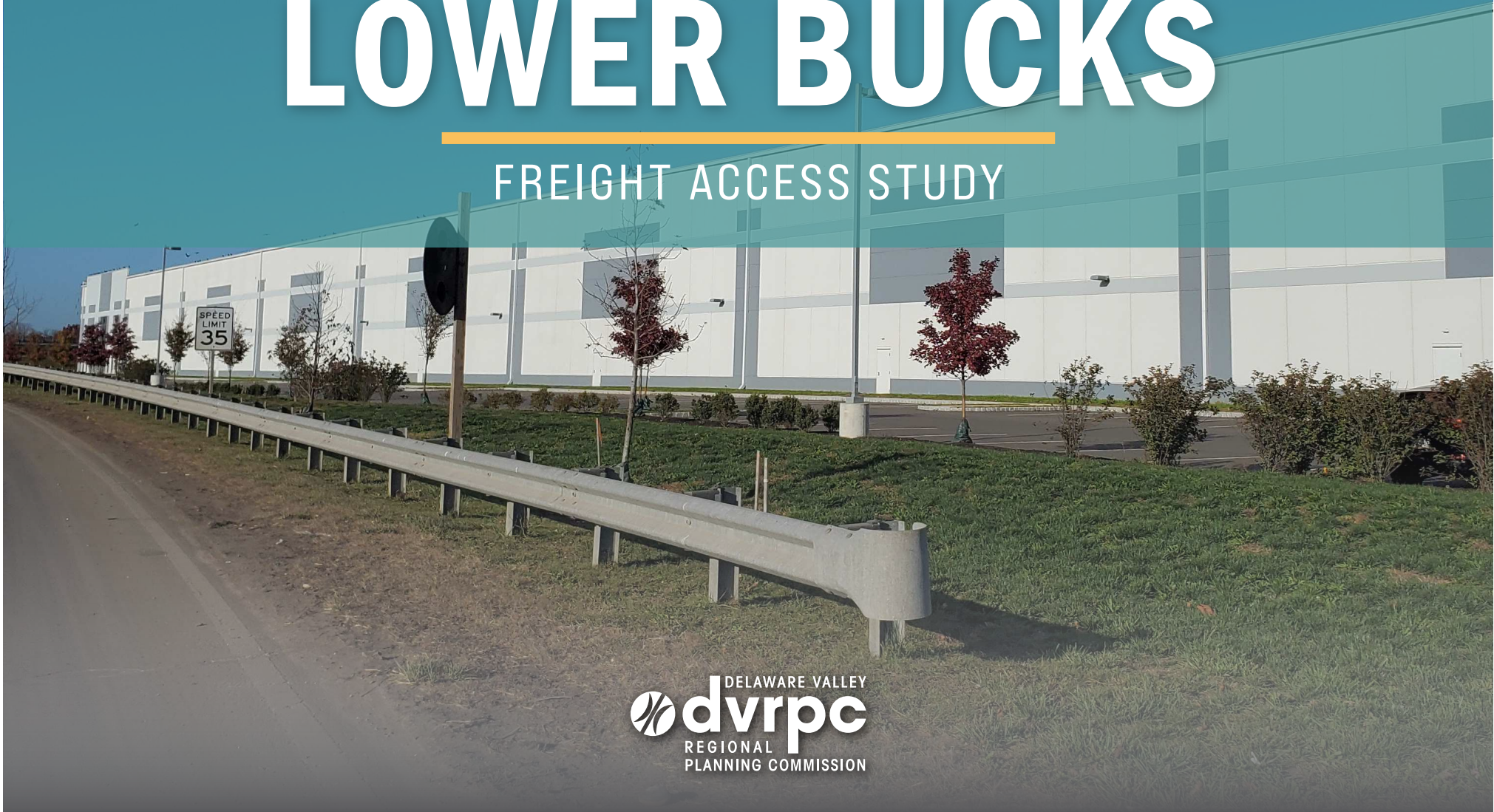


March 2024

LOWER BUCKS

FREIGHT ACCESS STUDY





DVRPC's vision for the Greater Philadelphia Region is a prosperous, innovative, equitable, resilient, and sustainable region that increases mobility choices by investing in a safe and modern transportation system; that protects and preserves our natural resources while creating healthy communities; and that fosters greater opportunities for all.

DVRPC's mission is to achieve this vision by convening the widest array of partners to inform and facilitate data-driven decision-making. We are engaged across the region, and strive to be leaders and innovators, exploring new ideas and creating best practices.

The Delaware Valley Regional Planning Commission

is the federally designated Metropolitan Planning Organization for the Greater Philadelphia region, established by an Interstate Compact between the Commonwealth of Pennsylvania and the State of New Jersey. Members include Bucks, Chester, Delaware, Montgomery, and Philadelphia counties, plus the City of Chester, in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer counties, plus the cities of Camden and Trenton, in New Jersey.

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EXECUTIVE SUMMARY

The *Lower Bucks Freight Access Study* examines freight generation patterns in and around the recently started Keystone Trade Center (KTC) development on the former U.S. Steel Fairless Works site in Falls Township. The site is accessed through multiple points including two Class I railroads, shortline rail, the Port of Bucks, and various highway connections. The study area includes surrounding residential communities that abut the KTC and two other smaller freight centers located along US-13. The new development has the potential to bring up to 15 million square feet of new distribution and logistics space and over 5,000 new jobs to the site. At present, over three million square feet of new distribution and logistics space has been completed.

This study documents the existing land use and employment patterns in the study area, which are heavily dominated by the industrial sector. Freight-intensive industries include regionally serving manufacturing and distribution facilities ranging from metal fabrication and recycling to salt and chemicals. The study analyzed this activity and the implications of the trend toward distribution and logistics development in the area and found the need to balance the aspects of a heavily-developing industrial center with those of adjacent residential neighborhoods, in both Morrisville Borough and Falls Township, in order to maintain a safe and thriving area.

Based on the findings from this analysis and discussion with the study steering committee, the report lays out a set of recommendations that can be undertaken by local municipalities and Bucks County in conjunction with PennDOT:

- Designating and implementing a truck route network;
- Re-designating Tyburn Road as the official National Highway System (NHS) Intermodal Connector instead of South Pennsylvania Avenue;
- Implementing traffic calming along South Pennsylvania Avenue;
- Improving transportation access to and pedestrian access within the Keystone Trade Center site;
- Creating and supporting a commuter shuttle; and
- Increasing clarity of directional and truck restriction signage.

This report also includes brief discussions of next steps to be taken by various stakeholders. Action steps for implementation are outlined, along with potential funding sources and resources available to support these recommendations.

INTRODUCTION

Lower Bucks County continues to evolve despite being largely built-out for some time. Older, heavy industrial uses are giving way to distribution and logistics-focused uses. Legacy infrastructure abounds, making this area an attractive location for operators of these new industrial uses.

PROJECT OVERVIEW

The Lower Bucks Freight Study considers freight generation and transportation recommendations for a study area in Falls and Bristol townships and Morrisville and Tullytown boroughs in Bucks County, bounded by US-1 in the North, US-13 to the West, the Pennsylvania Turnpike in the South, and the Delaware River to the East (see Figure 2). The Keystone Trade Center (KTC) located at the former Fairless Works is one of the largest and most prominent development sites in the Lower Bucks area. It has the potential to add up to 15 million square feet of new logistics and distribution facilities, as well as thousands of additional jobs, to the region.¹ Recent studies, such as the DVRPC *Bristol Corridor Study (2021)*, point to the need for additional planning efforts to be focused on the Lower Bucks County area to evaluate the impacts of new development.

The Bucks County Planning Commission (BCPC) requested the Delaware Valley Regional Planning Commission (DVRPC) to undertake *The Lower Bucks Freight Access Study*. With guidance from a study steering committee, the DVRPC project team examined the existing and anticipated freight generation of the KTC and its immediate surrounding area and

identified recommendations and strategies to better facilitate freight movements while also addressing key points of conflict to improve the safety of trucks, passenger vehicles, pedestrians, and bicycles. These freight considerations are intended to align with existing local planning efforts of Morrisville Borough, Falls Township, and Bucks County. The study objectives are to:

- Improve safety, road conditions, and truck routing throughout the study area;
- Maintain and ensure safe access to the KTC and other area businesses;
- Enhance the quality-of-life for residents;
- Reduce the possibility of conflict between trucks and other road users.

As a result, DVRPC has conducted a comprehensive study on freight access and truck routing centered around the KTC area in Lower Bucks County. The following report has documented the needs and identified strategies for addressing freight and workforce access concerns.

¹NorthPoint Development. (n.d.). About KTC. Keystone. <http://www.keystone-trade.com/>

STUDY ADVISORY COMMITTEE

DVRPC convened a study steering committee composed of local stakeholders, representatives from the surrounding municipalities, and relevant County departments. These members helped to guide the purpose and goals of this study and provide critical feedback on the recommendations in this report. A detailed account of outreach activities can be found in Appendix B. The members of the study steering committee included:

- Commissioner Robert J. Harvie Jr., Bucks County;
- Evan J. Stone, Bucks County Planning Commission;
- Richard G. Brahler Jr., Bucks County Planning Commission;
- Christian Regosch, Bucks County Planning Commission;
- Billie Barnes, Bucks County Department of Workforce and Economic Development;
- Dianna J. Krall, Bucks County Department of Workforce and Economic Development;
- Stephen J. Noll, TMA Bucks;
- Matthew Lawson, Mercer County Department of Planning;
- Matthew Zochowski, Mercer County Department of Planning;
- Anthony P. Carabelli Jr., Mercer County Department of Economic Development;
- Cheryl Kastrenakes, Greater Mercer TMA;
- Francis Hanney, Pennsylvania Department of Transportation;
- Matthew Takita, Falls Township;
- Helen Hlalol, Morrisville Borough;
- Judith Danko, Morrisville Borough;
- Robert Jones, Waste Management;
- Dennis Jones, NorthPoint Development; and
- Jeremy Michael, NorthPoint Development.

REPORT ORGANIZATION

This report provides a summary of the study analysis and findings. It is organized into the following sections:

- **Lower Bucks County Area Background:** documenting existing development patterns and neighborhood context;
- **Existing Transportation Conditions:** detailing and analyzing the existing transportation system and key activity patterns;
- **General Recommendations:** summarizing a series of actions and improvements to be considered by project stakeholders, as well as providing guidance on implementation and funding opportunities to advance those recommendations;
- **Design Focus Areas:** summarizing a series of actions and improvements to be considered by project stakeholders within three specific areas with well-recognized traffic and quality-of-life issues that need to be addressed.

RELATED STUDIES

The project team reviewed a number of previous and current related planning efforts in and around the study area. These studies were used to inform the current effort.

- [Bristol Corridor Study](#);
- [Bucks County Comprehensive Plan](#);
- [Falls Township Comprehensive Plan](#);
- [Morrisville Borough Comprehensive Plan](#);
- [Morrisville Borough Active Transportation Plan](#); and
- [Southerly Crossing Corridor Study](#).

BRISTOL CORRIDOR STUDY

The *Bristol Corridor Study*, completed in 2021, sought to better understand the freight-related impacts of two recently completed ramps between I-95 and I-276 in the Bristol area. The study specifically mentions the Falls Township area where the Keystone Trade Center development is taking place. The study outlines numerous recommendations for improving conditions in and around the area including designating a truck network, traffic calming, and wayfinding signage. The study calls for further analysis of the general area as new developments, such as NorthPoint's Keystone Trade Center (KTC) in Falls Township, are approved.

BUCKS COUNTY COMPREHENSIVE PLAN

The *Bucks County Comprehensive Plan*, last updated in 2011, enumerates the County's land use, transportation, and economic development goals. The plan contains numerous recommendations for the County to continue to develop efficiently while reducing negative growth impacts. The plan has a section devoted to freight transportation that seeks to position these assets for growth, especially in existing industrial areas in the southeastern section of the County where there is already a significant amount of freight-related infrastructure.

FALLS TOWNSHIP COMPREHENSIVE PLAN

The *Falls Township Comprehensive Plan* is intended to guide the development of Falls Township land use, infrastructure, and open space preservation. The plan outlines several goals and recommendations related to these aspects. Additionally, it mentions the former U.S. Steel Fairless Works site as an area that could provide opportunities for both industrial

revitalization and riverside recreation.

MORRISVILLE BOROUGH COMPREHENSIVE PLAN

The *Morrisville Borough Comprehensive Plan*, currently in draft form, provides guidance on the future development of the borough and focuses on five plan principles: Livability, Heritage, Equity, Mobility, and Resilience. Among many recommendations, the plan mentions redevelopment and reuse of vacant and underutilized properties and preserving the walkable scale of its residential neighborhoods.

MORRISVILLE BOROUGH ACTIVE TRANSPORTATION PLAN

This study, completed in 2019, considers existing non-motorized transportation conditions. The plan provides recommendations and action items to enhance the borough's pedestrian and bicycle network, for all residents regardless of age and ability. The study makes note of the many points of friction between vehicles and pedestrians along South Pennsylvania Avenue, and specifically highlights the conditions for schoolchildren.

SOUTHERLY CROSSINGS CORRIDOR STUDY

This study, conducted on behalf of the Delaware River Joint Toll Bridge Commission (DRJTBC), analyzes the current conditions of four DRJTBC bridges that cross the Delaware River around the Trenton area. The study notes the restraints of each crossing in their current condition and makes recommendations on possible solutions to mitigate the negative impacts of natural traffic growth over a 25-year time horizon. The study makes recommendations on how to better enhance traffic throughput on the US-1 Bridge.

FREIGHT PLANNING

Freight planning is a multi-faceted task that takes into account many aspects such as the built environment, economic development, and most importantly, transportation systems. Freight moves along a variety of different modes. Trucks transport the largest share of freight across the country, serving last-mile connections, transnational movements of commodities, and everything in between. According to the *Pennsylvania Statewide Comprehensive Freight Movement Plan*, in 2023, federal transportation planners are projecting Pennsylvania’s tonnage moved by freight truck to increase 51% by 2045. As a leading mode of freight transportation nationally, statewide, and regionally, truck issues remain a primary consideration of DVRPC’s ongoing regional planning work. The advent of new digital navigation systems, increases in e-commerce-driven deliveries, development pressures, and an overall growth in population have added to the challenges of managing truck freight at the regional and local levels. As the demand for truck freight has grown, DVRPC has been involved in various local and regional efforts to identify solutions around truck routing and urban delivery issues. This study will add to those efforts within the Lower Bucks County area.

FREIGHT VEHICLES

Fundamental to freight planning is an understanding of different types of trucks, which are referenced throughout this report. Each community has a different tolerance for various types of trucks, and local economies inform the types of trucks that are present. Given the diversity of manufacturing, distribution, and transportation industries present, the Lower Bucks County area experiences a wide variety of truck sizes and body types. These may range from simple van and delivery trucks to tractor-trailers.

For the purposes of freight planning, DVRPC utilizes the Federal Highway Administration (FHWA) classification of trucks based on the number of axles and presence of a trailer. When classifying trucks for estimating truck activity, DVRPC utilizes Class 5 single-unit trucks and larger, which are illustrated in Figure 1. Class 5 trucks can include smaller straight trucks and delivery vehicles with two axles and six tires. Class 6 and Class 7 trucks are single-unit vehicles with three to four axles. These may include dump vehicles or larger straight trucks and dry vans. Class 8 and larger trucks are what are commonly referred to as tractor trailers. These can range from smaller truck-trailer combination units to large 53-foot tractor trailers with large sleeper cabs.

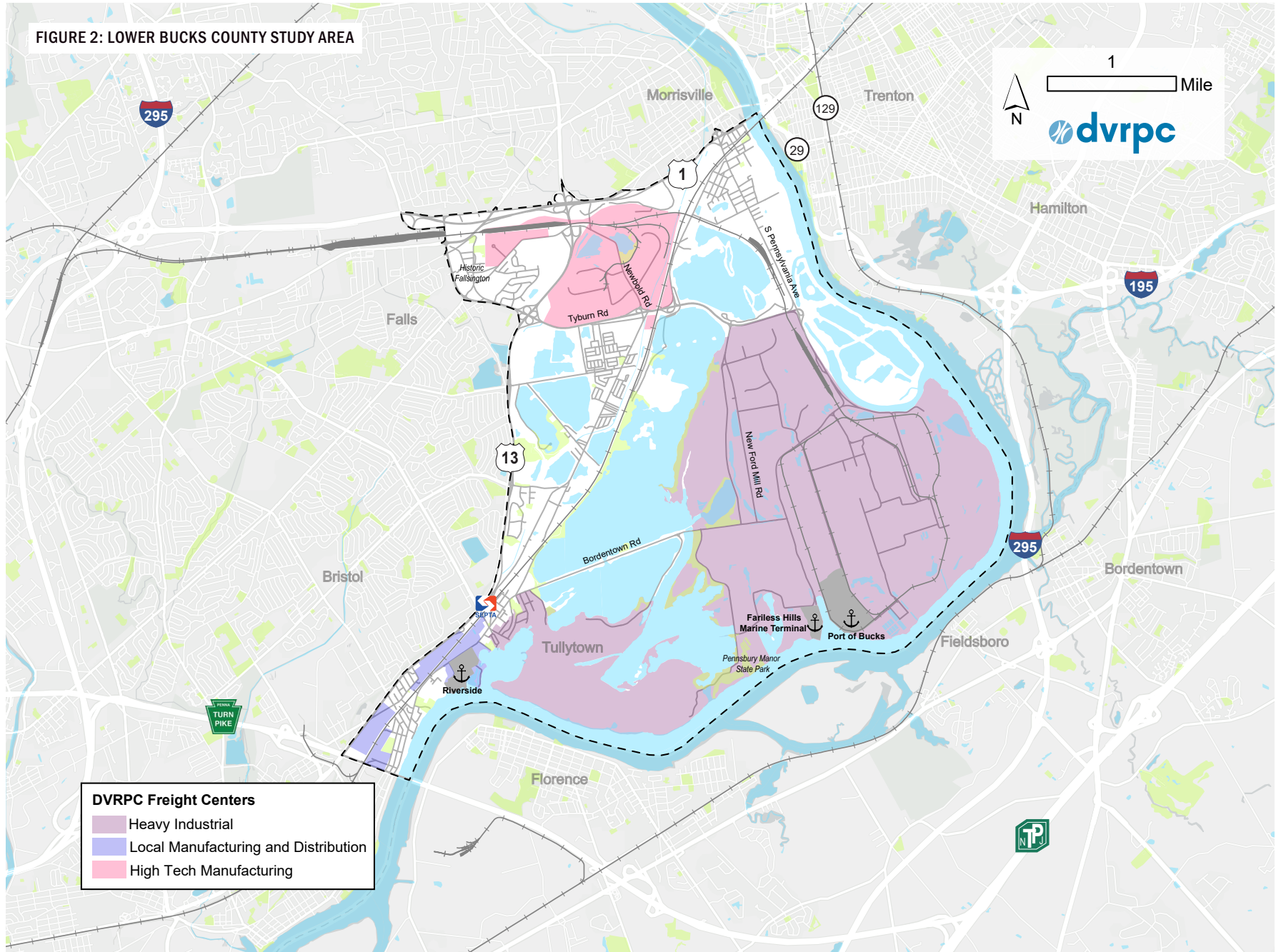
FIGURE 1: FHWA TRUCK CLASSIFICATIONS



Source: FHWA



FIGURE 2: LOWER BUCKS COUNTY STUDY AREA



BACKGROUND

This chapter provides an overview of the Lower Bucks County study area, including land use patterns, businesses and institutions, and the economic forces that shape and support its growth – including the Keystone Trade Center (KTC) development still under construction.

