



SEPTEMBER 2021

Trenton [COMPLETE STREETS DESIGN] Handbook





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What are Complete Streets?

Many cities, including Trenton, have recognized the importance of safe streets for all those who use them. Complete Streets are designed to accommodate the safe movement of all road users, including pedestrians, bicyclists, transit riders, and motorists, regardless of their age and ability. In Trenton, many trips are taken by foot, bicycle or transit and those people benefit from elements of Complete Streets like: sidewalks and crosswalks, bike lanes, bus lanes and shelters, and traffic calming.

What is the Trenton Complete Streets Handbook?

This handbook provides specific and general recommendations for building Complete Streets in Trenton, based on existing and desired roadway features. It sets forth best practices by categorizing every street in Trenton and describing and illustrating possible improvements for pedestrians, bicyclists, transit users, and motorists for each street type. Not every street will be able to incorporate every element described in the handbook, so the elements are prioritized into required and recommended elements.

How do I use the Handbook?

Users of this handbook can identify design recommendations that ensure a project is consistent with Complete Streets principles. The first step to using the handbook is to identify the relevant street category, or typology. Every street segment in Trenton is assigned one of eleven typologies, based on general characteristics like if the road is in a quiet neighborhood or a busy commercial district.

In addition to the street typology, many locations in the city are also subject to an overlay, which are areas of the city with special design considerations. For example, there are overlays for areas of the city that are near to schools and parks, to ensure that those streets are made safe for children.

The typology and overlays will dictate the design recommendations, but not every element pictured will be appropriate for every street. The images show many possible elements to consider, but only some are required everywhere. The “Table of Design Elements by Project Type” offers additional guidance on what to consider based on the type of project. For instance, a road repaving project will be focused on the roadway and may not include sidewalk considerations, unless the project team wishes to expand the scope of the project. The project type consideration helps to “right-size” the Complete Streets guidance in the handbook for the size of the proposed project.

With the typology, overlay (if any), and project type in hand, the user of this handbook can identify relevant design recommendations that ensure a project is consistent with Complete Streets principles.

Introduction

INTRODUCTION

What are Complete Streets and Why Does Trenton Need Them?

Many cities, including Trenton, have recognized the importance of safe streets for all those who use them. Complete Streets are designed to accommodate the safe movement of all road users, including pedestrians, bicyclists, transit riders, and motorists, regardless of their age and ability. Complete Streets aims to address historical imbalances in the planning and provision of infrastructure between drivers of vehicles and all other road users. In Trenton this is especially important since many residents do not own cars. According to the 2018 American Community Survey, one third of Trenton households have no vehicles and 40 percent of households only have one vehicle available to them. This means many trips are taken by foot, bicycle, or transit and those residents and visitors benefit from elements of Complete Streets like sidewalks and crosswalks, bike lanes, bus lanes and shelters, and traffic calming.

Complete Streets policies and design philosophies place safety at the forefront and crash data from Trenton shows how needed this is. Between 2008 and 2018, 64 people died in car crashes on Trenton's roadways. Of these, 32, or 50 percent, were people walking and biking, despite only 4 percent of Trenton residents walking or biking to work, according to 2012–2016 American Community Survey estimates, indicating the need for infrastructure that better protects pedestrians and people biking.

Strong Complete Streets policies that lead to streets designed to support walking and biking are also economically beneficial. According to the 2016 Urban Land Institute report, *Active Transportation and Real Estate: The Next Frontier*, bike lanes have been shown to benefit cities by helping companies attract skilled workers, increasing retail sales, making workers more productive and healthier, and helping neighborhoods attract redevelopment without needing major transportation investments like new transit stations or lines.

To begin to work toward these safety and economic improvements, the City of Trenton adopted a Complete Streets resolution in 2012, committing the City to build a “comprehensive, integrated, connected street network that accommodates all road users.” The *Trenton250* master plan, adopted in 2016, identifies many initiatives related to Complete Streets in Trenton and one of the guiding principles of the entire plan is to “build a safe city,” of which a multi-modal transportation system is a part. Trails, sidewalks, in-road bicycle networks, and transit routes and stops will allow people and goods to move efficiently through the city.

Handbook Purpose: describe and illustrate the appropriate infrastructure for pedestrians, bicyclists, transit users, and motorists for each type of street in Trenton.



The Circulation Report of the Trenton250 plan

Source: DVRPC, 2019

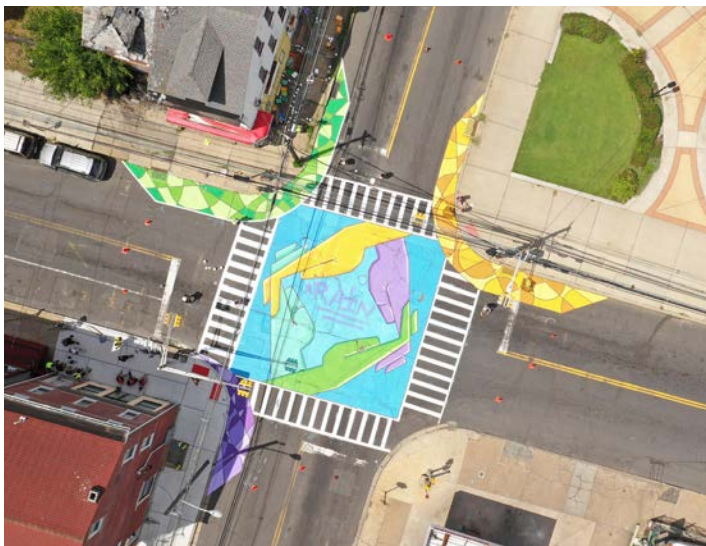
In 2018 in Trenton, 9 people were killed in crashes; 5 were pedestrians and 1 was a bicyclist



Downtown Trenton Bicycle & Pedestrian Plan Cover Source: DVRPC, 2019

Finished in 2016, the *Downtown Trenton Bicycle and Pedestrian Plan* examined existing facilities for pedestrians and bicyclists, including trails, in the downtown area and made a number of recommendations related to infrastructure and complementary policies (a map of the main plan bicycle recommendations is shown in Appendix A-3). In 2018, the Voorhees Transportation Center at Rutgers University published *Complete Streets in Trenton: Existing Conditions Analysis*, a study commissioned by the Trenton Health Team. The basis of that project was an intensive audit of existing conditions along seven transportation corridors in Trenton. Elements like crosswalks, curb ramps, and sidewalk presence and condition were documented in detail.

The Trenton Health Team (THT) has been instrumental in advancing Complete Streets in Trenton and remains one of the important partners for the City of Trenton. As an ongoing project, the THT has been working on creating a “safe and healthy corridor” along Brunswick Avenue. A recent high profile part of this work was a tactical urbanism project where THT partnered with the City of Trenton to design and build two Complete Streets demonstration projects. One of the demonstration intersections is shown in the bottom left photo. The Trenton Health Team, along with the Tri-State Transportation Campaign, convene a Complete Streets Advisory Committee and working group that includes other local stakeholders whose work includes aspects of Complete Streets in Trenton.



Overhead view of THT-led improvements on Brunswick Avenue Source: THT

As Complete Streets policies have grown and evolved, many have included or added considerations for green stormwater infrastructure (GSI). Green stormwater infrastructure handles stormwater with features like rain gardens and tree trenches, instead of traditional “gray” infrastructure that includes gutters, sewers, and retention basins, etc. GSI elements can be placed in the public right-of-way or street and it is therefore useful to include it in Complete Streets guidelines. And like the transportation infrastructure components of Complete Streets, GSI has many community and economic benefits. By planning and budgeting for the addition of GSI features to Trenton streets, the city has the potential to improve public health, diminish the costs and impacts of flooding events, and reduce overall infrastructure costs, according to *Banking on Green*, a 2012 joint report from American Rivers, the Water Environment Federation, the American Society of Landscape Architects, and ECONorthwest.

Project Purpose and References

This handbook builds on previous studies and seeks to provide guidance on how to put the city's Complete Streets resolution into practice by providing specific and general recommendations for streets in Trenton, based on their existing and desired characteristics. This document sets forth best practices by establishing and applying street typologies or categories to each street in Trenton and describing and illustrating the appropriate infrastructure for pedestrians, bicyclists, transit users, and motorists for each of those street types.

The guidance is a compilation of standards and best practices from a number of reference documents that were then tailored to Trenton. The typology and overlay organizational framework was also influenced by these other guides. The 2017 *New Jersey Complete Streets Design Guide* defines eight street typologies and this was one set of reference street types that was used as a starting point for this report. Most recently, the New Jersey Department of Transportation (NJDOT) published *Complete and Green Streets for All* that informed some of the implementation recommendations and provided updated Complete Streets review checklists.

Design guides from other cities were helpful resources since they describe similar historic urban places. These included the *City of New Haven Complete Streets Design Manual*, the *Boston Complete Streets Design Guidelines* and the *Cleveland Complete and Green Streets Typologies Plan*. Finally, the National Association of City Transportation Officials' (NACTO) *Urban Bikeway Design Guide* and *Urban Street Design Guide* document the state of the practice standards for many important elements of Complete Streets.

How to Use the Handbook

The Trenton Complete Streets Handbook is designed to help determine the appropriate elements to include in right-of-way projects in three basic steps. These steps are listed below and then explained in detail.

1. Using typology map, identify typology of the street
2. Using overlay map, identify applicable overlay(s), if any
3. Based on project type, identify design elements that must be considered

city of new haven COMPLETE STREETS DESIGN MANUAL

Adopted September 7, 2010



New Haven manual that was used as a reference Source: City of New Haven

Users of this handbook can identify design recommendations that ensure a project is consistent with Complete Streets principles.



The Complete and Green Streets for All guide was another helpful reference

Source: NJDOT, 2019

The first step to using the handbook is to identify the relevant typology for a given project. Every street segment in Trenton is assigned one of the 11 typologies. Some streets don't have the same typology for their entire length, switching due to changes in land use or estimated vehicular volumes, so it is important to ensure that the correct typology has been identified for the particular block(s) in question for the project. Maps are provided in the Appendix of this document, to aid with identifying the relevant typology for the project location.

In addition to the street typology, many locations in the city are also subject to an overlay, which adds to the design considerations at a given location. The detailed maps in the Appendix should be consulted to identify what, if any, overlays are relevant to the location.

The typology and overlay will dictate the design recommendations. The typology and overlay information can be found in their corresponding chapters of the handbook. More details on each design element included in the typology and overlay "Design Considerations" can be found in the "Complete Streets Design Elements Guide" chapter. For projects with a downtown typology, specific bicycle facility recommendations, developed in the *Downtown Trenton Bicycle and Pedestrian Plan*, are shown in maps in the Appendix. Finally, a master table of requirements for all design elements included in the "Complete Streets Design Elements Guide" chapter is in the Appendix. Guidance in the typology and overlay sections has been condensed to show the most relevant and necessary information for easier use.

The "Implementation" chapter also includes the "Table of elements to be considered in each project type," which offers guidance on which design elements should be considered by the type of project. For instance, a mill and pave project will be focused on the roadway and should not necessarily include sidewalk considerations, unless the project team wishes to expand the scope of the project. The project type consideration helps to "right-size" the Complete Streets guidance in the handbook for the size of the proposed project.

With the typology, overlay (if any), and project type in hand, the user of this handbook can identify relevant design recommendations that ensure a project is consistent with Complete Streets principles.

Typologies

Overview

Eleven typologies were developed to help guide Complete Streets design decisions for streets in Trenton. These Complete Streets Typologies serve a similar purpose to functional classification by divvying roads into logical categories, but rather than focus on the road's function within just the motorized transportation network as the functional classification does, these typologies take a holistic view of roads in Trenton and consider the wide variety of roles and functions that streets can play in urban life.

The 11 typologies developed for this guide are listed in the table below. These typologies are based on several key factors, including the adjacent land use, the density of surrounding

development, the estimated traffic volume on the road, and whether or not the road is located downtown. A full methodology is provided in the following section, "Typology Development."

The typologies are mapped together in Figure 1. Limited access facilities are also mapped in Figure 1, but these are not considered a Complete Streets typology since, by definition, they are open exclusively to motorized vehicles. Maps of subsections of the city, including all the street names, are provided in the Appendix.

This chapter provides details on each of the Complete Streets

Typology	Land Use	Density	Approx. Avg. Daily Vehicle Traffic	Downtown
Dense Residential	Residential	Above Average	1,500	No
Single-Family Residential	Residential	Below Average	1,000	No
Commercial Corridor	Commercial	Variable	7,000	No
Connector Corridor	Variable	Variable	5,000	No
Downtown Commercial Corridor	Commercial	Above Average	4,700	Yes
Downtown Connector Corridor	Variable	Above Average	4,500	Yes
Downtown Minor	Office, Commercial	Above Average	2,500	Yes
Neighborhood Mixed Use	Variable	Variable	3,000	No
Industrial Access	Industrial	Variable	2,300	No
Park	Park	Below Average	Very Low	No
Alley	Residential	Variable	Very Low	No

Source: DVRPC, 2020

Typologies, including an overview of how an ideal street in this typology could be designed. For each typology, a cross-section of a possible street configuration is provided. In addition, a table of design elements indicates what features should be included to ensure the design is compliant with Complete Streets principles. The guidelines developed here take into account issues like the types of people that this typology is likely to primarily serve—whether they're motorists, pedestrians, children, office workers, etc. They also provide guidance on the types of amenities that are most relevant and the types of traffic calming strategies that are likely to be appropriate in locations where speeding or other hazardous

driving behaviors are present. They also point out unique considerations that should be at the front of mind when designing a road in each typology.

Not every road will be able to incorporate every recommendation listed under their typology. This guide provides a starting point, however, for making context-sensitive design choices that further Trenton's Complete Streets implementation goals.

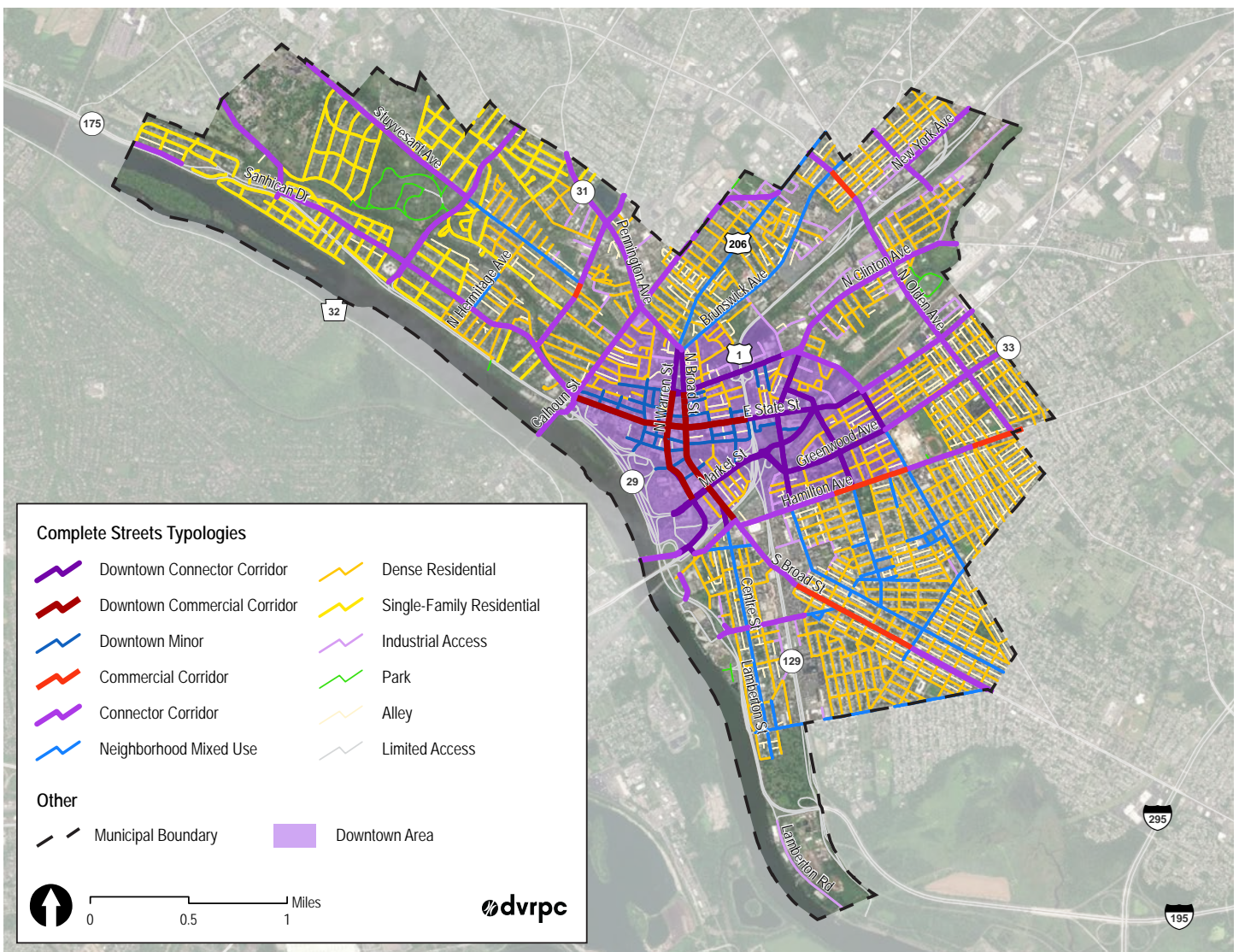


Figure 1 Trenton Complete Streets Typologies

Source: DVRPC, 2021; Aerial Imagery: Esri

Typology Development

To make appropriate recommendations, street typologies needed to be developed and applied to each street segment in Trenton. Typologies are a standard element of many Complete Streets guides. Typologies are useful because they can be tailored to the unique characteristics of Trenton and used to group similar streets across the city into categories that can communicate the best design guidelines to ensure compliance with the Complete Streets policy.

Typology development and assignment was done by analyzing the characteristics of the city that impact street activity: modes of transportation, land use, density of uses, the downtown area, daily vehicle traffic volumes, and bus routes.

Land use is reflective of the types of activities in an area, which in turn indicates the way that a street is used. For example, commercial streets with stores benefit from a frontage zone in the sidewalk, which serves as a buffer between shop entrances and the pedestrian zone that should always be clear from obstructions. Figure 2 maps the land use categories used to determine the Complete Streets Typologies.

People Density is determined by the number of people living and working by Census block. It indicates if the population density is higher or lower than the citywide average. This metric provides a sense of how many people are living and working along a given street. This is important to understand

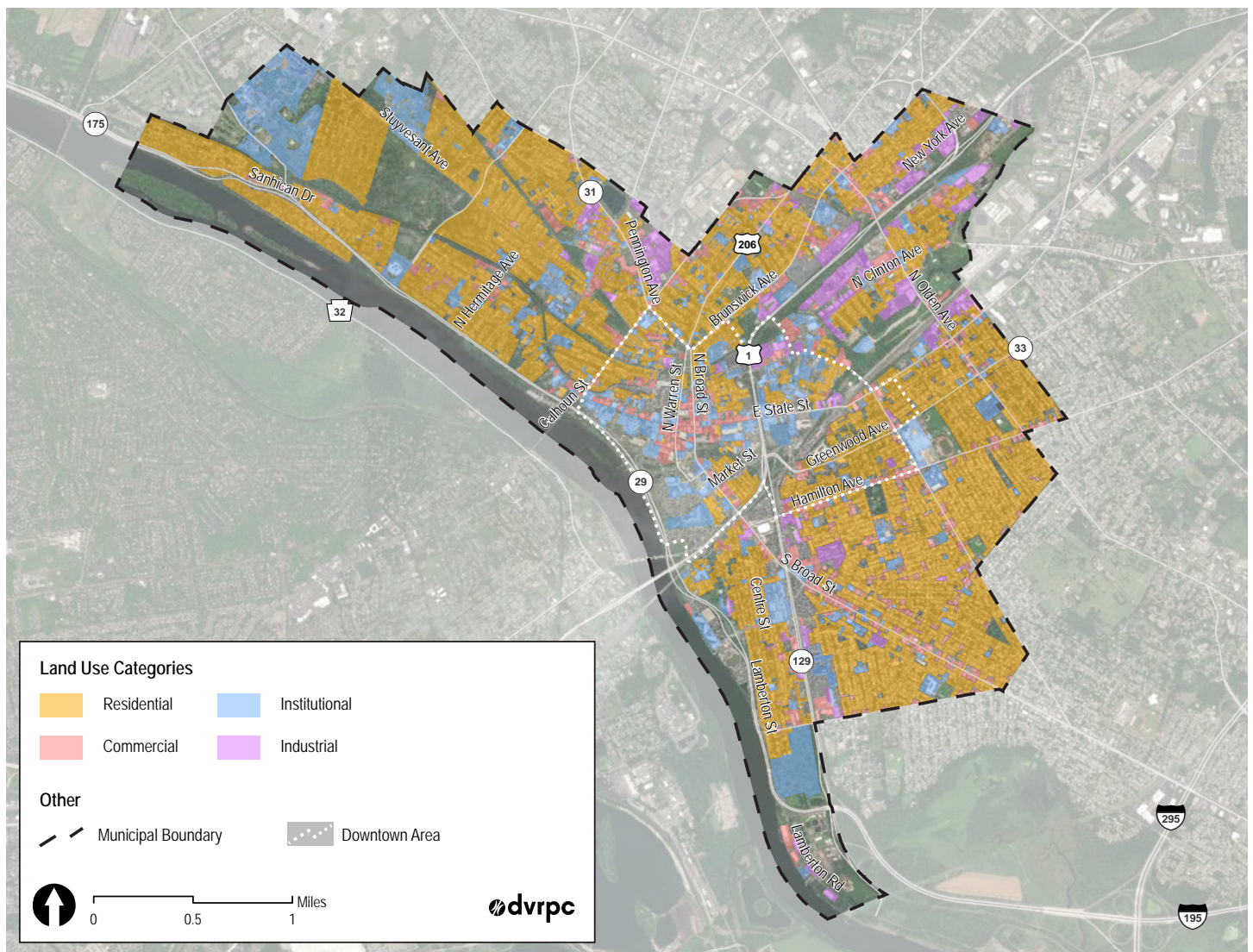


Figure 2 Land use

Data Source: DVRPC, 2015; Aerial Imagery: Esri

so that appropriate capacity is provided for different modes. For example, if a street is densely populated with residents and workers, then extra consideration for how they travel should be made, including accommodations for people that drive, bike, or take public transit. Figure 3 maps the people density across Trenton used to determine the Complete Streets Typologies.

The downtown boundary identifies streets that are in the active central business district of Trenton. These streets are generally high density, with a diverse group of workers and residents who use a wide range of transportation options. Each mode generally needs to be able to handle high capacity in this area, with more people using transit and more people walking.

Downtown Trenton also has unique aesthetic considerations. The main arterial streets should have elements like paired streetlights, brick accents on the sidewalks, and granite curbs that highlight their importance as the most traveled streets in the city and where people from across the city and area convene.

Estimated annual average daily traffic (AADT) reveals the number of cars traveling on a street segment each day. This informs recommendations that accommodate higher traffic volumes while also creating a safe environment. For example, many traffic calming strategies are limited to roads with lower AADT to avoid having a detrimental effect on throughput on

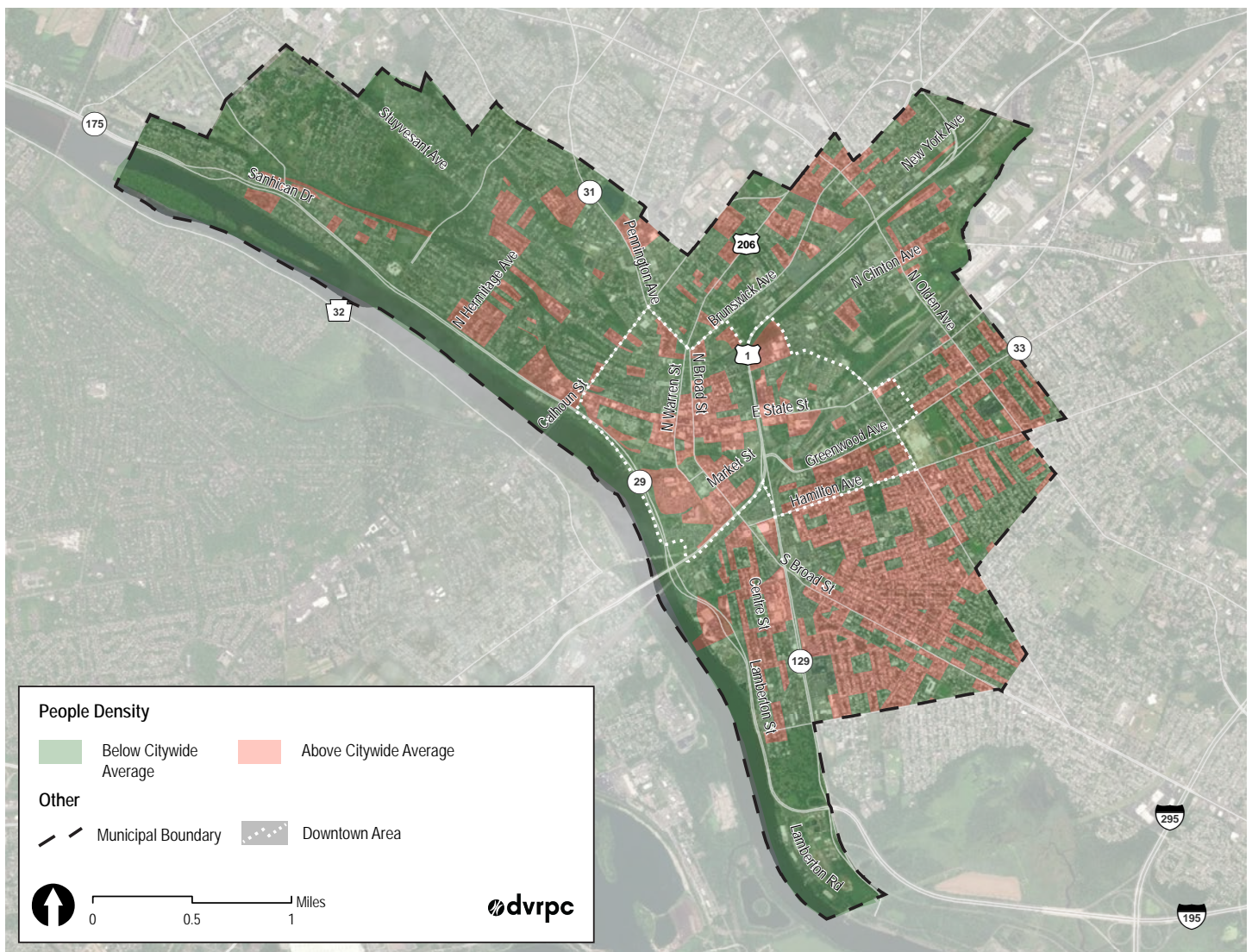


Figure 3 People density

TPOLOGIES

key arterial roads. Figure 4 maps the AADT estimates across Trenton's road network that were used to determine the Complete Streets Typologies.

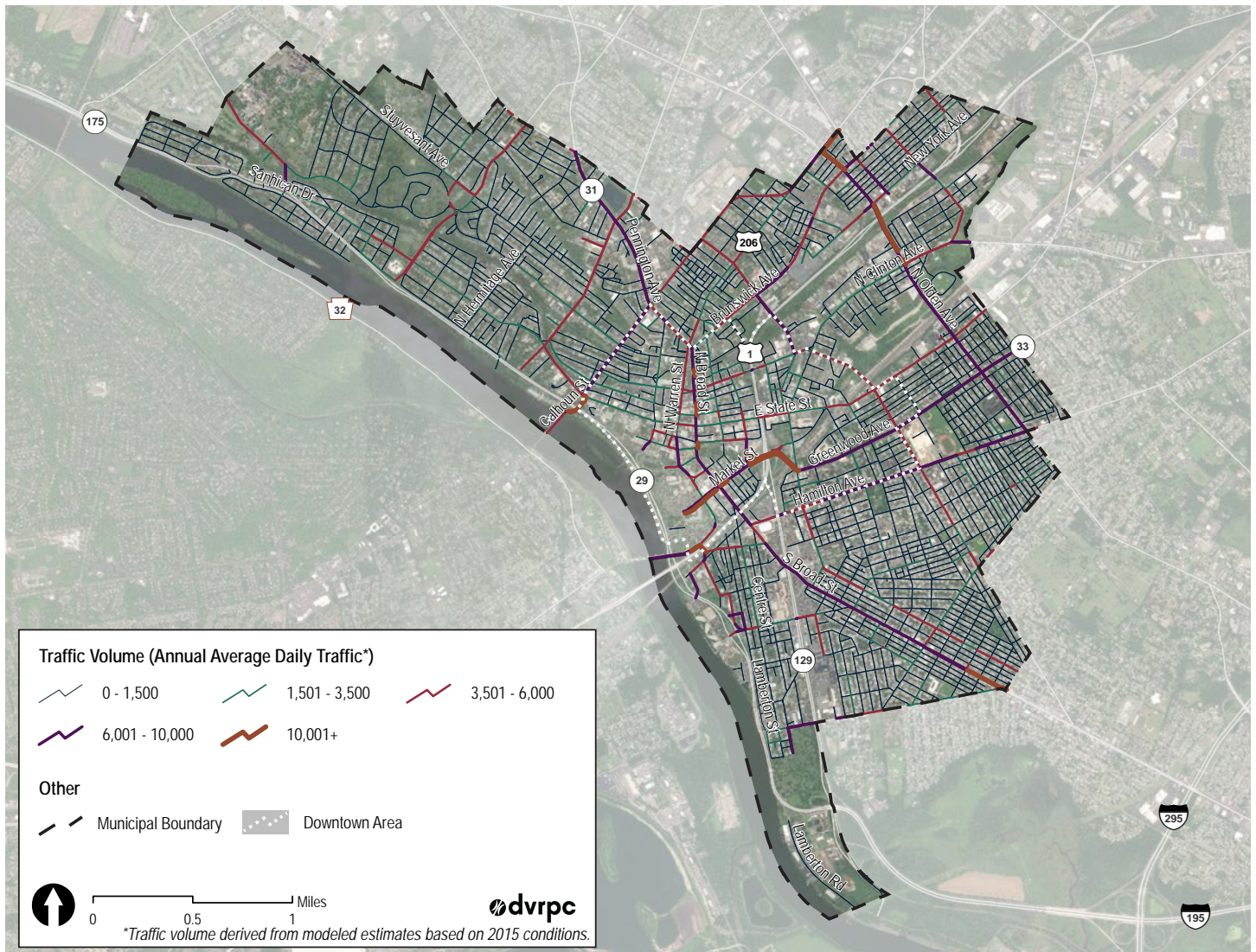


Figure 4 Estimated daily travel volumes

Source: DVRPC, 2015; Aerial Imagery: Esri

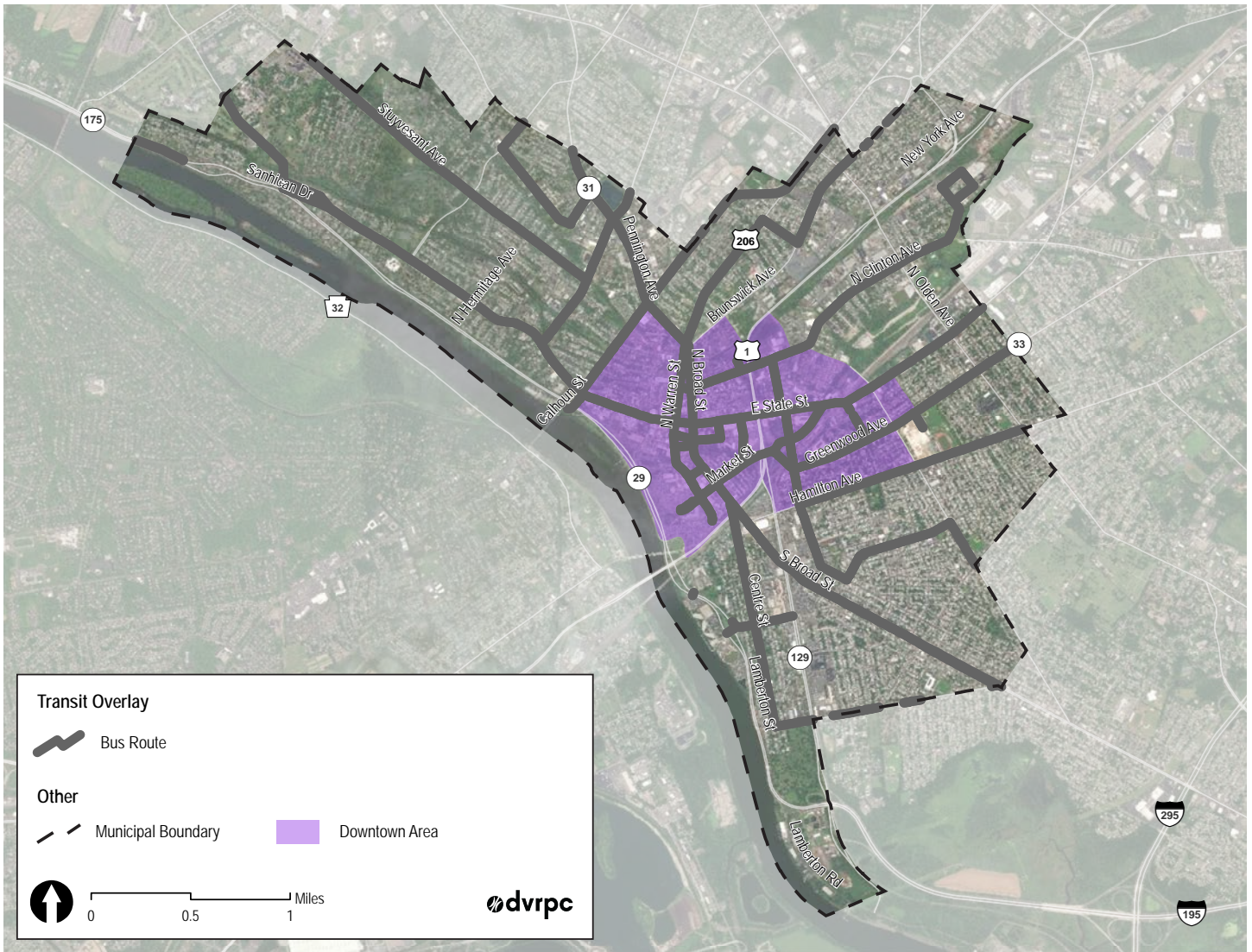


Figure 5 Bus routes

Source: NJ Transit, 2016; Aerial Imagery: Esri

Bus routes reflect the streets that need capacity for surface transit vehicles and people boarding and departing vehicles. For example, bus bulbs allow buses to stay in the travel lane during boarding and avoid the need to merge back into traffic. At the same time, bus bulbs keep the sidewalk clear and enable pedestrians to walk easily through the bus stop area. Safety is addressed by improving sight lines between the travel lane and the bus stop where people are boarding and alighting. Figure 5 maps the bus routes in Trenton used to determine the Complete Streets Typologies.

