DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

Philadelphia

Truck Network and Complete Streets Integration Guidebook

October 2023

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Executive Summary

The City of Philadelphia is a vibrant urban center with diverse communities growing alongside sites of historic manufacturing legacy and new investments. The transport, delivery, and pick-up of all kinds of goods is a remarkably important part of the urban landscape.

The City of Philadelphia has defined a three-pronged approach to addressing freight concerns. These concerns include truck parking capacity; loading zones and curb management; and the design, education, and implementation of a truck network for freight movement in the city. This Philadelphia Truck Network and Complete Streets Integration Guidebook creates a process for the truck network portion of the City's efforts.

A critical part of implementing an effective truck network in an urban area is the incorporation of freight into the vision for Complete Streets. The City of Philadelphia has already created the Philadelphia Complete Streets Design Handbook as a toolbox and guide for community groups looking to improve their neighborhood streets, developers looking to build new projects, and for city employees designing new streets to meet 21st-century transportation standards.

The Delaware Valley Regional Planning Commission's Freight Planning Program, with input from The City of Philadelphia Office of Transportation, Infrastructure, and Sustainability, created the Philadelphia Truck Network and Complete Streets Integration Guidebook to complement the existing Philadelphia Complete Streets Design Handbook. This plan adds to the existing guide by

highlighting considerations for freight in Complete Streets design to enhance the quality of life for residents and reduce the possibility of conflict between trucks and other road users.

This plan includes four chapters that together layout a process for truck network implementation.

Chapter 1: Truck Network Designation

The Delaware Valley Regional Planning Commission's Freight Planning Program has developed a framework for truck network planning across the region. The formal designation of this network is a locally owned process that requires a combination of data-driven analysis, community engagement, education, and ultimately adoption and application. This network designation process includes the identification of multiple components that form the system. Components include truck appropriate routes-- regional freight corridors, primary truck routes, secondary truck routes, and last-mile connectors-- and truck restricted routes-- geometric or weight restrictions, local restrictions, and oversized/overweight restrictions.

Chapter 2: Truck Network and Complete Streets Integration

Each truck network component has different activity types and characteristics, and therefore different treatment needs, when designing for a Complete Street. Integration of truck network classification with the Complete Streets types allows for treatment recommendations to be context sensitive to the street and adjacent land uses. Multiple preferred combinations of truck network component class and Complete Streets type are recommended within this chapter for consideration during truck network designation process.

Chapter 3: Design Considerations

By integrating the truck network with Complete Streets types, more context sensitive design guidance can be made. Consideration of the unique needs of design (frequent user of a given street) and control (infrequent, larger user of a given street) vehicles is especially important on truck routes and allows for a better understanding of the type of freight traffic that can be expected on a given route. The design considerations outlined in this section are intended to supplement those found in the Philadelphia Complete Streets Design Handbook and correspond with the existing design treatment matrix, Complete Street components, and priority level designations.

Chapter 4: Communication

To effectively integrate goods movement strategies into street network design, the City will need to incorporate this design guidance into already existing processes and policies. These include the City code, policies, project development and review processes, and the existing Complete Streets checklist. The truck network designation will also require comprehensive outreach to identify community activity and concerns and offer an opportunity to discuss the benefits of planning for goods movement. This chapter covers the various ways to communicate and conduct an effective outreach of the designated truck network with stakeholders.

Introduction

The goal of this guidebook is to incorporate freight into Complete Streets considerations using the designation of a truck network so that the needs and safety of all street users—especially vulnerable users—are considered.

The City of Philadelphia is a vibrant urban center with diverse communities growing alongside sites of historic manufacturing legacy and new investments. The transport, delivery, and pick-up of all kinds of goods is a remarkably important part of the urban landscape. Packages, supplies, and groceries moved between businesses, homes, and offices make life possible in the city. Often goods movement, a vital aspect of city life, is unseen until issues arise.

It is not uncommon to find a truck blocking a travel lane to make deliveries along commercial corridors. This is often viewed as a problem, the cause of additional congestion; but in many cases, it is a symptom of the real problem: a lack of adequate capacity to accommodate freight movement and deliveries in the design of streets, buildings, and curbs. Understanding the role of urban freight deliveries and including consideration of them in policy and design is increasingly important in communities.

The City of Philadelphia has defined a three-pronged approach to addressing freight concerns. This includes the education, enforcement, and design of a truck network, truck parking capacity, and loading zones for freight movement in the city. This *Philadelphia Truck Network and*

Complete Streets Integration Guidebook creates a process for the truck network implementation portion of the City's efforts.

A critical part of implementing an effective truck network in the city is the incorporation of freight into the vision for Complete Streets. The City of Philadelphia has already created the *Philadelphia Complete Streets Design Handbook* as a toolbox and guide for community groups looking to improve their neighborhood streets, developers looking to build new projects, and for city employees designing new streets to meet 21st-century transportation standards. As a vital component of Complete Streets policies, the *Philadelphia Complete Streets Design Handbook* prioritizes the accommodation and inclusion of vulnerable road users, and justifiably so. However, in order to create a system that is safe for the most vulnerable road users, other road users must be understood and considered, and that includes considerations for freight activity and how it affects the community around it.

The Philadelphia Truck Network and Complete Streets Integration Guidebook is intended to complement the existing *Philadelphia Complete Streets Design Handbook* by highlighting consideration of freight in Complete Streets design to enhance the quality of life for residents and reduce the possibility of conflict between trucks and other road users. This guidebook aims to elevate the city's understanding of existing freight systems and to provide recommendations for freight consideration in future Complete Streets design and truck network designation.

This plan is organized into four chapters that cover the following topics:

- **Chapter 1:** A process for designating a city truck route network;
- **Chapter 2:** Integration of a truck route network with the exiting *Philadelphia Complete Streets Design Handbook*;
- **Chapter 3:** Considerations for integrating freight into Complete Streets design; and
- **Chapter 4:** Communication guidance for the implementation of a truck route network and design strategies.

1

Truck Network Designation

Truck network designation ensures appropriate consideration for freight's specific needs in a multimodal transportation system, making it the foundation for planning and engineering recommendations.

The Delaware Valley Regional Planning Commission's Freight Planning Program has developed a framework for truck network planning. The actual designation of this network is a locally owned process that requires a combination of data-driven analysis, community engagement, education, and ultimately adoption and application. This process, outlined below, is the foundation for establishing a truck network to be used as a multimodal planning tool.

Truck Network Components

A truck network is composed of multiple components that form the system. These components fall under two categories: Truck-Appropriate Routes and Truck-Restricted Routes. Not all of these components need to be communicated to road users through signage because some may be established primarily for planning purposes. The following components and their roles are consistent with the standards established by DVRPC for truck networks in communities throughout the region.

Truck-Appropriate Routes

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 all Primary Highway Freight System 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 in the city.

Primary Truck Routes

Primary truck routes create a needed 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 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

Also of importance to the truck network are truck-restricted routes. These 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 standard heavy-truck loads. These restrictions may apply to, and be posted by, the gross load of a vehicle or the axle weight. Unless otherwise signed, the maximum gross vehicle weight on Pennsylvania state roads is 80,000 pounds.

Local Restrictions

Local restrictions are those where the City 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. Local truck restrictions can be effective in helping to manage the movement of trucks that are not appropriate for certain streets. It is important to have 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.

Oversized and Overweight Vehicles

Oversized and overweight vehicles are prohibited from all City streets without a permit. The Department of Streets issues special hauling permits for vehicles that are over 40 feet long as a single vehicle, over 60 feet long as a combination vehicle, over 8 feet wide, over 13.5 feet tall, or over 80,000 pounds. In many cases a Commonwealth of Pennsylvania Special Hauling Permit is also required.

Designation Process

The designation process lays out steps to identify and implement a truck route network. These steps use data, local knowledge, and community engagement to create a network that supports the needs of freight and communities.

1 | 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 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 in the city. 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 street classification.

System redundancy is a critical consideration to ensure that primary routes can accommodate through moves across the network in the event of a regional freight corridor disruption.

Objective
Understand key generators and connectivity.

Preliminary network matched to existing classification system.

Key Data
Freight trip generation model, DVRPC; DVRPC freight centers, DVRPC; land use/zoning (industrial, transit-oriented development, high-density zoning); intermodal terminals, DVRPC; city commercial corridors

2 | Segment Activity Evaluation

Utilize the preliminary network to further evaluate the individual components of the system and document the nature of activity on segments.

The second step 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.

Objective
Quantify route segment activity.

Confirm route segment role/use.

Key Data
Traffic classification counts, DVRPC; INRIX Trips (truck trajectory data), DVRPC

3 | Review and Adoption

Establish a clear understanding of the purpose of the network, build community consensus, and adopt regulatory standards 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), as well as by the Streets Department; Philadelphia City Planning Commission; and Office of Transportation, Infrastructure, and Sustainability.

In addition to internal review, this step includes the critical process of public outreach and education on the proposed network. Community education and outreach are intended to aid the public in understanding what the network is and is not and to clearly articulate the value of 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.

Objective

Educate the public and promote buy-in on route designation.

Formally adopt the truck route components.

Key Players

Local communities/residents;

Freight stakeholders; and

Elected officials and local planners.

