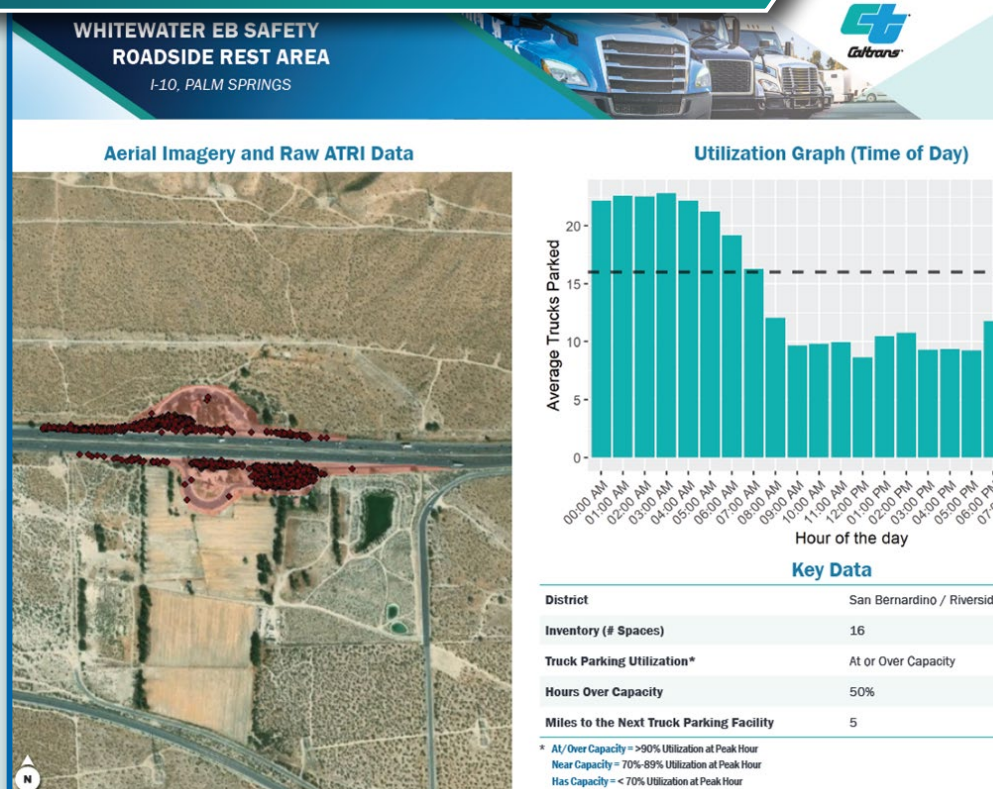
Below are several strategies that Caltrans or other public agencies can implement to add more designated truck parking spaces. **Providing zero emission fuels (ZEF), described under Policy and Program Strategies in Support of Truck Parking, may not be feasible everywhere but at a minimum should be considered at all future truck parking capacity projects.** Overnight charging is the most cost-effective way to charge heavy duty EV, which means truck charging and parking is most effective when they occur at the same time and location.



Expand Safety Roadside Rest Areas

Expanding existing SRRAs that are known to routinely fill up or exceed their truck parking capacity is more cost-effective than constructing new facilities due to existing amenities, established services such as trash or cleaning, and infrastructure such as access ramps. Another advantage of expanding existing facilities is known demand and driver familiarity, reducing the, and there is a low risk that new capacity would not be utilized. This strategy is mostly applicable in rural settings where SRRAs are typically located. The SRRAs profiles in Appendix B summarize the parking utilization patterns observed at each SRRRA, and an example is shown in Figure 15.

Figure 15. Example SRRRA Profile in Palm Springs



More detail on each public SRRRA can be found in

APPENDIX B: SAFETY ROADSIDE REST AREA PROFILES

The demand analysis conducted during this study found that

48 SRRAs

were **AT** or

OVER CAPACITY

during **PEAK HOUR.**⁵

⁵ Defined as > 90 percent utilization at the statewide peak hour of 12:00 a.m. to 1:00 a.m.

Build Dedicated Truck Parking Facilities within Highway Right of Way

In some cases, truck parking might be needed in locations where there are no SRRAs. **One option under this category is to repurpose closed SRRAs or Commercial Vehicle Enforcement Facilities (CVEF).** Land at these locations may still be publicly owned and prior investments (grading, entrance/exit ramps, electricity, pavement, etc.) can reduce up-front costs. Any discussion of repurposing a CVEF would need to be initiated by the respective units within Caltrans and CHP and have CHP executive management involvement. Missouri DOT has converted 23 obsolete rest areas and weigh stations to parking spaces for trucks, typically with no or minimal amenities (lighting, graded/paved, sometimes a vault toilet). An example location on I-70 is shown in Figure 16.



Figure 16. Missouri Converted Rest Area I-70

Source: Missouri DOT Presentation to the I-95 Corridor Coalition, May 1, 2018.

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

New truck parking facilities will be most effective if they are located where drivers need and expect to find truck parking. However, communities also need to balance industrial and transportation land uses with residential, recreational, educational, medical, and other uses. Proactive planning and requirements for truck parking siting and design can reduce tension between the goals of supporting quality of life and industry.

The Truck Parking Feasibility Guide sets forth the essential technical requirements for planning dedicated truck parking facilities, including dimensional requirements for safe truck movement and efficient parking, as well as operational features required to satisfy the design goals listed below. It also includes a set of layout examples intended to demonstrate how these requirements might be expressed within the constraints of real-world sites.

- » **Safety:** Provide for the safe movement of trucks and their drivers.
- » **Land Use:** Make efficient use of land resources.
- » **Services:** Provide services routinely needed by drivers.
- » **Logistics:** Provide focused support to truck-based logistics.
- » **Zoning:** Reflect local and regional zoning and land use plans.
- » **Access:** Provide effective and efficient access to highways and major arterials.

