NORTH CAROLINA
STATEWIDE MULTIMODAL FREIGHT PLAN

Planning for the Future of Freight Movement

TRUCK PARKING PLAN UPDATE - FINAL

North Carolina Statewide Multimodal Freight Plan

Truck Parking Plan Update

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Date
January 2023

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ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
AADTT	Average Daily Truck Traffic
ATRI	American Transportation Research Institute
ConOps	Concept of Operations
DMS	Dynamic message sign
DOT	Department of Transportation
FASTLANE	Fostering Advancements in Shipping and Transportation for the Long-term Achievement of National Efficiencies Grant Program
FHWA	Federal Highway Administration
FMSCA	Federal Motor Carrier Association
GPS	Global positioning systems
HOS	Hours of Service
HVAC	Heating, ventilation and air conditioning
IFTA	International Fuel Tax Agreement
IIJA	Infrastructure and Investment Jobs Act
MPO	Metropolitan Planning Organization
NATSO	Add National Association of Truck Stop Operators
NAICS	North American Industry Classification System
NCDEQ	North Carolina Department of Environmental Quality
NCDOT	North Carolina Department of Transportation
NCSHP	North Carolina State Highway Patrol
NCTA	North Carolina Trucking Association
OOIDA	Owner Operator Independent Drivers Association
P3	Public-private partnership
PHFS	Priority Highway Freight System (PHFS)
ROW	Right-of-way
RPO	Rural Planning Organization
STC	North Carolina Strategic Transportation Corridor
STI	Strategic Transportation Initiative
STIP	Statewide Transportation Improvement Program
TPAG	Truck Parking Advisory Group
TPAS	Truck Parking Availability System
US DOT	United States Department of Transportation

Executive Summary

Truck parking continues to be a serious concern for truck drivers, motor carriers, truck facility operators and public officials throughout the United States. According to a recent report, "Critical Issues in the Trucking Industry" (ATRI, 2021):

> "This is the tenth year that the lack of available truck parking has made the top ten list of industry concerns, and among commercial drivers it has consistently ranked in their top three. In 2020, when a number of states closed public rest areas due to COVID concerns, truck parking was the number one concern among truck drivers."[1]

Commercial drivers seeking to comply with the Federal Motor Carrier Safety Administration's (FMCSA) Hours of Service (HOS) regulations may be forced to park on highway shoulders, ramps and other unsafe locations when legal parking is either not available, or the location of available parking is not known. Improving truck parking in strategic locations will help to make conditions safer for truck drivers and other travelers, reduce unnecessary fuel consumption, and improve the efficiency of commercial vehicle operations. In response to increasing concerns regarding unauthorized truck parking, the N.C. Department of Transportation (NCDOT) updated previous 2017 and 2020 statewide truck parking studies.

The introduction chapter of this report provides an overview of the previous 2017 and 2020 Truck Parking studies. Those studies identified the primary truck parking issues in North Carolina and provided recommendations for addressing the truck parking issues. This study team believes that the previous truck parking issues and recommendations are still valid today.

The purpose of this study is to conduct an analysis of the adequacy of truck parking facilities in North Carolina and identify truck parking solutions that better serve freight transportation needs and provide a safer environment for the traveling public in and through the state. This will be accomplished by utilizing the information provided in the 2017 and 2020 Truck Parking studies as a baseline. The study's key tasks include the following activities:

- Re-assess truck parking supply along the state's key freight routes;
- Assess demand for truck parking by reviewing truck growth along freight routes;
- Assess the best way to optimize public and private sector assets for truck parking;
- Identify public-private partnerships that may lead to increased truck parking;
- Identify the costs and funding sources for increasing capacity of existing public truck parking facilities as well as converting existing rest areas, weigh stations and other assets to truck parking.

[1] Critical Issues in the Trucking Industry – 2021, ATRI, October 2021

Stakeholder Outreach

Stakeholder outreach focused on convening the Truck Parking Advisory Group (TPAG) and engaging the private sector that provides 85% of all truck parking in the state. The project team met with private sector providers including UpTime Trucking, Flying J, and Pilot Truck Stop. The Truck Parking Advisory Group meeting held June 8, 2022, provided an overview for the 2022 Truck Parking Update.

- While truck parking is generally available within 10-20 miles of the NC state line, there is still a need to expand truck parking throughout the state.
- Truck parking was also identified as one of the top 3 freight highway challenges in North Carolina during the Regional Forum meetings held during the North Carolina Multimodal Statewide Freight Plan Update on May 17 and 19, 2022.
- As part of the June 8, 2022, Truck Parking Advisory Group meeting, participants were asked to identify truck parking needs and new facilities. The Advisory Group identified 6 new truck parking facilities that have opened or are planned to open since the 2020 Truck Parking study.
- The Truck Parking Advisory Group also identified reasons for trucks parking in unauthorized locations. The main reasons cited for unauthorized parking include the “hours of service demands,” “limited access to truck parking and/or pickup or delivery areas,” and “limited overnight truck parking facilities.”

New and existing parking facilities should take these factors into account when siting new locations or upgrading existing facilities, particularly around industrial parks and industrial locations. This will ensure the maximum amount of truck drivers can access parking facilities. The information confirmed results from the previous survey conducted by ATRI in 2017, where hour of service demands and parking while off duty were top issues for drivers.

Truck Parking Supply

Truck parking supply refers to the number of authorized truck parking spaces capable of meeting truck parking requirements. This update first assessed 2017 - 2020 truck parking data to understand previous conditions, and then included any new truck parking that has been developed in the years since.

In total, there are over 6,600 authorized truck parking spaces throughout North Carolina. The supply of truck parking aligns with the heaviest traveled truck corridors and continues to cluster around key metropolitan regions. Public and private truck parking facilities vary by NCDOT Highway Division. Most truck parking facilities are in Highway Divisions 7, 10, and 12. The fewest number of truck parking facilities are in Highway Divisions 2 and 5.

Since the 2020 Truck Parking Study, 8 new truck parking facilities have been added to the system – 8 private and 0 public. The 8 new truck parking facilities include the 6 identified by the TPAG, plus 2 facilities identified through parking provider outreach. The inventory of truck parking facilities in North Carolina, displayed in Figure 3.3, consists of 190 parking facilities supplying over 6,600 parking spaces throughout the state. Figure ES.1 displays facilities by

those added between 2017 and 2020, and those added between 2020-2022. Of the 190 available facilities, approximately 50 % are private, 27 % are public, 13 % are Wal-Marts and 10% are weigh stations. Of the 6,600 parking spaces, about 87% are private.

Truck Parking Demand

Today, the demand for truck parking in North Carolina exceeds capacity, which will likely persist for the next 5-10 years given future freight flows projected by the U.S. Department of Transportation (US DOT).

The study team grew the previously collected 2017 truck parking utilization data to reflect estimated 2022 utilization. For the 2022 Truck Parking Plan update, truck parking demand at existing 2017 sites and new sites (identified in the 2020 update and in 2022) were determined by analyzing Annual Average Daily Truck Traffic (AADTT) and associated growth rates. AADTT from the NCDOT Traffic Survey Unit was used to calculate growth rates over last five years (2016-2019) to confirm growth on the Priority Highway Freight System (PHFS). Data from 2020 and 2021 were excluded because of the COVID-19 pandemic's effect on travel patterns. Growth rates were then applied to the truck parking facility utilization rates from the previous 2017 study. A growth rate was applied to each truck parking facility based on the corridor and the NCDOT division to accurately reflect the demand of each corridor.

In summary, the 2017 Truck Parking Plan identified 93 out of 111 (84%) truck parking facilities that were full most nights. This 2022 Truck Parking Plan update determined 104 out of 111 (94%) facilities are now full most nights. New facilities added between 2017 and 2022 (as described in Chapter 3) may help alleviate some capacity issues; however, it is unlikely the new facilities have enough spaces to address all truck parking needs. The results of the truck parking demand analysis are displayed in Figure 4.7. The definition of "full parking facilities" on the map means that the facility is full at least Monday through Thursday. Full parking facilities are depicted in red, available spaces in green, new facilities in purple, and spaces without utilization information in gray. 1Truck parking shortages present highway safety concerns when trucks are forced to park illegally on highway shoulders and ramps. The lack of safe, convenient, and easy-to-find parking forces truck drivers to make difficult choices, with dangerous consequences. When truck drivers reach their HOS limits without having found an appropriate parking location, they must choose whether to park illegally or drive illegally. Truck drivers face these decisions on a regular basis. To further analyze potential safety concerns caused by parking shortages, truck crash data over the 2015 - 2019 time period was analyzed as part of the North Carolina Statewide Multimodal Freight Plan and as part of the Truck Parking Study. Over this five-year period, a total of 46,630 truck-involved crashes occurred in the state. The total number of crashes increased each year, except in 2019. Ten counties accounted for nearly half of all truck-involved crashes in the state over the five-year period. This is consistent with the same counties through which trucks travel in the highest volumes and in which the highest concentration of freight generators are located.

Truck Parking Facility Analysis

Truck parking was identified in the 2017 Truck Parking Study as a major challenge to safety and economic productivity. Lack of available truck parking negatively impacts the safety of truck drivers and the traveling public when trucks park in unauthorized areas. Additionally, economic

productivity and efficiency is reduced when drivers must begin searching for parking well in advance of their hours-of-service expiring, costing them valuable driving time and fuel. The combination of hours-of-service restrictions and a lack of truck parking availability impacts the ability of shippers to get their goods to market. Furthermore, each of these issues impacts the motoring public by introducing safety hazards along the roadway and increasing local congestion due to trucks searching for parking in areas adjacent to major roadways or freight generators.

A high-level summary of some of the national trends in truck parking was performed that included:

- Increasing capacity at all rest areas and weigh stations for truck parking,
- Truck parking only sites being developed,
- Older weigh stations being converted/upgraded for truck parking,
- Repurposing existing DOT right-of-way (ROW) for truck parking, and
- Utilizing technology to provide real time parking availability information.

The North Carolina Truck Parking Plan, 2017, indicated that NCDOT transitioned from a budget line item in the State Transportation Improvement Program (STIP) to construct new rest areas to a process where the Roadside Environmental Unit is now providing an “off the top” amount of state maintenance funds of around $3 million to address both routine maintenance items, such as fixtures, painting, and other needs, and to update older facilities, such as new electric wiring or replacement of HVAC systems.

Staff expressed concerns over the current budget’s inability to keep up with normal maintenance issue as well as the lack of funding for new truck parking. Truck parking improvements are now only made in conjunction with corridor improvements adjacent to truck parking facilities.

The 2017 Plan revealed that 85% of the truck parking supply across North Carolina was operated by the private sector. With additional parking added over the last five years, the percent operated by the private sector has increased to 87%. Therefore, it would be appropriate to include the private sector as part of the solution. However, there are several options that NCDOT can explore to provide additional public parking spaces which include the department:

- Building truck parking lots at abandoned rest areas,
- Using weigh stations for additional truck parking,
- Pursuing public-private parking arrangements,
- Conducting site exploration at major interstate crossings, and
- Utilizing excess passenger car parking at existing rest areas.

1.0 Introduction

The N.C. Department of Transportation (NCDOT) completed a Truck Parking Study in 2017 (Phase I), as part of the Statewide Multimodal Freight Plan. The study analyzed the adequacy of off-road truck parking across the state and provided parking solutions that better serve freight transportation providers, creating a safer environment for all road users traveling in and through North Carolina.

In 2020, NCDOT developed an addendum Truck Parking Study (Phase II). Phase II included a Concept of Operations (ConOps), Technical Report and Implementation Plan. Both the 2017 Phase I and 2020 Phase II Truck Parking documents are located on NCDOT's Truck Parking Study website.

To ensure truck parking supply adequately meets parking demand across North Carolina, NCDOT has undertaken an update to the 2017 and 2020 Truck Parking Studies. This update will meet the requirements established within the Infrastructure Investment and Jobs Act (IIJA). These requirements include:

- Utilizing the most recent commercial motor vehicle parking facilities assessment conducted by NCDOT,
- Assess North Carolina's ability to provide adequate parking facilities,
- Develop a clear understanding and utilization of commercial motor vehicle traffic data in North Carolina, and
- Identify where gaps or areas within the state with a shortage of truck parking facilities.

1.1 Study Purpose

To meet the requirements of the IIJA related to truck parking, this truck parking study will include updated 2022 truck parking supply and demand data, verified in the field where possible. Stakeholder outreach efforts will verify that the truck parking supply established in the 2017 Plan and updated in 2022 remains consistent.

1.2 Truck Parking Overview (Phase I and II)

In response to increasing concerns regarding unauthorized truck parking, NCDOT conducted its first ever statewide Truck Parking Study in the fall of 2016. That study found that North Carolina had 167 parking facilities supplying 4,848 parking spaces throughout the state. Truck parking utilization in North Carolina indicates that parking facilities along I-26, I-77, I-85, and most of I-95 are at capacity for truck parking, and demand is projected to increase as freight volumes are forecast to grow by 43% by 2040. Additionally, truck driver survey respondents noted that parking demand is high statewide, not just in one geographical area or corridor.

Truck Parking Plan, Phase I

There are seven primary truck parking issues in North Carolina:

- **Parking capacity limitations.** Truck parking shortfalls highlight the capacity constraints at most public facilities and many private facilities. While some existing parking facilities could be redesigned to increase truck parking capacity, other challenges include cost, local opposition and available real estate.
- **Safety.** Truck parking shortages present highway safety concerns when trucks are forced to park illegally on highway shoulders and ramps. Drivers reported parking on a road shoulder or ramp for 10% of stops in North Carolina. The lack of safe, convenient, and easy-to-find parking in the corridor forces truck drivers to make difficult choices, with dangerous consequences. When truck drivers reach their Hours of Service (HOS) limits without having found an appropriate parking location, they must choose whether to park illegally or drive illegally. Truck drivers face these decisions on a regular basis.
- **Communicating parking information**. More truck drivers would use available parking facilities if they were better informed about parking availability. This lack of information results in some truckers driving longer than is safe while they search for a place to stop for the night. Some states are implementing electronic communication and detection systems, which provides better traveler information.
- **Lost productivity.** Almost 90% of drivers surveyed spent more than 30 minutes on average searching for truck parking in North Carolina, which is a potential drain on driver productivity.
- **Shipper/receiver practices.** Almost 75% of drivers surveyed experienced loading/unloading delays of over an hour. In addition, many distribution facilities only operate on weekdays, and do not allow for on-site parking before or after deliveries.
- **Public opposition.** There's a negative perception of trucks and truck stops among the general public, which limits the ability to expand existing facilities or build new facilities in some areas. As land is developed, it is increasingly difficult to find land available for additional truck parking. In addition, most parking demand occurs in metropolitan areas, where real estate prices are higher compared to areas that are more rural.
- **Maintaining parking facilities.** Most state DOTs in fast-growing locations like North Carolina cannot keep up with the growing backlog of maintenance needs. DOT leaders typically prioritize maintenance of deteriorating pavement and bridge structures ahead of constructing new or expanding existing rest areas with truck parking.

Providing adequate, safe parking for trucks requires both public- and private-sector efforts and there is no single solution. Numerous recommendations for addressing truck parking shortages were identified, including:

- Partner with truck travel centers seeking to expand facilities,
- Explore trial truck parking at selected weigh stations,
- Explore retrofitting selected abandoned rest areas,
- Explore using non-truck parking facilities for overnight truck parking,

- Conduct truck parking notification system pilot,
- Coordinate with Metropolitan Planning Organizations (MPO) and Rural Planning Organizations (RPO) on increasing awareness and acceptability, and
- Convene a Standing Truck Parking Committee.

The Phase I Study noted that the largest gap in supply existed on Interstate-26, I-77, I-85, and I-95 corridors. The largest increase in capacity occurred on I-40, which was noted as an area with a critical gap in the Phase I Study, while interstates with a high level of need have seen locations open on I-77 (Pilot at Exit 42), I-85 (Pilot at Exit 71), and I-95 (Pilot at Exit 106). The public supply of truck parking is unchanged other than the removal of a single space on I-77 following the consolidation of four rest areas into a single, new facility just south of Exit 59.

Providing adequate, safe parking for trucks requires both public and private sector efforts and there is no single solution. Following is a summary of the opportunities and recommendations for ensuring adequate and safe truck parking in North Carolina.

- **Partner with truck travel centers seeking to expand facilities**. Since the private sector controls 85% of the truck parking supply in the state, the private sector should be part of the truck parking solution. This is already occurring as private travel centers expand existing operations, build new facilities, and retrofit older facilities. It would be beneficial to establish a formal relationship between NCDOT and travel centers. For example, the facility operator Pilot has acquired Wilco Hess and Speedy stores in North Carolina, most of which have existing truck parking. They are retrofitting one facility on I-95 at Exit 77 (Hodges Chapel Road in Harnett County) and are considering several new locations along I-77 and I-85, both of which are high-volume truck corridors with parking limitations. NCDOT and the area MPOs/RPOs could coordinate with Pilot while it considers locations for new facilities to better understand the site plan considerations and possibly help mitigate any opposition to new truck parking facilities by communicating the benefits of increased economic development. The facility operator Loves is also retrofitting sites and several new facilities are under construction in the state. In addition to coordinating site plan considerations, there may be opportunities to coordinate truck parking signage and availability across public and private facilities, since improved parking information would benefit truck drivers.
- **Employ technology solutions.** Technology has the potential to significantly improve the truck parking situation in North Carolina. One of the biggest challenges is ensuring that truck drivers are aware of the location of truck facilities and parking availability and can easily plan rest periods ahead of time and while in transit. Technology solutions to this issue come in two parts: communication and detection. Communication systems include signage (both fixed and variable), smartphones and web-based applications. This technology is advancing rapidly, and smart phones are now being used for crowd-sourcing information through social media. Detection systems improve the way in which parking spaces are monitored, tracked and counted.
- **Explore trial truck parking at selected weigh stations**. The Hillsborough Weigh Stations on I-40/I-85 and the new Gaston County Weigh Station on I-85 have room for

overnight truck parking. These locations have back lots for queuing that could be striped for tractor-trailer truck parking. Funding would be required for striping, signage, new technology and expanded trash collection. Daytime restroom access is available at these sites. Technology options can be scaled proportionately to the amount of time the site is at capacity. The advantages to this option would be the relatively low cost of implementation to provide some additional truck parking. Disadvantages include disrupting weigh station activities with entering and exiting trucks, increased maintenance and potential confusion over where trucks should park.