These data points were used to create typologies. For instance, primarily residential streets in lower density sections of Trenton became the Single-Family Residential typology. Streets outside of the Downtown Area with more than 3,500 estimated

AADT that were not primarily commercial were assigned the Connector Corridor typology. Streets that were identified by the *Trenton250* plan and by the *Downtown Trenton Bicycle and Pedestrian Plan* were given special consideration to ensure consistency across the recent planning efforts.

The remainder of this chapter will address each typology in detail, including a description, goal, ideal cross-section, and design considerations for each.

Example Typology Spread

For each typology, a cross-section of an ideal street configuration is provided. In addition, a table of design elements indicates what features should be included to ensure the design is compliant with Complete Streets guidance. Green boxes below are provided to explain the purpose of each graphic and section that will be included for each typology. Each design element is defined and explained in the Complete Streets Elements Design Guide chapter (see page 73). Note that required elements are shown in the table, but do not necessarily appear in graphics. For example, intersections are not shown in graphics, but there are required elements at intersections.

- Goal:** The purpose of the typology
- Primary Land Use:** The most common land use
- Density:** Typical population density
- Average Estimated Traffic Volume:** #,### vehicles/day
- Miles:** Total miles of roadway with the typology
- Examples:** Example streets

Overview

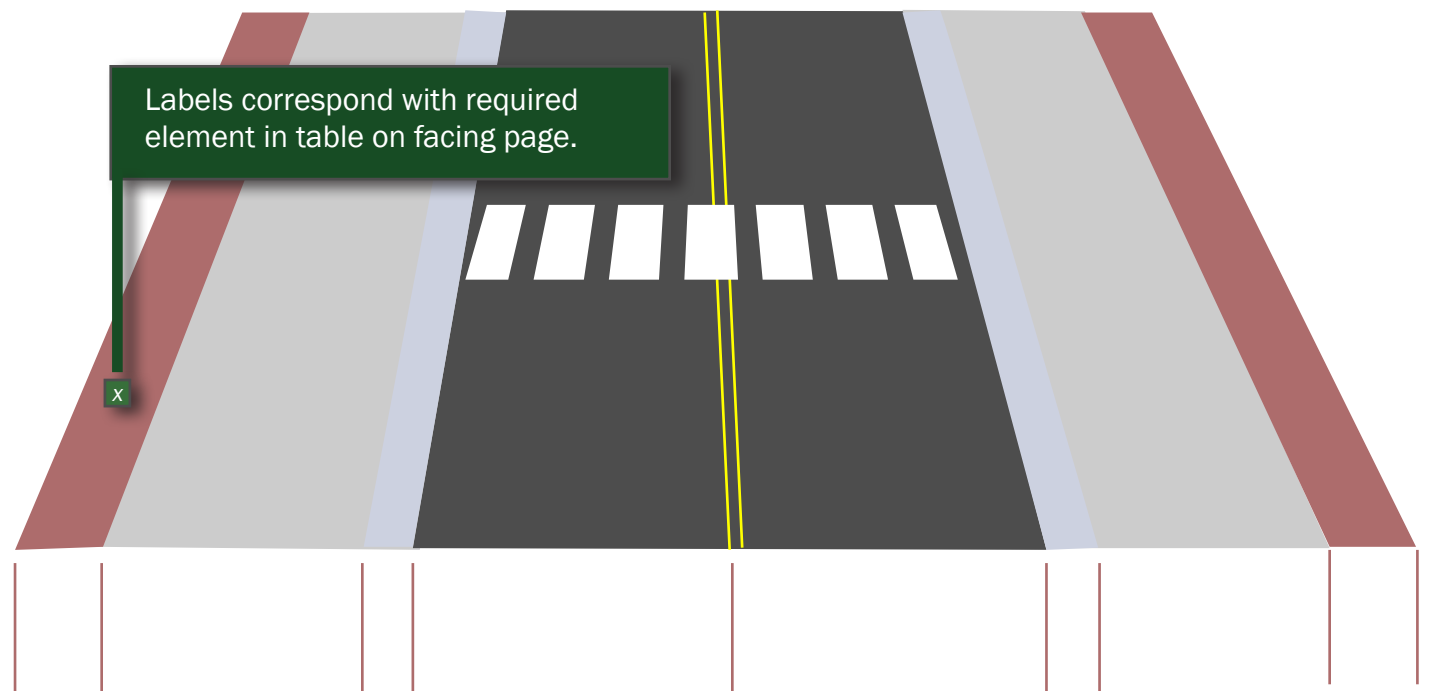
These streets are primarily residential, but may include some small commercial or institutional land uses such as corner stores, churches, and schools....

The overview section is used to gain a basic understanding for the context of the street typology.

The cross section shows an ideal street configuration, including required and recommended design elements.

The existing conditions box describes the characteristic of the typology.

Labels correspond with required element in table on facing page.



An ideal complete street for the typology

The typology element table shows if an element is required and any stipulations regarding implementation.

This column is used to determine if a design element is required, recommended, should be used only as needed, or not recommended.

	ELEMENT	STIPULATIONS	
KURB	Sidewalk Zones	Frontage Zone	Required
		Pedestrian Zone	Not Recommended or N/A
		Greenscape-Furnishing Zone	Recommended
		Infrastructure	As Needed
CURB	Sidewalk Facing	Bike Parking	Required
		Driveways / Entrances	Recommended
		Curb Extensions	As Needed
		Bus Loading Curb Extensions	Not Recommended or N/A
		On-street Parklets	As Needed
ROADWAY	Traffic Calming Strategies ²	Lane Narrowing	Recommended
		Vertical Deflection	Recommended
		Chicanes	Recommended
		Neckdowns	Recommended
		Dedicated Bus Lane	Not Recommended or N/A
		Bicycle Facilities ³	Recommended
		INTERSECTION	Pedestrian Safety and Priority
Pedestrian Signals and Warning Signs	Recommended		
Pedestrian Refuge Island	Not Recommended or N/A		
Bike Boxes	As Needed		
Two-stage Turning Boxes	As Needed		
Traffic Calming	Vertical Deflection and Turn Calming	Recommended	

The stipulations column details specifications relevant for a design element by typology.

These design elements are detailed in the design elements chapter. Not every design element is included; the focus is on elements with typology-specific guidance.

Each category is hyperlinked to the associated design elements page

Below the elements, special considerations provide additional guidance beyond what is included in the table. These items are indicated with a numbered footnote (¹).

¹**Lighting:** Pedestrian-scale lighting is not necessary on single-family residential streets. In addition, lighting fixtures may be more spread out at up to 120' spacing.

³**Bicycle Facilities:** Vertical and horizontal deflection, signage and other tools can be used to keep speeds and volumes low and create [Neighborhood Greenways](#).

Dense Residential

Overview

Dense Residential streets are characterized by multi-family developments and attached single-family homes. These streets are primarily residential, but may include some small commercial or institutional land uses such as corner stores, churches, and schools. These streets should be designed for local traffic and the comfort of all users. The graphic below shows a cross-section of a two-way Dense Residential street incorporating many recommended design elements. A one-way street would look similar, but without two-way traffic.

Goal: Create safe, comfortable spaces that prioritize access for all users of the street and for neighborhood uses

Primary Land Use: Residential

Density: Above Average

Average Estimated Traffic Volume: 1,300 vehicles/day

Miles: 149.1 miles

Examples: Genesee Street

Note: intersection elements are not included in the graphic, but may still be required.

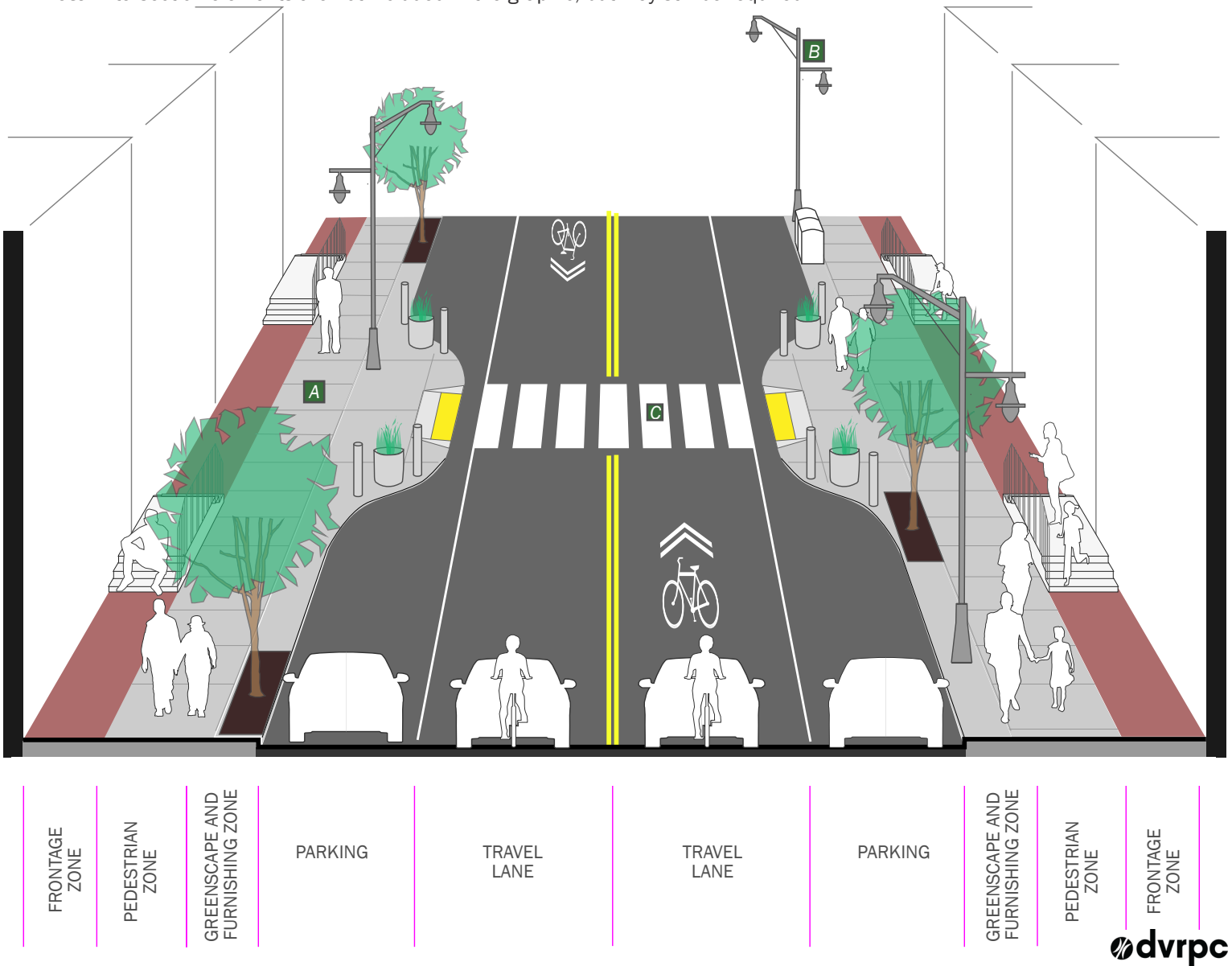


Figure 6 Model cross-section of a Dense Residential street

Design Considerations

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone	■	
		Pedestrian Zone ¹	A	5' - 6', sidewalk should be standard cast-in-place concrete
		Greenscape-Furnishing Zone	■	up to 6'
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	■	stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas	■	
		Street Trees	■	small-medium 25-50', spaced at least 20' apart
		Street Furniture	■	may be placed by residents if Pedestrian Zone can be maintained
		Lighting ²	B	alternating across street, 75'-120' spacing
		Bus Stop Amenities	■	provide seating, add shelter if possible
		Bike Parking	■	
CURB	Sidewalk Facing	Driveways / Entrances	■	no more than 10'-12' wide, at least 20' from signalized intersections
		Curb Extensions	■	
		Bus Loading Curb Extensions	■	
	Road Facing	On-street Parking ³	■	provide sufficient parking to address demand
		Parklets	■	
		Loading Zones	■	
ROADWAY	Traffic Calming Strategies ⁴	Lane Narrowing	■	11' for lanes with bus traffic, maximum 10' for all other lanes
		Vertical Deflection	■	use speed cushions if road used by buses or heavy vehicles
		Chicanes	■	use where speeding is a problem
		Neckdowns	■	use in areas with high pedestrian volume, midblock crossings
	Transit Bikes	Dedicated Bus Lane	■	
INTERSECTION	Pedestrian Safety and Priority	Bicycle Facilities ⁵	■	consider sharrows and creating <u>Neighborhood Greenways</u>
		Crosswalks ⁶	C	<u>continental style</u> with ADA ramps at all controlled intersections
		Pedestrian Signals and Warning Signs	*	install <u>countdown timers</u> and LPIs at all signalized intersections
	Bicycle Safety and Priority	Pedestrian Refuge Island	■	
		Bike Boxes	■	install at signalized intersections with bike facilities
		Two-stage Turning Boxes	■	use where there is high bike turning volumes and/or cycle tracks
Traffic Calming	Vertical Deflection and Turn Calming	■	use at intersections with <u>Corridors</u> and where speeding is a concern	

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or Not Applicable
 * Not shown in graphic but required

¹**Pedestrian Zone:** Six foot Pedestrian Zone is recommended, but porches and stoops are permissible as long as a five foot Pedestrian Zone is maintained.

²**Lighting:** Pedestrian-scale lighting should be provided.

³**On-Street Parking:** Spaces dedicated to short-term parking and drop-off zones may be used near some land uses like apartment buildings, churches, corner stores, or schools.

⁴**Roadway: Traffic Calming Strategies:** Traffic calming is permissible to keep speeds low, especially where speeding and speeding-related crashes are common.

⁵**Bicycle Facilities:** Vertical and horizontal deflection, signage and other tools can be used to keep speeds and volumes low and create Neighborhood Greenways. These sets of treatments are used to slow vehicular traffic and prioritize bicyclist movements.

⁶**Crosswalks:** All crosswalks should be outfitted with ADA ramps and detectable warning surface (DWS). Midblock crossings can be used where appropriate, likely around pedestrian trip generators.

Single-Family Residential

Overview

Single-Family Residential streets are characterized by single-family homes that are detached and set back from the street. Typically, these homes have off-street parking. These streets are primarily residential, but may include some small commercial or institutional land uses such as corner stores, churches, and schools. They are concentrated in the west end of Trenton and most have little through traffic. The graphic below shows a cross-section of a two-way Single-Family Residential street with many recommended design elements. A one-way street would look similar, but without two-way traffic.

- Goal:** Prioritize low speeds and residential access
- Primary Land Use:** Residential
- Density:** Below Average
- Average Estimated Traffic Volume:** 1,000 vehicles/day
- Miles:** 38.3 miles
- Examples:** Kensington Avenue

Note: intersection elements are not included in the graphic, but may still be required.

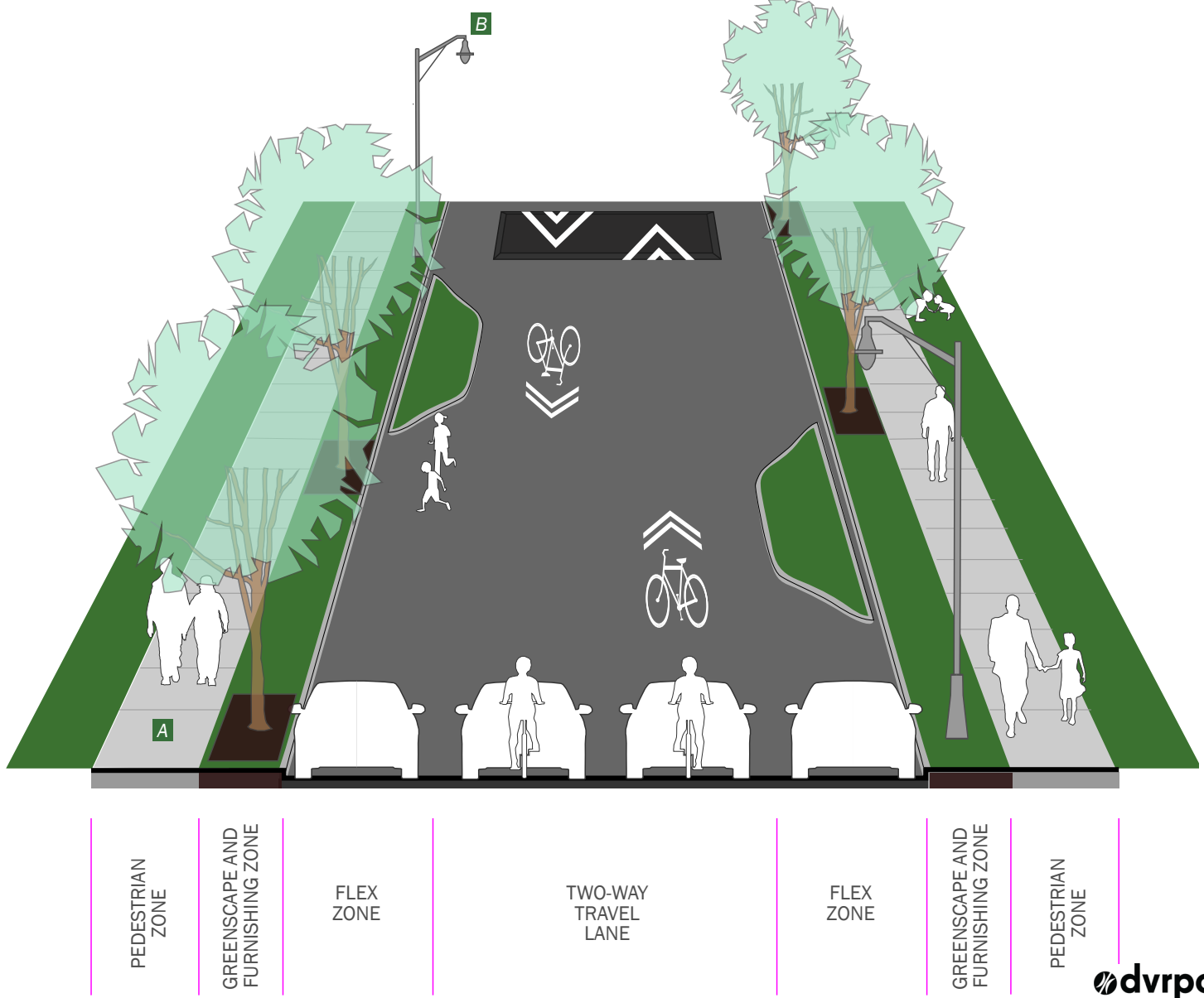


Figure 7 Model cross-section of a Single-Family Residential street

Design Considerations

		ELEMENT	✓ STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone	
		Pedestrian Zone	A 5' - 6', sidewalk should be standard cast-in-place concrete
		Greenscape-Furnishing Zone	2'-6" - 4'
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas	
		Street Trees	small, < or = 25', spaced at least 20' apart, spaced at least 25' apart
		Street Furniture	
		Lighting ¹	B alternating across street, 75'-120' spacing
		Bus Stop Amenities	
		Bike Parking	
CURB	Sidewalk Facing	Driveways / Entrances	10'-12' wide, at least 20' from signalized intersections
		Curb Extensions	use if visibility and/or speeding are issues
		Bus Loading Curb Extensions	
	Road Facing	On-street Parking	provide sufficient parking to address demand
		Parklets	
ROADWAY	Traffic Calming Strategies ²	Lane Narrowing	10', painted centerline not required
		Vertical Deflection	use speed cushions if road used by buses or heavy vehicles
		Chicanes	use where speeding is a problem
		Neckdowns	use in areas with high pedestrian volume, mid-block crossings
	Transit	Dedicated Bus Lane	
	Bikes	Bicycle Facilities ³	consider sharrows and creating Neighborhood Greenways
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	* continental style with ADA ramps at all controlled intersections
		Pedestrian Signals and Warning Signs	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	
	Bicycle Safety and Priority	Bike Boxes	
		Two-stage Turning Boxes	use where there is high bike turning volumes and/or cycle tracks
Traffic Calming	Vertical Deflection and Turn Calming	use at intersections with Corridors and where speeding is a problem	

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A
 ✱ Not shown in graphic but required

¹**Lighting:** Pedestrian-scale lighting is not necessary on single-family residential streets, but some form of lighting is still required.

²**Roadway: Traffic Calming Strategies:** Single-family residential streets are good candidates for many types of traffic calming where speeding and speeding-related crashes are a concern.

³**Bicycle Facilities:** Vertical and horizontal deflection, signage and other tools can be used to keep speeds and volumes low and create [Neighborhood Greenways](#). These sets of treatments are used to slow vehicular traffic and prioritize bicyclist movements.

Commercial Corridor

Overview

Commercial corridors are characterized by ground-floor retail establishments. Unlike neighborhood mixed use streets, commercial corridors have higher vehicle volumes as they serve through traffic and serve destinations for both local residents and non-residents. Streets should be designed to balance higher volumes of vehicles with walking and biking access to destinations and to minimize conflicts between different types of users. The graphic below shows a cross-section of a Commercial Corridor street with many recommended design elements.

Goal: Balance higher traffic volumes with access to a multitude of destinations by a variety of users and minimize modal conflicts that arise.

Primary Land Use: Commercial

Density: Varies

Average Estimated Traffic Volume: 7,000 vehicles/day

Miles: 3.1 miles

Examples: Hamilton Street, South Broad Street

Note: intersection elements are not included in the graphic, but may still be required.

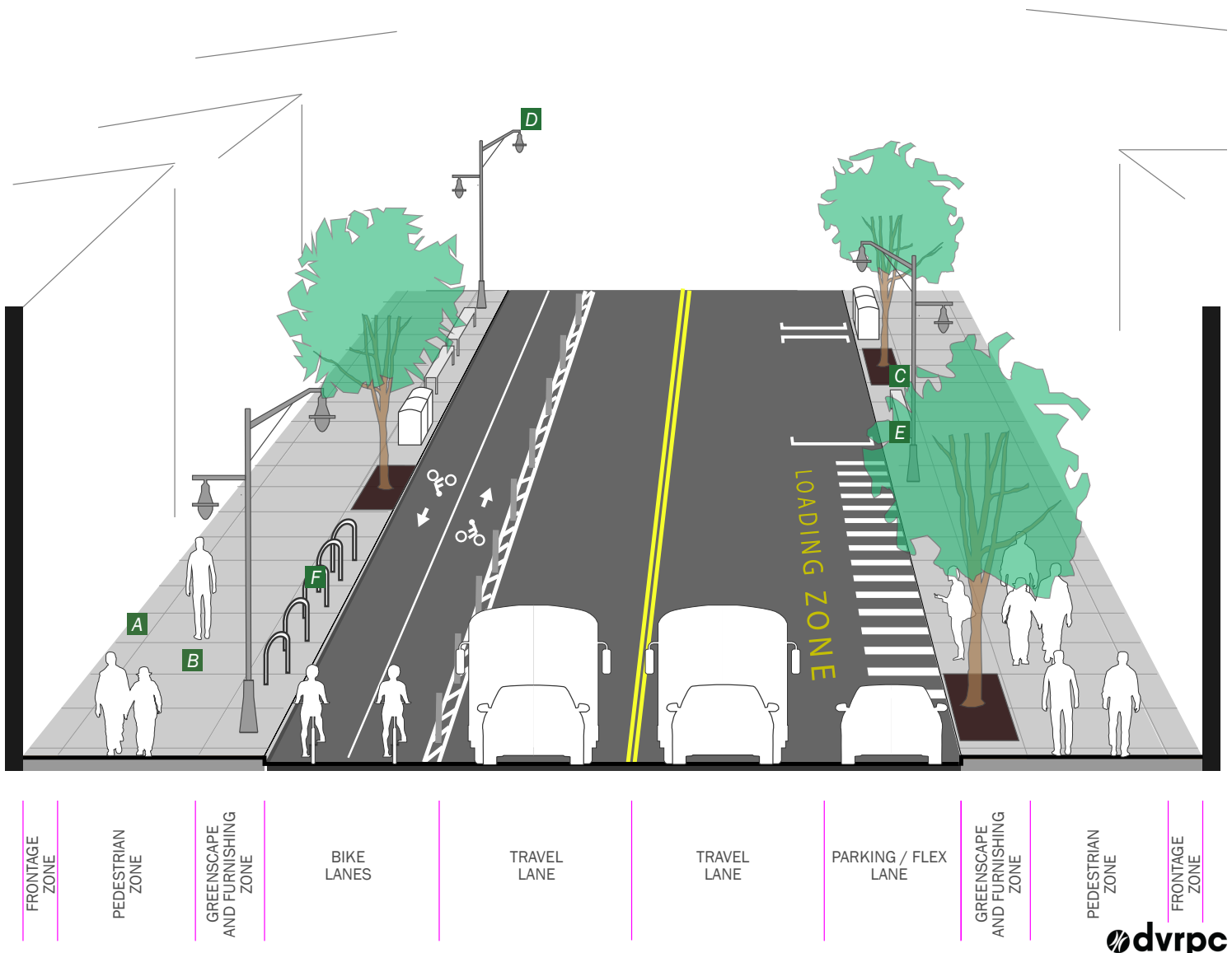


Figure 8 Model cross-section of a Commercial Corridor



Design Considerations

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone ¹	A	2' - 6'
		Pedestrian Zone	B	5' - 8', sidewalk should be standard cast-in-place concrete
		Greenscape-Furnishing Zone		2'-6" - 8'
	Sidewalk Elements ²	Drainage/Green Stormwater Infrastructure		stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas		
		Street Trees		small-medium 25-50', spaced at least 20' apart
		Street Furniture	C	provide seating, waste receptacles at regular intervals
		Lighting ³	D	alternating across street, 75'-120' spacing
		Bus Stop Amenities	E	provide seating, add shelter if possible
		Bike Parking	F	assess need for number of spots
CURB	Sidewalk Facing	Driveways / Entrances		20'-24' wide, 100' from signalized intersections
		Curb Extensions		
		Bus Loading Curb Extensions		as needed with bus stops and limited sidewalk space
	Road Facing	On-street Parking		parking lane may be used as a flex lane for other curb uses
		Parklets		add where appropriate
ROADWAY	Traffic Calming Strategies ⁴	Lane Narrowing		11' lanes recommended, consider 10' if not a bus route
		Vertical Deflection		use speed cushions if road used by buses or heavy vehicles
		Chicanes		
	Transit Bikes	Neckdowns		use in areas with high pedestrian volume, midblock crossings
		Dedicated Bus Lane		if space is available, place on the right side of the road
		Bicycle Facilities ⁵		use protected bicycle lanes or consider parallel routes
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	*	continental style with ADA ramps at all controlled intersections
		Pedestrian Signals and Warning Signs	*	install <u>countdown timers</u> and <u>LPIs</u> at all signalized intersections
		Pedestrian Refuge Island		assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		install at signalized intersections with bike facilities
		Two-stage Turning Boxes		use where there is high bike turning volumes and/or cycle tracks
Traffic Calming	Vertical Deflection and Turn Calming			

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A
 * Not shown in graphic but required

¹**Frontage Zone:** Building facade standards can be set by the City to establish an aesthetic consistency. Consider transparency of store fronts and variation of architectural form.

²**Sidewalk Elements:** Public art can be placed in the Greenscape-Furnishing Zone. Consider using neighborhood identity and local artists.

³**Lighting:** Pedestrian-scale lighting should be provided.

⁴**Roadway: Traffic Calming Strategies:** To be used to manage speeds, where necessary, with an emphasis on

ensuring the safety of vulnerable users. Speed cushions are most appropriate because they allow buses to pass. Neckdowns can be paired with midblock crossings where there is pedestrian demand.

⁵**Bicycle Facilities:** Because of higher vehicular speeds and volumes, separation and protection is necessary for bicycle facilities and bicyclists. Cycle tracks can be used where driveways are minimal, otherwise parking-protected bicycle lanes are preferred. On narrower streets, parallel routes should be used.

Connector Corridor

Goal: Safe, efficient streets for all road users to travel across Trenton

Primary Land Use: Varies

Density: Varies

Average Estimated Traffic Volume: 5,000 vehicles/day

Miles: 39 miles

Examples: South Broad Street, West State Street

Overview

Connector Corridors carry high vehicular volumes across Trenton, with a minimum of 3,500 vehicles per day and typically more. The land use profile of these streets has less commercial retail than Commercial Corridors, indicating fewer destinations. These roads serve the important role of ensuring that people can travel efficiently across the city, regardless of how they choose to get around. The graphic below shows a cross-section of a Connector Corridor street with many recommended design elements.

Note: intersection elements are not included in the graphic, but may still be required.