4 | Application

Communicate the designated network through signage, education, and the implementation of design considerations in infrastructure improvements.

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

The network should also be communicated in city 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 network planning.

Objective

Communicate new network designation to key stakeholders.

Implement improvements for truck freight.

Key Applications

Incorporation in city design guides and infrastructure planning.

Signage and maps to reinforce route designation for users.

2

Complete Streets Integration

There is an opportunity to enhance the existing complete streets policy by more comprehensively considering the role of trucks and goods movement on streets through the integration of a defined truck network. Planning for freight can improve the quality of life for residents and reduce the possibility of conflict between trucks and other road users.

Complete Streets, the concept that public streets are civic assets that must meet the needs of all users, is no longer a mere whim but a mandate bolstered by policy. In 2009, Mayor Michael Nutter issued an executive order, ensuring that the City's streets would accommodate "all users of the transportation system, be they pedestrians, bicyclists, public transit users, or motor vehicle drivers." This promise was followed by a city ordinance (Bill No. 120532) in 2012 and the delivery of the *Philadelphia Complete Streets Design Handbook* in 2017.

To view the *Philadelphia Complete Streets Design Handbook*
visit www.phila.gov/media/20170914173121/Complete-Streets-Design-Handbook-2017.pdf

The Philadelphia Complete Streets Design Handbook

The *Philadelphia Complete Streets Design Handbook* was created as a toolbox and guide for community groups looking to improve their neighborhood streets, developers looking to build new projects, and for city employees designing new streets to meet 21st-century transportation standards.

The handbook illustrates preferred multimodal street design and management practices within the city that consider the interaction of many different roadway users, elements of street design, and surrounding land uses since differing conditions and contexts require different design consideration and treatment. Previously the *Philadelphia Pedestrian and Bicycle Plan* established a new street classification that builds off of functional roadway classification to reflect land use characteristics, development density, and pedestrian activity level of streets. These new Complete Street types, reffered to below as Street Typologies, although not meant to replace the City's functional classification system, provide a more context-sensitive designation for Complete Streets planning that accommodates all roadway users.

Freight and Complete Streets Design

There is an opportunity to create a more complete street that improves the quality of life for residents and reduces the possibility of conflict between trucks and other road users.

As is the case with many Complete Streets policies, much emphasis is placed on the accommodation and inclusion of vulnerable road users. By focusing on the reduction of potential conflicts between trucks and road users, it is possible to enhance the implementation of the existing Complete Street policy.

This requires that projects more comprehensively consider the role of trucks and goods movement on the street. To better prepare developers and government agencies to address potential conflicts, it is essential to inventory and designate a truck network in Philadelphia and identify considerations around these routes to integrate freight into the fabric of the city rather than treating it as an afterthought. Integration with the *Philadelphia Complete Streets Design Handbook* provides the opportunity to apply the same context sensitive design to freight recommendations.

PHILADELPHIA COMPLETE STREETS DESIGN HANDBOOK: STREET TYPOLOGIES

High-Volume Pedestrian

These streets are important pedestrian destinations and connections in high-density commercial, residential, and mixed-use neighborhoods. High-volume pedestrian streets serve more than 1,200 pedestrians per hour during the mid-day. Many of these streets also provide important connections for vehicle traffic and serve high vehicle volumes and must often be designed to prioritize pedestrian movement and accommodate high vehicle traffic volumes.

Civic/Ceremonial Streets

This small group of streets includes some of the first mapped streets in the city (such as Broad Street and Market Street). These streets have great symbolic importance, house major ceremonial functions, and play a unique role in the life of the city (for example, the Parkway). Sidewalks on civic/ceremonial streets operate as generous pedestrian promenades. As major arterials, these streets also have high vehicle volume significance.

Walkable Commercial Corridor

These streets are active commercial corridors with pedestrian-friendly physical development patterns (for example, commercial sections of Germantown Avenue and Girard Avenue) On these streets, parking and access needs of local businesses often compete for limited right-of-way with pedestrian and bicycle facility needs. These streets have lower pedestrian volumes than high-volume pedestrian streets, but are more pedestrian friendly than auto-oriented commercial areas.

Urban Arterial

Urban arterials are major and minor arterials that carry high through traffic volumes. These streets usually have surface transit routes and must provide adequate pedestrian facilities to allow safe and comfortable access and waiting areas for transit users. Urban Arterials generally have more travel lanes and higher speeds than city neighborhood streets. They may have commercial uses but are not as pedestrian friendly as walkable commercial corridors.

Auto-Oriented Commercial/Industrial

These streets are characterized by an auto-oriented development pattern with buildings set back significantly from the street, generally with parking lots in front of commercial uses. Auto-oriented streets generally do not provide a pedestrian-friendly environment and are not likely to attract high levels of pedestrian activity other than at transit stops and individual activity centers.

Park Road

Park Roads provide transportation routes for vehicles and pedestrians within local parks. These streets typically have lower speed limits compared to scenic drives. These streets may include shared-use side paths for pedestrians and bicyclists and/or sidewalks and bike lanes or shared roadway facilities.

Scenic Drive

Scenic drives are major or minor arterials that provide a scenic view along parks or waterways. These streets typically have higher speeds than park roads and local streets. Scenic drives often accommodate pedestrian travel via shared-use paths. Shared-use paths and/or bike lanes or shared roadway facilities may be used to accommodate bicyclists.

City Neighborhood

City neighborhood streets include the majority of the grid streets in older sections of Philadelphia. These streets serve an equally important role for local vehicle and pedestrian traffic. The fronts of buildings on these streets typically meet the street line (edge of sidewalk), unlike low-density residential streets where dwellings are set back from the sidewalk.

Low-Density Residential

Low-density residential streets include most residential streets outside Center City, North Philadelphia, South Philadelphia, and West Philadelphia. These streets were generally constructed more recently than city neighborhood streets and are characterized by dwellings that are set back from the sidewalk. These streets serve local vehicle, pedestrian, and bicycle traffic.

Shared Narrow

These streets are very narrow local streets, primarily located in older areas of the city. Sidewalks also tend to be narrow on these streets, but pedestrians and bicyclists can generally walk and ride comfortably in the street similar to pedestrian priority streets. On-street parking is precluded on streets with cartways of 13 feet or less.

Local

Local streets are streets in residential or non-residential neighborhoods that are smaller than city neighborhood streets and low-density residential streets. This classification includes service streets and minor residential streets. Parking is provided on at least one side of the street, and sidewalks are usually present.

Source: Philadelphia Complete Streets Design Handbook

Truck Network and Complete Streets Type Integration

Each truck network class has different activity types and characteristics, and therefore different treatment needs, when designing for a Complete Street. But within a single class, road characteristics vary too. For example, a primary truck route on an urban arterial street should be treated differently from a primary truck route on a walkable commercial corridor. Integration of truck network classification with the Complete Streets types allows for treatment recommendations to be context sensitive to the street and adjacent land uses. Table 1 outlines the most common combinations of truck network component class and Complete Streets type. While not all Complete Streets types are listed, these are the types that are recommended for consideration during the truck network designation process. While these are the most common and recommended combinations, others may be possible and could be considered in unique situations.

TABLE 1: TRUCK NETWORK CLASS AND COMPLETE STREETS TYPE

TRUCK NETWORK CLASS	COMPLETE STREETS TYPE
LIMITED ACCESS HIGHWAY	N/A
PRIMARY TRUCK ROUTE	Auto-Oriented Commercial/Industrial Urban Arterial Walkable Commercial Corridor Civic/Ceremonial Street
SECONDARY TRUCK ROUTE	Auto-Oriented Commercial/Industrial Urban Arterial Walkable Commercial Corridor High-Volume Pedestrian City Neighborhood Street
LAST-MILE CONNECTOR	Auto-Oriented Commercial/Industrial Urban Arterial

3

Design Considerations

The design considerations in this section leverage the truck network integration with Complete Streets types to supplement those found in the *Philadelphia Complete Streets Design Handbook*.

Recommendations

Understanding the interaction of many different roadway users is critical for selecting appropriate treatments that encourage safe roadway usage and a balance of street functions and space. By integrating the truck network with Complete Streets types, more specific freight recommendations can be made. Consideration of the unique needs of design and control vehicles is especially important on truck routes and allows for a better understanding of the type of freight traffic that can be expected on a given route.

The design considerations outlined in this section are intended to supplement those found in the *Philadelphia Complete Streets Design Handbook*.

Design and Control Vehicles

Traditionally, a design vehicle reflects the largest vehicle assumed to use a given roadway. However, in urban and town center areas with a strong emphasis on creating livable spaces, The National Association of City Transportation Officials (NACTO) recommends that it may be more appropriate to consider a smaller vehicle with smaller turning movements for intersection design where cross streets are not expected to see large amounts of heavy truck traffic.

In this approach, the smaller design vehicle is a frequent user of a given street and must be accommodated without encroachment into opposing traffic lanes. A larger control vehicle is then considered to be an infrequent user and may encroach into opposing lanes or into the street side area as long as there is no median or critical infrastructure present. This design approach, depicted in Figure 1, allows the intersection to be more compact, reducing traffic speeds and making it safer for other road users.