- **Explore retrofitting selected abandoned rest areas.** Of the four abandoned rest areas evaluated in this study, one site measuring approximately 12 acres along I-85 in Cleveland County has the best potential for redevelopment.
- **Use weigh station technology to communicate truck parking**. Should weigh stations be established as acceptable for overnight truck parking, technology could play a role in communicating truck parking availability and in expanding weigh stations for truck parking. Technology retrofits could be cost-effective since weigh stations already have electronic communication capabilities. One example of a pilot program would be to consider installing dynamic message signs (DMS displaying available spaces in advance of the Hillsborough Weigh Stations and/or the Gaston County Weigh Station to communicate and manage truck parking at those sites. These are the only sites identified where there is currently room for overnight truck parking. The utilization information could be collected using either in-pavement sensors or remote cameras. At these locations, the DMS signs could also serve the dual purpose of communicating whether or not the weigh station is open for commercial vehicle inspections.
- **Conduct truck parking notification system pilot**. Many states are exploring truck parking communication and detection systems, and some states have implemented pilot programs. The I-95 Corridor Coalition is testing an electronic truck parking detection system at the Ladysmith Rest Area in Caroline County, Virginia, and the Welcome Center in Laurel, Maryland. Public and private facilities along I-95 in North Carolina could become engaged in an expansion of this program. Other states exploring this technology include Florida, Virginia, Wisconsin and Kansas. Private facilities are also participating in programs sponsored by the USDOT and other partners such as “Park My Truck,” which estimates truck parking availability based on a survey of demand at participating truck parking locations. Many of these efforts have been funded via Federal grants. NCDOT should consider apply for a FASTLANE grant in cooperation with the private sector.
- **Coordinate with Metropolitan Planning Organizations (MPOs) and Rural Planning Organizations (RPOs) to develop guidelines and mitigation strategies aimed at easing public opposition to private truck parking facilities.** MPOs and RPOs can help to mitigate public opposition to truck parking. They can also assist with truck parking implementation because they are familiar with the impacts of truck parking on surrounding communities. As businesses locate new facilities, MPOs and RPOs can help to ensure that adequate truck parking is part of the development design process.

MPOs and RPOs could convene truck parking subcommittees as part of the MPO and RPO Technical Committees, conduct local truck parking studies and add truck parking to the issues discussed with the private sector representatives of the MPO and RPO freight advisory committees.

- **Convene a standing Truck Parking Committee.** A standing statewide Truck Parking Committee, similar to the steering committee for the current study effort, could help oversee the implementation of study recommendations and provide regular updates to the NCDOT Board of Transportation on progress. The committee could develop an implementation plan to detail the actions, resources, and roles and responsibilities for each of the recommendations.

Truck Parking Plan, Phase II

The Phase II Truck Parking Study advanced the recommendations identified in Phase I of the North Carolina Truck Parking Study to implementation by developing detailed concepts of operations (ConOps) for the most feasible and highest priority recommendations for maximizing utilization of existing truck parking, increasing the supply of truck parking and facilitating ongoing education, and awareness of the need and benefits of freight activity and truck parking.

The ConOps document previously submitted to NCDOT and presented to the Truck Parking Advisory Committee, introduced several possible solutions to mitigate the State's truck parking issues. These include:

- Truck Parking Availability System (TPAS) along I-95.
- New or expanded truck parking capacity on I-26 and I-85.
- Emergency parking options along I-26 and I-40.
- Policy options and best practices for developing additional truck parking.

The ConOps detailed the potential number and location of spaces that could be made available for truck parking, what is needed in terms of resources (rough order of magnitude cost estimates) and policy and regulatory issues that need to be resolved. This document (Implementation Plans) provides a framework or steps for implementing the ConOps. It summarizes the solution and highlights the programmatic, policy, regulatory, and resource considerations that need to be addressed to put the solutions in place. Some of the information provided may seem repetitive. This is because the implementation plans are written, so they each be read and acted upon independently.

1.3 Organization of the Report

Beyond the Introduction chapter, this plan update is organized into four chapters:

Chapter 2 - Stakeholder Outreach

Chapter 3 - Truck Parking Supply

Chapter 4 - Truck Parking Demand

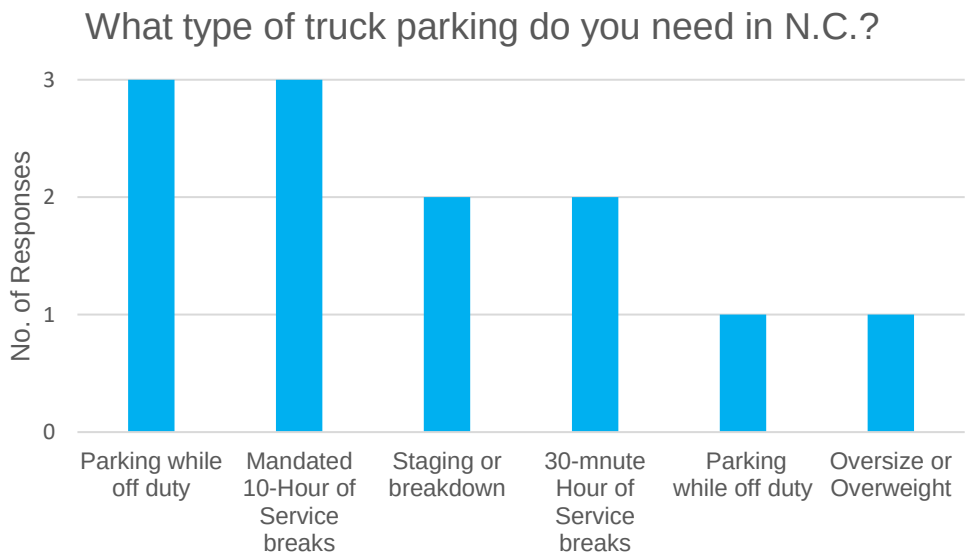
Chapter 5 - Truck Parking Facility Analysis

2.0 Stakeholder Outreach

Understanding the issues and trends facing the trucking industry helped organize our outreach efforts. For the Truck Parking Update, the project team met with the Truck Parking Advisory Group (Shown in Appendix A), made up of freight and trucking industry representatives with insights in truck parking challenges and opportunities. The Truck Parking Advisory Group meeting held June 8, 2022, provided an overview of the 2022 Truck Parking Update. The meeting served as a discussion of the Plan and as a way for stakeholders to provide comments and feedback. Since 85% of truck parking in North Carolina is privately supplied, meeting with private sector providers of UpTime Trucking, Flying J, Loves and Pilot Truck Stop was important. These private sector meetings provided an update to the plan and were used to gather data and receive feedback on key issues and needs.

While truck parking is generally available within 10-20 miles of the N.C. state line, there is still a need to expand truck parking throughout the state, as shown through stakeholder discussions and survey results. **Figure 2.1** shows the responses received from industry stakeholders when asked what kind of truck parking they feel are needed most.

Figure 2.1 Truck Parking Survey Responses

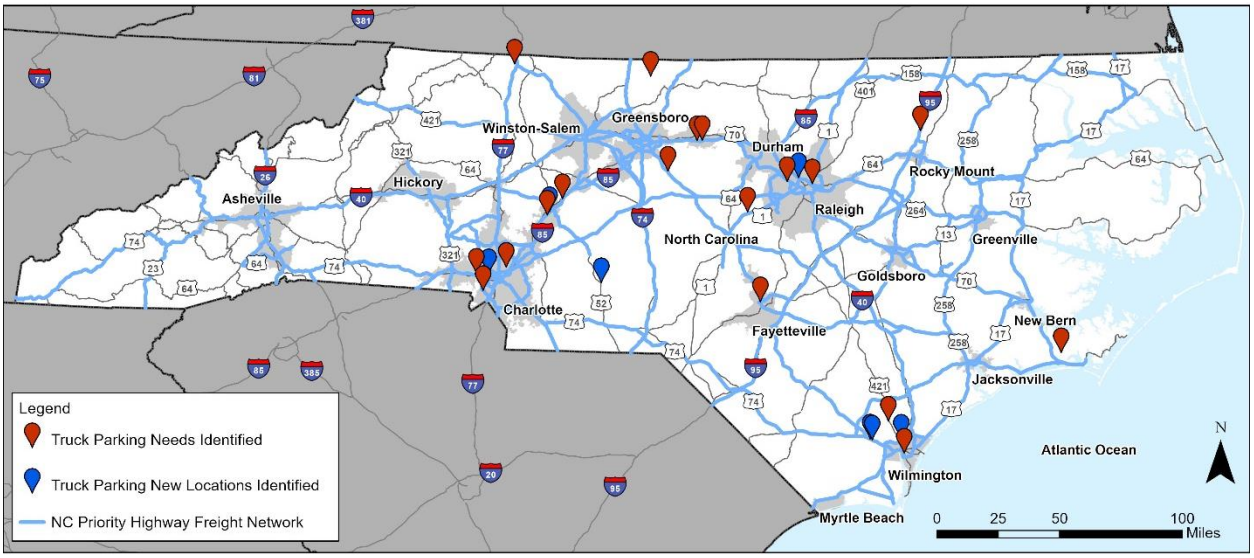


Source: June 8, 2022, Truck Parking Advisory Group meeting input during meeting

Truck parking was also identified as one of the top three freight highway challenges in North Carolina during the Regional Forums meetings held during the North Carolina Multimodal

Statewide Freight Plan Update on May 17 and 19. As part of the June 8, 2022, Truck Parking Advisory Group meeting, participants were asked to identify truck parking needs, as noted in red on the map below and new truck parking locations, identified in blue on the map. New truck parking locations identified through input received from a Multimodal Freight Plan Survey were incorporated into this map as well. It should be noted that this map is not reflective of all the new truck parking needs nor all the new truck parking locations in the state.

Figure 2.2 Truck Parking Needs and New Locations Identified by Truck Parking Advisory Group and from the Multimodal Freight Survey



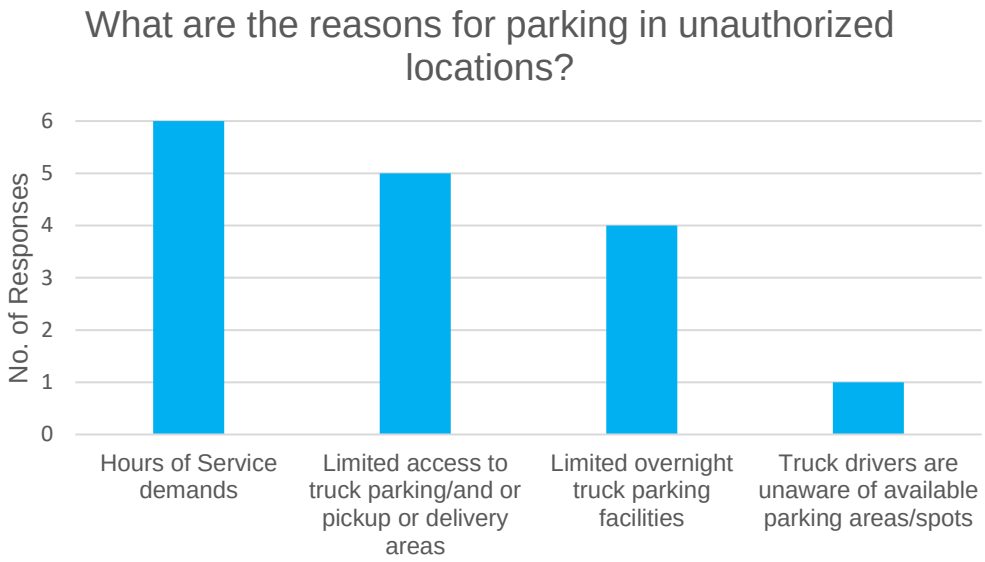
Source: June 8, 2022, Truck Parking Advisory Group meeting input during meeting and input from Multimodal Freight Survey question related to truck parking. Locations are approximate.

2.1 Issues

> Wilmington, NC ports and surrounding industrial parks/industrial locations do not have adequate parking for the volume of commercial vehicle that travel the areas surrounding. –Commenter from Multimodal Freight Survey June 15, 2022.

The Truck Parking Advisory Group also identified reasons for trucks parking in unauthorized locations (**Figure 2.3**). The main reasons cited for unauthorized parking include the "hours of service demands," "limited access to truck parking and/or pickup or delivery areas," and "limited overnight truck parking facilities." New and existing parking facilities should take these factors into account when setting up new locations or upgrading existing facilities, particularly around industrial parks and industrial locations. This will ensure the maximum amount of truck drivers can access parking facilities. The information gathered from the Truck Parking Advisory Group confirmed results from the previous survey conducted by ATRI in 2017, where hour of service demands and parking while off duty were top issues for drivers.

Figure 2.3 Unauthorized Parking Survey Response



Source: June 8, 2022, Truck Parking Advisory Group meeting input during meeting

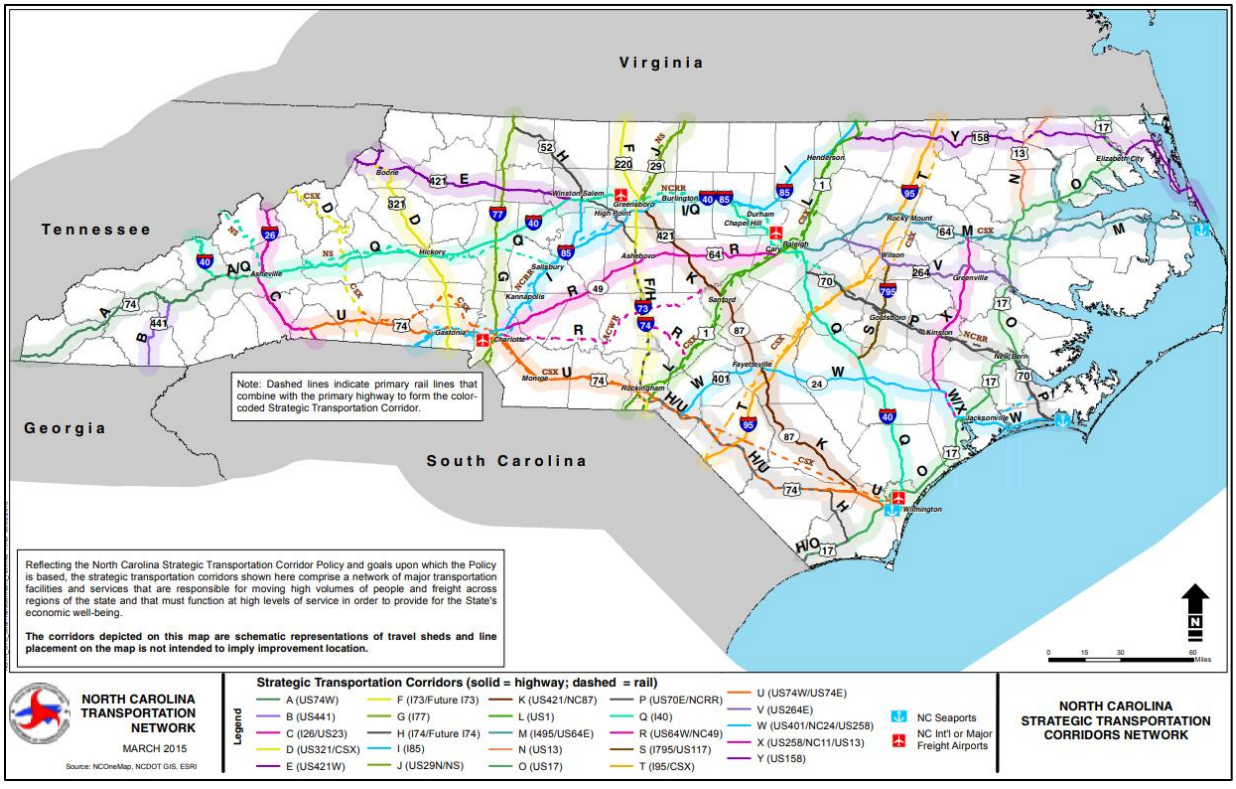
3.0 Truck Parking Supply in North Carolina

Truck parking supply refers to the number of authorized truck parking spaces capable of meeting truck parking requirements. This plan update first assessed 2017 and 2020 truck parking data to understand previous conditions, and then included any new truck parking that has been developed in the years since.

3.1 Truck Parking Availability along Major Corridors

Truck parking in North Carolina occurs mainly along major truck corridors in the state, where high-truck volumes have been identified in previous analyses. These corridors are part of the North Carolina's Strategic Transportation Corridors (STC) network, as represented in Figure 3.1. This section summarizes existing truck parking supply, locations of parking, and delineation between public and private facilities.

