Delaware Statewide Truck Parking Study

Draft Technical Memo 1: National and Regional Perspective on Delaware Truck Parking

Prepared for:

WILMAPCO and DelDOT

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Delaware Statewide Truck Parking Study

The objective of the Delaware Statewide Truck Parking Study is to address overnight parking hotspots as well as more localized, shorter-term truck parking and staging needs within the State of Delaware. An additional focus of this effort will include regular engagement with the local trucking community to help validate future strategies and recommendations.

Technical Memo

This Technical Memo is the first in a series of four that together inform the Study. This Technical Memo provides an initial understanding of truck parking in Delaware, a comparison between Delaware and its neighboring regions, and national and regional freight trends and forecasts affecting truck parking.

Acknowledgements

The CPCS Team acknowledges and is thankful for the input of those consulted in the development of this Technical Memo, as well as the guidance and input of representatives from WILMAPCO, DelDOT and their study partners.

Opinions

Unless otherwise indicated, the opinions herein are those of the authors and do not necessarily reflect the views of WILMAPCO or DelDOT.

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Acronyms / Abbreviations

AADT	Annual average daily traffic
ADTT	Average daily truck traffic
ATRI	American Transportation Research Institute
DelDOT	Delaware Department of Transportation
DOT	Department of Transportation
DVRPC	Delaware Valley Regional Planning Commission
ELD	Electronic Logging Device
FHWA	U.S. Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
GPS	Global positioning system
HOS	Hours of service
HPMS	Highway Performance Monitoring System
ITS	Intelligent Transportation Systems
MAP-21 Act	Moving Ahead for Progress in the 21st Century Act
NHS	National Highway System
NIMBY	Not In My Backyard
OOIDA	Owner-Operator Independent Drivers' Association
PPP	Public-private partnership
SR	State Route
U.S.	United States
VMT	Vehicle miles traveled
WILMAPCO	Wilmington Area Planning Council
WIM	Weigh-in motion

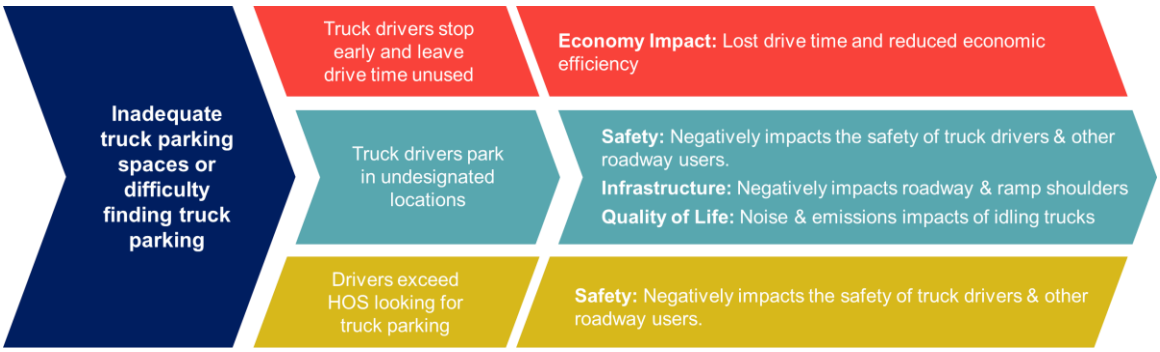
1 Introduction

1.1 Background and Objectives

Truck parking is essential for the efficient movement of goods throughout the nation. A 2020 survey of trucking industry stakeholders by the American Transportation Research Institute (ATRI) ranked truck parking as the third most important issue in the trucking industry, behind truck driver shortages and driver compensation.[1] Truck parking has remained a top issue in the trucking industry for the past nine years, reflecting its importance to the industry.

Safe and adequate truck parking provides truck drivers with a location to take federally required hours of service (HOS) breaks, wait for shipper or receiver appointments (known as staging), and use amenities such as restrooms or refueling stations. Truck parking near freight clusters (e.g., warehousing, distribution centers, intermodal connectors, manufacturing facilities, ports, etc.) is especially important, as drivers often find inadequate or prohibited truck parking near these facilities. Truckers nationwide face a shortage of adequate truck parking. When truck drivers are unable to find designated truck parking at public or private truck parking locations, there are harmful implications for safety, infrastructure, quality of life, and economic competitiveness (Figure 1-1). The options available to truck drivers who cannot find adequate truck parking where and when they need it include: stop driving early, park in an undesignated area, or exceed HOS to look for truck parking. Truck drivers that opt to stop driving early when they find available truck parking reduce their efficiency and productivity. Truck drivers who park in undesignated truck parking in unauthorized locations, such as on the shoulders of on-ramps, expose themselves and surrounding traffic to increased safety risks and can cause damage to infrastructure not designed to support truck weight. Truck drivers exceeding HOS regulations to look for parking pose a risk to public safety, while also leaving drivers susceptible to fines.

Figure 1-1: Impacts of Inadequate Truck Parking



In line with the rest of the nation, truck drivers in Delaware face truck parking shortages. In response, public agencies in Delaware and the surrounding region have focused on finding solutions to improve goods movement, increase driver safety, and resolve the conflicts that arise when truck drivers park in undesignated locations. Truck parking studies involving Delaware and the surrounding region have been conducted for the Port of Wilmington, the Delaware-Maryland-Virginia tristate region, the I-95

[1] ATRI, Critical Issues in the Trucking Industry, October 2020, https://truckingresearch.org/wp-content/uploads/2020/10/ATRI-Top-Industry-Issues-2020.pdf

corridor from Connecticut to North Carolina, and the Philadelphia-Camden-Trenton Region. The relevant findings from these studies are included in Section 2.

Following the identified issues and recommended strategies of these state plans and studies, the Delaware Statewide Truck Parking Study will provide the Delaware Department of Transportation (DelDOT), the Wilmington Area Planning Council (WILMAPCO), and other state and regional truck parking stakeholders with an analytical foundation to inform infrastructure investments and strategies to address the state's most pressing truck parking issues.

1.2 Project Structure

Key Questions

To achieve the project objective, the CPCS team will work with DelDOT and truck parking stakeholders to address several key questions. The CPCS team has framed this series of questions to respond to all items in the Scope of Work and to be addressed in the Technical Memos and other Deliverables. Figure 1-2 lists the keys questions for the study and the following Figure 1-3 identifies the core tasks of the Delaware Statewide Truck Parking Study.

Figure 1-2: Delaware Statewide Trucking Parking Study Key Questions

Truck Parking Inventory and National Best Practices

- What recent studies, data collection efforts, and fieldwork are relevant to understanding Delaware's truck parking needs, opportunities, and identifying potential solutions?
- What is the supply of truck parking spaces at public and private truck parking locations in Delaware?
- How does the truck parking supply and demand in Delaware compare to neighboring states?
- How do national and regional freight forecasts and ongoing initiatives impact truck parking in Delaware?

Designated and Non-Designated Truck Parking Analysis

- What is the utilization of public and private truck parking locations?
- What are the factors influencing truck parking demand statewide?
- What are the primary truck parking concerns of the trucking industry in Delaware?
- What patterns and gaps emerge for overnight parking hotspots and time of day usage in both designated and non-designated parking areas?
- What is needed to improve the safety standard of truck parking locations?
- What amenities could be added to incentivize truck parking at underutilized locations?

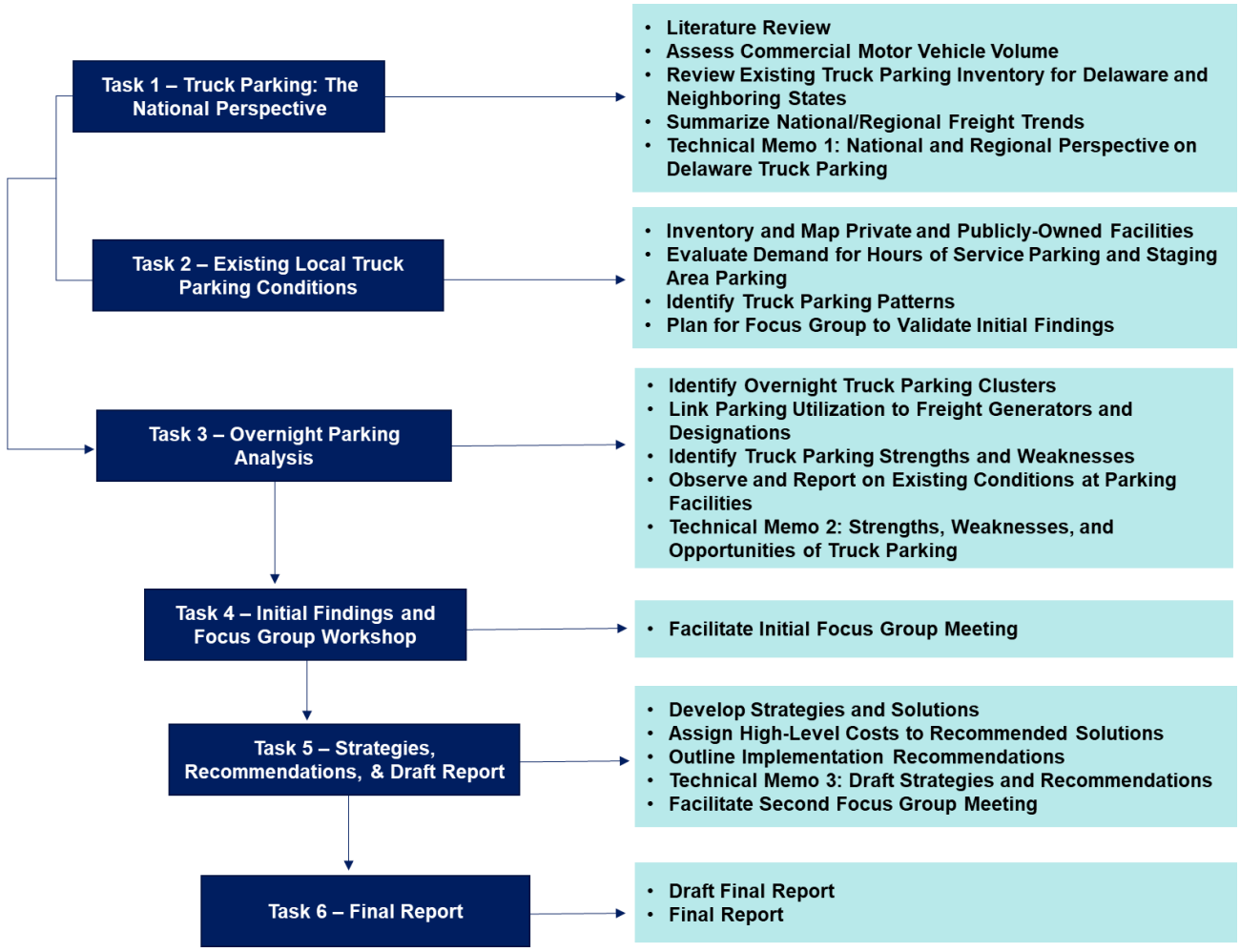
Findings, Strategies, and Recommendations

- What are Delaware's capacity, operational, safety, institutional, and policy truck parking issues?
- Where are the truck parking needs most acute, by corridor and general location?
- What solutions (e.g. policies, capacity projects, ITS programs, public-private partnership, other technology) best address Delaware's truck parking issues?
- What roles do WILMAPCO and DelDOT have in advancing truck parking and how should truck parking be incorporated into existing plans and capital programs?
- What are the recommended next steps to continue Delaware's truck parking efforts?
- What case studies or examples best highlight successful implementation approaches that mirror the study's recommendations?
- What are the high level estimated costs, location, and implementing agency for the recommendations?

Work Plan Overview

In line with the Key Questions, the following figure presents an overview of tasks for developing the Delaware Statewide Truck Parking Study.

Figure 1-3: Project Work Flow



Source: CPCS

1.3 Overview of this Technical Memo

Purpose

The purpose of this Technical Memo is to build an initial understanding of truck parking locations in Delaware. Specifically, this Technical Memo will review the existing U.S. Federal Highway Administration (FHWA) truck parking inventory using data from the 2015 Jason's Law Report and assess commercial vehicle traffic using annual average daily truck traffic (AADT) and truck vehicle miles traveled (VMT) to provide an overview of truck parking in Delaware and its neighboring states. This Technical Memo will also provide a literature review to summarize the national and regional freight trends and forecasts affecting truck parking in the state and region. This will set the basis for developing a complete truck parking inventory in the subsequent project task and ultimately lead to a detailed evaluation of the adequacy of truck parking in Delaware.

Methodology

This Technical Memo was prepared using existing FHWA truck parking inventory from the 2015 Jason's Law Report; available data on road traffic in Delaware; and a literature review of current national, regional, and state studies, plans, data collections, and initiatives.

Limitations

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

2 Relevant Findings from Existing Studies, Plans, and Initiatives

The pressing need to address truck parking shortages has driven agencies and organizations to investigate and collect data on truck parking issues, evaluate truck parking needs and demands, and develop best practices and recommendations for addressing truck parking issues. This section provides an overview of existing literature relevant to truck parking in Delaware, spanning national, regional, and local efforts. Delaware, like most states in the nation, faces truck parking shortages, leading to associated issues of idling and undesignated parking. Several regional and local studies recommend developing new trucking parking facilities, improving existing facilities, and integrating emerging technologies. The issues raised by these prior studies and reports will be used to validate and inform the assessment and identification of truck parking needs and issues in Delaware.

2.1 Jason's Law Truck Parking Survey

The Moving Ahead for Progress in the 21st Century (MAP-21) Act of 2012, enacted Jason's Law (Section 1401) to address the truck parking shortage on U.S. highways. MAP-21 establishes truck parking projects as eligible for federal funding and identifies addressing the shortage of long-term truck parking as a national priority.[2] Jason's Law also requires the U.S. Department of Transportation (DOT) to conduct a survey that accomplishes the following:

> *(1) "Evaluate the capability of each State to provide adequate parking and rest facilities for commercial motor vehicles engaged in interstate transportation;*
>
> *(2) Assess the volume of commercial motor vehicle traffic in each State; and*
>
> *(3) Develop a system of metrics to measure the adequacy of commercial motor vehicle parking facilities in each state."*[3]

In 2015, the FHWA surveyed public and private stakeholders – including truck drivers, trucking firm personnel, truck stop and rest area owners and operators, State DOT personnel, and enforcement officials – to evaluate truck parking in each state. FHWA also created a Stakeholder Technical Working Group to provide input and inform the system of metrics to evaluate truck parking as required by Jason's Law.