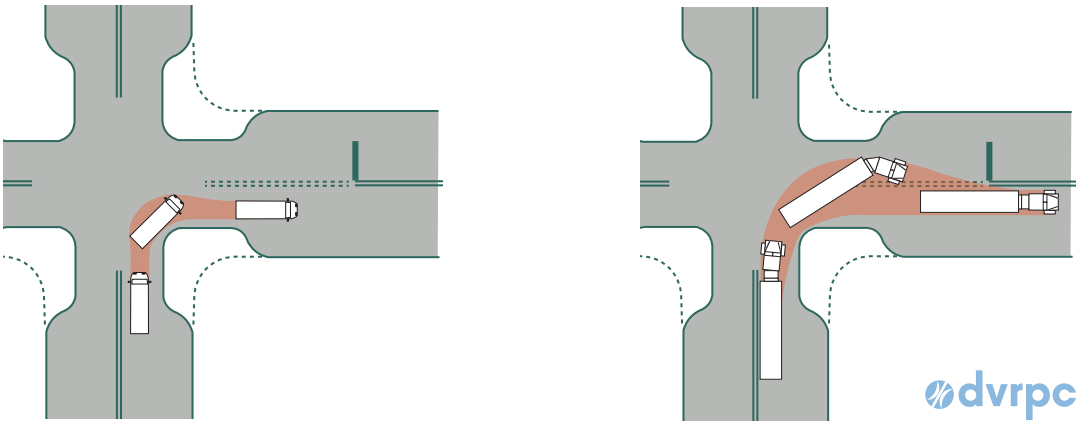
FIGURE 1: DESIGN AND CONTROL VEHICLES

DESIGN VEHICLE

- frequent user of a given street
- dictates the minimum required turning radius
- can turn using one incoming and one receiving lane

CONTROL VEHICLE

- infrequent, larger user of a given street
- road accommodates these vehicles
- can turn using multiple lane spaces



Source: DVRPC and NACTO

Case Study Examples

Seattle and Portland

The City of Seattle was one of the first to recognize the concept of design and control vehicles in their *Freight Master Plan*. They use the terms “design for” and “accommodate for" in their street design process and both have their place to enable safe mobility.

The City of Portland also uses a similar policy that allows for lane encroachment for the occasional larger vehicle, highlighting that the key design elements that need to be considered for the occasional large truck are lane widths and intersection design.

New York State

New York State Energy Research and Development Authority (NYSERDA) also highlights the NACTO design and control vehicles approach in their *Complete Streets Considerations for Freight and Emergency Vehicle Operations in New York City*.

When considering design and control vehicles, this guide highlights that emergency vehicles are often permitted priority use of street space, they can often be considered as control vehicles rather than design vehicles.

Tampa Bay

In Florida, the Tampa Bay region has a *Freight Roadway Design Considerations* guide that also uses design and control vehicles with a context sensitive approach. By assuming a design vehicle of less than WB-67 (vehicle size depicted in Figure 2), comfort for pedestrians is increased, turning speeds can be reduced, and capital costs for pavement can also be reduced. In this guide, five types of design vehicle and control vehicle intersection typologies have been identified and context is provided for when these pairings should be used.

> “Accommodating for a vehicle allows encroachment of other lanes, shoulders, or other elements to complete the required maneuver. Designing for a vehicle does not require encroachment onto those elements. Typically, an intersection turn movement is considered “designed for” if the design vehicle is allowed to encroach on the lane adjacent to the typical receiving lane for the turn movement (right lane for right turns), provided that encroachment is not into opposing traffic."
>
> *City of Seattle Right-of-Way Improvements Manual*

Selecting Design and Control Vehicles

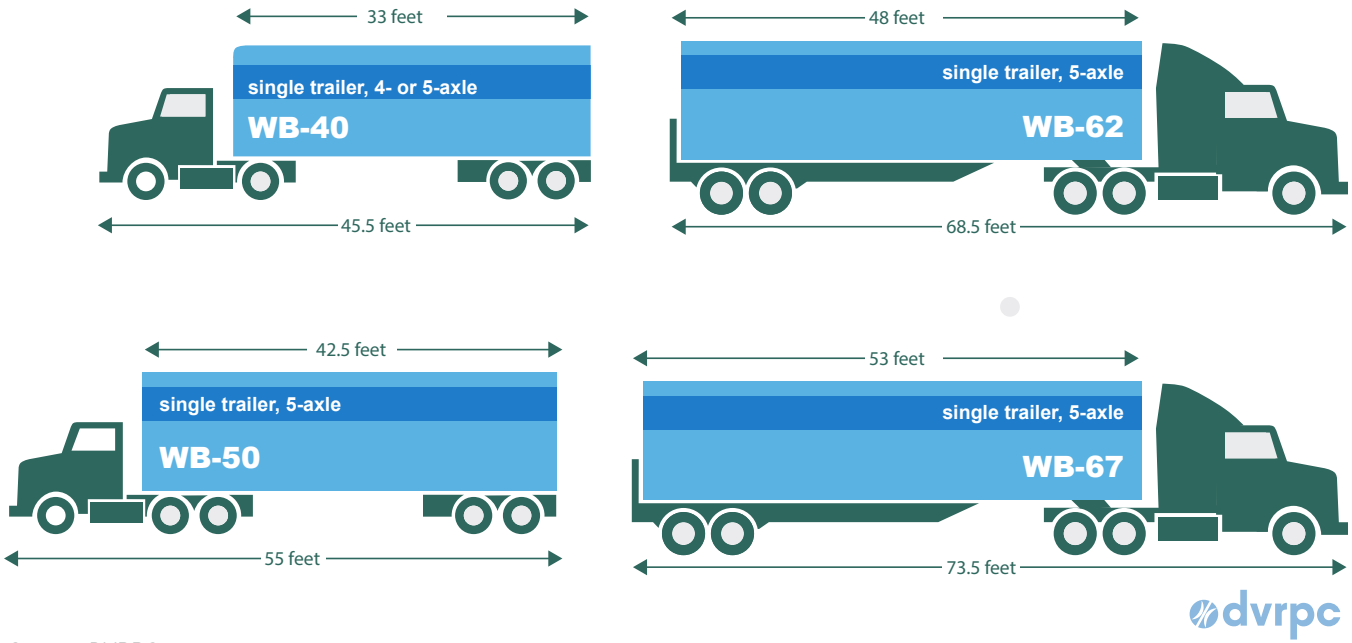
The proposed design and control vehicle sizes in Table 2 were selected using a context sensitive approach, taking into consideration the expected PennDOT functional classification and the Complete Streets type. The design and control vehicle sizes used for specific intersections may vary, and are determined by the Streets Department during the engineering design phase of a project. However, this chart provides a base recommendation for what size trucks need access along certain truck routes and allows planners to understand approximately what size of truck to expect during the planning phases of street and intersection design. Typical truck sizes can be seen in Figure 2.

Proposed Design and Control Vehicle Recommendations

In Philadelphia, we propose including design and control vehicle recommendations for each Freight Class and Complete Streets Class type combination.

Table 2 shows the function of each of these typologies and the proposed design vehicle (DV) and control vehicle (CV) for each.

FIGURE 2: TYPICAL TRUCK DIMENSIONS



Source: DVRPC

TABLE 2: PROPOSED DESIGN AND CONTROL VEHICLE RECOMMENDATIONS

FREIGHT CLASS	COMPLETE STREETS STREET TYPE	FUNCTIONAL CLASSIFICATION (DEFINED IN COMPLETE STREETS HANDBOOK)	TYPICAL LAND USE (DEFINED IN COMPLETE STREETS HANDBOOK)	DESIGN/ CONTROL VEHICLES
LIMITED ACCESS HIGHWAY	N/A			DV: WB-67
PRIMARY TRUCK ROUTE	Auto-Oriented Commercial/ Industrial	Major or Minor Arterial or Collector, others as selected	Automobile services, drive-ins, "big box" retail and shopping centers, industrial.	DV: WB-62
	Urban Arterial	Major or Minor Arterial	Commercial, mixed use, higher-density residential (R10+).	DV: WB-62
	Walkable Commercial Corridor	Major Arterial or Collector	Retail, commercial mixed use, residential, some institutional.	DV: WB-40 CV: WB-62
	Civic/ Ceremonial Street	Major Arterial	High density, governmental, cultural, institutional, and retail.	DV: WB-40 CV: WB-62
SECONDARY TRUCK ROUTE	Auto-Oriented Commercial/ Industrial	Major or Minor Arterial or Collector, others as selected	Automobile services, drive-ins, "big box" retail and shopping centers, industrial.	DV: WB-62
	Urban Arterial	Major or Minor Arterial	Commercial, mixed use, higher-density residential (R10+).	DV: WB-50 CV: WB-62
	Walkable Commercial Corridor	Major Arterial or Collector	Retail, commercial mixed use, residential, some institutional.	DV: WB-40 CV: WB-62
	High-Volume Pedestrian	Major and Minor Arterial	Commercial, mixed use, higher-density residential (R10+)	DV: WB-40 CV: WB-50
	City Neighborhood Street	Minor Arterial or Collector	Commercial, mixed use, higher density residential (R10+).	DV: WB-40 CV: WB-50
LAST MILE CONNECTOR	Auto-Oriented Commercial/ Industrial	Major or Minor Arterial or Collector, others as selected	Automobile services, drive-ins, "big box" retail and shopping centers, industrial.	DV: WB-62 / WB-67
	Urban Arterial	Major or Minor Arterial	Commercial, mixed use, higher-density residential (R10+).	DV: WB-62 / WB-67

Source: DVRPC

Design Considerations

Understanding the interaction of many different roadway users is critical for selecting appropriate treatments that encourage safe roadway usage and a balance of street functions and space. Consideration of the unique needs of design and control vehicles is especially important on truck routes. The design considerations outlined in this section are intended to supplement those found in the *Philadelphia Complete Streets Design Handbook*.