More detail on the truck parking feasibility can be found in

Appendix E:
Truck Parking
Feasibility Guide:
Siting and Layout
Considerations for
Dedicated Truck
Parking Facilities

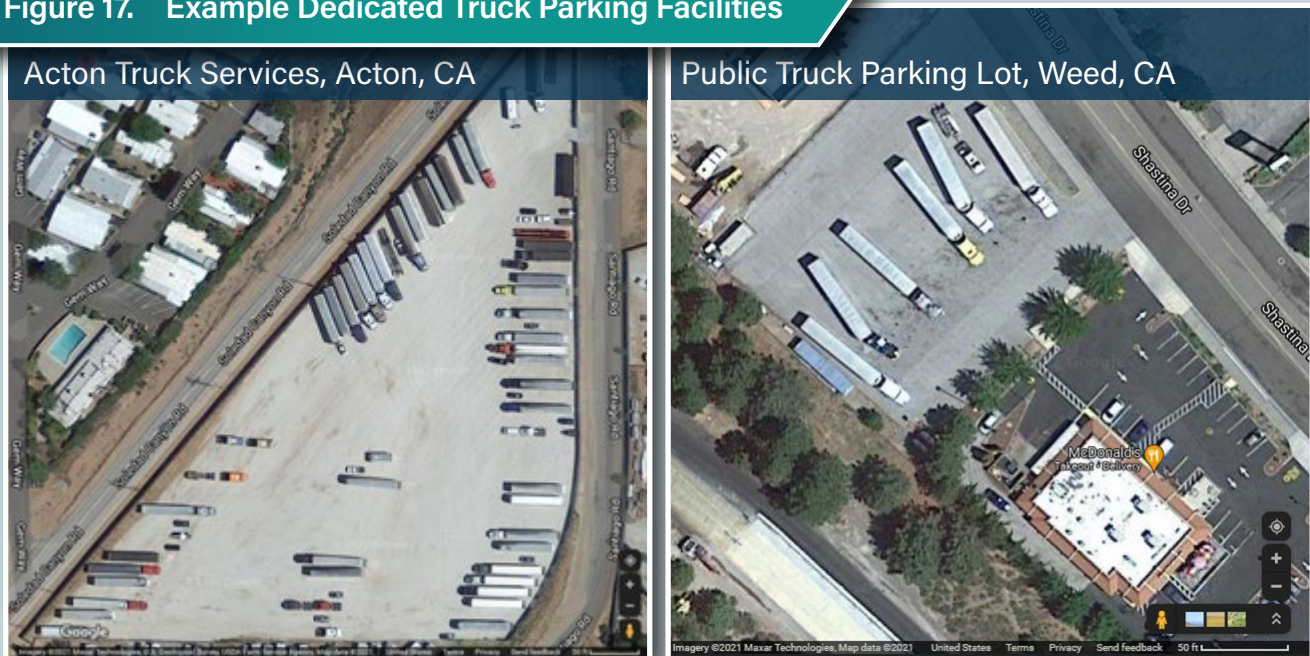
Build Dedicated Truck Parking Facilities Near Shippers and Receivers

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

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

Dedicated truck parking facilities with essential amenities are also owned and operated by private businesses. Examples of a private facility in Acton and a public facility in Weed are shown in Figure 17.

Figure 17. Example Dedicated Truck Parking Facilities



Source: Google Maps. North is to the top of the images.

Add Truck Parking at Existing or New Commercial Vehicle Enforcement Facilities

Most CVEFs include a handful of truck parking spaces for drivers to use while conducting business at the facility, such as purchasing a permit, or when a truck is temporarily placed out of service, that should not be used for routine truck parking. Enforcement officers have an important duty to fulfill that cannot be interrupted. This strategy proposes adding or expanding truck parking at CVEFs, but only if the additional parking will not interfere with the normal operations of the facility. Doing so would create an opportunity to increase capacity and share amenities at sites that are already designed for truck usage. CVEFs are already located throughout the interstate system and have pavement designed for the heavy weight of freight vehicles. Figure 18 is an example of a CVEF off I-71 in Walton, Kentucky with a large auxiliary truck parking lot.

This strategy should only be considered in consultation with and approval from the California Highway Patrol, and in situations where sufficient ROW exists adjacent to a CVEF upon which a separated parking lot could be developed that would not interfere with operations.

Figure 18. Walton Weigh Station, Kentucky



Source: Google Maps. North is to the top of the image.

Partner with the Private Sector

Private truck parking facilities provide 92 percent of all parking spaces in the State. It is unlikely that Caltrans can build enough spaces to close the gap. While the private sector continues to develop truck parking, there are actions the public sector can take to facilitate and leverage private investment. Because truck parking sits at the nexus of public safety and private goods movement, and because it results in mutual benefits to public and private partners, truck parking development creates a ripe environment for public-private partnerships (P3). A few of the many plausible partnerships for Caltrans and municipal agencies to consider include:

- » Private party designs, builds, finances, operates, and maintains a publicly owned parcel adjacent to a major freight hub.
- » Develop parking at a publicly owned parcel adjacent to an existing commercial truck parking facility.
- » Purchase a parcel adjacent to an existing commercial truck parking facility to construct additional parking.
- » Agreement with large existing parking facility that is used on a periodic or seasonal basis, such as a stadium, to be used for truck parking when not in use for its intended purpose.
- » Truck parking facility developed by Caltrans on publicly owned parcel within the highway ROW and operated and maintained by a private partner.

Appendix F: Public-Private Partnership Action Plan presents a screening tool to assess the feasibility of potential partnerships through the lens of different priorities and considerations. Several screening scenarios were identified as a framework for evaluation of individual projects. They represent a few of many strategies to better utilize existing infrastructure for truck parking.

Public-Private Partnership Action Plan: Partnership Screening Tool and Scenario Analysis

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

The **Public-Private Partnership Action Plan: Partnership Screening Tool and Scenario Analysis** provides a consistent and flexible tool to assess the feasibility of potential partnerships through the lens of different priorities and considerations. It also provides an annotated checklist of both high-level and detailed-level considerations to optimize the potential for a successful partnership approach and ultimate delivery of the project. Going forward, it is intended that this tool will serve as an ongoing reference guide for Caltrans and its partners to evaluate and develop potential truck parking partnerships.