[2] USDOT, FHWA, Jason's Law Truck Parking Survey Results and Comparative Analysis, August 2015, https://ops.fhwa.dot.gov/freight/infrastructure/truck_parking/jasons_law/truckparkingsurvey/jasons_law.pdf
[3] Ibid

Jason's Story

In 2009, father, husband, and truck driver Jason Rivenburg parked overnight at an abandoned gas station, as he was not allowed to arrive at his delivery destination ahead of his scheduled time. As Jason slept in his cab, an armed man entered the vehicle. He shot and killed Jason for $7.00 in cash. Jason left behind his wife, pregnant with twins at the time, and a 2-year old son. In the wake of his death, Jason's wife fought to make truck parking safer under Jason's Law. Ultimately, Jason's Law was incorporated into and enacted under the MAP-21 in 2012.

The 2015 Jason's Law truck parking survey results confirmed that most states experience truck parking shortages. For 36 states, including Delaware, State DOTs identified a problem with truck parking.

Key findings of the 2015 Jason's Law Survey applicable to this study include the following:

- As part of the Mid-Atlantic, Delaware is within one of the regions cited as the most challenging for truck parking shortages. Other challenging areas are the east-north central area, New England, and the Southeast.
- Challenges for expanding capacity at private truck parking locations include land use and zoning laws, in addition to a lack of funding and authority.
- More than half of state DOTs reported undesignated truck parking events, with the majority of such observations occurring at night or during weekend days. Motor Carrier Safety officials also reported consistent observations of trucks parked in undesignated locations, with a slight drop in the numbers during the winter months.
- About 75 percent of truck drivers and 66 percent of logistics personnel reported regularly facing challenges finding safe parking locations when in need of rest.
- Primary challenges related to truck parking supply and demand management include inclement weather conditions, delivery window limitations, and lack of funding for truck parking regulation enforcement.
- I-95 was listed as a top-five corridor with truck parking shortages.

Section 3 and Section 4.3 of this Technical Memo present Jason's Law Survey results specific to Delaware and its neighboring states.

An updated Jason's Law Inventory is expected to be released sometime in 2021. Once that inventory is publicly available, the analysis included in this Technical Memo will be updated to reflect this 2021 release, as well as a CPCS validated inventory of Delaware truck parking facilities..

2.2 ATRI Critical Issues in the Trucking Industry

ATRI published its annual Critical Issues in the Trucking Industry report in October 2020, highlighting key trucking issues based on a survey of over 3,100 trucking industry stakeholders, such as motor carrier personnel and commercial drivers, among others. Trucking companies ranked truck parking as the third-highest issue of concern (behind only driver shortage and driver compensation), two spots

higher than its 2019 ranking. Commercial drivers in particular ranked truck parking the highest priority concern. Truck parking has consistently made the top ten industry issue ranking since 2012, and it has risen from the 8th highest priority ranking to the 3rd in that time.[4]

Proposed Strategies to Address Truck Parking:

- Identify strategic locations on the National Freight Network for new or expanded truck parking due to increased traffic congestion, changing staging needs, and industry/regulatory changes
- Create a new dedicated federal funding program designed to increase truck parking capacity at freight-critical locations.
- Research the role and value of real-time truck parking information systems and truck parking reservation systems.

2.3 Eastern Corridor Coalition – Truck Parking Activities

The Eastern Corridor Coalition, formerly known as the I-95 Corridor Coalition, is a partnership of 17 states and D.C. – from Maine to Florida – focused on connecting public agencies to increase the safety and efficiency of travel across modes. The Coalition has conducted a series of truck parking activities over the past several years to address the critical issue of truck parking in the region.[5]

> *"These activities have included investigation of truck parking technologies; truck parking applications which are flexible and adaptable, and useable within states' existing system platforms; ability to reach the user with well-timed truck parking availability information; holding a truck parking workshop for the entire Corridor; and conducting a demonstration pilot project, along with an evaluation of the project and lessons learned."*

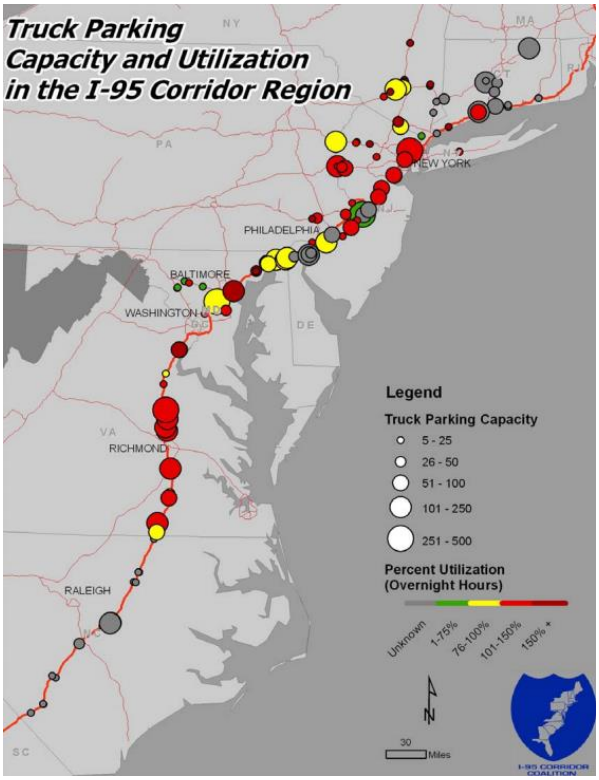
The Coalition received funding through FHWA's Truck Parking Initiative to assess truck parking issues along the corridor, with a particular focus on the area's long-term, overnight parking problem, along a stretch of the I-95 corridor, extending from Connecticut through North Carolina.

[4] ATRI, Critical Issues in the Trucking Industry, October 2020, https://truckingresearch.org/wp-content/uploads/2020/10/ATRI-Top-Industry-Issues-2020.pdf
[5] Eastern Transportation Coalition, 2020, https://tetcoalition.org/; Eastern Transportation Coalition, Truck Parking, 2020, https://tetcoalition.org/projects/truck-parking/#.

In its report, the Coalition highlighted regulatory changes, such as HOS requirements, regional population and economic growth, and just-in-time production and distribution operations, as key factors driving the increase in demand for long-term truck parking along I-95. Further, the Coalition noted several problems that underscore the need for innovative public-private and multi-jurisdictional truck parking solutions along the corridor:[6]

- A severe shortfall of truck parking, with severity expected to grow.
- Due to truck congestion along I-95, most public and private truck parking areas operate well above capacity (Figure 2-1).
- Due to insufficient safe, convenient, and easy-to-find parking, truckers may make choices that put personal and public safety at risk, such as driving while fatigued or parking in undesignated locations.

Figure 2-1: I-95 Truck Parking Capacity and Utilization



I-95 Corridor Coalition, Truck Parking Initiative 2015

As a result of the Truck Parking Initiative, the Coalition piloted and demonstrated a real-time truck parking information system using pavement sensors to detect trucks in spaces and determine space utilization. The project also evaluated options for sharing truck parking data with truckers, including through a truck parking website for pre-trip planning and a hands-free telephone system (using interactive voice response and automatic call-back) to provide automated parking availability information. The system was installed at five Virginia sites during the pilot, and upon the pilot's conclusion in April 2018, the system was turned over to the Virginia DOT.[7]

After the project's completion, the Coalition convened public agency stakeholders (representing the Coalition's 17 state DOTs) for a Truck Parking Workshop in March 2018 to share lessons learned, review findings, explore related needs and trends, and further potential solutions to address truck parking in the region. Figure 2-2 provides a summary of key truck parking challenges identified by stakeholders during the workshop.

[6] I-95 Corridor Coalition, Truck Parking Initiative, 2015, https://tetcoalition.org/wp-content/uploads/2015/02/I-95-Truck-Parking-Final-Proposal-Only.pdf
[7] Eastern Transportation Coalition, Truck Parking: Project, https://tetcoalition.org/projects/truck-parking/

Figure 2-2: I-95 Corridor Coalition Truck Parking Workshop Key Challenges

Key Challenges for Truck Parking in the I-95 Corridor
▪ Demand exceeds existing capacity. ▪ Lack of reliable, real-time parking availability information. ▪ Public need vs. perceived private-sector solution. What is DOT's role? ▪ High land cost, "Not In My Back Yard" (NIMBY), and cross-jurisdictional issues related to the geography of the corridor (e.g. New York, New Jersey, Connecticut, and Pennsylvania all within 60 miles of the Port of New York/New Jersey). ▪ Different long-haul/short-term/staging parking needs. ▪ Lack of uniform standards (site design, data use, etc.). ▪ Data acquisition, sharing agreements, and data quality concerns.

Source: I-95 Corridor Coalition, Truck Parking Workshop Summary, 2018

2.4 Delmarva Freight Plan

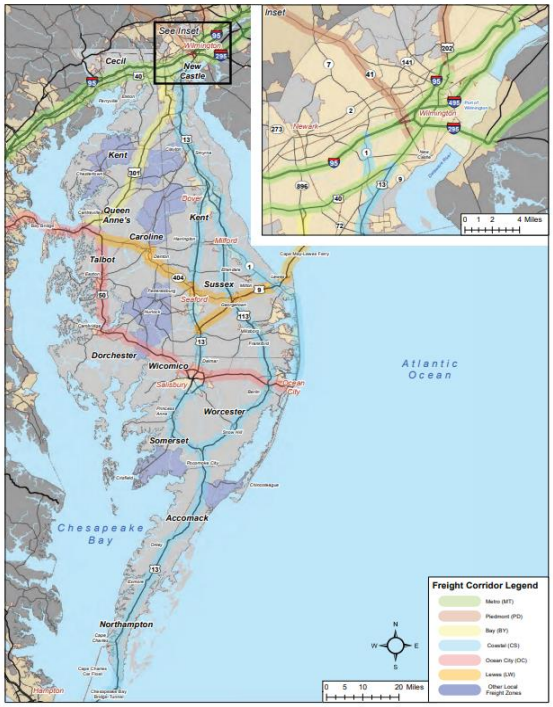
DelDOT, in collaboration with the Maryland DOT, Virginia DOT, and other regional stakeholders[8], completed the Delmarva Freight Plan (May 2015) to provide a regional perspective of freight flows, issues, and planning to inform future decision-making, investments, and policies.[9]

> *"The Delmarva Freight Plan summarizes current and future freight planning and transportation needs to enhance freight and goods movement and related economic opportunities on the 14-county tri-state area of the Delmarva Peninsula."*

Key multimodal freight corridors identified by the Delmarva Freight Plan (Figure 2-3) include:

- I-95 Metro Freight Corridor (north-south)
- US 301 Bay Freight Corridor (north-south)
- US 50 Ocean City Freight Corridor (east-west)
- US 13/113 and DE 1 Coastal Freight Corridor (north-south)
- US 202 and DE 41 Piedmont Freight Corridor (east-west)
- MD/DE 404 and US 9 Lewes Freight Corridor (east-west)

Figure 2-3: Delmarva's Major Freight Corridors and Local Freight Zones



Source: DelDOT, Delmarva Freight Plan, May 2015.

[8] Full list of partners: Maryland Department of Transportation, Virginia Department of Transportation, Wilmington Area Planning Council, Dover/Kent County MPO, Salisbury/Wicomico MPO, University of Delaware, IHS Global Insight, Federal highway Administration

[9] DelDOT, Delmarva Freight Plan, May 2015, https://deldot.gov/Publications/reports/freight_plan/pdfs/2015/Delmarva_Freight_Plan_Final_Report.pdf?cache=1604417992047

Consumer demand, freight movements, and distribution hubs on the Delmarva Peninsula are centered around established and growing locations with proximity to major transportation infrastructure and access to consumer markets, such as New Castle (DE), Cecil (MD), Kent (DE/MD), Sussex (DE), and Wicomico (MD) counties. Factors that impact freight movement through the region include economic and demographic trends, expected growth in freight-dependent industries, and local industry requirements. Meanwhile, the region faces global/national freight concerns of aging infrastructure and funding constraints, as well as concerns on the peninsula of congestion issues, residential encroachments, peak seasonal population spikes, secondary truck traffic increases, freight/passenger traffic conflicts, and motor freight cost increases.

The Plan's Strategic Goals, as summarized in Figure 2-4, provide further insight into the region's specific issues.

Figure 2-4: Delmarva Freight Plan Strategic Freight Goals

Goal: Economic Vitality

- Support efforts to preserve existing multimodal freight-transportation infrastructure to ensure mode choice and competition between modes.
- Support efforts to preserve land use compatibility adjacent to freight infrastructure.
- Support strategically-located or planned improvements that recognize growth areas and secondary traffic/population-based freight patterns.
- Support specific economic activities or growth in targeted industries.
- Support efforts to enhance regional port access.

Goal: Freight Connectivity, Mobility, and Accessibility

- Enhance freight mobility through broader mobility improvements that recognize the region's unique seasonal or tourist-based congestion patterns.
- Enhance freight network connectivity to/from the peninsula with emphasis on the unique needs and constraints related to the region's limited geographical points of access.
- Enhance opportunities for accessing and utilizing the freight transportation network on the peninsula through strategic multimodal infrastructure improvements.

Goal: Safety and Security

- Support improvements that recognize the criticality and regional/national significance of I-95 and the Northeast Corridor.
- Support improvements that enhance system redundancy with respect to the peninsula's geographic point of access limitations.
- Support improvements that recognize the presence and unique needs of the region's governmental, military, or international shipping communities.

Goal: System Management, Operations, and Maintenance

- Enhance policies and opportunities related to truck parking and rest areas, weight limits, taxes, tolls, or other freight issues
- Support efforts to address physical improvements on secondary roads and bridges critical to first/last mile connections.
- Support efforts to maintain or enhance dredging operations and the identification and preservation of suitable sites for excess dredge materials.

Goal: Sustainability and Environmental Stewardship

- Support improvements that recognize the unique relationships between consumer demands and commodity freight flows on the peninsula with respect to seasonal or tourist-based variability and quality of life.
- Support efforts to enhance the flexibility and resiliency of the freight transportation system to meet changing global energy demands or sources.

Source: Adapted from DelDOT, Delmarva Freight Plan, May 2015.

Among its focus areas, the Plan aims to enhance policies and opportunities related to truck parking and rest areas, weight limits, taxes, tools, or other motor freight issues. Truck parking issues and needs stated by the study include additional capacity for overnight truck parking and short-term staging areas. These issues and needs were noted for several locations in the tri-state region, including several in Delaware: along the I-95 corridor and any of the east/west routes that connect to I-95; in Kent County, DE; along US 301 near the Maryland/Delaware line; and in and around the Port of Wilmington.

The Plan also notes HOS regulations could increase the need for designated truck parking at rest areas in key locations to ensure safe truck parking, highlighting the importance of adequate truck parking, staging, and related access.