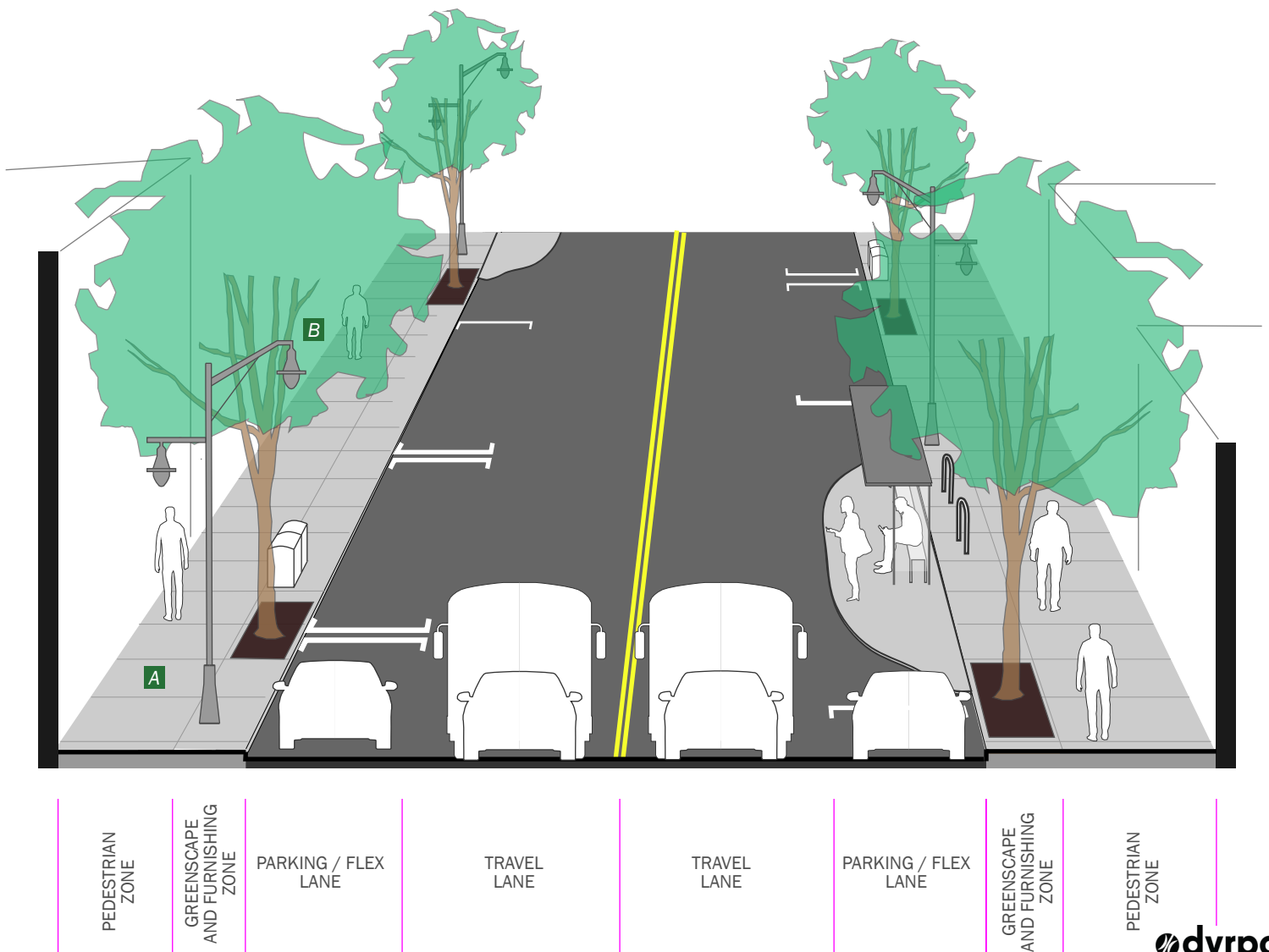


Figure 9 Model cross-section of a Connector Corridor



Design Considerations

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone	As Needed	none - 6'
		Pedestrian Zone	A	5' - 8', sidewalk should be standard cast-in-place concrete
		Greenscape-Furnishing Zone	Recommended	2'-6" - 8'
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	As Needed	if possible, stormwater planter, tree trenches, rain gardens
		Sidewalk Cafes and Plazas	As Needed	
		Street Trees	Recommended	medium-large 25-50', spaced at least 25' apart
		Street Furniture	Not Recommended	
		Lighting ¹	B	alternating across street, 75'-120' spacing
		Bus Stop Amenities	Recommended	provide seating, add shelter if possible
		Bike Parking	Recommended	assess need for number of spots
CURB	Sidewalk Facing	Driveways / Entrances	As Needed	20'-24' wide, 100' from signalized intersections
		Curb Extensions	As Needed	
		Bus Loading Curb Extensions	As Needed	as needed with bus stops and limited sidewalk space
	Road Facing	On-street Parking	As Needed	parking lane may be used as a flex lane for other curb uses
		Parklets	Not Recommended	
ROADWAY	Traffic Calming Strategies ²	Lane Narrowing	Recommended	11' lanes recommended, consider 10' if not a bus route
		Vertical Deflection	As Needed	use speed cushions if road used by buses or heavy vehicles
		Chicanes	Not Recommended	
	Transit Bikes	Neckdowns	Not Recommended	
		Dedicated Bus Lane	Recommended	if space is available, place on the right side of the road
		Bicycle Facilities ³	Recommended	use protected bike lanes or consider parallel routes
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	*	continental style with ADA ramps at all controlled intersections
		Pedestrian Signals and Warning Signs	*	install <u>countdown timers and LPIs</u> at all signalized intersections
		Pedestrian Refuge Island	As Needed	assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes	Recommended	install at signalized intersections with bike facilities
		Two-stage Turning Boxes	As Needed	use where there is high bike turning volumes and/or cycle tracks
Traffic Calming	Vertical Deflection and Turn Calming	Recommended	prioritize where pedestrian volume is high	

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A
 ✱ Not shown in graphic but required

¹**Lighting:** Pedestrian-scale lighting fixtures should be provided.

²**Roadway: Traffic Calming Strategies:** Traffic calming treatments should be evaluated on Connector Corridors where speeding and speeding-related crashes are a concern. Devices like speed cushions may be appropriate because they enable higher vehicle speeds and do not impede buses or emergency vehicles.

³**Bicycle Facilities:** Because of higher speeds and volumes, separation and protection is necessary. Cycle tracks can be used where driveways are minimal, otherwise parking-protected bicycle lanes are preferred. On narrower streets, parallel routes should be used.

Downtown Commercial Corridor

Goal: Accomodate access to the areas of the city with the most businesses, jobs, etc. by balancing the needs of many users of different modes

Primary Land Use: Commercial

Density: Above Average

Average Estimated Traffic Volume: 4,700 vehicles/day

Miles: 1.2 miles

Examples: East State Street, North Broad Street

Overview

Downtown Commercial Corridors are located in the downtown area and are characterized by ground-floor retail establishments with offices and/or residential units above. Despite making up the fewest miles of any typology, Downtown Commercial Corridors are among the most trafficked streets in Trenton.

While similar to Commercial Corridors, Downtown Commercial Corridors are generally higher density and have greater pedestrian traffic.

Note: intersection elements are not included in the graphic, but may still be required.

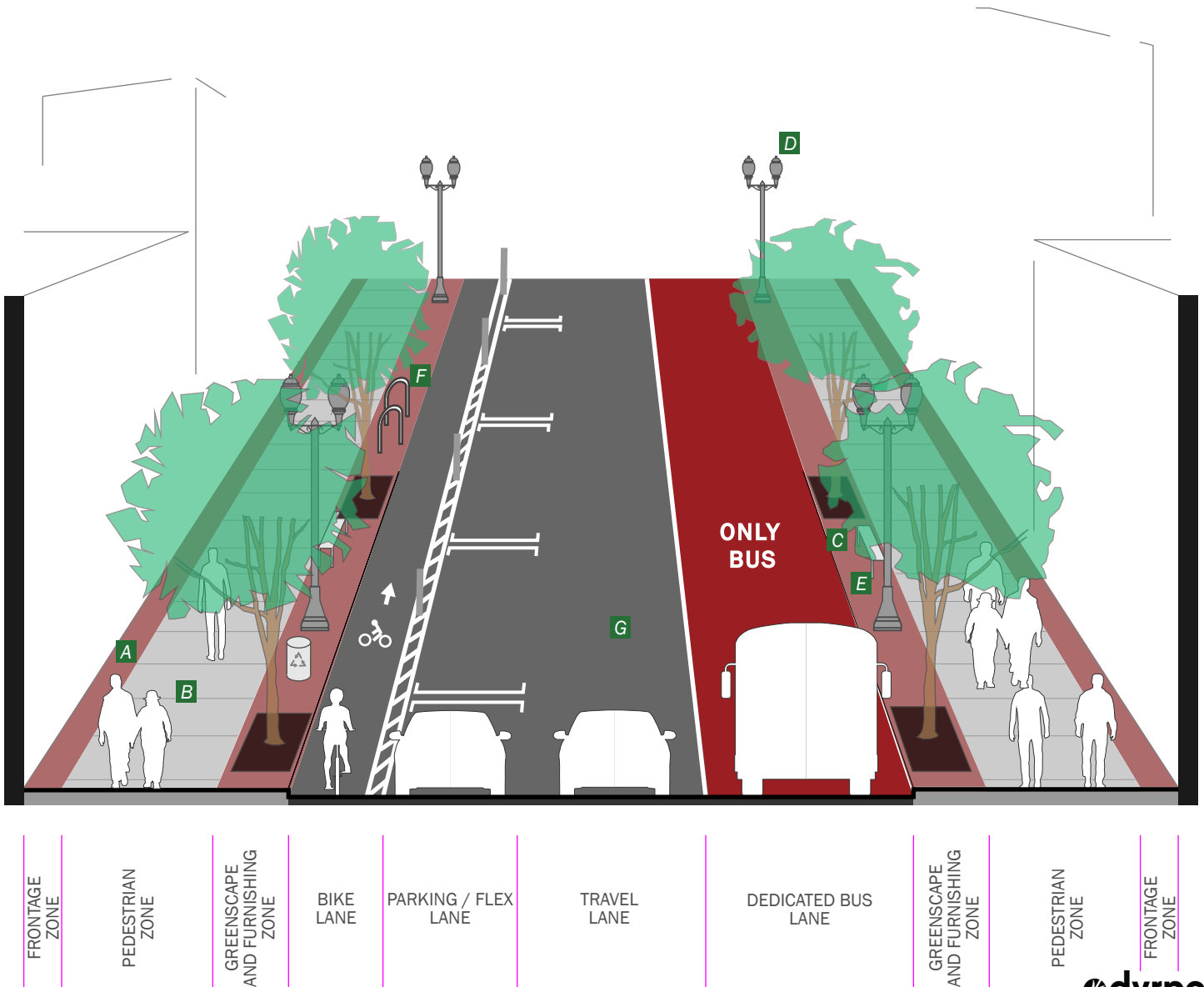


Figure 10 Model cross-section of a Downtown Commercial Corridor

Design Considerations

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone ¹	A	2' - 6'
		Pedestrian Zone	B	8' - 12'
		Greenscape-Furnishing Zone		2'-6" - 8', brick is the preferred paving material Downtown
	Sidewalk Elements ²	Drainage/Green Stormwater Infrastructure		stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas		
		Street Trees		medium < or = 25', spaced at least 25' apart
		Street Furniture	C	provide seating, waste receptacles at regular intervals
		Lighting ³	D	paired (not alternating) across street, 50'-80' spacing
		Bus Stop Amenities	E	provide seating, add shelter if possible
		Bike Parking	F	if sidewalk space is limited, consider bike corral in a parking space
CURB	Sidewalk Facing	Driveways / Entrances		20'-24' wide, 100' from signalized intersections
		Curb Extensions		use in high pedestrian traffic areas
		Bus Loading Curb Extensions		as needed with bus stops and limited sidewalk space
	Road Facing	On-street Parking		parking lane may be used as a flex lane for other curb uses
		Parklets		consider in areas with high pedestrian activity
		Loading Zones ⁴	*	30' loading zone in parking lane where frequent loading occurs
ROADWAY	Traffic Calming Strategies	Lane Narrowing	G	11' for lanes with bus traffic, maximum 10' for all other lanes
		Vertical Deflection		use speed cushions if road used by buses or heavy vehicles
		Chicanes		
	Transit Bikes	Neckdowns		use in high pedestrian traffic areas
		Dedicated Bus Lane		if space is available, place on the right side of the road
INTERSECTION	Pedestrian Safety and Priority	Bicycle Facilities ⁵		buffered or protected bike lanes or consider parallel routes
		Crosswalks	*	continental style with ADA ramps at all controlled intersections
		Pedestrian Signals and Warning Signs	*	install <u>countdown timers</u> and <u>LPIs</u> at all signalized intersections
	Bicycle Safety and Priority	Pedestrian Refuge Island		assess need if road is four lanes or wider
		Bike Boxes		install at signalized intersections with bike facilities
Traffic Calming	Two-stage Turning Boxes		use where there is high bike turning volumes and/or cycle tracks	
		Vertical Deflection and Turn Calming		

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A
 * Not shown in graphic but required

¹**Frontage Zone:** Building facade standards can be set by the City to establish an aesthetic environment. Consider transparency of store fronts and variation of architectural form.

²**Sidewalk Elements:** Public art can be placed in the Greenscape-Furnishing Zone. Wayfinding signage can direct visitors to various downtown destinations and parking.

³**Lighting:** Pedestrian-scale lighting should be provided.

⁴**Loading Zones:** Timed deliveries and the use of alleys and Downtown Minor streets for deliveries should be

encouraged and coordinated.

⁵**Bicycle Facilities:** Bike lanes should be on most Downtown Commercial Corridor streets in order to create a complete network. If space is limited, consider placing a bike lane on one street and a single bike lane in the opposite direction on a parallel street. Consider a buffer, like parking or flexible delineators, to improve safety and comfort for bikers. Reference the *Downtown Trenton Bicycle and Pedestrian Plan* for more detail (see map of plan recommendations in the Appendix).

Downtown Connector Corridor

Overview

Downtown Connector Corridors carry high volumes through Downtown Trenton, where street activity increases, with a minimum of 3,500 vehicles per day and typically more. The land use profile of these streets has less commercial retail than Downtown Commercial Corridors, indicating fewer destinations, but more commercial than Connector Corridors. Similar to Connector Corridors, the goal of these roads is to ensure that people can travel efficiently and safely through Downtown Trenton. These streets are typically bus routes and ensuring efficient transit should be a key priority.

Goal: Safe, efficient movement of all road users through Downtown Trenton

Primary Land Use: Varies

Density: Above Average

Average Estimated Traffic Volume: 4,500 vehicles/day

Miles: 13.2 miles

Examples: Perry Street

Note: intersection elements are not included in the graphic, but may still be required.

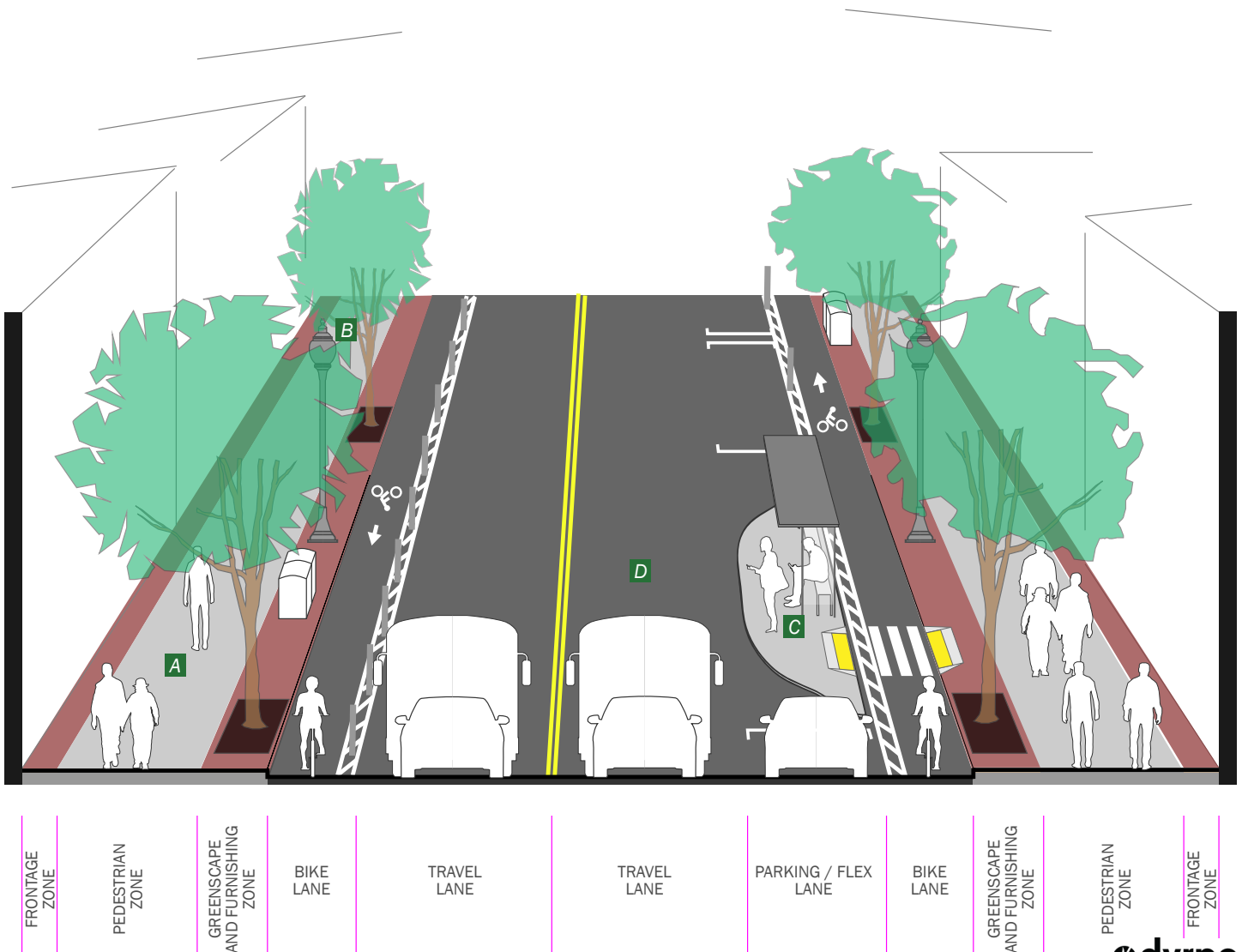


Figure 11 Model cross-section of a Downtown Connector Corridor

Design Considerations

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone ¹	Yellow	none - 6'
		Pedestrian Zone	A	6' - 12'
		Greenscape-Furnishing Zone	Green	2'-6" - 8', brick is the preferred paving material Downtown
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	Yellow	if possible, stormwater planters, tree trenches, rain gardens
		Street Cafes and Plazas	Yellow	
		Street Trees	Green	medium or large < or = 25', spaced at least 25' apart
		Street Furniture	Red	
		Lighting ²	B	paired across street, 50'-80' spacing
		Bus Stop Amenities	C	provide seating, add shelter if possible
		Bike Parking	Green	if sidewalk space is limited, consider bike corral in a parking space
CURB	Sidewalk Facing	Driveways / Entrances	Yellow	20'-24' wide, 100' from signalized intersections
		Curb Extensions	Yellow	as needed, only in high pedestrian traffic areas
		Bus Loading Curb Extensions	Yellow	as needed with bus stops and limited sidewalk space
	Road Facing	On-street Parking ³	Yellow	assess need, consider parking on one side only
		Parklets	Red	
ROADWAY	Traffic Calming Strategies	Loading Zones	Red	only if space is available and need is present
		Lane Narrowing	D	11' for lanes with bus traffic, maximum 10' for all other lanes
		Vertical Deflection	Green	use speed cushions if road used by buses or heavy vehicles
	Transit Bikes	Chicanes	Red	
		Neckdowns	Green	use in high pedestrian traffic areas, opportunity for gateways
		Dedicated Bus Lane	Yellow	if space is available, place on the right side of the road
INTERSECTION	Pedestrian Safety and Priority	Bicycle Facilities ⁴	Green	use buffered or protected bike lane or consider parallel routes
		Crosswalks	*	continental style with ADA ramps at all controlled intersections
		Pedestrian Signals and Warning Signs	*	install <u>countdown timers</u> and <u>LPIs</u> at all signalized intersections
	Bicycle Safety and Priority	Pedestrian Refuge Island	Yellow	assess need if road is four lanes or wider
		Bike Boxes	Green	install at signalized intersections with bike facilities
Traffic Calming	Two-stage Turning Boxes	Yellow	use where there is high bike turning volumes and/or cycle tracks	
		Vertical Deflection and Turn Calming	Green	prioritize where pedestrian volume is high

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A
 * Not shown in graphic but required

¹**Frontage Zone:** Only needed if pedestrian traffic is high and there are frequent entrances; otherwise, this space can be allocated to the Greenscape-Furnishing Zone.

²**Lighting:** Pedestrian-scale lighting should be provided.

³**On-street Parking:** Assess parking needs, and consider parking on only one side of the street to make room for a bike lane.

⁴**Bicycle Facilities:** Bike lanes should be on most Downtown Connector Corridor streets in order to create a complete network. If space is limited, consider placing a bike lane on one street and a single bike lane in the opposite direction on a parallel street. Consider a buffer, like parking or flexible delineators, to improve safety and comfort for bikers. Reference the *Downtown Trenton Bicycle and Pedestrian Plan* for more detail (see map of plan recommendations in the Appendix).

Downtown Minor

Goal: Provide access to destinations while making the most of these secondary streets for activities like biking, loading and deliveries

Primary Land Use: Commercial, Institutional, Office

Density: Above Average

Average Estimated Traffic Volume: 2,600 vehicles/day

Miles: 9.3 miles

Examples: South Stockton Street

Overview

Downtown Minor streets are located in the downtown area and are characterized by office and governmental buildings and some ground-floor retail establishments, but are just as likely to have entrances to parking garages and other "back-end" uses. They are generally lower-volume roads with less through traffic and have fewer users and destinations compared to Downtown Commercial Corridors. The graphic below shows a cross-section of a two-way Downtown Minor street with many recommended design elements. A one-way street would look similar, but without two-way traffic.

Note: intersection elements are not included in the graphic, but may still be required.

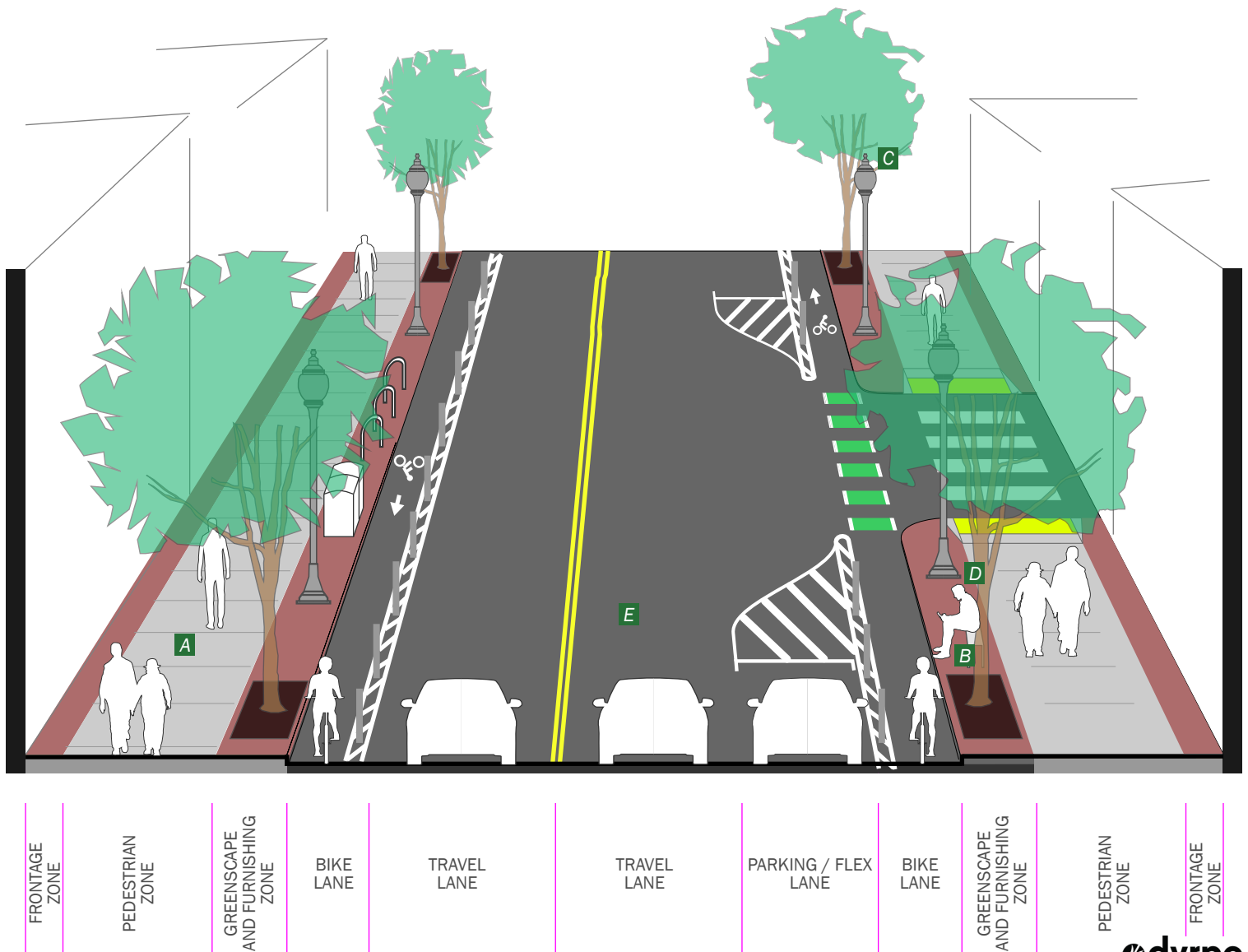


Figure 12 Model cross-section of a Downtown Minor street

Design Considerations

		ELEMENT	✓ STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone ¹	2' - 6'
		Pedestrian Zone	A 6' - 12'
		Greenscape-Furnishing Zone	2'-6" - 8', brick is the preferred paving material Downtown
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	if possible, stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas	
		Street Trees	small or medium < or = 25', spaced at least 20' apart
		Street Furniture	B provide seating
		Lighting ²	C paired across street, 50'-80' spacing
		Bus Stop Amenities	D provide seating, add shelter if possible
		Bike Parking	if sidewalk space is limited, consider bike corral in a parking space
CURB	Sidewalk Facing	Driveways / Entrances	20'-24' wide, 100' from signalized intersections
		Curb Extensions	as needed, only in high pedestrian traffic areas
		Bus Loading Curb Extensions	as needed with bus stops and limited sidewalk space
	Road Facing	On-street Parking ³	parking lane may be used as a flex lane for other curb uses
		Parklets	add in high pedestrian traffic areas
		Loading Zones ⁴	assess need, place at the beginning of a block
ROADWAY	Traffic Calming Strategies	Lane Narrowing	E 11' for lanes with bus traffic, maximum 10' for all other lanes
		Vertical Deflection	use speed cushions if road used by buses or heavy vehicles
		Chicanes	
	Transit	Neckdowns	use in high pedestrian traffic areas
		Dedicated Bus Lane	consider for bus routes, if space is available
Bikes	Bicycle Facilities ⁵	use most protection possible, but shared vehicle lanes permissible	
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	* continental style with ADA ramps at all controlled intersections
		Pedestrian Signals and Warning Signs	* install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes	install at signalized intersections with bike facilities
		Two-stage Turning Boxes	use where there is high bike turning volumes and/or cycle tracks
Traffic Calming	Vertical Deflection and Turn Calming	use at intersections with Corridors and where speeding is a concern	

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A
 * Not shown in graphic but required

¹**Frontage Zone:** Only needed if pedestrian traffic is high and there are frequent entrances. Otherwise, this space can be designated to the Greenscape-Furnishing Zone.

²**Lighting:** Pedestrian-scale lighting should be provided.

³**On-street Parking:** Assess parking needs, and consider parking on only one side of the street to make room for a bike lane.

⁴**Loading Zones:** Loading and deliveries can be encouraged on these streets, as long as it is designed to separate larger vehicles from people riding bicycles and minimize conflicting movements between users.

⁵**Bicycle Facilities:** The *Downtown Trenton Bicycle and Pedestrian Plan* calls for bike facilities on some Downtown Minor streets, which are essential to creating a complete network. Consider a buffer, like parking or flexible delineators, to improve safety and comfort for bikers.

Neighborhood Mixed Use

Overview

Neighborhood Mixed Use streets are characterized by a relatively even mix between residential and non-residential land uses. Unlike Commercial Corridors, these streets are relatively low volume as they primarily serve local residents. Like Commercial Corridors, the goal of these streets is to balance the needs of different users, but the lower vehicle volumes and fewer destinations demand a different approach. Opportunities should be taken to brand these walkable streets with elements that reflect neighborhood identity.

- Goal:** Safely balance the needs of different road users accessing neighborhood destinations
- Primary Land Use:** Mixed Commercial/Residential
- Density:** Varies
- Average Estimated Traffic Volume:** 3,000 vehicles/day
- Miles:** 23.6 miles
- Examples:** South Clinton Avenue, Liberty Street

Note: intersection elements are not included in the graphic, but may still be required.

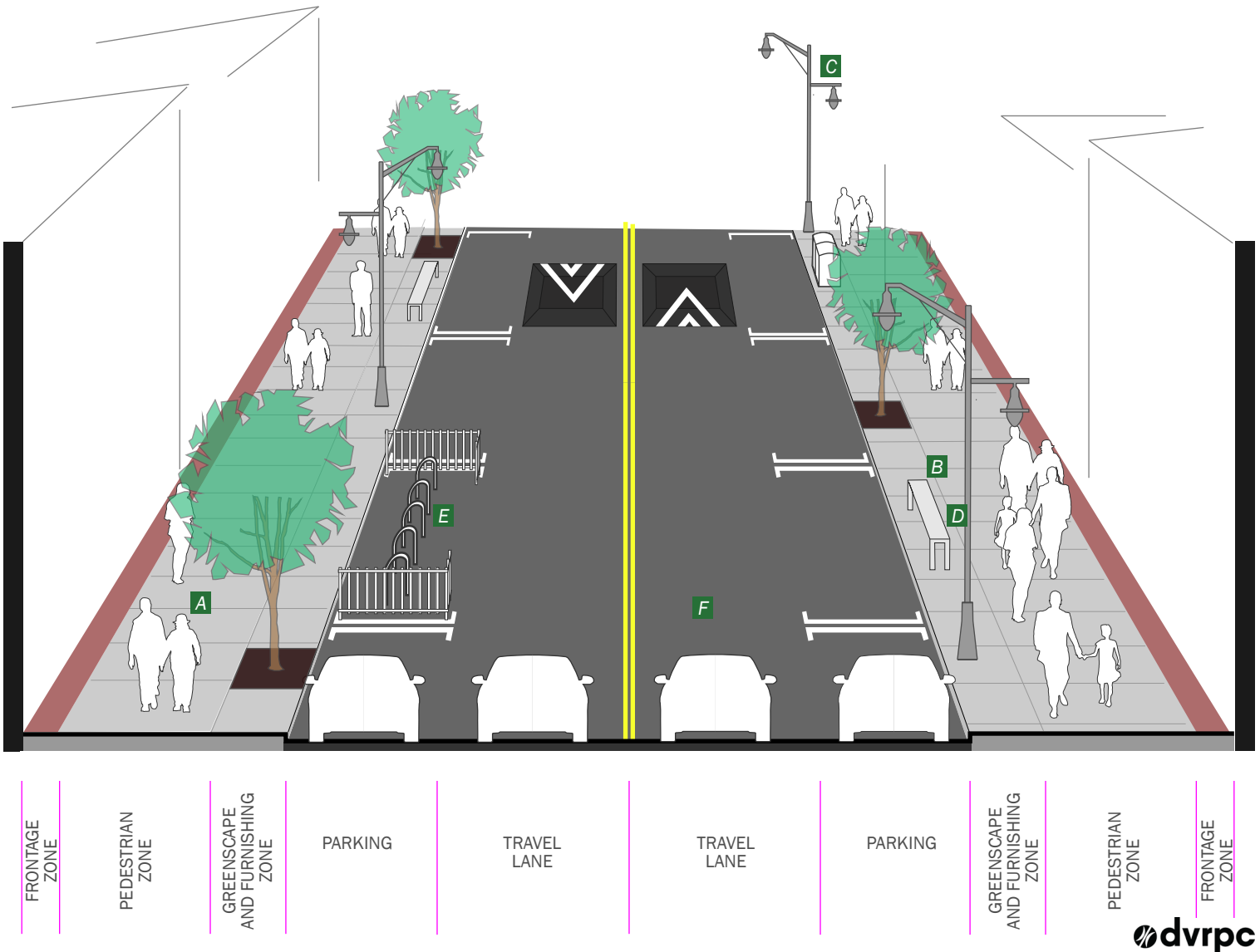


Figure 13 Model cross-section of a Neighborhood Mixed Use street



Design Considerations

		ELEMENT	✓ STIPULATIONS AND GUIDANCE	
SIDEWALK	Sidewalk Zones	Frontage Zone	2' - 6'	
		Pedestrian Zone	A 5' - 12', sidewalk should be standard cast-in-place concrete	
		Greenscape-Furnishing Zone	2'-6" - 8'	
	Sidewalk Elements ⁴	Drainage/Green Stormwater Infrastructure		stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas		
		Street Trees		small or medium, < or = 25', spaced at least 20' apart
		Street Furniture	B	provide seating, waste receptacles at regular intervals
		Lighting ²	C	alternating across street, 75'-120' spacing
		Bus Stop Amenities	D	provide seating, add shelter if possible
		Bike Parking	E	if sidewalk space is limited, consider bike corral in a parking space
CURB	Sidewalk Facing	Driveways / Entrances	20'-24' wide, 100' from signalized intersections	
		Curb Extensions	as needed, only in high pedestrian traffic areas	
		Bus Loading Curb Extensions		
	Road Facing	On-street Parking ³		may be used as a flex lane for other curb uses, like parklets
		Parklets		Consider in areas with high pedestrian activity
		Loading Zones		30' long, use as needed
ROADWAY	Traffic Calming Strategies ⁴	Lane Narrowing	F 11' for lanes with bus traffic, maximum 10' for all other lanes	
		Vertical Deflection		use speed cushions if road used by buses or heavy vehicles
		Chicanes		
		Neckdowns		use in high pedestrian traffic areas
	Transit Bikes	Dedicated Bus Lane		if space is available, place on the right side of the road
	Bicycle Facilities ⁵		consider sharrows or parallel routes with high quality facilities	
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	* continental style with ADA ramps at all controlled intersections	
		Pedestrian Signals and Warning Signs	* install countdown timers and LPIs at all signalized intersections	
		Pedestrian Refuge Island		
	Bicycle Safety and Priority	Bike Boxes		install at signalized intersections with bike facilities
		Two-stage Turning Boxes		use where there is high bike turning volumes and/or cycle tracks
Traffic Calming	Vertical Deflection and Turn Calming		use at intersections with Corridors and where speeding is a concern	

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A
 * Not shown in graphic but required

¹**Sidewalk Elements:** Public art can be placed in the Greenscape-Furnishing Zone. Consider using neighborhood identity and local artists.

²**Lighting:** Lighting fixtures should be more concentrated at 75' spacing. Pedestrian-scale lighting fixtures should be provided.

³**On-street Parking:** Spaces dedicated to short-term parking and drop-off zones may be used near some land uses like apartment buildings, churches, stores, or schools.

⁴**Traffic Calming Strategies:** Traffic calming treatments should be carefully evaluated where speeding and speeding-related crashes are a concern. Devices like raised crosswalks or intersections may be appropriate in locations with high volumes of pedestrians, while speed cushions can calm traffic at midblock locations.