STUDY AREA

Figure 2 shows the study area identified to better understand freight and workforce access to and from the Keystone Trade Center (KTC) site. Portions of four municipalities make up the study area: Morrisville Borough, Tullytown Borough, Falls Township, and Bristol Township. While the KTC is the largest industrial center within the study area, there are other significant centers located within the boundaries. Three DVRPC Freight Centers (highlighted in different colors on the map) are located within the study area and are mainly composed of local distribution, waste management, and manufacturing businesses. See page 12 for more information on DVRPC Freight Centers.

In addition to DVRPC Freight Centers, there are a few residential neighborhoods within the study area. These neighborhoods include Penn Valley and Historic Fallsington in Falls Township, Morrisville south of US-1, and Tullytown east of Bristol Pike (US-13). However, the vast majority of residents are insulated from the new development taking place at the KTC as a result of natural boundaries and other intentional mitigation tactics such as truck restrictions on local roads. Other points of interest within the study area include Historic Pennsbury Manor State Park, Historic Fallsington, and the Levittown SEPTA Regional Rail Station.



Remaining U.S. Steel Facility in KTC.

Source: DVRPC

LAND USE AND DEVELOPMENT CONTEXT

The study area has a long history of industrial development and as a result has had significant investment in infrastructure. Even though U.S. Steel started to wind down operations long ago, the area retains its industrial character and orientation. It is likely to remain industrial as defunct and outmoded properties are redeveloped into a new distribution and logistics hub.

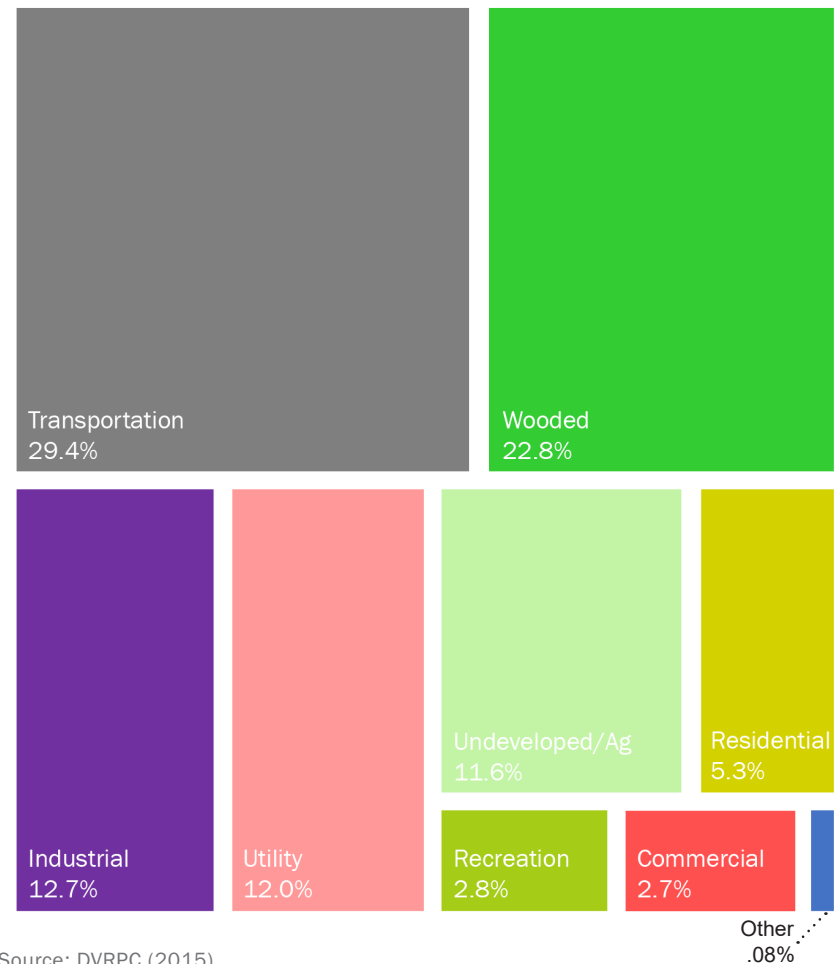
Today, as seen in Figures 3 and 4, nearly half of the acreage (13,156 acres total) within the study area is a combination of non-industrial land uses such as wooded areas, undeveloped land, recreation space, and private residences. The remaining industrial and utility land uses are freight reliant and represent over 24 percent of the site. Transportation infrastructure accounts for nearly 30 percent of land use within the study area and contains industrial shortline rail, an NHS intermodal connector, as well as numerous arterial and local access roads.

The study area's freight-related land uses range from a Waste Management landfill and recycling center to various metal fabrication workshops. A small deepwater port, owned by NP Falls Township Industrial, LLC and operated by Kinder Morgan, serves as an entry point for raw materials that are used by businesses within the KTC — and is one of the largest steel distribution sites on the east coast.¹ A Liquefied Natural Gas (LNG) pipeline serves one power generating facility located on site owned by NP Falls Township Industrial, LLC and operated by Starwood Energy.

Within the study area there exist a few important recreational amenities — Pennsbury Manor State Park and Quaker Penn Park. Both facilities are located along the Delaware River at the southwest corner of the site and are accessible from Bordentown Road via Pennsbury Memorial Road. Immediately outside the study area are numerous residential neighborhoods and commercial developments that have the potential to support growth at the KTC. However, those residents are concerned about impacts to their quality-of-life as well.

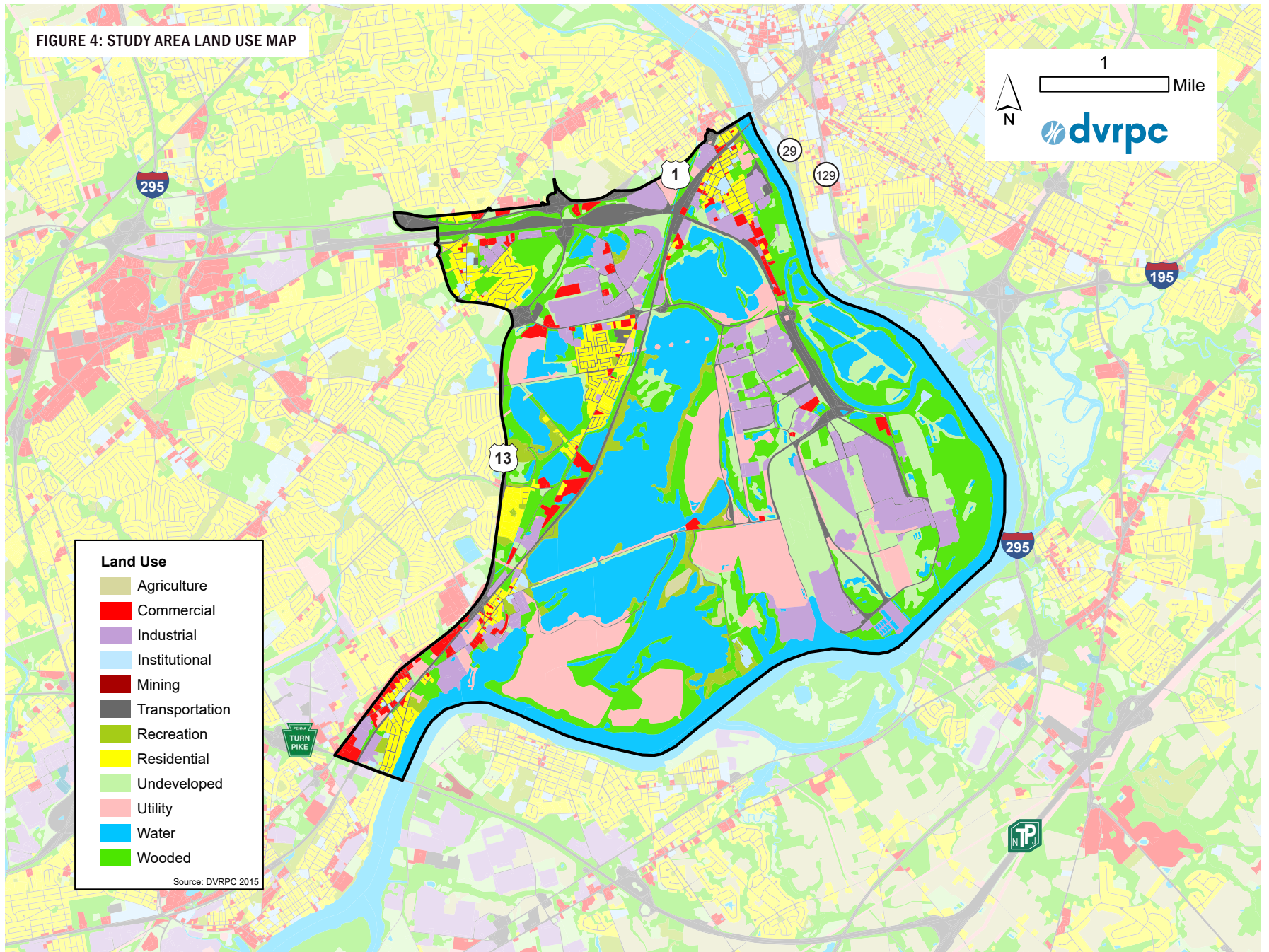
¹ Clark, K. F. (2022, March 9). Redevelopment Authority gives Bucks Industrial Sites New Life. The Bucks County Herald. <http://www.buckscountyherald.com/stories/redevelopment-authority-gives-bucks-industrial-sites-new-life,15645>

FIGURE 3: PERCENTAGE LAND USE WITHIN THE STUDY AREA



Source: DVRPC (2015)

FIGURE 4: STUDY AREA LAND USE MAP



FREIGHT CENTERS

DVRPC has identified Freight Centers across the region that are clusters of freight-related economic activity and employment. Freight Centers are intended as a planning tool to help DVRPC and regional partners better understand the priorities, challenges, and opportunities created by these important regional centers.

The production and distribution of goods is an integral part of the region's economy, requiring dedicated expanses of land to meet the needs of businesses and consumers. This land is an essential resource for a prosperous economy and an important part and source of tax revenues for many communities. The goal of the DVRPC Freight Centers inventory is to identify and categorize these key locations to enhance planning that concentrates growth, invests in appropriate transportation infrastructure, and minimizes conflict with host communities. For more information on DVRPC's Freight Centers, visit [Philly Freight Finder](#)².

Defined Freight Center typologies help planners, decision-makers, and other users to better understand transportation infrastructure requirements, land use/land development patterns, building types, employment characteristics, and potential community impacts that may exist at each Freight Center type.

In Table 1, the definitions for the different types of DVRPC Freight Centers are outlined. Within the study area, there are three of the five distinct types of Freight Centers represented: Heavy Industrial, High Tech Manufacturing, and Local Manufacturing and Distribution. The KTC site is located in a Heavy Industrial district, although future development may see this freight center evolve into a Distribution and Logistics focused center. High Tech Manufacturing is located along Newbold Road in Falls Township, while Tullytown contains a Local Manufacturing and Distribution freight center.

TABLE 1: FREIGHT CENTER TYPES AND DESCRIPTIONS

TYPE	DESCRIPTION
Heavy Industrial	A Heavy Industrial Freight Center is a node focused around heavy industrial land uses involved in the manufacturing of goods. These centers are served by freight rail access and often have additional access to a port terminal allowing for the movement of bulk or break-bulk source materials.
Distribution and Logistics	A Distribution and Logistics Freight Center is a node with a high concentration of regional and national serving distribution and logistics businesses. These centers are often located around key highway interchanges with access to both port gateways and consumer markets.
High Tech Manufacturing	A High Tech Manufacturing Freight Center is a node focused around advanced manufacturing land uses and businesses. These centers rely less on major freight rail and maritime facilities but are well located relative to highway facilities.
Local Manufacturing and Distribution	A Local Manufacturing and Distribution Center is a node focused around locally serving small manufacturing and distribution facilities. These are less dependent on prime location near interstate interchanges, but are well served by smaller highway facilities and proximity to consumer populations.
International Gateways	An International Gateway Freight Center is a core node in the regional and national goods movement system and serves as a connection to global markets. These centers are focused around a single or multiple air, maritime, or port facilities.

Source: DVRPC

² Delaware Valley Regional Planning Commission, Office of Freight Programs. "Phillyfreightfinder." DVRPC, n.d. <http://www.dvrpc.org/webmaps/PhillyFreightFinder>.



*Recently Completed Phase 1 Distribution and Logistics Space in the KTC.
Source: DVRPC*

EMPLOYMENT

According to the U.S. Census Bureau, over two-thirds of employment within the study area is concentrated in freight-related businesses such as manufacturing and wholesale trade (Table 2). With 4,714 jobs, this represents a significant cluster for not only Lower Bucks County, but the Philadelphia region as a whole. There are a number of large employers located within the study area, such as Covanta, Amazon, GMA Garnet, Morton Salt, and Waste Management (Figure 5). In addition, there is still a U.S. Steel facility that operates on the eastern end of the KTC and is a reminder of the site's former heavy industrial orientation. Complimenting the U.S. Steel presence are various metal fabrication, recyclers, and wholesale businesses, which together form a cluster of skilled industrial workers in the area.

KEYSTONE TRADE CENTER (KTC)

Going forward, the area is poised to attract thousands of logistics and distribution workers as the Keystone Trade Center development continues to build-out. As of 2024, Phase 1 is complete and Phase 2 is nearing completion. Phase 1 includes over two million square feet of new warehouse space that is due for occupation by 2024. The KTC, once fully built-out, could bring over 5,000 additional jobs to the site.³ This large increase has the potential to generate a significant amount of new car and truck traffic that will need to access the site on a given day. In addition, just north of the KTC site in Morrisville, a 973,200 square foot warehouse has been approved for development and will likely generate additional traffic in the area on top of what is generated by the KTC.

WORKFORCE ACCESS

Workforce access conditions were one of the principal concerns of the study steering committee. A survey of study area tenants conducted by the site's current developer also identified workforce access as a significant issue. This survey found that employees primarily access the site via personal vehicles. No transit routes directly serve the study area. The Levittown SEPTA Regional Rail Station on the Trenton line is located on the western periphery of the study area, but is not accessible to a majority of the jobs located throughout.

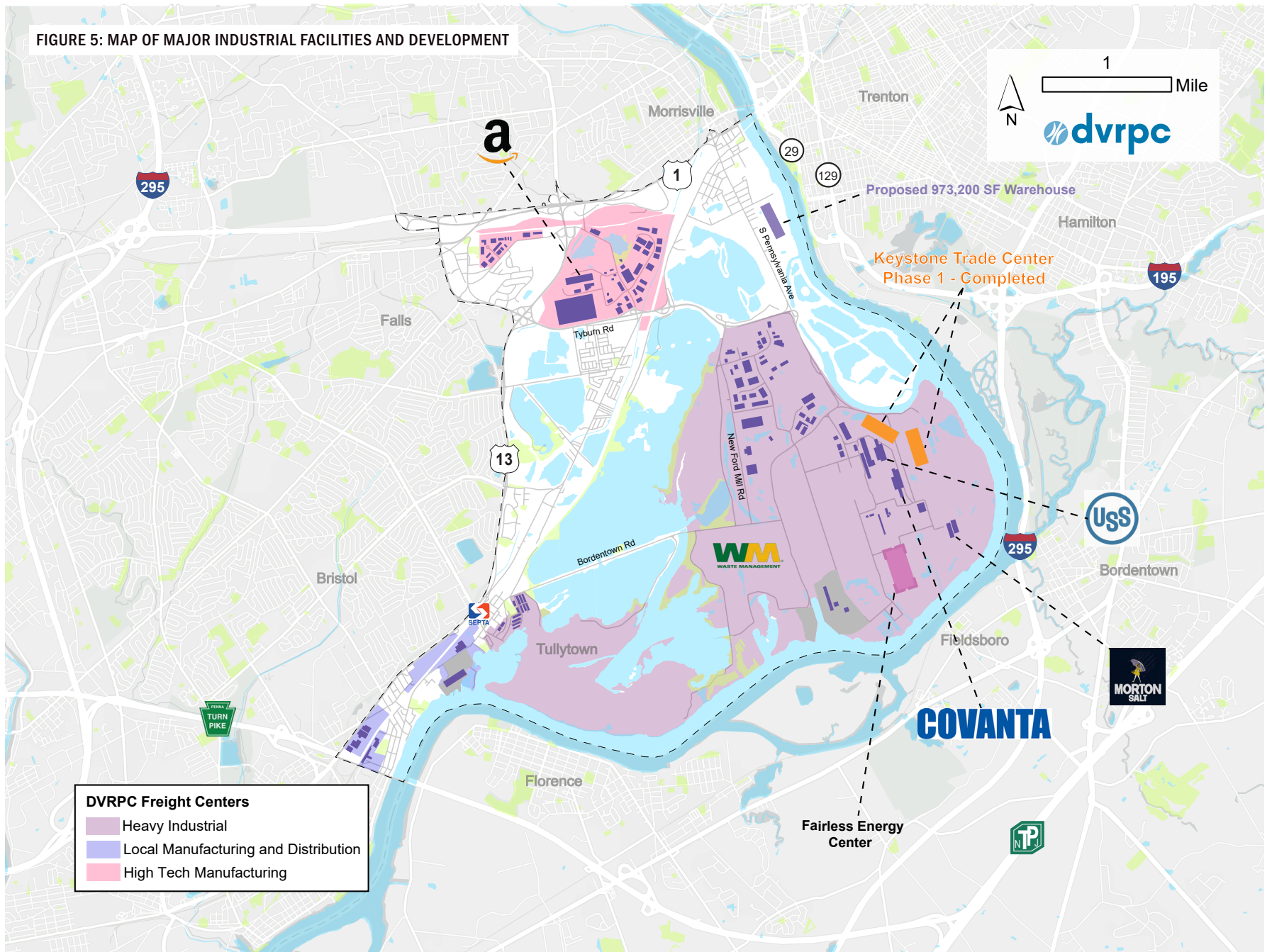
³ NorthPoint Development. (n.d.). About KTC. Keystone. <http://www.keystone-trade.com/>

TABLE 2: NUMBER OF JOBS WITHIN THE STUDY AREA BY INDUSTRY SECTOR

JOBS BY NAICS INDUSTRY SECTOR	# OF JOBS	PERCENT OF ALL JOBS
Utilities	15	0.2%
Construction	454	6.6%
Manufacturing	2,281	33.1%
Wholesale Trade	1,081	15.7%
Transportation and Warehousing	883	12.8%
Total Freight-Related Jobs	4,714	68.5%

Source: U.S. Census, LEHD (2019)

FIGURE 5: MAP OF MAJOR INDUSTRIAL FACILITIES AND DEVELOPMENT





Raw Materials Transported Within the KTC.
Source: DVRPC

EXISTING TRANSPORTATION CONDITIONS

This chapter summarizes the collection and analysis of transportation data used in this study. The purpose of outlining these existing conditions is to evaluate the transportation conditions and highlight the ongoing freight-related issues and needs in the area that will increase with further development.

FREIGHT ACCESS TO THE KTC

The KTC occupies one of the better-connected industrial redevelopment areas in the DVRPC region. Due to its former orientation as a large-scale steel production facility, the site has an extensive internal rail system (operated by Conrail and Kinder Morgan), which also serves the Port of Bucks. This port facility is the largest in the county and handled a significant proportion of U.S. Steel's import and exports when it was the sole tenant. Now, other tenants such as Morton Salt utilize the port to import raw materials for use in their facilities. Two Class I Rail operators, CSX and Norfolk Southern, have access to the site by way of privately-owned connections and shared access agreements with Conrail.