The screening factors below are the criteria by which each Screening Scenario is evaluated. Each factor identifies aspects of the potential partnership that are critical for achievement of Caltrans' goals.

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

More detail on P3 Assessment Tool can be found in

Appendix F:

Public-Private Partnership
Action Plan: Partnership
Screening Tool and
Scenarios Analysis

Strategies to Better Utilize Existing Infrastructure for Truck Parking

Underutilized pavement in public ROW and on private property exists across the State that under the right circumstances might be appropriate for truck parking.

Deploy Smart Curbside Management Techniques

While local regulations often discourage on-street truck parking, it can be safely accommodated in the right context, in locations with sufficiently wide streets, industrial or commercial land uses, lack of bicycle and pedestrian traffic, and beyond a specified distance from sensitive land uses such as schools. Truck drivers already use these spaces for parking, as shown in Figure 19 and they could be used more efficiently and safely if managed appropriately. Criteria would need to be developed so that only those curbs that meet the criteria are considered for truck parking. This strategy targets truck parking needs near existing staging demand, and it is intended to only provide short-term parking due to the lack of amenities and services.

This strategy also offers opportunities for cities to partner with private sector technology developers who are creating the business model and technologies (apps) to facilitate curb area parking solutions to truck drivers. Drivers could locate parking within a short time window and close geographic proximity to their destination, reserve a spot for a specific time window, and facilitate payment through a mobile app or other reservation system. This approach aims to make more efficient use of existing curb areas in commercial and industrial areas by communicating both location and availability, and then enabling the ability to reserve spaces.

Recognizing the need to help owner-operators who live in their city, the city of Auburn, Washington designated four areas inside industrial zones where truck parking is acceptable, and issues parking permits to truck drivers who are residents of the city. **The designated curbs are appropriately signed and truck drivers with the appropriate permit are allowed to leave their truck for a maximum of 72 hours, without any occupants, while they are home and off duty.**⁶ This is a unique usage of industrial curb space that is appropriate for longer periods because the drivers do not stay with their trucks and therefore do not need any services or amenities. This has helped to remove parked trucks from residential areas where drivers typically park when home.

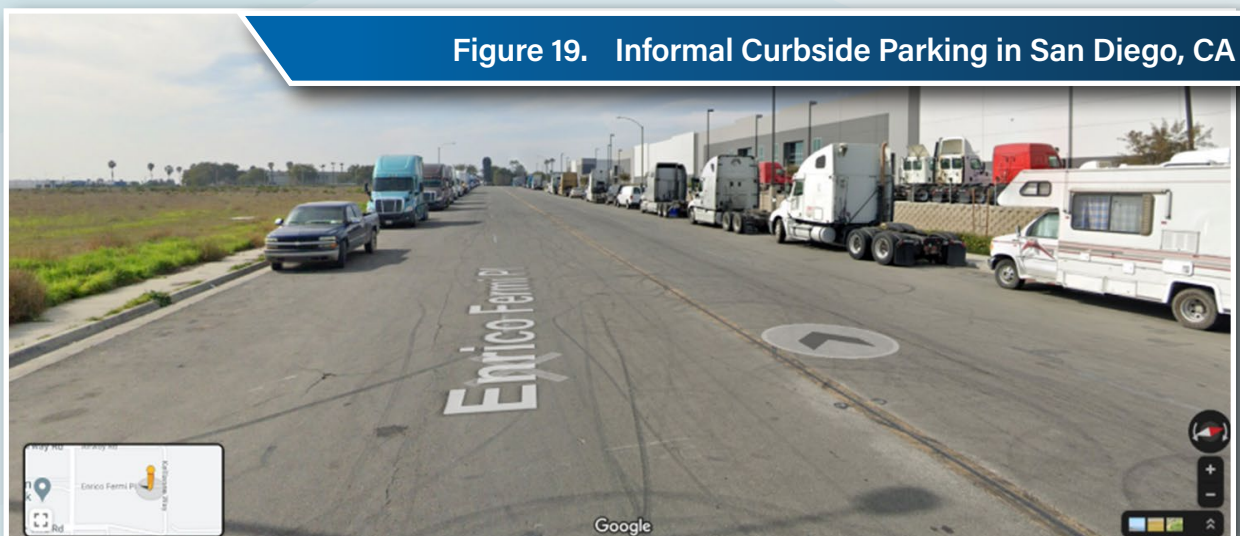


Figure 19. Informal Curbside Parking in San Diego, CA

Source: Google Street View, 2021. (Note: no specific information about the truck parking shown is available.)

⁶ For more information visit: <https://www.auburnwa.gov/cms/one.aspx?portalId=11470638&pageId=15503832>.