⁵**Bicycle Facilities:** Because the cartway is often constrained and there are many uses competing for space, creating high-quality bicycle facilities on parallel routes is recommended.

Industrial Access

Overview

Industrial Access streets provide important access to industrial land uses and must be designed to accommodate the large vehicles that use these streets, like having wider driving and parking lanes. In Trenton, these streets are mostly dead-ends and small access streets off of Connector Corridors in the Northeast section of the city. The graphic below shows a cross-section of a two-way Industrial Access street with many recommended design elements. A one-way street would look similar, but without two-way traffic.

Goal: Provide trucks and large vehicles efficient access to industrial land uses. Street designs should minimize modal conflicts in places where they occur.

Primary Land Use: Industrial

Density: N/A

Average Estimated Traffic Volume: 2,300 vehicles/day

Miles: 22.8 miles

Examples: Muirhead Avenue

Note: intersection elements are not included in the graphic, but may still be required.

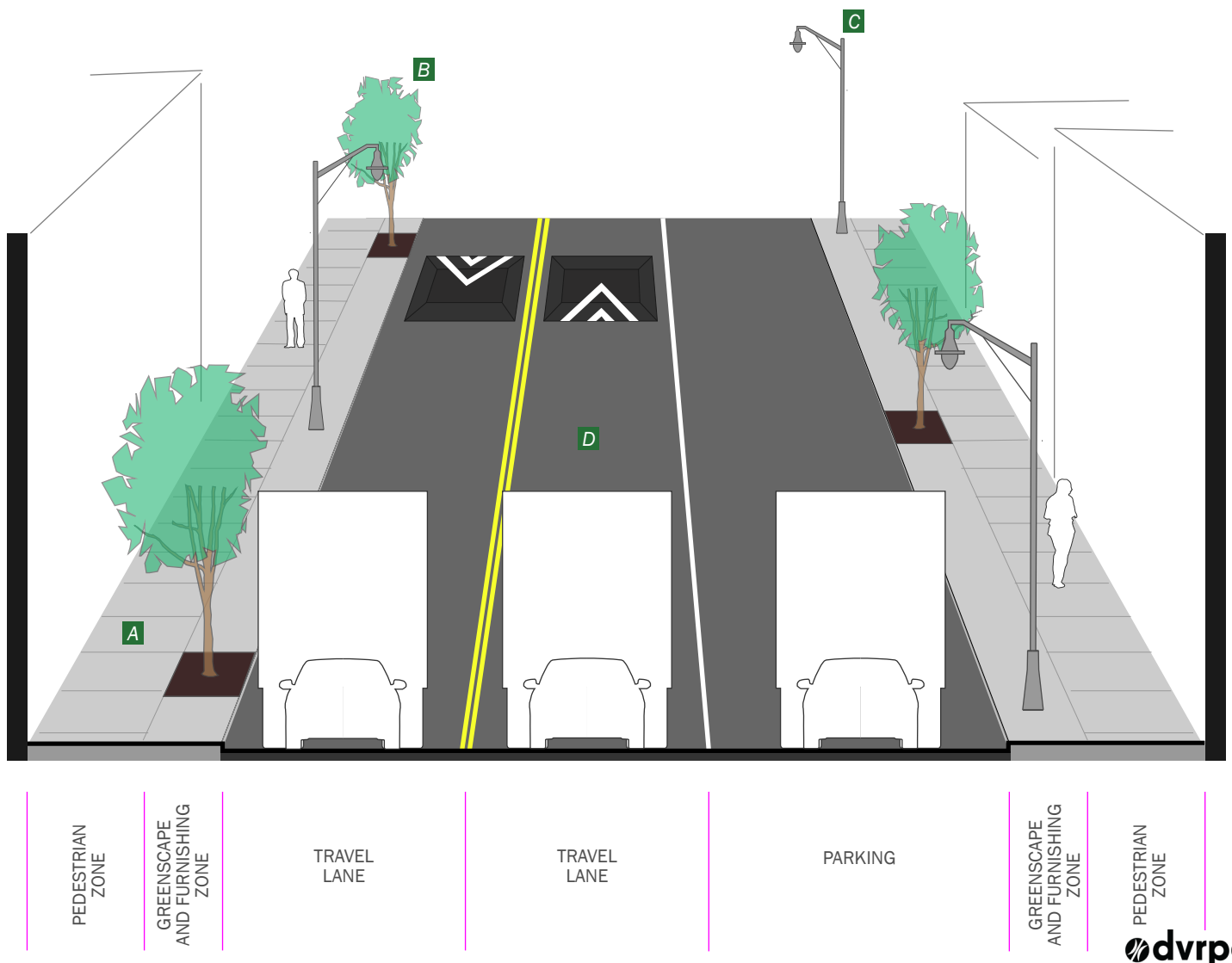


Figure 14 Model cross-section of an Industrial Access street

Design Considerations

		ELEMENT	✓ STIPULATIONS AND GUIDANCE	
SIDEWALK	Sidewalk Zones	Frontage Zone ¹	none - 6'	
		Pedestrian Zone	A 5' - 6', sidewalk should be standard cast-in-place concrete	
		Greenscape-Furnishing Zone		
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure ²		if possible, stormwater planter, tree trenches, rain gardens
		Sidewalk Cafes and Plazas		
		Street Trees	B	medium or large < or = 25', spaced at least 20' apart
		Street Furniture		
		Lighting ³	C	alternating across street, 75' - 120' spacing
		Bus Stop Amenities		provide seating, add shelter if possible, especially at popular stops
		Bike Parking		
CURB	Sidewalk Facing	Driveways / Entrances		20'-24' wide, 100' from signalized intersections
		Curb Extensions		as needed
		Bus Loading Curb Extensions		
	Road Facing	On-street Parking ⁴		use 9'-10' minimum width spaces to accommodate trucks
		Parklets		
		Loading Zones		80' long and 9'-10' minimum width to accommodate trucks
ROADWAY	Traffic Calming Strategies	Lane Narrowing	D	maximum 11' lanes
		Vertical Deflection		speed cushions preferred because of truck traffic
		Chicanes		
	Transit	Neckdowns		
		Dedicated Bus Lane		
Bikes	Bicycle Facilities ⁵		strongly consider parallel routes	
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	*	continental style with ADA ramps at all controlled intersections
		Pedestrian Signals	*	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island		assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		install at signalized intersections with bike facilities
		Two-stage Turning Boxes		use where there is high bike turning volumes and/or cycle tracks
Traffic Calming	Vertical Deflection and Turn Calming		design to not impede truck traffic	

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A
 ✱ Not shown in graphic but required

¹**Frontage Zone:** Only needed if pedestrian traffic is high and there are frequent entrances. Otherwise, this space can be designated to the Greenscape-Furnishing Zone.

²**Drainage and Green Stormwater Infrastructure:** Facilities should be placed away from intersections to not impede turning movements or access. Green Stormwater Infrastructure installations should not be constructed near operations working with or handling chemicals so these substances are not entering the ground water.

³**Lighting:** Pedestrian-scale lighting is not required.

⁴**On-street Parking:** Where provided, the parking lane should be 9'-10' minimum, and up to 15', to accommodate trucks (typically 8.5').

⁵**Bicycle Facilities:** Because these roads have a higher proportion of large, heavy vehicles, bicycle facilities should use alternative routes, unless it is a critical link in the bike network. If bicycle facilities are necessary, separate bicyclists from vehicles in bike lanes that are at least buffered but preferably also have physical protection.

Park

Goal: Facilitate movement of all road users within parks

Primary Land Use: Recreation

Density: Below Average

Average Estimated Traffic Volume: Very Low

Miles: 5.3 miles

Examples: Trenton Road

Overview

Park streets generally have limited vehicle access and a significant portion of these streets are closed to most vehicular traffic. Whether or not these roads allow motorized vehicles, they serve to facilitate the movement of road users within parks. Park streets are confined to Cadwalader Park, which is large enough to require interior vehicle circulation connecting the city road network to destinations within the park and across it. They are unique from the "Park Access" overlay, which focuses attention on safe access to parks throughout Trenton.

Note: intersection elements are not included in the graphic, but may still be required.

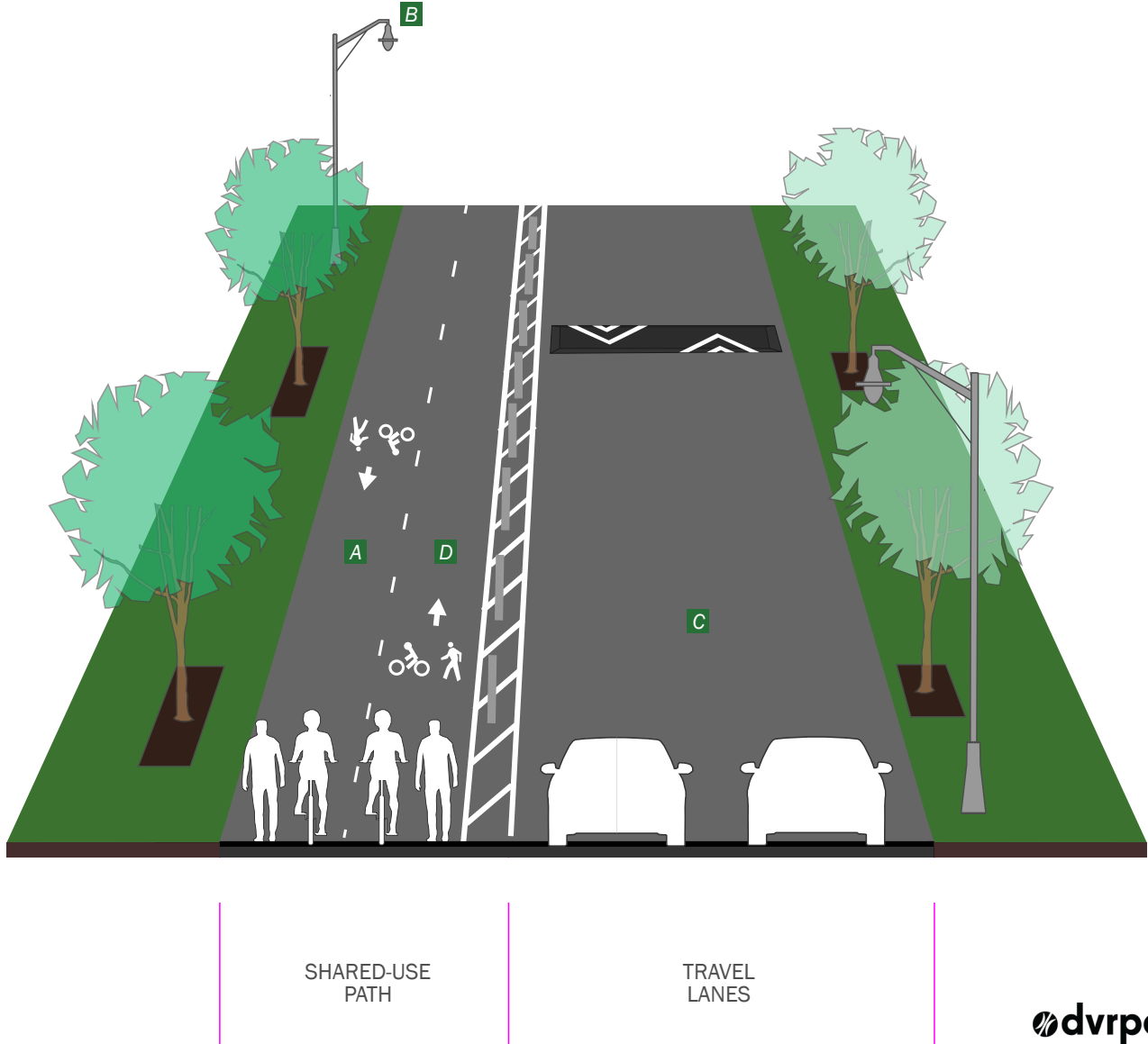


Figure 15 Model cross-section of a Park street

Design Considerations

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone		
		Pedestrian Zone	A	5' - 6', sidewalk should be standard cast-in-place concrete
		Greenscape-Furnishing Zone		
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure		
		Sidewalk Cafes and Plazas		
		Street Trees		
		Street Furniture		provide seating
		Lighting ¹	B	alternating across street, 50'-80' spacing
		Bus Stop Amenities		
		Bike Parking		assess need for number of spots
CURB	Sidewalk Facing	Driveways / Entrances		
		Curb Extensions		
		Bus Loading Curb Extensions		
	Road Facing	On-street Parking		
		Parklets		
		Loading Zones		
ROADWAY	Traffic Calming Strategies ²	Lane Narrowing	C	10', painted centerline not required
		Vertical Deflection		use speeds humps/tables to slow traffic if speeding is an issue
		Chicanes		
	Transit	Neckdowns		
		Dedicated Bus Lane		
Bikes	Bicycle Facilities ³	D	consider shared-use path	
INTERSECTION	Pedestrian Safety and Priority	Crosswalks		
		Pedestrian Signals and Warning Signs		
		Pedestrian Refuge Island		
	Bicycle Safety and Priority	Bike Boxes		
		Two-stage Turning Boxes		
Traffic Calming	Vertical Deflection and Turn Calming			

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A

¹**Lighting:** Pedestrian-scale lighting is not necessary on Park streets, although street lighting is required.

²**Traffic Calming Strategies:** Park streets are good candidates for speed humps, which require vehicles to travel at very slow speeds, because they are low volume, semi-private, and posted at 15 mph.

³**Bicycle Facilities:** Where conflicts with vehicular traffic need to be addressed, the Pedestrian Zone may be widened to 10' or more to create a shared-use path, which designates a protected portion of the right-of-way for two-way, shared pedestrian and bicyclist use. Shared-use paths are typically asphalt, not concrete.

Alley

Overview

Alleys are primarily used for accessing adjacent residential and occasionally commercial properties. They tend to be very narrow, under 14 feet, and have very limited vehicle traffic. It may not be possible to have dedicated space for pedestrians, so alleys should be designed as shared streets by slow moving vehicles. Therefore vehicles, pedestrians, people on bicycles, and kids playing can share the space safely. Where possible alleys can be used to add trees, plantings and other green stormwater infrastructure.

Goal: Shared spaces that provide local access to adjacent properties and may be used for multiple uses including parking and loading.

Primary Land Use: Residential

Density: N/A

Average Estimated Traffic Volume: Very low

Miles: 61.2 miles

Examples: Kuhn Alley

Note: intersection elements are not included in the graphic, but may still be required.

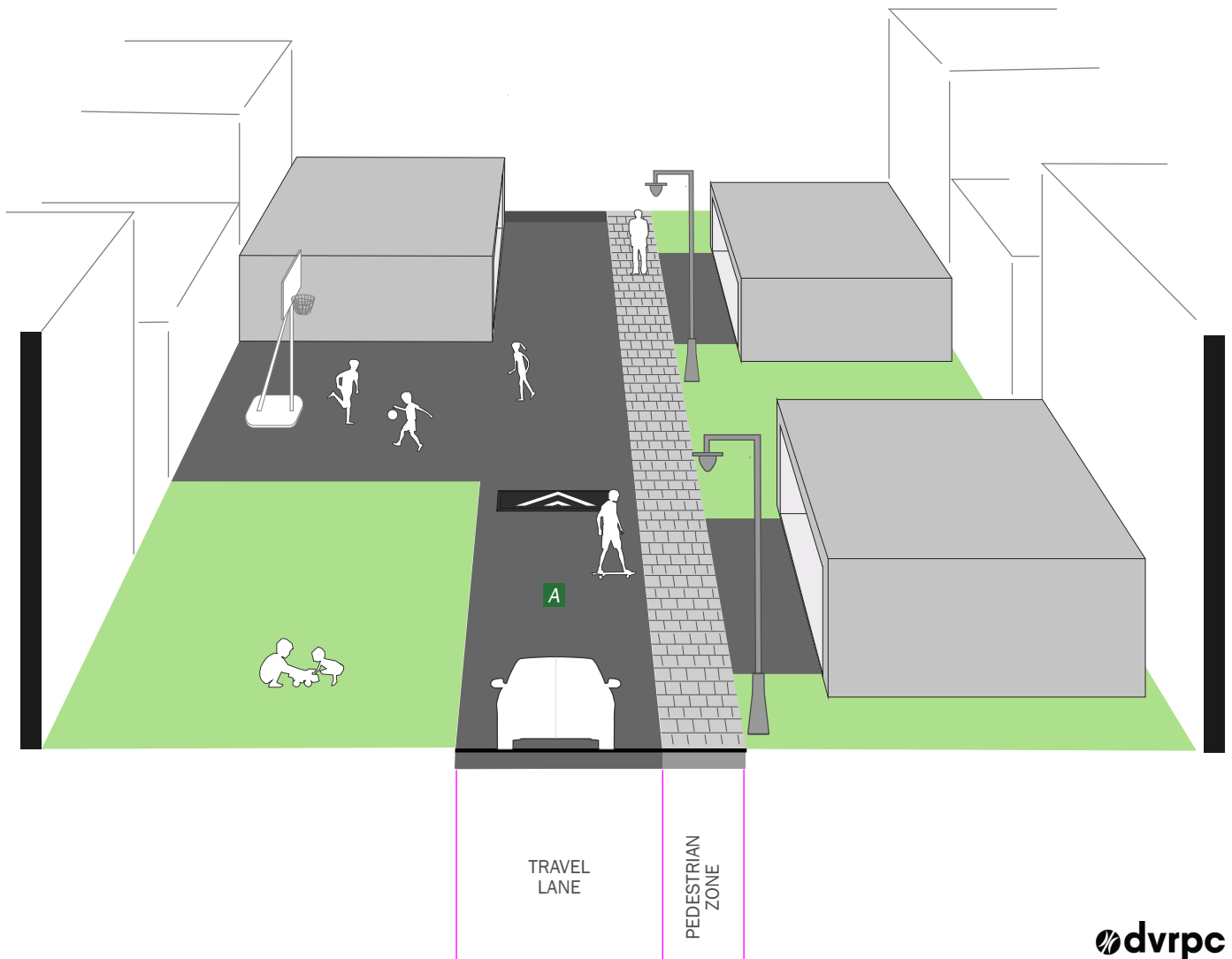


Figure 16 Model cross-section of an Alley



Design Considerations

		ELEMENT	✓	STIPULATIONS AND GUIDANCE	
SIDEWALK	Sidewalk Zones	Frontage Zone	Not Recommended or N/A		
		Pedestrian Zone	Recommended	5' - 6'	
		Greenscape-Furnishing Zone	As Needed		
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	As Needed	if possible, stormwater planters, tree trenches, rain gardens	
		Sidewalk Cafes and Plazas	Not Recommended or N/A		
		Street Trees	As Needed	if possible, small < or = 25', spaced at least 20' apart	
		Street Furniture	Not Recommended or N/A		
		Lighting ¹	Recommended	where space is available, alternating across street, 50' spacing	
		Bus Stop Amenities	Not Recommended or N/A		
		Bike Parking	Not Recommended or N/A		
	CURB	Sidewalk Facing	Driveways / Entrances	As Needed	
			Curb Extensions	Not Recommended or N/A	
Bus Loading Curb Extensions			Not Recommended or N/A		
Road Facing		On-street Parking	As Needed		
		Parklets	Not Recommended or N/A		
ROADWAY	Traffic Calming Strategies ²	Lane Narrowing	A	no wider than 10' lanes, painted centerline not required	
		Vertical Deflection	As Needed	use if speeding is an issue	
		Chicanes	Not Recommended or N/A		
		Neckdowns	Not Recommended or N/A		
	Transit	Dedicated Bus Lane	Not Recommended or N/A		
	Bikes	Bicycle Facilities	Not Recommended or N/A		
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	Not Recommended or N/A		
		Pedestrian Signals and Warning Signs	Not Recommended or N/A		
		Pedestrian Refuge Island	Not Recommended or N/A		
	Bicycle Safety and Priority	Bike Boxes	Not Recommended or N/A		
		Two-stage Turning Boxes	Not Recommended or N/A		
Traffic Calming	Vertical Deflection and Turn Calming	As Needed	consider raised crosswalks if speeding is a concern		

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A

¹**Lighting:** Where space is available, downward facing lighting can increase visibility and safety. When there is not space in the public right-of-way for fixtures, incentivize the installation of lighting on private property or attached to private structures. Pedestrian-scale lighting is not required.

²**Traffic Calming Strategies:** Alleys are good candidates for speed humps, which require vehicles to travel at very slow speeds.

Because Alleys are often too narrow for a sidewalk and they have very low vehicle volumes, they can be designed as shared streets where vehicles and non-motorized users mix together in the right-of-way without the delineation of separate spaces. Traffic calming can be used to encourage very slow speeds. Signage can be used to further reinforce the shared nature of these roads.



Overlays

What Are Overlays and Why Were They Developed for the Plan?

In addition to the typologies, there are areas of the city that have needs or users that would benefit from additional treatments or types of infrastructure, no matter what the underlying typology is. The overlays specify recommended treatments above and beyond the typology requirements, acknowledging that it is especially important to provide safe access for vulnerable users in these places. Overlays were

defined to delineate the access routes and streets adjacent to particular uses. Figure 17 shows a map of all seven types of overlays. Detailed maps with overlays identified by street are available in the Appendix.



Figure 17 Map of all overlays

Source: DVRPC, 2021



Lyndale Avenue, next to Villa Park

Source: DVRPC, 2018

The seven overlay types are:

- Transit
- Trail Access
- Park Access
- School Access
- Station Area
- Limited Access Transitions
- Combined Sewer

Each of the overlays was defined individually based on assumptions made about how and how far a person walking or biking might go to access each of the features included in the overlay or if transit vehicles are present. For example, the catchment area for the Trenton Transportation Center Station overlay is likely different than that of a neighborhood park. These differences are reflected in what is covered by each overlay.

The following section describes how each overlay was defined and maps where each overlay is applicable. Next a description of each overlay's design goals and tools is described and illustrated, ending with a table of required, recommended, and as needed elements for these streets.



E. State Street, a hub of bus activity

Source: DVRPC, 2018

Overlay Development Methodologies

The following are the methodologies used to develop each overlay and their most common underlying typology:

Transit

Streets identified in the transit overlay serve as bus routes in NJ TRANSIT's network. These streets have an array of underlying typologies, but the most common underlying typologies are Connector Corridors, Downtown Connector Corridors, and Neighborhood Mixed Use streets. The source data used was NJ TRANSIT 2015 bus routes.



Multimodal street in Seattle, WA

Source: Dan Burden, PBIC



Figure 18 Transit overlay

Source: DVRPC, 2021

Trail Access

Streets identified in the Trail Access overlay are adjacent to an access point to the Delaware & Raritan Canal Trail, and include segments up to the nearest major intersection. These streets have an array of underlying typologies, but the most common underlying typologies are Dense Residential streets and Connector Corridors. The data source was DVRPC trail count data from 2018.



High-visibility crosswalk leading into a multiuse trail in Vancouver, WA.

Source: Adam Coppola, PBIC



Figure 19 Trail Access overlay

Source: DVRPC, 2021

Park Access

Streets identified in the Park Access overlay are within 100 feet of a park, and include segments up to the nearest major intersection. These streets have an array of underlying typologies, but the most common underlying typologies are Dense Residential streets, Single-Family Residential streets, and Alleys. The input data was DVRPC open space information from 2011.



Neighborhood park in Boston, Massachusetts

Source: Laura Sandt, PBIC

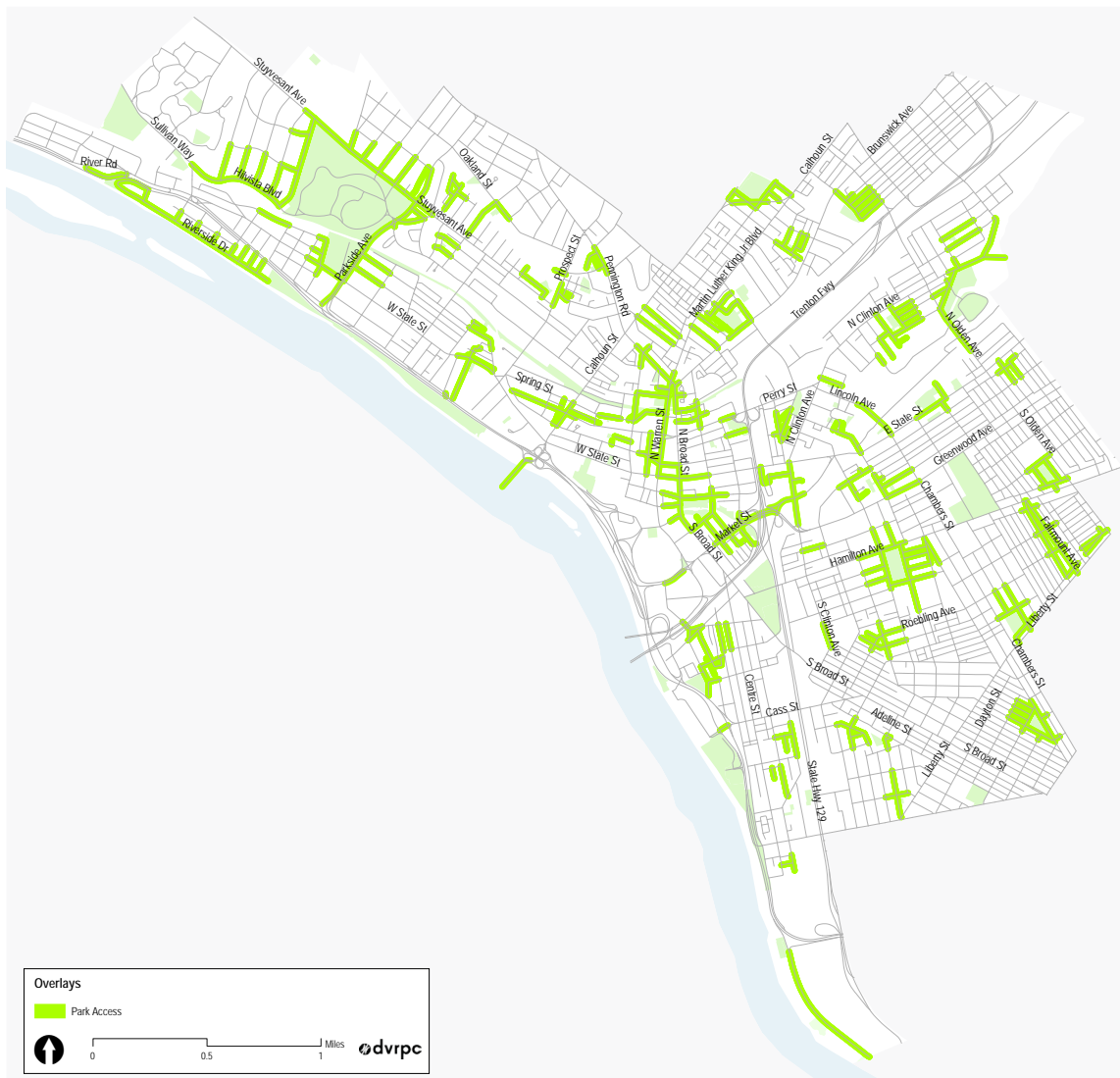


Figure 20 Park Access overlay

Source: DVRPC, 2021

Schools

Streets identified in the Schools overlay are adjacent to school parcel boundaries, and include segments up to Safe Passage intersections. Safe Passage intersections have been identified by the Trenton Public Schools district and the data is available on their website. Where there is not a Safe Passage defined, the nearest major intersection was used. These streets have an array of underlying typologies, but the most common underlying typologies are Dense Residential streets, Connector Corridors, and Neighborhood Mixed Use streets. Schools were identified using information from the National Center for Education Statistics from 2015 to 2019 and include all schools, kindergarten through high school (K-12), including public, private, and charter schools.



Crossing guard ensuring that children cross safely on their route to school. Source: Rachel Bowden, PBIC



Figure 21 School overlay

Source: DVRPC, 2021

Rail Station Area

The Rail Station Area overlay includes streets within a quarter-mile radius of each of the four train stations in Trenton (the Trenton Transit Center and the three RiverLine stations), with adjustments made to include major origins and destinations. The quarter-mile radius is expanded in the downtown direction from the Trenton Transit Center, with additional areas determined by the 2018 *Trenton Transit Center Strategic Action Plan*. The Cass Street Station boundary is expanded slightly to include the baseball stadium and other waterfront open spaces to the west of the station.



Transit Station, Charlotte NC

Source: Laura Sandt, PBIC



Figure 22 Station Area overlay

Source: DVRPC, 2021

Limited Access Transitions

The overlay identifies transition points between limited access roads and local streets where vehicles must quickly decelerate. It includes all intersections that immediately follow off-ramps, extending 100 feet from the intersection on the local street network. Also included in this overlay are several intersections on corridors that have a mile or more spacing between intersections.



Four-lane road near an interstate off-ramp.

Source: Dan Burden, PBIC



Figure 23 Limited Access Transitions overlay

Source: DVRPC, 2021

Combined Sewer

The Combined Sewer overlay is defined by the existing boundary of the combined sewer overflow area in Trenton. A combined sewer overflow system means that rainfall, sewage, and industrial and human wastewater are all collected in one pipe, and when the pipe reaches capacity during heavy rain events and snowmelt, untreated wastewater is discharged to local rivers, streams, and other bodies of water like the Delaware River in Trenton. It is important to note that green stormwater infrastructure is important citywide and should not be limited to only the Combined Sewer overlay.



Bioswale in the curb zone, Portland, OR

Source: Ben Baldwin



Figure 24 Combined Sewer overlay

Source: DVRPC, 2021

Transit

Overview

The Transit overlay triggers additional considerations to ensure the smooth operation of transit vehicles and safe, easy access for transit riders at transit stops. Streets identified in the transit overlay serve as bus routes in NJ TRANSIT’s network.

Considerations

The roadway must accommodate buses to the greatest extent possible, ideally with a dedicated bus lane. At a minimum, the outer lanes of the road must have an 11' width.

- A** If vertical traffic calming treatments are needed on the roadway, speed cushions should be selected because they will allow the bus to pass unimpeded.
- B** At the curb, priority should be given to bus boarding and alighting through loading bumpouts and the

minimization of obstacles that can interfere with bus operations like driveways. This guidance applies whether near-side or far-side (as shown below) bus stops are used.

Where the bike network interacts with bus stops, special care should be made to minimize conflicts between bicyclists, buses and transit riders. This may include raising the bike lane to the level of the sidewalk and allowing bicyclists to pass between the sidewalk and the loading bumpout.

- C** On the sidewalk, space should be allocated for transit riders with shelters, seating areas, and other amenities.
- D** Accommodation should be made for safe access to bus stops including high visibility crosswalks with ADA ramps and bicycle parking for multimodal trips. Bus stops should be outfitted with amenities for transit riders, including shelters, seating, transit maps and timetables, and trash receptacles.