The area is also served by an extensive highway network that provides multiple points of access to the core site. The current official NHS Intermodal Connector for the site is South Pennsylvania Avenue. However, Tyburn Road is the more utilized road for access to the site given its separation from local roads and the availability of extra lanes.

The steering committee for this study highlighted numerous issues and concerns regarding access to the area. There is considerable friction

between the residential properties along South Pennsylvania Avenue and the many trucks that pass by, especially north of Post Road. Trucks have been observed traveling above the posted speed limit, which contributes to the unsafe conditions for pedestrians along the corridor. This corridor is also the sole route where schoolchildren can walk to educational facilities in the northern part of the borough on the other side of US-1.

The steering committee also identified three concerns for the City of Trenton. Due to a decades old restriction, all trucks over 13 tons or carrying hazardous materials are barred access to the Lambertson Tunnel section of NJ-29, unless they are making a local delivery. Second, the designated truck route moves trucks around Trenton to access US-1. As a result, trucks seeking a direct route to Pennsylvania have had to navigate through city streets, most commonly NJ-129 and Cass Street, in order to get to US-1. Third, if truck traffic from New Jersey increases as a result of development at the KTC, then Trenton will be challenged with absorbing the additional volumes.

The following section will detail the above and numerous other existing conditions of the area's transportation network.

HIGHWAY ACCESS

Truck access from US-1 to the study area is maintained along South Pennsylvania Avenue coming from the north end of the site. Tyburn Road, which enters the area from the west, provides access from Bristol Pike (US-13). Bordentown Road also provides direct access to the site from the southwest, however, travel by medium and heavy trucks moves through a primarily residential area.

NHS INTERMODAL CONNECTOR

Currently, South Pennsylvania Avenue serves as the official NHS connector between the Port of Bucks and the wider NHS system accessed via US-1. However, this route directs trucks down a road primarily surrounded by private residences. In addition, the South Pennsylvania Avenue corridor serves as the primary access for children walking to school on the other side of the borough north of US-1.



Homes Along South Pennsylvania Avenue.
Source: DVRPC

ROAD VOLUMES

DVRPC conducted and compiled 24-hour classification counts between 2019 and 2022 to better understand the activity on major roads in the study area. These provided hourly counts of the number of vehicles using the roads, by direction and by vehicle class, differentiating between trucks and passenger vehicles. Truck volumes for vehicles in FHWA Class 5 or higher were analyzed, which includes single-unit straight trucks, tri-axle dump trucks, and tractor trailers with three or more axles.

A transportation impact study for the new development at the KTC site anticipates 3,773 truck trips and 1,359 delivery vehicle trips, constituting both inbound and outbound, over a 24-hour period for up to 11.5 million square feet of new warehousing (9.8 million square feet of distribution facilities and 1.7 million square feet of last-mile warehousing). This is based on trip generation rates compiled from the ITE Trip Generation Manual, 10th Edition for High-Cube Transload and Short-Term Storage Warehouse building typologies.



Traffic at the Corner of S. Pennsylvania and W. Philadelphia.
Source: DVRPC

TRUCK PATHS/TRAVEL FLOWS (INRIX)

Truck and vehicle volumes provide an understanding of activity levels by road but do little to explain the distribution of trips as they move across the network. DVRPC analyzed INRIX Trip data to better understand how trips move in and out of the study area. The INRIX Trip data is compiled from global positioning system (GPS) trace trip tour data, categorized between medium and heavy trucks. It was collected over four one-week periods in 2018 that represent each season. These weeks include January 21–27, April 22–28, July 15–21, and October 14–20.

The analysis of these sample trips focused on activity that originated in or was destined for the Keystone Trade Center. This Origin-Destination (O-D) analysis provides a clearer understanding of which roads trucks are taking to get to and depart from the study area. Analysis of the INRIX Trip data illustrates the path selection, providing clarity on how trucks utilize local and arterial connectors to access the primary access highways.

GATE ORIGIN/DESTINATION ANALYSIS

To evaluate the paths that trucks use to access the KTC site, trips that either start or end within the KTC boundaries were selected from the INRIX data to form a study area data set. Gateway locations were then defined at strategically selected access roads, and these gates are labeled in Figure 6. The gateways were used to calculate the distribution of study area truck trips that travel through those selected points. Since the data used were a sample set, the percentage of total truck trips was calculated instead of truck volumes. This percentage was then used to estimate the additional truck traffic that would be added at each gate, given the traffic study estimated new truck generation of 3,773 truck trips per day.

Terms:

- **Gate Percentage** = Percentage of INRIX study area trips calculated to pass through each gate
- **New Truck Trips** = Estimated total generated truck trips from the KTC Traffic Study = 3,773 Trucks
- **New Trucks at Gate** = Estimated new truck generation at gate from KTC activity
- **Existing AADT** = Existing AADT (Average Annual Daily Trips) from DVRPC Traffic Counts
- **Existing AADTT** = Existing AADTT (Average Annual Daily Truck Trips) from DVRPC Traffic Counts
- **Increase in AADT** = Estimated increase in AADT at gate location

Gate Percentage* × *New Truck Trips* = *New Trucks at Gate

$$\frac{\text{New Trucks at Gate}}{\text{Existing AADT}} = \text{Increase in AADT}$$

Significant portions of truck traffic either originating from or destined for the site use the PA Turnpike (21 percent), I-95 Southbound (12 percent), and the NJ Turnpike Northbound (10 percent). This indicates that this site is already a regional destination with many trips coming to and from non-local destinations and potentially from outside of the DVRPC region. A detailed breakdown of the percentages that trucks use each gate when accessing the KTC is provided in Table 3.

FIGURE 6: MAP OF GATES ANALYZED

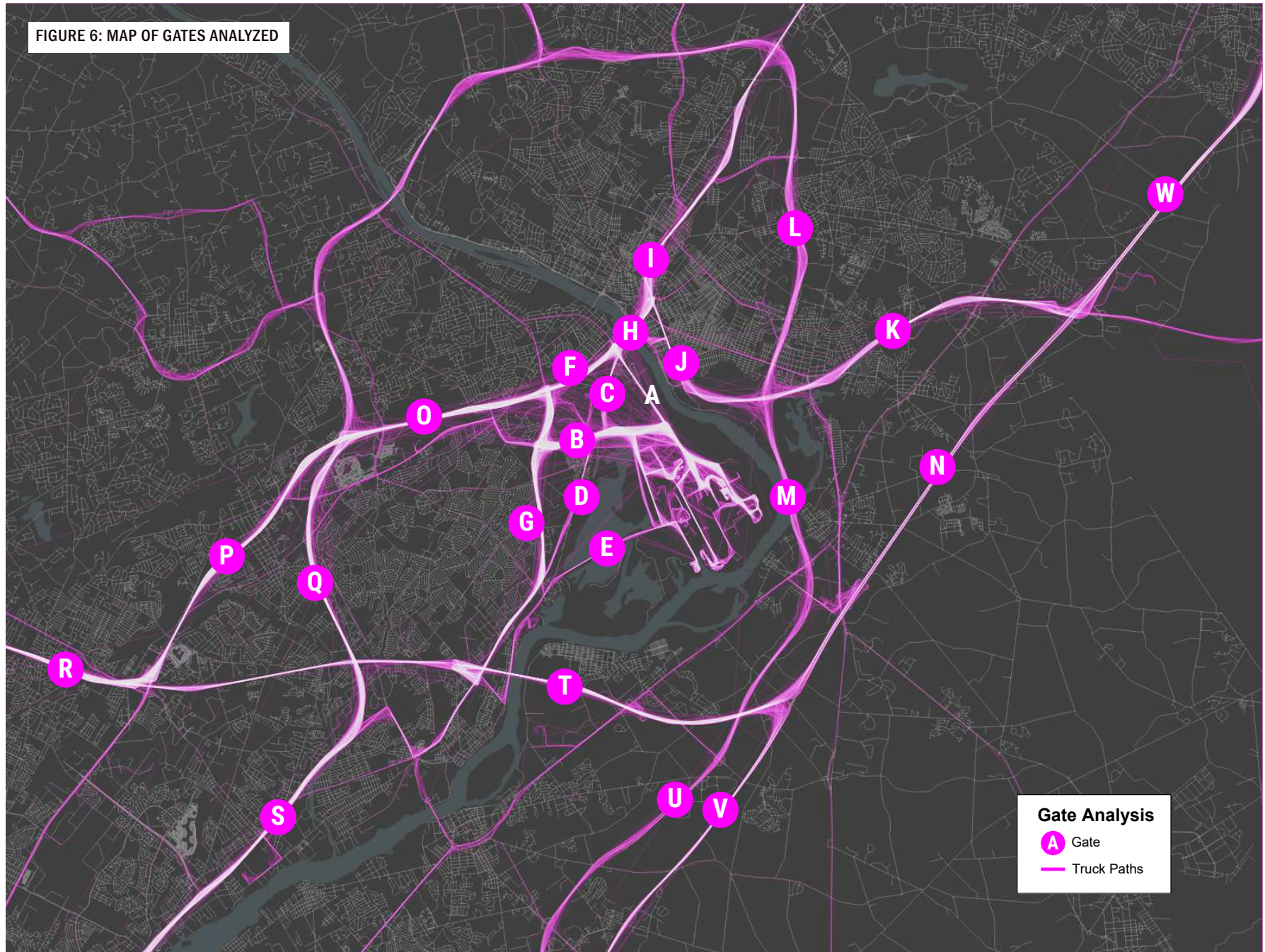


TABLE 3: GATE LOCATIONS AND PERCENTAGE OF SITE TRAFFIC

LOCATION	ROAD NAME	START EXTENT	END EXTENT	EXISTING AADT ¹	EXISTING AADTT ¹	TRUCK TRAFFIC ^{2*}	NEW TRUCK TRIP GENERATION ³	ESTIMATED AADT INCREASE
A	South Pennsylvania Ave	Tyburn Road	US-1	3,982	1,182	35%	1,796	45%
B	Tyburn Road	South Pennsylvania Ave	US-13	4,186	1,803	43%	2,207	53%
C	South Philadelphia Ave	South Pennsylvania Ave	Tyburn Road	5,246	1,102	6%	308	6%
D	Old Bristol Pike	Tyburn Road	US-13	3,497	551	2%	103	3%
E	Bordentown Road	New Ford Mill Road	Main St	1,544	140	2%	103	7%
F	US-1	US-13	South Pennsylvania Ave	30,890	2,162	27%	1,386	4%
G	US-13	US-1	I-95	12,562	1,212	14%	718	6%
H	US-1	South Pennsylvania Ave	NJ-129	48,319	2,416	2%	103	0%
I	US-1	NJ-129	I-295	44,723	2,236	19%	975	2%
J	NJ-129	I-195	US-1	25,218	1,034	10%	513	2%
K	I-195	I-295	NJ Turnpike/ I-95	61,657	4,285	11%	565	1%
L	I-295	I-195	US-1	53,164	3,695	3%	154	0%
M	I-295	I-195	I-95	65,395	4,545	3%	154	0%
N	NJ Turnpike/ I-95	NJ Turnpike	I-195	110,217	15,969	10%	513	0%
O	US-1	US-13	I-295	23,492	2,257	35%	1,796	8%
P	US-1	I-295	PA Turnpike/ I-276	28,288	1,414	20%	1,026	4%
Q	I-295	US-1	PA Turnpike/ I-276	21,555	1,404	11%	565	3%
R	PA Turnpike/ I-276	PA-611	US-1	-	-	21%	1,078	---
S	I-95	PA Turnpike/ I-276	PA-132	49,531	3,494	12%	616	1%
T	I-95	PA Turnpike/ I-276	NJ Turnpike	46,776	7,547	10%	513	1%
U	I-295	I-95	Mt. Holly Road	73,227	4,994	2%	103	0%
V	NJ Turnpike	I-95	Mt. Holly Road/ Exit 5	64,523	8,502	3%	154	0%
W	NJ Turnpike/ I-95	I-195	Exit 8	120,210	17,508	10%	513	0%

Source:

1. NPMRDS, 2023
2. INRIX, 2018
3. KTC Traffic Study, 2022

*Note: Gate percentages do not add up to 100%. Trips can pass through more than one gate.

TRUCK CRASH AND INJURY ANALYSIS

From 2017 to 2020, 1,217 total crashes occurred in the study area. Of these, 27 (2 percent) resulted in one or more serious injuries and twelve (0.9 percent) resulted in a fatality. Of the total crashes, 306 crashes (25 percent) involved trucks. In the area, 139 crashes involving one or more heavy trucks and 178 involving one or more small trucks occurred. Eleven crashes involved both a heavy truck and a small truck. Four (0.3 percent) of the total truck crashes resulted in one or more serious injuries, and three (0.2 percent) resulted in a fatality. The most common crash types were rear-end (40 percent) and angle (20 percent). The distribution of truck crashes by type in the study area is documented in Table 4 below.

A majority of crashes involving trucks took place on US-1 and US-13, particularly around the interchange between the two. This is not an uncommon situation across the region, as trucks have challenges navigating interchanges.

TABLE 4: DISTRIBUTION OF TRUCK CRASHES BY TYPE

CRASH TYPE	COUNT	PERCENT OF TOTAL
Non-Collision	6	2%
Rear-End	122	40%
Head-On	14	5%
Backing	2	1%
Angle	61	20%
Sideswipe (Same Dir.)	38	12%
Sideswipe (Opposite Dir.)	4	1%
Hit Fixed Object	52	17%
Hit Pedestrian	1	<1%
Other (Unknown)	6	2%

Source: PennDOT

RAIL ACCESS

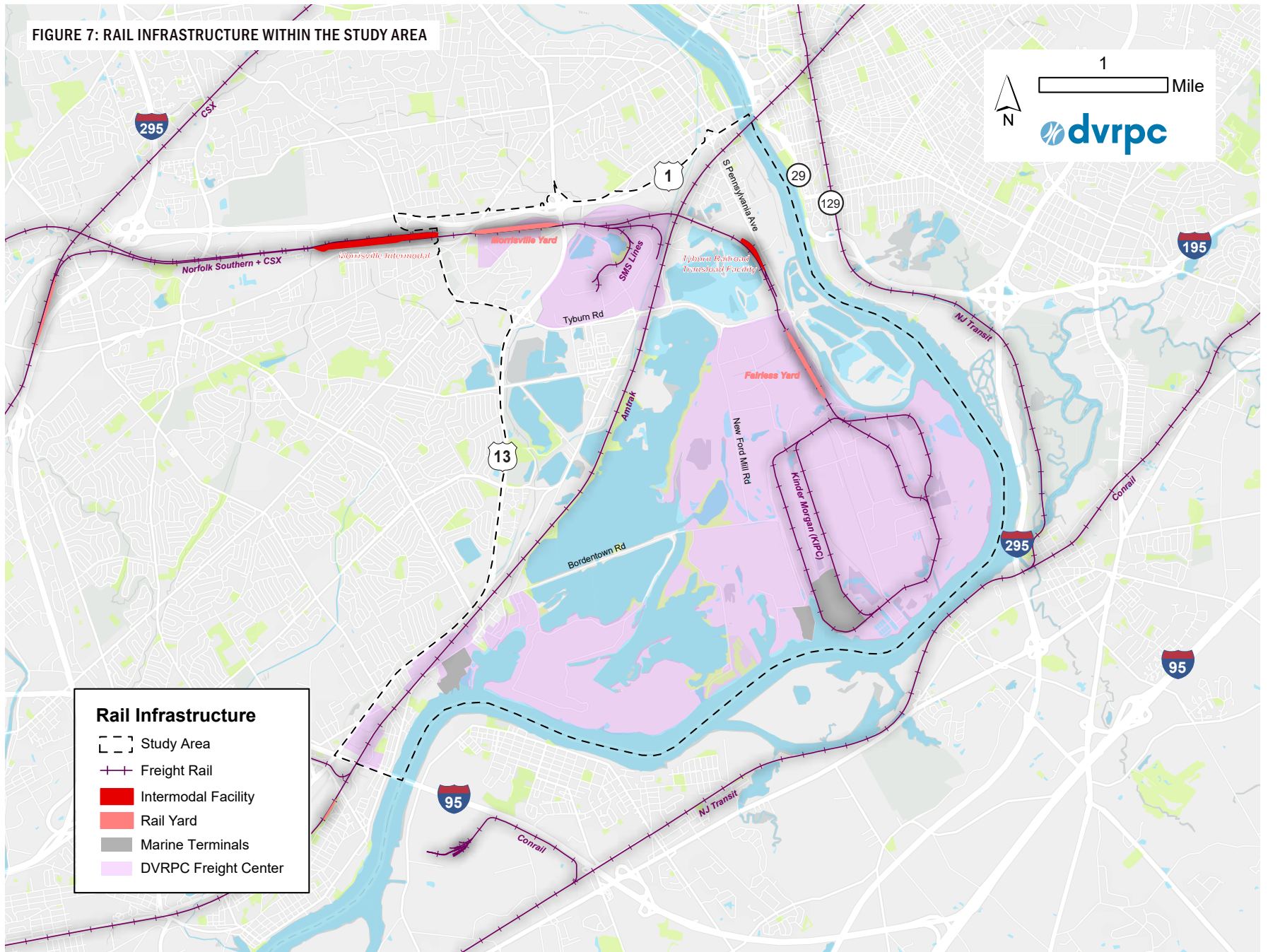
A Conrail-owned industrial connector that originates from the Interstate Morrisville Line, owned by Norfolk Southern, provides rail access to the KTC (see Figure 7). A CSX owned connector also links to the Norfolk Southern line providing access to the site. Access to the KTC comes by way of the Fairless Yards or “north yard” located at the north end of the site. The Fairless Yards are NP Falls Township Industrial, LLC owned with Class I operators CSX and Norfolk Southern running service to the site. NP Falls Township Industrial, LLC owns the 9.88 miles of industrial shortline located throughout the KTC site with Conrail operating throughout and Kinder Morgan operating on rail servicing their port. The Tyburn Railroad Transload Facility is located just north of the core study area and acts as an intermodal facility between freight rail and truck operators. The facility handles both liquid and bulk cargoes and spans 14 acres. In addition to freight rail, passenger rail service runs along the western edge of the core study area by way of the Northeast Corridor owned by Amtrak and used by SEPTA and NJ Transit as well. Freight service does run along Amtrak’s Northeast Corridor, but does not have any direct connection to the KTC.



Shortline Rail Within the KTC.