Figure 3.1 North Carolina Strategic Transportation Corridors



Source: NCDOT

The 2017 Truck Parking Plan identified 167 total parking facilities and 4,848 total parking spaces across the state. In 2020, the number of parking facilities increased by 15, adding 1,194 parking spots to the total parking supply. And by 2022, 8 facilities were added to the system,

supplying 582 additional parking spaces. Table 3.1 provides a breakdown of truck parking within two miles of a corridor for years 2020 to 2022, and Figure 3.2 displays these same locations, spatially, across North Carolina. Parking supply analysis revealed that most of these corridors matched the STC system except for the N.C. 11 and N.C. 13 corridors. Interstates are listed in descending order based on the number of truck parking facilities.

Table 3.1 List of North Carolina Corridors with Truck Parking within Two Miles of the Corridor 2017-2022

Corridor	2017 Truck Parking Facilities	2017 Truck Parking Spaces	2020 and 2022 Parking Facilities	2020 and 2022 Parking Spaces	Total Facilities	Total Parking Spaces
I-40	35	852	5	301	40	1153
I-85	26	523	5	460	31	983
I-95	24	1,216	1	125	25	1341
I-77	17	405	2	150	19	555
I-26	10	154	0**	44	10	198
I-40,85	8	852	2	255	10	1107
U.S. 70	6	44			6	44
U.S. 17	5	47			5	47
U.S. 13	4	135			4	135
I-73,74	3	76			3	76
I-74	3	10	1	50	4	60
N.C. 24	3	45			3	45
U.S. 220	3	103			3	103
U.S. 421	3	21	1	20	4	41
U.S. 74	3	111			3	111
U.S. 64	2	17			2	17
I-73			1	25	1	25
I-440	1	Variable			1	0

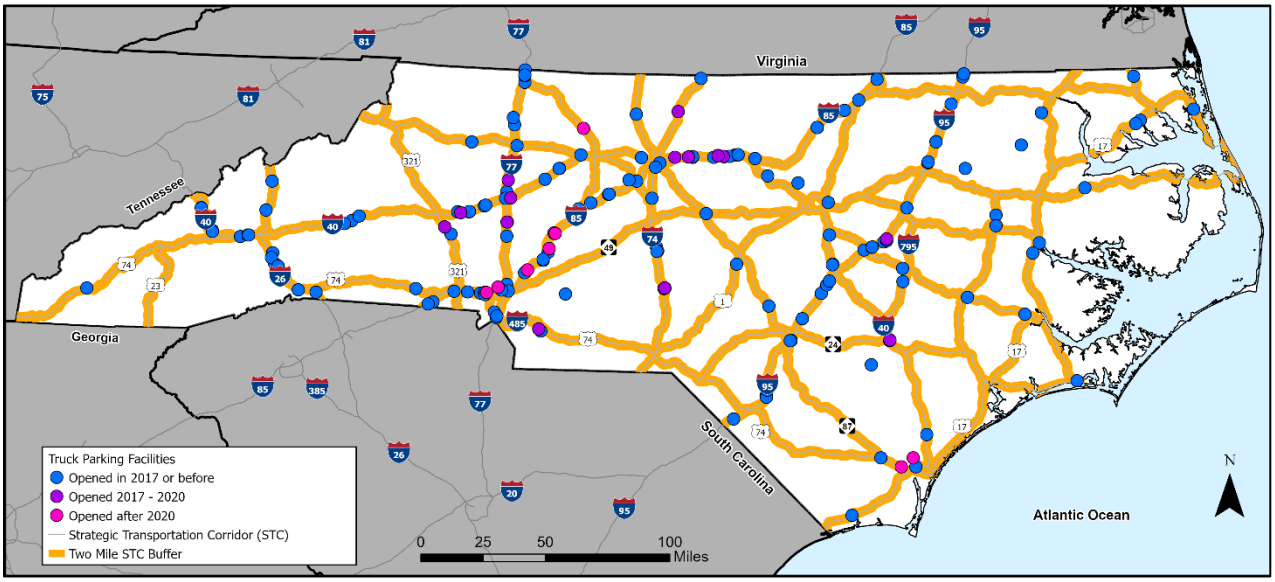
Corridor	2017 Truck Parking Facilities	2017 Truck Parking Spaces	2020 and 2022 Parking Facilities	2020 and 2022 Parking Spaces	Total Facilities	Total Parking Spaces
N.C. 11	1	10			1	10
N.C. 33	1	10			1	10
U.S. 1	1	15			1	15
U.S. 158	1	4			1	4
U.S. 19	1	3			1	3
U.S. 220, 311	1	53			1	53
U.S. 264	1	10			1	10
U.S. 29	1	10	1	109	2	119
U.S. 321	1	35	1	104	2	139
U.S. 74, 76	1	22	1		2	22
U.S. 77	1	Variable			1	0
N.C. 16			1	133	1	133
U.S. 52			1		1	0
Total	**167**	**4,783***	**23**	**1,776**	**190**	**6,559***

* Totals do not include weigh-station or Wal-Mart parking areas

** No new parking facilities added in 2022, but renovations occurred, which increased parking supply

Source: North Carolina Department of Transportation, 2017 Statewide Multimodal Freight Plan; Consultant analysis.

Figure 3.2 North Carolina Strategic Transportation Corridors with Truck Parking Facility within Two Miles 2017-2022



Source: North Carolina Department of Transportation; Consultant analysis.

Table 3.2 lists the counties in North Carolina that have at least one truck parking facility. Of the 100 counties in the state, 64 have at least one authorized truck parking facility.

Table 3.2 Counties with Authorized Truck Parking Facilities

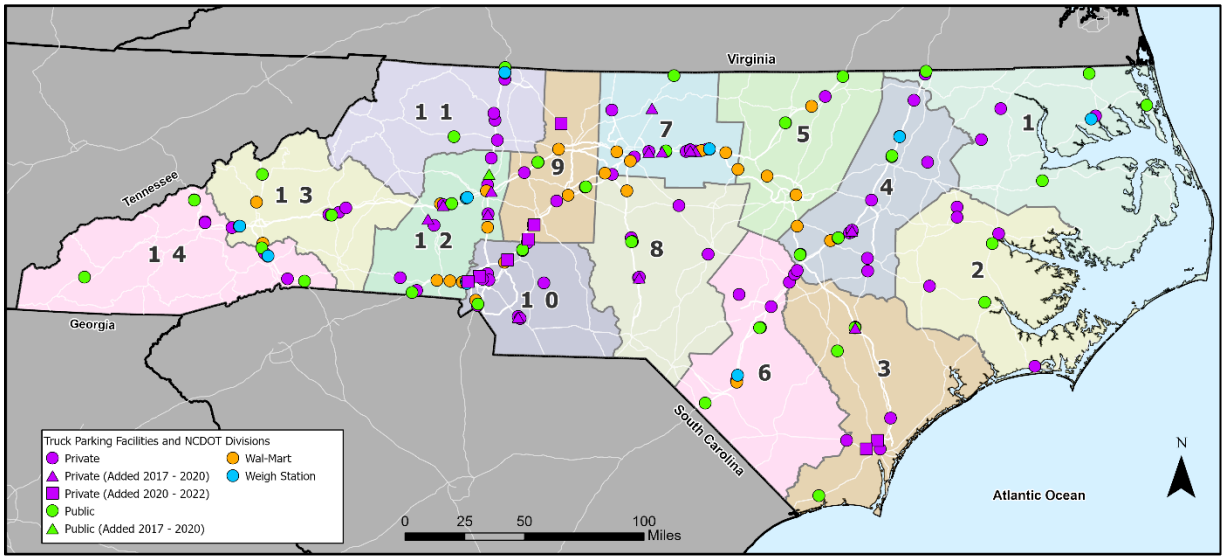
Alamance	Currituck	Johnston	Randolph
Beaufort	Davidson	Lee	Robeson
Bertie	Davie	Lenoir	Rockingham
Brunswick	Duplin	Madison	Rowan
Buncombe	Durham	McDowell	Sampson
Cabarrus	Edgecombe	Mecklenburg	Stanly
Camden	Forsyth	Montgomery	Surry
Carteret	Gaston	Nash	Union
Caswell	Granville	New Hanover	Vance
Catawba	Guilford	Northampton	Wake
Chatham	Halifax	Orange	Warren
Cherokee	Harnett	Pasquotank	Washington
Cleveland	Haywood	Pender	Wayne
Columbus	Henderson	Perquimans	Wilkes
Craven	Hertford	Pitt	Wilson
Cumberland	Iredell	Polk	Yadkin

3.2 Truck Parking Inventory

Truck parking facilities in North Carolina include public rest areas, privately owned and operated truck stops, and specific businesses that allow for truck parking. Truck parking location information in North Carolina was obtained through stakeholder outreach, online websites and applications that report both available public and private truck parking stops, aerial photography of private facilities and NCDOT inventories that document public truck parking facilities, including rest areas and weigh stations.

Criteria used to identify truck parking in 2017 included, 1) sites with large trucks identified on Google Maps, (i.e. class 8 and above in FHWA vehicle classification) and 2) sites that allow overnight parking according to online truck parking sites. This same approach was carried forward into this update. Figure 3.3 displays the locations of public and private sector truck parking facilities across the state, within NCDOT Highway Divisions. Truck parking facilities added since the 2017 Truck Parking Plan are symbolized based on the year added. Facilities included in the 2017 Truck Parking Plan inventory are shown as circles, facilities added between 2017 to 2020 are shown as triangles, and facilities added between 2020 and 2022 are shown as squares.

Figure 3.3 Public and Private Truck Parking Locations by NCDOT Division



Note: Numbers on map refer to NCDOT divisions

Source: North Carolina Department of Transportation; Consultant analysis.

3.2.1 New Truck Parking Facilities

Private

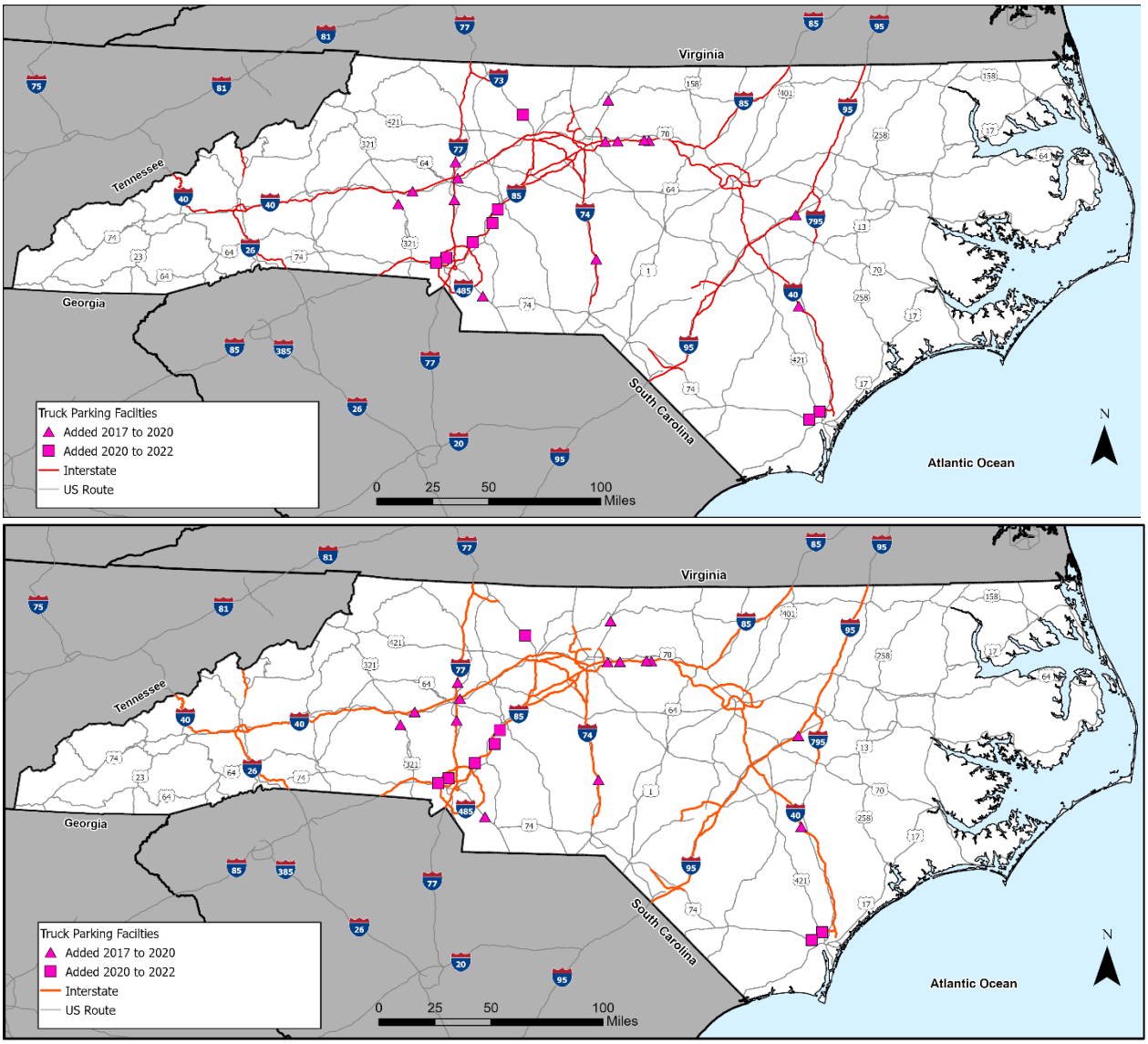
There are 95 privately owned parking facilities in North Carolina, and they include Pilot/Flying J, Loves, Kangaroo Express, Mayway, Sheetz, Uptime and others. As of 2022, these private facilities make up 87% of the state's truck parking supply, as shown in Figure 3.5. Fourteen private facilities were added between 2017 and 2020, with an additional eight added between 2020 and 2022, as shown in Figure 3.4 and Table 3.3. In total, since 2017, there has been a 28% increase in private parking facilities, with a 19% increase occurring in 2020 and a 9% increase occurring in 2022. Wal-Mart is another type of private parking facility that allows overnight parking at select locations. There are 25 identified across the state that allow overnight truck parking, as shown in Table 3.4.

Table 3. 3 New Truck Parking Facilities Added in 2022

Name	Corridor	Division	Number of Spaces	Status
Loves	U.S. 52	9		Under Development
Mayway Truck Stop	U.S. 74,76	3		Under Development
Pilot	U.S. 421	3	20	Complete
Sheetz	I-85	9		
Uptime Parking	I-85	10	290	Complete
Uptime Parking	I-85	10	95	Complete
Uptime Parking	N.C. 16	10	133	Complete
Uptime Parking	I-85	10		Under Development
Total			**538**	

Source: Truck Parking Advisory Group, Consultant Analysis

Figure 3.4 Truck Parking Locations added since 2017

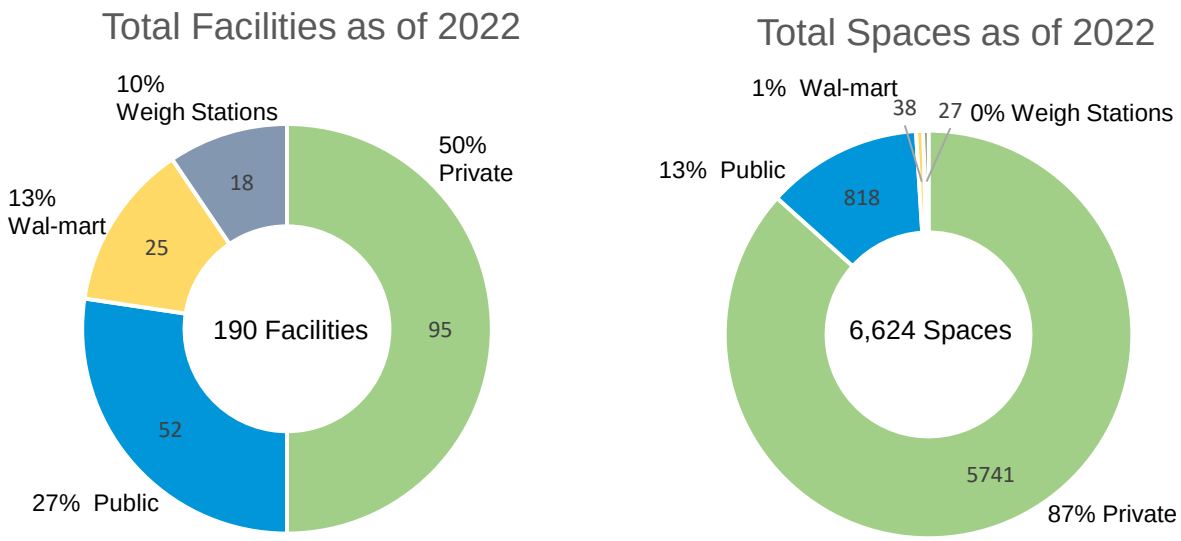


Source: North Carolina Department of Transportation; Consultant analysis.

Public

Public rest areas across the state are maintained by the NCDOT Roadside Environmental Unit, and provide restrooms, vending machines, and designated parking for automobiles and trucks. These areas are spaced evenly throughout the state and provide rest areas even in the most remote parts of the state. Weigh stations are the other public facility that trucks use for parking. However, these areas are not ideal due to their lack of amenities (restrooms and vending). As of 2022, there are 52 public rest areas across North Carolina as shown in Figure 3.5, making up 27% of all parking facilities. In 2020 there was one public facility added. Weigh stations have remained at 18 across the same five-year period (Table 3.3).