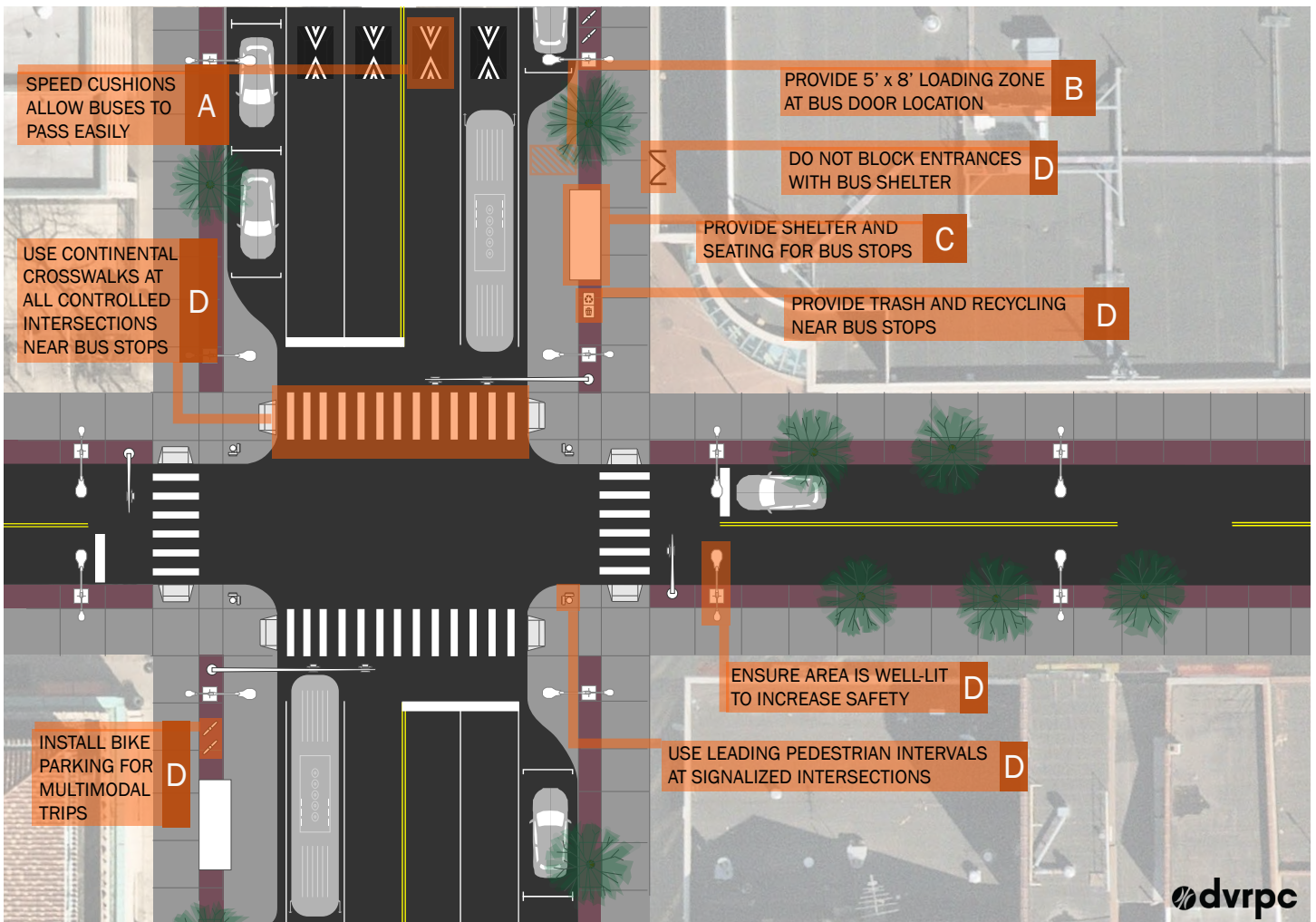


Figure 25 Design considerations for streets within the Transit overlay

Note: Overlay stipulations override underlying typology stipulations except where otherwise noted.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone		<i>refer to underlying typology</i>
		Pedestrian Zone	Required	8' - 12'
		Greenscape-Furnishing Zone	Required	8' at bus stops
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	Required	special attention to grade/pooling if loading bumpout is built
		Sidewalk Cafes and Plazas		<i>refer to underlying typology</i>
		Street Trees	Recommended	site trees to not block view of approaching buses
		Street Furniture	Required	provide seating
		Lighting	Required	50' spacing
		Bus Stop Amenities	Recommended	add shelter if possible
		Bike Parking	Required	if space limited, consider installing a bike corral in a parking space
CURB	Sidewalk Facing	Driveways / Entrances	As Needed	restricted use
		Curb Extensions	Recommended	use with bus stop
		Bus Loading Curb Extensions	Recommended	as needed with bus stops and limited sidewalk space
	Road Facing	On-street Parking	As Needed	assess need, minimize in proximity to bus loading
		Parklets	As Needed	use caution around bus stops to avoid interfering with operations
	Loading Zones	As Needed	assess need, minimize when possible	
ROADWAY	Traffic Calming Strategies	Lane Narrowing	Required	11' for lanes with bus traffic
		Vertical Deflection	Recommended	use speed cushions if road used by buses or heavy vehicles
		Chicanes	Not Recommended/Not Applicable	
		Neckdowns		<i>refer to underlying typology</i>
	Transit	Dedicated Bus Lane	Recommended	if space is available, place on the right side of the road
Bikes	Bicycle Facilities	Recommended	use most protection possible, consider parallel routes	
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	Required	continental style with ADA ramps at signalized intersections
		Pedestrian Signals and Warning Signs	Required	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	As Needed	assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		<i>refer to underlying typology</i>
Two-stage Turning Boxes			<i>refer to underlying typology</i>	
	Traffic Calming	Vertical Deflection and Turn Calming	As Needed	design to not impede bus operations

Required
 Recommended
 As Needed
 Not Recommended/Not Applicable

Trail Access

Overview

Streets under the Trail Access overlay must be designed to accommodate trail users. Trenton's trails offer a unique network of fully separated paths for pedestrians and bicyclists to travel and recreate with minimal interaction with motorized vehicles.

Considerations

A Conflict points with the street network require interventions that slow vehicles and increase visibility of the trail crossing, such as daylighting (ensuring that there are no visual obstructions like parked cars) around trail entrances and advance warning signs.

B If possible, midblock crossings should be installed that enable continuous use of the trail through the conflict point with the street network. The midblock crossing can be further protected by raising the crosswalk with a speed table, if that type of traffic calming is appropriate on the underlying street typology. This both calms traffic and ensures accessibility for all trail users.

C Provide for easy trail and public transit access with features like parking facilities for bicycles and vehicles and well-designed transit facilities.

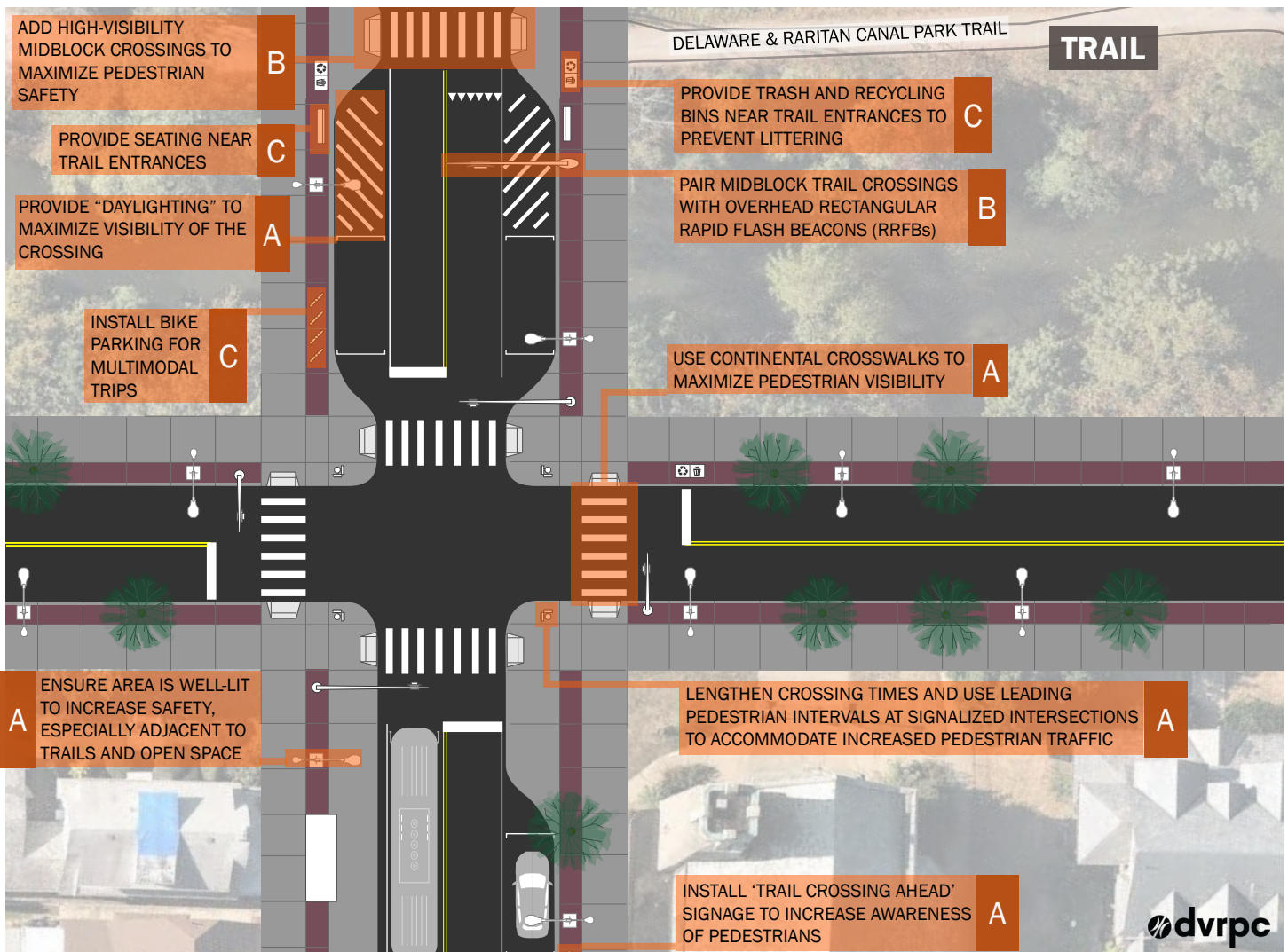


Figure 26 Design considerations for streets within the Trail Access overlay

Note: Overlay stipulations override underlying typology stipulations except where otherwise noted.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone		refer to underlying typology
		Pedestrian Zone		refer to underlying typology
		Greenscape-Furnishing Zone	■	2'-6" - 8'
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	■	
		Sidewalk Cafes and Plazas		refer to underlying typology
		Street Trees	■	
		Street Furniture		
		Lighting	■	50' spacing
		Bus Stop Amenities	■	provide seating, add shelter if possible
		Bike Parking	■	assess need for number of spots
CURB	Sidewalk Facing	Driveways / Entrances		refer to underlying typology
		Curb Extensions	■	if possible
		Bus Loading Curb Extensions		refer to underlying typology
	Road Facing	On-street Parking	■	
		Parklets		refer to underlying typology
	Loading Zones	■	30' long, near trail entrance for passenger vehicles	
ROADWAY	Traffic Calming Strategies	Lane Narrowing		refer to underlying typology
		Vertical Deflection	■	consider raising midblock crossings at trail entrance
		Chicanes		refer to underlying typology
	Transit	Neckdowns		refer to underlying typology
		Dedicated Bus Lane		refer to underlying typology
	Bikes	Bicycle Facilities	■	use most protection possible
INTERSECTION	Pedestrian Safety and Priority ¹	Crosswalks ²	■	continental style at signalized intersections or trail entrances
		Pedestrian Signals and Warning Signs	■	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	■	assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		refer to underlying typology
		Two-stage Turning Boxes		refer to underlying typology
Traffic Calming	Vertical Deflection and Turn Calming	■		

■ Required ■ Recommended ■ As Needed ■ Not Recommended/Not Applicable

¹**Pedestrian Safety and Priority:** "No Right Turn on Red" prohibitions and accompanying signage should be implemented at signalized intersections in this overlay due to the high number of children and other vulnerable pedestrians crossing the street. Advance warning signs can be used before trail crossings.

²**Crosswalks:** Raised midblock crossings at locations of high pedestrian activity (e.g., trail crossings) should be considered. Crossings should be paired with Rectangular Rapid Flashing Beacons (RRFBs) to alert drivers when pedestrians are crossing.

Park Access

Overview

The Park Access overlay identifies locations where extra consideration is needed to ensure safe access to parks. Neighborhood parks are community assets that attract users of all ages and abilities. As such, streets under the Park Access overlay should be locations where traffic moves as slowly as possible. The presence of the park elevates the need to slow traffic and ensure that everyone can easily and safely access the park.

Considerations

A In the roadway, all pedestrian crossings must be designed and maintained for high visibility, including the use of continental crosswalks and in-road signage. On streets with long distances between intersections or high demand midblock attractions, a midblock crossing should be considered. All crosswalks should be outfitted with ADA ramps and detectable warning surface.

B At the curb, a buffer should be provided between the Pedestrian Zone and the travel lane(s) to increase comfort and safety for pedestrians. This can be accomplished in two ways—a Greenscape-Furnishing Zone or on-street parking. Ideally both are used.

C On the sidewalk, facilities should be provided that encourage people to travel to the park without a car. This includes providing seating and a shelter at any bus stops and providing sufficient bike parking. Trash and recycling containers should be provided to minimized litter on the sidewalk, in the road, and in the park.

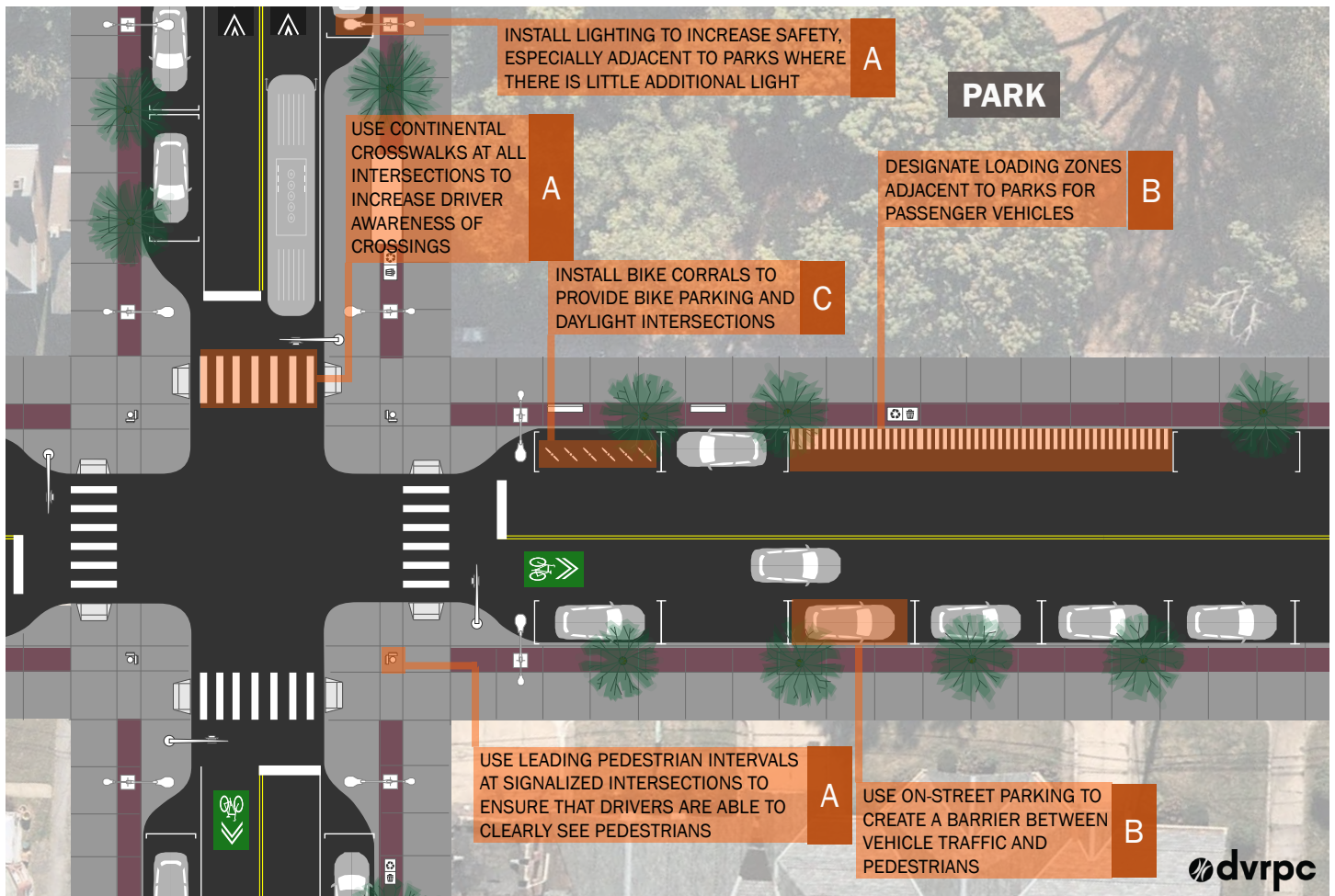


Figure 27 Design considerations for streets within the Park Access overlay

Note: Overlay stipulations override underlying typology stipulations except where otherwise noted.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone		refer to underlying typology
		Pedestrian Zone	Required	6' minimum, 8' preferred
		Greenscape-Furnishing Zone	Required	2'-6" - 8'
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	Required	
		Sidewalk Cafes and Plazas		refer to underlying typology
		Street Trees	Recommended	
		Street Furniture		
		Lighting ¹	Recommended	50' spacing
		Bus Stop Amenities	Recommended	provide seating, add shelter if possible
		Bike Parking	Recommended	consider a bike corral in an on-street parking space, if needed
		CURB	Sidewalk Facing	Driveways / Entrances
Curb Extensions	As Needed			if space allows
Bus Loading Curb Extensions				refer to underlying typology
Road Facing	On-street Parking		As Needed	
	Parklets			refer to underlying typology
ROADWAY	Traffic Calming Strategies	Loading Zones	As Needed	30' long, near park entrance for passenger vehicles
		Lane Narrowing		refer to underlying typology
		Vertical Deflection	Recommended	consider raising midblock crossings
		Chicanes		refer to underlying typology
	Transit Bikes	Neckdowns		refer to underlying typology
		Dedicated Bus Lane		refer to underlying typology
		Bicycle Facilities	Recommended	use most protection possible
INTERSECTION	Pedestrian Safety and Priority ²	Crosswalks ³	Recommended	continental style at signalized intersections or park entrances
		Pedestrian Signals and Warning Signs ⁴	Recommended	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	As Needed	assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		refer to underlying typology
		Two-stage Turning Boxes		refer to underlying typology
Traffic Calming	Vertical Deflection and Turn Calming	Recommended		

Required
 Recommended
 As Needed
 Not Recommended/ Not Applicable

¹**Lighting:** Lighting should be spaced every 50' to ensure that people feel safe near parks at night. This is particularly important immediately adjacent to parks, where there are fewer light sources in general.

²**Pedestrian Safety and Priority:** "No Right Turn on Red" prohibitions and accompanying signage should be implemented at signalized intersections in this overlay due to the high number of children and other vulnerable pedestrians crossing the street.

³**Crosswalks:** All crosswalks should be outfitted with ADA ramps and detectable warning surface (DWS). Raised midblock crossings at locations of high pedestrian activity should be considered. Crossings should be paired with Rectangular Rapid Flashing Beacons (RRFBs) to alert drivers when pedestrians are crossing.

⁴**Pedestrian Signals and Warning Signs:** Countdown timers should be set at 3.5 feet per second to allow both children and elderly park visitors a slightly longer crossing time than usual.

Schools

Overview

Roads surrounding schools are often subject to existing regulations to slow traffic and ensure that students can safely get to school on foot or by bike, including regulations that are part of Safe Routes to Schools and School Zone programs. The Schools Overlay is intended to build on these with additional considerations for Complete Streets elements that facilitate the heightened awareness demanded of drivers in proximity to schools.

Considerations

A In the roadway, all pedestrian crossings must be designed and maintained for high visibility, including the use of continental crosswalks with ADA curb ramps and in-road signage.

B Major pedestrian trip generators like the entrances to school buildings should be paired with midblock crossings, if appropriate.

C At the curb, a buffer should be provided between the Pedestrian Zone and the travel lane(s) to increase comfort and safety for pedestrians. This can be accomplished in two ways—a Greenscape-Furnishing Zone or on-street parking. Ideally both are used. Care should be given to creating loading (drop-off) zones that ensure safety for both students leaving vehicles and for non-motorized road users that may conflict with these operations, particularly bicyclists.

D On the sidewalk, facilities should be provided that encourage students to travel to the school without a car. This includes providing seating and a shelter at any bus stops and providing sufficient bike parking. Trash and recycling containers should be provided to minimized litter.

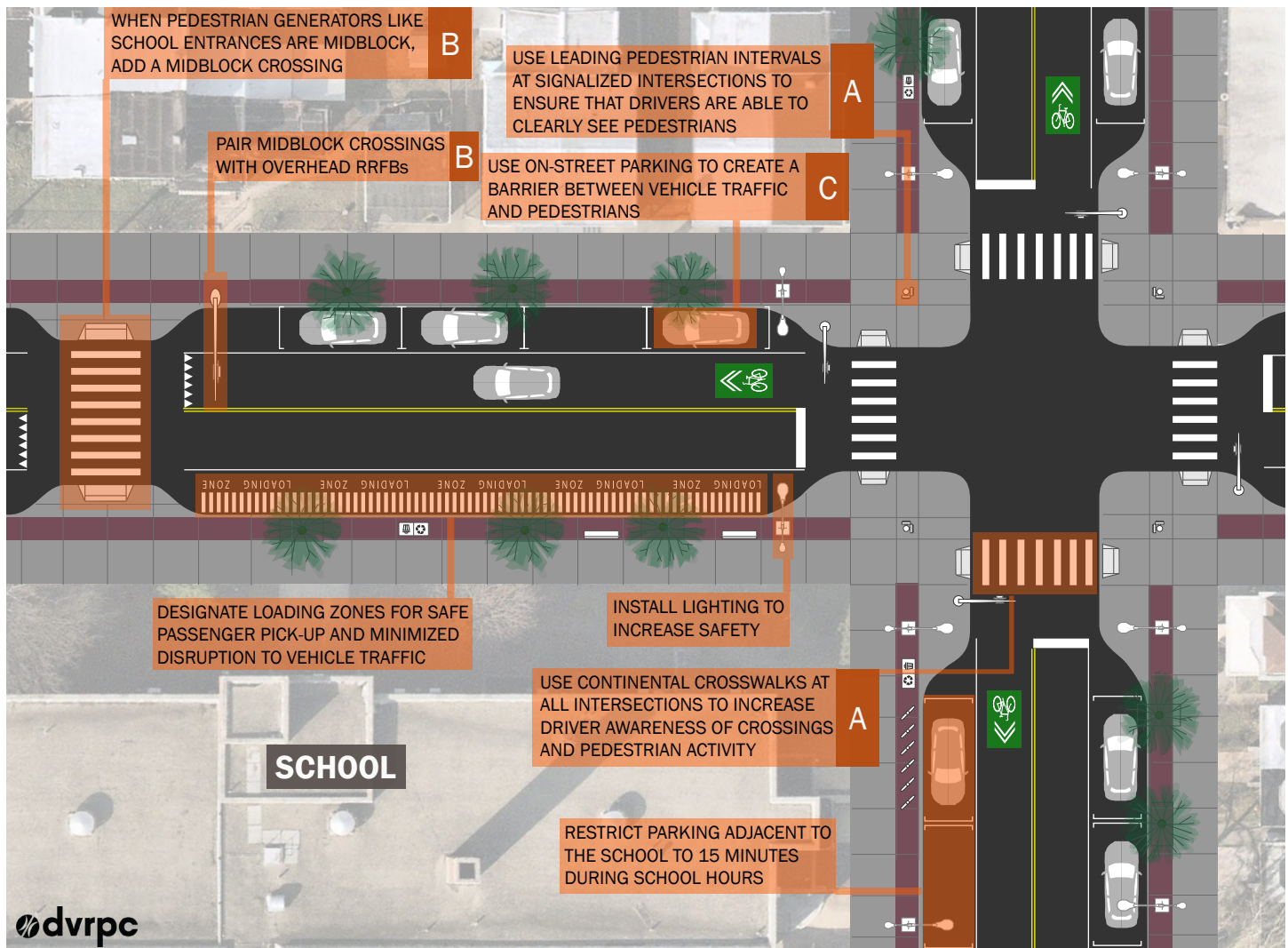


Figure 28 Design considerations for streets within the Schools overlay

Note: Overlay stipulations override underlying typology stipulations except where otherwise noted.

		ELEMENT	✓ STIPULATIONS AND GUIDANCE	
SIDEWALK	Sidewalk Zones	Frontage Zone	refer to underlying typology	
		Pedestrian Zone	refer to underlying typology	
		Greenscape-Furnishing Zone	2'-6" - 8'	
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure		
		Sidewalk Cafes and Plazas	refer to underlying typology	
		Street Trees		
		Street Furniture		
		Lighting	50' spacing	
		Bus Stop Amenities	provide seating, add shelter if possible	
		Bike Parking	consider a bike corral in an on-street parking space, if needed	
CURB	Sidewalk Facing	Driveways / Entrances	refer to underlying typology	
		Curb Extensions	if possible	
		Bus Loading Curb Extensions	refer to underlying typology	
	Road Facing	On-street Parking		
		Parklets	refer to underlying typology	
ROADWAY	Traffic Calming Strategies	Lane Narrowing	refer to underlying typology	
		Vertical Deflection	consider raising midblock crossings at school entrance	
		Chicanes	refer to underlying typology	
		Neckdowns	refer to underlying typology	
	Transit	Dedicated Bus Lane	refer to underlying typology	
	Bikes	Bicycle Facilities	use most protection possible	
	INTERSECTION	Pedestrian Safety and Priority ¹	Crosswalks ²	continental style with ADA ramps at all signalized intersections
		Bicycle Safety and Priority	Pedestrian Signals and Warning Signs	install countdown timers and LPIs at all signalized intersections
Pedestrian Refuge Island			assess need if road is four lanes or wider	
Traffic Calming		Bike Boxes	refer to underlying typology	
	Two-stage Turning Boxes	refer to underlying typology		
	Traffic Calming	Vertical Deflection and Turn Calming		

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended/ Not Applicable

¹**Pedestrian Safety and Priority:** "No Right Turn on Red" prohibitions and accompanying signage should be implemented at signalized intersections in this overlay due to the high number of children and other vulnerable pedestrians crossing the street.

²**Crosswalks:** All crosswalks should be outfitted with ADA ramps and detectable warning surface (DWS). Raised midblock crossings at locations of high pedestrian activity

(e.g., school entrances) should be considered. Crossings should be paired with Rectangular Rapid Flashing Beacons (RRFBs) to alert drivers when pedestrians are crossing.

School Zone: Design standards relevant to school zones should be consulted to ensure maximum safety benefits in proximity to the school entrances. For instance, "School Zone" signage should be installed at the nearest controlled intersections to alert drivers.

Rail Station Area

Overview

Streets in the Station Area overlay should be designed to encourage pedestrian and bicycle network connectivity to the nearby station. The Station Area overlay includes streets within a quarter-mile radius of each of the four train stations in Trenton. Given their proximity to a RiverLine station, these streets serve land slated for transit-oriented development (TOD) under *Trenton250* and related TOD planning documents. As such, these streets must be designed to take into consideration the impacts that TOD will have, including greater pedestrian traffic and the need to ensure safe and efficient paths to the station. Streets adjacent to the station should be designed to ensure safe, efficient access and to capitalize on the placemaking potential of the station as a major trip generator.

Considerations

- A** On streets that provide access to the station but are not adjacent to it, designs should enhance walkability. These include ensuring a minimum of an 8' wide pedestrian zone on the sidewalk .
- B** Other enhancements may include providing seating and enhanced lighting.
- C** Pedestrian-scale wayfinding signage that directs people on foot to the station should be considered.
- D** Crosswalks should be high visibility and as short as possible with ADA ramps and curb bumpouts and paired with other strategies like pedestrian refuge islands, where appropriate.

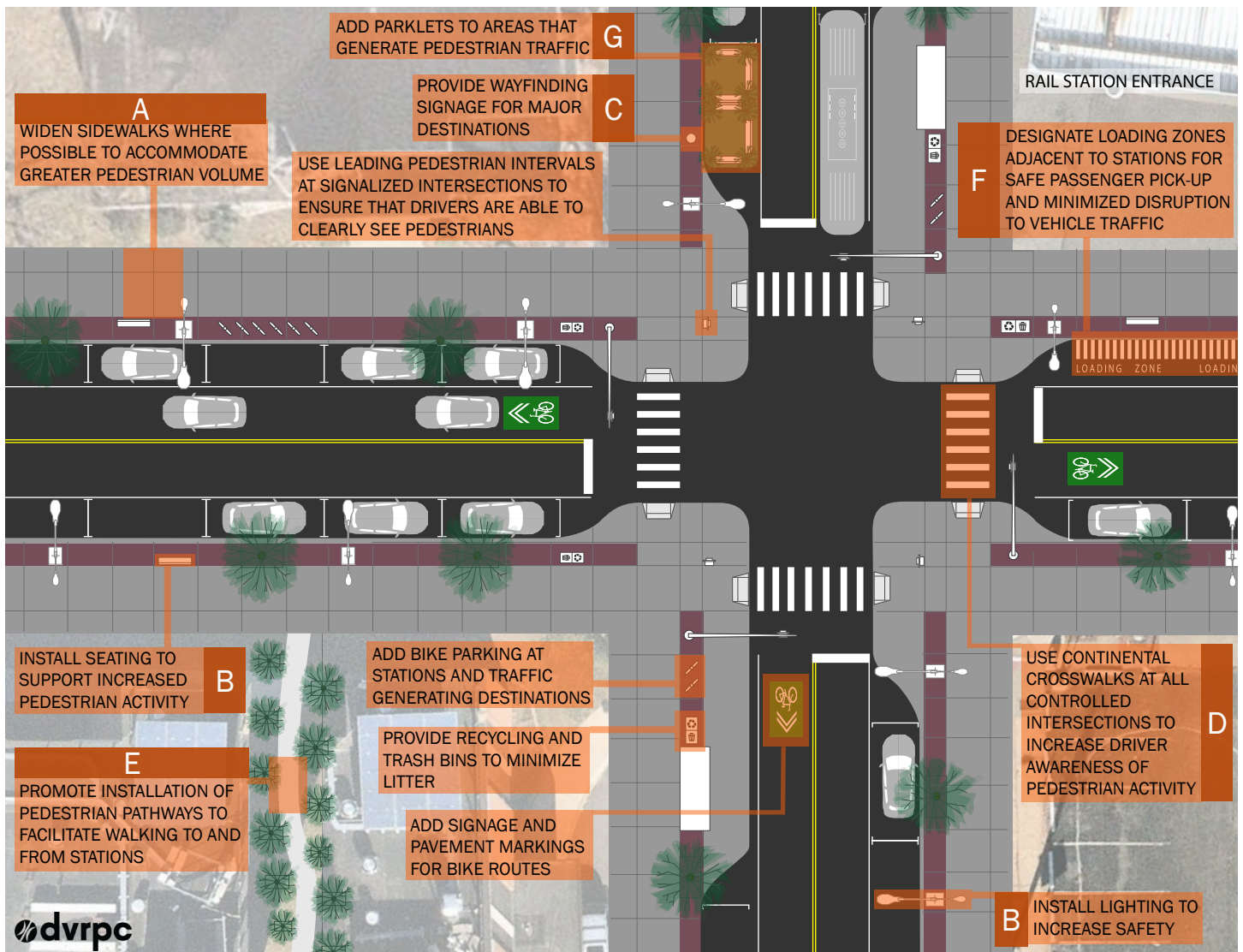


Figure 29 Design considerations for streets within the Rail Station Area overlay

Note: Overlay stipulations override underlying typology stipulations except where otherwise noted.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone		refer to underlying typology
		Pedestrian Zone	Required	minimum 8'
		Greenscape-Furnishing Zone	Required	2'-6" - 8'
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	Recommended	
		Sidewalk Cafes and Plazas	Recommended	
		Street Trees	Recommended	
		Street Furniture	Recommended	
		Lighting	Recommended	50' spacing
		Bus Stop Amenities	Recommended	provide seating, add shelter if possible
		Bike Parking	Recommended	assess need for number of spots
		CURB	Sidewalk Facing	Driveways / Entrances
Curb Extensions	As Needed			if possible
Bus Loading Curb Extensions				refer to underlying typology
Road Facing	On-street Parking		As Needed	
	Parklets		As Needed	place away from bus stops to reduce potential conflicts
	Loading Zones	As Needed	30' long, near park entrance for passenger vehicles	
ROADWAY	Traffic Calming Strategies	Lane Narrowing		refer to underlying typology
		Vertical Deflection		refer to underlying typology
		Chicanes		refer to underlying typology
		Neckdowns		refer to underlying typology
	Transit	Dedicated Bus Lane		refer to underlying typology
	Bikes	Bicycle Facilities	Recommended	use most protection possible
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	Required	continental style with ADA ramps at all signalized intersections
		Pedestrian Signals and Warning Signs	Required	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	As Needed	assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		refer to underlying typology
		Two-stage Turning Boxes		refer to underlying typology
Traffic Calming	Vertical Deflection and Turn Calming	Recommended		

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended/ Not Applicable

F Opportunities to better connect pedestrians to the station should be explored, such as pedestrian paths through private developments that provide pedestrian short-cuts to the station.

Streets adjacent to the station should have elements that ensure safe, easy access to the station. Parking around stations is often at a premium; streets adjacent to the station should have time-limited parking, restricted to 15 minutes.

F Passenger loading zones can be used to encourage quick drop-offs and pick-ups without disruption to traffic.

G Stations are also major trip generators in the city and a prime opportunity for placemaking. Parklets and other opportunities for creating destinations adjacent to the station should be explored.

Limited Access Transition

Overview

The transition from limited access roads to the local city network is a conflict point of particular concern because drivers must shift their awareness to the presence of vulnerable users and the need for slower driving speeds. The heavy volumes and high speed of entering vehicles, however, precludes many forms of traffic calming that are intended for lower speed, less trafficked roads. Instead, visual cues and low-impact tactile interventions can alert drivers to the changing roadway conditions.

Considerations

A Along the roadway, multiple signals to drivers that they are entering an area of mixed traffic must be installed. These can include overhead warning signals or rectangular rapid flashing beacons (RRFBs).

B They can also include in-ground features like soft transverse rumble strips to encourage drivers to slow down.

C In particular, pedestrians should be made as visible as possible through continental crosswalks with ADA ramps and leading pedestrian intervals that make their presence in the roadway known to drivers. Tools like leading pedestrian intervals (LPIs) can do this by giving pedestrians a headstart into the intersection. The same design consideration should be given to any intersecting bicycle network features.

D It is particularly important that roadways under the Limited Access Transition overlay are well-lit.