Source: DVRPC

FIGURE 7: RAIL INFRASTRUCTURE WITHIN THE STUDY AREA



PORT ACCESS

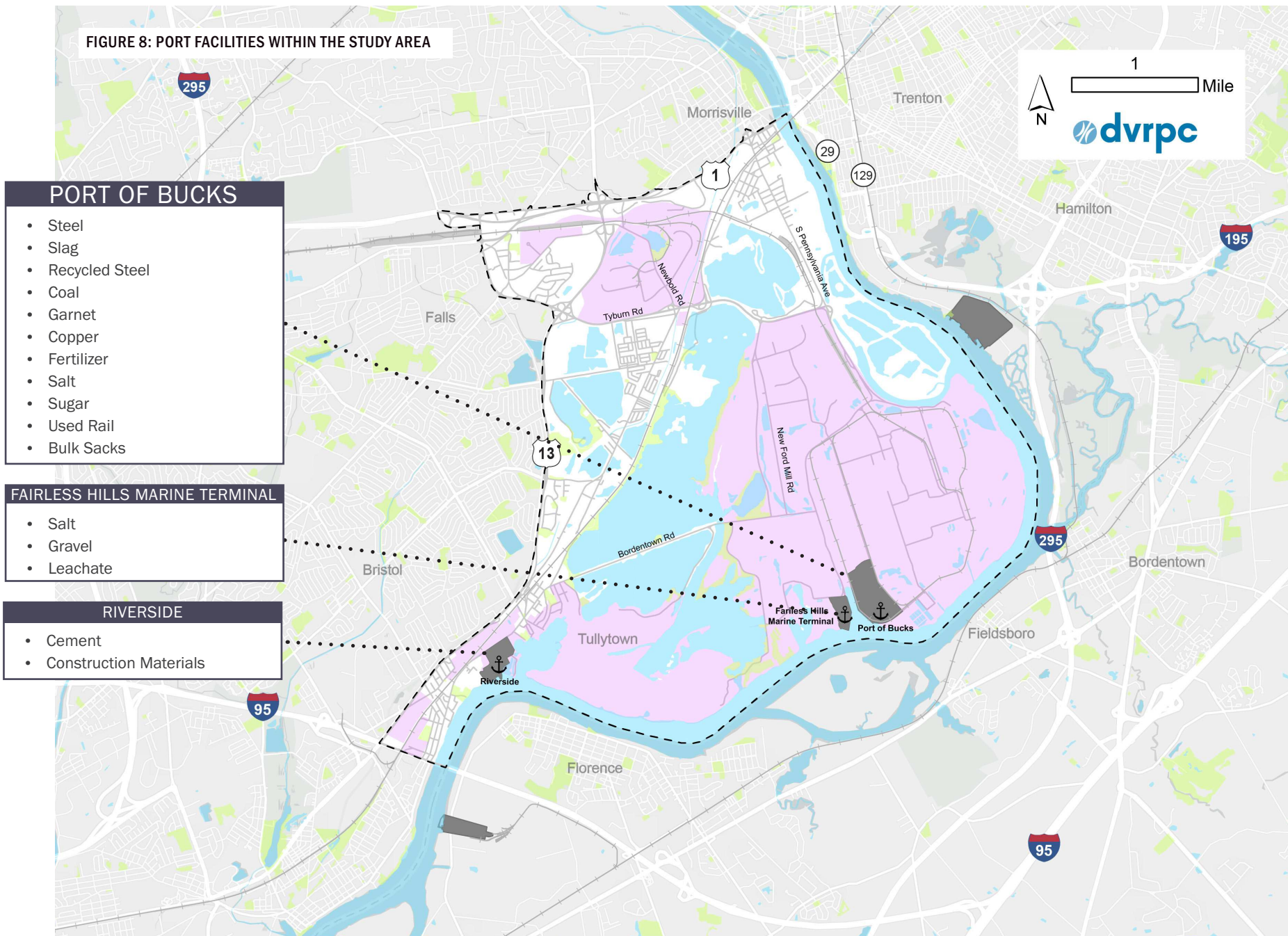
The study area is unique in that it contains three separate port facilities, which all handle different commodities or materials. The largest port facility is the Port of Bucks located within the KTC. The Port of Bucks is Bucks County's principal port facility and its most heavily used, with 67 ship calls in 2022. It contains two berths with a total length of 2,000 feet and five cranes to service docked vessels. The two other ports, Riverside and the Fairless Hills Marine Terminal, are less heavily used (20 and 36 ship calls in

2022) and handle a limited set of materials. See Figure 8 for a detailing of the materials each port handles.



Aerial Image of the Fairless Hills Marine Terminal (Left) and the Port of Bucks (Right).
Source: Google (2023)

FIGURE 8: PORT FACILITIES WITHIN THE STUDY AREA



PORT OF BUCKS

- Steel
- Slag
- Recycled Steel
- Coal
- Garnet
- Copper
- Fertilizer
- Salt
- Sugar
- Used Rail
- Bulk Sacks

FAIRLESS HILLS MARINE TERMINAL

- Salt
- Gravel
- Leachate

RIVERSIDE

- Cement
- Construction Materials

SIGNAGE INVENTORY

Near an industrial complex with substantial freight activity, there are many types of signage posted to convey preferred directions and restrictions to drivers. This section describes the current wayfinding infrastructure in place that leads trucks into and out of the KTC site. An inventory was prepared of the following types of signs and can be found in Appendix A.

TRUCK RESTRICTIONS

Truck restrictions are an important and necessary component of a comprehensive truck network. To be effective, these restrictions must be well planned, adequately justified, and appropriately communicated through signage and other supporting actions. There are three types of truck restrictions found in the study area: weight, height, and local restrictions.

Weight and height restrictions can limit the options of larger vehicles to access industrial facilities. In the study area there are only two weight restricted bridges, both located on Bridge Street in Morrisville, which is not a main access route for truck traffic. To accommodate this bridge restriction, alternative truck route signs are used on US-1 to indicate that Pennsylvania Avenue must be taken to access Morrisville Borough going north. Just outside of the study area in Bristol, there is a 3.5 ton weight restricted bridge on Randall Avenue that makes truck access south of the KTC site on Bordentown Road a less than ideal pathway for connecting to Bristol Pike and other major highways. This bridge has been proposed for replacement by PennDOT due to its advanced state of disrepair. There are no height restricted bridges prohibiting normal truck movement; however, the Amtrak bridge over South Pennsylvania Avenue has a height limit of 13'6" which is just sufficient for standard truck access.

Some of the residential streets in Morrisville have local truck restrictions. These are designated using "NO TRUCKS EXCEPT LOCAL DELIVERIES" signs. These are placed to keep trucks from turning off of South Pennsylvania Avenue, although many are not visible until a vehicle is making the turn.

Falls Township has a restriction on garbage trucks south of Post Road on South Pennsylvania Avenue. This restriction is signed at the municipal border, but does not give trucks advance warning that they will be prohibited or an option for redirecting.

SITE/DESTINATION-SPECIFIC SIGNAGE

Owing to the presence of significant traffic generating facilities, this area witnesses a substantial amount of truck activity at specific sites. Examples of such traffic include the truck traffic activity associated with the Waste Management facilities in the southwest zone of the study area and the soon to be industrial complex at the KTC. Waste trucks specifically are unique in that they serve both the site and the residential communities in the vicinity. To assist in their local dispersion on preferred routes, site specific direction signage has been used to demarcate the entrance to the Waste Management facilities and advise about waste disposal around the site premises.

ROUTE AND AUXILIARY MARKERS

There are many route and auxiliary signs that guide drivers in and around the study area. There are also a few notable instances of truck specific guidance that indicate a preferred truck route. In Morrisville Borough, there are many signs along South Pennsylvania Avenue that direct drivers south to access US-1. Similar signs can also be found on West Philadelphia Avenue.

SIGN COMBINATIONS

On major roads such as US-1, NJ-29, NJ-129, etc., it is common to see multiple items of information combined in overhead signs. An example for this would be signs with information about the distance remaining on the approach to a certain infrastructure along with restrictions against heavy-duty vehicles or vehicles with hazardous materials.

Examples of Existing Signage Throughout the Study Area



Source: DVRPC



Pedestrian Conditions Along Philadelphia Avenue.
Source: DVRPC

GENERAL RECOMMENDATIONS

This chapter details a list of recommendations to improve safety, road conditions, and truck maneuverability throughout the study area. These recommendations are not only intended to benefit members of the freight community by maintaining and ensuring access to industrial properties and local businesses, but also to enhance the quality-of-life for residents and reduce the possibility of conflict between trucks and other road users.

The freight recommendations in this report are focused on promoting the safe and efficient movement of goods in the context of the surrounding community. These recommendations aim to better incorporate freight considerations into all transportation planning and engineering activities in the area. The goal of the recommendations and actions outlined in this section is to improve the safety and quality-of-life of all road users, including both the freight community and surrounding residential communities.

Each set of recommendations include next steps in order to guide local decision-makers through implementation. Potential funding sources are highlighted where appropriate.

The recommendations are categorized into four focus areas:

- **Redesignate the NHS Intermodal Connector**
- **Designate a Truck Network/Network Components**
- **Implement Truck Wayfinding and Signage**
- **Incorporate Supportive Infrastructure**

REDESIGNATE THE NHS INTERMODAL CONNECTOR

National Highway System (NHS) Intermodal Connectors are highways that provide access between major intermodal facilities (such as rail or port terminals) and the rest of the National Highway System. In the study area for this project, there is one NHS Intermodal connector – South Pennsylvania Avenue from US-1 to the entrance to the Keystone Trade Center. This route runs directly through the Borough of Morrisville and has multiple homes that front the street directly. As a result, it is not well equipped to carry the existing or expected truck traffic that serves the area, and the NHS Intermodal Connector designation is not appropriate for this route. It is recommended that Tyburn Road be considered as the preferred alternative for the NHS Intermodal Connector Designation.

Tyburn Road is a multi-lane, median separated facility. It is classified as a minor arterial and has a higher capacity to carry truck traffic and is more separated from the surrounding community than South Pennsylvania Avenue. As a part of the recommendations of this study, it is recommended that the intermodal connector be redesignated to Tyburn Road (Figure 9). Below are the justifications and limitations for this recommendation.

LARGER FACILITY WITH GREATER CAPACITY

Tyburn Road has two lanes in each direction while South Pennsylvania Avenue has only one lane in each direction. Tyburn Road is median separated with wide shoulders. It allows access not only to the port site and Keystone Trade Center Development, but also to other freight center clusters of industrial activity (DVRPC High Tech Manufacturing Freight Center in Falls Township).

LARGER BUFFER FROM THE SURROUNDING COMMUNITY

South Pennsylvania Avenue has homes directly on the road while Tyburn Road has a more significant barrier separating it from nearby communities. No homes are directly along Tyburn Road.

CURRENTLY CARRIES A MAJORITY OF TRUCK TRAFFIC

An INRIX analysis of the current truck traffic at the site showed that 43 percent of truck trips originating or ending in the study area currently use Tyburn Road, while only 35 percent of truck trips use South Pennsylvania

NATIONAL HIGHWAY SYSTEM (NHS)

The National Highway System (NHS) is composed of roadways that are important to the nation's economy, defense, and mobility. The NHS was developed by the U.S. Department of Transportation (USDOT) in cooperation with states, local officials, and metropolitan planning organizations (MPOs). There are five main components that make up the NHS system – the Interstate Highway System and four additional subsystems of roadways. These components are as follows:

Interstate	The Eisenhower Interstate System of highways retains its separate identity within the NHS.
Other Principal Arterials	These are highways in rural and urban areas that provide access between an arterial and a major port, airport, public transportation facility, or other intermodal transportation facility.
Strategic Highway Network (STRAHNET)	This is a network of highways that are important to the United States' strategic defense policy and provide defense access, continuity and emergency capabilities for defense purposes.
Major Strategic Highway Network Connectors	These are highways that provide access between major military installations and highways that are part of the Strategic Highway Network.
Intermodal Connectors	These highways provide access between major intermodal facilities and the other four subsystems making up the National Highway System. A listing of all official NHS Intermodal Connectors is available.

The advantage of the NHS is that it encourages states to focus on a limited number of high-priority routes and to concentrate on improving them with federal-aid funds. At the same time, the states can incorporate design and construction improvements that address their traffic needs safely and efficiently.

Avenue. Tyburn is already the preferred route.

LONGER PATH TO CONNECT TO THE NEAREST NHS SYSTEM COMPONENT

The designation of Tyburn Road as the NHS Intermodal Connector would be 2.72 miles instead of the 0.57 miles currently designated for South Pennsylvania Avenue. This would add additional mileage to the network.

FOLLOW UP RECOMMENDATIONS FOR CONNECTIONS WITH US 13 AND US 1

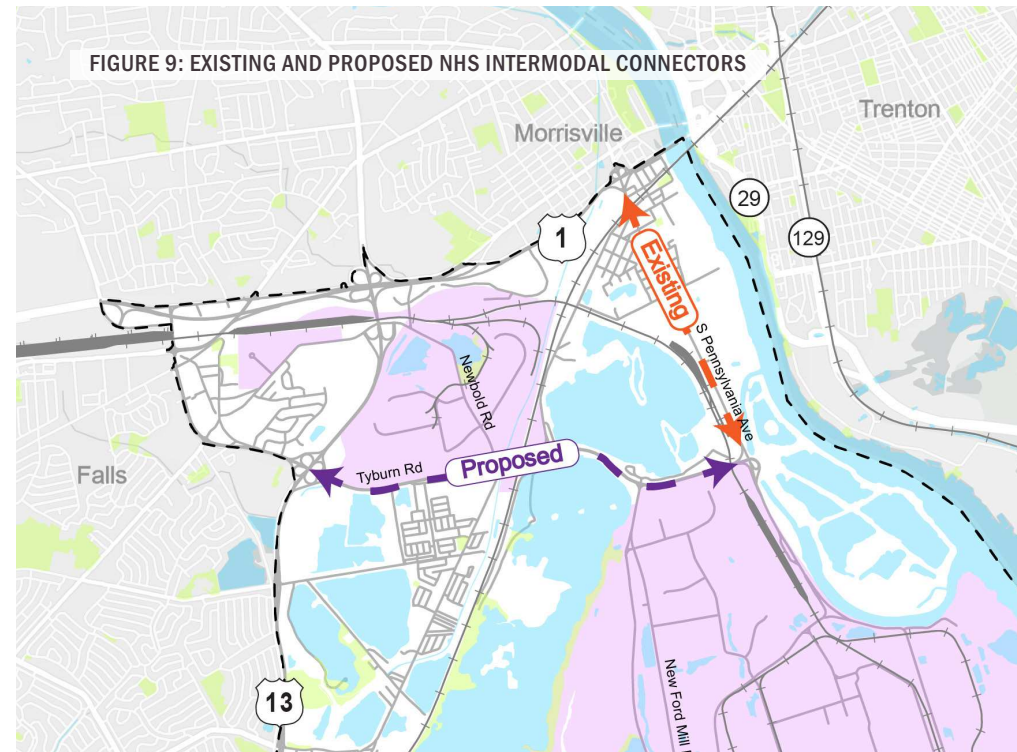
Tyburn Road is the preferred route for trucks to get from the Keystone Trade Center to US-1, even in current road conditions. There could be a few improvements considered for the intersection of Tyburn Road and US-13 as well as the intersection of US-13 and US-1. Especially with the increase in truck traffic expected from the development at the Keystone Trade Center, the on and off ramps from these intersections would benefit from larger turning radii and longer merge space.



South Pennsylvania Avenue Looking North.
Source: DVRPC



Tyburn Road Looking West.
Source: DVRPC



DESIGNATE A TRUCK NETWORK

The designation of a truck route network can be used to more effectively address concerns around the interaction of trucks with other road users and within a community. A defined network serves as the guiding foundation for truck wayfinding signage, traffic calming implementation, and geometric improvements. The network can also be used to inform the development of other transportation improvements and planning efforts. Failure to incorporate consideration for truck movements can not only impact the performance of the network as a whole, but can have safety and quality-of-life impacts for other road users and local residents.

This section defines the components of a truck network, specifies clear steps for the designation of this network, and initiates the process by summarizing potential primary network components based on known truck activity and the analysis conducted as a part of this freight access plan (Figure 10).

TRUCK NETWORK COMPONENTS

A truck route network is composed of multiple components that form a system. Not all of these components need to be communicated to road



South Pennsylvania Avenue Looking North From Tyburn.

Source: DVRPC

users through signage, because some may be established primarily for planning purposes. Truck route working groups can help incorporate local context and concerns into the designation process. The following recommended components are consistent with the standards established by DVRPC for truck route networks in communities throughout the region.

TRUCK-APPROPRIATE ROUTES

Truck-appropriate routes are streets that have been identified and/or signed as accessible for either all trucks or some trucks based on size or weight. The following hierarchy is recommended when designing a truck network.

Limited Access Highways/Regional Freight Corridors

This component of the truck network represents the highest level of the truck-appropriate routes and is composed of regionally and nationally significant through routes. These include the [Primary Highway Freight System](#)¹ components of the network, as well as major limited-access facilities or state and U.S. routes that serve regional travel. These facilities are often high-speed facilities that have limited interaction with pedestrians and other non-vehicular modes. The points at which this network interchanges with the surface street network are significant ingress/egress points for freight traffic to access the surface transportation system.

Primary Truck Routes

Primary Truck Routes create redundancy and serve to move trucks from the Regional Freight Corridors network to lower-level routes and final origin/destinations. These routes will require special consideration for the design of transit, bike, and pedestrian activity because they are likely to carry higher volumes of trucks, including tractor trailers.

Secondary Truck Routes

Secondary Truck Routes fill the gaps in the network, providing key connections to commercial corridors and individual freight generators. Although at a lower intensity than the Primary Truck Routes, this network will need to accommodate trucks that continue to serve commercial and industrial generators. As such, additional consideration should be made in the design of transit, bike, and pedestrian facilities that coexist on these routes.

Last-Mile Connectors

Last-Mile Connectors serve to connect intermodal terminals and

¹ "National Highway Freight Network Map." National Highway Freight Network Map - FHWA Freight Management and Operations, April 17, 2023.

high-intensity freight centers to the rest of the freight network. These roads experience high volumes of heavy freight traffic and will need to accommodate significant tractor trailer volumes.

TRUCK-RESTRICTED ROUTES

Identifying truck-restricted routes is equally as important to the designation process as identifying truck-appropriate routes. Truck restricted routes are streets that have been identified and/or signed as restricted for all trucks or some trucks based on size or weight.

Geometric and Weight Restrictions

Geometric restrictions may limit the length, width, or height of a vehicle. The national standard trailer width is 102 inches, and 102-inch-wide trailers are permitted on all state roads in Pennsylvania unless there is a geometric constraint. In Pennsylvania, trailers are restricted to a maximum of 53 feet in length for a single trailer and 28.5 feet for a twin trailer combination. Signage must be used to specify the length, width, or height limits of a road constrained beyond these standards.

Weight restrictions are applied to roads that are not structurally adequate to support heavy-truck loads. These restrictions may apply to, and be posted by, the gross load of a vehicle or the axle weight.

Local Restrictions

Local restrictions are those where a municipality may restrict truck traffic using a “No Trucks” or “No Thru Trucks” sign with the option to allow an exception for local or residential deliveries using an “Except Local/Residential Deliveries” sign. These can be effective in helping to manage the movement of trucks that are not appropriate for certain streets. It is important that there be clear policy guidance for the use of these restrictions. This policy should include the requirement to undertake analysis about the type of truck behavior being addressed and the impact to the distribution of these trips as a result of any new restrictions. Failure to undertake a complete assessment of the goals and impacts of the truck restrictions prior to issuing them can result in more problems than they solve.

Falls Township Ordinance 133-6 designates streets for vehicles transporting waste or recyclable materials generated outside the municipality into or through Falls Township to and from the disposal sites. This is another example of a local truck restriction that applies to certain vehicles and should be considered as a part of the network designation.



An Example of Local Weight Restrictions Within Morrisville.
Source: DVRPC



Waste Truck Prohibition on South Pennsylvania Avenue.
Source: DVRPC

TRUCK ROUTE DESIGNATION PROCESS



DVRPC has created an approach to defining and adopting truck routes for municipalities across the region. This process has been refined through various studies. As a component of this study, DVRPC completed the first steps of the designation process that provide a foundation for future work in the study area.



PRELIMINARY SCREENING

Utilize data and existing knowledge of key generators throughout the network to designate a preliminary network that adequately serves the hierarchy of functions for trucks.

The first step in defining a truck route network is to identify key connectivity and potential route options. This step will produce a draft network of connections that links the top tier Regional Freight Corridors to the key freight generators and attractors. These locations are the points or corridors that truck trips are directly serving and may include industrial properties, commercial corridors, or intermodal terminals.