Project or study candidates related to truck parking in the tristate region include:

- Truck Parking at the Bay County Rest Area on US 301 in Maryland
- US 13 truck parking study in Accomack and Northampton Counties, Virginia
- Several Delaware targeted studies with an area-wide focus (in Newark, Wilmington, Dover, and Seaford) focused on freight management, which may include truck parking strategies

2.5 Delaware Valley RPC Regional Truck Parking Study

The Delaware Valley Regional Planning Commission conducted a Regional Truck Parking Study to analyze the supply and demand of truck parking in the Philadelphia-Camden-Trenton Region (2011).[10]

> *"This study identifies the capacity of truck parking in the DVPRC region, provides an estimate of the current and future demand, presents the observations of overnight truck parking inventories, and offers recommendations to ensure a sufficient network of truck parking facilities"*

Limited drive time, complex supply chains, and narrow delivery windows are identified as key factors contributing to the need for safe and secure overnight parking. Based on its analysis of truck parking availability and demand, the study finds trucks parking in the region inadequate, with a shortfall of 247 spaces in 2009 projected to grow to 466 spaces by 2035. The study also recommends several multi-agency and regional actions to improve the region's truck parking network, as listed in Figure 2-5.[11]

Figure 2-5: DVRPC Regional Truck Parking Study Actions

Action 1: Fully utilize available public funding that directly supports the creation of additional overnight truck parking spaces.	**Action 4:** Promote the need for additional truck parking spaces and amenities to both DVRPC partners and the public.

[10] DVRPC, Delaware Valley Truck Parking Study and Abstract, May 2011, https://www.dvrpc.org/Products/09057
[11] DVRPC, Delaware Valley Truck Parking Study, May 2011, https://www.dvrpc.org/Products/09057

Action 2: Advance the use of the latest Intelligent Transportation Systems (ITS) technologies to optimize existing parking locations.	**Action 5:** Improve access to existing truck parking facilities.
Action 3: Reduce emissions that are caused by idling parked trucks.	**Action 6:** Maintain existing facilities and create additional regional capacity where possible.

Source: DVRPC, Regional Truck Parking Study, 2011

2.6 Delaware Freight and Goods Movement Plan

The Delaware Freight and Goods Movement Plan (2004) aims to define actions and investments for the implementation of Delaware's Statewide Long-Range Transportation Plan.[12]

> *"This Plan identifies freight and goods movement issues, develops solutions to encourage the efficient and economical movement of goods and materials, and establishes priorities for improvements through the year 2020."*

The Plan identified several key trucking issues, including a lack of rest areas on major truck corridors and undesignated, roadside truck parking. Among the Plan's recommendations included two strategies specific to truck parking: [13]

- **Develop a plan to improve truck access and operations in the vicinity of the Port of Wilmington.** This recommendation proposes a plan to assess the Port of Wilmington and its surrounding area to identify existing and projected future transportation improvement needs. This includes the need for a full-service truck stop and service facility near the port, to meet the need for truck parking both at the Port of Wilmington and in the greater northern Delaware area. In 2013, WILMAPCO conducted a Port of Wilmington Truck Parking Study. Please refer to Section 2.7 for an overview of the study.

- **Develop truck rest areas to address problems of driver fatigue.** This recommendation proposed at least two new truck rest areas be developed in Delaware, with one in the northern half of the state (on US 13 or US 113) and one in the southern half of the state (possibly on I-495 near the Port of Wilmington).

2.7 Port of Wilmington Truck Parking Study

The Port of Wilmington Truck Parking Study was published by WILMAPCO in July of 2013 to evaluate an off-site truck parking lot location at Delaware's Port of Wilmington.[14]

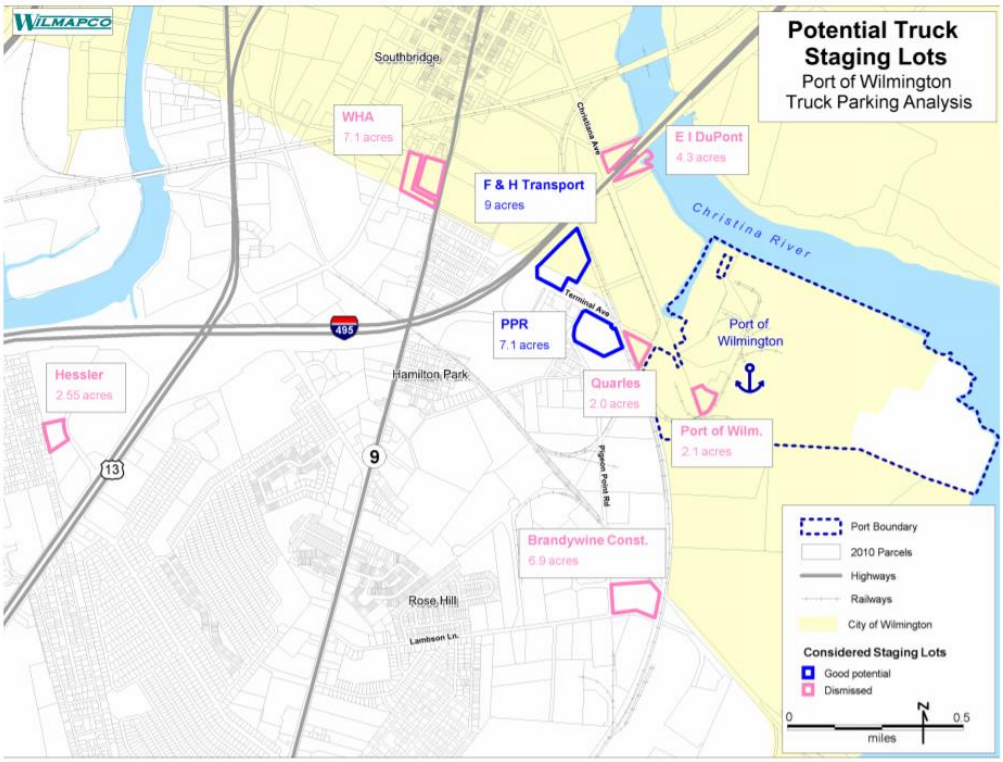
> *"This study examines the possibility of locating an off-site truck parking lot at the Port of Wilmington, Delaware, while also addressing issues surrounding the violations of truck restrictions on South Wilmington's residential roadways, truck idling, and non-motorized access to the port."*

[12] "Delaware Freight & Goods Movement Plan Executive Summary". Delaware Department of Transportation, 2000. https://deldot.gov/Publications/reports/freight_plan/pdfs/executive_summary.pdf
[13] DelDOT, Delaware Freight & Goods Movement Plan Technical Report, 2004, https://deldot.gov/Publications/reports/freight_plan/pdfs/technical_report.pdf
[14] WILMAPCO, Port of Wilmington Truck Parking Study, July 2013.

The Port of Wilmington is a key freight generator in Delaware and the surrounding region, with over 90 percent of its products moved inland via truck.[15] A combination of the port's fresh products (fruits and juices) and nearby primary markets (within a one-day truck drive) make trucking the primary and optimal mode of transport to and from the Port. As a result, the Port and its surrounding areas experience heavy truck traffic and demand for staging, both during and after business hours. The Port of Wilmington identified truck parking areas as its top short-term need, and expected increases in port activity are expected to escalate this need. The key findings of the study included the following recommendations:

The study identifies potential locations to pursue a truck parking area outside of Port property. The proposed truck parking area would provide a staging location for trucks, in turn reducing queuing on Terminal Avenue (which connects the port to major highways). This would free space on Port property and enable the expansion of port activity. The truck parking facility may take form as a private venture seeking investment or a public development by the Port or State seeking expansion of and improved truck flow management around the Port. The study identified two locations with good potential for a truck parking area. Figure 2-6 illustrates the potential truck staging lots evaluated by the study.

Figure 2-6: Possible Staging Area Locations



Source: Port of Wilmington Truck Parking Study, July 2013

Community issues near the Port include illegal truck movements through residential communities and truck idling throughout South Wilmington. The study recommends several measures to address these issues, including the development of a truck parking lot for staging to mitigate truck idling, which is an issue of particular trouble at the interstate ramps along Terminal

[15] Ibid

Avenue. A truck parking lot provides a long-term solution for truck idling near the Port, with the addition of electrification offering the potential to further address noise and air quality issues in the community.

2.8 Special Committee to Study and Make Recommendations Regarding Truck Traffic & Freight Movements Along SR 41, SR 48 & SR 7

The Delaware State Senate passed Senate Resolution No. 10 (SR 10) in 2017 to create a Special Committee to study and make recommendations regarding truck traffic movement along SR 41, SR 48, and SR 7 in New Castle County, Delaware.[16]

> *"Per SR 10, the Special Committee was directed to study and make recommendations regarding:*
>
> *(1) How to reduce the number of trucks traveling along these roadways; and*
>
> *(2) Any improvements in engineering, infrastructure, education, and enforcement that can improve the quality of life for those that live along these roadways."*

In January 2018, the Special Committee published 24 recommendations to DelDOT and the General Assembly. While the recommendations did not specify truck parking, several recommendations relate to improving regional freight movement and reducing congestion, which may impact truck parking needs and locations. These recommendations are listed in Figure 2-7.

Figure 2-7: Sample of Special Committee Recommendations

Recommendations
Recommendation #1*: Conduct a feasibility study of constructing a bypass between US 1 and I-95
Recommendation #2: Conduct a feasibility study of constructing a dedicated freight line along the NE corridor from Perryville, MD to Newark, DE
Recommendation #4: Conduct a feasibility study of restricting trucks on SR 7, SR 41, and SR 48 during specified times, in specified directions, and based on loaded vs. unloaded conditions, determining impacts to, and improvements needed, on alternate routes
Recommendations #5: Conduct a feasibility study for improvements to the SR 896 corridor, including a potential alternate parallel route, to encourage trucks to use I-95 to SR 896
Recommendation #15: Perform a traffic engineering study to determine any potential improvements for intersections on SR 7, SR 41, and SR 48 that are currently operating at LOS E or worse, based on WILMAPCO's Congestion Management Program Results
Recommendation #17: Perform a study to identify feasible locations to install fixed virtual WIM stations on SR 7, SR 41, and SR 48

[16] Special Committee to Study and Make Recommendations Regarding Truck Traffic & Freight Movements Along SR 41, SR 48 & SR 7, Recommendations, January 12, 2018, http://www.wilmapco.org/sr10/SR%2010%20Final%20Report%20Recommendations_2018.01.12.pdf

Recommendations #23*: Establish a bi-state working/coordination group to discuss and address issues associated with regional freight movement. The working group should be comprised of representatives from DelDOT, PennDOT, WILMAPCO, Delaware Valley Regional Planning Commission (DVRPC), Delaware State Police, Pennsylvania State Police, and other relevant stakeholders

Source: Special Committee to Study and Make Recommendations Regarding Truck Traffic & Freight Movements Along SR 41, SR 48 & SR 7, Recommendations, 2018. Note: Asterisk (*) indicates recommendations that received priority from at least five Committee members.

2.9 Maryland Statewide Truck Parking Study

The Maryland DOT published the Maryland Statewide Truck Parking Study in 2020 to assess statewide truck parking needs and develop opportunities and actions to improve truck parking in the state.[17]

> *The Maryland Department of Transportation (MDOT) recognizes that safe and available truck parking is critical to safety, roadway condition, and the efficient movement of goods. The Maryland Statewide Truck Parking Study inventoried truck parking locations, identified factors affecting truck parking demand, identified and prioritized undesignated truck parking, conducted outreach with public and private sector freight stakeholders, and identified recommendations to address truck parking needs.*

Delaware, as a neighbor state to Maryland, was also included in the Study's regional discussions and analysis of truck parking needs and opportunities. Regional findings relevant to Delaware include the following:

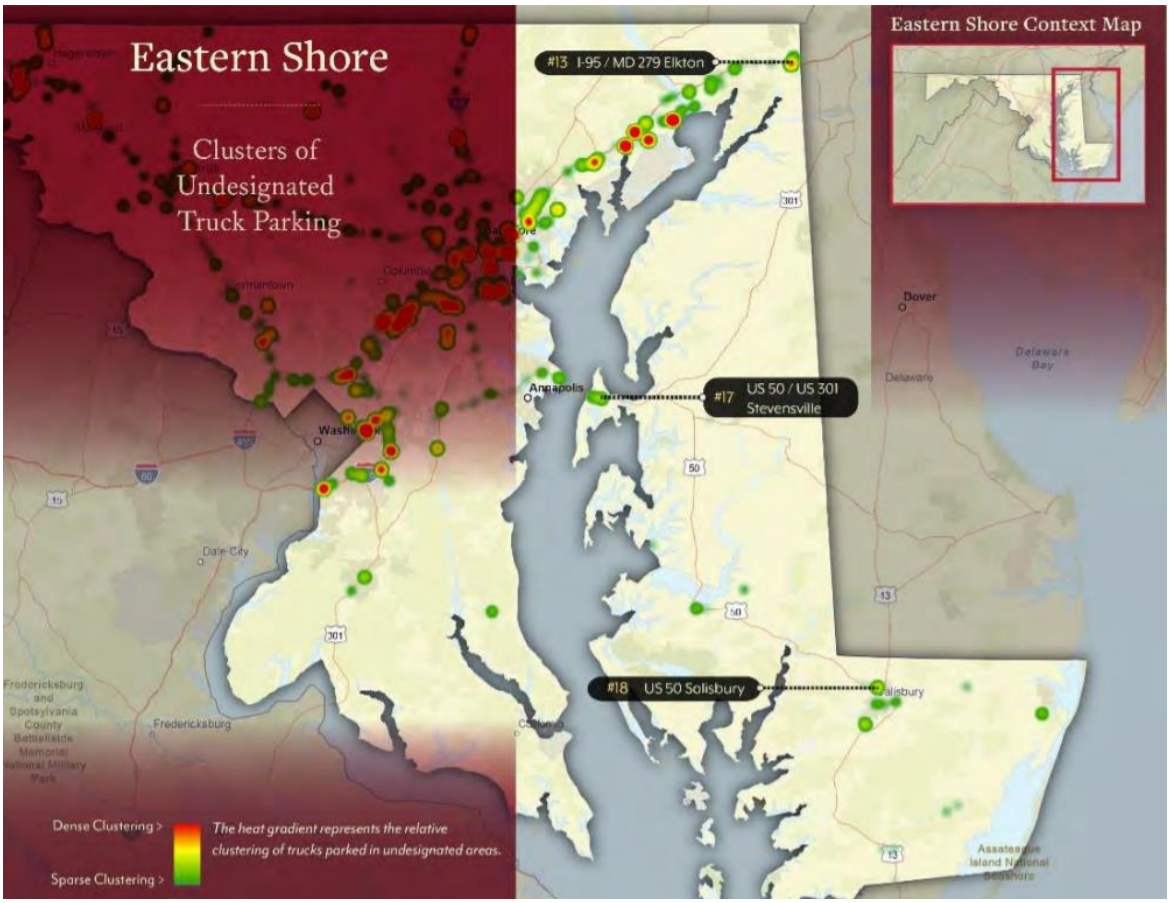
- I-95 serves as a significant regional route in Maryland, but experiences limited truck parking availability at night, resulting in undesignated truck parking throughout the region.
- There is a lack of truck parking on Maryland's Eastern shore between Maryland/Delaware and Virginia state lines. Figure 2-8 identifies priority clusters of undesignated truck parking – the most severely impacted areas on which to focus analysis and solutions – in Eastern Maryland.