Design Considerations Matrix

Table 3 summarizes the suitability of various design treatments for application along different truck route street types. The treatments correspond with the design treatment matrix outlined in the *Philadelphia Complete Streets Design Handbook* in Table 1- Street Segment Design Matrix and Table 2 – Street Design Matrix with additional treatments added. The Complete Street components that are affected by truck route designation are Building & Furnishing (Section 4.4), Bicycle (Section 4.5), Curbside Management (Section 4.6), Vehicle/ Cartway (Section 4.7), and Intersections & Crossings (Section 4.9). As a part of this report, an additional component, Truck Turning Movement (Section 4.10), has been added. Priority levels are designated for each treatment under these components and are classified into 5 categories identical to those used in the *Philadelphia Complete Streets Design Handbook*. They are the following:

- **Required** – These design treatments must be incorporated into all street improvement projects on designated street types. None of the design considerations listed in this report are indicated as required.
- **High Priority** – These design treatments should be incorporated into all street improvement projects on designated street types if adequate clear sidewalk width can be maintained in compliance with ADA requirements and *Philadelphia Pedestrian and Bicycle Plan* guidelines.
- **Low Priority** – These design treatments should be considered for incorporation into all street improvement projects on designated street types if adequate clear sidewalk width can be maintained in compliance with ADA requirements and *Philadelphia Pedestrian and Bicycle Plan* guidelines. Additional consideration should be given to how the design treatment complements the surrounding context and desired function of the street.

- **Appropriate in Limited Circumstances** – These design treatments may be incorporated into street improvement projects on designated street types in a limited number of circumstances, such as locations near schools, transit stops, trails, or other non-auto-oriented trip generators.
- **Not Recommended** – These design treatments are generally not recommended for use on designated street types due to space constraints, safety concerns, or incompatibility with surrounding uses or the desired function of the street.

TABLE 3: DESIGN CONSIDERATIONS MATRIX

	Primary Truck Routes				Secondary Truck Routes					Last Mile Connector	
Road Design Considerations	Auto-Oriented Commercial/ Industrial	Urban Arterial	Walkable Commercial Corridor	Civic/ Ceremonial Street	Auto-Oriented Commercial/ Industrial	Urban Arterial	Walkable Commercial Corridor	High-Volume Pedestrian	City Neighborhood Street	Auto-Oriented Commercial/ Industrial	Urban Arterial
4.4 Building & Furnishing											
4.4.2 Furnishing Zone Width											
4.5 Bicycle											
4.5.1 Conventional Bike Lane	-	-	-	-	■	■	■	■	■	-	-
4.5.2 Left-Side Bike Lane											
4.5.3 Buffered Bike Lane	■	■	■	■	■	■	■	■	■	■	■
4.5.6 Cycle Track	■	■	■	■	■	■	■	■	■	■	■
5.4.8 Bicycle Friendly Street	-	-	-	-	-	-	-	-	-	-	-
4.5.9 Marked Shared Lane	-	-	-	-	-	-	■	■	■	-	-
4.5.10 Green Colored Pavement	■	■	■	■	■	■	■	■	■	■	■
4.5.11 Bike Route Signs	■	■	■	■	■	■	■	■	■	■	■
4.6 Curbside Management											
4.6.1 On-Street Parking	■	■	■	■	■	■	■	■	■	■	■
4.6.2 In-Street Bicycle Parking	-	■	■	■	-	■	■	■	■	-	■
4.6.3 Lay-By Lanes	-	■	■	■	-	■	■	■	-	-	■
4.6.4 Loading Zones	■	■	■	■	■	■	■	■	■	■	■
4.6.5 Transit Stops	■	■	■	■	■	■	■	■	■	■	■
4.6.6 Alternative Uses of Parking Lanes	-	-	-	-	-	-	■	■	■	-	-
4.7 Vehicle/Cartway											
4.7.1 Lane Width											
4.7.2 Raised Speed Reducers	-	-	■	-	-	-	■	■	■	-	-
4.7.3 Medians	■	■	■	■	■	■	■	■	■	■	■
4.7.4 Chicanes	-	-	■	-	-	-	■	-	■	-	-
4.7.5 Bus Lanes	■	■	■	■	■	■	■	■	-	■	■
4.7.6 Chokers (new)											

■ High Priority

■ Low Priority

■ Appropriate in Limited Circumstances

- Not Recommended

Change from the Philadelphia Complete Streets Handbook Design Matrix

TABLE 3: DESIGN CONSIDERATIONS MATRIX (CONT)

	Primary Truck Routes				Secondary Truck Routes					Last Mile Connector	
Road Design Considerations	Auto-Oriented Commercial/ Industrial	Urban Arterial	Walkable Commercial Corridor	Civic/ Ceremonial Street	Auto-Oriented Commercial/ Industrial	Urban Arterial	Walkable Commercial Corridor	High-Volume Pedestrian	City Neighborhood Street	Auto-Oriented Commercial/ Industrial	Urban Arterial
4.9 Intersections & Crossings											
4.9.1 Marked Crosswalks	■	■	■	■	■	■	■	■	■	■	■
4.9.2 Uncontrolled Crossings											
4.9.3 Curb/corner Radii											
4.9.4 Curb Extensions	■	■	■	■	■	■	■	■	■	■	■
4.9.5 Pedestrian Refuge Islands	■	■	■	■	■	■	■	■	■	■	■
4.9.6 Signal Timing and Operations	■	■	■	■	■	■	■	■	■	■	■
4.9.7 Pedestrian Hybrid Beacon	-	-	-	-	-	-	-	-	-	-	-
4.9.8 Bicycle Signals											
4.9.9 Rectangular Rapid Flashing Beacon											
4.9.10 Bike Boxes	■	■	■	■	■	■	■	■	■	-	-
4.9.11 Raised Crossings	-	-	-	-	-	-	-	-	-	-	-
4.9.12 Two-Stage Left Turn Queue Boxes	■	■	■	■	■	■	■	■	■	■	■
4.9.13 Traffic Diverters	-	-	-	-	-	-	-	-	-	-	-
4.9.14 Neighborhood Traffic Circles	-	-	-	-	-	-	-	-	-	-	-
4.9.15 Roundabouts	■	■	■	■	■	■	■	■	■	■	■
4.10 Truck Turning Movement (New)											
4.10.1 Parking Restrictions at Intersections	■	■	■	■	■	■	■	■	■	■	■
4.10.2 Alternative Median Nose	■	■	■	■	■	■	■	■	■	■	■
4.10.3 Recessed Stop Lines	■	■	■	■	■	■	■	■	■	■	■
4.10.4 Mountable Curbs	-	-	■	■	-	-	■	■	■	■	■
4.10.5 Delineated Conflict Areas	■	■	■	■	■	■	■	■	■	■	■

■ High Priority

■ Low Priority

■ Appropriate in Limited Circumstances

- Not Recommended

Change from the Philadelphia Complete Streets Handbook Design Matrix

Treatment Components

Details of the recommendations made in the matrix are provided below. These are formatted by component and treatment falling into two main categories: Enhanced/Updated Component Title and New Component Title.

Enhanced/Updated Component Title

Enhanced/Updated Treatment Title

The *Philadelphia Complete Streets Design Handbook* component number will be specified to provide reference to existing details. Updated treatments will include:

- Updated/additional considerations
- Specific design components (if appropriate)
- Additional resources

New Component Title

New Treatment Title

New treatments will include details as included in the *Philadelphia Complete Streets Design Handbook*:

- Application
- Considerations
- Design
- Roles & Responsibilities
- Examples
- Resources

4.4 Building & Furnishing

4.4.2 Furnishing Zone Width

Updated/Additional Considerations

- Elements in the furnishing zone should allow sufficient clearance for mirrors on trucks and buses that are in the extreme right lane of a facility, especially if there is not a buffer between the travel lane and the curb. Examples of roadside elements that should be considered include, but are not limited to, signs and sign supports, trees, landscaping items, and power poles.
- Where commercial deliveries are expected or loading zones exist, a reasonable distance should be maintained between the parked commercial vehicle and elements of the furnishing zone. This horizontal clearance zone should be maintained along an expected pedestrian delivery path to allow typical dollies, hand carts, pallet jacks, and other equipment that an operator may use to move goods, to pass unimpeded.
- Roadway obstructions must allow clearance for the expected control vehicle to operate.