The network defined in this screening should serve the roles identified in the network component section above. These draft network segments should be matched to compatible existing classification systems that can serve the route function and the current classification of the streets.

Consideration of redundancy in the system is critical for the primary routes to ensure that these facilities can accommodate through moves across the network in the event of a disruption to the Regional Freight Corridors.



DATA EVALUATION

Utilizing the preliminary network, this step applies a layer of data analysis to further evaluate the individual components of the system and document the nature of activity on segments.

The second step of the process is the evaluation of the preliminary network for activity levels and accommodation of existing trip distribution. This data evaluation step is meant to measure the validity of the initial assumptions. It provides quantitative data to the process, measuring the activity levels for each of the draft network facilities. Truck trip trajectory data provides better contextual information on how trucks currently move through the network and guides decisions on the appropriate facilities to be recommended for inclusion in the final network.



REVIEW AND ADOPTION

Establishing a clear understanding of the purpose of the network, building community consensus, and regulatory adoption is key to ensuring the success and utilization of the truck network.

Once a final draft network has been established through the data evaluation step, the network will require additional review. During this step, internal and external stakeholder input is solicited on the recommended network. Formal review of the draft network should be conducted by the Pennsylvania Department of Transportation (PennDOT).

In addition to internal review, this step includes the critical process of public outreach and education on the network. Community education and outreach are intended to aid the public in understanding what the network is and is not and clearly articulating to the value of the network designation in designing infrastructure that accommodates trucks while preserving quality-of-life.

The final component of the review and adoption of the network is the act of adopting the network designation.



APPLICATION

Putting the network to work includes communication through signage and education plans as well as the implementation of design considerations in infrastructure improvements.

After adoption of the truck route network, municipalities and the county must act to ensure the system is implemented. There are several applications for a truck route network. The primary use of the network is as a planning and design tool.

The network should also be communicated in County and municipal transportation maps and supported by a signage plan that reinforces the location of both appropriate and restricted routes. Local truck route maps and outreach to key freight generators may also be leveraged to address specific areas of interest or locations where problematic routing was identified in earlier steps. Land use and economic development policies can also be used to complement truck route network planning.

FIGURE 10: POTENTIAL PRIMARY NETWORK COMPONENTS

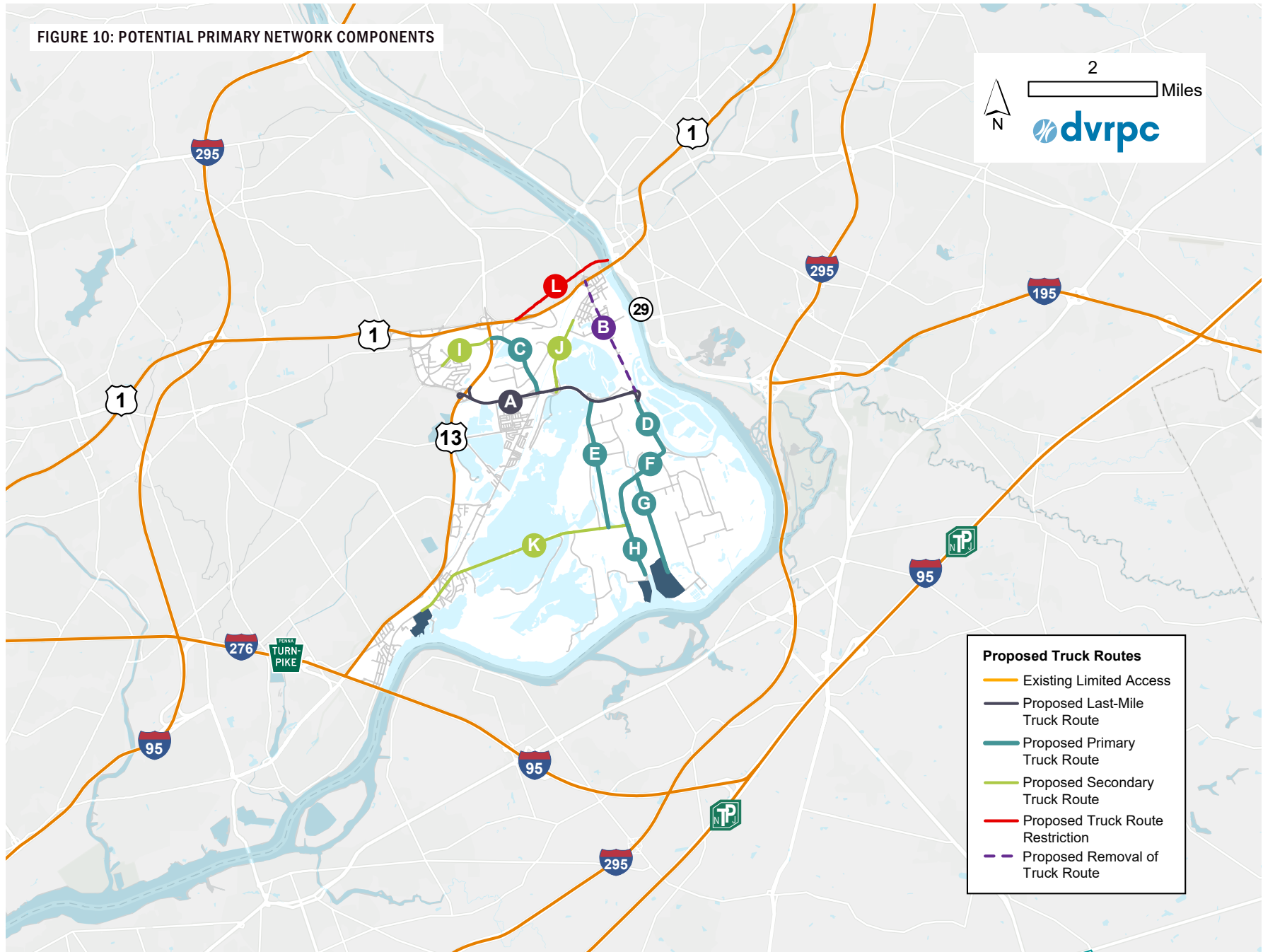


TABLE 5: POTENTIAL TRUCK NETWORK COMPONENTS

SEGMENT ID	SEGMENT NAME	SEGMENT TYPE	SEGMENT START	SEGMENT END
A	Tyburn Road	Last-Mile	US-13	South Pennsylvania Avenue
B	South Pennsylvania Avenue	Last-Mile (Removal)	US-1	Tyburn Road
C	Newbold Road	Primary	US-13	Tyburn Road
D	South Pennsylvania Avenue	Primary	Tyburn Road	KTC Entrance
E	New Ford Mill Road	Primary	Tyburn Road	Bordentown Road
F	Old Bordentown Road	Primary	KTC Entrance	Bordentown Road
G	South Port Road	Primary	Old Bordentown Road	Sinter Road
H	Lauderbach Road	Primary	Old Bordentown Road	Penn Manor Road
I	Lower Morrisville Road	Secondary	US-13	Old Locust Avenue
J	West Philadelphia Avenue	Secondary	Tyburn Road	Wright Avenue

TABLE 6: NEXT STEPS – TRUCK ROUTE DESIGNATION

RECOMMENDATION	RESPONSIBLE AGENCY	TIMELINE	COST
Apply for the designation of Tyburn Road as the official intermodal connector for the KTC instead of South Pennsylvania Avenue.	DVRPC, PennDOT, FHWA	Short (Complete)	\$
Work with PennDOT and other local municipalities to reclassify South Pennsylvania Avenue and West Philadelphia Avenue from arterials to collectors.	PennDOT, Falls Township, Morrisville Borough	Short	\$
Identify members for KTC truck route implementation working group.	PennDOT, Falls Township, Morrisville Borough	Short	--
Define clear purpose and role around the evaluation, communication, and designation of truck routes and restrictions.	Truck Work Group DVRPC	Short	--
Create an action plan and schedule, building on actions outlined in the Lower Bucks Freight Access Study.	Truck Work Group, Falls Township, Morrisville Borough	Short	\$
Conduct an evaluation of draft primary route designations in a larger scope analysis using the purpose and role defined in Phase 1.	DVRPC, Bucks County PennDOT	Short- Medium	\$\$-\$
Using the provided inventory as a starting point, conduct an evaluation of all signed geometric restrictions on proposed Primary Truck Routes and conduct updated engineering studies where necessary.	Truck Work Group, PennDOT	Short- Medium	\$\$-\$
Update the draft route and restriction designations in response to updated engineering analysis.	Truck Work Group, Falls Township, Morrisville Borough, PennDOT	Short- Medium	\$

PHASE 1

PHASE 2

Continued on following page

TABLE 6: NEXT STEPS – TRUCK ROUTE DESIGNATION (Continued)

RECOMMENDATION	RESPONSIBLE AGENCY	TIMELINE	COST
Undertake an inventory and evaluation of all signed geometric restrictions on proposed Secondary Truck Routes to ensure proper engineering justification and conduct updated engineering studies where necessary.	Truck Work Group Bucks County PennDOT	Short-Medium	\$-\$\$
Conduct additional evaluation of draft route designations, including engineering studies where appropriate to identify any remaining geometric restrictions not scheduled to be addressed in currently programmed projects.	Truck Work Group, Bucks County, PennDOT	Short-Medium	\$-\$\$
Update the draft route and restriction designations in response to updated engineering analysis.	Truck Work Group, Falls Township, Morrisville Borough, PennDOT	Short-Medium	\$
Hold community information sessions and conduct outreach with residents and industry on the draft secondary network to provide education on the purpose and need of the routes, as well as gain feedback on the current designations.	Truck Work Group, Falls Township, Morrisville Borough	Short-Medium	\$
Draft and adopt a local ordinance for designation of routes and restrictions.	Truck Work Group, Falls Township, Morrisville Borough	Short-Medium	-
Integrate truck routes into municipal maps and share final designations with DVRPC for inclusion in regional network products.	Falls Township, Morrisville Borough, DVRPC	Medium	\$
Develop printed route guides for distribution to drivers at major freight generators; these can be customized per generator to improve the usability and better reach drivers that frequent the study area.	Truck Work Group, Freight Generators	Medium	\$

PHASE 3

PHASE 4

Source: DVRPC

IMPLEMENT TRUCK WAYFINDING AND SIGNAGE

Effective communication of preferred and alternate routes, as well as restrictions, is an essential part of establishing a usable truck wayfinding system that supports the truck network designation. In turn, this creates a more effective network for freight movement and safer communities in and around industrial areas like this study area. Preferred routes can be directly communicated using wayfinding signage or more subtly by using traffic calming measures. Traffic calming interventions can deter unsafe behaviors while also discouraging routes as through routes for heavy vehicle traffic.

The study steering committee helped to identify three focus areas for deeper analysis for wayfinding and traffic calming needs. The three focus areas are South Pennsylvania Avenue in Morrisville Borough and Falls Township, Bridge Street in Morrisville Borough, and truck routing through Trenton. Existing signage was evaluated to identify gaps in wayfinding directions and opportunities to better direct trucks to preferred routes.

SIGNING TRUCK ROUTES

The designation of a network of truck routes is the first step in developing a functional signage plan. Utilizing these designated routes, PennDOT and local partners should undertake a plan to install and maintain a series of truck route wayfinding and restriction signs that support the preferred routes identified and supported by Morrisville Borough and Falls Township.

Truck Appropriate Route Signage

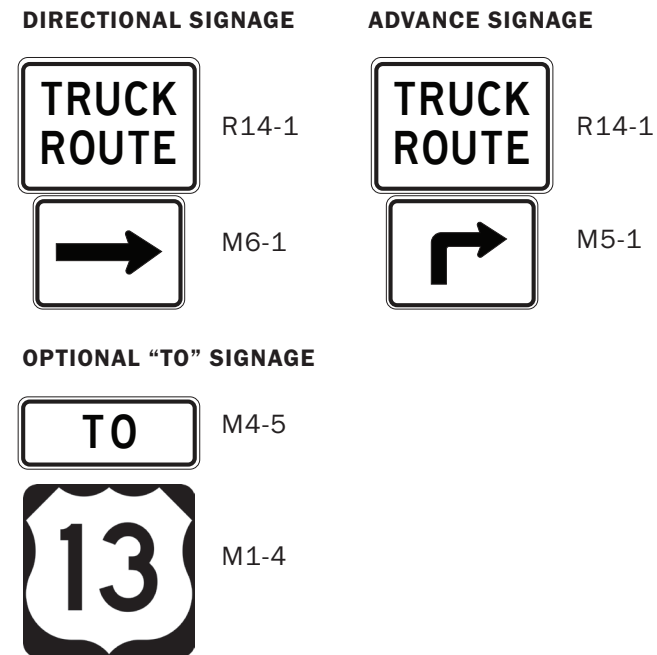
In order to guide trucks onto the roads that are intended to accommodate them, a signage plan should include consistent placement of signs to reinforce the route. This can be done through the use of three types of truck route signs: directional, advance, and on-route signs. These signs are described in detail in Table 7 and displayed in Figure 11.

In addition to the truck route signage, the signage plan should consider utilizing a “TO Marker” (M4-5) in conjunction with U.S. route or Pennsylvania route markers, along with corresponding arrow plaques to direct truck traffic to major regional freight routes. This helps to supplement the truck route wayfinding and reinforce to drivers that the route provides the necessary highway interchange for their trip.

TABLE 7: TRUCK ROUTE SIGNS AND RECOMMENDED LOCATIONS

SIGN TYPE	DESCRIPTION	LOCATION
Directional	Truck route sign (R14-1) with 90-degree turn arrow plaque (M6-1R/L) pointing to truck route at intersections or other decision points.	All intersections/ Points at which truck routes turn left or right at intersections with non-truck routes/ At base of exit ramps/ At tunnel and bridge exits.
Advance	Truck route sign (R14-1) with advance 90-degree turn arrow plaque (M5-1R/L) in advance of intersections where trucks have to turn onto truck route.	150 feet before intersection.

FIGURE 11: TRUCK ROUTE SIGN CONFIGURATION



Source: DVRPC

Truck Restriction Signage

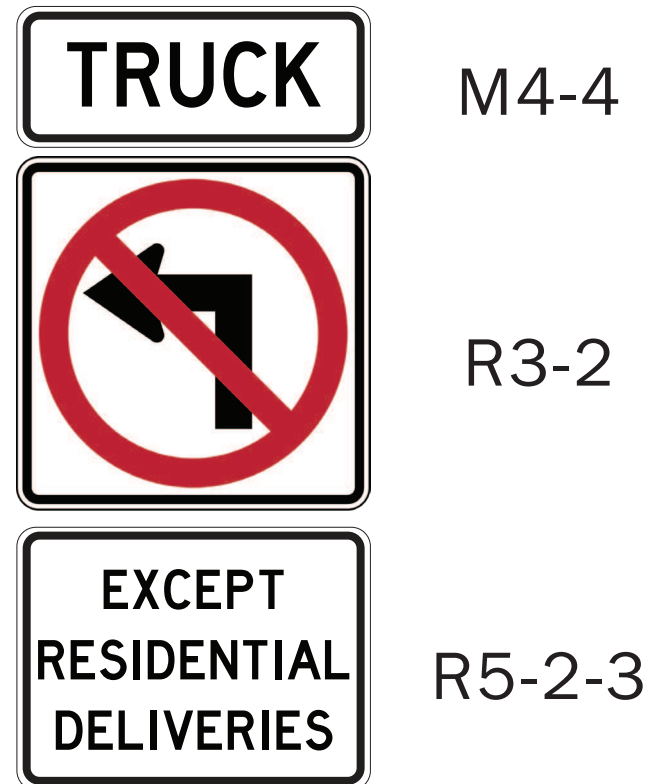
Similar to the application for truck route signs, the signage plan should include restriction signage. Morrisville Borough predominately uses the “No Trucks” (R5-2) and “Except Local Deliveries” (R5-2-3) local restriction signage, but there is little advance notice to drivers. It is important to consider the location of the signage to ensure the necessary notice to drivers. This can be done through the use of two types of signage: advance and restriction signs. These signs are described in detail in Table 8.

To ensure consistency and provide more advanced notice to drivers, it is recommended that municipalities with local truck prohibitions utilize the sign standard shown in Figure 12. The inclusion of this signage on streets in advance of their intersection with restricted routes will improve the effectiveness of the restriction signage that may already exist but may not be visible until a truck has committed to a turning movement onto the restricted route.

TABLE 8: TRUCK ROUTE SIGNS AND RECOMMENDED LOCATIONS

SIGN TYPE	DESCRIPTION	LOCATION
Advance	Applicable restriction sign with advance move restriction.	150 feet before intersection.
Restriction	Applicable restriction sign at the intersection marking the beginning of the restricted route.	At intersections nearest the beginning of the restriction, at which point an alternative move is available to the driver.

FIGURE 12: PENNDOT STANDARD LOCAL TRUCK PROHIBITION ADVANCE SIGNAGE



INCORPORATE SUPPORTIVE INFRASTRUCTURE

There are number of improvements that could be made within and around the KTC site. This includes preparing for electric vehicles, truck parking, rail access, pedestrian infrastructure, and workforce access. Steps to enact these recommendations, responsible agencies, potential funding sources, timeline, and approximate costs are outlined in Table 9.

ELECTRIC VEHICLES (EV)

Electric vehicles, while still early in their commercial development, are likely to expand in use in the near future for small and medium trucks.¹ These trucks will need dedicated infrastructure on-site to park and recharge. It is important to “future-proof” any new distribution and logistics focused sites by adding the basic infrastructure necessary to prepare them for the possibility of an electric-powered vehicle future.

Site Infrastructure

In order to properly prepare sites within the study area for electric-powered vehicles, property developers should make sure each site has the necessary utility connections, either above or below ground, that an operator can utilize if and when they decide to transition their fleet. Providing these basic connections may also help in marketing any new developments as they will be better positioned to compete with similar facilities outside of the study area. When getting started, it is important to coordinate with local municipalities and utility providers regarding power output availability. The KTC is currently home to one the area’s largest natural gas power stations and is also served by high voltage transmission lines that carry larger loads of power longer distances. This level of infrastructure provides a unique opportunity for growth in site-wide EV use to take place.

Last-Mile Distribution Facilities

According to NorthPoint Development, it is expected that upwards of 1.7 million square feet of new construction within the KTC will be last-mile distribution facilities. This amount of development is likely to generate around 1,400 delivery van trips to and from the site daily. These delivery vans are the most likely to be converted in the near future to EVs, therefore last-mile distribution sites should be prioritized for the provision of EV

¹ Boudette, Neal E. “Electric Vans, Delayed by Production Problems, Find Eager Buyers.” *The New York Times*, May 17, 2023. <http://www.nytimes.com/2023/05/16/business/energy-environment/electric-vehicle-delivery-vans.html>.



Existing High Voltage Transmission Lines Within the KTC.

Source: DVRPC

infrastructure connections.

TRUCK PARKING

According to NorthPoint Development, there is potential for upwards of 3,700 additional truck trips generated from the development at the KTC site. As a result, there will be a significant need to provide parking and queuing space to accommodate this growth.

Semi-truck parking can be a contentious issue for local communities due to a number of concerns. Excessive noise, diminished air quality, and the visual blight of trucks parked on residential streets are common nuisances cited when discussing truck parking with regards to adjacent freight centers. Due to the size and scale of the KTC, the following recommendations are most appropriate given the level of anticipated truck traffic:

- **1. Provide a Centralized Parking Facility/Lot**
 - For the benefit of all KTC tenants.
 - Provide lighting, surveillance, and EV charging as basic amenities.
 - Restrooms, food service, and sleeping accommodations are also amenities that could be provided and managed by a third party.