  Priority Cluster #13: undesignated truck parking occurs on roadways leading to warehouses and on the shoulder of I-95. This location offers the opportunity to install an information system that directs trucks to available parking in the area. Information systems could be installed at the Maryland House, Chesapeake House, and the Perrysville TWIS for trucks driving north on I-95; and at the Maryland/Delaware border for trucks driving south on I-95.

  Priority Cluster #18: undesignated truck parking occurs in Salisbury near US 50, on local roadways the connect to warehousing and other industrial land use. This location offers the opportunity to coordinate with local jurisdictions to integrate truck parking needs into planning, zoning, and land use development; and utilize nearby park and ride facilities for overnight truck parking.

[17] Maryland DOT, Maryland Statewide Truck Parking Study: Final Report, 2020, https://mdot.maryland.gov/OPCP/MDOTTruckParkingStudyWeb.pdf.

Figure 2-8: Eastern Maryland Priority Clusters



Source: Maryland DOT, Maryland Statewide Truck Parking Study, 2020.

The Maryland Statewide Truck Parking Study identified nine truck parking obstacles and challenges,

- Lack of dedicated and overall truck parking
- Lack of knowledge of where/how to find truck parking
- Different truck parking needs in rural and urban areas
- Safety and the perception of safety
- Lack of amenities at truck parking facilities
- Noise in neighboring communities near truck parking facilities
- Lack of innovation in truck parking
- Lack of real-time truck parking system and navigation
- Legislative challenges

The identified obstacles and challenges highlighted truck parking needs and informed final Study recommendations to "reduce undesignated truck parking through the implementation of projects, policies, and partnerships that positively affect safety, economic prosperity, and the condition of transportation infrastructure."[18] Figure 2-9 details these recommendations.

[18] Maryland DOT, Maryland Statewide Truck Parking Study: Final Report, 2020, p. 100, https://mdot.maryland.gov/OPCP/MDOTTruckParkingStudyWeb.pdf.

Figure 2-9: Maryland Statewide Truck Parking Study Recommendations

Recommendation 1: Further develop the truck parking program.
Recommendation 2: Convene a standing truck parking committee and further outreach on truck parking issues.
Recommendation 3: Integrate truck parking into land use, zoning, and planning.
Recommendation 4: Utilize grants and other alternative funding and partnership opportunities.

Source: Maryland DOT, Maryland Statewide Truck Parking Study, 2020.

2.10 Truck Parking in Pennsylvania

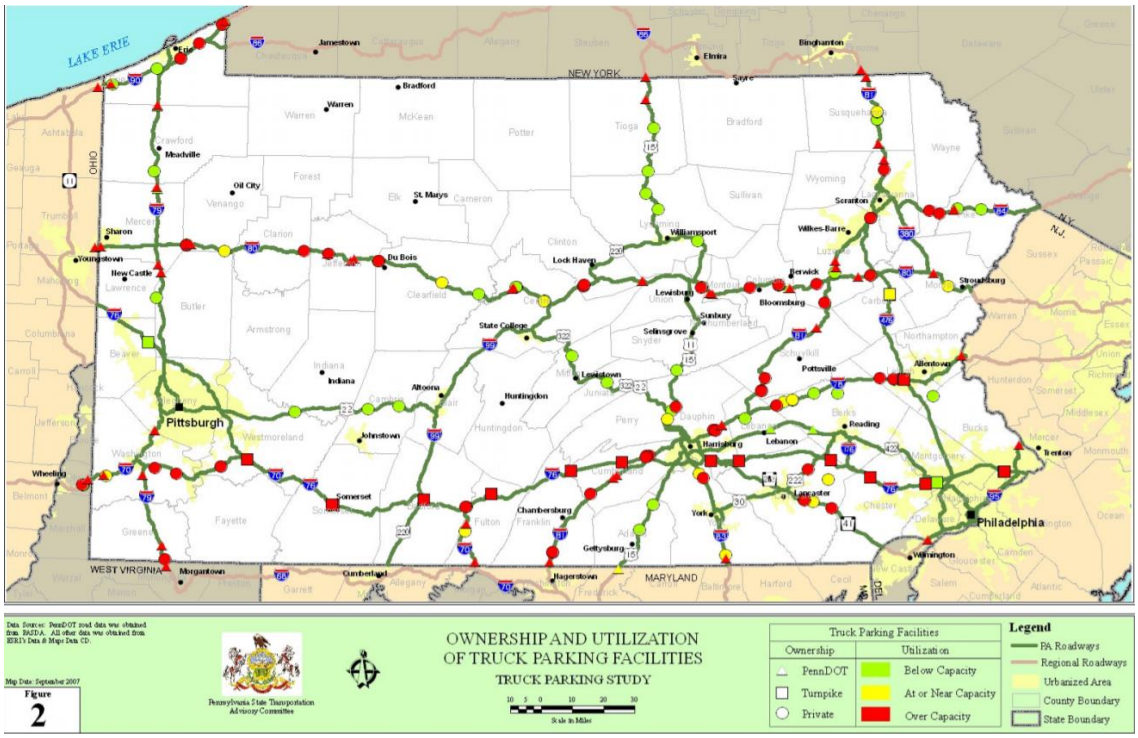
The Pennsylvania State Transportation Advisory Committee conducted a study on Truck Parking in Pennsylvania (December 2007) in response to the increasing demand for truck parking in the state and nationwide.[19]

> *This study provides an overview of the truck parking issues and trends facing Pennsylvania, the identification of regions in the state where parking demand is highest, and options for parking providers, drivers, and decision makers.*
>
> *Through this study the TAC provides an analysis of the complex issues surrounding truck parking, and multi-faceted strategies to achieve adequate and safe truck parking across the state.*

The Truck Parking in Pennsylvania study provides context for truck parking issues and needs in Pennsylvania and its surrounding states – including Delaware. As illustrated in Figure 2-10, several truck parking locations in Pennsylvania on corridors extending to Delaware are over capacity.

[19] Pennsylvania State Transportation Advisory Committee, Truck Parking in Pennsylvania, December 2007, https://www.talkpatransportation.com/assets/TAC/Truck%20Parking%20in%20Pennsylvania%20-%20December%202007%20-%20Final%20Report.pdf.

Figure 2-10: Pennsylvania Truck Parking Locations and Utilization



Source: Pennsylvania State Transportation Advisory Committee, Truck Parking in Pennsylvania, December 2007.

The Truck Parking in Pennsylvania study recommends a 12-point strategy (Figure 2-11) through which PennDOT can "provide overall leadership to eliminate unsafe truck parking practices and to assist in facilitating new and expanded facilities as well as innovative ways to foster partnerships." [20]

Figure 2-11: Twelve-Point Strategy for Truck Parking in Pennsylvania

Partnering
1. Advance TAC study recommendations by forming a public-private task force.
2. Collaborate with neighboring states to forge regional solutions.
3. Explore opportunities for expanding truck parking capacity and local economic development through dual-use facilities, brownfield re-use, and provision of parking at truck-oriented developments.
Policy
4. Remove obstacles to public-private partnering for truck parking facilities and driver services.
5. Develop a truck parking policy through the National Governor's Association and the American Association of State Highway and Transportation Officials for the reauthorization of federal transportation legislation emphasizing partnership, innovative finance, and new funding programs.

[20] Pennsylvania State Transportation Advisory Committee, Truck Parking in Pennsylvania, December 2007, p. 39, https://www.talkpatransportation.com/assets/TAC/Truck%20Parking%20in%20Pennsylvania%20-%20December%202007%20-%20Final%20Report.pdf.

Planning & Finance
6. Explore all funding opportunities, particularly for innovative pilot projects.
7. Address truck parking through established statewide planning and programming processes.
8. Reevaluate approaches for accommodating the growing truck parking demand on toll facilities, particularly the PA Turnpike mainline.
9. Establish appropriate performance monitoring to track progress.
Technology & Design
10. Develop complementary ITS applications that support more efficient operations and truck parking.
11. Evaluate new truck parking design concepts to provide improved access to services, more parking at existing sites, and improved circulation.
12. Integrate technologies and design principles into truck parking facilities to mitigate environmental impacts.

Source: Pennsylvania State Transportation Advisory Committee, Truck Parking in Pennsylvania, December 2007.

2.11 Virginia Truck Parking Study

The Virginia DOT published the Virginia Truck Parking Study (July 2015) to provide the state agency with current information to address truck parking challenges statewide.[21]

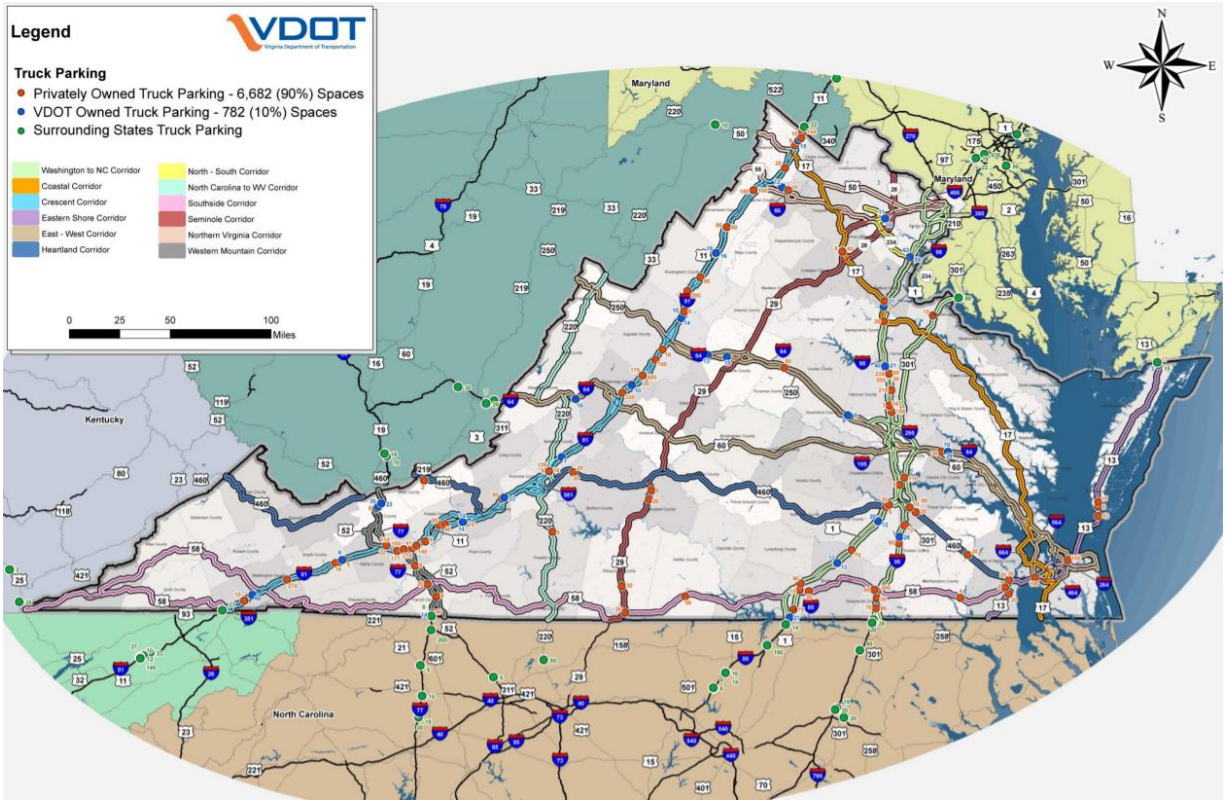
> *The FY2014/2015 VDOT Business Plan committed VDOT to "launch a truck parking study to identify areas where commercial truck parking is needed along 14 Corridors of Statewide Significance (CoSS) to provide safe places for truckers to rest so they do not impede traffic by parking on entrance and exit ramps."*

Given Delaware's proximity to Virginia, the Virginia Truck Parking Study provides context for truck parking issues and needs in the greater region. The Study includes an analysis of the following corridors that extend through Delaware (Figure 2-12 and Figure 2-13):

- Washington to North Carolina Corridor (I-95, I-395, I-495, I-85, I-195, I-295, US 1, and US 301)
- Eastern Shore Corridor (US 13)

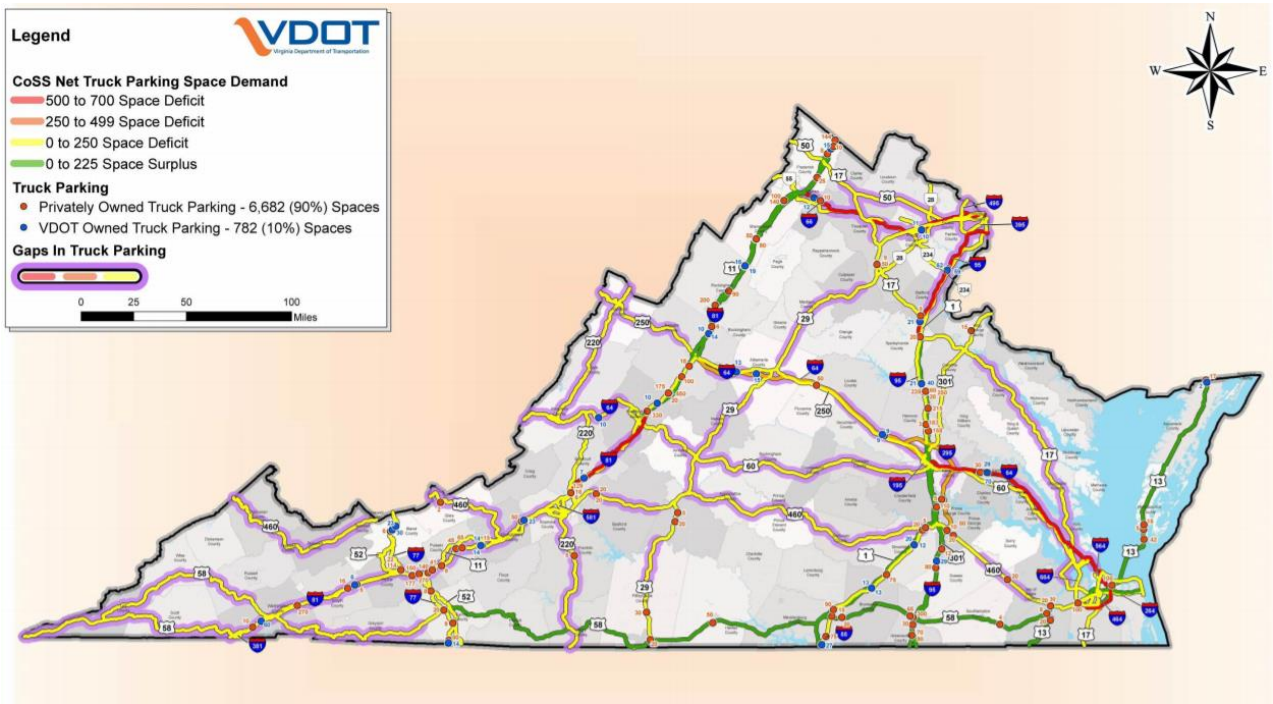
[21] Virginia DOT, Virginia Truck Parking Study, July 2015, https://www.virginiadot.org/projects/resources/VirginiaTruckParkingStudy_FinalReport_July2015.pdf.