Specific Design Components

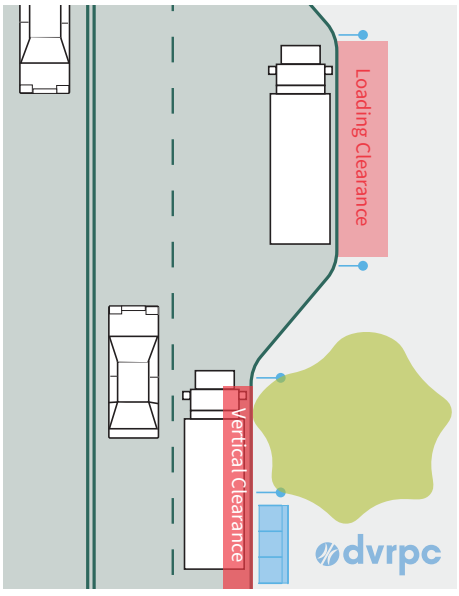
- Guidance on vertical clearance is found summarized in AASHTO's *Geometric Design of Highways and Streets* Table C.4.
- Guidance on horizontal clearance is found summarized in AASHTO's *Geometric Design of Highways and Streets* Table C.3.

Additional Resources

AASHTO Geometric Design of Highways and Streets

FHWA Clear Zone and Horizontal Clearance Guidance

NYSERDA Complete Streets Considerations for Freight and Emergency Vehicles



Vertical clearance should be considered where there is no buffer between the travel lane and the curb, and horizontal clearance should be considered at expected loading zones
Source: DVRPC.

4.5 Bicycle

4.5.1 Conventional Bike Lanes

Conventional Bike Lane

Updated/Additional Considerations

- High volumes of truck traffic degrade adjacent bicycling safety and comfort.
- Offer a dedicated space for cyclists but not a barrier from truck traffic in adjacent lane.
- Provide additional space for effective turning radius of trucks and other large vehicles at the intersection.
- Not recommended on primary truck routes or last-mile connectors due to the high volume of heavy truck traffic. Preference should be given to bicycle facilities that offer more protection/separation from truck facilities.
- Not recommended on truck routes where curbside loading is common as they may eliminate direct curbside access.

Specific Design Components

- Minimum of 6-foot wide bike lanes should be installed on truck routes.

Additional Resources
NACTO Urban Bikeway Design Guide

4.5.3 Buffered Bike Lanes

Buffered Bike Lane

Updated/Additional Considerations

- Recommended on truck routes instead of conventional bike lanes to provide additional horizontal clearance and help to reduce driver blind spot issues.
- Provide additional space for effective turning radius of trucks and other large vehicles at the intersection.

Specific Design Components

- Minimum of 6-foot wide bike lanes should be installed on truck routes.

4.5.6 Cycle Tracks

Updated/Additional Considerations

- Offer separated, dedicated space for cyclists.
- Recommended on wide, high volume truck routes.
- Parking protected cycle tracks may hide cyclists from the view of larger vehicles requiring additional safety consideration or treatments near intersections and driveways.
- Cycle tracks adjacent to loading zones should have adequate buffer to allow for delivery activities without obstruction of the bicycle facility (See 4.6.4 Loading Zones).

Additional Resources

PennDOT Pub 13M

NYSERDA Complete Streets Considerations for Freight and Emergency Vehicles

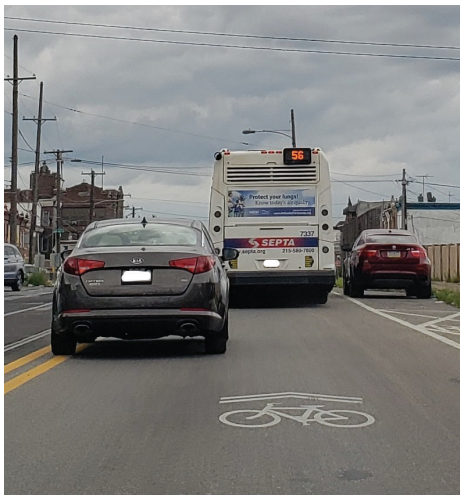
4.5.9 Marked Shared Lanes

Updated/Additional Considerations

- Provides no separation between cyclists and trucks.
- Not recommended that cyclists share a lane with vehicles on designated truck routes unless there are two lanes in the direction of travel.

Specific Design Components

- A lane width of 14 feet for an outside lane is recommended on streets with less than 5 percent heavy truck traffic for optimal accommodation of bicyclists with no bike lane (PennDOT Pub 13M, Table 1.3, Note 1).



Marked Share Lane

4.5.10 Green Colored Pavement

Updated/Additional Considerations

- Green paint can be used as a spot treatment to delineate areas where conflict may occur at an intersection or at high volume generating industrial driveways between cyclists and large vehicle operators.
- For truck routes that are not wide enough to have protected bike lanes, green paint can be used to improve the visibility of the bike facility.

4.6 Curbside Management

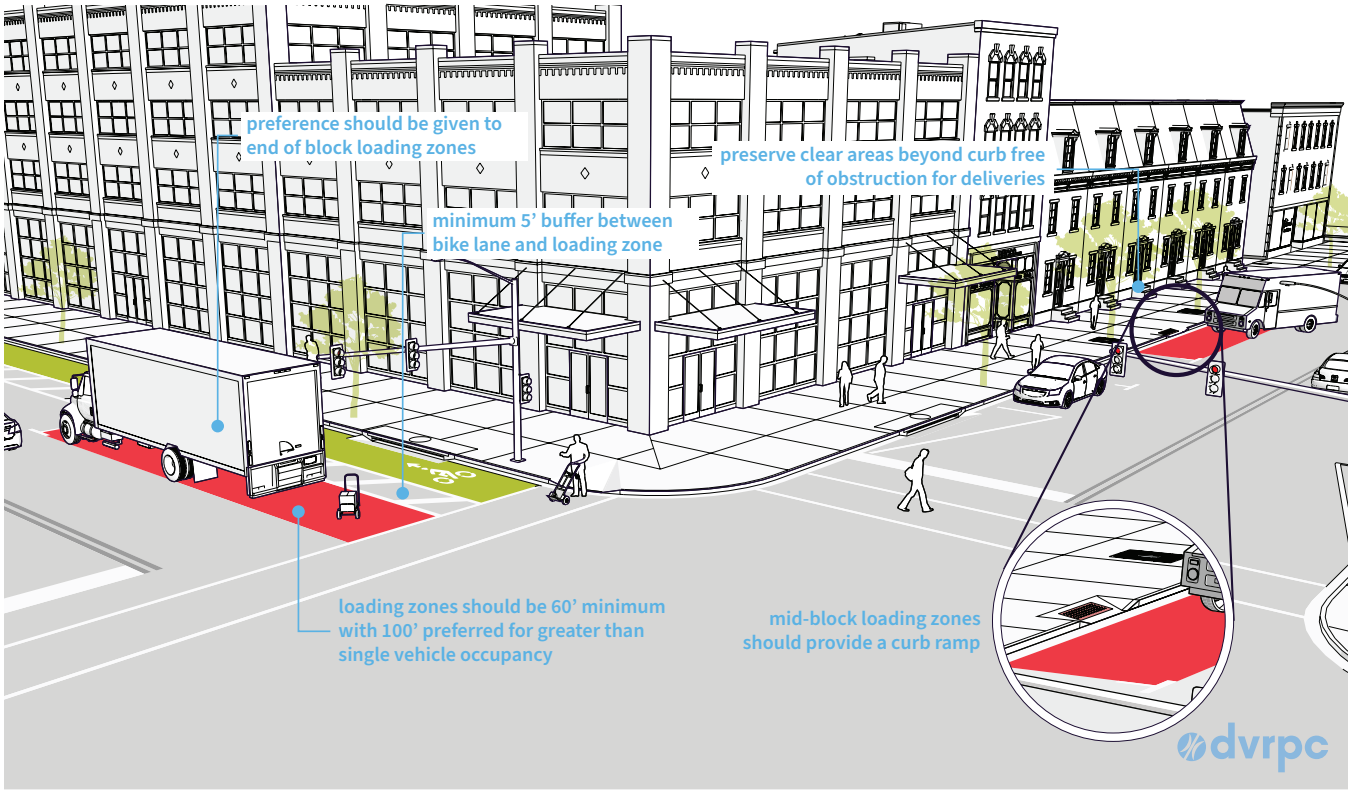
4.6.4 Loading Zones

Updated/Additional Considerations

- Design of loading zones should provide appropriate lane width and access geometry to ensure delivery vehicles can fit into the facility without obstructing adjacent lanes or traversing other modal spaces.
- Consider additional buffer between loading zones and crosswalks or bike lanes to provide load/unload space for delivery drivers without obstructing pedestrian/cyclist flow and prevent risk of injury due to door and gate activities.
- Maintain horizontal clearances in the furnishing zone and provide mid-block curb cuts where appropriate to accommodate movement of deliveries to establishments.

Additional Resources
Developing Design Guidelines for Commercial Vehicle Envelopes on Urban Streets

Complete street design considerations for loading zones
Source: DVRPC



Specific Design Components

- Where possible, locate curbside loading zones at the approach block ends to ease maneuvering into and out of the space.
- For commercial vehicle loading zones, the minimum recommended length is 60 feet.
- For commercial vehicle loading zones, an 8-foot zone width is the minimum with a 9- to 10-foot width preferred to accommodate the full width of the vehicle. Where 8-foot wide zones are utilized, adjacent travel lane width should be provided to allow for vehicle to safely pass stopped commercial vehicles.