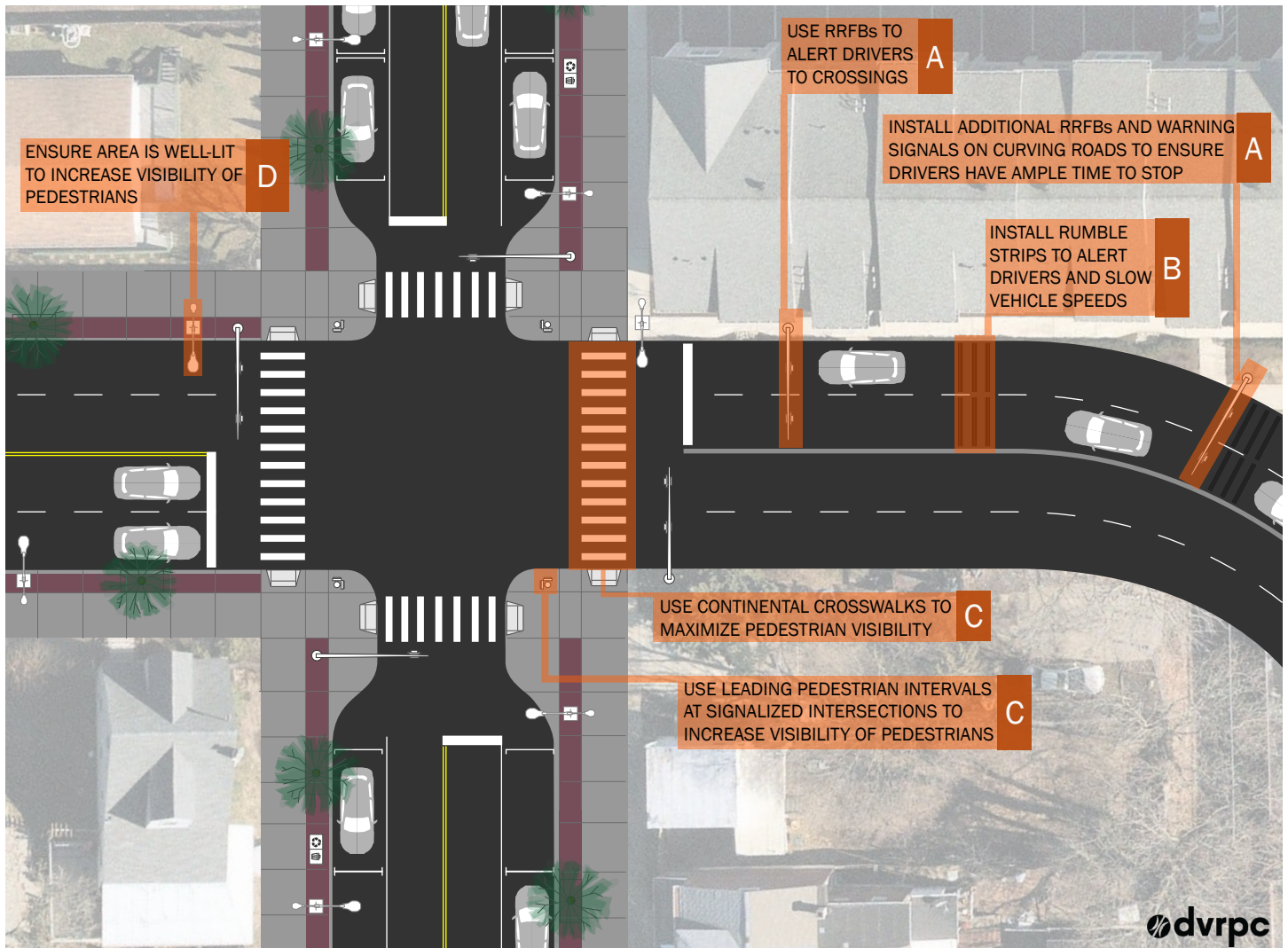


Figure 30 Design considerations for streets within the Limited Access Transition overlay

Note: Overlay stipulations override underlying typology stipulations except where otherwise noted.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone		refer to underlying typology
		Pedestrian Zone		refer to underlying typology
		Greenscape-Furnishing Zone	■	2'-6" - 8'
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	■	
		Sidewalk Cafes and Plazas		refer to underlying typology
		Street Trees	■	
		Street Furniture	■	
		Lighting	■	50' spacing
		Bus Stop Amenities	■	provide seating, add shelter if possible
		Bike Parking		refer to underlying typology
		CURB	Sidewalk Facing	Driveways / Entrances
Curb Extensions	■			may be paired with gateway elements (see "Gateway" below)
Bus Loading Curb Extensions				refer to underlying typology
Road Facing	On-street Parking			refer to underlying typology
	Parklets			refer to underlying typology
ROADWAY	Traffic Calming Strategies ¹	Loading Zones		refer to underlying typology
		Lane Narrowing		refer to underlying typology
		Vertical Deflection	■	
		Chicanes		
	Transit Bikes	Neckdowns	■	
		Dedicated Bus Lane		refer to underlying typology
		Bicycle Facilities ²	■	use most protection possible
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	■	continental style with ADA ramps at all signalized intersections
		Pedestrian Signals and Warning Signs	■	install <u>countdown timers and LPIs</u> at all signalized intersections
		Pedestrian Refuge Island	■	assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		refer to underlying typology
		Two-stage Turning Boxes		refer to underlying typology
Traffic Calming	Vertical Deflection and Turn Calming	■		

■ Required ■ Recommended ■ As Needed ■ Not Recommended/ Not Applicable

¹Roadway - Traffic Calming Strategies: Limited access transitions require specialized traffic calming that can slow vehicles transitioning from much higher travel speeds. RRFBs and other warning signals can alert drivers to the changing context. Rumble strips can provide a tactile warning. Most types of vertical deflection are not appropriate because the design speed of the roadway is too high for the profile of typical vertical deflection elements.

²Bicycle Facilities: Roads under the Limited Access Transition overlay are good candidates for green-backed bicycle facilities and physical protection at conflict points between the bicycle network and these streets.

Gateways: Gateways are generally vertical elements that frame the roadway and signal to drivers that they should slow down, while also providing placemaking (e.g., "Welcome to...") benefits. Limited access transition locations can benefit from both of these features.

Combined Sewer

Overview

Streets under the Combined Sewer overlay should be considered for projects that can absorb rainwater and divert it from the sewage system. Most of the southern portion of the city has a combined sewer overflow infrastructure and therefore would particularly benefit from slowing the flow of rainfall into the sewer system. Other areas of the city could undoubtedly also benefit from green stormwater management techniques but areas with a combined sewer system should be prioritized.

Considerations

The Combined Sewer overlay triggers unique considerations in roadway design.

- A** For instance, building materials can have a positive effect on water retention by using porous pavement on the sidewalk and in the road.
- B** Curb extensions that provide traffic calming benefits can be outfitted with plantings that absorb rainwater.
- C** Street trees that provide shade and improve the pedestrian environment can be installed with tree trenches that maximize the water capture of these amenities.

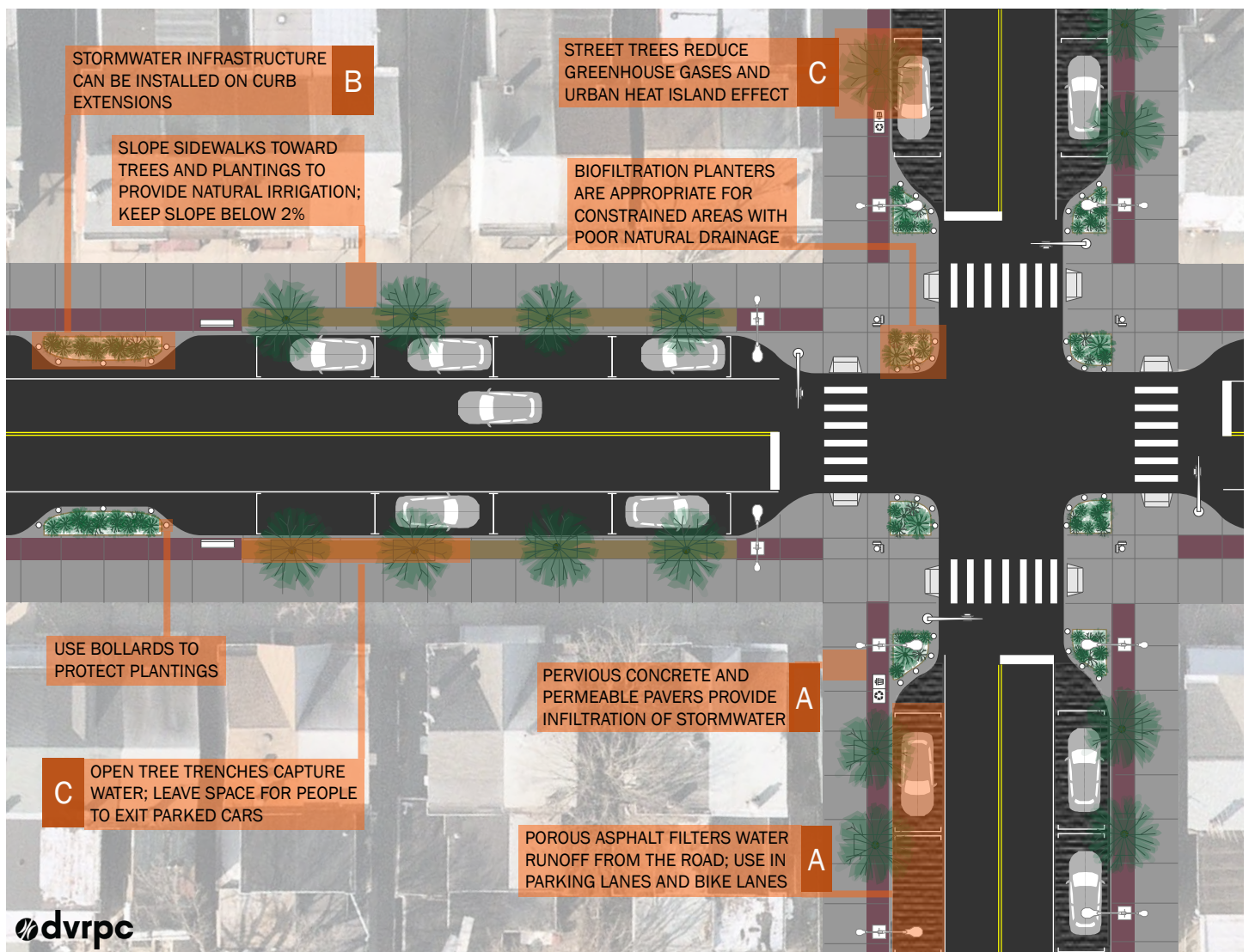


Figure 31 Design considerations for streets within the Combined Sewer overlay

Note: Overlay stipulations override underlying typology stipulations except where otherwise noted.

		ELEMENT	✓ STIPULATIONS AND GUIDANCE
SIDEWALK	<u>Sidewalk Zones</u>	Frontage Zone	Consider permeable paving
		Pedestrian Zone	Consider permeable paving
		Greenscape-Furnishing Zone	2'-6" - 8', outfit with GSI features
	<u>Sidewalk Elements</u>	Drainage/Green Stormwater Infrastructure	
		Sidewalk Cafes and Plazas	refer to underlying typology
		Street Trees	strongly recommended, pair with tree trenches
		Street Furniture	refer to underlying typology
		Lighting	refer to underlying typology
		Bus Stop Amenities	refer to underlying typology
		Bike Parking	refer to underlying typology
CURB	<u>Sidewalk Facing</u>	Driveways / Entrances	refer to underlying typology
		Curb Extensions	outfit with GSI projects, where possible
		Bus Loading Curb Extensions	refer to underlying typology
	<u>Road Facing</u>	On-street Parking	install porous asphalt in parking lane
		Parklets	refer to underlying typology
ROADWAY	<u>Traffic Calming Strategies</u>	Loading Zones	refer to underlying typology
		Lane Narrowing	refer to underlying typology
		Vertical Deflection	refer to underlying typology
		Chicanes	outfit with GSI projects, where possible
	<u>Transit Bikes</u>	Neckdowns	outfit with GSI projects, where possible
		Dedicated Bus Lane	refer to underlying typology
		Bicycle Facilities	refer to underlying typology
INTERSECTION	<u>Pedestrian Safety and Priority</u>	Crosswalks	refer to underlying typology
		Pedestrian Signals	refer to underlying typology
	<u>Bicycle Safety and Priority</u>	Pedestrian Refuge Island	outfit with GSI projects, where possible
		Bike Boxes	refer to underlying typology
		Two-stage Turning Boxes	refer to underlying typology
<u>Traffic Calming</u>	Vertical Deflection and Turn Calming	refer to underlying typology	

Required
 Recommended
 As Needed
 Not Recommended/ Not Applicable





Complete Streets Elements Design Guide

Complete Streets Elements Design Guide

Overview

The design elements in this chapter are organized into four sections: sidewalk, curb, roadway, and intersection. This organization helps to identify project components, but it also highlights how different design elements are connected. For example, bumpouts are part of the curb zone, but they also serve as a traffic calming device in the roadway.

A full list of treatments are listed on the next page and explored in depth throughout this chapter. Some design elements can be built quickly with low-cost materials. These interim strategies typically utilize easy-to-install elements like planters or delineator posts and can be used to test designs or build public support before replacing with concrete. Treatments that may utilize interim strategies are indicated by a green icon (see "Key" below). Many elements have benefits to safety, including crash reduction. Orange icons indicate where an element has been included in Federal Highway Administration's (FHWA) Proven Safety Countermeasures,

and the crash reduction benefit is listed. Most elements include technical specifications to ensure that concerns like minimum clearances or sight lines are addressed. The guidance in this document is not exhaustive, however, and is tailored to focus on specifications that support Complete Streets implementation. Additional guidance documents are referenced for many design elements.

A Complete Street should unify each of the four sections by providing facilities that work with other elements of the street. Bicycle lanes are incomplete without bicycle storage. Bus lanes are incomplete without dignified shelters and stops. Each element works together with others to unify the streetscape, providing amenities for all street users.

Key

Interim Design Strategy

FHWA Proven Safety Countermeasure



One-way street, Trenton, NJ

Source: Jay Watson

Design Treatment List

Sidewalk (pp. 76-87)

Sidewalk Zones

Sidewalk Elements

Drainage & Green Stormwater Infrastructure

 Sidewalk Cafes & Plazas

Street Trees

Street Furniture

Lighting

Bus Stop Amenities

Bike Parking

Curb (pp. 88-95)

Sidewalk Facing Elements

Driveways & Entrances

 Curb Extensions

 Bus Loading Curb Extensions

Roadway Facing Elements

On-street Parking

Loading Zones

 Parklets


Drainage & Green Stormwater Infrastructure

Roadway (pp. 96-103)

Traffic Calming Strategies

Lane Narrowing

 Lane Reductions

 Vertical Deflection


Speed Humps

Speed Tables

Speed Cushions

Horizontal Deflection

 Chicane

 Neckdown

Prioritizing Transit

 Dedicated Bus Lane

 **Bicycle Facilities**

Intersection (pp. 104-113)

Pedestrian Safety and Priority Elements

 Crosswalks

Pedestrian Signals and Warning Signs

 Countdown Timers and LPIs

In-Street Crossing Signage

 RRFBs and Pedestrian Hybrid Beacon

 Pedestrian Refuge Islands

Bicycle Safety and Priority Elements

Bike Signals

 Bike Boxes

 Two-Stage Turning Boxes

 Intersection Crossing Markings

Traffic Calming Strategies

Vertical Deflection

Raised Intersections

 Raised Crosswalks

  Roundabouts

 Right-turn Traffic Calming

 Left-turn Traffic Calming

Diverter

Sidewalk

Sidewalks serve many purposes in achieving Complete Streets, not least of which is providing an exclusive right-of-way to pedestrians where they can safely travel without encroachment from vehicles. Sidewalks, however, can provide space and amenities that serve many other purposes of a Complete Street, including relief for pedestrians through seating and shade; delivery of municipal services like lighting and waste and excess stormwater management; entertainment and recreation through programmed pedestrian plazas; and multimodal mobility support through bike storage and bus shelters. The design elements that correspond to each of these uses are covered in this section.

Considerations

All sidewalks consist of three zones: Frontage, Pedestrian, and Greenscape-Furnishing; they are discussed in detail in the section of this chapter on “Sidewalk Zones.” Sometimes the boundaries between zones can be blurred, and in some cases not all zones are present, but each of them serves a purpose and contributes to Complete Streets.

In addition to the three sidewalk zones, sidewalks also have a “street wall,” the point where the sidewalk ends and a building begins. Activating this space is critical to create lively and interesting spaces for street users. On commercial corridors, street walls are effective when they house retail and restaurant

spaces at the street level. The street wall can be enhanced with plantings, lighting, signage, and awnings. Windows provide opportunities for businesses to display goods. Walls provide space for public art, signage, and informational displays.

The materials used to construct a sidewalk are of critical importance to its successful functioning. Materials used must be safe in different weather conditions and remain in a state of good repair for an optimal period of time. Materials should be selected that reflect the architectural style of the surrounding buildings. Materials can be used to demarcate different zones of the sidewalk or to give character to a commercial district. Whatever materials are selected, they should remain consistent on similar roadways within the district. The most successful sidewalk materials will improve public space while assisting in other efforts like stormwater management.

Sidewalks are also a prime location for the installation of public art. Public art strengthens the connection between a community and its streets by engaging people. Creating space for artistic expression can also create a sense of place and community ownership. Creative expression of functional street elements like lights and benches can make interesting and unique street elements. Transit stops and other visible, high use locations such as trail entrances, are good locations for art.



Brick and bluestone are common in downtown Trenton

Source: DVRPC



Building facade with large transparent windows

Source: Russ Roca, PBIC

Best Practices

- **Ensure Accessibility.** To ensure accessibility for all users, sidewalks must have:
 - smooth, stable, slip resistant surfaces,
 - a cross-slope of less than 2 percent and ideally 1.5 percent,
 - ramps at all intersections,
 - minimize pooling which can lead to ice,
 - remain continuous across driveways, and
 - have joints of less than 3/8."
- **Promote Traction.** Permeable materials increase traction for pedestrians by reducing water pooling and minimizing slippery surfaces and can assist with stormwater management.
- **Deploy Brick Strategically.** Brick and other materials like cobblestone or slate can lead to tripping hazards and pose challenges to people in wheelchairs when they are not well-maintained. This is especially important near trees, where insufficient space for root growth can result in bricks being lifted and becoming a tripping hazard. However, brick creates a unique aesthetic appropriate for some areas (like historic downtown districts) when properly installed and maintained. Downtown Trenton has a history of using brick sidewalks and bluestone curbs, so this should be considered when repairing or replacing sidewalks in that area. On streets in Downtown Trenton, brick is recommended for the Greenscape-Furnishing Zone and concrete for the remainder of the sidewalk.
- **Signage Guidance.** Signage should be deployed in the Greenscape-Furnishing Zone. Different categories of signage have different considerations. These include:
 - Wayfinding signage, or signs that direct people to and through areas, should be well maintained, visible, and

consistent. It should define distances by the time it takes to reach a destination rather than by miles or kilometers alone. "You are here" labels should be used to orient users. For more information on wayfinding signage, see the wayfinding chapter of the *New Jersey Complete Streets Guide*.

- Pedestrian specific signage should include tactile signage (braille) to accommodate vision impaired users of the street, and multilingual signage should be installed where appropriate.
- Signs for bicyclists should direct them to bicycle routes while providing directional information, distances, and timing information to local destinations.
- Signs for motorists should include traffic control signs, warning signs, and wayfinding signs.



Street art next to a cafe

Source: Laura Sandt, PBIC

Sidewalk Zones

Overview

There are three zones of the sidewalk and each has a unique role. See Figure 32 for an illustration of each of the sidewalk zones.

The Frontage Zone is most important in downtown, commercial, and dense areas in which there is a lot of movement in and out of buildings along the sidewalk. It serves as a buffer that achieves several goals. The Frontage Zone protects pedestrians from doors opening outward, while also allowing for foliage, signage, and other street wall elements. In areas with high pedestrian traffic, a wider Frontage Zone can support sidewalk cafes and plazas that contribute to an active sidewalk environment. This is especially valuable in downtown and mixed-use areas.

The Pedestrian Zone is the area of the sidewalk that is kept clear for pedestrian movement. It is the most important part of the sidewalk. Although zone widths vary by typology, a 5' wide Pedestrian Zone is required for every sidewalk to ensure accessibility for all people and compliance with the Americans with Disabilities Act (ADA). The other zones allow

for improvements and amenities, but the Pedestrian Zone is essential.

The Greenscape-Furnishing Zone stretches from the front edge of the Pedestrian Zone to the roadway curb face. It provides a buffer between pedestrians and the roadway. This zone is where landscape elements, street furniture, signage, and utilities are located. Therefore the minimum width and required amount of space vary depending upon the street typology and the contextual circumstances. Street trees, stormwater planters and GSI, lighting, benches, bus shelters, fire hydrants, street light boxes, wayfinding signage, and bike parking are all found in this zone.

Best Practices

- **Use Appropriate Materials.** Sidewalks need to be smooth, stable, and slip resistant to increase access and minimize injuries.
 - Frontage Zone materials are somewhat flexible and contribute to defining or blurring boundaries with other zones. When traversal of the Frontage Zone is expected, as with a building entrance, paving should



Figure 32 Zone elements of the sidewalk, plus the curb zone

Source: DVRPC

match the Pedestrian Zone materials to signal that it's an area intended for passage. Otherwise the materials should match the Greenscape-Furnishing Zone.

- **Account for Pedestrian Volume.** The width of the Pedestrian Zone should vary based on the anticipated pedestrian volume on the sidewalk.
 - The Pedestrian Zone is required to be at least 5' wide and maintained as a clear zone.
 - It is recommended that the Pedestrian Zone be at least 8' wide on Corridor streets, at least 12' wide on Downtown streets, and at least 6' wide on all other streets.
 - For Downtown and Corridor typologies, a wider Pedestrian Zone is recommended to allow for higher pedestrian volumes and chaotic movement by people who are entering and exiting businesses and transit stops.
 - An 8' minimum width should be implemented when

the Pedestrian Zone is immediately adjacent to moving traffic, without a Greenscape-Furnishing Zone or on-street parking.

- **Maintain Access Across Driveways.** When driveways and entrances cross sidewalks, the Pedestrian Zone must continue at the same width and cross-slope (see "Driveways and Entrances" for more information).
- **Consider Loading Drop-off Space.** On streets with transit, schools, or parks, where pick-ups and drop-offs are facilitated, space needs to be made for passenger loading zones and waiting areas in the Greenscape-Furnishing Zone. See "Overlays" for more information on where these elements should be considered.
- **Account for Clearances.** Many of the elements in the Greenscape-Furnishing Zone have minimum horizontal clearance requirements. It is important to consider each of these when laying out this part of a sidewalk, especially in the most complex areas like downtown. Clearances are addressed by sidewalk element in the remainder of this chapter.



Lively sidewalk in Pittsford, NY

Source: Dan Burden, Pedestrian and Bicycle Information Center, PBIC

Sidewalk Elements

Drainage and Green Stormwater Infrastructure on the Sidewalk

Overview

Sidewalk space can be used to house green stormwater infrastructure (GSI), such as retention basins or rain gardens. GSI allows water to infiltrate into the ground and slowly release into the water table rather than through pipes and into rivers. GSI can provide habitat for native flora and fauna, increase tree cover, and reduce the heat island effect by providing shade and the cooling effect of evapotranspiration. GSI is most commonly installed in the Greenscape-Furnishing Zone, although some elements may be appropriate for the Frontage Zone.

Best Practices

- **Choose GSI Sites that Accomplish Multiple Goals.** GSI should be sited and sized based on not only drainage requirements, but also on how to avoid or benefit adjacent utilities and how to direct pedestrian traffic. GSI like rain gardens provide both stormwater management benefits and added green space for public use and can be scaled according to context.
- **Create Permeable Surfaces.** Permeable pavement can be used to assist with infiltration. If permeable is not an option, stormwater from sidewalks can be conveyed into underground infiltration basins. Street trees and other plants can reduce runoff by adding permeable surfaces and providing evapotranspiration.
- **Use Retention Basins to Hold Stormwater.** Retention basins are underground basins used to hold and slowly release water to infiltrate groundwater, as shown in Figure 33. Basins should be located to avoid underground utilities.
- **Use Biofiltration to Avoid Water Damage.** Biofiltration planters should be used instead of other infiltration measures in areas where basements, transit tunnels, or underground utilities could be damaged by water. See NACTO's *Green Street Design Guide* for more information.



Small sidewalk rain garden in Philadelphia, PA

Source: Philadelphia Water Department

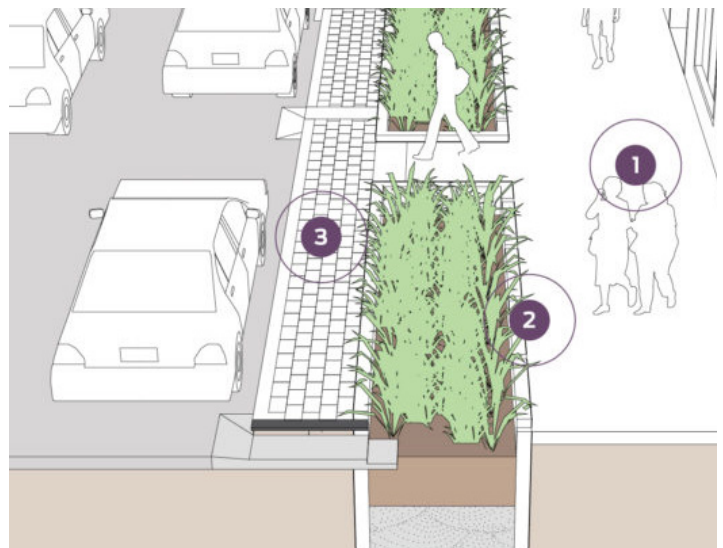


Figure 33 Bioretention planter in sidewalk zone

Source: NACTO

Sidewalk Elements

Sidewalk Cafes and Plazas



Overview

Sidewalk cafes and plazas offer outdoor space for dining and public gathering. They animate the street and can help create a sense of place to busy streets like commercial corridors. Both increase activity on the street, calm traffic, and provide safer access for all users. These elements are not specific to a sidewalk zone and may be present in the Frontage Zone, Greenscape-Furnishing Zone, and even in the curb space (see “Parklets”).

Best Practices

- **Site Where the People Are.** Pedestrian plazas should be located near pedestrian generators such as transit stops or schools.
- **Design for Future Programming.** Plazas should be located with consideration for lighting, water, and electricity. Plazas should accommodate vendors where possible, to provide space for commerce and increase pedestrian activity.
- **Support Mobility.** Plazas can house infrastructure that increases mobility such as bike share docking stations.
- **Interim Design Strategy.** Plazas can be built using low-cost, quick-build methods like street paint, planters, flex-post delineators, and plastic curbing. This interim strategy allows for testing and refinement, and builds public support before any concrete is poured. Plazas can be built by repurposing parking or by taking extraneous space from the street.
- **Sidewalk Cafe Guidance.** Sidewalk cafe seating must meet certain criteria to ensure they function properly. These criteria apply whether the sidewalk seating is located in the Frontage Zone of the sidewalk or in a parklet (see Figure 34). Criteria include:
 - Seating zone should be a minimum of 6’ deep
 - A 5’ clearance path should be maintained for ingress and egress to the seating zone
 - The seating zone must not overlap with the Pedestrian Zone



A pop-up plaza in University City, Philadelphia

Source: NACTO



Figure 34 Sidewalk zone with cafe outside of the pedestrian zone

Source: NACTO

Sidewalk Elements

Street Trees

Overview

Street trees provide a wide range of benefits. Environmental benefits include reducing greenhouse gases, airborne particulates, and the urban heat island effect. Street trees improve groundwater discharge capacity and reduce pressure on stormwater infrastructure. They support ecological diversity. They reduce exposure to harmful ultraviolet rays and keep pedestrians cool in the summer. They generally improve the aesthetics of the street and can increase the appeal of retail districts and property values overall. Street trees have also been shown to have economic and safety benefits. Street trees should be consistent with Trenton's Zoning and Land Development code. Street trees belong in the Greenscape-Furnishing Zone.

Best Practices

- **Provide Adequately Sized Tree Planting Areas.** To succeed, street trees require properly sized pits to grow in. These come in different forms, which may fit better in one context versus another.
 - Tree pits are most typical. They should be 4' x 10' x 3' deep where possible to give roots space to grow, but should be 4' wide at a minimum.
 - Open tree trenches connect a row of trees and capture and filter stormwater. They should be 4' wide. They are not conducive to high turnover on-street parking.
 - Covered tree trenches should be 5' wide, 3' deep. They are effective for high pedestrian traffic areas, but it is important to note that the grate does not count towards minimum pedestrian zone. They are easier to install when the sidewalk is being replaced.
 - Raised tree beds are a good solution for locations with underground utilities or other barriers. The constrained soil is only suitable for smaller trees. They can provide seating if the bed wall is 16"-24" tall (ideal is 20").
- **Consider Soil Type.** Soil type is an important consideration for street trees and green stormwater infrastructure (GSI). Consult with the city's public works department on soil type considerations.
- **Design Sidewalks to Anticipate Tree Growth.** Pitching the sidewalk toward trees provides natural irrigation. Flexible pavement like asphalt should be considered around tree pits. Flexible porous paving helps maintain level surfaces; it bends but does not crack, thereby accommodating root growth. It is three-to-five times more expensive, but costs can be saved long-term due to easier maintenance. It also provides a smooth, accessible surface to pedestrians.



S. Broad Street

Source: DVRPC

Sidewalk Elements Street Furniture

Overview

Street furniture supports the uses and aesthetics of a sidewalk by making it more comfortable and convenient. Benches are a common type of street furniture, but other types of seating like raised planter boxes or tree beds should be considered as well. Creative seating can also be a form of public art. Street furniture is most commonly installed in the Greenscape-Furnishing Zone, although it may be appropriate for the Frontage Zone as well, where space allows.

Best Practices

- Ensure Accessibility.** To ensure accessibility for all people, consider providing traditional benches both with and without arms. Arms make it difficult for those using wheelchairs to slide onto a bench, but they make it easier for people who have difficulty sitting down or standing up.
- Avoid Creating Obstructions.** Seating must not interfere with loading zones, building entrances, and access to fire hydrants. See Figure 35 for minimum clearance distances according to ADA guidelines.
- Plan for Future Maintenance.** Ensure that maintenance and cleaning are easy by maintaining a 1' clearance around the back and 3' clearance on the front and sides of a bench.



Bench in Saugatuck, Michigan

Source: Dan Burden, PBIC

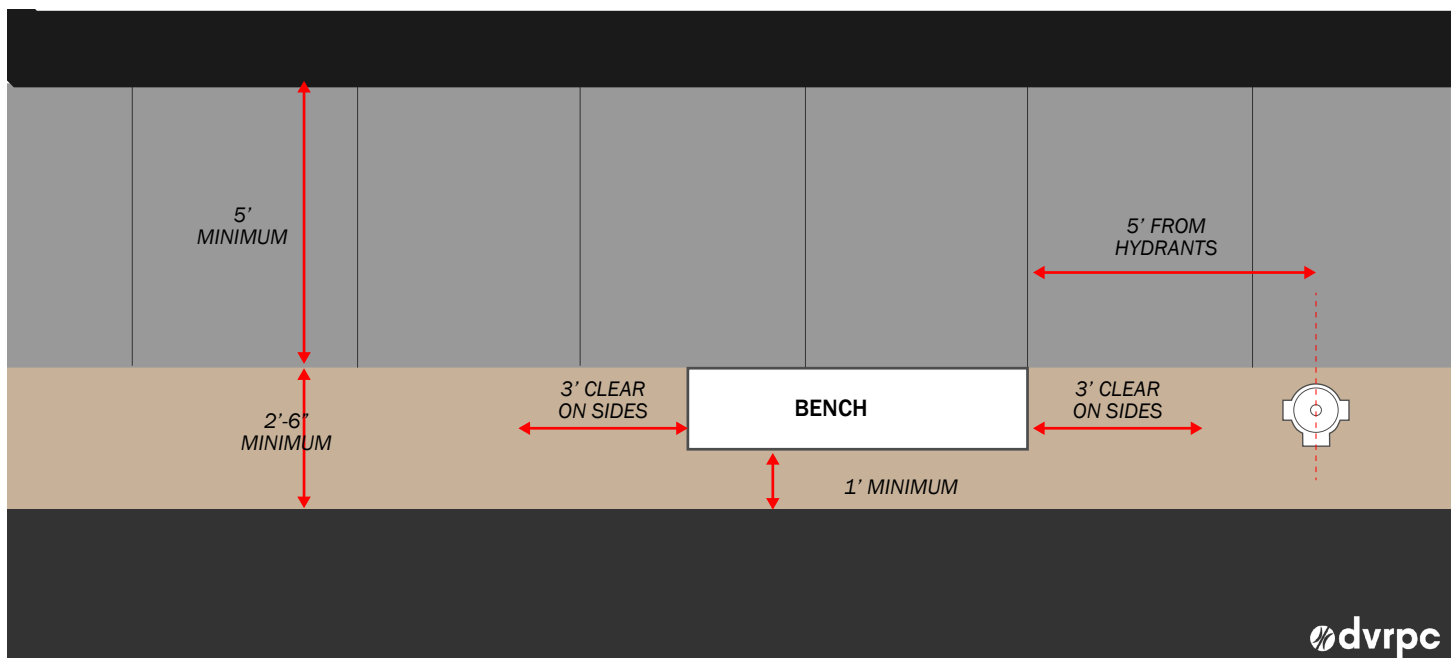


Figure 35 Minimum clearances for street furniture

Sidewalk Elements Lighting

Overview

Lighting should be consistent with Trenton’s Zoning and Land Development code, specifically Section 315-208 (Lighting Guidelines) and Section 315-209 (Lighting Design Standards).