Figure 3.5 North Carolina Truck Parking Facilities by Type 2022



Source: North Carolina Department of Transportation; Consultant analysis.

Table 3.4 shows all parking facility type by division across all years, 2017-2022. Facilities that were added between 2020 and 2022 are noted by an asterisk.

Table 3.4 Truck Parking Facilities by NCDOT Highway Division 2017-2022

Highway Division	Private Facilities	Public Facilities	Wal-Mart	Weigh Station	Total
1	4	4	0	1	9
2	5	2	0	0	7
3	6*	3	0	0	9*
4	9*	6	2	2	19*
5	1	3	4	0	8
6	7	3	1	2	13
7	14*	3	5	2	24*
8	7*	2	1	0	10*
9	7*	4	2	0	13*
10	12*	3	2	3	20*
11	4	3	0	2	9
12	11*	7*	6	2	26*
13	4	3	2	2	11
14	4	6*	0	2	12*
Total	**95**	**52**	**25**	**18**	**190**

* Includes new facilities constructed 2020 – 2022

Source: North Carolina Department of Transportation; Consultant analysis.

3.3 Summary of Truck Parking Supply

In total, there are over 6,600 authorized truck parking spaces throughout North Carolina. The supply of truck parking aligns with the heaviest traveled truck corridors and continues to cluster around key metropolitan regions. Public and private truck parking facilities vary by NCDOT Highway Division. Most truck parking facilities are in Highway Divisions 7, 10, and 12. The fewest number of truck parking facilities are in Highway Divisions 2 and 5.

Table 3.5 Number of Truck Parking Spaces for Different Facility Types (2017)

2017		
Facility Type	**Number of Truck Parking Facilities**	**Number of Truck Parking Spaces**
Private	73	4,064
Public	51	719
Wal-Mart	25	38
Weigh Station	18	27
Total	**167**	**4,848***

*Sum of truck parking spaces by facility type per NCDOT 2017 Truck Parking Plan, Table 3.4

Source: NCDOT 2017 Truck Parking Plan

Table 3.6 Number of Truck Parking Spaces for Different Facility Types (2020)

2020						
Facility Type	**Facilities Added**	**Total Facilities as of 2020**	**% Increase**	**Parking Spaces Added**	**Total Spaces as of 2020**	**% Increase**
Private	14	87	19%	1,139	5,203	28%
Public	1	52	2%	55	774	8%
Wal-Mart	0	25	0%	0	38	0%
Weigh Station	0	18	0%	0	27	0%
Total	**15**	**182**		**1,194**	**6,042**	

Source: North Carolina Department of Transportation; Consultant analysis

Table 3.7 Number of Truck Parking Spaces for Different Facility Types (2022)

2022						
Facility Type	**Facilities Added**	**Total Facilities as of 2022**	**% Increase**	**Parking Spaces Added**	**Total Spaces as of 2022**	**% Increase**
Private	8	95	9%	538	5,741	10%
Public	0	52	0%	44	818	6%
Wal-Mart	0	25	0%	0	38	0%
Weigh Station	0	18	0%	0	27	0%
Total	**8**	**190**		**582***	**6,624***	

* Does not reflect final counts at new facilities under development

Source: North Carolina Department of Transportation; Consultant analysis

The provision of parking from private providers continues to be strongest parking type in North Carolina, providing 87% of all available truck parking. As shown in Table 3.7, a total of 10 facilities were added between 2020 and 2022, with eight being private and two being public. The largest increase in parking facilities and spaces occurred between 2017 and 2020, with 1,139 private parking spaces added (a 28% increase) at 14 parking facilities (a 19% increase). In 2022, 582 additional truck parking spaces were added to the system (10% increase). In both 2020 and 2022 there were no new weigh stations or Wal-Mart parking added in North Carolina. Retrofitting weigh stations may be one strategy for the state to consider as it continues to work to expand the parking supply.

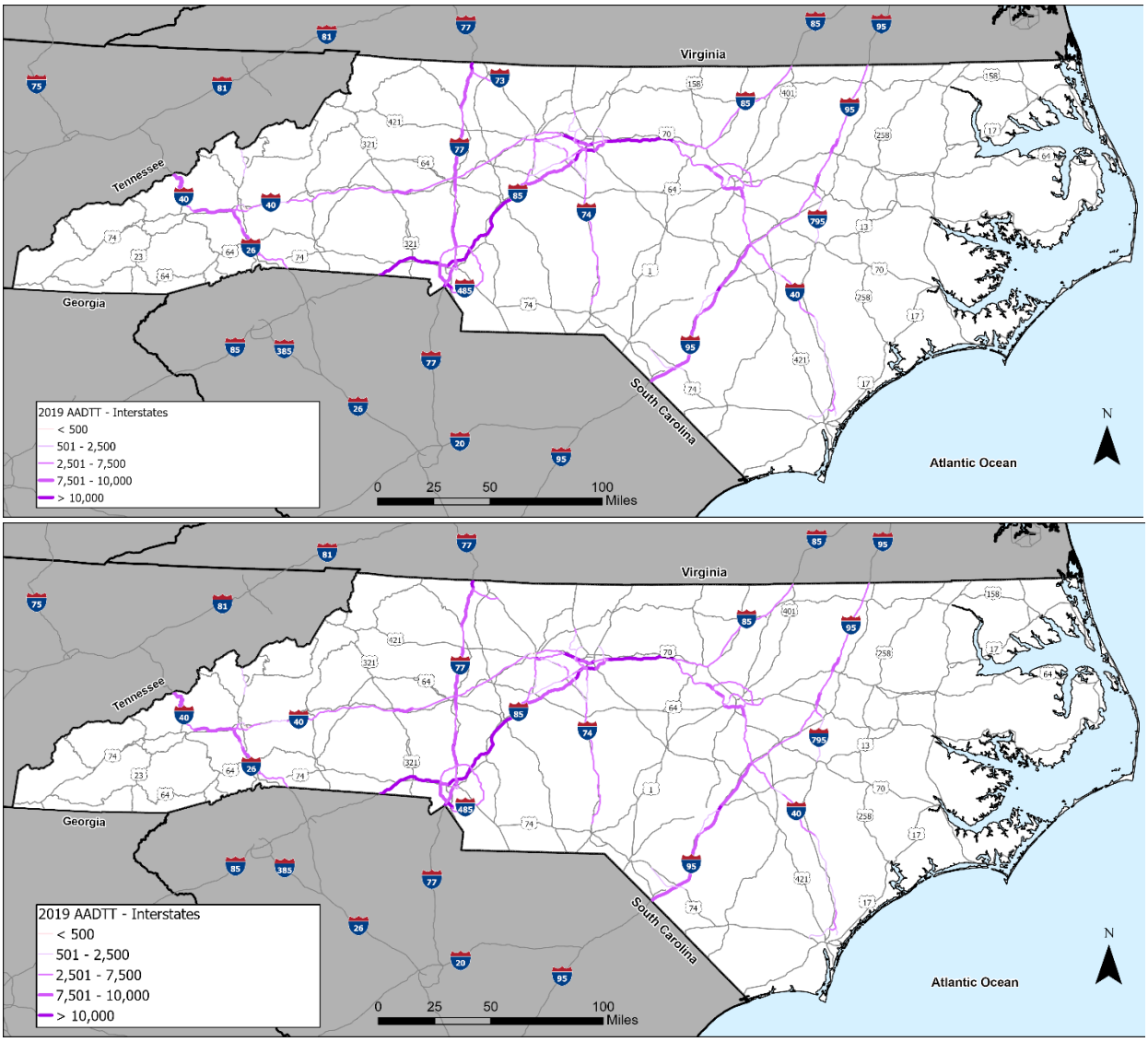
4.0 Truck Parking Demand

As defined in the 2017 and 2020 Truck Parking Plans, truck parking demand is defined as parking for 45 minutes or longer. To understand demand, it is important to understand the number of trucks traveling on each route, which routes are being used, and why those routes are being used over other routes. To better understand these factors, this section presents data on truck volumes and freight-generators that facilitate truck traffic. Following the volume and freight-generator sections, this section will present data on truck parking locations and potential safety implications of unauthorized truck parking.

4.1 Truck Volumes

Truck counts help to identify the busiest and most important truck corridors in the state. In Figure 4.1, roadways with higher truck volumes are displayed with heavier purple lines while those with lower truck volumes are displayed with thinner purple lines. Roadways with fewer than 500 trucks per day are shown in grey. Most of North Carolina's truck flows occur on the interstate highway system. In particular, the highest truck volumes in the state are estimated to occur on I-85 between Greensboro and Durham, with over 16,000 trucks per day. Other interstate highways with particularly high truck volumes include I-77, I-40, I-26 and I-95. This matches the information collected in the 2017 truck driver survey, with survey respondents indicating the need for additional truck parking along each of these highways throughout North Carolina. No truck driver survey was performed in 2020 or 2022. I-77 between I-40 and NC 150 and between NC 73 and I-485 (north of Charlotte) experience between 7,000 and 9,000 trucks per day. I-26 south of Asheville experiences similar volumes. I-40 between Winston Salem and Greensboro carries between 6,000 to 12,000 trucks daily. I-95 near its interchange with I-40 carriers over 9,500 trucks per day. Since North Carolina is situated in the middle of the Northeast Corridor, a significant portion of north-south truck traffic includes through traffic from the border states of Virginia, South Carolina, Tennessee and Georgia.

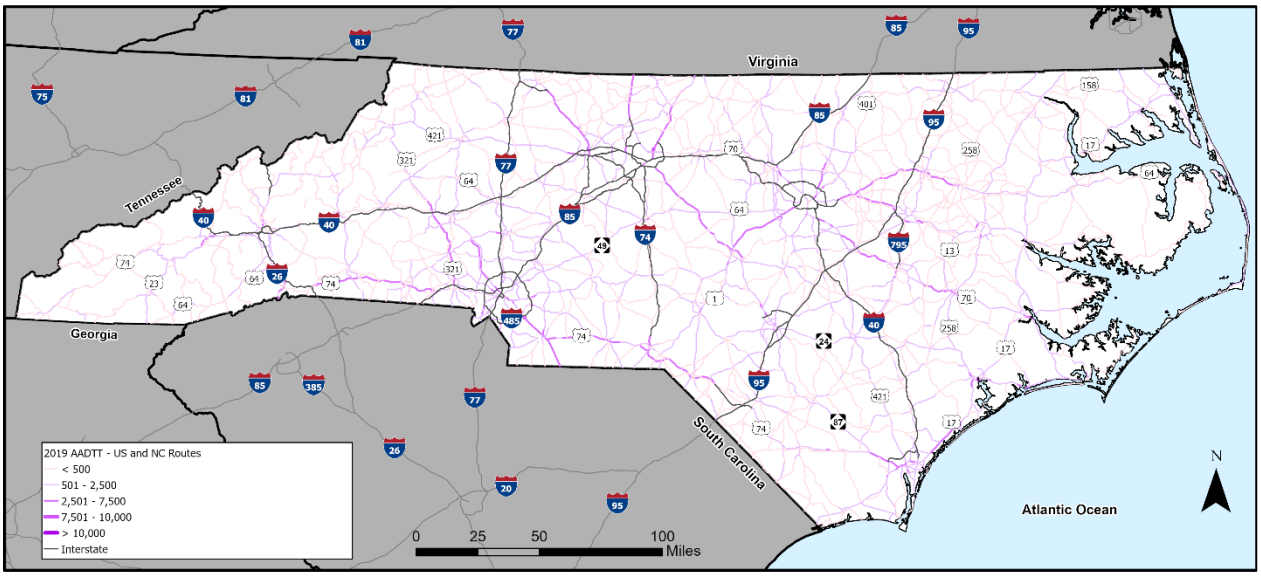
Figure 4.1 Truck Volumes on the North Carolina Interstate Highway System (2019)



Source: North Carolina Department of Transportation; Consultant analysis.

Several non-interstate highways are important freight corridors as indicated by daily truck volumes displayed in Figure 4.2. Some of these highways achieve daily truck volumes that are comparable to those experienced by the interstate highway system. Among the largest non-interstate highway freight corridors are U.S. 74 and U.S. 70, which provide east-west connectivity over the southern portion of North Carolina and between Morehead City and Raleigh. These highways exhibit freight flows that approach those of interstate highways. At its busiest, portions of U.S. 74 transports over 7,000 trucks per day. U.S. 70 carries over 4,000 trucks daily along its busiest portions. This level of freight activity correlates to the fact that these highways connect major metro areas and distribution hubs and freight generators (in places like Charlotte and Raleigh/Durham) with the North Carolina ports (such as in Wilmington and Morehead City).

Figure 4.2 Truck Volumes on Non-Interstate Highways (2019)

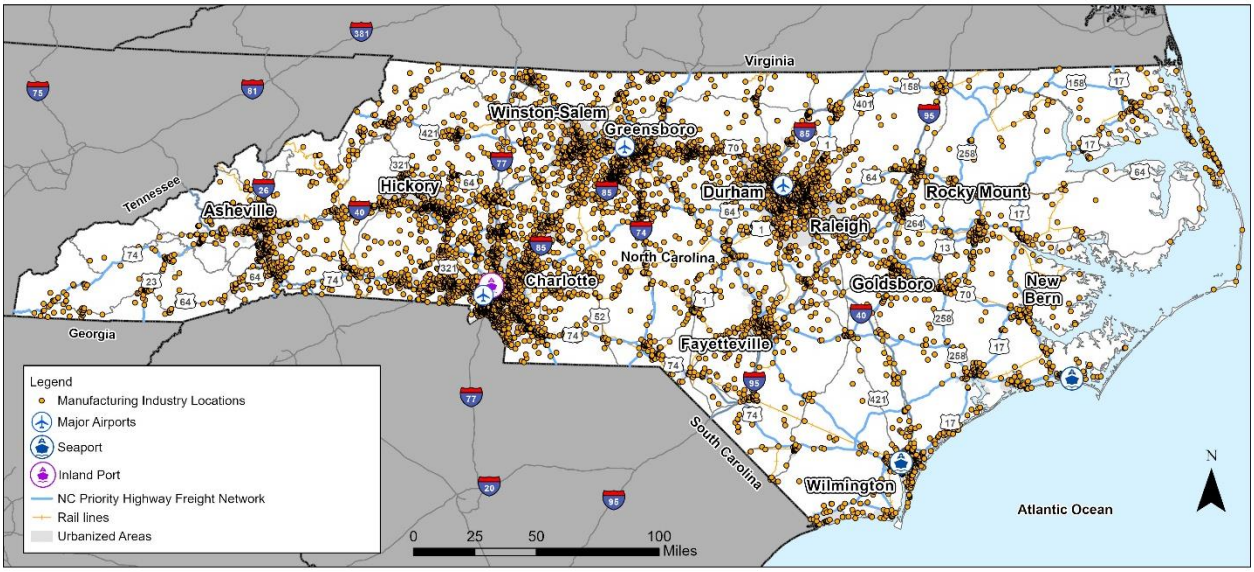


Source: North Carolina Department of Transportation; Consultant analysis.

4.2 Freight Generators

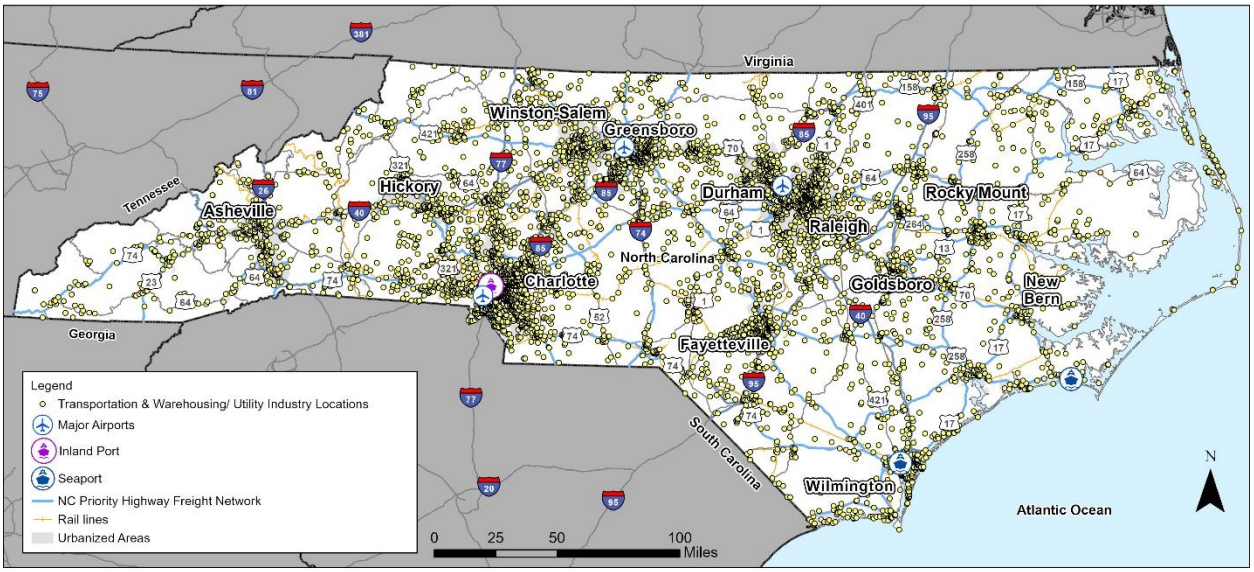
Another factor affecting truck parking needs are freight generators, or freight intensive industries. Truck parking occurs near freight generators as drivers wait to either pick up or drop off deliveries. Some businesses allow truck drivers to park before or after they deliver their loads. Examples include Wal-Mart stores and food distribution centers. Other businesses do not allow for this type of parking, requiring drivers to seek alternative solutions for truck parking. The following three maps, Figure 4.3 through Figure 4.5, depict locations of freight-intensive industries in the state by economic sector. For purposes of this analysis, freight-intensive industries are defined as those with primary North American Industry Classification System (NAICS) codes corresponding to manufacturing, construction, wholesale trade, transportation and warehousing, and agriculture. Largely, these facilities are clustered in the state's major metropolitan regions: Charlotte, Raleigh/Durham, Greensboro/Winston-Salem,, Fayetteville and Wilmington regions.