4.6.6 Alternative Uses of Parking Lanes

Updated/Additional Considerations

- On blocks where alternative parking lane use is desired, appropriate accommodations for loading should be provided on the same block face to ensure access for commercial deliveries.
- Plantings and furnishings in the parking lane should maintain necessary vertical and horizontal clearance from travel lanes on designated truck routes (See 4.4.2 Furnishing Zone Width).

4.7 Vehicle/Cartway

4.7.1 Lane Width

Updated/Additional Considerations

- A lane width of 11 feet on highly traveled truck routes is acceptable.
- Wider lane widths may be required for cartways with street-faced special generators with oversized loads.

Specific Design Components

- NACTO recommends one travel lane of 11 feet may be used in each direction for designated truck or transit routes.
- PennDOT Pub 13M provides recommendations for lane width and roadside clearance.

Additional Resources

NACTO Urban Street Design Guide

PennDOT Pub 13M

4.7.2 Raised Speed Reducers

Updated/Additional Considerations

- Utilization of raised speed reducers on truck routes is not recommended and can lead to detrimental noise impacts for adjacent communities.
- Speed cushions are the recommended treatment for use on truck and emergency vehicle routes.

Additional Resources

NYSERDA Complete Streets Considerations for Freight and Emergency Vehicles

4.7.3 Medians

Updated/Additional Considerations

- When utilized on primary truck routes, medians should not reduce available lane width below the minimum recommended width for the applicable facility.
- Median islands on truck routes may need mountable curbs or asymmetrical median noses to accommodate larger control vehicles.
- Appropriate consideration should be made for driveway access for large vehicles.

4.7.6 Chokers

Like curb extensions at intersections, chokers are curb extensions into the street that result in a narrower roadway section that are located mid-block. This type of street width reduction narrows the width or perceived width of the travel lane causing motorists to slow in order to maintain an acceptable level of comfort.

Considerations

- Chokers can be created by a pair of curb extensions on either side of the cartway.
- Inclusion of landscaping and other vertical elements is critical for motorist visibility of chokers and will improve the visual impact of the narrowing feature.
- See also considerations for 4.9.4 Curb Extensions.

Design

- Can be located at any spacing desired but a minimum length of 20 feet is recommended.
- Width of choker should be that necessary to fill the parking lane/shoulder offset 1.5 feet from the traffic lane.
- City encourages incorporating stormwater planters (See treatment 4.4.9) into chokers where feasible.

Examples

- The City already uses chokers in locations often referred to as stormwater bumpouts at mid-block locations such as the implementations on W. Queen Lane in East Falls.

Application

Should be considered on routes with large vehicle activity that would preclude the use of horizontal and vertical deflection traffic calming measures.

Chokers can serve as a clear transition point between commercial/industrial areas or other wide streets and residential areas.

Chokers can also be marked as a crosswalk for this treatment. See 4.9.4 Curb Extensions.

Roles & Responsibilities

Chokers are an extension of the sidewalk and, therefore, are the maintenance responsibility of the adjacent property owner.

Streets Department partners with the Water Department to construct stormwater planters in chokers. The adjacent property owner is typically responsible for maintenance.

Additional Resources

ITE Traffic Calming Fact Sheets

FHWA Traffic Calming e-Primer

4.9 Intersection & Crossing

4.9.2 Uncontrolled Crossings

Updated/Additional Considerations

- Crossings not at signaled intersections along truck routes should have additional visibility and safety measures included.
- Curb extensions (Treatment 4.9.4), pedestrian refuge islands (Treatment 4.9.5), Rectangular Rapid Flashing Beacons (RRFBs) (Treatment 4.9.8) are elements that can be used to make uncontrolled crossings safe for truck routes.

4.9.3 Curb/Corner Radii

Additional Resources
NACTO Urban Street Design Guide

Updated/Additional Considerations

- Curb radii should accommodate design vehicles without encroachment into other traffic lanes on designated truck routes.

4.9.4 Curb Extensions

Updated/Additional Considerations

- Painted, striped, or textured curb extensions can be demarcated from the existing roadway without using a physical barrier to accommodate occasional large vehicle turning movements.

4.9.5 Pedestrian Refuge Islands

Updated/Additional Considerations

- Consider the use of an asymmetrical or mountable median nose where medians are extended to provide pedestrian refuge islands on truck routes.
- Provide a safe separation for pedestrians from truck traffic.

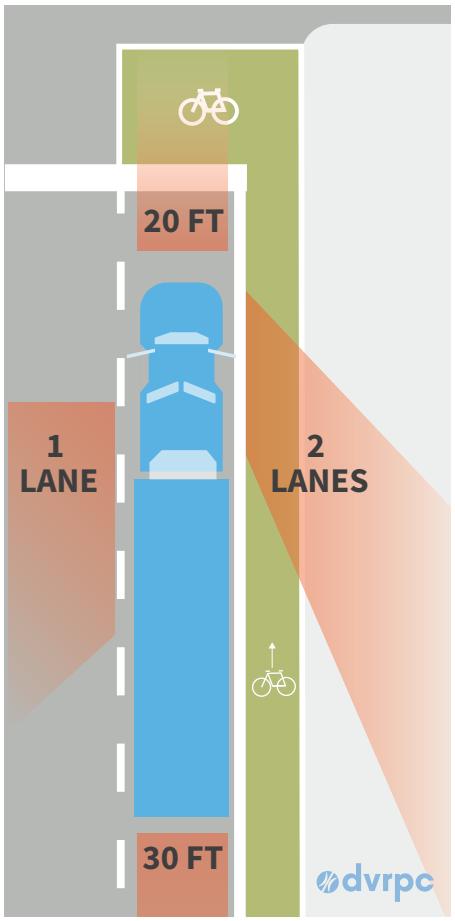
4.9.10 Bike boxes

Updated/Additional Considerations

- Bike boxes on truck routes should ensure that cyclists are not in a driver's blind spot.

Specific Design Components

- The blind spot on a conventional truck cab can be up to 20 feet in front of the truck.



Truck blind spots near bike boxes
Source: Federal Motor Carrier Safety Administration (FMCSA)

4.9.15 Roundabouts

Updated/Additional Considerations

- A mountable curb (or truck apron) should be provided around the center island if roundabouts are used along truck routes.

Specific Design Components

- The PennDOT design standards for mountable curbs are shown on drawing RC-65M in Publication 72M.

Additional Resources
PennDOT Pub 72M

4.10 Truck Turning Movement

4.10.1 Parking Restrictions at Intersections

Restricting parking near intersections can help to provide a clear turning path for freight, transit, and emergency vehicles. Similar restrictions are also effective at mid-block curb cuts to allow trucks to access facility driveways and loading areas without stopping traffic to make a multi-point maneuver. Parking can be regulated near intersections with the use of signs, curb markings, or pavement striping to provide motorists with additional visual reference for parking restrictions. These restrictions and setbacks from driveways and intersections have the added benefit of increasing visibility for both turning trucks and pedestrians, helping to alleviate the potential for conflict.

Considerations

- Restricting parking near intersections can help to provide a clear turning path for freight, transit, and emergency vehicles.
- Similar restrictions are effective at mid-block curb cuts to allow trucks to access facility driveways and loading areas without stopping traffic to make a multi-point maneuver.
- Parking can be regulated near intersections with the use of signs, curb markings, or pavement striping to provide motorists with additional visual reference for parking restrictions.

Application

Should be considered at all intersection corners along a truck route to meet required curb radii for design vehicles.

Narrow intersections where the curb radii may not allow for trucks to turn without encroaching in to oncoming traffic.

At any intersection in order to support emergency vehicles.

Roles & Responsibilities

Streets Department Traffic Engineering Division sets curbside rules.

Streets Department installs and maintains striping for on-street parking.

Streets Department Traffic Engineering Division to maintain signage and lane marking.

The Philadelphia Parking Authority regulates the use of on-street parking and permits loading zones.