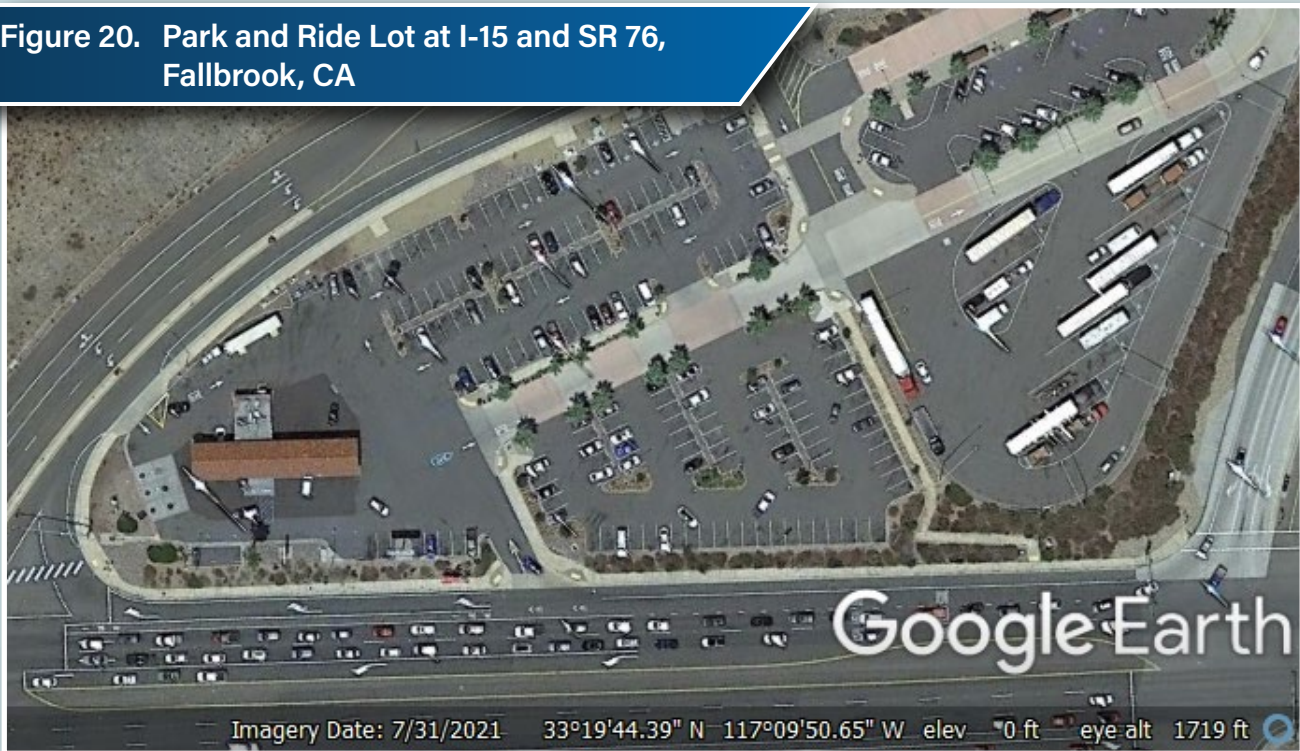
Promote Truck Parking on Unused Industrial Properties (Airbnb of Truck Parking)

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

Allow Trucks to Park in Auto-Designated Parking Lots during Off-hours

Some parking lots designated for cars are primarily used during the day and go unused during overnight hours. Allowing trucks to park at these facilities during the off hours creates additional truck parking supply. Potential public sites to consider include safety pull-offs, scenic vistas, commuter lots/park-and-ride lots, bus depots, and agency fleet vehicle maintenance lots. This strategy has limited applicability, as most lots designed and located for car use are not appropriate for trucks, and therefore would require careful consideration and planning. For instance, the park and ride lot at I-15 and SR 76 in Fallbrook, California, shown in Figure 20, created a permanent parking area dedicated for truck parking.

Figure 20. Park and Ride Lot at I-15 and SR 76, Fallbrook, CA



Source: Google Earth.

Allow Emergency Truck Parking at Large Parking Lots when Not in Use

Extreme weather conditions, hazardous spills, and other unplanned events can close roads temporarily, creating a large demand for truck parking until the road re-opens. Building truck parking lots solely for the purpose of accommodating this large but infrequent demand is not a practical use of limited transportation funding.

Many large parking facilities such as sports venues and fairgrounds have large parking areas, are easily accessible from the road, and would provide safe emergency parking for trucks if they are allowed to park there. These types of locations have schedules that are known far in advance, often have significant downtime, and are used to accommodating large numbers of vehicles and people in a condensed period. An example of the application of this policy can be found on I-80 on the western slope of Donner Pass. At one time in the past, Caltrans had an arrangement with the Gold Country Fairgrounds & Event Center in Auburn (Figure 21), and with the Boreal Ski Resort after 11:00 p.m., to allow trucks to park in their lots during winter closures of I-80.

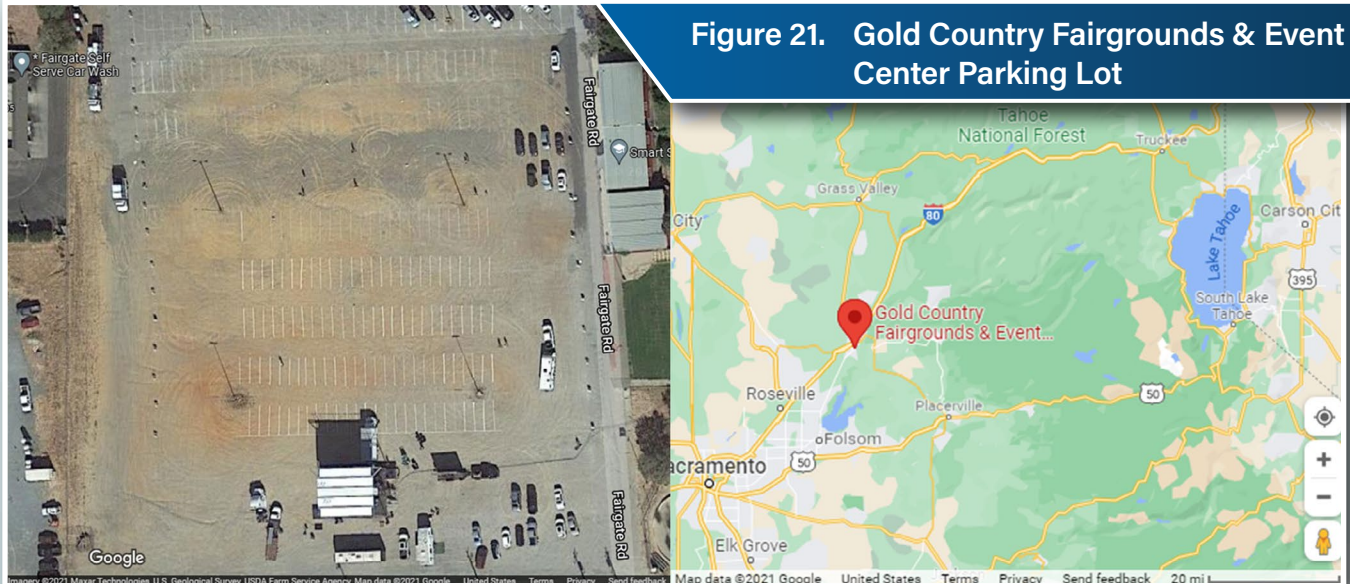


Figure 21. Gold Country Fairgrounds & Event Center Parking Lot

Source: Google Maps.