- **2. Integrate More Parking Into Future Phase Plans**

- As more phases are planned for, incorporate enhanced parking facilities on individual tenant sites — EV charging hookups, ample lighting, road markings.

TRUCK IDLING

Truck idling is an important environmental concern that is often brought up in community discussions related to freight development. Local residents, businesses, and officials are generally concerned that the presence of more trucks leads to worse ambient air quality and excessive noise. This concern is valid as numerous studies have shown that this type of ambient air pollution can lead to respiratory problems such as asthma, especially among children.

Trucks idle due to a number of factors such as when waiting to load or unload cargo during harsh weather conditions. In addition, depending on the amount of time a driver has already spent on the road, they may need to park for an extended period of time and require climate control for personal comfort. There are several strategies that site managers or tenants can use to reduce truck idling at distribution facilities:

- **Implement a “no idling” policy** with a specific time limit for trucks to turn off their engines while parked at the facility, and enforce penalties for non-compliance.
- **Implement an appointment system**, that allows trucks to minimize the amount of time they are on-site and idling.
- **Provide or encourage the use of Idling Reduction Technologies (IRTs)**, especially during the hottest and coldest months of the year.
- **Incentivize and support the use of electric vehicles (EVs)** on-site by providing charging stations and other amenities to increase the rate of fleet transition.

RAIL ACCESS

Rail access to the KTC site is extensive and still active. Various raw materials and other goods are moved between the Port of Bucks, operators within the site, and the wider freight rail network. This existing rail access is a significant asset to the future of goods movement within and outside the site. Currently, the site is served by an NP Falls Township Industrial, LLC owned and Conrail operated shortline with connections to various

sites throughout the KTC. Kinder Morgan also operates on parts of the shortline that serve their facilities. In addition, this shortline connects to Conrail owned assets that are used by both Norfolk Southern and CSX. All rail movements that will traverse the Delaware need to be no more than a single-container tall since there is presently no river crossing with double-stack clearance. The potential for growth in rail use on-site is promising as rail is often touted as the more sustainable alternative to ever-increasing truck traffic. Therefore, it is imperative that existing rail access and facilities be preserved for the benefit of future tenants.

New Rail Connections

While rail may not be optimal for moving certain goods to the site, it is important to provide rail connections to newly developed sites to better market the KTC to a wider swath of potential operators. These new connections would make it possible for operators to have more varied options for moving goods to and from their facilities.



Rail Access to an Existing Facility in the KTC.

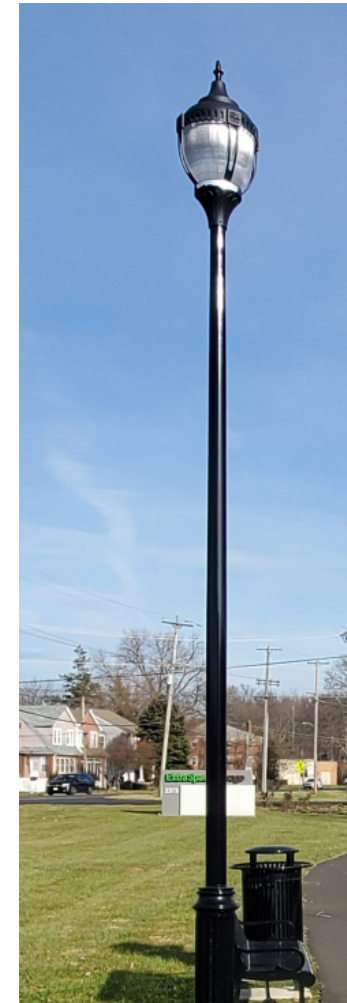
Source: DVRPC

PEDESTRIAN AND BIKE ACCESS

Well-designed pedestrian and bike infrastructure is an important element of a highly functioning employment center. Due to the scale of the KTC and its surrounding context, it is difficult to provide comprehensive external pedestrian and bike access to the overall site. However, it is worth considering what amenities can be provided for employees on-site. Providing an internal network of pedestrian pathways can enable employees to access their workplaces from dedicated drop-off zones and for general ease of movement between facilities. In addition, pathways reduce the friction between vehicles and pedestrians by providing a safe means to walk or bike separated from the roadway. The following recommendations are appropriate for the scale and existing context of the KTC:

- **Install Standard ADA-Accessible Sidewalks or Pedestrian Paths**
 - Asphalt pedestrian paths can be used by both pedestrians and bicyclists, thus reducing friction between bikes and vehicles using the road network.
 - Pedestrian-scaled lighting should be provided throughout the site along any pathways.
 - Bike racks and repair stations should be installed at employer sites and at other points along the pedestrian network.
- **Provide Safe and Efficient Pedestrian Crossings Throughout the KTC**
 - Where practical, provide flashing beacons, signage, and bump-outs, to support safe pedestrian crossing movements within the study area.
- **Provide Safe Areas for Drop-Offs and Shuttle Access**
 - Provide dedicated areas for drop-off and pick-up of employees by personal vehicles, vans, shuttles, or public transportation.
 - Include shelters, benches, and lighting.

Examples of Pedestrian and Bike Infrastructure Within Employment Centers



Source: DVRPC

WORKFORCE ACCESS

Public transportation services to and from the study area are limited. The SEPTA Trenton Regional Rail line cuts through the study area along the Northeast Corridor rail alignment. The closest stations to the study area along this line are the Levittown and Trenton stations. Two buses serve nearby stations on the Trenton Line, but do not provide any direct connection to the KTC. The Route 127 SEPTA bus runs just outside the study area and takes riders from Oxford Valley Mall through Falls Township and Morrisville Borough terminating at the SEPTA Trenton Regional Rail Station. Route 128 carries riders from Neshaminy Mall through Bristol and Levittown Station before shifting northwest and terminating at Oxford Valley Mall.

In the coming years, SEPTA is planning a major revamp of the existing bus system across the region named “Bus Revolution.” This revamp of the system will further limit the public transit options for local workers within the study area as the Route 127 and 128 buses will likely be eliminated and replaced with lines that are further away from the KTC.² As a result of the limited access to the site by public transit services, the vast majority of workers rely on alternative modes such as a personal vehicle or carpooling.

Going forward, it is important for any employer or property management company to collect data regarding the commuting habits of employees on a periodic basis so as to establish an understanding of the need for additional alternatives. In order for an agency such as SEPTA to consider a new route, or a Transportation Management Association (TMA) to provide help with a shuttle service, there often needs to be a study that evaluates the need for the service. Important points of data to collect are origin/destination of commute, current commuting mode, current commute time, shift times, and preferred mode of transportation.

Carpooling

One popular alternative method for employee commuting is carpooling. Carpooling is oftentimes an informal arrangement between individual employees, but it can be formally organized by an employer and incentivized. Typically, this method of commuting is more unreliable as an employee absence could lead to additional employees not able to make it in. Prior to the pandemic, there were a few commercial apps oriented

towards organizing carpool arrangements for individual employees. However, the most prominent one — Waze Carpooling³ — shut down as a result of the pandemic greatly altering commuting patterns. In their absence there are a number of state-sponsored services such as Share-A-Ride⁴ in Pennsylvania and NJ Rideshare⁵ in New Jersey. A common strategy for employers to help encourage reliable carpooling is to facilitate matching. This is done by maintaining a list of both drivers and riders in order to take the burden off the employees to self organize.

Vanpooling

Vanpooling is another employee ridesharing alternative that employers may utilize to facilitate their employees commutes. Vanpools are often more reliable and cost-effective than carpools. They typically accommodate more people than a car, but less than a shuttle bus, so they can be a middle-ground between these two other methods. Similar to a shuttle service, they are usually organized by an employer in conjunction with other agencies such as a local Transportation Management Association (TMA). The TMA of Bucks County provides services to employers and employees in the study area.

Commuter Benefits Program

Regional commuter benefit programs, such as the Edenred Employee Benefits Program, can be used by employees for official vanpool services and transit. Through this program, employers can incentivize or subsidize the use of vanpool or other transit services by providing employees with benefit cards that can be used to access these services.

Shuttle Service

Absent a direct SEPTA service to the site and given the size and scale of the KTC, a commuter shuttle service is the preferred recommendation for providing alternative transportation to and from the site. Shuttle services are a common solution to the issue of limited public transit options for employees to and from the worksite. Services can be funded and/or organized by individual employers, property management companies, local municipalities, the local TMA, SEPTA, or a combination thereof. Funding is

² “SEPTA Forward: Bus Revolution.” SEPTA Forward: Bus Revolution, Spring 2023. <https://www.septabusrevolution.com/>.

³ Malik, Aisha. “Waze Shutting down Its Carpool Service Starting next Month.” TechCrunch, August 26, 2022. <https://techcrunch.com/2022/08/26/googles-waze-shutting-down-its-carpool-service/>.

⁴ “Pacarpool.Org a One-Stop Resource for a Better Commute to and around Pennsylvania.” PACARPOOL, n.d. <https://www.dvrpc.org/pacarpool/>.

⁵ NJ Rideshare, n.d. <http://www.njrideshare.com/rp2/Home/Home>.

often composed of multiple sources such as part of a common area fee for tenants, grants from state or federal programs, and direct subsidy from single employers. Commuter shuttle programs can provide a number of benefits for both employees and employers.

- Improving access to job opportunities for employees who may not have access to reliable transportation.
- Increasing employee productivity and job satisfaction by reducing stress and the time and costs associated with commuting.
- Reducing congestion and air pollution by taking cars off the road.
- Reducing the amount of employee vehicles interacting with trucks trying to access the facility.
- Providing a perk that can help attract and retain employees.

A potential shuttle service would best run from a central transit node that acts as a transfer point from other existing public transit routes. Levittown and Trenton stations along the SEPTA Trenton Regional Rail line offer the best opportunity to connect a shuttle with other transit options. There are a few regional examples of this type of commuter shuttle service, such as the Pureland East-West Shuttle in Gloucester County and Camden Counties. This shuttle serves the Pureland Industrial Complex by way of a number of stops throughout Gloucester County terminating at the Avandale Park-and-Ride in Winslow Township in Camden County. The shuttle has a \$1 fare that is waived if the rider is connecting from an NJ Transit service.

SHUTTLE SERVICE CASE STUDIES

Shuttle services can take many forms. The following case studies provide a better understanding of the different possibilities for organizing, funding, and implementing a successful shuttle service for distribution and logistics employees.

ZLine - Greater Mercer TMA

The ZLine bus service in Mercer County is one of the most successful employee shuttle services in the region. What started as a single line in 2014 has evolved into a two-line service with stops at Amazon facilities within two Matrix Business Parks. The route is between Hamilton Marketplace – served by NJTransit and the Route 130 Connection – and Matrix Business Park. The shuttle’s operating hours are between 4:50 am and 7:10 pm, with higher frequency around major shift changes. The rolling stock ranges from vans and mini-buses to a full size bus, depending on the line. A contracted third party runs the service. Providers typically charge an hourly rate for this type of service with hourly costs ranging between \$80

and \$100 plus depending on the size and capacity of the rolling stock. Funding for the services comes directly from Amazon, Mercer County, and a grant from New Jersey’s Job Access and Reverse Commute (NJ-JARC) program.

Navy Yard Shuttle - Philadelphia Authority of Industrial Development

The Navy Yard is a similarly-scaled development to the KTC and has a total employment count of around 15,000⁶. The Navy Yard Shuttle provides a commuting alternative for those workers - currently utilized by ten percent of them. The Philadelphia Industrial Development Corporation (PIDC) is the organization in charge of the Philadelphia Navy Yard’s redevelopment and it also oversees the Navy Yard shuttle by way of the Philadelphia Authority of Industrial Development (PAID). The service has two routes. The first constitutes a loop from NRG Station to stops within the Navy Yard, while the second delivers employees from Center City. The shuttle’s hours of operations are Monday to Friday, 7:00AM to 7:20PM, with early-bird departures from NRG Station on the SEPTA Broad Street Line beginning at 5:38AM. This accommodates a majority of workers within the Navy Yard complex, including the thousands who work earlier or later shifts. The Navy Yard shuttle is funded primarily by tenants through a common area fee and

⁶“About The Yard.” Navy Yard, n.d. <https://navyyard.org/about/the-yard/>



The Navy Yard Shuttle.
Source: DVRPC

it is provided by a third-party operator, Krapf’s. In 2023, the yearly cost of operation was approximately two million dollars for a fleet of seven full-size transit buses. The supportive infrastructure recommendations below are

organized by type of intervention and include information on responsible agencies, timeline for implementation, and cost.

TABLE 9: SUPPORTIVE INFRASTRUCTURE NEXT STEPS

RECOMMENDATION	RESPONSIBLE AGENCY	TIMELINE	COST	
Assess the capacity and conditions of the local power delivery system by reaching out to the utility provider.	NorthPoint Falls Township	Short	–	EV INFRASTRUCTURE
Assess each future development phase for the potential of providing EV infrastructure on appropriate sites, such as last-mile facilities.	NorthPoint	Short-Medium	\$	
Install EV infrastructure on appropriate sites throughout the KTC. <i>Potential Funding Sources: Carbon Reduction Program (FHWA), Multimodal Transportation Fund (PA DCED)</i>	NorthPoint	Long	\$\$\$	
Consult with the local TMA (TMA Bucks) regarding the creation, routing, and potential funding for a commuter shuttle to service the site. <i>Potential Funding Sources: Travel Options Program (DVRPC), Multimodal Transportation Fund (PA DCED)</i>	NorthPoint TMA Bucks	Short	–	WORKFORCE ACCESS
Contract with a third-party transportation provider to begin service of a commuter shuttle to the KTC.	NorthPoint TMA Bucks	Medium	\$\$-\$\$\$	
Identify underutilized commercial or industrial sites, either within the KTC or in the immediate surrounding area, for the construction of a centralized truck parking facility/rest stop.	NorthPoint Falls Township Morrisville Borough	Short	\$	TRUCK PARKING
Once a preferred truck parking site has been identified, begin the process of property acquisition as well as posting of an RFI/RFP for construction and operation of a new truck parking facility/rest stop.	NorthPoint Falls Township	Medium	\$\$	
Once a truck parking site has been acquired and a contractor secured, begin construction of the facility.	NorthPoint Falls Township	Medium-Long	\$\$-\$\$\$	
Incorporate pedestrian infrastructure and other site-based improvements in the planning of future phases of development at the KTC.	NorthPoint	Short-Medium	\$	PEDESTRIAN INFRASTRUCTURE
Install pedestrian infrastructure and other site-based improvements in future phases of development at the KTC.	NorthPoint	Long	\$\$-\$\$\$	

Source: DVRPC



*Incomplete Sidewalk Along South Pennsylvania Avenue.
Source: DVRPC*

DESIGN FOCUS AREAS

This chapter provides local policymakers with guidance and recommendations that focus on smaller areas with critical issues that need to be addressed in order to achieve an equitable balance between local residents' quality-of-life and freight movement within the wider study area. During two steering committee meetings, multiple members highlighted the specific issues that these recommendations seek to address.

The previous chapter's recommendations focused on safety, road conditions, and truck, truck operator, and employee needs throughout the study area. Three selected focus areas were highlighted as pain points by the steering committee and include areas both within and just outside the study area. This chapter addresses these three specific areas with well-recognized traffic and quality-of-life issues. Similar to the previous sets of recommendations, next steps and potential funding sources are provided for local policymakers to begin implementation.

The first focus area is South Pennsylvania Avenue in Morrisville Borough within the bounds of the study area. It was noted that heavy truck traffic degrades the road surface, creates an inhospitable pedestrian environment, and endangers school children who need to use South Pennsylvania Avenue to access their school on the other side of the borough. Recommendations for South Pennsylvania Avenue center around traffic calming and wayfinding that disincentivizes trucks from utilizing the corridor.

The second focus area is just outside the study area in the northern part of Morrisville Borough along Bridge Street and its intersection with South Pennsylvania Avenue. Committee members noted the potential for trucks to avoid tolls on US-1 by using the Lower Trenton ("Trenton Makes") bridge.

Additionally, the area's signage is confusing and sometimes contradictory. Recommendations center around providing clarity through new wayfinding signage and removing contradictory signage.

The third focus area is South Trenton, due to its struggle with accommodating truck traffic seeking to access US-1 and the KTC area on the other side of the Delaware River. Concerns were raised about the current, circuitous truck route that is reinforced through signage along westbound I-195 as it approaches I-295. It was noted that many trucks ignore the official route and use local roads. This issue will only worsen with increased activity at the KTC. Recommendations for this focus area center on options for reducing truck volumes on local roads in South Trenton. The first option is to re-examine previous plans for an additional Delaware River crossing. The second option is to reconsider truck restrictions in the Lambertson Tunnel. This is the most direct and logical connection to US-1 through Trenton, absent a new crossing.

SOUTH PENNSYLVANIA AVENUE

This focus area includes South Pennsylvania Avenue from the intersection with Bridge Street to the intersection with Tyburn Road. This road currently serves as a connection for both trucks and passenger vehicles to travel to and from the KTC site and US-1. Around 34 percent of trucks use South Pennsylvania Avenue to go to the KTC site, and 37 percent of trucks use South Pennsylvania Avenue to leave the site.

There are three distinct segments of this road with unique characteristics. The first segment extends from Bridge Street to Philadelphia Avenue under US-1 and connects the north and south areas of Morrisville. The second segment extends from Philadelphia Avenue to Post Road, the Morrisville Borough Boundary, through a highly residential area. The third segment extends from Post Road to Tyburn Avenue, entirely within Falls Township, and provides access to multiple industrial facilities.

The residential character of segment two makes this road an inappropriate path for high truck volumes, such as those expected from the KTC development. Currently, residents experience the impacts of a heavy amount of trucks traveling through the Morrisville Borough area. This heavy vehicle traffic is the primary cause for concerns about noise and disruption of community character; pedestrian safety due to speeding vehicles, especially around school aged children; and cost of infrastructure maintenance to support wear and tear on the roadways, signage, and lights. Table 10 details next steps for wayfinding along South Pennsylvania Avenue, including recommendations, potential funding sources, responsible agencies, timeline, and rough cost estimates.

TRUCK RECOMMENDATIONS

NHS Intermodal Connector Redesignation

There is one NHS Intermodal connector in the study area – South Pennsylvania Avenue from US-1 to the entrance to the KTC. This route runs directly through the Borough of Morrisville and has multiple homes that front the street directly. Tyburn Road was built as a two lane each direction, median separated facility. It is classified as a minor arterial. It has a higher capacity to carry truck traffic and is more separated from the surrounding community than South Pennsylvania Avenue. It is recommended that the Intermodal connector be redesignated to Tyburn Road. See the NHS Intermodal Connector Redesignation section (page 30) for more information on this recommendation.

Truck Route Designation

Due to the residential characteristics of segments one and two of South Pennsylvania Avenue, only segment three should be considered as a secondary truck route. While trucks cannot be fully restricted from Segments one and two, wayfinding and traffic calming treatments can help to direct trucks away from this area towards Tyburn Road as the main point of access for industrial facilities south of Morrisville Borough. Existing restrictions exist on segment three where Falls Township ordinance (#133-6) restricts waste trucks on South Pennsylvania Avenue.

Supportive Improvements

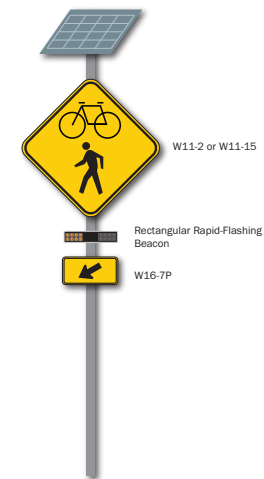
Additional improvements may be appropriate at the intersection of US-13 and Tyburn Road in order to incentivize trucks to use Tyburn Road instead of South Pennsylvania Avenue. Currently, the on-ramps to US-13 from Tyburn Road have insufficient length to accommodate an increase in truck traffic from both the KTC full build-out and the designation of Tyburn as the official truck route. Further study is needed to determine the appropriate course of action.