Figure 2-12: Virginia Truck Parking Inventory on Study Corridors



Source: Virginia DOT, Virginia Truck Parking Study, July 2015.

Figure 2-13: Virginia Truck Parking Gaps on Study Corridors



Source: Virginia DOT, Virginia Truck Parking Study, July 2015.

The Virginia Truck Parking Study's final recommendations seek to meet the objective of "increasing the supply of truck parking spaces in appropriate areas [to have] a significant impact in mitigating truck parking in undesirable locations."[22] Figure 2-14 details these recommendations.

Figure 2-14: Virginia Truck Parking Study Recommendations

Recommendation 1: Partner with private industry and local governments to increase capacity and related improvements.
Recommendation 2: Provide accurate and real-time information about truck parking supply and availability in Virginia.
Recommendation 3: Improve the safety, effectiveness, and supply of truck parking spaces at State-owned facilities.

Source: Virginia DOT, Virginia Truck Parking Study, July 2015.

2.12 Summary of Review of Existing Studies

The existing studies related to truck parking and freight movement issues in Delaware and the region reinforce WILMAPCO and DelDOT aims for this project: that the State of Delaware and its surrounding region face significant truck parking shortages; key freight corridors and freight generators, in particular I-95 and Port of Wilmington in Delaware, face rapid growth in truck traffic and require additional truck parking to address these growing needs; and truck traffic patterns are placing pressure on secondary roadways in Delaware. The findings of these prior studies will be considered both when conducting the forthcoming detailed analysis of truck parking behavior and truck traffic patterns in the next technical memo as well as in the development of final study recommendations, strategies, and solutions.

[22] Virginia DOT, Virginia Truck Parking Study, July 2015, p. 68, https://www.virginiadot.org/projects/resources/VirginiaTruckParkingStudy_FinalReport_July2015.pdf.

3 Truck Parking Facilities

Based on the 2015 Jason's Law Survey, Delaware is home to 16 truck parking facilities – one public facility, one public-private facility[23], and 14 private truck stops. For every one public parking space in the state, there are 10.5 private truck parking spaces.

This section provides an initial overview of Delaware's truck parking facilities based on 2015 Jason's Law Truck Parking data. The CPCS team will validate and supplement this initial overview with additional data sources, including truck GPS data, to develop a complete and updated inventory of truck parking in Task 2.

An updated Jason's Law Inventory is expected to be released sometime in 2021. Once that inventory is publicly available, the analysis included in this Technical Memo will be updated to reflect this 2021 release, as well as a CPCS validated inventory of Delaware truck parking facilities.

3.1 Existing Facilities in Delaware

Truck parking is provided by private truck parking stops, public truck parking facilities, or public-private truck parking facilities. Private facilities are owned and operated by private companies, while public facilities are owned and operated by public agencies – such as by DelDOT in Delaware. Truck parking facilities may also operate under a public-private partnership (PPP). For instance, the Biden Welcome Center – the sole PPP facility in the state – is owned by DelDOT, but is operated and maintained by a private company. For this Technical Memo, the Biden Welcome Center has been designated a private facility in line with the 2015 Jason's Law Inventory reporting.

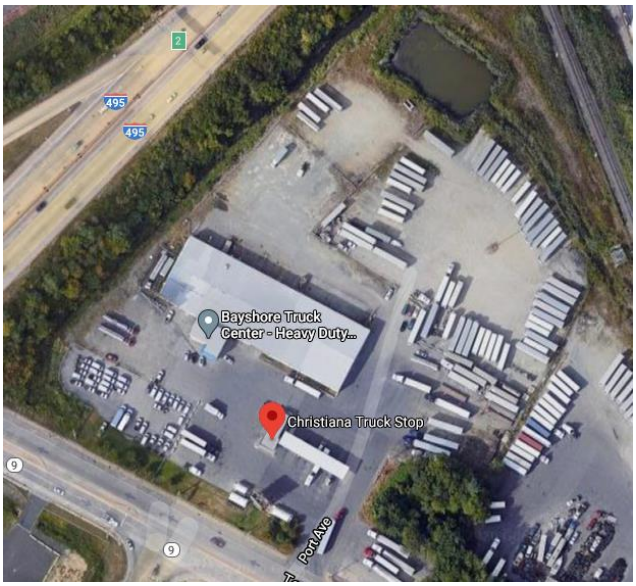
3.1.1 Private Facilities

In Delaware, private truck parking facilities supply the majority of truck parking, offering 294 spaces across 15 private truck stops. Private truck spots are primarily owned by small independent operators, such as local gas stations and convenience stores, with over half of private truck stops providing one to ten parking spaces.[24] The largest truck stop chains in the nation (TravelCenters of America/Petro, Love's, Pilot/Flying J) do not offer truck parking in Delaware.

Two of the state's largest independent truck stops are located in north Delaware near Wilmington. The Christiana Truck Stop is located off I-495 near the Port of Wilmington operates as a privately owned staging area for port facilities, with additional food, fuel, and shower facilities (Figure 3-1). The Delaware Truck Plaza is located near New Castle County Airport is on US 13, offering truck parking in addition to fuel and shower facilities (Figure 3-2).

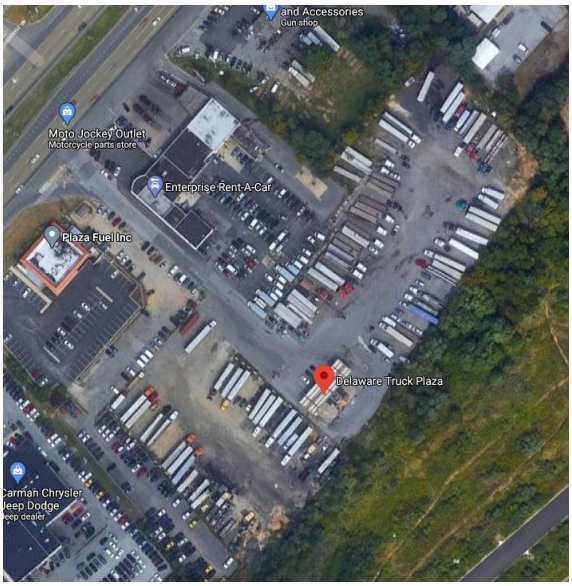
[23] Note the 2015 Jason's Law Survey classifies the one public-private facility as private. However, the 2020 Jason's Law Survey reclassifies this facility as a public facility.
[24] CPCS Analysis of Jason's Law Survey, 2015

Figure 3-1: Christiana Truck Stop



Source: Google Maps, Retrieved November 6, 2020

Figure 3-2: Delaware Truck Plaza



Source: Google Maps, Retrieved November 6, 2020

Biden Welcome Center: A Public-Private Facility

The Biden Welcome Center[25] is owned and operated under a public-private partnership between DelDOT and HMSHost, under which the center is publicly owned but privately operated. In 2008, DelDOT entered a 35-year agreement with HMSHost to redevelop, maintain, and operate the facility.[26] Under this partnership, DelDOT maintains ownership of the facility and also receives a percentage of sales from fuel and other items sold. The facility is located on I-95 in northern Delaware near Newark, serving as the main service plaza accommodating trucking on the northeast corridor in Delaware.

Idle Air is an electricity and air filtration system which connects truck cabins to a local electricity source and climate controlled air pump. This allows truckers to have clean filtered air in their cabins while they sleep without having to take the risk of rolling down their windows, leaving them exposed to theft or violence. This system also allows the use of electronics without having to idle the truck engine (thereby avoiding wasting expensive diesel and creating pollution).

The facility provides 65 truck parking spaces, 50 of which are truck parking spaces with anti-idle truck electrification hookups.[27] In addition to parking, the facility offers a 42,000-square-foot main building that was renovated in 2009 and amenities such as a convenience store, six fast-food restaurants, and 21 high-speed diesel fuel pumps.[28] Figure 3-3 provides a satellite view of the facility and associated truck parking area.

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[25] Jason's Law 2015 classifies the Biden Welcome Center as a private facility, but Jason's Law 2020 classifies the Biden Welcome Center as a public facility. This is due to Jason's Law reclassification of public-private facilities as public facilities.

[26] QSR Magazine. "Delaware Awards 35-Year Contract to HMSHost". September 3, 2008. Retrieved November 4, 2020. Retrieved from https://www.qsrmagazine.com/news/delaware-awards-35-year-contract-hmshost

[27] Rip Watson, Transport Topics News. "More Electrification Firms Vie for Truck Stop Business". June 20, 2011. Retrieved October 5, 2020. Retrieved from https://www.ttnews.com/articles/more-electrification-firms-vie-truck-stop-business.

[28] "Delaware Welcome Center Travel Plaza Closes Tuesday for Renovations". Delaware Department of Transportation. September 3, 2009. Retrieved September 29, 2020.

Figure 3-3: Biden Welcome Center

Source: Google Earth, Retrieved November 6, 2020

3.1.2 Public Facilities

There is one public truck parking facility in Delaware. Figure 3-4 provides an overview of the sole publicly owned *and* operated facility in the state.

Figure 3-4: Publicly Owned Truck Parking Facilities in Delaware

Facility Name	Operating Type	Owner Type	Corridor	City	Truck Parking Spaces
Smyrna Area	Public	Public	US 13	Smyrna	28

Source: Jason's Law Truck Parking Survey, 2015

Smyrna Rest Area

The Smyrna Rest Area is the single publicly owned and operated parking facility in Delaware, serving as the main rest area on US 13 to the southern half of the state. The rest area, whose existing building was opened in 1991, includes 28 truck parking spaces and additional facilities – public restrooms, vending machines, and picnic tables.[29] Figure 3-5 provides a satellite view of the facility and associated truck parking area.

[29] "Delaware Rest Areas". Delaware Department of Transportation. Retrieved October 5, 2020. Retrieved from https://deldot.gov/Programs/restareas/index.shtml?dc=SmyrnaRestArea

Figure 3-5: Smyrna Rest Area

Source: Google Earth, Retrieved November 6, 2020

3.2 Regional Comparison

Delaware has a lower absolute number of public and private truck parking spaces, compared to its neighbors (Figure 3-6). This is likely attributable to the fact that Delaware is one of the smallest states by area in the nation. However, Delaware remains a critical location for goods movement, particularly along I-95 and US 13. Section 4.3 further details the number of truck parking spaces in Delaware and the surrounding region, relative to truck traffic and highway mileage in each state.

Figure 3-6: Public and Private Parking Availability (Delaware and Neighbor States)[30]

State	Public Facilities	Public Truck Spaces	Public Share of Total Truck Spaces	Private Truck Stops	Private Truck Spaces	Private Share of Total Truck Spaces	Truck Spaces
Delaware	1	28	8.7%	15	294	91.3%	322
Maryland	20	492	16.2%	49	2,544	83.8%	3,036
Pennsylvania	66	1,569	14.4%	223	9,363	85.6%	10,932
New Jersey	15	757	25.5%	112	2,213	74.5%	2,970
Virginia	35	729	8.9%	148	7,463	91.1%	8,192
West Virginia	30	641	26.8%	37	1747	73.2%	2,388
National	**1,908**	**36,222**	**11.7%**	**6,376**	**272,698**	**88.3%**	**308,920**

Source: Jason's Law Truck Parking Survey Results 2015.

Compared to its neighboring states, Delaware offers the highest ratio of private to public parking in the region, with 10.5 private parking spaces for every one public parking space. This ratio ranks thirteenth in the nation and is higher than the national average ratio of 8. Figure 3-7 details the ratio of private to public truck parking spaces in Delaware and the surrounding region, compared to the national average.

Figure 3-7: Ratio of Private to Public Parking Spaces (Delaware and Neighbors)

State	Ratio of Private to Public Parking Spaces	National Ranking
Delaware	10.5	13
Virginia	10.2	15
Pennsylvania	6	29
Maryland	5.2	36
New Jersey	2.9	42
West Virginia	2.7	44
National Average	**8**	**N/A**

[30] Note the 2015 Jason's Law Survey classifies Delaware's public-private facility as private. However, the 2020 Jason's Law Survey reclassifies this facility as a public facility.

4 Truck Traffic

This section uses Highway Performance Monitoring System (HPMS) data to analyze combination truck traffic in Delaware. Current truck traffic data, combined with future forecasts, provides a preliminary indication of where truck parking demand is likely to be concentrated and where demand will increase in Delaware.

Key corridors in the state assessed in this analysis include I-95, I-295, I-495, US 13, US 113, and SR 1. Compared to its neighboring states, Delaware offers the fewest number of truck parking facilities and spots – both public and private – per daily annual truck VMT.

4.1 Major Trucking Routes Entering and Exiting Delaware

Interstates, U.S. highways, and state routes carry freight to, from, within, and through Delaware. Key freight routes with high volumes of combination truck traffic in the state include I-95, I-495, I-295, US 13, US 113, US 301, and US 40. State routes are also critical in Delaware, carrying freight through the state (particularly SR 1), connecting larger corridors, and providing alternate freight routes between large urban areas. The following tables detail key interstates (Figure 4-1), U.S. routes (Figure 4-2), and state routes (Figure 4-3) for freight in Delaware.