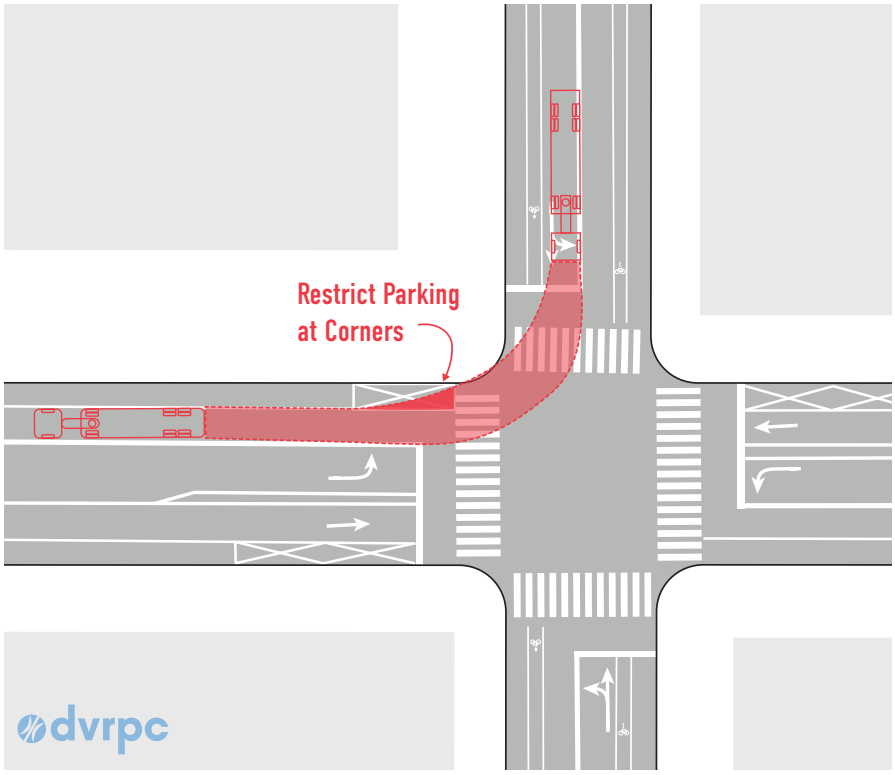
Design

- Section 3353 of the Pennsylvania Vehicle Code (Title 75) and Section 12-913 of the Philadelphia Code requires by law that parking is restricted 30 feet upon the approach to any flashing signal, stop sign, yield sign, or traffic control signal.
- In accordance with PennDOT Publication 212, Section 212.5, local authorities may install, revise, or remove curb markings on state-designated highways, and PennDOT approval is not required.
- PennDOT Standard sign "No Parking Symbol/Arrow Sign" (R7-302) is recommended to prohibit parking near the corner of an intersection.
- The *Manual on Uniform Traffic Control Devices* (MUTCD) standards allow the use of colored curb markings to supplement standard signs for parking regulation. Yellow is used to indicate "No Parking" and vehicles can stop long enough to load or unload passengers. Red indicates "No Parking" and fire lanes.
- Length of prohibited parking will vary based on design.

Additional Resources

PennDOT LTAP Technical Sheet 155

PennDOT Pub 236



Restricted parking at intersections helps to provide trucks with a clear turning path while having the added benefit of increasing visibility for both trucks and pedestrians
Source: DVRPC

4.10.2 Alternative Median Nose

On wide streets where there are pedestrian crossings, it may be beneficial to extend the median to meet the crosswalk and provide a pedestrian refuge space. This extended median however, does not always accommodate large vehicle turning movements. Alternative median nose treatments allow for large turning vehicles to make left turns while also providing a pedestrian island for safe crossing on wide streets.

Considerations

- An asymmetrical median nose is an angled geometry at the end of the median.
- Use of an asymmetric median nose, mountable curb at the median, or painted median provides extended median for protected pedestrian refuge while providing adequate turning radius for control vehicles.
- Use of an asymmetric median nose may provide reduced space for pedestrian waiting which could be problematic in areas with high pedestrian volume.
- See Pedestrian Refuge Island (Treatment 4.9.5) for considerations about pedestrian safety.

Design

- PennDOT recommends the use of AASHTO standards. Medians must be a minimum of 6 feet wide to allow for a pedestrian refuge area.

Application
Should be considered at intersections along a truck route with existing medians.

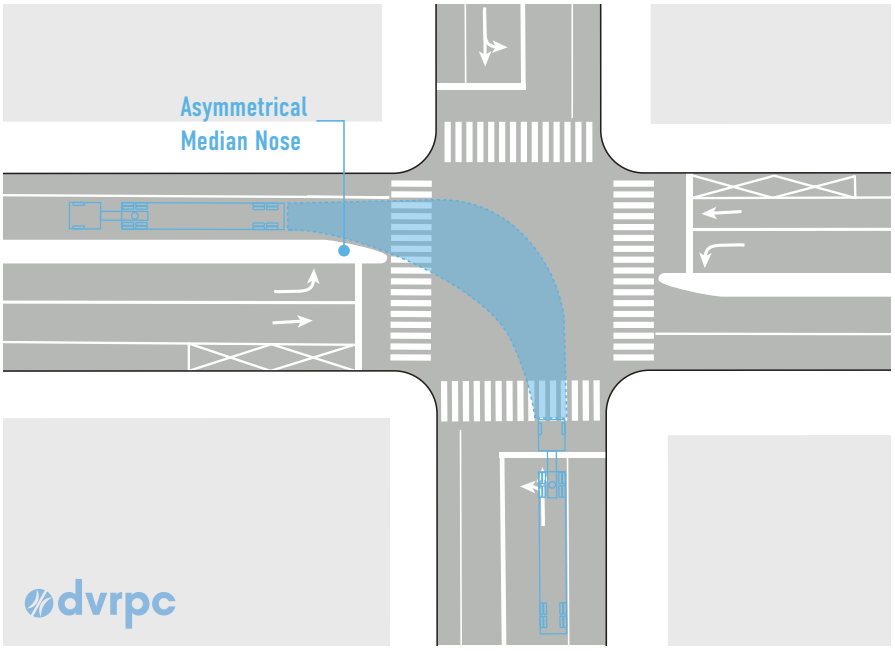
Wide intersections with significant pedestrian traffic.

Roles & Responsibilities
Streets Department installs and maintains pedestrian islands and medians.

PennDOT is involved on state routes.

Additional Resources
NYSERDA Complete Streets Considerations for Freight and Emergency Vehicles

Chester County Planning Commission Roadway Design Standards



Alternative median nose designs can provide a refuge for pedestrians crossing the road while still allowing for adequate turning radii for control vehicles.
Source: DVRPC

4.10.3 Recessed Stop Lines

Recessed stop lines are stop lines that are set back from the intersection to provide additional space for large vehicles to encroach into an oncoming lane while making a wide turn. They can be utilized where larger vehicles face challenging turn geometries at tight intersections, especially when turning from curbside lane to curbside lane.

Considerations

- Provides adequate turning radius for a control vehicle, accounting for the inner and rear sweep paths.
- Prevents encroachment into oncoming traffic for vehicles turning from curbside lane to curbside lane.
- Prevents vehicles from entering pedestrian space by encroaching on curb space while turning.
- Proper consideration should be given to intersection capacity when utilizing this treatment as it will reduce queuing capacity on the receiving approach.

Design

- An advance stop bar can be applied with "STOP" stencil, as well as "Stop Here" sign (R1-5b).
- For stop bars that are more than 20 feet from the intersection, "Stop Here on Red" signage (MUTCD R10-6) and "STOP" pavement markers may be required. (Philadelphia Code, Parking Regulations and Penalties, §12-913)

Application

Intersections on two-lane truck routes.

Intersections along bus routes where bus makes right turn.

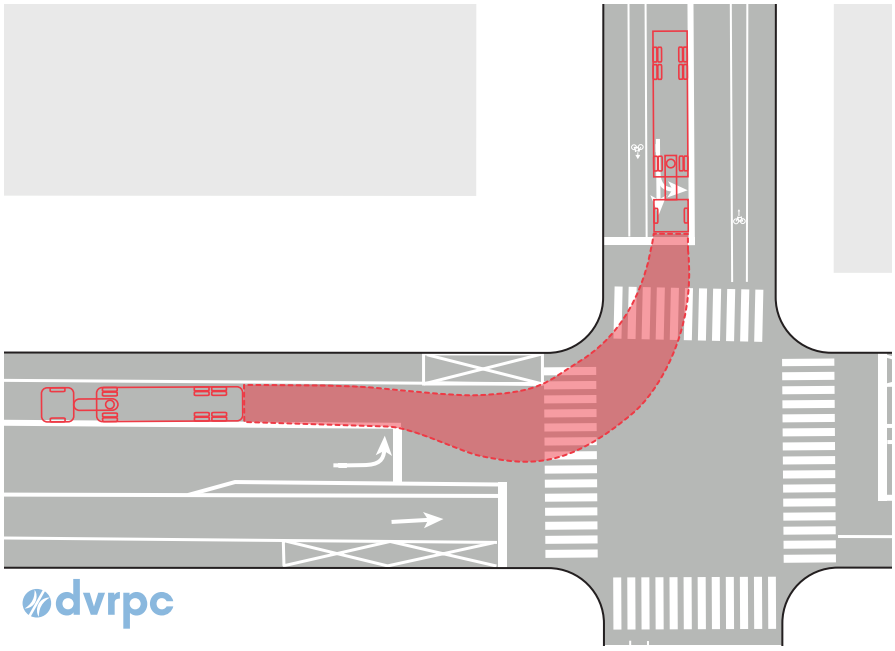
Roles & Responsibilities

Streets Department Traffic Engineering Division marks and maintains stop bars.

Additional Resources

NACTO Transit Street Design Guide

MUTCD



Recessed stop lines can provide an adequate turning radius for trucks while allowing for a more compact intersection design.
Source: DVRPC

4.10.4 Mountable Curbs

Unlike vertical curbs that are typically four to six inches tall, mountable curbs are less than six inches tall and are rounded or sloped to provide flexible entry for larger vehicles moving at a slow speed.

Considerations

- Can be used when a small curb radius is desired to maintain safe speeds for design vehicles, but a larger effective curb radius is needed for infrequently expected, larger control vehicles (trucks, transit, or emergency vehicles).
- Mountable curbs can be delineated with color or paving treatments that both prohibit cars from entering and alert pedestrians to look for encroaching vehicles.