Figure 4.3 Freight-Intensive Industries by Economic Sector - Manufacturing



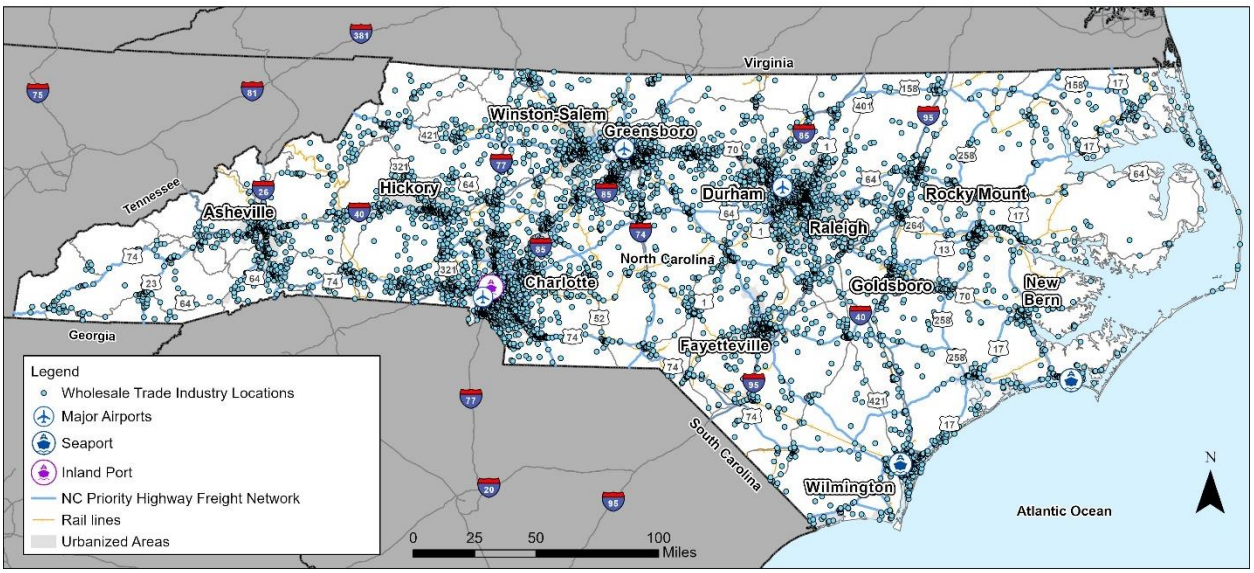
Source: Data Axle, 2021

Figure 4.4 Freight-Intensive Industries by Economic Sector - Transportation/Utility



Source: Data Axle, 2021

Figure 4.5 Freight-Intensive Industries by Economic Sector - Wholesale Trade



Source: Data Axle, 2021

4.3 Public Parking Facility Demand

In 2014, the American Association of State Highway and Transportation officials (AASHTO) was conducting research for Jason's Law and requested parking utilization rates from multiple states. In response to this request, NCDOT conducted a survey of 49 public parking facilities to determine utilization rates. A total of 47 out of 49 public parking facilities were included in the truck parking inventory developed as part of the 2017 Truck Parking Plan. The two parking facilities that were not included were in remote locations and therefore had low utilization rates. Survey results confirmed nearly all, or 87% of the rest areas were "more than 100% full" between 7:00 p.m. and 5:00 a.m., except for rest areas in Randolph and Brunswick Counties, (which were 50% to 100 % full on average), and Camden, Caswell, Dare, Macon, Madison, Sampson and Wilkes Counties (which were 0 to 50 % full on average). During the summer months of June, July and August and in December, public rest areas in six counties were more than 100 % full. This included rest areas McDowell, Mecklenburg, Nash, Northampton, Polk and Randolph Counties.

4.4 Private Parking Facility Demand

As part of the 2017 Truck Parking Plan, representatives from 73 private truck parking facilities around the state were surveyed. Responses were obtained from 67 representatives, for a response rate of 92 %. Of those surveyed, 74 % of respondents said their truck parking spaces were "full most nights." 58 % indicated they were "full every weekend," and 19 % indicated they were "full only from Monday through Thursday" during the week. These results indicated that private truck parking facilities are full most nights, and that there are different demands on parking capacity depending on the day of the week. This is largely due to the fact major distribution centers often have weekday-only hours of operation. Though this 2022 Truck

Parking Plan did not update the 2017 utilization survey, it is assumed these data are similar or worse in 2022.

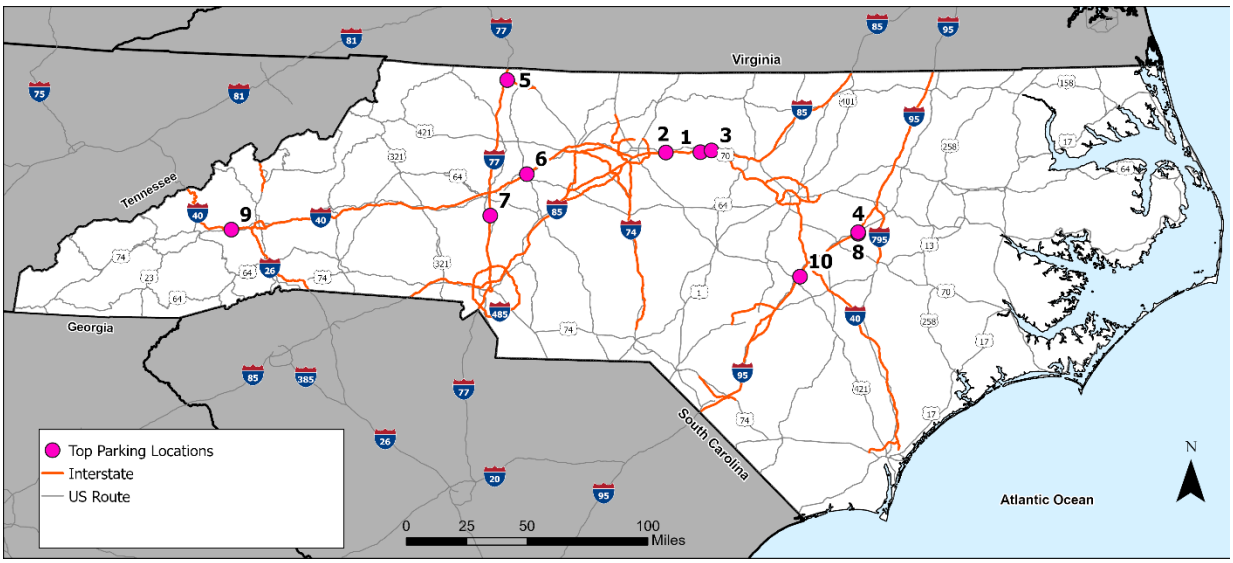
4.5 Truck Parking Demand Analysis Methodology

The 2017 and 2020 Truck Parking Plans included significant survey and data collection efforts through ATRI. This 2022 study grew the previously collected truck parking utilization data to reflect estimated 2022 utilization. For the 2022 Truck Parking Plan update, truck parking demand at existing 2017 sites and new sites identified in 2020 were determined by analyzing AADTT and associated growth rates. Other factors that were considered in determining truck parking demand were nearby businesses and resources that attract truck traffic, such as freight generators. Freight generators throughout the state were identified using 2021 Data Axel data from the Statewide Multimodal Freight Plan.

4.5.1 2017 Truck Parking Demand Analysis Overview

Under the 2017 Truck Parking Plan, ATRI truck GPS data for the 167 identified parking locations were processed in order to identify the top parking locations. For the analysis, an "official" stop at a parking location was classified to be between 8 and 38 hours. This stop time is based on historic experience, industry operational models, and by the Hours of Service (HOS) regulations. A baseline of 1,000 trucks across all locations was applied to determine the parking rate of the top ten parking locations in the state. This baseline is a way to normalize the number of trucks at each parking location in order for each facility to be directly comparable to one another. For example, the top ranked parking location, Pilot, has 58 trucks parking at this facility for every 1,000 trucks spread across all parking locations studied in the state. The remaining 942 trucks are considered parked at other parking facilities. Figure 4.6 shows the top ten parking locations in North Carolina based on the number of trucks. The top ten parking locations are all privately owned facilities.

Figure 4.6 Top 10 Parking Locations in North Carolina



Source: North Carolina Department of Transportation; ATRI; Consultant analysis; 2017.

The 2017 Truck Parking Plan also studied the average length of time that truck drivers remained at one parking location. At the top ten parking locations, the average stop time was approximately 13 hours. To better understand the challenges of finding parking at the top ten parking locations, the number of trucks per hour of the day was analyzed. As expected, parking frequency at each location dramatically increases in the late afternoon to early evening timeframe and reaches peak frequency around 8 p.m.

The top ten parking locations by frequency and stop time are all privately owned facilities. Average stop time and relative stopped truck volume per 1,000 trucks at other types of facilities were also considered in the 2017 report. The average stop time and relative volume per 1,000 trucks at public facilities, Wal-Mart, and weigh stations was much lower than those of private facilities. At these other locations, the average stop time ranged from ten to eleven hours, and the relative volume ranged from one to five trucks per 1,000 trucks stopped. The 2017 study indicated that this difference in parking frequency and stop time may be related to the quality and/or quantity of amenities offered at private truck parking facilities.

2017 results indicated the top truck parking locations are clustered in the central part of North Carolina. In addition, two of the ten parking locations are close to the Virginia and Tennessee state borders. The top parking locations clustered in central North Carolina are consistent with the highest truck volumes in the state along I-85. The near-border parking locations may be highly frequented parking locations due to different freight regulations between each state. For example, over-sized/over-weight vehicles are not allowed to travel at night in North Carolina; however, this is not the case in Virginia. All parking locations are adjacent to the following four major interstates: I-77, I-85, I-40 and I-95. The parking frequency along these four interstates match the 2017 survey results, with respondents indicating the need for additional truck parking along each of these highways throughout North Carolina. Truck GPS point data showed parking per hour of the day with a drastic increase in the number of trucks parking during the evening. This echoes survey respondents who indicated the most difficult time to find truck parking is during the evening hours. The Truck Parking Advisory Group confirmed in June 2022 that the 2017 survey data are still accurate.

4.5.2 2022 Truck Parking Demand Analysis

The study team grew the previously collected 2017 truck parking utilization data to reflect estimated 2022 utilization. For the 2022 Truck Parking Plan update, truck parking demand at existing 2017 sites and new sites (identified in the 2020 update and in 2022) were determined by analyzing AADTT and associated growth rates. AADTT from the NCDOT Traffic Survey Unit was used to calculate growth rates over last five years (2016-2019) to confirm growth on the PHFS. 2020 and 2021 data were excluded because of the COVID-19 pandemic's effect on travel patterns. Growth rates were then applied to the truck parking facility utilization rates from the previous 2017 study. A growth rate was applied to each truck parking facility based on the corridor and the NCDOT Highway Division based on each corridor's AADTT.

For the purpose of this 2022 Truck Parking Plan, all facilities determined to be regularly "full" in the previous study are assumed to remain at capacity if their associated corridor growth rates were positive. Of the 93 truck parking facilities identified as "full" in the 2017 Truck Parking Plan, eight facilities had negative truck volume growth rates on their associated corridors. The

negative truck volume growth rates ranged from -6.97 % on I-77 in Mecklenburg County to -0.01 % on U.S. 29 in Caswell County. The majority of facilities with negative growth rates were in rural counties such as Northampton, Wayne, Cherokee, and Pitt. Four of the eight facilities with negative growth rates are on I-77 in Mecklenburg County. Because the AADTT data used was from 2016-2019, it was assumed the negative growth rate over this time period is an outlier due to construction of the I-77 express lanes and not truly representative of truck volumes on the corridor. Trucks likely avoided this route during construction to avoid congestion and delays. A list of facilities determined to be “full” in 2017 with an assumed decrease in demand in 2022 is included in Table 3.1. Four facilities (excluding the I-77 facilities) previously determined to be full regularly may now have available truck parking spaces.

Table 4.1 Regularly Full Facilities in 2017 with Negative Average Annual Growth (2016-2019)

Facility Name	County	Highway Corridor	Total Number of Spaces	Average Annual Growth Rate (2016-2019)
Charlotte Travel Plaza[1]	Mecklenburg	I-77	50	-6.97%
Sam's Mart[1]	Mecklenburg	I-77	7	-6.97%
Wal-Mart[1]	Mecklenburg	I-77	Variable	-6.97%
Welcome Center: Mecklenburg County I-77[1]	Mecklenburg	I-77	17	-6.97%
Pilot	Northampton	I-95	42	-5.5%
Welcome Center: Northampton County I-95	Northampton	I-95	20	-5.5%
Rest Area: Cherokee County U.S. 19/129	Cherokee	U.S. 19	3	-2.85%
Fuel Doc Travel Center	Pitt	U.S. 13	32	1.59%

[1] The negative growth rate over this time period is assumed to be an outlier due to construction of the I-77 express lanes and not truly representative of truck volumes on the corridor.
Source: NCDOT 2017 Truck Parking Plan; NCDOT Traffic Survey Unit; Consultant analysis.

Eighteen truck parking facilities were determined as regularly “available” in the 2017 plan. Of those 18 facilities, 15 were determined to have increased truck volumes and therefore, positive growth rates on their associated corridors. The positive truck volume growth rates on facilities previously determined to have available truck parking spaces ranged from 0.01% on I-95 in Halifax County to 10.62% on N.C. 24 in Stanly County. As a result of the positive truck volume growth at 15 of the previously determined “available” truck parking facilities, it is assumed these facilities are now likely approaching or at capacity. A list of facilities determined to be “available” in 2017 with an assumed decrease in demand in 2022 is included in Table 4.2.

Table 4. 2 Regularly Available Facilities in 2017 with Negative Average Annual Growth (2016-2019)

Facility Name	County	Highway Corridor	Total Number of Spaces	Average Annual Growth Rate (2016-2019)
Downeast Truck Stop	Wayne	U.S. 13	30	-6.71%
County Mart	Pitt	U.S. 13	38	-1.59%
Visitor Center: Caswell County US 29	Caswell	U.S. 29	10	-0.01%

Source: NCDOT 2017 Truck Parking Plan; NCDOT Traffic Survey Unit; Consultant analysis.

In summary, the 2017 Truck Parking Plan identified 93 out of 111 (84%) truck parking facilities with utilization information were full most nights. This 2022 Truck Parking Plan update determined 104 out of 111 (94%) facilities are now full most nights. New, additional facilities added between 2017 and 2022 (as described in Chapter 3) may help alleviate capacity issues at these full facilities, but it is unlikely the new facilities have enough spaces to address all truck parking needs.

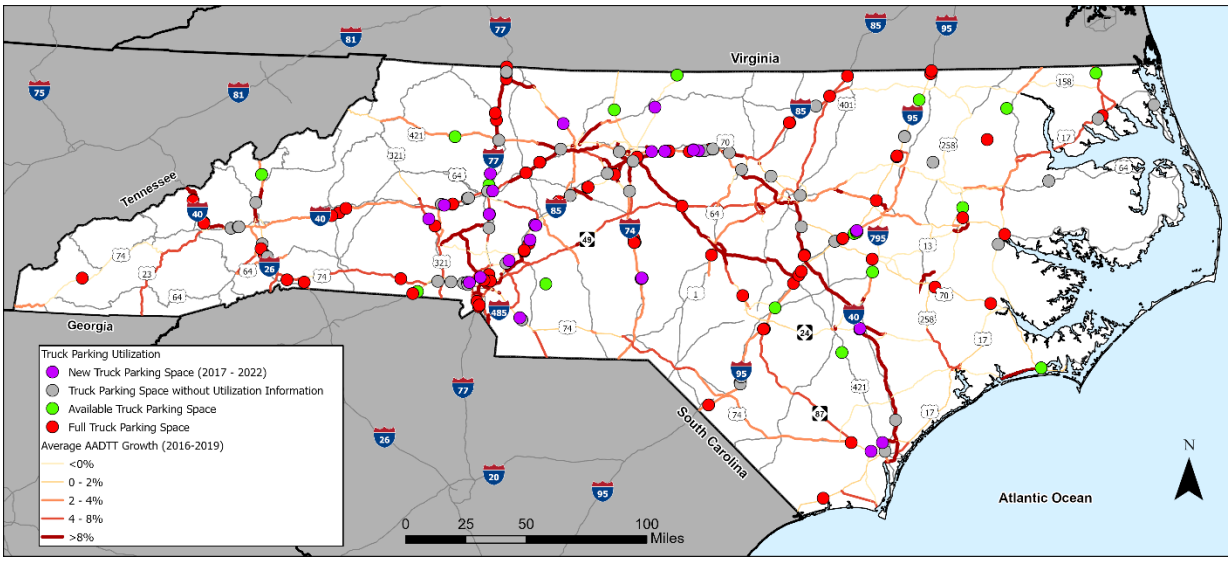
4.6 Identifying Gaps on Study Corridors

Truck parking shortages are a national concern affecting the efficiency of U.S. supply chains and safety for truck drivers and other roadway users. The results of the truck parking demand analysis are displayed in Figure 4.7. The definition of “full parking facilities” on this map means that the facility is full at least Monday through Thursday. Full parking facilities are depicted in red, available spaces in green, and spaces without utilization information in gray.