Figure 4-1: Key Interstates for Freight

Interstates	
	I-95 is a north-south corridor stretching over 1,900 miles along the nation's eastern coast from Houlton, ME (at the Canada border) to Miami, FL, connecting Delaware to states along the entire U.S. eastern seaboard. The interstate passes through 15 states and the District of Columbia. In Delaware, I-95 operates as the Delaware Turnpike. The corridor runs from the state's eastern border with Maryland near Brookside, Wilmington, to the state's northern border with Pennsylvania at Claymont just west of the Delaware River. I-95 is the most heavily trafficked corridor in Delaware for combination trucks, with combination truck AADT ranging from approximately 3,500 to 14,000.
	I-295 (Delaware Valley) in Delaware, New Jersey, and Pennsylvania is an auxiliary route of I-95 and an eastern bypass of Philadelphia, PA. In Delaware, I-295 extends from I-95 in New Castle and crosses the Delaware River on the Delaware Memorial Bridge into New Jersey. Combination truck AADT on I-295 in Delaware ranges from approximately 5,400 to 7,400.
	I-495 (Delaware) is an auxiliary route of I-95 and a bypass of Wilmington, DE. The corridor runs from Newport, east of Wilmington, to Claymont. The corridor connects traffic to the Port of Wilmington and directs traffic around Wilmington's downtown area. Combination truck AADT on I-495 in Delaware ranges from approximately 1,500 to 6,500.

Figure 4-2: U.S. Routes for Freight

U.S. Routes	
	US 9 is a north-south highway that extends from Champlain, NY, through New Jersey, Laurel, DE. In Delaware, US 9 begins in Laurel at US 13 and runs east through Georgetown to Lewes. The Cape May-Lewes Ferry crosses the Delaware Bay, where US 9 picks up again in Cape May, NJ. Most segments of US 9 in Delaware see an estimated combination truck AADT of 100 to 1,500.
	US 13 is a north-south highway running from Falls Township, PA to Eastover, NC. The corridor spans five states – Pennsylvania, Delaware, Maryland, Virginia, and North Carolina. In Delaware, US 13 begins at the state's northern Pennsylvania border near Claymont and passes by Wilmington and the Port, New Castle, Smyrna, Dover, Harrington, Seaford, and Delmar to the state's southern Maryland border. US 13 provides a direct route between Wilmington in northern Delaware to the Chesapeake Bay Bridge-Tunnel on the southern Delmarva peninsula. Combination truck AADT on most segments of US 13 in Delaware ranges from an estimated 200 to 3,900.
	US 40 is an east-west highway extending across 12 states from Silver Summit, UT to Ocean City, NJ. The corridor crosses through northern Delaware from the state's western Maryland border east of Glasgow to the Delmarva Bridge on the state's eastern New Jersey border. US 40 merges with US 13 south of New Castle, then with I-295 north of New Castle, which runs the corridor through the rest of Delaware to New Jersey. US 40 offers an alternate route to I-95 from northern Delaware to Baltimore and Washington, D.C. US 40 in Delaware has a combination truck traffic ranging from approximately 600 to 1,000 AADT.
	US 113 extends 73 miles north-south from SR-1 in Milford, DE to US 13 in Pocomoke City, MD. In Delaware, US 113 passes through Georgetown (US 9 intersection) and runs to Shelbyville at the state's southern Maryland border. SR-1 to US 113 provides an alternate route to US 13, connecting northern Delaware to the Chesapeake Bay Bridge-Tunnel on the southern Delmarva peninsula. Combination truck traffic on US 113 in Delaware ranges from about 500 to 1,400 AADT.
	US 202 is a northeast-southwest corridor connecting Bangor, ME to New Castle, DE. The corridor passes through eight states – Maine, New Hampshire, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, and Delaware. US 202 enters Delaware at Brandywine along the state's northern Pennsylvania border. In Delaware, US 202 intersects with I-95 and US 13 by New Castle Airport. In Delaware, US 202 has an estimated combination truck AADT of 700 to 1,600 vehicles.
	US 301 extends over 1,000 miles along the east coast, from US 13 and SR-1 in Biddles Corner, DE down to Sarasota, FL. The corridor spans seven states – Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida. In Delaware, US 301 runs from Biddles Corner west to the state's Maryland border near Middletown. US 301 offers an alternate route to I-95 from northern Delaware to Annapolis and Washington, D.C. Combination truck traffic on US 301 ranges from about 400 to 1,100 AADT.

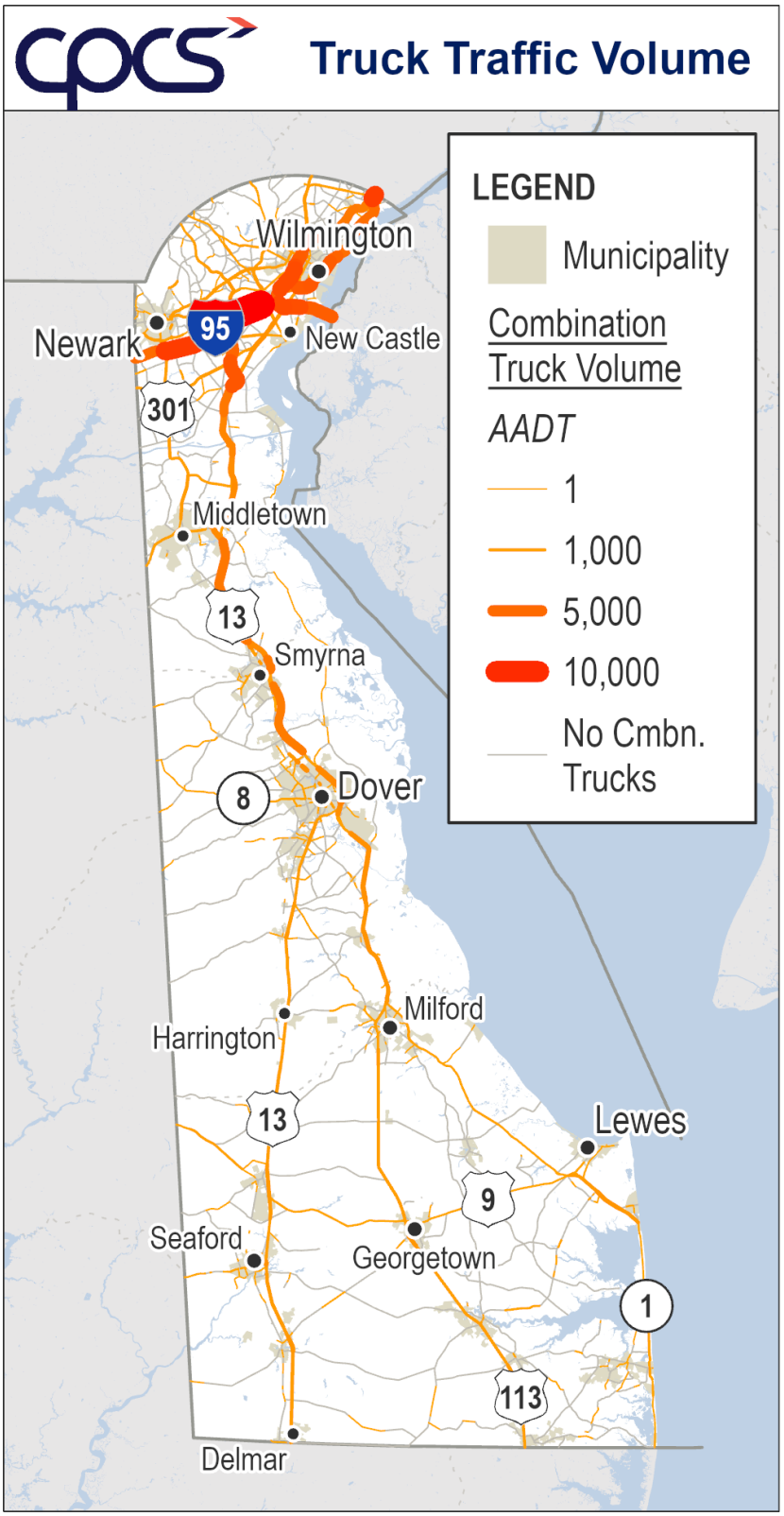
Figure 4-3: Key State Routes for Freight

State Routes	
	State Route (SR) 1 extends 103 miles along Delaware's eastern coast. SR 1 begins in Christiana (I-95 intersection) and passes Smyrna, Dover, Milford, Lewes, Rehoboth Beach, and Bethany Beach to Fenwick Island on the state's southern Maryland border. The corridor serves the Cape May-Lewes Ferry and coastal beach communities in Southern Delaware. Most segments on SR 1 experience combination truck AADT ranging from approximately 100 to 6,600.
	SR 2 extends over 10 miles connecting eastern Newark and Wilmington. Combination truck AADT on SR 2 ranges from 100 to 1,150.
	SR 4 extends 14 miles connecting southern Newark to Newport and Wilmington. SR 4 sees a combination truck AADT range from 100 to 1,250 vehicles.
	SR 7 extends about 17 miles north-south in northern Delaware, from the state's northern Pennsylvania border near Hockessin to Wrangle Hill. SR 7 connects with I-95 at Christiana, US 40 at Bear, and US 13 at Wrangle Hill. Most segments of SR 7 see combination truck AADT range from 350 to 6,300 vehicles.
	SR 8 extends 17 miles in Delaware, between Marydel, MD on the state's western border and Little Creek just east of Dover. The corridor passes through Dover, with combination truck AADT ranging from an estimated 50 to 500.
	SR 9 extends about 58 miles along the state's eastern coast – east of SR 1 – connecting Wilmington to the Dover Air Force Base. SR 9 also provides access to the Port of Wilmington. Combination truck AADT on SR 9 ranges from about 130 to 380.
	SR 18 extends just under 20 miles in Delaware, from Federalsburg, MD across the state's western border to Georgetown. SR 18 merges with SR 404 east of US 13, and SR 404/SR 18 meets US 113 and US 9 in Georgetown. SR 18 sees combination truck AADT range from an estimated 70 to 350.
	SR 20 extends over 40 miles from Reliance, MD across the state's western border to SR 54 near Fenwick Island in southeast Delaware. SR 20 passes through Seaford, Millsboro, and Dagsboro, and it intersects US 13, US 9, and US 113. Combination truck AADT ranges from approximately 200 to 500 vehicles on SR 20.
	SR 41 extends six miles in northwest Delaware from Hockessin to Prices Corner. Delaware State Route 41 becomes Pennsylvania State Route 41 across the state's border and connects to US 1 in Pennsylvania. SR 41 sees combination truck AADT range from an estimated 300 to 1,400.

	SR 48 extends seven miles in northwest Delaware from SR 41 in Hockessin to Wilmington. SR 48 passes through Wilmington on Lancaster Ave. and MLK Jr. Blvd, and the corridor provides connections to I-95 and US 13. Combination truck AADT on SR 48 ranges from about 300 to 900 AADT.
	SR 71 extends 22 miles in northern Delaware, connecting Tybouts Corner (where US 13 and SR-1 intersect) to Townsend (again meeting US 13). Combination truck AADT ranges between 300 and 1,100 on SR 71.
	SR 72 extends about 18 miles in northern Delaware, from Pike Creek to Delaware City, connecting Pike Creek (intersecting SR 7) to Delaware City (intersecting SR 9). The corridor intersects US 40 and US 13. SR 72 sees combination truck AADT range from 400 to 920 vehicles.
	SR 141 is a western bypass of Wilmington. The corridor extends 12 miles from Fairfax (where US 202 and SR 261 intersect) and passes by Newport and New Castle Airport to New Castle (intersecting SR 9). SR 141 also connects to I-95 and US 13. Combination truck AADT on SR 1 ranges from about 350 to 1,600 vehicles.
	SR 273 extends just under 13 miles across southern Delaware from Newark on the state's western Maryland border to New Castle on the state's eastern Delaware River border. The corridor intersects I-95 and US 13, and it also runs south of New Castle Airport. SR 273 sees a combination truck AADT of about 100 to 1,150.
	SR 404 extends 35 miles across southern Delaware from the state's western Maryland border near Scotts Corner to Five Points. The corridor passes through Bridgeville, then joins with SR 18 just east of US 13 to Georgetown, Past Georgetown, SR 404, and US 9 join on the Lewes Georgetown Highway/Seashore Highway to meet SR 1 at Five Points. Combination truck AADT on SR 404 ranges from an estimated 80 to 590.
	SR 896 extends 21 miles from Newark (intersecting SR 4) to Boyds Corner (just east of SR 1). The corridor also connects to I-95 and US 40. SR 896 sees combination truck AADT ranges between 100 and 1,150 AADT.

Figure 4-4 on the following page illustrates key freight corridors in Delaware by combination truck AADT. The map depicts the high concentration of truck traffic on I-95, I-295, and I-495 as described above. Another notable route that emerges with significant combination truck traffic volumes is SR 1 south of the interchange with I-95. Some of this combination truck traffic from I-95 on to SR 1 then appears to continue to US 13 down through Dover.

Figure 4-4: Delaware Truck Traffic Volume (2018)



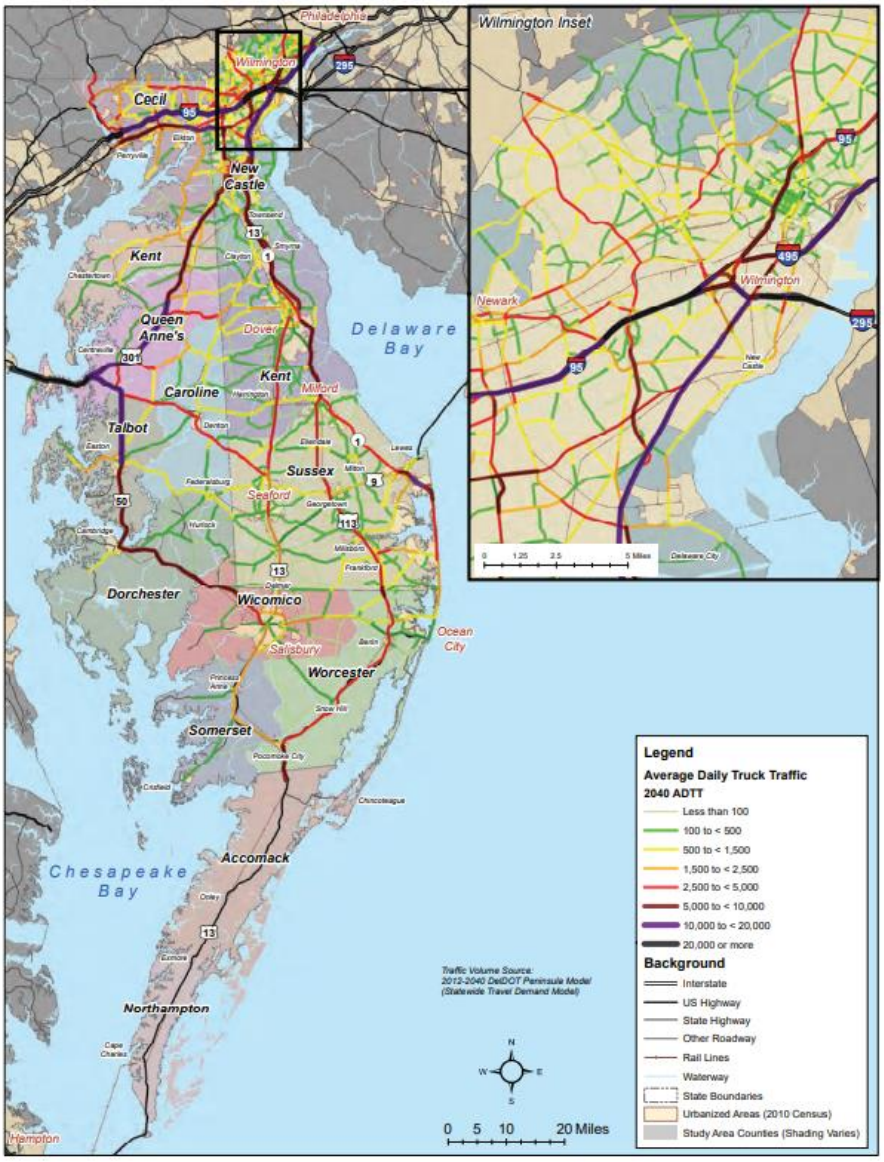
Source: HPMS 2018

4.2 Truck Traffic Forecasts (2040)

The Delmarva Freight Plan (2015) included truck traffic projections for Delaware out to 2040, based on 2012 volumes. Truck traffic was forecasted to increase throughout the state, based on combination and single-unit truck AADT. Figure 4-5 displays the average daily truck traffic forecast for Delaware in 2040 according to the Delmarva Freight Plan.