Develop a Truck Parking Availability System

A truck parking availability system (TPAS) would include dynamic signs along the highway alerting drivers of upcoming available parking sites, distances, and the number of currently available spots at each site. This strategy allows drivers to make better-informed decisions about whether to continue driving or choose available parking nearby despite the loss of driving hours. A typical TPAS consists of sensors at parking facilities to detect available (and occupied) spaces, and software to monitor and report on availability. The parking availability is then displayed in real-time via mobile applications and on dynamic signs along the highway in advance of the parking sites. While this approach does not add new capacity or additional amenities, it makes drivers aware of available spaces on their route to better distribute parking where capacity exists, thereby reducing the frequency of undesigned parking. Caltrans is currently developing a concept of operations (ConOps) for a multistate TPAS on I-10 in partnership with Arizona, New Mexico, and Texas.



Install Static Signs Indicating Upcoming Locations for Truck Parking (pre-TPAS)

This strategy is considered a precursor to an electronic TPAS system and would **install roadside signs indicating truck parking locations, distance, and the number of truck parking spots at upcoming locations.** These signs are particularly helpful if the truck parking area is not visible from the highway.

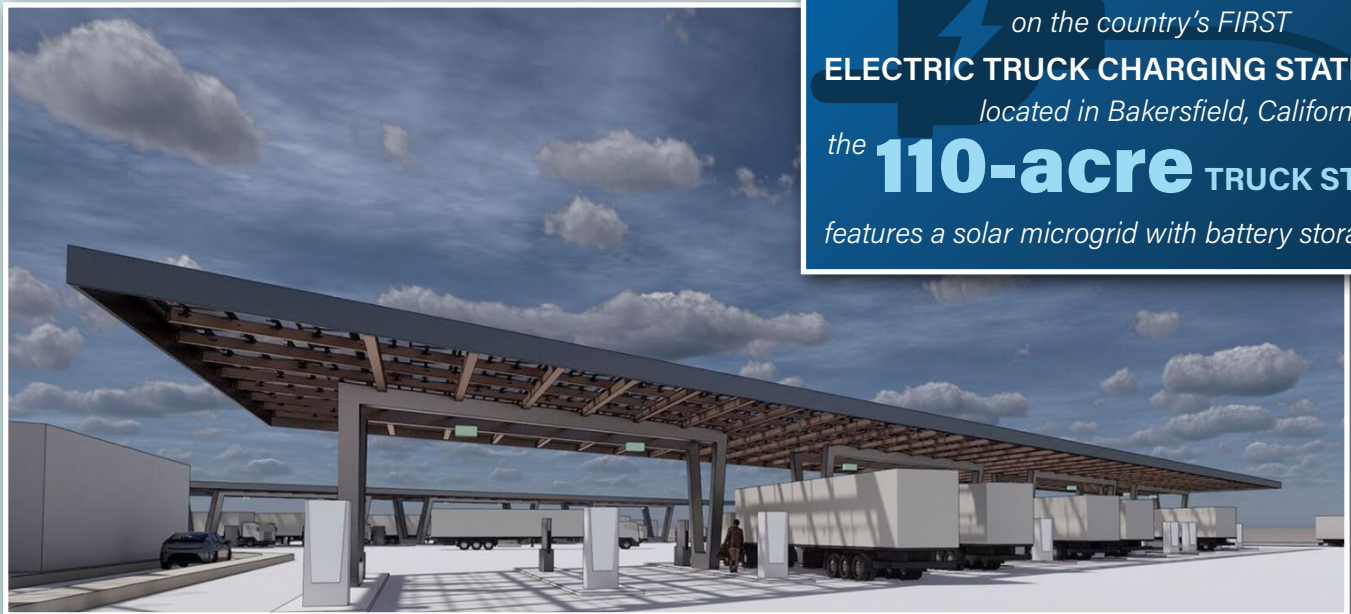
Policy and Program Strategies in Support of Truck Parking

Provide Zero Emission Fuels at Truck Parking Facilities

Zero-emission trucks are expected to experience rapid growth in California in the coming years resulting from legislation recently adopted by the California Air Resources Board (CARB). In June of 2020, CARB adopted the **Advanced Clean Trucks rule which, requires that 5 percent of Class 7-8 (heavy-duty) truck sales must be zero-emission starting in 2024, with that sales percentage increasing to 40 percent by 2035**⁷. This type of growth requires diligent planning to build and locate the infrastructure needed to support these vehicles.

A key consideration is Section 111, of Title 23, United States Code, and 23 CFR 752.5 which prohibit over-the-counter sales of merchandise in public facilities located within the Interstate ROW, and at all rest areas.⁸ Exception is made for telephones, vending machines, and distribution of travel-related materials. As a result, states cannot generate revenue from truck parking services or sale of goods, including ZEF. It will be cost prohibitive to provide ZEF at facilities where Caltrans lacks the authority to charge a fee, however facilities that are not designated rest areas and not located within Interstate ROW could be feasible options.

To support and expedite the rollout of heavy duty zero emission vehicles (ZEV) Caltrans should consider partnering to expand ZEF at private facilities. As a lifeline to truck drivers to help ease their concerns over range anxiety, Caltrans should only consider providing ZEF on state property where the private sector cannot fulfill the need, and it is allowed within federal regulations, such as facilities that are not designated rest areas and not located within Interstate ROW.



WATTEV broke ground in December on the country's **FIRST** **ELECTRIC TRUCK CHARGING STATION**, located in Bakersfield, California, the **110-acre TRUCK STOP** features a solar microgrid with battery storage.