The 2017 Truck Parking Plan contacted private parking facility managers to obtain utilization rates for private facilities. This study grew the previously collected truck parking utilization data using AADTT growth rates to reflect estimated 2022 utilization.

Corridors at capacity for truck parking include I-26, I-77, I-85 and most of I-95. Therefore, these corridors should be the focus of acquiring additional parking facilities or expanding existing facilities. This correlates with the high truck volumes on those corridors and the large concentrations of distribution facilities in Charlotte, Greensboro and Raleigh areas. It is worth noting that although a facility may report that spaces are full, they may not actually be filled with a parked truck. According to the North Carolina Trucking Association (NCTA), some larger carriers have parking provisions in their fuel contracts with the larger private facility operators. Therefore, some spaces are reserved for these carriers and will not be available for use by others even if they are empty. The 2017 study was not able to confirm the extent to which this results in unused spaces. However, it does open the potential for a truck parking clearinghouse by which carriers could sell off their excess or unused parking on a nightly basis.

Figure 4.7 Truck Parking Utilization and Average AADTT Growth (2016 – 2019) in North Carolina



Source: North Carolina Department of Transportation; Consultant analysis; 2022.

Table 4.3 summarizes truck parking demand and capacity information from the 2017 Truck Parking Plan for highly utilized facilities. Though the information is from the 2017 analysis using ATRI truck GPS data, it is assumed that demand and capacity is similar or greater in 2022 given the increase in trucks on the state's highways.

Table 4.3 Truck Parking Supply and Demand Summary Table

Rank	Name/Location	Nearest Interstate	Average Time Stopped (hours)	Frequency (per 1,000 trucks)	Capacity (# truck parking spaces)
Private Parking					
1	Pilot	I-40, 85	13.03	58	140
2	Travel Centers of America	I-40	13.43	55	186
3	Petro Mebane	I-40,85	13.13	55	285
4	Metro Kenly	I-95	13.03	53	250
5	Pilot	I-77	12.09	50	150
6	Travel Centers of America	I-40	13.49	44	134
7	WilcoHess	I-77	12.90	35	84
8	Flying J	I-95	12.99	34	145
9	Candler Travel Center	I-40	12.37	29	106

Rank	Name/Location	Nearest Interstate	Average Time Stopped (hours)	Frequency (per 1,000 trucks)	Capacity (# truck parking spaces)
10	Pilot	I-95	12.93	28	300
Public Parking					
1	Rest Area: Iredell/Yadkin Counties	I-77 North	10.90	5	11
2	Rest Area: Cumberland County	I-95 North	11.35	4	18
3	Rest Area: Cabarrus County	I-85 North	11.38	4	21
Wal-Mart					
1	Wal-Mart: Belmont	I-85 North	10.67	4	Variable
2	Wal-Mart: Charlotte	I-485	10.84	3	Variable
3	Wal-Mart: Mooresville	I-77	11.60	3	Variable
Weigh Station					
1	Weigh Station: Charlotte	I-85 North	11.63	1	Variable
2	Weigh Station: Mount Airy	I-74 East	9.78	1	Variable
3	Weigh Station: Charlotte	I-85 South	13.81	1	Variable

Source: NCDOT 2017 Truck Parking Plan.

4.6.1 Rest Areas

Rest areas in North Carolina are constructed and maintained by NCDOT. Open 24 hours a day, every day, North Carolina's highway rest areas offer opportunities for convenient stops and provide easy roadside access to public restrooms and drinking water. Thirty-two rest areas across the state account for 478 total truck parking spaces as of June 2022. In the past, the rest area program was funded by the STIP, but this is no longer the case. This has greatly impacted the program in a negative way. The rest area program previously had a ten-year replacement/upgrade program in the STIP, but the program was eliminated in 2015. All rest area projects now rely solely on state funding instead of the 80 % federal and 20 % state funding that was in place previously.

Under the new funding program, the only way to build new or greatly expanded rest areas is to tie them to major widening projects. The most recent example of this is on I-26 south of Asheville under STIP (2020-2029) projects I-4400 and I-4700. The existing rest areas on I-26 in Henderson County were reconstructed as part of STIP project I-4400/I-4700 and opened in June 2022 with an additional 44 truck parking spaces. According the NCDOT Roadside

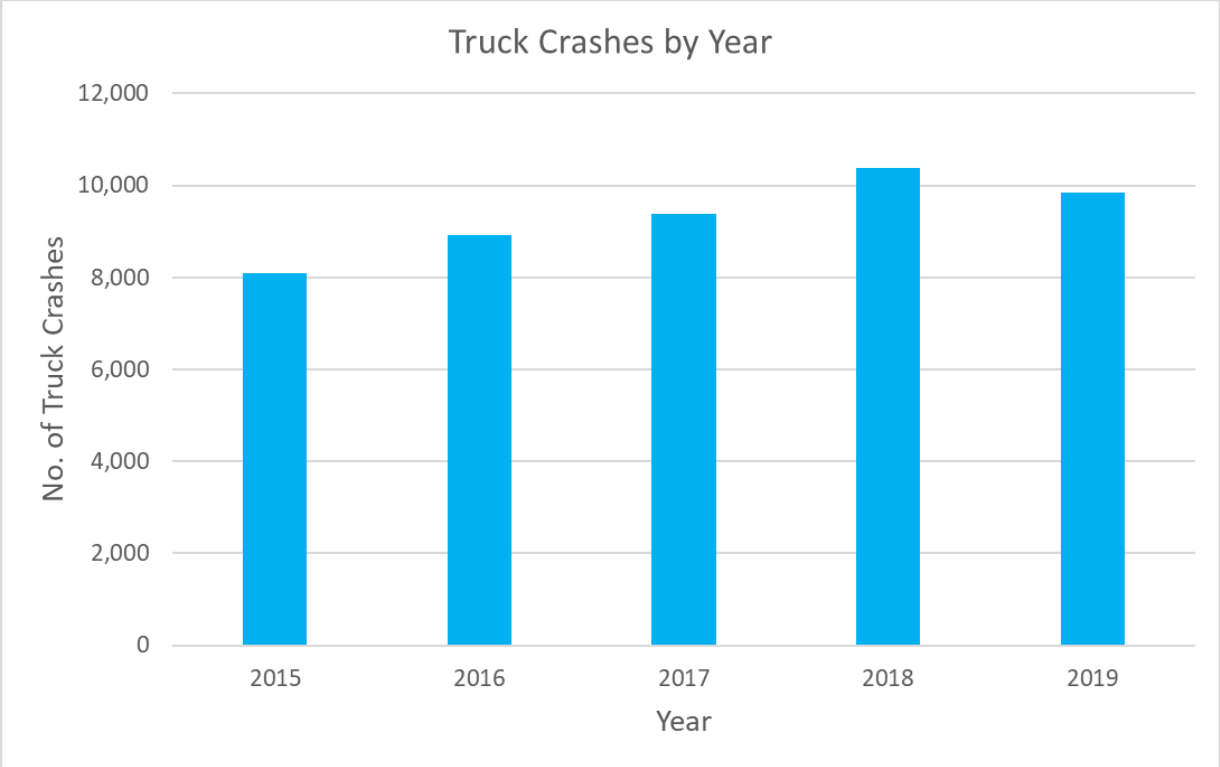
Environmental Unit's Rest Area Supervisor, the average cost to build two rest areas (one in each highway direction) is $20 million. is $20 million.

Most rest area's truck parking spaces are full nightly. Based on the utilization analysis completed for this Plan, stakeholder engagement, and interviews with NCDOT Roadside Environmental Unit's Rest Area Supervisor, the only current rest area with regularly available parking is the I-26 rest area in Madison County. It is recommended that NCDOT explore further funding avenues for rest area expansion, as little to no rest area improvements are planned due to lack of funding.

4.7 Truck Safety

Truck crash data over the 2015 - 2019 time period was analyzed as part of the North Carolina Statewide Freight Plan and as part of the Truck Parking Study. Data from 2020 and 2021 were excluded because of the COVID-19 pandemic's effect on travel patterns. Over this five-year period, a total of 46,630 truck-involved crashes occurred in the state. Figure 3.8 illustrates that the total number of crashes increased each year, except in 2019. As shown in Table 4.4, ten counties accounted for nearly half of all truck-involved crashes in the state over the five-year period. This is consistent with the same counties through which trucks travel in the highest volumes and in which the highest concentration of freight generators are located.

Figure 4.8 Truck Crashes by Year 2015-2019



Source: North Carolina Department of Transportation; Consultant analysis.

Table 4.4 Top Ten Counties by Truck Crashes 2015-2019

County	Number of Truck Crashes	Percentage of Total Crashes	Number of Truck Crashes on Ramps	Percentage of Truck Crashes on Ramps
Mecklenburg	7,507	16%	671	44%
Wake	3,502	8%	155	10%
Guilford	2,302	5%	241	16%
Forsyth	1,782	4%	96	6%
Gaston	1,507	3%	69	5%
Iredell	1,490	3%	66	4%
Buncombe	1,315	3%	75	5%
Cabarrus	1,271	3%	51	3%
Durham	1,242	3%	68	4%
Cumberland	1,143	2%	34	2%
Top 10 Counties	**23,079**	**49%**	**1,526**	**99%**
Statewide Total	**46,630**	**100%**	**2,084**	**100%**

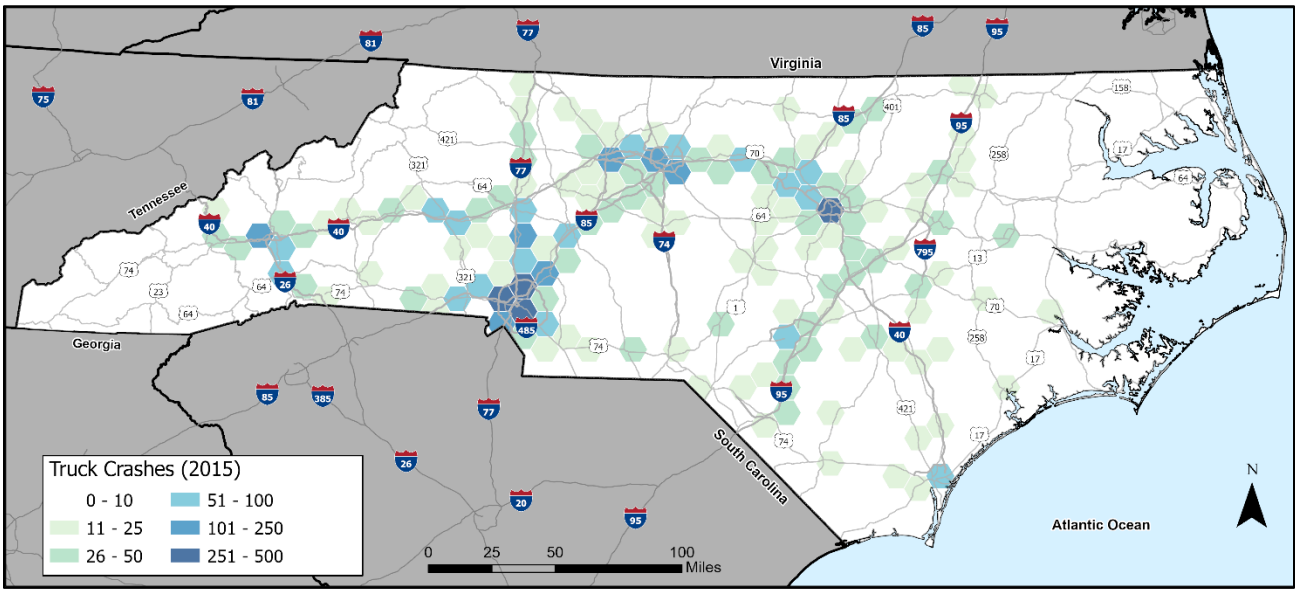
Source: NCDOT Crash Data, 2015-2019.

Mecklenburg County accounted for the highest number of truck crashes, followed by Wake and Guilford counties. This is consistent with the trend of high truck volumes on I-40 and I-85, along which most of the truck crashes occurred over the five-year period.

Figure 4.9 to Figure 4.13 display truck crashes per 10 square miles for each year between 2015 and 2019. The total number of crashes for each year were summarized into hexagons (10 square miles in size) and symbolized using graduated colors. Areas of the state with less than 10 truck crashes per 10 square miles annually are not shown. As the number of crashes in the area increases, the colors used to symbolize these areas are darker green/blue. This method of spatial aggregation allows for easy visualization of high-density data.

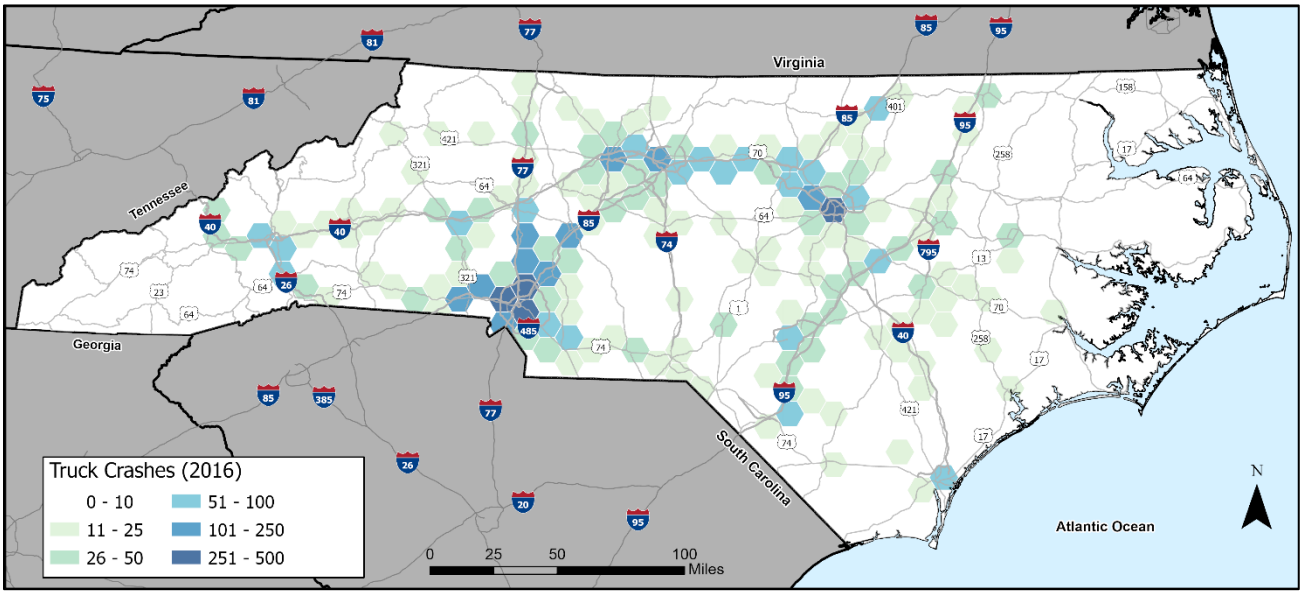
As can be observed, the number of truck crashes consistently increase around high truck volume corridors including I-85, I-77 and I-40. Moreover, the number of truck crashes increase in vicinity of major urbanized areas such as Raleigh, Greensboro and Charlotte. This is consistent with the trend of freight generators, which have high concentration in the aforementioned urbanized areas.

Figure 4.9 Truck Crashes in North Carolina, 2015



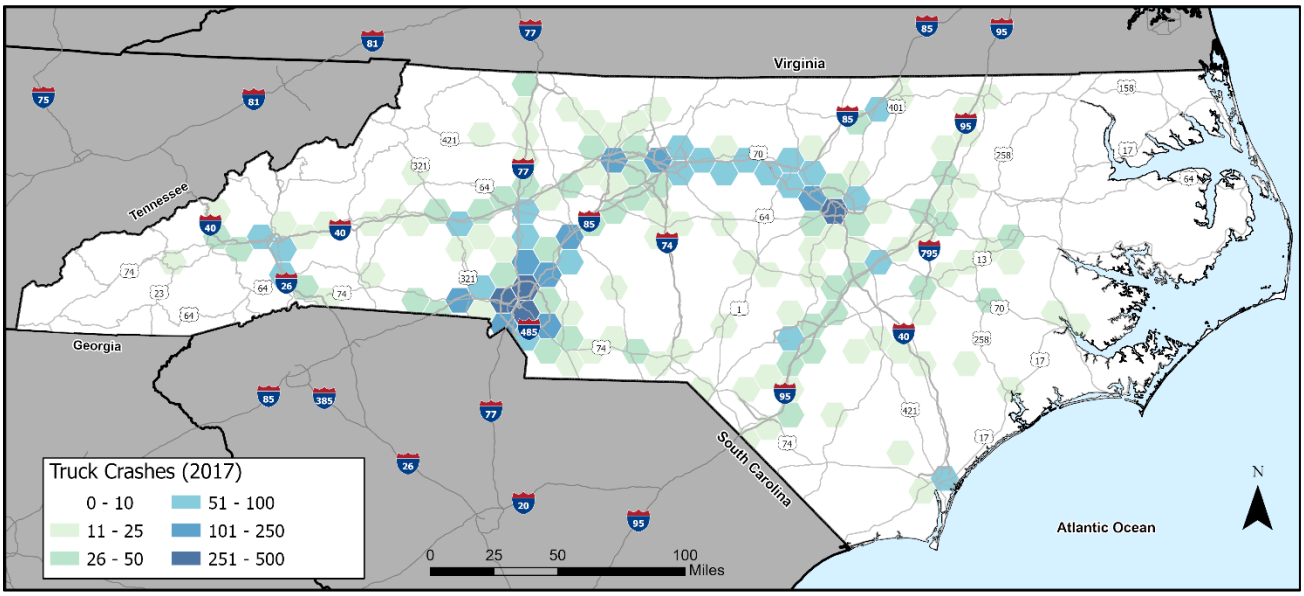
Source: NCDOT Crash Data, 2015-2019.