Forecasts projected the highest truck volumes in the state at I-95, I-295, and I-495 in Wilmington, exceeding 10,000 AADT and even reaching 20,000 AADT along with certain segments by 2040. However, 2018 HPMS data shows certain interstate segments near Wilmington are already seeing *combination* truck AADT of up to 14,000 – not inclusive of non-combination trucks and over 20 years in advance of the forecasted the year 2040. The rapid growth in truck traffic, exceeding the forecasted expectations, strains the existing infrastructure that is meant to support this traffic, including truck parking.

Figure 4-5 Average Daily Truck Traffic Forecast 2040



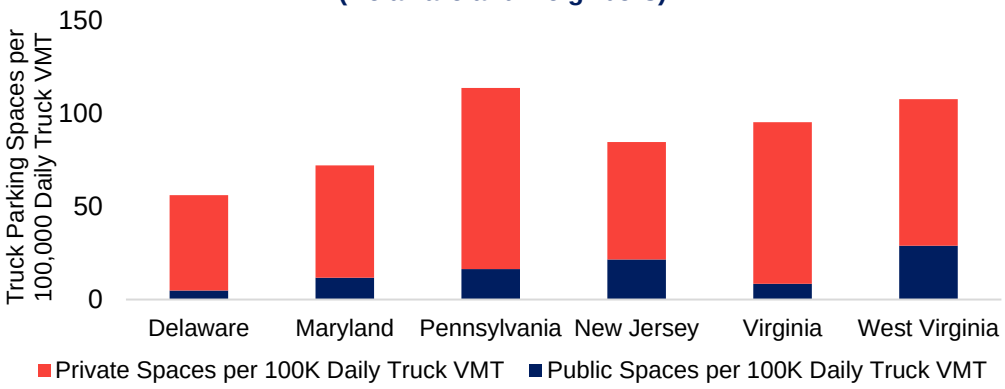
Source: Delmarva Freight Plan, 2015

4.3 Truck Parking Relative to Truck Traffic

The existing number of parking spaces (supply-related) relative to the truck traffic moving through the state (demand-related) provides further insight into the current truck parking supply and demand in Delaware. Understanding truck parking supply relative to daily truck VMT and National Highway System (NHS) mileage puts truck parking in the context of the size of the NHS and truck traffic in the state. This context is particularly helpful for comparing neighboring states that have larger roadway networks.

Delaware has the lowest number of public and private truck parking spaces per 100,000 daily truck VMT (Figure 4-6) compared to its surrounding states. Delaware ranks 46th nationwide in the number of truck parking spaces per 100,000 daily truck VMT (Figure 4-7). While Delaware offers 56.1 spaces per 100,000 daily truck VMT, its neighbors offer 72.2 to 113.8 truck parking spaces.

Figure 4-6: Truck Parking Spaces per 100,000 Daily Truck VMT (Delaware and Neighbors)



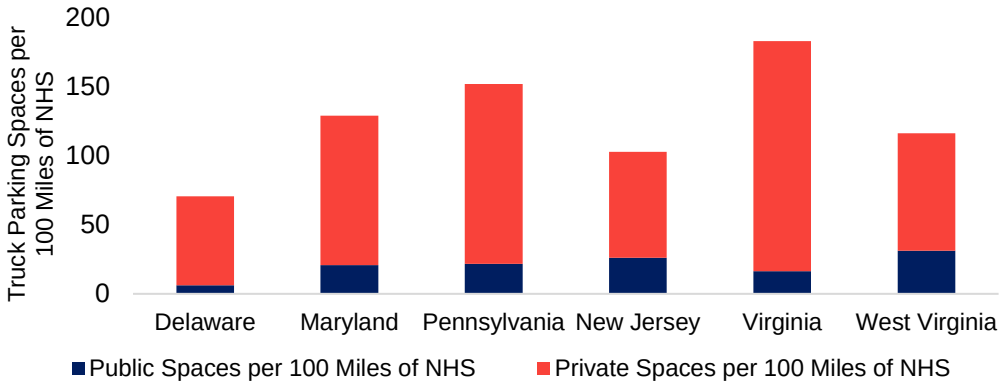
Source: Jason's Law Truck Parking Survey 2015

Figure 4-7: National Ranking (Delaware and Neighbors)

State	Ranking
Pennsylvania	20
West Virginia	21
Virginia	27
New Jersey	33
Maryland	41
Delaware	46

Delaware also provides the lowest number of public and private truck parking spaces per 100 miles of NHS (Figure 4-8) compared to its surrounding states. Delaware ranks 44th nationwide in the number of truck parking spaces per 100 miles of NHS (Figure 4-9), thirteen spots lower than the next lowest-ranked state – New Jersey – in the region.

Figure 4-8: Parking Spaces per 100 Miles of NHS (Delaware and Neighbors)



Source: Jason's Law Truck Parking Survey 2015

Figure 4-9: National Ranking (Delaware and Neighbors)

State	Ranking
Virginia	7
Pennsylvania	17
Maryland	22
West Virginia	26
New Jersey	31
Delaware	44

Truck traffic in Delaware is growing rapidly and the truck parking spaces available in Delaware remain limited. Subsequent technical memos will look in more detail at the usage of truck parking throughout the state to make recommendations on where additional truck parking would be beneficial.

5 National and Regional Trends Impacting Truck Parking

This section identifies the key national and regional trends impacting truck parking, including ongoing trends such as hours of service (HOS) regulations, emerging technologies, changing land use, and the COVID-19 crisis. These trends affect current and future truck parking supply and demand, potential opportunities to address truck parking needs, and implementation actions. As a result, these trends provide important context for subsequent tasks to understand truck parking needs and issues, identify potential impact to truck parking demand and capacity, and recommend strategies and solutions to advance truck parking in Delaware.

5.1 Updated Hours of Service Regulations

The Federal Motor Carrier Safety Administration's (FMCSA) HOS regulations place specific limits on the number of hours truck drivers are allowed to be on duty and drive, to improve safety for truck drivers and other road users. If truck drivers violate HOS regulations, they are subject to a range of penalties, including written warnings, fines, and putting a driver out of service. HOS regulations impact when and where trucks require truck parking, and recent revisions to HOS provisions have the potential to affect truck parking demand.

Figure 5-1 summarizes current HOS regulations for truck drivers which includes the September 2020 changes to HOS rules identified in Figure 5-2. Truck drivers must follow the 11-hour, 14-hour, and 60/70-hour rules at all times, with the option to split the minimum 10-hours off-duty time.

Figure 5-1: HOS Regulations for Truck Drivers

Regulation	Description
11-Hour Driving Rule	Allows a maximum of 11 hours driving after 10 consecutive hours off-duty
14-Hour Rule	Allows a maximum of 14 hours working after 10 consecutive hours off-duty. Extending the off-duty time does not extend the 14 hours.
30-Minute Break Rule	Allows a maximum of 8 hours driving without break. Requires drivers to take a 30-minute break when they have driven for 8 cumulative hours, without at least a 30-minute break. Break hours may be satisfied by any non-driving period (e.g. off-duty, on-duty not driving, sleeper berth, or any combination taken consecutively).
60/70-Hour Rule	Prohibits driving after 60 hours on duty in 7 consecutive days or 70 hours on duty in 8 consecutive days. The drivers are allowed to restart driving after at least 34 consecutive off-duty hours.
Sleeper Berth Rule	Allows drivers to use the sleeper berth to get the equivalent of at least 10 consecutive hours off-duty at one time or in several periods, as long as one off-duty period is at least 2 hours long, and the other includes at least 7 consecutive hours spent in the sleeper berth. All sleeper berth pairings *must* add up to at least 10 hours. When used together, neither period counts against the maximum 14-hour on-duty window.

Adverse Driving Conditions	Allows drivers to extend their 11-hour maximum driving window by up to 2 hours only during adverse driving conditions
Short-Haul Exception	If the driver operates within a 150 air-mile radius of the normal work reporting location and does not exceed a maximum duty period of 14 hours, then they are exempt from the previous regulations.

Source: Adapted from Federal Motor Carrier Safety Administration, Summary of Hours of Service Regulations, 2020.

The Electronic Logging Device Mandate

In 2012, the enacted MAP-21 Act mandated the use of Electronic Logging Devices (ELDs) to monitor HOS compliance. An ELD is a small electronic device that connects to a truck's internal systems, records information (e.g. truck motion, location, mileage, on/off duty status), and displays this information to the driver and owner. ELDs replaced manual logbooks, which had been used since 1938 to track HOS. Compared to paper logs, which recorded time in 15-minute intervals, ELDs track driving time by the minute with limited ability to edit inputs, reducing flexibility for drivers to beyond HOS limits. Although MAP-21 was enacted in 2012, the FMCSA developed rulemaking for the ELD mandate, followed by a three-phase approach to implement the ELD rule: awareness and transition (through December 2017), phased-in compliance (through December 2019), and full compliance after December 16, 2019.[31]

FMCSA recently updated HOS regulations to provide more flexibility for drivers, while still protecting roadway safety. The rule change, which includes four revised provisions (Figure 5-2), took effect on September 29, 2020.[32] These revised provisions are also reflected in the above summary table of HOS regulations.

Figure 5-2: HOS Revised Provisions (2020)

Regulation	Revised Provision
30-Minute Break Rule	Requires drivers to take a 30-minute break after 8 cumulative hours of driving time (instead of on-duty time). Allows the on-duty/not-driving period to qualify as the required break.
Sleeper Berth Rule	Modifies the sleeper berth exception from at least 8 consecutive hours in the sleeper berth to at least 7 hours in the sleeper berth.
Adverse Driving Conditions	Adds a provision to expand driving window up to an additional two hours during adverse driving conditions.
Short-Haul Exception	Expands short-haul exception distance to 150 air-miles (from 100 air-miles) and allows 14-hour work shift (from 12-hour) to take place under the exemption.

Source: Adapted from Federal Motor Carrier Safety Administration, Hours of Service, HOS Final Rule, 2020.

5.2 Emerging Technologies

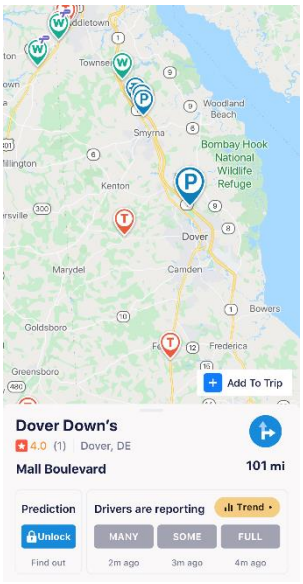
New and emerging freight technology deployments have the potential to enhance the movement of goods. Technology trends have the potential to both provide solutions for truck parking issues and impact truck parking needs and patterns.

[31] FMCSA, ELDs, Implementation Timeline, Accessed 2020, https://www.fmcsa.dot.gov/hours-service/elds/implementation-timeline
[32] FMCSA, Hours of Service, Accessed 2020, https://www.fmcsa.dot.gov/regulations/hours-of-service

5.2.1 Digitized Logistics Systems

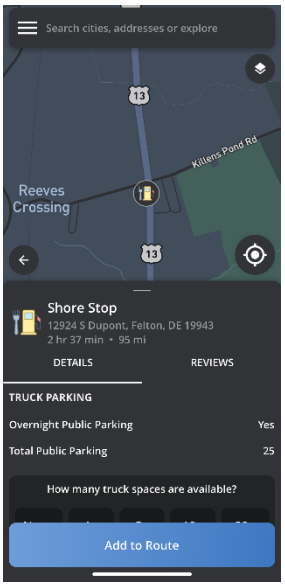
Truck drivers are increasingly using smart devices to locate and even reserve available parking. Major private truck stop companies (e.g. TA/Petro, Loves, and Pilot/Flying J) offer truck parking applications to provide truck drivers with information about facility location and truck parking availability. Several private facilities even offer truck drivers the ability to make reservations.

Figure 5-3: Trucker Path User View



Source: Trucker Path App

Figure 5-4: Truck Map User View



Source: Truck Map App

In addition to facility-provided information, truck drivers also provide and access crowdsourced truck parking information through applications such as Trucker Path (Figure 5-3**Error! Reference source not found.**), Truck Map (Figure 5-4**Error! Reference source not found.**), and Park My Truck.

Meanwhile, public agencies have installed ITS truck parking technologies and developed truck parking information systems to similarly provide real-time truck parking information to drivers. For instance, the Eastern Corridor Coalition (formerly the I-95 Corridor Coalition) developed a real-time truck parking information system using pavement sensors to detect trucks, assess space utilization, and disseminate information to truck drivers through a truck parking website and hands-free telephone system.[33] Similarly, a Truck Parking Information and Management System (TPIMS) among eight Midwest states[34] disseminates truck parking information through 511 real-time traveler information websites, dynamic truck parking signs, and smart phone applications.[35]

Port and warehousing facilities are also increasingly using appointment systems, allowing truck drivers to schedule drop-off/pick-up times. As a result, truck drivers can avoid waiting long periods and staging in undesignated locations nearby.