Drawing courtesy of WattEV. Accessed on 6/4/2021 from: https://www.bakersfield.com/news/electric-truck-stop-proposed-near-bakersfield-would-be-first-of-its-kind/article_4df7b6b8-b1ac-11eb-91d8-2329004b5c32.html

⁷ <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2019/act2019/fro2.pdf>

⁸ Code of Federal Regulations. <https://ecfr.federalregister.gov/current/title-23/chapter-I/subchapter-H/part-752/section-752.5>

Co-locating Electric Charging and Truck Parking

Overnight charging is the most cost-effective way to charge EV trucks, so there are ample opportunities to address two statewide priorities, increasing truck parking supply and transitioning to zero-emission trucking, with shared infrastructure. While hydrogen fuel cell presents opportunities, the intersection of EV and truck parking presents the most opportunities due to the extended length of time required for EV charging.

Implementation Considerations

- » **Energy required.** Preliminary analysis from the California Energy Commission estimated the energy demand resulting from increased electric truck market penetration in California. The electricity cost of charging trucks is dependent on the utility rates, which is determined by geography as well as the time of day the charging is occurring. California's three largest utilities offer overnight rates for electric vehicles for roughly \$0.19 per kWh on average. Using that overnight rate, the cost to charge 20 trucks overnight that consume approximate 7.7 MWh of energy would be roughly \$1,500. Close coordination with energy utilities to assess their ability to provide sufficient energy is essential to utilizing EV trucks.
- » **Solar Considerations.** In order to accommodate a solar array setup, space is required for not only the solar panels, but for other related infrastructure such as storage batteries. The first solar-powered truck stop in the United States for heavy-duty electric trucks is expected to open late October 2022 in Bakersfield, California¹⁰. The 25-megawatt, solar-powered electric-only 110-acre truck stop will feature a solar micro-grid with battery storage and grid energy from Pacific Gas & Electric, and over time will grow to support more than 40 charging bays.¹¹
- » **Curbside charging.** Curbside charging represents another opportunity to build out a more robust charging network in areas where trucks already routinely park. However, there are several limitations such as the need to provide significant electrical capacity and plan for upgrades, as well as space available. Nonetheless, the city of Sacramento has recently undergone a curbside charging pilot program through a public-private partnership with EVgo which currently features 12 curbside chargers with charging capacity of 50 kW or greater.¹²

California could have as many as
180,000
 ZERO-EMISSION
 medium-duty and heavy-duty trucks
 on the roadways
 by
2030.⁹

More information on combining ZEF and truck parking can be found in

Appendix G:
 Zero Emission Fueling
 Considerations at Truck
 Parking Facilities

⁹ California Energy Commission (2021). *Assembly Bill 217 Electric Vehicle Charging Infrastructure Assessment Analyzing Charging Needs to Support ZEVs in 2030*.

¹⁰ <https://www.truckinginfo.com/10150943/solar-powered-truckstop-for-electric-truck-charging-to-break-ground-this-fall>

¹¹ <https://www.truckinginfo.com/10143043/wattev-to-build-first-u-s-megawatt-electric-truck-stop>

¹² [Curbside Charging - City of Sacramento](#)

Promote On-Site Parking at Shippers and Receivers

When land use and zoning decisions allow for new commercial and industrial development, but do not account for the increased demands for truck parking, the costs for future mitigation are often passed on to the local jurisdiction. Counties, cities, and municipalities across the nation already develop traffic impact assessments and review site plans for new developments. Local ordinances routinely set employee and customer parking requirements for developments; however, on-site truck parking and staging areas are rarely required.

Encouraging freight-focused new developments to provide truck parking on-site, or to support a shared lot for that purpose, is one of the most effective tools for addressing future demand for truck parking in the long run. It would keep the problem from getting worse.

Appendix H: Truck Parking Demand Model: Shipper and Receiver Parking Estimator provides a truck parking generation rate for estimating truck parking demand based on the service industry and estimates of truck trips from a traffic impact assessment. FHWA will soon release the *Truck Parking Handbook* which will include guidance, sample ordinance language, and various additional tools for estimating the demand for truck parking generated by new developments.

When reviewing new freight-intensive development projects, Caltrans and other agencies could provide comments on the estimated number truck parking spaces needed at the development by using the *Shipper and Receiver Parking Estimator*. If desired and applicable, new freight-intensive development projects could also be required under the California Environmental Quality Act to mitigate truck parking impacts by providing sufficient spaces.

Truck Parking Generation Rate Estimator

To estimate the truck parking demand generated by shipper/receiver facilities, truck GPS data from ATRI was overlaid with parcel data from San Diego County to determine truck parking patterns generated by the freight intensive land uses of manufacturing, warehousing, and transportation logistics. The GPS data of trucks, during four, two-week periods in 2019, were used to identify the location, timing, duration, origins and destinations of stopped trucks. Consecutive stops a truck makes were converted to trip tables.

In San Diego County during the eight week period when data were collected, it was determined that 80,853 trips were made to manufacturing, warehousing, and transportation logistics facilities by trucks in the ATRI sample. **Approximately 10 percent, or 8,300 of those trips were preceded by a parking stop.**

Because not all parking stops occur at the same time, a peak parking factor was calculated for each land use category to estimate the number of parking spaces needed to accommodate the peak parking demand. Manufacturing, warehousing and transportation logistics facilities have peak demands of 12 percent, 22 percent and 42 percent of daily parking, respectively (see Table 9). The product of the daily parking demand and peak parking factor can be used to estimate the number of parking spots a new facility will need to accommodate the demand it generates.