Context-sensitive street lighting is key to a successful Complete Street and should be tailored to the Complete Street Typology.

Lighting should avoid light trespass beyond property lines and be located along streets and at intersections in order to light roadways, sidewalks, and at locations where circulation systems merge. Pedestrian-scale lighting is recommended in business districts or areas with high pedestrian activity. Lighting should minimize light pollution, be spaced evenly when possible, and reflect the neighborhood character.

When done well, lighting can make a street welcoming at all hours and encourage the intended use of the street.

Streetlights belong in the Greenscape-Furnishing Zone, but pedestrian-scale lighting and property-specific lighting fixtures may be installed in the Frontage Zone. Lighting illumination levels should follow recommendations from the Illumination Engineering Society RP-9-00 and from the FHWA standards, as these sources detail appropriate illumination levels for varying use, street size, and pedestrian activity.

Best Practices

- **Avoid Creating Obstructions.** Light poles need minimum clearances from other street features. Figure 36 and Figure 37 illustrate many of these considerations, including minimum clearances for street features like traffic poles, curb ramps, street trees, and hydrants.
- **Select Bulbs that Fit Lighting and Energy Needs.** Types of lights include (1) LED – white light (10–25 year lifetime, use when compatible fixtures are available), (2) High Pressure Sodium – warm yellow light (4–5 year lifetime, use for lower nighttime activity), and (3) Metal Halide – cool white (4–5 year lifetime, use for heavy nighttime activity). Light-emitting diode (LED) lights on a network can be controlled for color.
- **Consider Pedestrian-Scale Lighting.** Pedestrian-scale lighting is intended to light walkways and typically must be paired with street lights, if adjacent to the roadway. Pedestrian-scale lighting should be provided near transit stops and high pedestrian crossings.
- **Space Poles to Reflect the Context.** Lights paired across the street provide a formal look (this should

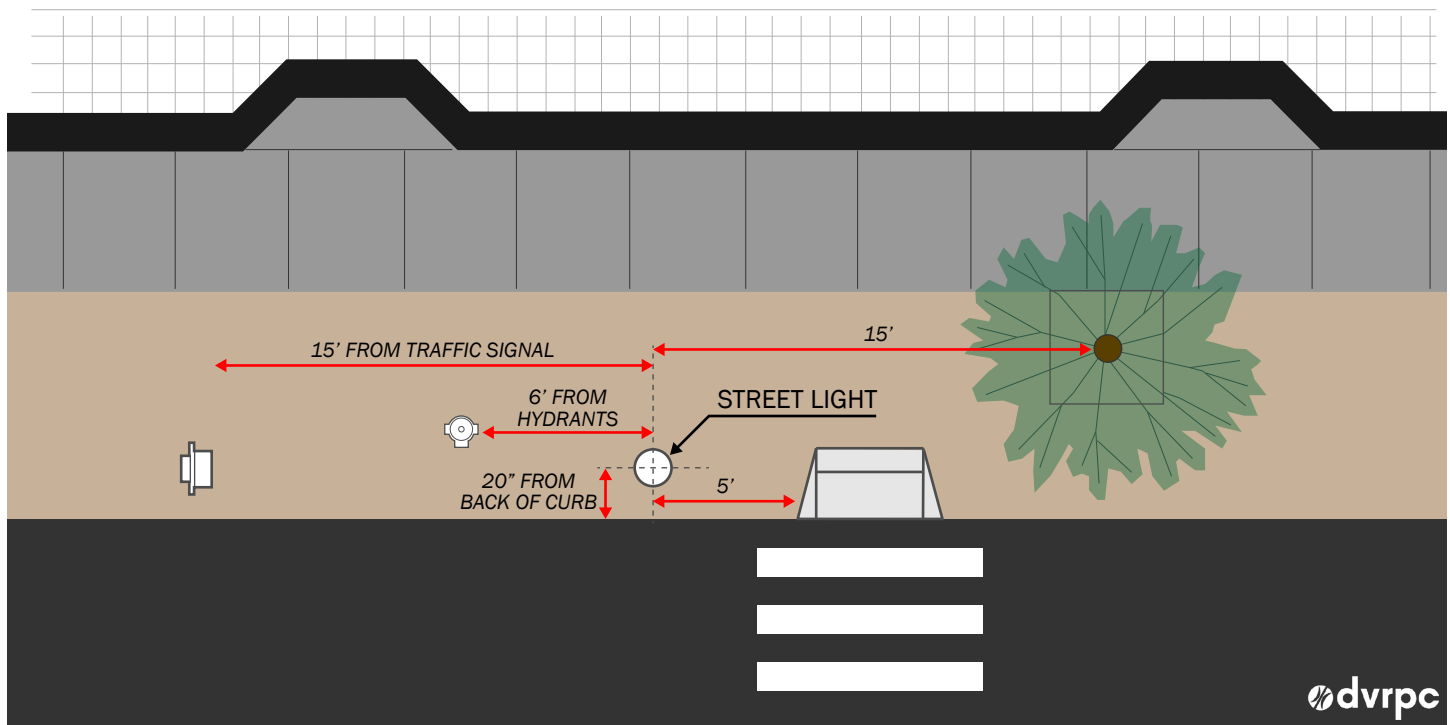


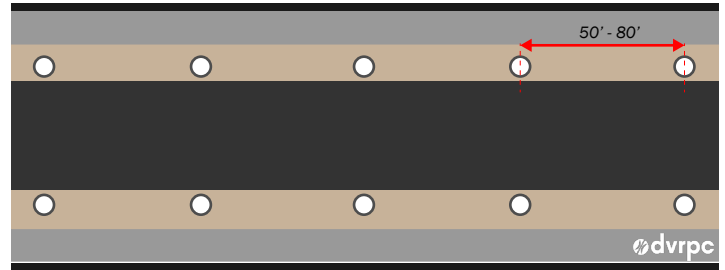
Figure 36 Street light clearance diagram

be used downtown). Lights staggered across the street provide more uniform lighting for a lower cost (best in residential areas). Spacing can be 50'–120' depending upon the illumination of the fixture. See “Spacing” inset for additional information.

- **Consider Unique Fixtures.** Unique lighting fixture designs can be used to identify historic areas or other spaces of significance.

Spacing

Downtown, lights should be placed in pairs 50'–80' apart



For other typologies, lights should alternate 75'–120' apart

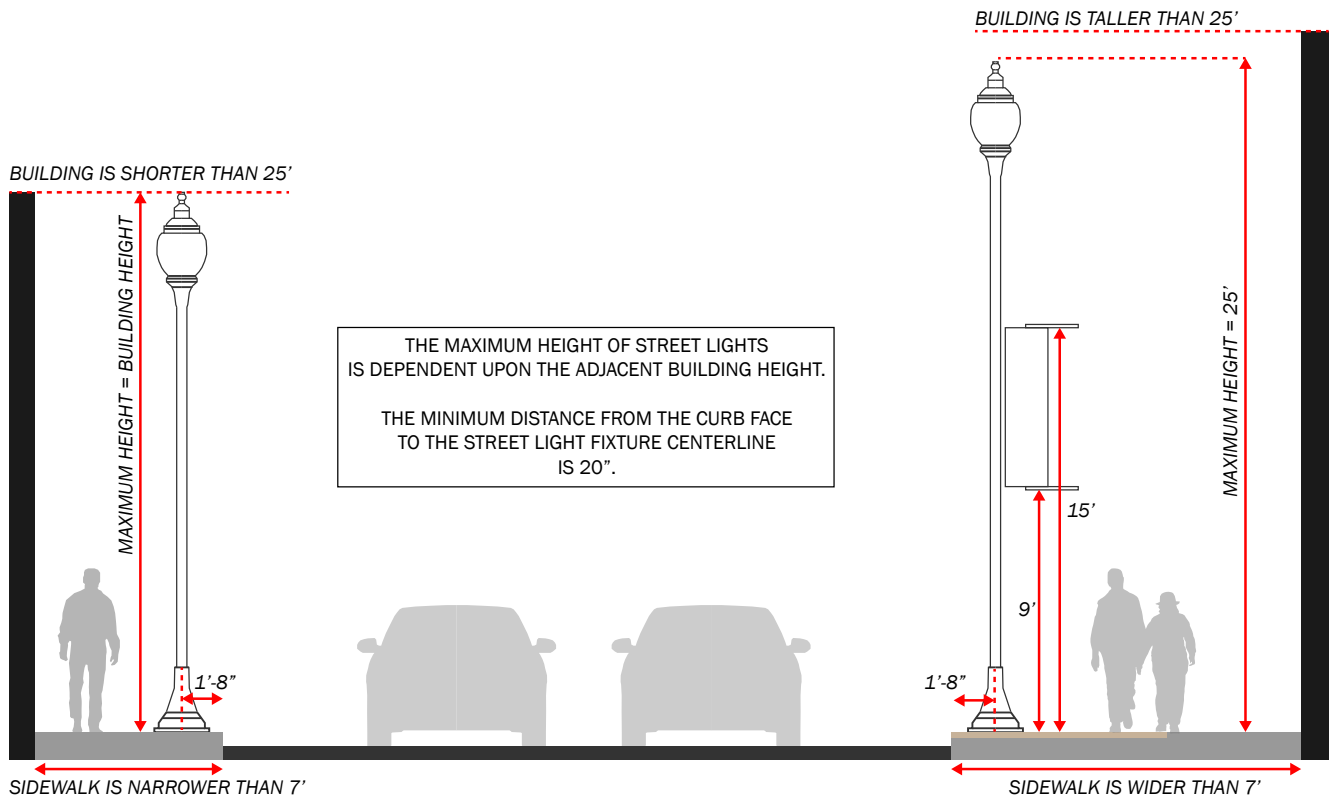
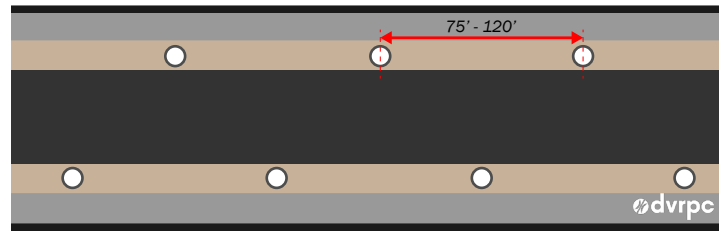


Figure 37 Street light specifications

Source: DVRPC

Sidewalk Elements

Bus Stop Amenities

Overview

Bus stop amenities make travel more comfortable and efficient by providing amenities and information to transit users waiting for the bus to arrive. At a minimum, seating and route information should be provided at every stop. Shelters should be constructed when space permits. Bus shelters belong in the Greenscape-Furnishing Zone, unless they are installed on a curb extension (see “Bus Loading Curb Extensions”).

Shelters provide protection from the elements along with information regarding transit and wayfinding. Shelter roofs are an opportunity to add solar power or green roofs, and the side panels can be used to display public art or passenger information.



Bus shelter with amenities

Source: Oran Viriyincy, NACTO

Best Practices

- **Ensure Accessibility.** Bus shelters and all bus stops must be ADA accessible with a 5'-wide opening to the sidewalk. If located on a curb extension or island, ADA-compliant curb ramps must be used.
- **Provide Space for Passengers to Alight.** Landing zones (where passengers alight) should ideally be 10' wide by 8' deep at all bus doors for new construction, and should be at minimum 5' wide by 8' deep.
- **Use Durable Materials Where Bus Stops.** Bus pads (where the bus stops along the curb) should be concrete to avoid warping asphalt.
- **Ensure Clearances.** Bus shelters need minimum clearances surrounding them from other sidewalk amenities. See Figure 38 for minimum clearance distances.

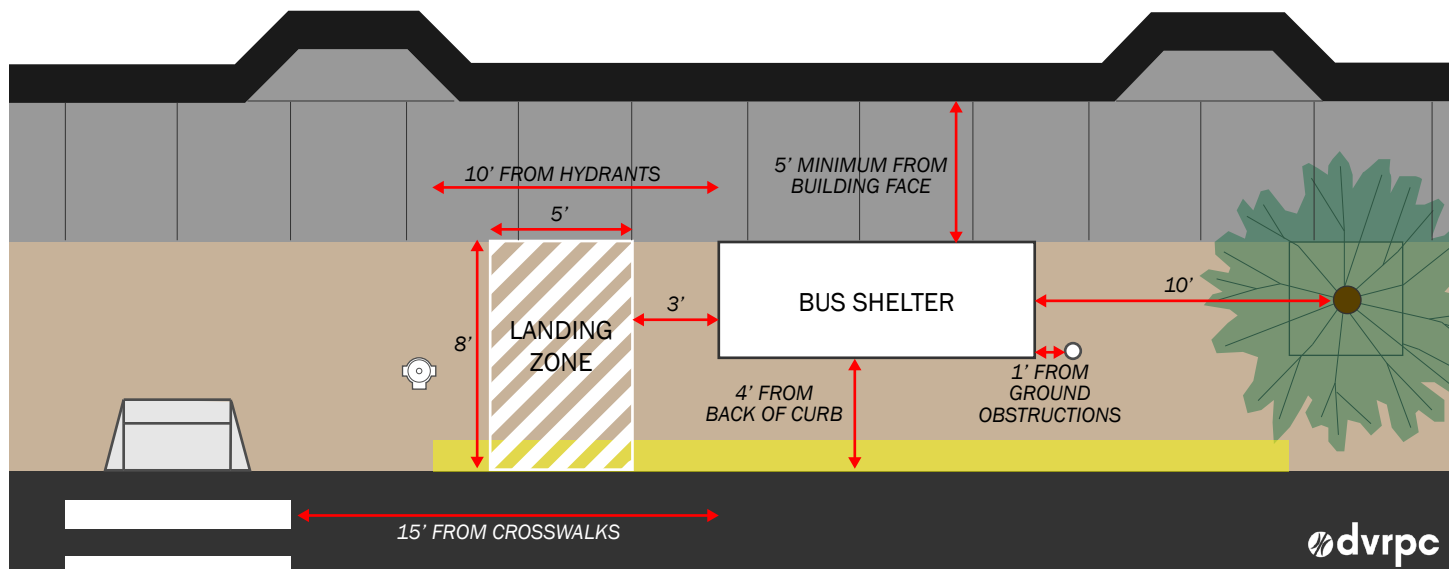


Figure 38 Bus shelter clearances



Sidewalk Elements

Bike Parking

Overview

Bike parking is a crucial part of bike infrastructure and encouraging people to cycle. Parking makes cycling more convenient, and certain bike rack designs are effective at discouraging bicycle theft. There are three types of bike parking: bike racks, bike corrals, and bike lockers. Bike parking is most commonly installed in the Greenscape-Furnishing Zone, but may be appropriate for the Frontage Zone as well.

Two recommended styles of bike racks are shown in Figure 39. Bike corrals (shown in Figure 40) allow 10 bikes to fit in one on-street parking space. Bike lockers should be considered near transit stations. Lockers allow bicyclists to store their bike safely while commuting by train.

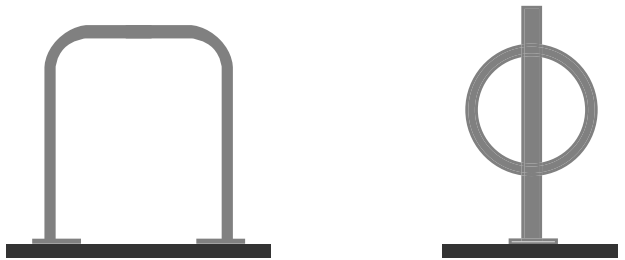


Figure 39 Inverted (left) and post & ring (right) bicycle parking

Source: DVRPC

Best Practices

- Bike Rack Guidance.** A bike rack with a parked bike should be allotted a 2' x 6' unobstructed space to park out of people's way. Racks must allow bikes to be secured at both the frame and the wheel for security.
 - Recommended types of bike racks: Inverted "U," Post-and-Ring (see Figure 39).
 - Not recommended types of bike racks: Wave, Schoolyard, Wheelwell, Secured Wheelwell, Coathanger, Bollard
- Bike Corral Guidance.** Figure 40 shows the layout for a bike corral. Consider placing corrals in the end-most parking space on a street, adjacent to an intersection. This increases visibility for drivers as they approach the intersection. If multiple racks are placed together, they should be 3' apart to allow easy access, as illustrated in Figure 40.
- Provide Lighting.** Bike parking should be well-lit to ensure safety at night.

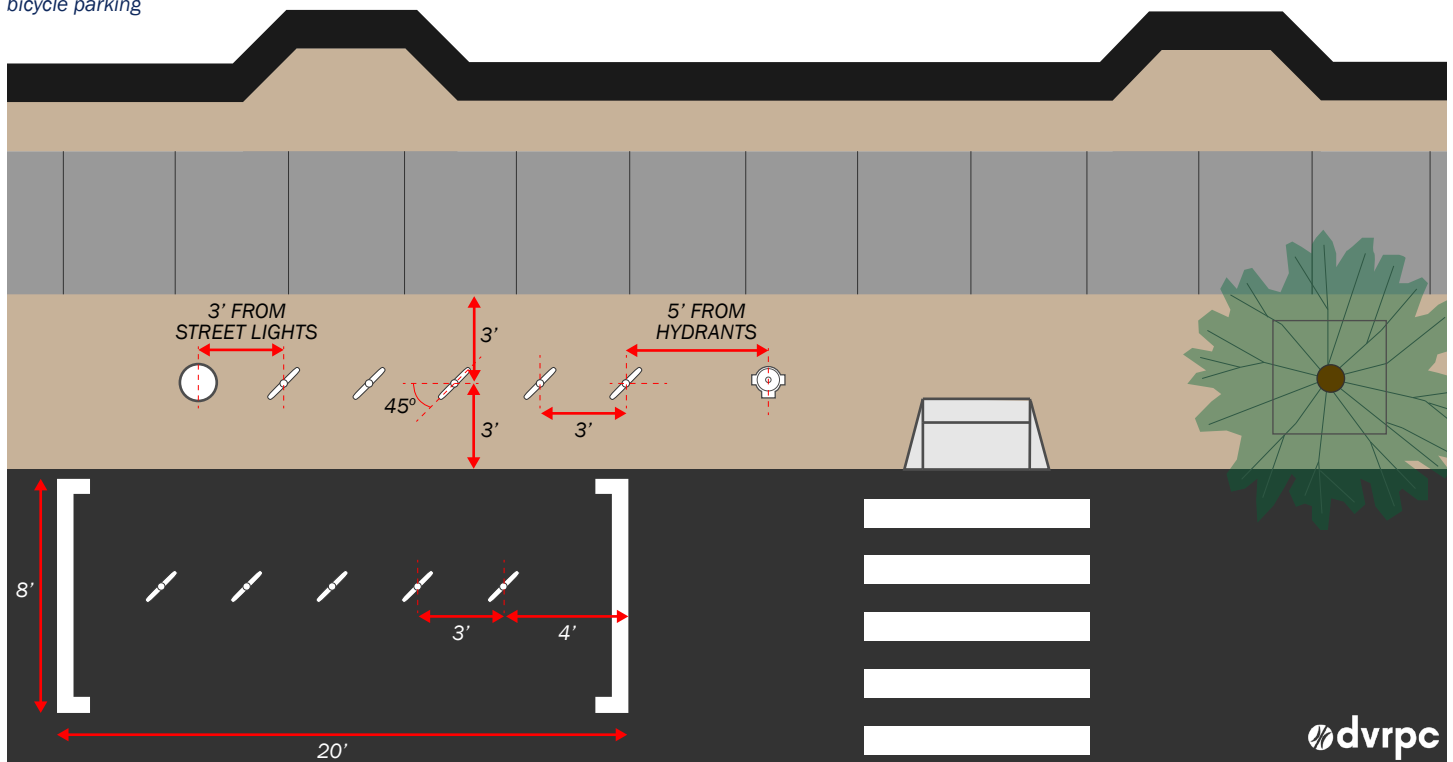


Figure 40 Bicycle parking clearances

Curb

The curb is an area of special interest in Complete Streets implementation. The curb is the threshold between the sidewalk—where vehicles are not permitted—and the roadway—where vehicular movement is often prioritized. As a result, it plays many key roles in negotiating the interaction and competition for space between these two travel zones. For purposes of this guidebook, the curb includes the curbstone itself and the roadway space directly adjacent to it that is critical for drainage and non-travel lane uses. This space can serve many purposes of a Complete Street, including vehicle storage; vehicle access to adjacent land uses; extensions of the sidewalk for pedestrian safety and recreation; and stormwater. The design elements that correspond to each of these uses are covered in this section. They are divided into two categories: elements that extend from the sidewalk toward the roadway (“Sidewalk Facing”) and elements that are exclusively in the roadway along the curb (“Roadway Facing”).

Considerations

The design of all curbs should pay special attention to the radius of the curb at corners. Curb radii influence the speed at which a vehicle can turn at an intersection: smaller radii require slower speeds to navigate a turn while larger radii can be taken at higher speeds and by large vehicles. Curb design should use the smallest possible curb radius. A smaller curb radius not only slows vehicles, but provides greater sidewalk area and less roadway area for pedestrians.

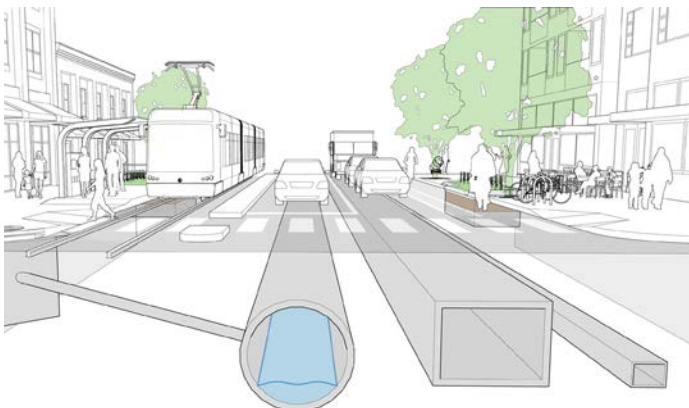


Figure 41 Diagram of underground utilities

Source: NACTO

The curb is also a key area for storm drains and other above- and below-ground utilities. Curbs need to be cut or left open to allow for road and/or sidewalk runoff to feed into GSI infrastructure (see Figure 41). Where utilities must take up real estate on the street (like hydrants), they must be placed in the Greenspace-Furnishing Zone, without encroaching upon the Pedestrian Zone. These utilities should maintain clearances from trees, lighting, bus shelters, and other utilities.

Best Practices

- Curb Radius Guidance.** Curb radius should be less than 10', except on Industrial Access streets. Larger curb radii are necessary on Industrial Access streets to accommodate truck turning radii. The effective turning radius (the curvature that turning vehicles follow, not the curb radius) on all other streets should be less than 35' and as little as 15'. The designed turning speed should be less than 4 miles per hour. See Figure 42 for a diagram of a typical curb radius.

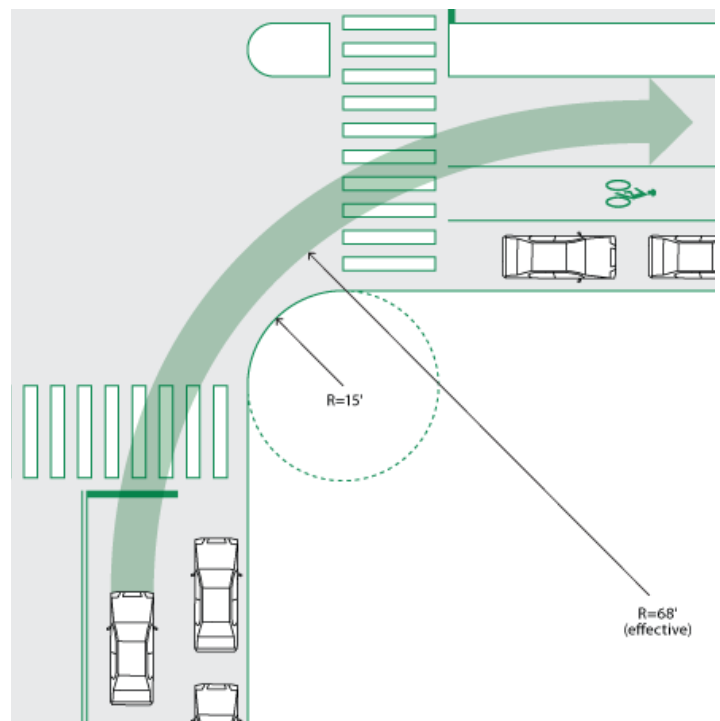


Figure 42 Curb radius diagram

Source: NACTO

Sidewalk-Facing Elements

Driveways and Entrances

Overview

Driveways connect off-street parking to the road network and, in most urban contexts, must do this by crossing the sidewalk. This creates conflicts between vehicles and pedestrians. In addition, driveways create conflicts between vehicles and bicyclists in the travel lanes. It is important that driveways are designed to minimize all of these conflicts to the greatest extent possible.

Best Practices

- Minimize Conflicts.** Driveways should be avoided on major roads whenever possible to minimize conflict areas. Instead, place driveways on side streets and smaller roads.
- Maintain Pedestrian Right-of-Way.** Driveways must give priority to pedestrians by prioritizing the visible and physical continuity of the sidewalk through conflict zones. Clear identification of the Pedestrian Zone is required to help drivers see pedestrians and be aware of where pedestrians might be.
 - The cross-slope should not exceed 2 percent and the slope of driveway flare should not exceed 10 percent.
- Provide Clearance to Intersections.** Residential driveways should be 10'–12' wide; 40' from a signalized intersection or 20' from an unsignalized intersection. Two-way commercial driveways should be 20'–24' wide and 100' from any intersection. See Figure 43, Figure 44, and Figure 45 for more information.

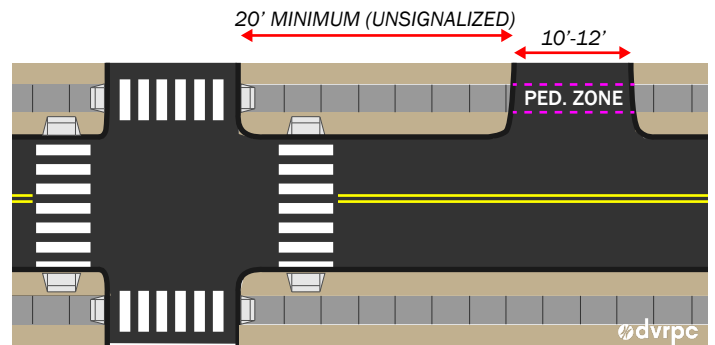


Figure 43 Residential driveway clearance for unsignalized intersection

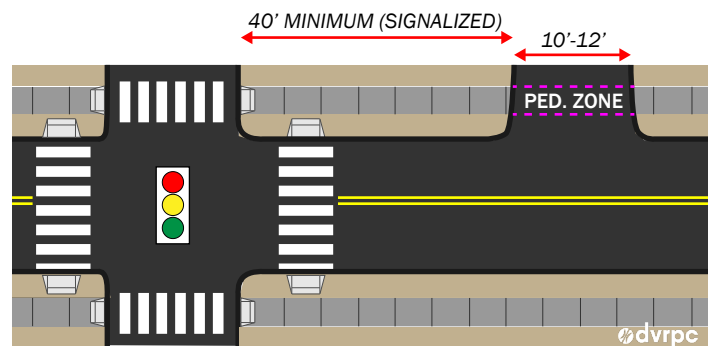


Figure 44 Residential driveway clearance for signalized intersection

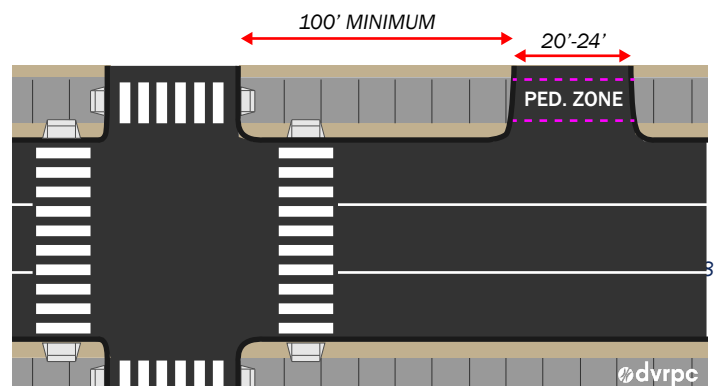


Figure 45 Driveway clearance for commercial driveways

Sidewalk-Facing Elements

Curb Extensions



Overview

Curb extensions (also called bumpouts) provide expanded pedestrian space while slowing vehicle turning movements and shortening pedestrian crossing distances. Curb extensions can be built with curbing and concrete, or interim bumpouts can be built quickly using paint, delineators, and/or planters. An interim strategy provides benefits more quickly while allowing for testing and refinement, and also acclimates street users to changes. Curb extensions can also incorporate green stormwater infrastructure (GSI), as shown in Figure 46.

Best Practices

- **Curb Extension Dimensions.** Curb extension length must be at least equal to the width of the adjacent crosswalk. They should be 1'–2' narrower than the parking lane (6' is typical). Curb extensions should extend to the stop bar.
- **Avoid Interfering with Bus Operations.** Planters should be placed as to ensure buses can still perform turns. Flexible posts can be used instead during the interim phase to solidify the best design before full construction.



Figure 46 Curb extension with GSI

Source: NACTO

Sidewalk-Facing Elements

Bus Loading Curb Extensions



Overview

Bus loading curb extensions, or bus bulbouts/bumpouts, provide additional space for transit users waiting for the bus by extending the bus landing area onto a curb extension. This also frees up space on the sidewalk for passing pedestrians. Bus bumpouts speed up transit service by allowing the bus to load passengers in the travel lane. Bus loading bumpouts also have the possibility for interim implementation, using modular plastic platforms.

Best Practices

- **Provide Sufficient Space.** Loading bumpouts should occupy at least the width of the parking lane. They should be at least the length of the transit vehicles servicing the stop (typically 40').
- **Reduce Conflicts Between Modes.** When used on corridors with bicycle facilities, bike lanes can be routed behind loading bumpouts to further separate cyclists from vehicular traffic and passenger boarding and alighting.
- **Outfit with Amenities.** Wayfinding signage, transit information, and shelters are all beneficial amenities that should be considered for bus bumpouts. For more information, see NACTO's Transit Street Design Guide.
- **Ensure Accessibility.** Bus loading bumpouts must be designed to enable access for all users. They can either be built at-grade or use ADA ramps to ensure access.



Bus bulbout with rear bicycle lane

Source: Adam Coppola, PBIC



Modular plastic bus bulb in Pittsburgh, PA

Source: Zicala (CC)

Roadway-Facing Elements

On-Street Parking

Overview

On-street parking serves a number of key purposes on streets, beyond vehicle storage. It can serve as a buffer between pedestrians on the sidewalk and vehicles on the road, or even, when designed for a parking-protected bike lane, between bicyclists and vehicles. In addition, on-street parking can have traffic calming benefits by narrowing the roadway. Providing sufficient parking to meet demand is important as it reduces vehicles circling the neighborhood, but it should be weighed against other potential uses of the public right-of-way. Parking lanes provide flexible space that is often used for other purposes cited in this chapter (see "Parklets," "Curb Extensions," etc.). In general, on-street parking can be either parallel to the curb or angled (front or back) and set against the curb or at some distance from it.

Best Practices

- **Parallel Parking Dimensions.** Parallel parking should be a minimum of 7' wide, and up to 9' wide.
- **Ensure "Daylighting" at Crosswalks.** Parking stalls should be a minimum of 20' from the closest crosswalk to ensure clear sightlines of the travel lane for crossing pedestrians and vice versa ("daylighting").
- **Consider Back-in Angle Parking for Safety Benefits.** Back-in angle parking provides drivers with better sightlines of the street than parallel parking spaces. It also reduces risk of dooring bicyclists. It may take space away from the sidewalk. It is most recommended for use on low-speed streets and requires education to familiarize the public with the unusual configuration.
- **Price High Demand Parking.** Paid parking is recommended in commercial and downtown areas, using meters and time restrictions. Restrictions are typically needed to discourage long-term parking.