5.2.2 Connected and Autonomous Trucks

Several companies are working to re-imagine the trucking industry through the development of connected and autonomous trucks.[36] The timing of widespread adoption and the exact impact of connected and autonomous technologies on the trucking industry are unclear. However, as the widespread level of automation increases, so does the potential impact on truck parking (Figure 5-5).

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[33] Eastern Corridor Coalition, Truck Parking, Project, Accessed 2020, https://tetcoalition.org/projects/truck-parking/
[34] Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Ohio, and Wisconsin
[35] MAASTO, Truck Parking Information and Management System, http://www.maasto.net/TPIMS.html.
[36] James Ayre for CleanTechnica, (December, 16, 2020) Electric Semi Trucks & Heavy-Duty Trucks — Available Models & Planned Models, Retrieved from https://cleantechnica.com/2017/12/16/electric-semi-trucks-heavy-duty-trucks-available-models-planned-models/#:~:text=Planned%20Plug-In%20Electric%20Heavy-Duty%20%26%20Semi%20Truck%20Models,a%20300%20kWh%20battery%20pack.%20More%20items...%20

Figure 5-5: Autonomous Driving Levels and Potential Impacts on Truck Parking

Level of Automation	Description	Potential Impacts on Truck Parking
Level 0 No Automation	Driver performs all driving tasks.	N/A
Level 1 Driver Assistance	Driver controls all driving tasks while the vehicle assists with steering *or* acceleration/deceleration.	N/A
Level 2 Partial Automation	Driver may disengage from both steering *and* acceleration/deceleration but must remain engaged with driving and be ready to take control of the vehicle.	N/A
Level 3 Conditional Automation	Vehicle controls all aspects of driving, but the driver provides critical attention when requested. Driver remains a necessity.	In the future, regulations could allow a truck driver to find available parking and reserve spaces, using smart or other in-cab devices while the vehicle is moving.
Level 4 High Automation	Vehicle controls the operation of all aspects of driving, in safe conditions.	In the future, HOS regulations could change to allow truck drivers to rest or save drive time for use when the autonomous system is not in control. Truck stops will still be needed for staging and other HOS requirements, but there may be an increased emphasis on amenities. However, the demand for truck parking spaces may decline if supply chains are restructured to maximize automation miles.
Level 5 Full Automation	Vehicle controls and performs all aspects of driving, under all conditions.	In the future, HOS regulations could be eliminated, which would leave truck parking open for other trucks. Without drivers, stops may be limited to delivery, pick up, fuel, and maintenance.

Source: NHTSA, Automated Vehicles for Safety, Accessed 2020

Although many enabling technologies have matured for market-wide implementation, fully autonomous vehicles are not likely to reach widespread implementation in the short-term. However, current efforts continue to develop, test, and pilot these technologies to understand how they can be leveraged by the trucking industry and integrated into real-world freight operations. For instance, truck platooning, which is enabled by automated and connected technologies, allows two or more trucks to operate in a line with one or more trucks following a lead truck at a reduced distance. Truck platooning offers improved fuel efficiency, reduced operation costs, and improved safety. Automated following truck platooning technology would allow a lead driver to take control of its following platoon, enabling following drivers to go hands-free (Level 3 or 4). Public agencies and companies are currently developing and testing truck platoon systems with up to Level 4 following systems.[37]

[37] SAE, "Peloton CEO Talks Level 4 'automated following,'" August 2, 2019, https://www.sae.org/news/2019/08/peloton-ceo-talks-level-4-platooning; Forbes, "U.S. States Are Allowing

5.2.3 Truck Electrification

Commercial and public interest in using battery-powered electric trucks has grown, in an effort to meet fuel economy standards, mitigate harmful health and environmental impacts, and reduce costs. Electric trucks have proved to be a viable solution for light- and medium-duty vehicles traveling short-distances, such as in urban environments. However, electrification for heavy-duty long/line-haul trucking still faces several barriers, including the cost and weight of batteries, the need for charging infrastructure, and uncertainty about the longevity of vehicles. Hybrid vehicles offer an alternative, with a combination of diesel engines to meet necessary mileage and electric propulsion to improve fuel economy and reduce emissions.

The electrification of heavy-duty long/line-haul trucking has the potential to shape the role of truck parking. Truck parking locations can offer charging stations, fulfilling a need for charging infrastructure. The widespread implementation of battery-powered electric trucks will require a nationwide investment in charging stations, with rest areas and truck stops that offer single-system or dual-system electrified spots.[38] Truck stop electrification also offers the potential to improve community perception of truck parking by addressing current truck parking development concerns of emissions and idling. Fully electric trucks produce zero tailpipe emissions and they do not generate vibrating noise, as diesel-powered engines do.

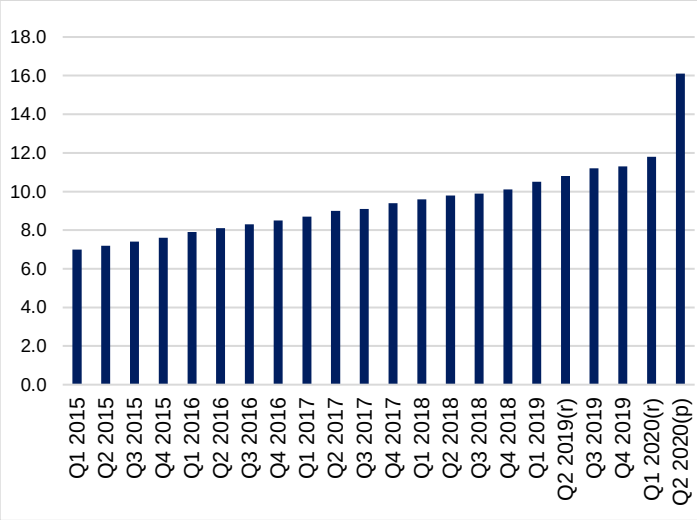
5.3 Changing Land Use

The steady growth of e-commerce (Figure 5-6) and expectations of next day delivery, combined with lean inventory management, have impacted freight and logistics movements to meet the increasing need for on-demand and short-distance transportation. Manufacturing facilities, warehouses, and distribution centers are increasingly moving into urban and surrounding areas, to expand their population reach, while also optimizing delivery distance, time, and costs.

Automated Follower Truck Platooning While The Swedes May Lead in Europe," May 2, 2020, https://www.forbes.com/sites/richardbishop1/2020/05/02/US states-are-allowing-automated-follower-truck-platooning-while-the-swedes-may-lead-in-europe/?sh=3042c1ed7e8d; Washington State Transportation Commission, Autonomous Vehicle Work Group, Infrastructure and Systems Subcommittee Report, December 13, 2019, https://oohwstcavworkgroup.blob.core.windows.net/media/Default/documents/infrastructure-systems/Meeting_7/WSTC_AVWG_Infrastructure_Subcommittee_Meeting_7_Activity3Action2TruckPlatooning.pdf; Truckinginfo, "Autonomous Convoy Developer Locomation Completes Initial Phase of Fleet Testing, August 12, 2020, https://www.truckinginfo.com/10123518/autonomoUS convoy-developer-locomation-completes-initial-phase-of-fleet-testing.

[38] In a single-system electrified truck stop, off-board equipment provides internet access, heating, ventilation, and air conditioning, whereas, in a dual-system electrified stop, trucks equipped with energy inverter and other electrical systems can plug in to outlets at the truck stop. For more information see: https://afdc.energy.gov/conserve/idle_reduction_electrification.html

Figure 5-6: E-Commerce Retail Sales as a Share of Total Sales



Source: U.S. Census Bureau, E-Commerce Retail Sales as a Percent of Total Sales (Percent, Annual, Seasonally Adjusted), retrieved from FRED, Federal Reserve Bank of St. Louis; November 5, 2020.

Lean inventory management refers to the practice of minimizing inventory held on-site (e.g. at stores, factories) to help companies reduce costs and improve their flexibility in maintaining inventory. Inventory is provided when demanded, which requires warehousing and distribution centers to be located in areas where goods can be dispatched quickly.

These land use and development trends influence freight transportation patterns, as new last-mile logistics facilities generate a large influx of truck traffic, in turn affecting truck parking needs and locations. Additionally, increased traffic and resulting congestion near major origins and destinations exacerbate truck parking issues. High levels of congestion and low travel time reliability force truck drivers to stage as close to their drop-off/pick-up location as possible, to not miss appointment windows. However, expanding truck parking in urban and urban periphery areas often face land-use conflicts and opposition from local communities that see truck parking as a nuisance that will bring increased truck traffic, congestion, and air and noise emissions.

5.4 Seasonality

Seasonal trends, driven by tourism, agriculture, and weather events, impact truck traffic moving through Delaware. As a result, these trends also influence truck parking needs in the region. Delaware-specific planning and research materials, including the Delmarva Freight Plan (2015) and Delaware State Freight Plan (2017) identify areas of concern related to seasonal traffic, including the following:

- **Tourism:** Tourism is a key industry in Delaware, bringing an additional 9 million visitors to the state annually with particular concentrations during the summer months in the state's beach and coastal communities.[39] The influx of visitors during tourist seasons brings not only additional passenger traffic but also additional truck traffic supporting increasing consumption and freight demand in tourist centers. DelDOT estimates traffic can more than double on some major routes during the tourist season. Routes particularly impacted in Delaware include I-95 and primary routes to coastal resort areas that stretch from Lewes, DE to the state's southern Maryland border (SR 1, SR 404, US-113, US-9).[40]

[39] Delaware Tourism Office. 2020. Report: Delaware tourism sets new records.
[40] DelDOT, Delmarva Freight Plan (2015)

- **Agricultural Traffic on Rural Roads:** Agriculture is a major freight-dependent industry for much of the Delmarva peninsula. Harvest times bring increased agricultural truck traffic to the region. This slow-moving agricultural traffic can also create localized congestion, particularly as it moves on rural first- and last-mile connection roads.

- **Flooding and Sea Level Rise:** Continued sea-level rise, as well as significant weather and tidal events, may lead to coastal flooding, which can affect and even block low-level roads in the state.[41] These weather events can trap truck traffic, forcing trucks to park until travel is safe again. Blocked roads due to weather events may also force truck traffic to find alternate routes, where available, to continue to their destination.

5.5 COVID-19

The COVID-19 crisis has caused extensive supply chain disruptions, impacting the entire transportation and logistics industry – trucking included. COVID-19 impacted trucking in several ways, including:

- Commodity-specific demand variations (e.g. skyrocketing demand for medical and household supplies, decreasing demand for the travel and restaurant industries)

- Reduced congestion, even at some of the nation's worst bottlenecks

- Operational changes (e.g. personal protective equipment use, social distancing, quarantining) due to the health implications of COVID-19[42]

5.5.1 Emergency Relief from Regulation

Given the importance of trucking, motor carriers and drivers providing direct assistance in support of COVID-19relief efforts [43] have been granted emergency relief from select trucking regulations,[44] including HOS regulations.[45] Initially executed on March 13, 2020, the emergency declaration has been extended through the end of the calendar year, with the potential for future extensions. Modified regulations impact the demand for truck parking. For instance, the lack of HOS requirements allows truck drivers to drive for longer periods, reducing the demand for truck parking. Further, truck industry

[41] Strategic Implementation Plan for Climate Change, Sustainability & Resilience for Transportation. Delaware DOT. 2017.
[42] ATRI, Critical Issues in the Trucking Industry, October 2020, https://truckingresearch.org/wp-content/uploads/2020/10/ATRI-Top-Industry-Issues-2020.pdf
[43] Limited to trucks providing direct assistance in support of COVID-19 emergency relief efforts. See https://www.fmcsa.dot.gov/emergency/extension-modified-expanded-emergency-declaration-no-2020-002-under-49-cfr-ss-39025 for more information on qualifying transportation (expires December 31, 2020).
[44] In accordance with 49 CFR 390.23, motor carriers and drivers operating a commercial motor vehicle to provide emergency relief during an emergency are granted regulatory relief from 49 CFR Parts 390 through 399.
[45] FMCSA, Emergency Declaration Under 49 CFR § 390.23 No. 2020-002, March 13, 2020, https://www.fmcsa.dot.gov/emergency/emergency-declaration-under-49-cfr-ss-39023-no-2020-002. "Extension of the Modified Expanded Emergency Declaration No. 2020-002 Under 49 CFR § 390.25". Federal Motor Carrier Safety Administration, September 11, 2020. Retrieved from https://www.fmcsa.dot.gov/emergency/extension-modified-expanded-emergency-declaration-no-2020-002-under-49-cfr-ss-39025.

workers have been exempt from state requirements to quarantine upon entry. Truck drivers are similarly exempt from quarantine requirements when passing between the U.S. and Canada.

5.5.2 Emergency Temporary Parking

Despite the classification of truck drivers as essential workers and FMCSA regulatory relief for motor carriers and truck drivers, the onset of the COVID-19 pandemic saw many states shut down truck parking facilities due to the inability to fund and properly implement health safety measures. For instance, the Biden Welcome Center in Delaware shut down for approximately a week in March; however, the gas station, bathrooms, and Starbucks remained open for use. The truck stop's private operator, HMSHost, was able to quickly reopen the center in a limited capacity. One survey of trucking industry stakeholders found 44 percent of respondents indicate that finding parking was "somewhat harder" or "much harder" to find during the pandemic. However, 42 percent noted trucking has not gotten worse during the pandemic.[46] Several temporary truck parking locations have been made available in a short time, opening at locations such as weigh stations, churches, private freight yards, and other rest areas previously closed to truckers. There is support among trucking organizations for making a portion of this temporary parking permanent, particularly at sites that are already government-owned, such as weigh stations.

[46] ATRI and the OOIDA Foundation, COVID-19 Impacts on the Trucking Industry, April 2020, https://truckingresearch.org/wp-content/uploads/2020/05/ATRI-OOIDA-COVID-19-Impacts-on-the-Trucking-Impacts-05-2020.pdf

6 Conclusion and Next Steps

This Technical Memo provides an initial understanding of truck parking in Delaware through a literature review of existing truck parking efforts in the region, an overview of truck parking and truck traffic in the state, and a review of national and regional trends affecting truck parking.

The next phase of this study will include an updated inventory of truck parking facilities in and around Delaware and examine existing local truck parking conditions in the state. This will be done by mapping and developing a detailed inventory of truck parking facilities in the state; evaluating the demand for HOS parking and staging area parking; identifying truck parking patterns; and planning for a focus group to validate initial findings. These steps, in combination with this technical memo and subsequent technical memos, will form the basis of the Study's strategies and recommendations to meet Delaware's truck parking needs.