Design

- The PennDOT design standard for mountable curbs are shown in drawing RC-65M in Publication 72M.
- Specified in Standard Drawings in Section 501.3 and in Section 630.3.

Application

At intersections along more narrow truck routes to allow for control vehicle turning movements.

Additional Resources

NACTO Transit Street Design Guide

Roles & Responsibilities

Streets Department determines appropriate curb radii on city streets.

Adjacent property owners are responsible for maintenance of curbs.

Streets Department Traffic Engineering Division sets curbside rules.

Streets Department partners with the Water Department to construct stormwater curb extensions. The adjacent property owner is typically responsible for maintenance.

4.10.5 Delineated Conflict Zones

Paint, pavement texture, striping, and bollards can be used to delineate conflict areas between pedestrians and vehicle operators and between cyclists and vehicle operators, bringing the potential danger to the attention of all road users.

Considerations

- Green paint can be used as a spot treatment to delineate areas where conflict may occur at the intersection between cyclists and large vehicle operators or at high volume generating industrial driveways.
- Texture, paint, or bollards can be used to delineate sections of the sidewalk where freight vehicles may access street facing loading docks, driveways, or alleys.
- Texture, paint, or bollards can be used to delineate pedestrian crossing at mid-block curb cuts for loading activity.

Design

- Compliance with ADA requirements and potential misuse by visually impaired users should be explicitly considered in any implementation.

Application

Appropriate at intersections with high pedestrian and bicycle volume along truck routes.

High pedestrian areas with street facing loading.

Streets where bike lane is adjacent to commercial buildings with street facing loading.

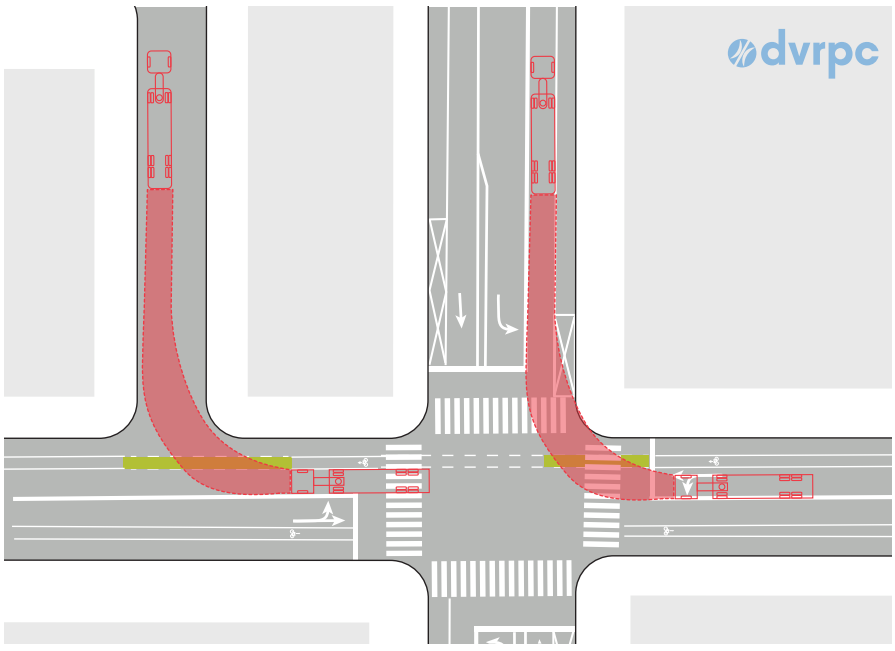
At mid-block curb cuts to alert cyclists of potential delivery activity.

Roles & Responsibilities

Property owners are responsible for the maintenance and repair of sidewalks and curbs that abut their property.

Streets Department may grade, pave, or repair sidewalks and set curbs on any public street in the city, but may only assess abutting property owners 30 percent of the cost of the work.

Sidewalks are generally improved through targeted streetscape projects. There is currently no dedicated capital funding for sidewalk repair (except in Dept. of Parks and Recreation).



Delineated zones can be used to highlight conflict areas between various road users, both at intersections and mid-block driveways.
Source DVRPC

4

Communication

Outreach and communication are critical to implementing the truck network and applying street design strategies that consider goods movement.

To effectively integrate goods movement strategies into street network design, the City will need to designate a truck network and identify strategies for incorporating this design guidance into already existing processes and policies.

The truck network designation will require comprehensive outreach to identify community activity and concerns and offer an opportunity to discuss the benefits of planning for goods movement. After adoption, the designated network can be communicated to stakeholders through maps and incorporated into planning processes that address transportation, land use, and development. Where necessary, wayfinding and signage can be used to communicate preferred routes to drivers.

Applying the truck network into street design guidance will require that the strategies from this guidebook are incorporated into city code, policies, project development and review processes, and the existing Complete Streets checklist.

Outreach and Education

The comprehensive outreach needed to designate a citywide truck network is also an important opportunity to start the goods movement conversation with stakeholders that may include residents, city planners and engineers, and freight businesses. While the purpose of outreach during the review and adoption phase of the designation process is to better understand activity on potential freight corridors, hear the needs and concerns of the community, and to discuss options for truck routes and restrictions, it is also an opportunity to bring stakeholders together to better understand each other's roles and contributions to the community.

After adoption, education about the truck network is critical for implementation and can be done through meetings, maps, explanatory materials, and signage plans. This is an opportunity to share with the public the benefits of considering goods movement in street design and the ability to further protect vulnerable road users, but it is also an opportunity to educate industrial partners about appropriate routes, community needs, and good neighbor best practices.

Signage and Wayfinding

Where appropriate, wayfinding signage can be used to communicate preferred truck routes to drivers. Since the truck network designation is intended primarily for planning purposes, not all truck network components will need to be signed. It can be beneficial to sign certain routes where there is known confusion or deviation from preferred routes.

Review Location of Existing Signage

Advanced communication of preferred and alternate routes, as well as restrictions, is an essential part of establishing a usable truck wayfinding system. Existing signage restricts trucks on some local streets and on other streets provides direction of routes and alternate routes. However, when signage is located after the appropriate decision point, it can lead drivers to commit to a route they should not be on or sends them looking for alternatives on streets that are not appropriate for large trucks. To address these issues, the location of signage should be carefully reviewed.

Signing New Truck Routes

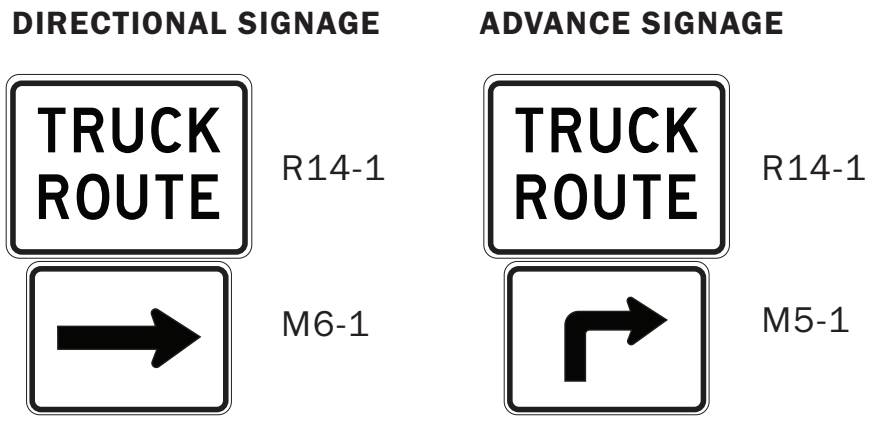
The designation of a truck network is the first step in developing a functional signage plan. Utilizing these designated routes, the City should undertake a plan to install and maintain a series of truck route wayfinding and restriction signs that support the preferred routes identified and supported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

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 4 and displayed in Figure 3.

In addition to the truck route signage, the signage plan should consider utilizing a "TO Marker" sign (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.

FIGURE 3: TRUCK ROUTE SIGN CONFIGURATION



Source: DVRPC

Truck Restriction Signage

Similar to the application for truck route signs, restriction signage should also be incorporated into a signage plan. It is important to consider the location of restriction 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 5.

TABLE 4: 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.
ON-ROUTE	Truck route sign (R14-1) reassuring driver that they are on a truck route.	All truck routes. One-half-mile increments.

TABLE 5: TRUCK RESTRICTION 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.

Philadelphia Truck Network and Complete Streets Integration Guidebook

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ABSTRACT: The *Philadelphia Truck Network and Complete Streets Integration Guidebook* is intended to complement the existing *Philadelphia Complete Streets Design Handbook* by highlighting consideration of freight in complete streets design to enhance the quality of life for residents and reduce the possibility of conflict between trucks and other road users. This guidebook seeks to provide the tools and resources necessary for the City to implement a truck route network that coincides with a Complete Streets policy that considers urban freight activity for a sustainable and more seamless integration of commerce and livability. This guidebook includes an introduction, truck route designation, complete streets integration, design considerations, and communication section to ensure communities in Philadelphia can enjoy the benefits of vibrant and multimodal streets.

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