Figure 4.10 Truck Crashes in North Carolina, 2016



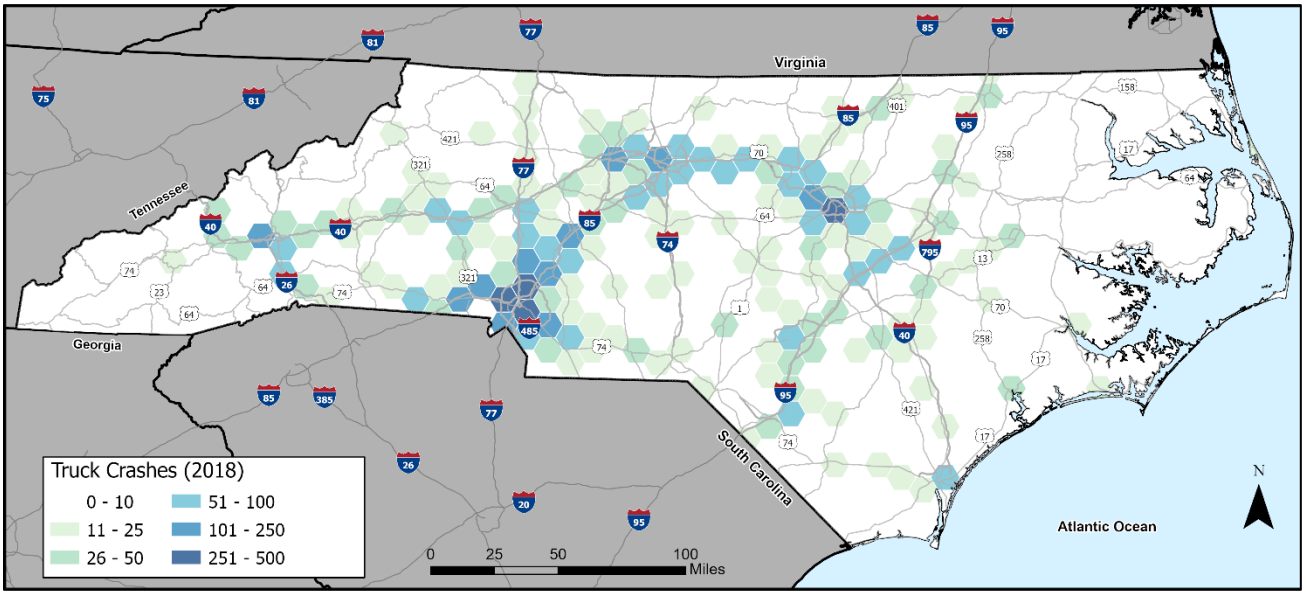
Source: NCDOT Crash Data, 2015-2019.

Figure 4.11 Truck Crashes in North Carolina, 2017



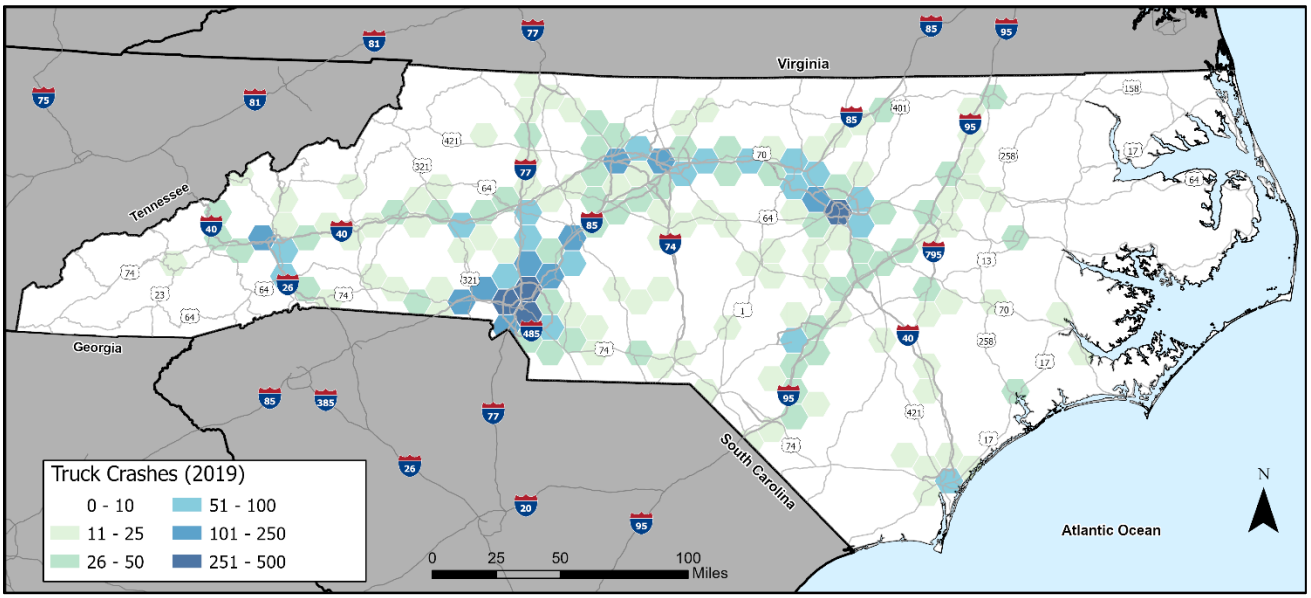
Source: NCDOT Crash Data, 2015-2019.

Figure 4.12 Truck Crashes in North Carolina, 2018



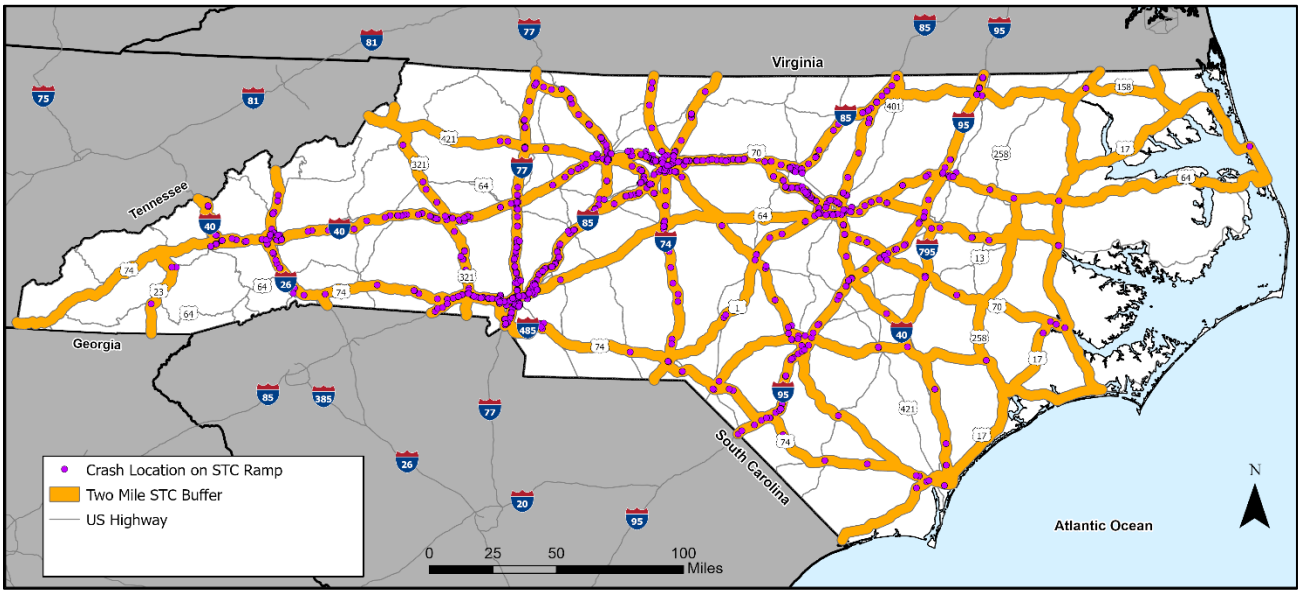
Source: NCDOT Crash Data, 2015-2019.

Figure 4.13 Truck Crashes in North Carolina, 2019



Source: NCDOT Crash Data, 2015-2019.

Figure 4.14 Truck Crashes on Ramps on STC Corridors



Source: NCDOT Crash Data, 2015-2019.

A total of 36% of the total truck-related crashes occurring in North Carolina occurred on highway ramps within two miles of a truck parking facility, as shown in Figure 4.14. The lack of truck parking spaces and information about available truck parking nearby forces truck drivers to park illegally on ramps. It is important to recognize that truck crashes on ramps could be due to any number of factors besides parked trucks. Although these ramp crashes did not represent a majority of the total crashes, there is clearly a safety risk associated with trucks parking along ramps. In interviews with private truck stop operators under the 2017 Truck Parking Plan, it was said that ramp parking is the first sign to passing trucks that parking facilities are at capacity. When trucks park on shoulders or ramps, they become a fixed object within the travel way

endangering the traveling public. Off-ramps are more dangerous than on-ramps since vehicles exiting interstate highways are traveling at a higher rate of speed.

Truck ramp crashes along STC Corridors from 2015 to 2019 occurred primarily within the urban areas around the cities of Charlotte, Greensboro and Raleigh and along I-85, I-40, I-77, I-26 and I-95. A significant number of on-ramp crashes involving trucks occur close to truck parking facilities. To determine how many of these crashes were due to parked trucks would require examining the individual crash reports, which is recommended for future study. However, ramp crashes are just one safety concern regarding adequacy of truck parking. Of more concern is having truck drivers remain beyond their legal hours of service on the roadways.

Table 4.5 illustrates the percentage of on-ramp truck crashes occurring within a half-mile, one-mile and two-miles of a truck parking facility. Truck crashes on ramps could be reduced by expanding truck parking spaces near main truck corridors in the state, and by implementing technologies to allow truck drivers to find available truck parking. Adding more truck parking spaces to existing parking facilities would also help to meet truck parking demand.

Table 4.5 Truck Crashes Occurring Near Highway Ramps, 2015 – 2019

Location	1/2-Mile Radius	1-Mile Radius	2-Mile Radius
Truck Crashes Near Parking Facilities	308	476	741
Total Truck Crashes on Ramps	2,084	2,084	2,084
Percent of Truck Crashes on Ramps of All Truck Crashes	**15%**	**23%**	**36%**

Source: NCDOT Crash Data, 2015-2019.

North Carolina weigh stations can experience ramp queues when stations are opened and are at risk for interstate truck crashes. However, N.C. State Highway Patrol (NCSHP) routinely monitors ramp queue lengths during weigh station operations to ensure this does not happen. To evaluate truck ramp crashes near weigh stations, truck crashes occurring from 2015 - 2019 within a half-mile of each weigh station were totaled. The results, presented in Table 4.6, indicate that the percentage of truck crashes near weigh stations is not significant regardless of whether the crash was on ramp or at other locations.

Table 4.6 Truck Crashes Occurring Near Weigh Stations, 2015 – 2019

Location of Truck Crash	On-Ramp	Other Locations
Truck Crashes Within 1/2-Mile of Weigh Stations	0	158
Total Crashes	2,084	46,630
Percent of Truck Crashes	**0%**	**0.3%**

Source: NCDOT Crash Data, 2015-2019.

The 2017 Truck Parking Plan reviewed other studies to evaluate weigh station locations and truck crashes. In a Weigh Station Feasibility Study conducted for NCDOT in 2003, which included a review of accident reports, study authors could not establish a definitive link between the weigh stations and the crashes reported near them.

5.0 Truck Parking Facility Analysis

Truck parking was identified in the North Carolina Statewide Multimodal Freight Plan, Truck Parking Study, 2017 as a major challenge to safety and economic productivity. Lack of available truck parking negatively impacts the safety of truck drivers and the traveling public when trucks park in unauthorized areas. Additionally, economic productivity and efficiency is reduced when drivers must begin searching for parking well in advance of their hours-of-service expiring, costing them valuable driving time. The combination of hours-of-service restrictions and a lack of truck parking availability impacts the ability of shippers to get their goods to market. Furthermore, each of these issues impacts the motoring public by introducing safety hazards along the roadway and increasing local congestion due to trucks searching for parking in areas adjacent to major roadways or freight generators.

As local and national economies continue to rely on freight movement, the necessity of parking continues to remain of critical importance across the country and in North Carolina. Below is a high-level summary of some of the national trends in truck parking, with a review of both Texas and Florida strategies.

Increasing capacity at all rest areas and weigh stations for truck parking

- Texas has identified dozens of rest areas to be considered for truck parking expansion by restriping and repurposing formally closed or underutilized rest areas for truck parking.[2]
- Florida has increased truck parking along I-10 at the Gadsden Rest Area by restriping a portion of existing car parking and adding official parallel parking along the rest area ramps. Florida has also Increased truck parking along I-95 at the Martin County Rest Area by 30% through new restriping design without the addition of new pavement.[3]

Truck parking only sites being developed

- Texas is considering utilizing available ROW to build new truck parking only facilities and develop truck staging lots in urban settings.[4]

Older weigh stations being upgraded for truck parking

- Florida installed 24-hour restrooms and vending machines at weigh stations on I-4, just east of Tampa. With the addition of restrooms and vending machines, these areas can accommodate overnight truck parking.[5]

Activating existing DOT ROW to truck parking

[2] https://ftp.txdot.gov/pub/txdot/move-texas-freight/studies/truck-parking/final-report.pdf
[3] https://ftp.txdot.gov/pub/txdot/move-texas-freight/studies/truck-parking/final-report.pdf
[4] https://ftp.txdot.gov/pub/txdot/move-texas-freight/studies/truck-parking/final-report.pdf
[5] https://ops.fhwa.dot.gov/freight/infrastructure/truck_parking/workinggroups/parking_capacity/product/row.htm

- Florida has identified utilizing DOT ROW for truck parking in a variety of locations, including through a parking on median concept and utilizing available ROW adjacent to existing DOT provided rest areas.[6]

Utilizing Technology

- Technology impacts on truck parking. Technology implementation is similar but fragmented between public sector and private sector-driven initiatives. The public and private sectors are taking parallel paths towards the development and implementation of trucking information management systems. Those already in the marketplace today have roughly similar functionalities: gather information about available spaces and disseminate that information through a wide range of user interfaces. Parking information is disseminated through smartphone applications, in-cab systems and roadside DMS. In order to ensure safe operations, smartphone applications need to be FMCSA "one-touch" compliant by relying on hands-free voice interactive commands. A smartphone or in-cab application may sense a vehicle's roadway heading and GPS location to present parking availability information to drivers for facilities in proximity to the vehicle's position and travel path. These systems have come a long way in the past few years providing drivers with real time information through push notifications to provide up to date information along the entire route. However, the ability to predict availability at a time in the future is still lacking.[7] Another approach, typically used by the private sector, are reservation systems.
- Impacts of autonomous vehicles. Most of the studies reviewed acknowledge that autonomous and connected vehicles are coming and will have the potential to greatly impact both freight movements in general and truck parking. However, a full discussion and analysis of those impacts is lacking. Initial test deployments of this technology have focused on long-haul, Interstate corridors. If this trend continues, it will reduce the need for long-term truck parking along rural stretches of highway. However, since autonomous vehicle technology will likely take longer to be deployed in urban areas, short-term parking areas near urban interchanges (where loads switch between autonomous and human drivers) and staging parking to support urban deliveries will continue to remain a need.[8]

Truck Parking Policy, Outreach and Coordination Strategies

- Develop guidelines for integrating truck parking into the project development process.
- Consider truck parking needs prior to purchase or sale of ROW.
- Coordinate with private property owners to allow truck parking at large parking facilities when not in use.
- Create guidance to help local agencies include truck parking demand as part of Traffic Impact Analyses for new developments.

[6] https://ftp.txdot.gov/pub/txdot/move-texas-freight/studies/truck-parking/final-report.pdf
[7] https://ftp.txdot.gov/pub/txdot/move-texas-freight/studies/truck-parking/technical-memos/1.pdf
[8] https://ftp.txdot.gov/pub/txdot/move-texas-freight/studies/truck-parking/technical-memos/1.pdf

- Develop guidelines for integrating truck parking plans into local and regional transportation and land use plans.
- Encourage commercial and industrial property owners to provide truck parking on-site.
- Create guidance for next generation logistics parks that include integrated and full-service truck parking facilities

5.1 Public Truck Parking Funding

The North Carolina Truck Parking Plan, 2017, indicated that prior to the development of the Strategic Transportation Initiative (STI), NCDOT created a budget line item to construct new rest areas. Staff used a condition assessment survey to rate the quality, safety, cleanliness of vertical buildings and pavement needs. Historically, NCDOT has used the assessment data and expected budget financial support to plan for future facilities based on need. The NCDOT Roadside Environmental Unit also works with the 14 Division Engineers to determine which rest areas suffer from lack of utilization or age and recommend eroding facilities (such as pump stations and water/sewer lines) for closing or consolidation. NCDOT's cycle of proactive management and assessment has been successful in maintaining a high quality standard of rest areas with limited resources.