More detail on the rate estimator can be found in

Appendix H:
Truck Parking Demand
Model: Shipper and
Receiver Parking
Estimator

Table 9. Truck Parking Generation Rate as a Percent of Daily Truck Trips

Service Industry	Truck Parking Generation Rate
Manufacturing	1.24% of truck trips
Warehouse	2.24% of truck trips
Transportation and Logistics	4.33% of truck trips

Collect Truck and Car Utilization Data at SRRAs

Truck utilization data at SRRAs can be used for performance reporting, evaluating the effectiveness of public investments in truck parking, and providing data to FHWA for future updates to Jason's Law. In addition, by also collecting data on cars and recreational vehicles, Caltrans will know how each SRRRA is being used by vehicle type, time of day, and day of week. These data could inform the need for expansion or future renovation plans for more efficient configuration and utilization of parking areas. For instance, if few cars use the parking area, Caltrans may have the opportunity to convert some of the car space to truck parking. Or if cars are not parking overnight, trucks could be allowed to park in those spaces during restricted hours.

Integrate Truck Parking Needs into Agency Roadway Project Development Processes

Integration of truck parking in the roadway project development process INCREASES EFFICIENCY OF PROJECTS by coordinating issues and needs early and preventing the need for re-design, re-work, delays to the schedule, and increases to the budget. Guidelines for integrating truck parking into the project development process should be developed and include early involvement of all necessary parties. Guidelines should also be developed for including truck parking in all short- and long-range planning efforts such as local and regional transportation and land use plans.

Consider Truck Parking Needs Prior to the Purchase or Sale of Right-Of-Way

Truck parking needs should be considered as ROW decisions are being considered for planning and implementation. Identified ROW should be reviewed against truck parking high-need areas to ensure that opportunities for expansion or new development are not overlooked. Guidelines governing ROW transactions and long-range ROW planning processes should be revised to include truck parking.

Re-assess Public Facility Closures in High Demand Areas

Converting closed public facilities such as CVEFs, maintenance yards, rest areas, and picnic areas to truck parking may be an economical way to provide more truck parking inventory in lieu of new site construction. Guidelines should be developed for assessing and repurposing sites, potential maintenance, or site upgrades (such as paving, utilities, debris clearance, signing, etc.) and these guidelines should include assessment by Caltrans to determine truck parking demand levels before any closure.



Increase Enforcement of Undesignated Parking, Especially in Areas with Available Truck Parking

As alternative strategies for truck parking are implemented, **enforcement should become more active in preventing and addressing undesignated parking, especially in areas with available truck parking.**

When risk of enforcement is higher, drivers feel more incentivized to stop at designated locations, increasing overall safety and facility utilization. Designated parking is safer and reduces environmental and infrastructure challenges associated with undesignated parking.



Create an Awareness Campaign on the Importance of Truck Parking

The public relies on trucks to deliver food, medicine, clothing, and all personal and household goods, often directly to their door. Employers also depend on trucks to deliver materials and supplies to keep factories, offices and places of employment open. However, few people think about how those purchases drive a demand for truck trips and thus the need for trucks to park. Trucks, like much of the freight system that supports California's economy, are often considered a problem rather than a necessity.

Changing this public perception is a critical piece of outreach for Caltrans in partnership with other agencies and the private sector. One of the largest challenges private truck parking operators face when trying to expand or build new inventory is opposition from residents who do not want trucks in their communities. An awareness campaign should explain the need for truck parking and examine how the negative impacts (noise, light pollution, traffic, etc.) can be ameliorated.

Caltrans Short-term Actions

While it would be appropriate for local jurisdictions and transportation agencies to implement many of the strategies, **Caltrans plays an important role by providing guidance, coordination, and leadership.** In all cases, those implementation strategies would require further study and local outreach to determine precisely which strategy would be best for each region and corridor, and to determine appropriate locations for implementation. This chapter summarizes the first actions that need to take place to support the strategies to increase truck parking capacity, better utilize existing truck parking infrastructure, and support truck parking through policies and programs.

Caltrans provides



Action 1: Develop District or Regional Implementation Plans

Priority areas have been identified within each District where the need for parking is the greatest (Figure 14). **Using data and guidance from this study, to the extent that it is possible each District should evaluate and potentially develop a truck parking implementation plan in cooperation with local jurisdictions and transportation planning agencies.** The District Implementation Plans should consider if and where the truck parking strategies would be most feasible, and identify specific actions, coordination, and funding needed for implementation. District and regional truck parking implementation plans may be eligible to compete for funding from the Sustainable Transportation Planning Grant Program or the State Planning and Research Program.

DISTRICT IMPLEMENTATION PLANS COULD CONSIDER IF AND WHERE THE STRATEGIES LISTED BELOW WOULD BE MOST FEASIBLE

Strategies to Increase Truck Parking Capacity

- Provide ZEF at Truck Parking Facilities
- Expand Safety Roadside Rest Areas
- Build Dedicated Truck Parking Facilities within Highway ROW
- Build Dedicated Truck Parking Facilities Near Shippers and Receivers
- Add Truck Parking at Existing or New Commercial Vehicle Weigh Stations
- Build a System of Connected Truck Parking and Staging Lots
- Partner with the Private Sector

Strategies to Better Utilize Existing Infrastructure for Truck Parking

- Deploy Smart Curbside Management Techniques
- Allow Trucks to Park in Auto-Designated Parking Lots during Off-hours
- Allow Emergency Truck Parking at Large Parking Lots when not In Use
- Install Static Signs Indicating Upcoming Locations for Truck Parking (Pre-TPAS)

Action 2: Develop a Concept of Operations for a System of Connected Truck Parking and Staging Lots

A remote parking facility could serve as a staging lot if connected via information systems to the truck drivers' customer and to other short-term staging options close to their customer. Drivers could “check-in” with their customers at the remote lot and wait there, with access to needed amenities, until their customer is ready to receive them. They could also access information on small staging lots and curbside parking options throughout the region with information on how to reserve space when possible and needed. Using real-time traffic data, the receiving facility could inform the truck driver what time to depart the remote staging lot to arrive when they are ready to receive them and direct the driver to the appropriate routing information. GPS signals from the driver's smartphone could enable the receiver to track the driver's progress, be aware of any unforeseen delays, and be prepared to receive them upon arrival.