TRAFFIC CALMING RECOMMENDATIONS

Traffic calming elements can be implemented to deter trucks from taking South Pennsylvania Avenue as a through route, which as an added benefit will reduce the speeds of all vehicles that travel through this residential area. There are a few treatments that could fit within this focus area to promote traffic calming, see Figure 13.

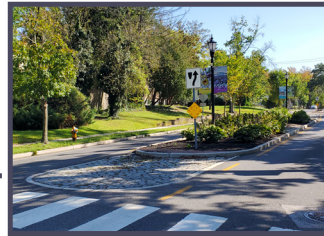
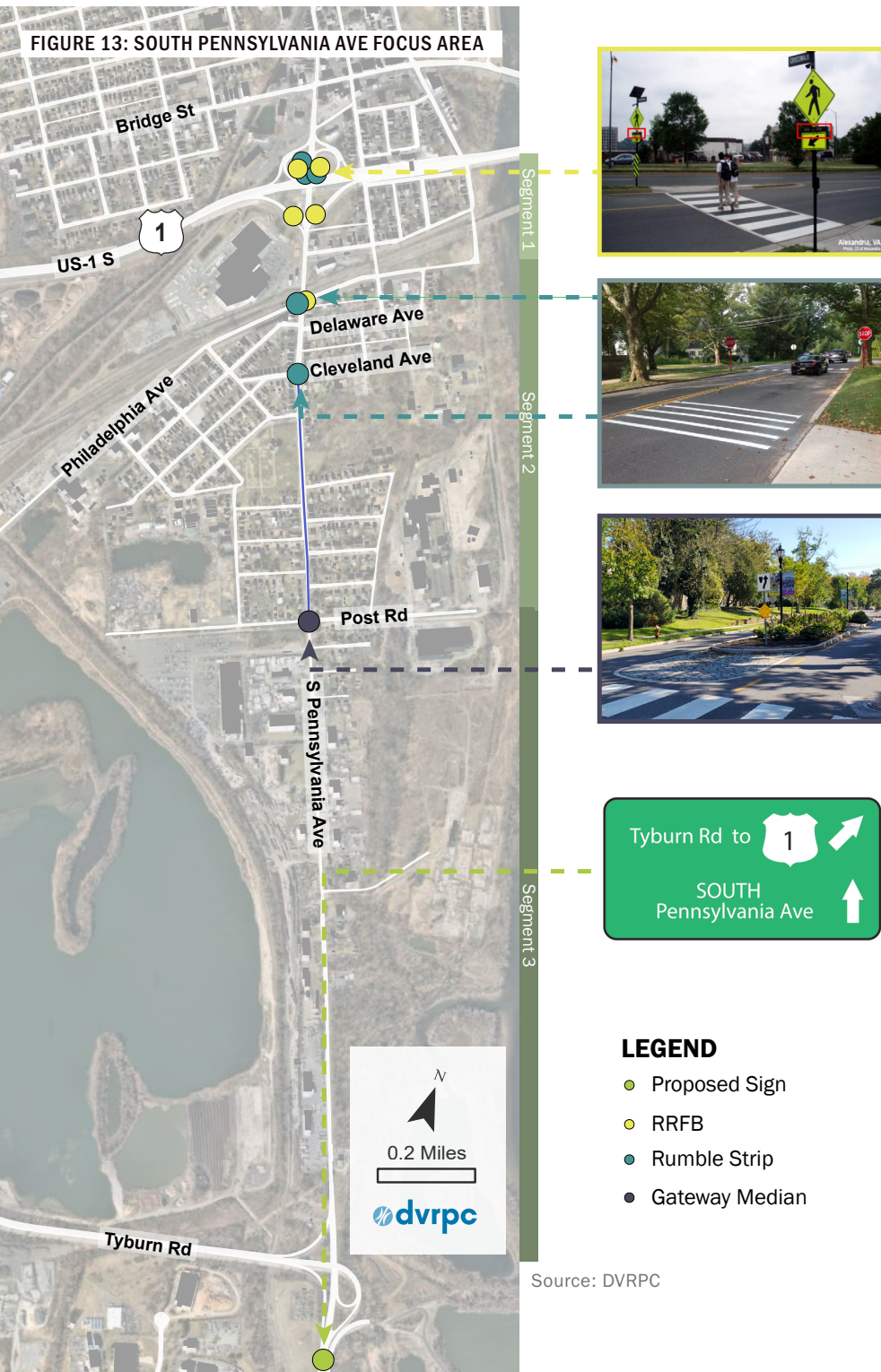
Rapid Flashing Beacons (RFB)

RFBs use light-emitting diodes to supplement warning signs at uncontrolled intersections or midblock crosswalks. They can be activated by pedestrians and bicyclists by manually pushing a button or via a pedestrian detection system. When paired with a warning-type sign as designated by PennDOT, such an arrangement works as an alert for drivers to slow down and stop for pedestrians and bicyclists. The exit ramps leading cars from US-1 onto South Pennsylvania



Source: DVRPC

FIGURE 13: SOUTH PENNSYLVANIA AVE FOCUS AREA



- LEGEND**
- Proposed Sign
 - RRFB
 - Rumble Strip
 - Gateway Median

Source: DVRPC

Avenue make a considerable transition in speed that can be dangerous to pedestrians crossing the street. An important group to consider are children who cross these streets on their way to school. Installing an RFB along with a warning sign for drivers can potentially make these problem points safer for the community. Figure 13 identifies specific recommended installation locations.

High-Visibility Crosswalks

Striped pedestrian crossings are a strategy to make crosswalks highly visible to all road users by demarcating the crosswalk area using a striping pattern. In a high-visibility crosswalk strategy, the striping pattern is painted on the street inside two lines forming a “ladder” pattern. This pattern can be seen from about twice as far away as the traditional two-transverse-lines marking. The use of PennDOT’s R1-6 “In-Street Pedestrian Crossing” signs can also bring extra visibility to the intersection.

Recommended installation locations for high-visibility crosswalks are at intersections where there is significant interaction between vehicular, particularly truck, and pedestrian traffic. Along South Pennsylvania Avenue, this treatment could be used at the intersections with the US-1 exit ramps, Bowling Green Avenue, and Post Road to improve the safety of pedestrians through increased visibility and reduced vehicle speeds.

Gateway Median Treatment

Enforcement of speed restrictions along South Pennsylvania Avenue can be difficult for a small municipality like Morrisville. However, there are other infrastructure improvements that can affect driver behavior. One way to communicate to drivers that they are entering a different road environment and to adjust speed accordingly is by applying a gateway treatment at transition. Post Road serves as a dividing line between industrial and residential uses in Morrisville and its intersection with South Pennsylvania Avenue is the primary entry point.

A gateway median treatment at the intersection of Post Road and South Pennsylvania Avenue could benefit the community by communicating the change in neighborhoods to car and truck drivers, and encouraging them to drive at slower speeds.

Rumble Strips

The NACTO design guidelines define rumble strips as a soft treatment to give a tactile cue to drivers when they encroach upon the transit lane. They are a low-cost way to reduce vehicle incursions and are typically reserved for higher speed roads that are unsafe for bicyclists and wheelchair users

(among other vulnerable groups) to cross.

On the US-1 exit ramp that meets South Pennsylvania Avenue, rumble strips, a striped pedestrian crossing, and a rapid flashing beacon could be very effective in informing drivers about their approach toward South Pennsylvania Avenue. This combination can slow vehicle speeds and ensure that pedestrians are visible to drivers, especially children.

WAYFINDING RECOMMENDATIONS

There is a significant amount of wayfinding signage by both public and private entities within the vicinity of the KTC. These signs are largely not coordinated and many of them are from different eras of route enforcement. Despite the current official intermodal connector being South Pennsylvania Avenue, there are many signs directing trucks to use Tyburn Road to access US-1, as well as barring them from side streets in the residential southern end of Morrisville. This signage adequately communicates to trucks originating from South Pennsylvania Avenue industrial operators that they should use Tyburn. Official signage is still necessary leading out of the KTC site before Tyburn Road to direct trucks to the new preferred route (#3 in Figure 14). Access to the KTC from Trenton via US-1 needs updated signage that directs trucks to the preferred route.

Trucks entering the area from the west on US-1 will be directed to US-13 and Tyburn Road using a series of new and updated highway signage, both overhead and roadside (#'s 1, 4, 5, and 6 in Figure 14). An existing sign on Tyburn Road before its end at South Pennsylvania Avenue should be replaced with newer, simpler signage that textually indicates the lane to access the KTC (#2 in Figure 14).

Once a freight network is designated, it should be reinforced through proper, consistent signage throughout the area. This includes removing existing, inconsistent signage. There are a number of signs throughout the area that will need to be removed when directing to outdated routes

FIGURE 14: PROPOSED WAYFINDING SIGNAGE TO TYBURN ROAD



Source: DVRPC

1

TRUCK ROUTE

TO

KTC SITE

←

2

Keystone Trade Center - KTC

RIGHT LANE

Morrisville

Pennsylvania Ave

LEFT LANE

3

Tyburn Rd to 1

SOUTH Pennsylvania Ave

LEGEND

- Existing Wayfinding Signage
- Proposed Wayfinding Signage

4

TRUCKS 13 SOUTH

Keystone Trade Center - KTC

Morrisville

Pennsylvania Ave

5

TRUCKS EAST KTC

Tyburn Road East

6

TRUCKS EAST KTC

Keystone Trade Center

NEXT EXIT

7

TRUCK ROUTE

13 SOUTH Philadelphia

Morrisville SOUTH Pennsylvania Ave SECOND RIGHT

Morrisville NORTH Pennsylvania Ave

TABLE 10: SOUTH PENNSYLVANIA AVENUE NEXT STEPS

RECOMMENDATION	RESPONSIBLE AGENCY	TIMELINE	COST
Undertake an inventory and evaluation of the signed restrictions to ensure consistency of information and routing.	PennDOT, Morrisville Borough, Falls Township	Short-Medium	\$
Undertake a corridor study for South Pennsylvania Avenue in order to explore the options, feasibility, and design of various traffic calming and pedestrian infrastructure to be implemented along the corridor. <i>Potential Funding Sources: Transportation and Community Development Initiative (DVRPC)</i>	Bucks County, PennDOT, Morrisville Borough, DVRPC	Short-Medium	\$
Undertake a study of the interchange between US-13 and Tyburn Road in order to determine if further improvements are needed.	Bucks County PennDOT, Falls Township	Short-Medium	\$-\$-\$
Draft and adopt a local ordinance for designation of routes and restrictions.	Morrisville Borough, Falls Township	Short-Medium	-
Integrate truck routes into municipal maps and share final designations with DVRPC for incorporation into regional network products.	Morrisville Borough, Falls Township, DVRPC	Medium	\$
Implement the preferred traffic calming and pedestrian infrastructure improvements along South Pennsylvania Avenue.	Bucks County, PennDOT, Morrisville Borough	Medium-Long	\$-\$-\$-\$
Implement local truck restriction signage to be consistent with recommendations in this report, including the deployment of new advance signs for restrictions and the removal of outdated signs.	Bucks County, PennDOT, Morrisville Borough, Falls Township,	Medium-Long	\$-\$

Source: DVRPC

BRIDGE STREET

Bridge street is the main commercial corridor through Morrisville Borough. Lined with shops east of South Pennsylvania Avenue and commercial and residential buildings to the west, it is not conducive to heavy truck volumes. In addition to the character of the land use along the road, there is a 5-ton bridge restriction across the Trenton Makes (Lower Trenton) bridge and a 34-ton restriction near the intersection with US-1.

Despite these conditions and existing truck restrictive signage, the Borough still experiences the impacts of trucks and residents have concerns about drivers ignoring these restrictions and the character of this area being impacted with growing truck traffic.

WAYFINDING RECOMMENDATIONS

Equally important in the truck route designation process is truck restriction designation and appropriate wayfinding signage to navigate restrictions. There are three known restrictions along Bridge Street that could be evaluated for better wayfinding signage. It is important to consider both location of the restriction and advance signage in order to ensure drivers have the necessary notice to make alternative route decisions and keep trucks away from inappropriate routes.

34-Ton Bridge Restriction

This 34-ton weight restriction, located on Bridge Street between the intersections with Cox and Harding avenues is generally well signed on US-1 (#'s 6, 7, 8, and 9 in Figure 15) to alert drivers to the approaching restriction at the Route 32 Morrisville exit and to direct them to the alternative route of Pennsylvania Avenue at the following exit. To make this restriction clearer, additional "Alternate" (M4-1) and Truck" (M4-4) signs at the Pennsylvania Avenue exit could be added. This decision point could also include additional signage allowing only local truck traffic, since South Pennsylvania Avenue is not a preferred truck route.

5-Ton Bridge Restriction

The 5-ton bridge restriction over the Trenton Makes Bridge is also generally well signed (#s 4, 5, and 10 in Figure 15). DVRPC vehicle class counts show low truck volumes over the bridge, indicating that most drivers are following the existing restrictions. Additional advance signage to US-1 South at William Trent Place (#11 in Figure 15) is recommended since this is one of the last decision points before the bridge restriction.

South Pennsylvania Ave/ Bridge Street Truck Restriction

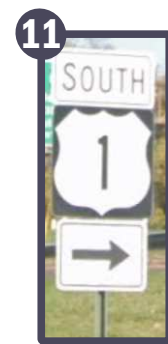
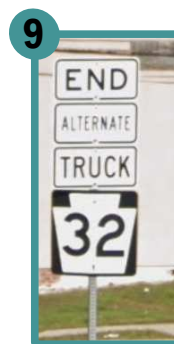
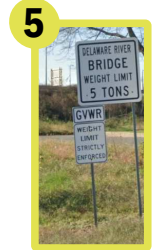
There is currently conflicting signage at the intersection of Bridge Street and Pennsylvania Avenue (#1 and #2 in Figure 15), which creates a decision point with no place for trucks to go. Trucks traveling east-bound on Bridge Street are restricted from turning right or left, and there is an approaching 5-ton bridge restriction ahead. There is an opportunity to consider removing the right turn restriction that would direct trucks back to the US-1 interchange. This may require a further engineering study to determine if the turn radius is appropriate.



Source: DVRPC



PROPOSED



PROPOSED

TABLE 11: BRIDGE STREET NEXT STEPS

RECOMMENDATION	RESPONSIBLE AGENCY	TIMELINE	COST
Undertake an inventory and evaluation of the signed restrictions to ensure proper engineering justification and conduct updated engineering studies where necessary.	PennDOT, Morrisville Borough	Short-Medium	\$\$-\$
Draft and adopt a local ordinance for designation of routes and restrictions.	Falls Township Morrisville Borough	Short-Medium	-
Integrate truck routes into municipal maps and share final designations with DVRPC for incorporation into regional network products.	Falls Township Morrisville Borough, DVRPC	Medium	\$
Implement local truck restriction signage to be consistent with recommendations in this report, including the deployment of new advance signs for restrictions.	Falls Township Morrisville Borough, DRJTBC, PennDOT	Medium-Long	\$\$\$

Source: DVRPC

TRENTON

Trenton, like many downtown areas in the region, is experiencing increasing demands on roadways, including an increase in truck traffic. The City's location between industrial developments in lower Bucks County and Mercer County, as well as its proximity to major highways like the NJ Turnpike, I-195, and I-295, make it a through area for a significant amount of traffic, and the new development at the KTC site is expected to increase those volumes. Currently 14 percent of trucks going to site and 24 percent coming from the site use US-1 North through Trenton.

The preferred truck route network is difficult for drivers to navigate, and there are a limited number of alternative options that are appropriate for truck traffic. In south Trenton, the preferred routes include US-1, I-295, and NJ-129 and these are part of the New Jersey Large Truck Access Network, a statewide network defined by NJDOT that includes truck route designations and restrictions for certain types of trucks within the City. NJ-29 is a restricted road on this network due to the closure of the Lambertson Tunnel to truck traffic.

To navigate around the truck restrictions on NJ-29, many trucks use NJ-129 instead, traveling either via Cass Street to access NJ-29 and US-1 or through the multi-step connection at US-1. Since NJ-129 runs directly through the city, is signalized, and carries pedestrian and cyclist cross traffic, this is a much less ideal route than a highway to be moving trucks through the City. There are also two missing connections at the intersection of NJ-129 and US-1: NJ-129 NB to US-1 SB and US-1 NB to NJ-129 SB. To avoid those missing connections, many trucks use Cass Street, which is also a small, residential street that is not intended to carry heavy truck traffic. Trucks are technically banned on Cass Street, but this prohibition is not typically enforced.

In 1988, a study was conducted by STV Engineers and DVRPC for the Delaware River Joint Toll Bridge Commission (DRJTBC) exploring the feasibility of constructing a new bridge crossing the Delaware River — connecting Tyburn Road in Falls Township, PA to NJ-29 in Hamilton Township, NJ. Discussions and pre-feasibility analysis began in the 1970's and culminated in the 1988 study. It concluded that the projected increase in traffic through 2000 was not enough to justify the expense of construction, at the time estimated at between 80 and 120 million dollars. New developments, increasing truck traffic, and equity concerns call for a reexamination of this potential crossing as a means of mitigating the negative effects of continued industrial development within the area.

However, this would be an expensive and long-term solution. Therefore, the implementation of the following additional recommendations is essential for providing relief in the short and medium term.

TRUCK RECOMMENDATIONS

Truck Route Designation

A Primary Truck Route network needs to be identified in order to best direct trucks around and through Trenton. There are three main options for trucks to navigate the City between US-1 and I-195. These route options are:

- Truck Route 1 - Improve signage that directs trucks to I-295 around Trenton.
- Truck Route 2 - NJ-129, Cass Street, and NJ-29 and explore missing turning movement at NJ-129/US-1.
- Truck Route 3 - Re-opening of Lambertson Tunnel restriction to allow truck access on NJ-29.

WAYFINDING RECOMMENDATIONS

The current signage plan directs trucks through and around the City of Trenton in an especially confusing manner. A wayfinding plan to support the preferred truck routing would help to direct trucks to the preferred path and alert drivers to decision points well in advance. Figure 16 on the following page shows each potential truck route and locations for new signage where appropriate. Table 12 details recommendations, responsible agencies, timeline, and potential costs for truck movement enhancements in the City of Trenton.

Truck Route 1

Truck Route 1 is the current signed truck route leading drivers from I-195 to I-295 in order to bypass the urban core of the city of Trenton. This is primarily due to the limiting of hazmat and heavier trucks from the Lambertson Street Tunnel on NJ-29 (Truck Route 3). This is a much longer and circuitous route for trucks to reach US-1 and as a result is not utilized as often as other routes through the city. Signage for this route is adequate, but in the event of the designation of a more direct route to US-1, signs delineating this route should be modified to reflect the preferred route.

Truck Route 2

Truck Route 2 is the current route most often utilized by truck drivers when trying to navigate to US-1 from east of Trenton. This represents the most direct route aside from using NJ-29. This route is the least ideal as it runs

FIGURE 16: TRENTON FOCUS AREA



through residential areas along Cass Street, potentially exposing residents to harmful vehicle emissions and excessive noise. This route is well signed along NJ- 129 leading to Cass Street. However, there are currently no official signs directing trucks along Cass Street itself. While an expensive solution, the construction of an additional turning movement at NJ-129 and US-1 could be explored in order to disincentivize trucks from using Cass Street.