STI legislation recognized that NCDOT needed a method to determine which projects in its delivery pipeline would be subject to the new data driven approach. Future planned rest areas could not compete for capital funds and be included in the STIP since the department's prioritization process does not include criteria to score and compare them to other infrastructure needs, such as highway capacity projects. Therefore, the Roadside Environmental Unit is now provided an "off the top" amount of state maintenance funds of around $3 million to address both routine maintenance items, such as fixtures, painting, and other needs, and to update older facilities, such as new electric wiring or replacement of HVAC systems. Highway Divisions s have the budgetary discretion to determine at what investment level and by what funding source, such as resurfacing funds, to address these pavement needs. They must do this while also balancing investment in a growing backlog of priority pavement/bridge needs throughout their respective Highway Divisions. Therefore, NCDOT's ability to plan for and construct new rest areas that address passenger demand and accommodate additional truck parking is extremely constrained. All of the truck parking modifications identified in the 2017 and 2020 Truck Parking Plans have been completed. No additional public-sector truck parking has been added by NCDOT.

NCDOT staff routinely observes an increased level of trash associated with truck parking at existing rest areas, even during times when truck parking is plentiful and amenities are fully available. Staff expressed concerns about how new publicly funded truck-only parking facilities would address these ongoing needs, which may exacerbate the already small Highway Division maintenance budgets and service contracts. Staff noted such parking lots would need security safety equipment and bathroom facilities, which would add to NCDOT's maintenance budget. This issue was identified in the previous Truck Parking Studies as well.

5.2 Truck Parking Options

The private sector controls about 85% of the truck parking supply in the state, according to the 2017 Truck Parking Study. Therefore, it would be appropriate to include the private sector as part of the solution. However, there are several options that NCDOT can explore to provide additional public parking spaces. In 2017, NCDOT used data, interviews and best practices from ten other related truck parking studies, to explore several options to improve the state's truck parking situation, along with advantages and disadvantages to each option. The options discussed below are not listed in priority order.

5.2.1 NCDOT Builds Truck Parking Lots at Abandoned Rest Areas

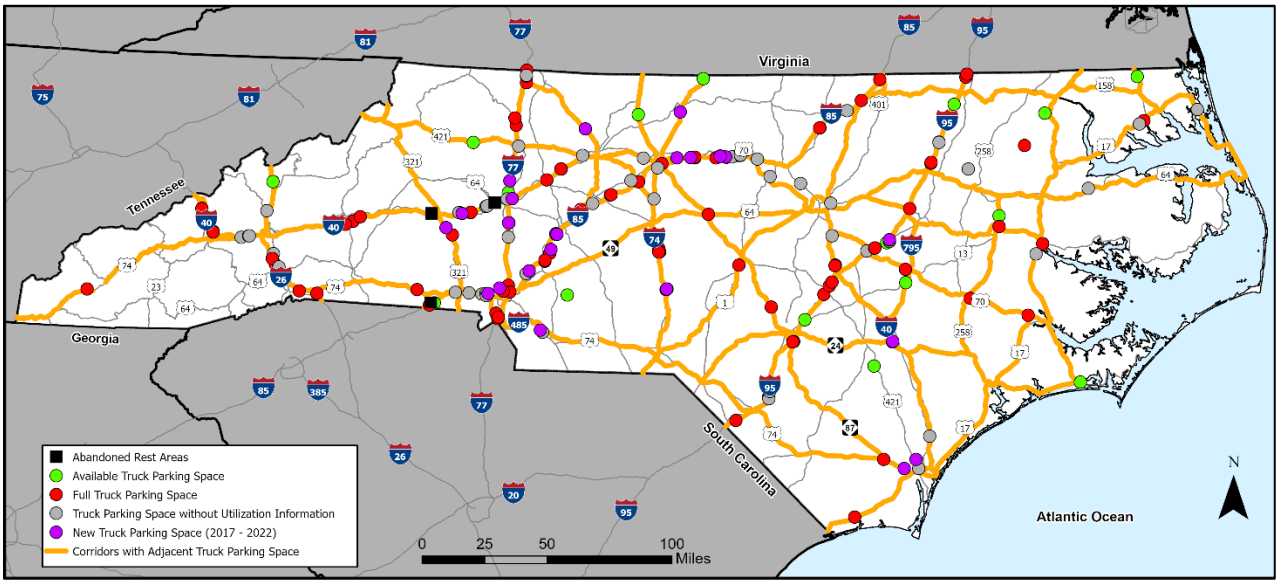
Advantages

NCDOT still owns the ROW for five abandoned rest area sites. Two are located on I-40 and three on I-85. For an abandoned rest area to be considered for reuse and renovation, it should meet two criteria: (1) there should not be available truck parking facilities with low utilization nearby, and (2) the site should be close to one of the main freight highway corridors. Several abandoned rest areas identified by NCDOT were evaluated to determine if they met the above-mentioned criteria.

Two sites on I-40 in Burke County are near multiple private parking facilities along I- 40 that are keeping up with truck parking demand along this corridor. A third site is located on I-85 five miles north of North Carolina's southern border in Cleveland County. This site is near available parking locations including a North Carolina welcome center and King's Mountain Truck Plaza.

However, I-85 is a high demand corridor with insufficient overall parking capacity. The size of this site is approximately 12 acres. Therefore, this site along I-85 is in a better location for re-use than the I-40 locations with regard to parking demand and parcel size. Two sites along I-40 in Iredell County are in a good location but lack the acreage required for any significant truck parking.

Figure 5.1 Location of Three Abandoned Rest Areas



Source: CS, NCDOT, 2017

Disadvantages

Ramps at each site are not up to current interstate standards and would need to be lengthened. The sites would also require upgrading water and sewer utilities to be considered in the construction cost to prepare this site for safe truck transport and parking. Residential development has expanded adjacent to the I-40 site, increasing the likelihood of community resistance to truck parking development. The community would experience higher decibel levels of noise and could be concerned about increased safety and security risks. Additional considerations include restrooms, installing adequate lighting and security cameras, providing vending machines and maintaining trash collection.

The sizes of these sites vary, from one half to twelve acres. This is an important consideration given the space needed for truck parking. Of the four proposed sites, the Cleveland County site on I-85 should be considered as a high-level planning candidate for parking new rest area since the site may have sufficient land for vehicle access, new facilities and parking.

5.2.2 NCDOT Uses Weigh Stations for Additional Truck Parking

Advantages

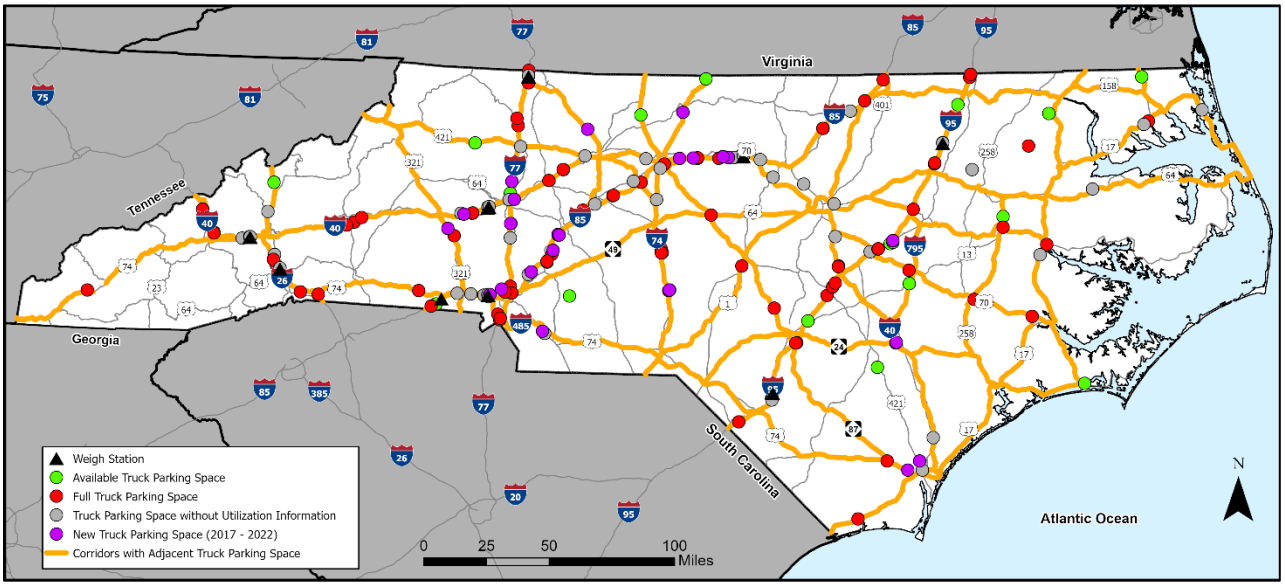
For a weigh station to be considered for truck parking, staff concluded they meet the following criteria: (1) there should not be available truck parking facilities nearby, and (2) the location should be close to one of the main freight corridors. The weigh stations identified are located in areas, which *may* help mitigate the overcapacity problem at existing rest areas.

Engineering costs and construction expenses are not as problematic at weigh stations compared to rest areas, and some weigh stations could accommodate truck parking. Most weigh stations have adequate lighting and security camera installation that could make truck parking accommodations more cost effective, depending on the condition of the utilities in place. Truck

drivers may feel safer parking at a weigh station staffed by NCSHP, even if the facilities are not staffed overnight.

Figure 5.2 illustrates the location of weigh stations with respect to other truck parking locations. The weigh stations on I-26 and I-77 are good candidates for expansion to accommodate truck parking based on their locations. However, these sites are too small to accommodate more than two or three trucks for overnight parking due to size limitations. Out of the eight pairs of weigh stations, seven were constructed in the 1970s. Parking is adequate for patrol cars, but not adequate for truck inspections, impoundment and even short-term parking at most locations. However, three sites have the potential to accommodate overnight truck parking. These include the two Hillsborough stations on I-40/I-85 in Orange County, and the new Charlotte NB Station that recently opened on I-85 in Gaston County.

Figure 5.2 North Carolina Weigh Stations



Source: CS, NCDOT, 2017

Disadvantages

NCDOT is already facing challenges of replacing utility lines to these sites due to their remote locations. Weigh stations have been designed to accommodate truck queuing for weighing and inspection purposes, not for truck parking. Some additional site work may be required to accommodate truck parking, including additional signage and striping to configure truck parking spaces. To be effective, implementing truck parking at weigh stations would need to be communicated broadly to truck drivers that weigh stations can be “safe havens” for truck drivers reaching the end of their hours of service.

A weigh station review document was developed for NCDOT, Transportation Mobility and Safety Division, ITS and Signals Management Unit. The document is, in part, a review of the existing Weigh Station Feasibility Study The intent of the document is to provide an overview and high-level update of the original study and identify current best practices for consideration in the evaluation of and recommendations for the statewide weigh stations.

The document was developed through a review of the Study, the 2017 North Carolina Multimodal Freight Plan, the 2016 Greater Charlotte Regional Freight Mobility Plan, and stakeholder coordination. The goal of the document was to determine the applicability of information contained in the previous Study and document information that has changed or requires updates.

To support the information contained in the report review, a separate Weigh Station Best Practices document was prepared, which outlines the current and evolving state of the industry for weigh station layout, features, site selection, technology, data storage, asset management and policies and procedures.

The document provides recommendations based on the condition changes resulting from deployed technology and facility upgrades that have occurred since the original study was published. Recommendations are made for the development of a business plan and policy considerations as well as further analysis of recommended improvements based on the 2022 freight plan currently under development.

5.2.3 NCDOT Pursues Public-Private Parking Arrangements

NCDOT can also work with the private sector to promote privately financed rest areas similar to the facility in Delaware along I-95. Since the private sector controls 85% of the truck parking supply in the state, the private sector can be part of the truck parking solution. Working with the private sector, NCDOT can establish public-private partnerships (P3) to design and construct additional truck parking facilities.

When Congress created the Interstate Highway System, community leaders were concerned that local businesses, would be jeopardized as truck drivers and motorists bypassed their towns. As a result, Congress prohibited states from offering commercial services, such as food and fuel, at commercial rest areas on the interstate ROW. Since that time, businesses such as restaurants, fuel stations and truck stops have clustered near the interstates at the interchanges along the interstates to provide traveler services. Due to their advantageous locations, state-owned commercial rest areas compete with businesses on the sale of services to highway travelers.[20]

P3s are legal in North Carolina. Government entities may enter into a P3 for any public-private project for which the entity determines it has a critical need. The General P3 Statute defines P3 as “a capital improvement project undertaken for the benefit of a governmental entity and a private developer under a development contract that includes construction of a public facility or other improvements, including paving, grading, utilities, infrastructure, reconstruction, or repair, and may include both public and private facilities”. There are two primary statutes that govern P3s in the state[21]:

- Section 143-128.1C of the North Carolina General Statutes (General P3 Statute), which authorizes governmental entities to enter into P3s to acquire, construct, own, lease as a lessor or lessee, and operate or participate in the acquisition, construction, ownership, leasing, and operation of a public- private project or of specific facilities within a public-private project. The General P3 Statute is primarily a procurement statute.

- Sections 136-18(39) and (39a) and 136-89.180 to 136-89.220 of the North Carolina General Statutes (DOT and TA P3 Statutes), which authorize the North Carolina Department of Transportation and the North Carolina Turnpike Authority to develop transportation infrastructure using P3s.

Advantages

These types of arrangements, found in other states, are receiving favorable results from private and public entities. In addition to the Delaware example, the reuse of brownfield sites that was recommended as a solution for additional truck parking in Illinois DOT's "Trucker's Parking/Rest Facility Study" (2008) and Virginia DOT's "Virginia Truck Parking Study" (2015), is one potential option for implementing a P3 arrangement. Using underutilized retail, manufacturing, and seasonally affected sites could also be employed for additional truck parking.

Disadvantages

There may be limited locations where this arrangement is feasible. There are also limitations within the interstate ROW areas in North Carolina for such projects due to federal regulations.

5.2.4 NCDOT Conducts Site Exploration at Major Interstate Crossings

Highly visible locations of abandoned facilities, distribution centers and warehouses at the intersection of major Interstates or at the state border where truckers can rely on availability and better time their stops based on delivery are another option for truck parking. These areas typically have more room due to the land required for ramps for both major interstates. Examples include the intersections of I-40 and I-95, I-40 and I-85 and I-26 and I-40.

Advantages

These types of arrangements, found in other states, are receiving favorable results from private and public entities. These locations would provide more land on which to construct such facilities.

Disadvantages

Access to such facilities may require the construction of long access roads due to access management requirements on interstate highways. Existing interchange intersections may be already at capacity for development, particularly in urban areas.

5.2.5 Utilizing Excess Passenger Car Parking at Existing Rest Areas

While the truck parking at public rest areas is at or near capacity, there is some underutilization of passenger spaces at existing rest areas. All rest areas on North Carolina Interstates have segregated parking for trucks and automobiles.

Advantages

NCDOT already owns and operates the facilities so the costs for restriping and designating the spots could be modest.

Disadvantages

According to NCDOT staff, underutilized peripheral passenger spots would require trucks to traverse through passenger parking lots, subsequently increasing safety risks to families and motorists. Additionally, the engineering constraints of this segregated parking configuration, including lack of turning radii through the passenger lot and the need to lengthen stalls, may prove cost prohibitive and may not generate enough new parking availability to address near term parking shortages. Finally, the net gain in truck parking spaces would be minimal.

Appendix A. Truck Parking Advisory Group Invited Participants

Names	Organizations
Justin Sykes	American Petroleum Industry
Alexandra Shirk	ATRI
Dan Murray	ATRI
Laura Sandt	Collaborative Sciences Center for Road Safety
Will Seel	Council of Supply Chain Management Professionals
Nichole Mumford	Council of Supply Chain Management Professionals
Chris Davies	Freight Works Transportation and Logistics
Jerry Cook	Hanes Brands
Ginger Laidlaw	NATSO
Lane Bailey	NC Association of Regional Councils of Government
Peter Daniel	NC Chamber
Buddy Holson	NC League of Transportation and Logistics
Jason Orthner	NC Rail Division
Stephanie Ayers	NC State Ports Authority
Steve Massey	North Carolina Trucking Association
Andrew King	OOIDA
Bryce Mongeon	OOIDA
Collin Long	OOIDA
Joe Milazzo	Regional Transportation Alliance
Michael Tart	State Police Department
Michelle Grainer	Sweet Potatoes Packers and Shippers Contact
Rick Warner	TSPS
Jeff Wofford	UPS Airlines
Petrina Lawrence	Women in Trucking

Names	Organizations
Susie Crane	Uptime Truck Parking
Terrye Ward	Ideal Transport, Inc.
Will Reich	Best Logistics Group, Inc.
Jason Wing	Red Classic Transit
Jim Gore	Loves Truck Stop
Adam Trundle	Loves Truck Stop
Staton Smith	Loves Truck Stop
Shelia Blanchard	NCDEQ
April Fletcher	South Carolina Port Authority
Cathie Vick	Virginia Port Authority
Ben Hinnant	Overweight and Oversize Permits
Bill Slagle	Economic Development Partnership of NC
Karen Pentz	Guildford Technical Community College
John Pope	Cargo Transporter
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