Figure 22. Next-Gen System of Connected Truck Parking and Staging Lots



The remote parking facility could also provide zero emission fuel, which combined with information on connected parking options and customer appointment times, could create a next-gen parking facility and system that has a higher probability of securing FHWA grant funding support.

The short-term action is to develop a ConOps for the project that defines the approach, technologies, feasible locations, and secures support from public and private partners. The mid- and long-term actions are to prepare a federal grant application for the project, which would follow the advanced planning efforts, and if successful, proceed with implementation. Developing a ConOps may be eligible to compete for funding from the Sustainable Transportation Planning Grant Program or the State Planning and Research Program.

Action 3: Evaluate Partnership Opportunities with P3 Tool

Caltrans is likely to have a variety of potential opportunities to address truck parking challenges in partnership with either the private sector or other public sector entities. These partnership concepts typically vary with respect to the purpose, location, structure, costs, and potential funding sources, so it is often challenging to compare opportunities using similar metrics and advance a clear approach that aligns with organizational priorities and resources. **The P3 assessment tool developed for this study can be used to assess the feasibility of potential partnerships through the lens of different priorities and considerations.** It provides an annotated checklist of both high-level and detailed-level considerations to optimize the potential for a successful partnership approach and ultimate delivery of the project.



Source: Google Maps.

THE P3 ASSESSMENT TOOL

Appendix F: Public-Private Partnership Action Plan provides a P3 assessment tool that can be used to assess potential partnerships using a checklist of considerations to optimize success and ultimately deliver the project.

The short-term action calls for identifying potential opportunities to partner with private or public sector partners, and using the P3 Assessment Tool, conduct a preliminary evaluation of those opportunities. Those partnership opportunities that look promising should be explored in more detail, using the criteria in the P3 Assessment Tool to guide the research and conversations with potential partners. Mid- and long-term actions would be to implement feasible partnerships.

Action 4: Develop Statewide TPAS ConOps

TPAS makes finding a truck parking space easier and less stressful for drivers by accurately counting and disseminating real-time information of the number of available spaces at connected facilities. Caltrans is currently developing a concept of operations for a multistate TPAS on I-10 in partnership with Arizona, New Mexico, and Texas. Deploying TPAS statewide would increase the number of locations where information would be available to drivers, helping them make better parking choices, ultimately reduce unauthorized truck parking, reducing the number of trucks searching for parking (and associated environmental and pavement degradation), and reducing the chance that drivers might drive over the HOS limits and contribute to a fatigue-related crash.

The short-term action would be to develop a ConOps that would prioritize locations for TPAS across the State and consider data collection and information dissemination approaches. Many of those considerations should be consistent with the ConOps being developed for the I-10 Corridor Coalition. Over the mid-term TPAS should be deployed in and along the top priority areas or corridors, followed by a full statewide deployment over the long-term. The cost will vary depending on the number of locations where it is deployed as well as the number of spaces and type of sensors used at each location.

Technology solutions may be more effective when deployed at a regional or multistate level, especially applicable for TPAS. Truck drivers benefit from a single, national source for locating available parking. Caltrans engages in several formal and informal multistate coalitions and conversations and should continue to seek opportunities to partner with other states, including considering multistate grant applications, like the I-10 Corridor Coalition, to help fund TPAS deployment.



Action 5: Develop Guidance and Process Documents

Many of the strategies to better utilize existing infrastructure would benefit from guidance documents on how best to proceed; and many of the policies and programs in support of truck parking would require the establishment of procedures or program implementation actions. These strategies include:

Develop Guidance Documents for:

- ☒ Deploy smart curbside management techniques.
- ☒ Promote truck parking on unused industrial properties.
- ☒ Allow trucks to park in auto-designated parking lots during off-hours.
- ☒ Promote on-site parking at shippers and receivers.

Develop Process Documents for:

- ☒ Integrate truck parking needs into agency roadway project development processes.
- ☒ Consider truck parking needs prior to the purchase or sale of right-of-way.
- ☒ Re-assess public facility closures in high demand areas.

Develop Implementation Plan for:

- ☒ Create an awareness campaign on the importance of truck parking.

The short-term actions for each of these would be for Caltrans to develop the necessary guidance, procedures or actions which would be implemented in the mid- and long-term by Caltrans Districts and local jurisdictions. Development of guidance and actions would be best accomplished with collaboration between Caltrans, Caltrans District Offices and local communities.



Next Steps for California

The development of the California Statewide Truck Parking Study is a first-of-its-kind for California. This study builds on the strong foundation of the 2020 California Freight Mobility Plan and the Final SRRA Master Plan by updating and supplementing the data, tools, processes and approaches to the truck parking challenge. The Study was guided by California TPTAC, the California Freight Advisory Committee, and other community-based organizations and air quality monitoring districts. The study reaffirms California's truck parking challenges and puts forth investment strategies and policies needed to address them.

The State must be prepared to address the increase in freight and truck traffic that accompany population, economic and international trade growth. The CSTPS identifies a balanced, comprehensive approach that the State can follow to meet the needs of the trucking and freight industry and maintain its position as a global trade hub. The Truck Parking Study highlights the importance of safe, reliable truck parking to the economy, safety, and quality of life in California.

Acronyms

ATRI	American Transportation Research Institute
CARB	California Air Resource Board
CHP	California Highway Patrol
ConOps	Concept of Operations
CSTPS	California Statewide Truck Parking Study
CTP	California Transportation Plan
CVEF	Commercial Vehicle Enforcement Facilities
EPC	Equity Priority Communities
EV	Electric Vehicle
FMCSA	Federal Motor Carrier Safety Administration
GHG	Greenhouse Gas
HOS	Hours-of-Service
P3	Public-Private Partnerships
ROW	Right of Way
SRRA	Safety Roadside Rest Area
TPAS	Truck Parking Availability System
TPTAC	Truck Parking Technical Advisory Committee
ZEF	Zero Emission Fuels
ZEV	Zero Emission Vehicle