Truck Route 3

Absent the immediate construction of a new bridge between Tyburn Road and NJ-29, Truck Route 3 is a logical route for trucks to travel through Trenton without impacting neighborhood quality-of-life. It is the most direct route for trucks entering Trenton from I-195 to access US-1. However, there is a 13-ton weight restriction and hazmat prohibition in the tunnel, restricting heavy truck traffic access to this route. This prohibition is over 20 years old and should be re-examined by local officials and NJDOT through an additional study that considers the impact of heavy truck use in the tunnel and possible policy or engineering solutions. Depending

on the engineering needs in the Lambertson Tunnel, this may also be an expensive and longer term solution. Trenton is also exploring converting certain segments of NJ-29 to a more pedestrian-friendly boulevard in order to restore access to the river for residents north of US-1. The City of Trenton should make sure any proposed improvements do not exacerbate existing routing issues, although this is unlikely to be the case due to their location.

TABLE 12: TRENTON NEXT STEPS

RECOMMENDATION	RESPONSIBLE AGENCY	TIMELINE	COST
Undertake an inventory and evaluation of the signed restrictions to ensure proper engineering justification, especially regarding NJ-29's truck restrictions, and conduct updated engineering studies where necessary.	NJDOT, City of Trenton	Short-Medium	\$\$-\$
Evaluate the possibility of an additional connection from NJ-129 to US-1 in Trenton to enable all turning movements.	NJDOT, City of Trenton	Short-Medium	\$
Undertake a traffic and feasibility study for a new river crossing between PA and NJ connecting Tyburn Road to NJ-29.	NJDOT, PennDOT, DRJTBC, Bucks County, Mercer County, DVRPC	Short-Medium	\$\$-\$
Draft and adopt a local ordinance for designation of routes and restrictions.	City of Trenton	Short-Medium	-
Integrate truck routes into municipal maps and share final designations with DVRPC for incorporation into regional network products.	City of Trenton, DVRPC	Medium	\$
Implement local truck restriction signage to be consistent with recommendations in this report, including the deployment of new advance signs for restrictions.	City of Trenton, Mercer County, NJDOT, DRJTBC	Medium-Long	\$\$\$

Source: DVRPC

CONCLUSION

The Lower Bucks County area has a long history of large-scale industrial development. For decades, U.S. Steel's Fairless Works in Falls Township, produced steel goods before beginning to wind down operations in the 1990s. The former steel site and its immediately surrounding area still contain significant clusters of industrial businesses and the infrastructure to support more, such as two Class I rail operators, shortline rail, highway connections, and the Port of Bucks.

The overarching goal of this planning exercise is to provide local stakeholders with the information necessary to implement a more equitable balance between freight-related redevelopment and the health and safety needs of adjacent residential communities. In order to accomplish this goal certain objectives needed to be addressed by this report:

- Improve safety, road conditions, and truck routing throughout the study area;
- Maintain and ensure safe access to the KTC and other area businesses;
- Enhance the quality-of-life for residents;
- Reduce the possibility of conflict between trucks and other road users.

In the previous chapter, this report provides recommendations and guidance to address issues such as the designation of truck routes, workforce access, as well as quality-of-life along South Pennsylvania Avenue and Bridge Street in the project study area, and the South Trenton residential neighborhood. Moving forward, municipalities within the study area can work with DVRPC, PennDOT, Bucks County, and other local stakeholders to identify funding sources to implement the recommendations included in this report. In addition, coordination with the developer of the Keystone Trade Center (KTC) will be key to ensuring workforce access and site-based recommendations are enacted as it continues its build-out. Coordination is key for the implementation of this report's recommendations and can lead to better outcomes for both area residents and freight operators.



Appendices

A: Wayfinding Signage Inventory

B: Stakeholder Outreach

WAYFINDING SIGNAGE INVENTORY

This appendix details the truck restriction and wayfinding signage that was inventoried as a part of this study. Signage that conveyed restrictions to truck travel—including weight, height, length, and local restrictions—was documented. The inventory also includes truck route and directional signage in place at the time of the report. Signage nomenclature is also provided per PennDOT’s Publication 236, Handbook of Approved Signs and The Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), published by the United States Department of Transportation and the Federal Highway Administration and adopted in New Jersey’s Title 39 of the Motor Vehicle State Law as the current standard. It is recommended that this list be reviewed and consulted when drafting a new truck route network.

FIGURE 17: TRUCK SIGNAGE INVENTORY

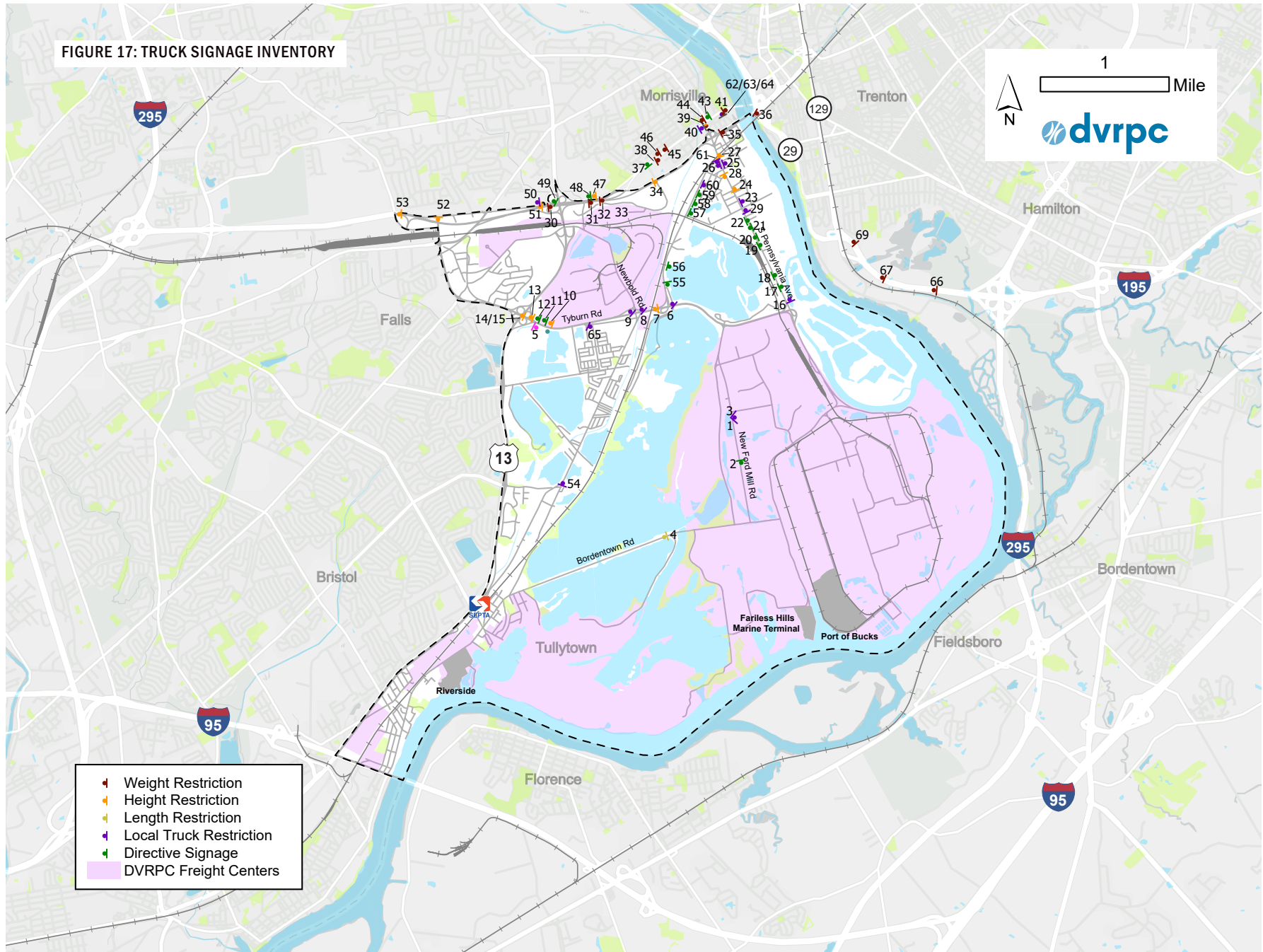


TABLE A-1: WAYFINDING SIGNAGE INVENTORY

MAP ID	ROAD NAME	SIGN TYPE	SIGNAGE NOMENCLATURE	DESCRIPTION
1	New Ford Mill Road	Local	n/a private sign	No Trucks: Shipping and Receiving North Entrance Only
2	New Ford Mill Road	Not Restrictive	n/a private sign	Truck Entrance
3	New Ford Mill Road	Local	n/a private sign	No Trucks: Shipping and Receiving North Entrance Only
4	Bordentown Road	Length	R3-102P,W16-103P, R3-1	Trucks over 25ft long - 2 miles ahead - No Right Turn
5	Tyburn Road	Other	R4-104	Trucks & Buses: Right Lane Only
6	Tyburn Road	Local	R14-6	Waste Trucks Prohibited
7	Tyburn Road	Height	W12-2, W163AP	Height Restriction: 13'-8" - 1/4 Miles
8	Tyburn Road	Local	R14-6	Waste Trucks Prohibited
9	Tyburn Road	Local	R14-6	Waste Trucks Prohibited
10	Tyburn Road	Height	W12-2, W16-103P	Height Restriction: 13'-8" - 1000 Feet
11	Tyburn Road	Not Restrictive	SP-1*, M4-5, M1-4, M6-2	Tractor Trailers to US-1 - Right Exit Ahead Arrow
12	Tyburn Road	Not Restrictive	SP-1*, M4-5, M1-4, M6-2	Tractor Trailers to US-1 - Right Exit Arrow
13	Tyburn Road	Height	W12-2, W16-103P	Height Restriction: 13'-8" - 500 Feet
14	Tyburn Road	Height	W12-2A	Height Restriction: 13'-8" (on overhead bridge)
15	Tyburn Road	Height	W12-2	Height Restriction: 13'-8" - Ramp
16	South Pennsylvania Avenue	Local	R14-6	Waste Trucks Prohibited
17	South Pennsylvania Avenue	Not Restrictive	SP-1*, M4-5, M1-4, W1-6	Tractor Trailers to US-1 - Right Arrow
18	South Pennsylvania Avenue	Not Restrictive	SP-1*, M4-5, M1-4, W1-6	Tractor Trailers to US-1 - Right Arrow
19	South Pennsylvania Avenue	Not Restrictive	SP-1*, M4-5, M1-4, W1-6	Tractor Trailers to US-1 - Right Arrow
20	South Pennsylvania Avenue	Not Restrictive	SP-1*, M4-5, M1-4, W1-6	Tractor Trailers to US-1 - Left Arrow
21	South Pennsylvania Avenue	Not Restrictive	SP-1*, M4-5, M1-4, W1-6	Tractor Trailers to US-1 - Left Arrow
22	South Pennsylvania Avenue	Not Restrictive	SP-1*, M4-5, M1-4, W1-6	Tractor Trailers to US-1 - Right Arrow
23	Dieter Ave	Local	R5-2, R5-2-3	No Trucks: except delivery vehicles
24	South Pennsylvania Avenue	Height	W12-2, W16-103P	Height Restriction: 13'-6" - 1800 Feet
25	Delaware Ave	Local	R5-2, R5-2-3	No Trucks: except delivery vehicles
26	Harrison Ave	Local	R5-2, R5-2-3	No Trucks: except delivery vehicles
27	South Pennsylvania Avenue	Height	W12-2	Height Restriction: 13'-6"
28	South Pennsylvania Avenue	Height	W12-2, W16-103P	Height Restriction: 14'-0" - 1.5 Miles

MAP ID	ROAD NAME	SIGN TYPE	SIGNAGE NOMENCLATURE	DESCRIPTION
29	South Pennsylvania Avenue	Local	R14-6	Waste Trucks Prohibited
30	US-1	Weight	N/A	Vehicles over 34 Tons prohibited - Left Exit - 1/2 Mile
31	US-1	Weight	N/A	Vehicles over 34 Tons prohibited at this exit - Left Exit to PA-32 North
32	US-1	Weight	N/A	Vehicles over 34 Tons prohibited at this exit - Left Exit to PA-32 North
33	US-1	Weight	N/A	Vehicles over 34 Tons prohibited at this exit - Left Exit to PA-32 North
34	US-1	Height	W12-2	Height Restriction: 14'-3"
35	US-1	Weight	N/A	No trucks over 13 Tons/No Hazmats/No Bottle Gas - NJ-29 Tunnel
36	US-1	Weight	N/A	No trucks over 13 Tons Except Local Deliveries (NJ-29)
37	Lincoln Highway	Not Restrictive	SP-1*, M4-5, M1-4, W1-6	Tractor Trailers to US-1 - Left Arrow
38	Lincoln Highway	Weight	R12-1-2, R12-1-3, W16-103P	Weight Limit 34 Tons - 200 Feet
39	W. Bridge Street	Other	W12-2, R12-1-3, W16-103P	Weight Limit 5 Tons / Height Limit : 10' - 4/10 Miles
40	E. Bridge Street	Local	non-standard	No Tractor Trailers (Left or RightTurn)
41	E. Bridge Street	Weight	R12-1-3, W16-103P	Weight Limit 5 Tons - 1/8 Mile
42	E. Bridge Street	Weight		Trucks over 34 Tons follow alternate
43	E. Bridge Street	Not Restrictive	M4-1, R14-1, W1-6	Alternate Truck PA-32 - Left Arrow
44	E. Bridge Street	Weight	R12-1-3	Weight Limit 34 Tons - 1/2 Mile
45	Lincoln Highway	Weight	R12-1-3	Weight Limit 34 Tons - 400 Feet
46	Lincoln Highway	Weight	R12-1-2, R12-1-3	Weight Limit 34 Tons
47	Lincoln Highway	Height	W12-2	Height Restriction: 14'-2" - 2 Miles
48	Lincoln Highway	Not Restrictive		End Alternate Truck PA-32
49	Lincoln Highway	Not Restrictive	SP-1*, M4-5, M1-4, W1-6	Tractor Trailers to US-1 - Right Exit Arrow
50	Lincoln Highway	Local	R14-6	Waste Trucks Prohibited
51	Lincoln Highway	Height	W12-2	Height Restriction: 14'-2" - 1.5 Miles
52	Lincoln Highway	Height	W12-2	Height Restriction: 14'-5" (South to Tyburn Rd)

MAP ID	ROAD NAME	SIGN TYPE	SIGNAGE NOMENCLATURE	DESCRIPTION
53	US-1	Height	W12-2	Height Restriction: 14'-2" (Both overhead and roadside signs)
54	Old Bristol Pike	Local	R14-6	Waste Trucks Prohibited
55	Old-13	Not Restrictive	SP-1*, M4-5, M1-4, W1-6	Tractor Trailers to US-1 - Right Arrow
56	Old-13 (W Philadelphia Ave)	Not Restrictive	SP-1*, M4-5, M1-4, W1-6	Tractor Trailers to US-1 - Right Arrow
57	Old-13 (W Philadelphia Ave)	Not Restrictive	SP-1*, M4-5, M1-4, W1-6	Tractor Trailers to US-1 - Right Arrow
58	Old-13 (W Philadelphia Ave)	Not Restrictive	SP-1*, M4-5, M1-4, W1-6	Tractor Trailers to US-1 - Right Arrow
59	Old-13 (W Philadelphia Ave)	Not Restrictive	SP-1*, M4-5, M1-4, W1-6	Tractor Trailers to US-1 - Right Arrow
60	Baker Ave	Local	R5-2, R5-2-3	No Trucks: except delivery vehicles
61	Old-13 (W Philadelphia Ave)	Local	N/A	Thru Trucks use Phila Ave to Tyburn Rd
62	Old-13 (Delmorr Ave)	Weight	R12-1-2, R12-1-3	Bridge (Right Arrow) - Weight Limit 5 Tons
63	Old-13 (Delmorr Ave)	Local	Tractor Trailer, R3-1	Tractor Trailers: no right turn (roadside sign)
64	Old-13 (Delmorr Ave)	Local	Tractor Trailer, R3-1	Tractor Trailers: no right turn (overhead sign next to traffic light)
65	Old Tyburn Road	Local	R14-6	Waste Trucks Prohibited
66	NJ-29	Weight	N/A	No Trucks over 13 Tons (NJ-29 North)
67	NJ-29	Weight	N/A	No Trucks over 13 Tons (NJ-29 North)
68	NJ-29	Weight	N/A	No Trucks over 13 Tons (NJ-29 North)
69	NJ-29	Weight	N/A	No Trucks over 13 Tons (NJ-29 North)

STAKEHOLDER OUTREACH

Stakeholder outreach is an important component of the freight planning process, ensuring its effectiveness and sustainability. Engaging both public and private stakeholders such as municipalities, government agencies, freight operators, and local residents fosters collaboration, transparency, and trust. Outreach and engagement allows DVPRC to gather valuable insights and different perspectives, leading to balanced and sustainable recommendations for local policymakers.

The Lower Bucks Freight Access Study engaged a wide range of local stakeholders through two methods, one-on-one interviews and larger steering committee meetings. The study team held two virtual steering committee meetings composed of between 15 and 20 members (depending on individual availability).

The first meeting was held on October 28th, 2022 and focused on introducing the study goals and background information on the area. Committee feedback was solicited on major trends affecting freight movement and local quality-of-life within the study area. Some major trends highlighted were pedestrian safety and truck behavior along South Pennsylvania Avenue, workforce access to the Keystone Trade Center, and Trenton truck traffic (NJ-29 truck restrictions). In addition, the study team asked the assembled members if there were any additional stakeholders that needed to be engaged in this process. Steering committee members mentioned the inclusion of a SEPTA representative.

The second meeting was held on February 9th, 2023 and was focused on presenting the preliminary set of recommendations based on initial research and stakeholder outreach. Feedback was solicited on the likely effectiveness of the presented recommendations, proposed changes, as

well as any additional recommendation ideas. The study team noted the following specific feedback:

- Potential funding sources for South Pennsylvania Avenue traffic calming improvements.
- Re-examine the former Falls-Hamilton Bridge proposal as a long-term solution to mitigate increasing truck traffic in the area.
- Study successful commuter shuttle programs and estimate costs for a site-based solution.
- Keep working with SEPTA on the potential for a bus line to service the KTC site in the future.

In addition to the above mentioned committee meetings, one-on-one interviews were held with certain stakeholders to obtain additional information and feedback on specific elements of the study during the planning process:

- Greater Mercer TMA
- Mercer County
- NorthPoint Development (Keystone Trade Center)
- Philadelphia Industrial Development Corporation (PIDC)
- SEPTA

LOWER BUCKS

FREIGHT ACCESS STUDY

Publication Number:

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Date Published:

February 2024

Geographic Area Covered:

Lower Bucks County, Falls Township, and Morrisville Borough Area

Key Words:

Industrial Development, Freight, Freight Centers, Truck Route, Workforce Access, Keystone Trade Center

Abstract:

At the request of Bucks County, the *Lower Bucks Freight Access Study* was undertaken to examine freight generation and patterns in more detail and to provide recommendations and strategies that support the area's industrial growth centered around the Keystone Trade Center development, while ensuring the safe and efficient movement of both people and goods. This study documents existing land use and employment patterns; provides an analysis of activity and identified trends; and lays out recommendations for designating and implementing a truck route network, traffic calming considerations, workforce access, and increased clarity of directional and truck restriction signage. This report is divided into five chapters: introduction, background, existing transportation conditions, general recommendations, and design focus areas.

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