Grand Street

Source: DVRPC



Lyndale Street

Source: DVRPC



Roadway-Facing Elements

Parklets

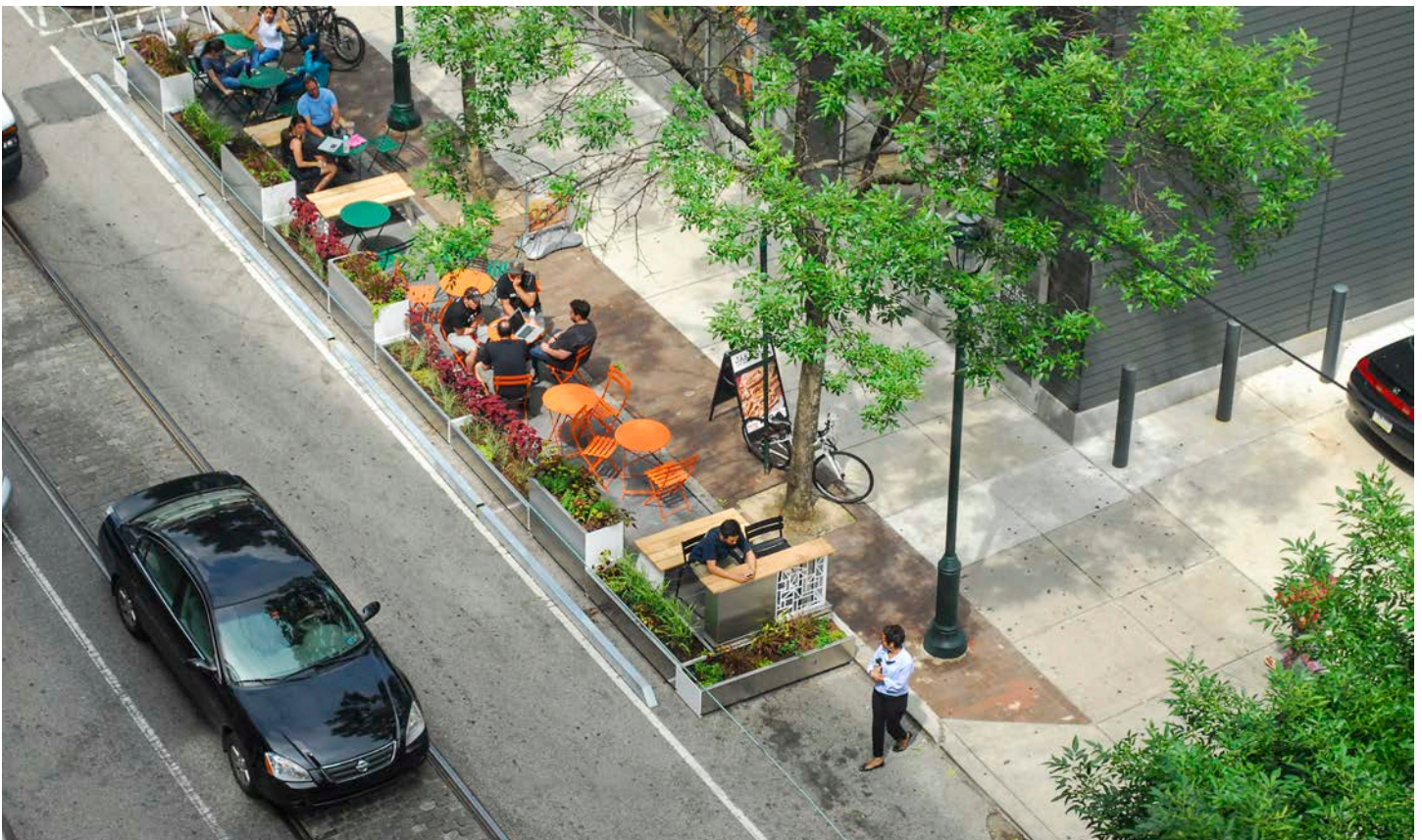
Overview

Parklets provide gathering space and amenities for people and businesses, including seating, bicycle parking, public art, and plantings in lieu of one or more parking stalls. Parklets can be temporary, as shown by annual (Park)ing Day demonstrations. A parklet can also be a permanent reallocation of space.

Parklets are often funded by local businesses and community groups. A 2017 University City District study in Philadelphia, PA found that parklets increased sales by 20 percent at nearby businesses.

Best Practices

- **Parklet Dimensions.** Parklets are recommended to be 6' deep, or one foot shallower than the parking lane, and one to two parking spaces long. To avoid visibility issues, solid elements like walls or tables should be no more than 3' high.



Parklet in Philadelphia

Source: Shiftspace (CC)

Roadway-Facing Elements

Loading Zones

Overview

Providing dedicated space for loading and unloading prevents double-parking issues that impede other street users. Figure 47 shows a diagram of a typical loading zone.

Best Practices

- **Loading Zone Dimensions.** Loading zones need to meet minimum lengths and widths to accommodate commercial deliveries; passenger pick-up and drop-off requires less space.
 - Loading zones should utilize wider parking lanes, up to 15' wide, to support delivery trucks and industrial vehicles. For truck usage, it is recommended that loading zones be located at the beginning of a block to facilitate easy ingress and egress. If drivers must access the sides of a vehicle to unload, consider additional space to ensure safety.
 - Loading zones should be 80' long to accommodate large trucks or multiple vehicles. At minimum, loading must be at least 30' long to enable for-hire vehicles to pull in.
- **Provide Signage.** Loading zones should have signage to denote extents of the loading zone and applicable regulations and time limits.
- **Consider Flexible, Shared Zones.** Loading zones can be available for 24 hours a day to offer greater delivery flexibility, or they can use a window model where loading is only allowed during certain times. Outside of loading hours, these spaces can be used for food trucks, markets, and parklets on a temporary basis.

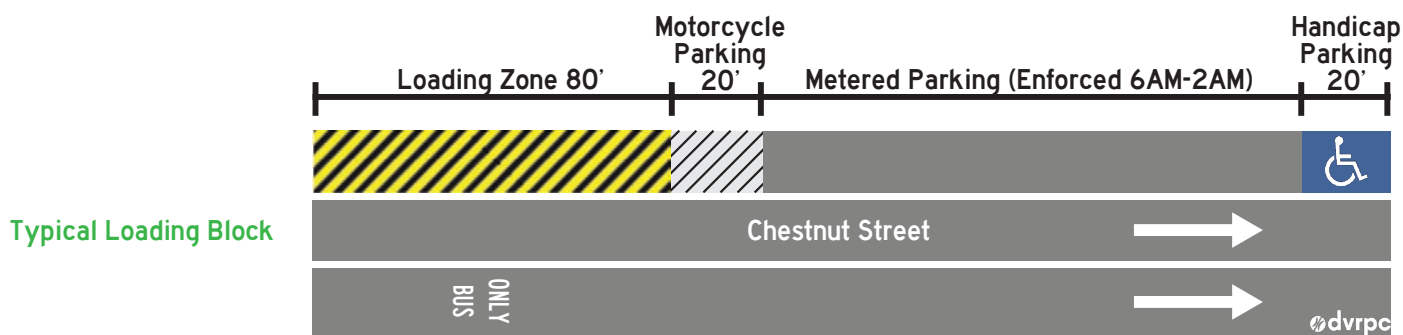


Figure 47 Loading zone diagram

Roadway-Facing Elements

Drainage and Green Stormwater Infrastructure at the Curb

Overview

Curb space can be used to house green stormwater infrastructure (GSI). GSI allows water to infiltrate into the ground and slowly release into the water table rather than through pipes and into rivers. GSI can be located in bumpouts or inlets can drain water into infiltration basins. GSI strategies include street trees, rain gardens, and permeable pavement. All of the strategies function using the same principle: hold and absorb water and then slowly release it back into the sewer.

Using GSI in curb space reduces pollution runoff in rivers, decreases flooding, recharges groundwater, lowers wastewater treatment cost, and can increase property values. Additionally, GSI in public spaces can increase support for effective water management due to greater public visibility and tangible benefits. See the *Boston Complete Streets Design Guide* for more information on utilizing GSI in the curb.

Best Practices

- **Divert Water from Flowline.** Ideally, GSI at the curb will keep stormwater out of the combined sewer, putting less stress on the system. Strategies that can help with this include porous unit pavers that assist in stormwater infiltration. Soft paving, grass, and mulch can help to absorb and hold water. Stormwater planters can be used along a curb to decrease runoff. Rain gardens can be used to create public space with the added benefits of GSI.
- **Maintain Flowline to Sewer Inlets.** It is also critical to ensure that any infrastructure added at the curb, like curb extensions, do not interrupt the flowline. Use a grate with curb extensions to allow stormwater to reach existing inlets. Bicycle-friendly grates and sewer inlets should be used.
- **Install Curb Extensions with GSI.** Curb extensions calm traffic while also retaining water and providing greenery. This can mitigate the urban heat island effect while helping mitigate stormwater overflows.



Green stormwater curb extension

Source: Kristen Langford



GSI curb extension

Source: Laura Sandt

Roadway

The roadway is the part of the street that carries vehicular traffic. This does not just include cars, but many other types of road users as well, including bicycles, trucks, transit vehicles, motorcycles, and, increasingly, new forms of micromobility like electric scooters. Even pedestrians must use the roadway frequently, at a minimum to cross the street. The diversity of users in the roadway creates conflicts as not all vehicles can or wish to travel at the same speed and some pose a much greater safety risk to the rest than others. The roadway must be designed to weigh the safety and access concerns of all users against the need to maintain the throughput necessary to support the economic life of the city.

The design elements in this section are divided into three categories. The first category includes traffic calming elements that can be used to lower the speed that vehicles can comfortably travel along the roadway, thereby increasing safety for all road users. The second category includes design elements that prioritize transit service, making travel by bus more efficient and attractive to potential riders. The third category covers bicycle facilities that should be installed to segregate these users from faster moving and heavier automobile traffic in the roadway.

Considerations

A key factor in the design of any roadway is the design speed, or the speed that the road is designed for a driver to feel comfortable traveling at. Speed is the key factor determining the risk and severity of a traffic crash. Oftentimes, urban streets are designed according to the operating speed of vehicles using the existing facility, or the 85th percentile. Streets designed to Complete Streets design standards should instead focus on the target speed of vehicles and (re-)design the street so that drivers can't exceed it.

Best Practices

- Design Roads for Target Speed.** The target speed of non-limited access streets in built-up areas should not exceed 30 mph except in limited cases where a 35 mph target speed may be permissible on some arterials (Figure 48 shows how higher speed increases crash and severity risk). Design criteria for urban streets (including arterials) must not exceed the target speed for the facility. Design speeds can be lowered on existing facilities in order to bring the design speed in line with the target speed. See "Traffic Calming Strategies" for more information on strategies to lower design speeds.

SPEED (MPH)	STOPPING DISTANCE (FT)*	CRASH RISK (%)†	FATALITY RISK (%)†
10–15	25	5	2
20–25	40	15	5
30–35	75	55	45
40+	118	90	85

* Stopping Distance includes perception, reaction, and braking times.

† Source: Traditional Neighborhood Development: Street Design Guidelines (1999), ITE Transportation Planning Council Committee 5P-8.

Figure 48 Design speed table

Source: NACTO

Traffic Calming Strategies



Overview

Traffic calming measures manipulate the roadway to slow traffic to create a safer travel environment for bicyclists and pedestrians, as well as motorists. The traffic calming strategies can generally be divided into three categories. The first includes those that alter the road configuration through striping, primarily by narrowing lane widths and reducing the number of lanes through road diets. The second category uses vertical deflection through strategies like speed humps, speed tables, and speed cushions that force vehicles to slow as they traverse the raised obstruction in the roadway. The third category uses curb extensions through strategies like chicanes and neckdowns to slow vehicles by interrupting an otherwise straight or wide roadway. GSI best practices can also be integrated into traffic calming projects.

Best Practices

- **Make Lanes as Narrow as Possible.** Narrowing vehicle travel lanes can reduce speeds and free roadway space for different modes. Ten-foot lanes encourage slower speeds, increasing safety for other road users. Lanes greater than 11' should not be used. Wider lanes may cause unintended speeding, accommodate error, and assume right-of-way at the expense of other modes.
 - Commercial Corridors, Connector Corridors, and Industrial Access streets should have 11' wide lanes to accommodate wider vehicles, and all other streets should have lanes that are 10' wide.
 - Parking lanes should be between 7'-9'. Parking lanes with a loading zone should be 8'-9' and can be up to 15' to accommodate trucks.
 - Where there is extra room in the cartway, an edgeline, with gore striping if necessary, can be painted to maintain proper lane widths.
- **Reduce the Number of Lanes.** A road diet reduces the number of travel lanes to reduce speeds, increase safety, and create room for bicycle facilities or wider sidewalks. A four-lane street could be reduced to one travel lane in each direction and a center turning lane. They are a FHWA Proven Safety Countermeasure and have been shown to result in a 19–47 percent reduction in total crashes.



Example of a Road Diet, Vanderbilt Avenue, NYC

Source: NACTO

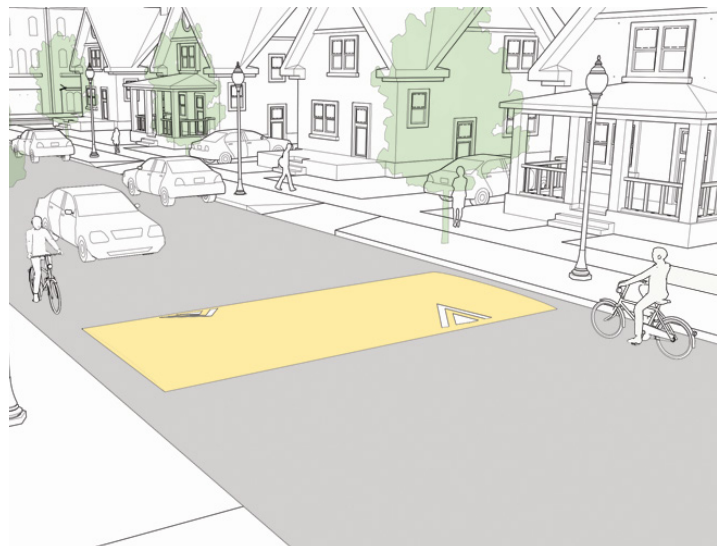


Figure 49 Example diagram of a speed hump

Source: NACTO



Figure 50 Example diagram of a speed table

Source: NACTO

Traffic Calming (continued)



Example of a chicane

Source: NACTO

- **Implement Vertical Deflection.** Speed humps, speed tables, and speed cushions are all types of vertical deflection. The design profile (including the slope of the ramp and length of the top) and spacing between installations influence how appropriate each element is for different types of roads. Warning signs are needed to alert drivers to vertical deflection elements. Caution should be exercised when considering vertical deflection on streets wider than 50'.

- *Speed Humps* are the most abrupt vertical deflection design and reduce speeds to 15–20 mph (Figure 49).
- *Speed Tables* have a flat area between the sloped edges (Figure 50). The longer traversable surface calms traffic less abruptly than speed humps; they can be crossed at up to 25–30 mph. If a speed table is needed in the same location as a crosswalk, a raised crosswalk should be installed.
- *Speed Cushions* function similarly to speed humps, but feature wheel cutouts to allow emergency vehicles and trucks to pass easily through. Speed cushions reduce speeds to 15–20 mph.



Example of an interim speed cushion

Source: NACTO

- **Use Horizontal Deflection to Slow Traffic.** Chicanes and neckdowns are traffic calming strategies that use curb extensions to slow traffic. Due to the impact these elements have on the curb, drainage is a potential issue when installing them. Edge islands can provide the same benefits without impacting existing drainage channels. Warning signs should be installed to alert drivers of the traffic calming measure.

- *Chicanes* are a traffic calming strategy that use offset curb extensions to increase public space along a roadway and force drivers to maneuver small bends, slowing speeds.
- *Neckdowns* are curb extensions that are used to narrow the roadway. They can be utilized at the intersection as a gateway treatment or at the mid-block, often with midblock crossings. Neckdowns create an opportunity for tree plantings or additional bicycle parking on the curb extension.



Example of an interim neckdown

Source: Bicycle Coalition of Greater Philadelphia



Prioritizing Transit

Overview

Prioritizing transit in the roadway increases the reliability of surface transit schedules and can decrease travel times. Strategies to prioritize transit on the roadway include dedicating travel lanes for transit and installing priority signals for transit.

Best Practices

- **Dedicate Bus Lanes.** A dedicated bus lane reserves the curbside lane for bus travel (Figure 51). Dedicated bus lanes can be applied on major routes with 10-minute headways where traffic congestion could significantly affect reliability. A dedicated bus lane can increase travel speeds by 20–30 percent, reducing overcrowding and allowing for faster service. To benefit transit the most, the lane should be reserved exclusively for bus travel; where space is limited and depending on the adjacent land use, it may be necessary to allow right turns and business access in the dedicated bus lane as well.
 - Dedicated bus lanes should use the curbside lane with a minimum lane width of 11'. Pavement markings must indicate "Bus Only." Red paint in the dedicated lane is recommended; it deters drivers from driving and parking in it.
 - Transit signal priority (see below) for these lanes is recommended to reduce delays.
- **Prioritize Transit at Signals.** Priority signals for transit are used to reduce delays for buses by changing the lights to green for public transit. These systems can be used intermittently, to make up time for a late vehicle, or consistently along a corridor. Priority signals are best used when signal cycle length is a significant factor to transit delay. Priority signals could also create an extended turn phase to provide room for transit to turn and maneuver slowly.



Queens, NY bus lane

Source: NYC DOT



Figure 51 Bus lane diagram

Source: NACTO

Bike Facilities



Overview

Bicycle facilities in the roadway designate space for bicyclists. This increases awareness of these users for motorists and can increase safety and comfort for bicyclists. Bike facilities in the roadway cover a range of strategies, from pavement marking and signage to different types of bike lanes with varied levels of segregation and protection from car traffic.

Best Practices

- **Establish a Cyclist's Right and Space in the Street.** Some types of bike lanes provide more protection from traffic than others. They can be broadly categorized as sharrows, conventional bike lanes, and protected bike lanes, in ascending order of protection and segregation. Determining the right strategy is contingent on factors like road space, operating speed of motorized vehicles, and the volume of motorized vehicles. See NACTO's *Urban Bikeway Design Guide* for more specifics on appropriate contexts for different bike lane facilities.

 - Sharrows: Sharrows are road markings that indicate that a roadway is a shared lane for both motorists and bicyclists. Can be used over green paint for "green-backed" sharrows for more visual impact. They offer no protection and no segregation and should only be utilized on very low risk roadways.
 - Conventional Bike Lanes: Conventional bike lanes designate exclusive space in the roadway for bicycle travel, usually next to the curb or parking lane. Conventional bike lanes use pavement markings and signage to designate their locations. They offer segregation, but no protection.
 - Protected Bike Lanes: Protected bike lanes function similarly to conventional bike lanes in giving bicyclists a designated space on the roadway, but separates them further with a painted buffer space or physical barriers placed in the buffer zone such as bollards, planters, and flexible delineators. These physical barriers, depending on the material, may or may not be crash resistant to provide full physical protection for bicyclists. Protected bike lanes can also be parking-protected, which places the protected bike lane to the right of the parking lane, adjacent to the curb.



Sharrow in Media, PA

Source: DVRPC



Figure 52 Conventional bicycle lane

Source: NACTO

Bike Facilities (continued)



Green striped conflict zone

Source: DVRPC

Some type of a barrier between the parking lane and the bicycle lane, such as flexible delineators, may be necessary in a parking-protected bike lane concept if drivers are not accustomed to the design.

- **Consider Reverse and Two-Way Bicyclist Flow.**

Occasionally, allowing bicyclists to travel against the typical flow of traffic is beneficial to bicycle network connectivity. There are two broad categories of these types of bike lane.

- **Contraflow Bike Lane:** Contraflow bike lanes transform one-way streets for motorists to two-way streets for bicyclists by adding a bike lane traveling the opposite direction.
- **Two-Way Cycle Tracks:** Two-way cycle tracks are physically separated bike lanes that allow travel in both directions on one side of the road.



Protected bicycle lane in Madison, WI

Source: DVRPC

- **Increase Visibility with Lane Markings and Signage.**

All bike facilities need some type of pavement markings on the roadway. Green paint increases awareness of the bike lane and reinforces that the lane is not for motor traffic. It can be used in conflict areas only (driveways, intersections) or to mark the entire lane.

- **Sharrows:** Sharrows should be paired with “Share the Road” signage.
- **Conventional Bike Lanes:** A white solid line at least 6” wide should separate the bike lane from the vehicle travel lane. In merging areas, a dashed line should be used. Pavement markings should be placed outside of the motor vehicle tread path to minimize wear. When a bike lane is adjacent to a curb, place “no parking” signs.
- **Protected Bike Lanes:** Protected bike lanes should use green paint. ‘Bike Only’ pavement markings and ‘Bike Lane’ signs could clarify these lanes as well. Pavement markings should be placed at the beginning of the lane, and in periodic intervals based on the place-specific context and engineering judgment. If a protected lane utilizes only a buffer, the buffer zone

Bike Facilities (continued)



should be marked with solid white lines filled with diagonal cross hatching. Physical barriers between the travel lane and the bike lane are recommended to emphasize the space.

- Contraflow Bike Lane: Contraflow lanes are marked by a solid double yellow line to separate the lane, unless separated by parking. Streets with contraflow lanes should include an “Except Bikes” sign to “One Way” signs. For any “Do Not Enter Signs,” an “Except Bikes” sign should be added. Bike lane pavement markings should indicate the direction of travel.
- Two-Way Cycle Tracks: Pavement markings should signal the cycle track at the beginning and at periodic intervals. On one-way streets, an “Except Bikes” sign should accompany the “One Way” sign. The cycle track should also have “Do Not Enter” and “Except Bikes” signs at every entrance to the track. Bike signals should be installed at all controlled intersections on a cycle track.
- **Provide Sufficient Width.** Adhering to minimum widths for bike facilities is critical to their success.
 - Sharrows: Sharrows do not have minimum width guidance because they share the vehicle through lane.
 - Conventional Bike Lane & Contraflow Lane: Conventional bike lanes must be at least 4’ wide; but ideally 6’ wide. When conventional bike lanes are placed next to a parking lane, they must be at least 5’ wide. The same applies to contraflow lanes.
 - Separated or Protected Bike Lane: Protected bike lanes must be at least 5’ wide, with an additional 3’ buffer width. If it is a parking-protected bike lane, total width for the parking lane and bike lane should be at least 11’.
 - Two-Way Cycle Tracks: Two-way cycle tracks must be at least 8’ wide, though 12’ wide is recommended.
- **Provide Wayfinding.** Bicycle wayfinding systems combine comprehensive signage and/or pavement markings to guide cyclists to destinations along bicycle routes while



Two-way cycle track, NYC

Source: NACTO



Contraflow bicycle lane, Chicago, IL

Source: NACTO

Bike Facilities (continued)



Neighborhood greenway with traffic diverter

Source: Russ Roca, PBIC

familiarizing users with the network. These systems lower barriers to entry for infrequent cyclists by providing the best route to a popular destination. Wayfinding systems are typically applied over the entirety of the corridor or streets with the bicycle facility for continuity.

- **Manage Interactions with Transit.** At transit stops, a bumpout should be used for transit rider boarding and alighting and the bicycle lane should wrap behind it.
- **Minimize Obstructions.** Designers should minimize conflicts with drain and utility covers, and keep these elements at grade, and with bike-friendly covers.
- **Develop Neighborhood Greenways.** Neighborhood greenways are a type of bike facility that has benefits for all street users. Throughout the country these facilities have a number of names, including bicycle boulevards, neighborhood bikeways, local street bikeways and bicycle priority streets, among others. These shared roads utilize a variety of tools to decrease auto traffic volumes and speeds to provide a low-stress environment for bicyclists and pedestrians. To create a street that is comfortable for bicyclists of all ages and skill levels, traffic calming, traffic reduction, signage and pavement markings, and intersection crossing treatments are used. In Trenton, many alley streets and some dense residential streets are good candidates for this treatment.
- **Plan for Maintenance.** The most common forms of protected bicycle lanes require installing bollards, often flexible delineator posts. These pose maintenance challenges as they may create spaces too narrow for traditional street sweepers or snow plows to navigate. Bike lane maintenance is possible, however, with limited planning, including purchase of pickup truck-mounted plow blades or other small snow removal vehicles and proactive deicing efforts (see "Winter Bike Lane Maintenance: A Review of National and International Best Practices" for more information). Limiting the extent of bollard deployment to high conflict areas like intersections or curves where drivers are more likely to encroach the bicycle lane can also "right-size" a protected bike lane project and save on maintenance.



Neighborhood greenway in Portland, Oregon

Source: Russ Roca, PBIC

Intersection

Overview

All road users come together at the intersection. Intersection design is of special importance to Complete Streets because it must balance the competing needs of many users and reduce the inherent conflicts created where the strands of the transportation network meet and cross. Intersections designed to Complete Streets standards bring in elements from all other parts of the street—the sidewalk, the curb, and the roadway—and adapt them to suit the heightened awareness that intersections demand. Traffic calming strategies adapt to turning vehicles, bike facilities focus on safely mixing with vehicles, and pedestrian facilities ensure that the protections of the sidewalk are not completely lost as pedestrians venture into the street.

The design elements in this section are divided into three categories. The first category includes design elements that prioritize pedestrian movements through the intersection, increasing their visibility and safety. The second category covers bicycle facilities that should be installed to maintain safety as bicycles mix with vehicles in the intersection. The third category includes traffic calming elements that can be used to slow both turning vehicles and those continuing straight, thereby increasing safety for all road users.

Considerations

All intersections should be evaluated for line of sight concerns and designed to ensure greater visibility and safety for all road users to be able to maneuver the street. Street corners must be designed to maximize eye contact between all modes of transportation, including pedestrians, bikes, transit, and automobiles. These changes should not widen roadway corners. Though this change may increase visibility, it may also increase speed of automobiles, decreasing the driver's peripheral vision and awareness of pedestrians.

Intersections can be ideal locations to create additional public space with tactics like curb extensions. This extra space can be activated with street furniture, public art, lighting, small plazas, and parklets to create a sense of place. Areas utilizing placemaking techniques should be defined with plantings, trees, and furniture. These techniques can include wayfinding signage. Placemaking can enhance access to amenities such

as transit stops, libraries, schools, government buildings, post offices, bike parking, and bike share stations.

Gateways build on these placemaking techniques with vertical elements that define the street and make pedestrians, bicyclists, and drivers more aware of their surroundings. This could be accomplished with overhead banners, or decorative signage at the entrance to neighborhoods, districts, or the city. Other vertical fixtures could be special light fixtures, overhead lighting, prominent street trees, and public art installations that make road users see the distinction of the area.

Best Practices

- **Maintain Sight Lines.** To create better lines of sight, designers should remove parking within 20' of the intersection, keep trees at least 5' from the intersection, 3' from a curb, and 5' from signage.
- **Use Texture to Enhance Placemaking and Gateway Programs.** Horizontal elements can provide placemaking and gateway benefits by defining the street to make road users more aware of their surroundings. Materials could include textured pavement, unique patterns or materiality on crosswalks, murals, raised intersections, or shared streets.



Painted intersection placemaking strategy

Source: Trenton Health Team

Pedestrian Safety Elements

Crosswalks



Overview

Crosswalks designate places for pedestrians to cross roadways and alert motorists to watch for pedestrians crossing. Crosswalks can create a more walkable urbanized environment.

Marked crosswalks must be installed on all legs of signalized intersections unless pedestrians are prohibited from the roadway. All new crosswalks should have a pedestrian countdown signal.

Best Practices

- Prioritize Visibility.** Crosswalks must be striped in high-visibility continental crosswalk markings at least as wide as the sidewalks they connect, and align with the sidewalk as closely as possible (see Figure 53). Street lighting is required near all intersections with crosswalks to increase visibility at night.
 - Stop bars must be at least 8' before the crosswalk, perpendicular to the travel lane.
- Ensure Accessibility.** ADA curb ramps with detectable warning surface must be installed with all crosswalks. Curb ramps should be installed perpendicular to the sidewalk, directly facing the crosswalk (not diagonal to the sidewalk, facing the middle of the intersection). Crosswalks must be at-grade unless crossing a limited access highway.
- Minimize Crossing Distance.** Crosswalks should be as short as possible, utilizing bumpouts, pedestrian refuges, and smaller curb radii to minimize crossing time.
- Minimize Distance Between Crossings.** Controlled crosswalks should ideally be spaced 200'–300' apart. Midblock crossings should be considered where there are significant pedestrian generators and pedestrians must walk more than 200' to reach the nearest crosswalk. Midblock crossings are best on streets with lower speeds and vehicle volumes. Placement and design should ensure that sight distances are sufficient and ample clear space is provided on either side. Additional treatments can be considered to ensure pedestrian safety and visibility. See FHWA's *Safe Transportation for Every Pedestrian* guide for more information.



Continental-style crosswalk in Indianapolis, IN

Source: NACTO

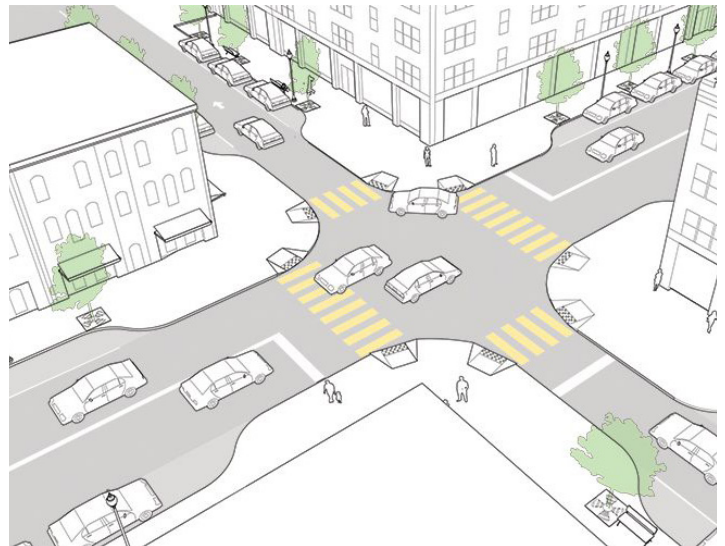


Figure 53 Crosswalk diagram

Source: NACTO

Pedestrian Safety Elements

Pedestrian Signals



Overview

Pedestrian signals are used to create a safer, more comfortable, and more predictable crossing environment for all pedestrians. These countermeasures reduce pedestrian-motorist crashes and increase motorist yielding. Safety elements include those that impact pedestrian crossing time like countdown signals, which should be installed at all new crosswalks. They also include those that increase visibility of pedestrians in the intersection, like rectangular rapid flashing beacons (RRFB), pedestrian hybrid beacons, and in-street crossing signage. Leading pedestrian intervals (LPI) accomplish both goals by extending crossing time and making pedestrians more visible in the intersection. Several of these strategies are FHWA Proven Safety Countermeasures and have been shown to result in significant pedestrian crash reductions including RRFB (47 percent), pedestrian hybrid beacons (55 percent), and LPI (60 percent).

- Provide Sufficient Crossing Time.** Walk times must allow for a cross time of 3.5 feet per second. Crossing times should be increased near hospitals, senior centers, and other places where pedestrians may move more slowly (assume 2.5 feet per second). Two-stage crossings should be avoided.
 - Signal cycles should be no more than 60 to 90 seconds; shorter cycle lengths increase compliance with crossing signals. Half-cycle lengths that are below 40 seconds at signalized crosswalks and below 20 seconds at unsignalized crosswalks minimize risk-taking behavior.
- Display Pedestrian Countdown Information.** Pedestrian signals can convey countdown information in multiple formats: visual, audible, and vibrotactile. Visual representations of countdown information include walk and hand signals. Audible representations of countdown information come from the tones to accommodate walk and don't walk. Vibrotactile representations can come from an actuator device, if one is used, which has a raised arrow in the direction of the crossing, and the button's ability to vibrate in alignment with the audible tone. Visual is the standard format. Other formats should be used as necessary in response to the needs of area users.



Pedestrian signal

Source: AZ Magazine



LPI signal in NYC

Source: NYC DOT

Pedestrian Safety Elements

Pedestrian Signals (continued)



- **Make Actuators Accessible, if Needed.** Generally actuators or push buttons should not be used and a pedestrian cycle should be part of every signal phase. If push buttons are used, they must be accessible: placed on a level segment (<2% slope) that is 3' by 4', or 5' by 5' if the pedestrian must turn to use the actuator. Devices must be 2' to 6' from the curb, within 5' of the crosswalk, and 3'-6" from the ground, and be parallel to the direction of travel. Buttons must be large enough for those with limited hand function to operate, and easy to press.
- **Provide a Leading Pedestrian Interval.** Leading Pedestrian Intervals (LPIs) allow pedestrians to begin crossing before vehicle traffic enters the intersection. Pedestrians are given a 3 to 7 second "head start" before vehicles have the green light to turn or proceed, allowing pedestrians to be seen more easily in the intersection. It is an easy and inexpensive strategy with significant safety benefits. Intersections where LPIs were installed saw a 60 percent reduction in pedestrian-vehicle crashes, and are especially beneficial where left-turn volumes are high.
- **Increase Visibility at Key Locations.** Rectangular Rapid Flashing Beacons (RRFBs) and Pedestrian Hybrid Beacons (also known as High-Intensity Activated Crosswalks or HAWKs) can dramatically improve safety at unsignalized and other priority pedestrian crossings, including at midblock locations.
 - *Rectangular Rapid Flashing Beacons* (RRFBs) are flashing lights actuated by a crossing pedestrian that alert drivers to crosswalks and pedestrian activity. They can also be used for bike/trail crossings. RRFBs are best used for high-volume bicycle and pedestrian crossings, midblock crossings, and low-visibility crossings. A 2009 study (Hunter, Srinivisan, Martell) showed that motorists yielding to pedestrians increased from 2 percent without an RFFB to 54 percent with a flashing RFFB. If RRFBs are intended to be used by bicyclists, the actuator button (the device to trigger the signal) should be placed in a position that does not require the cyclist to dismount.
 - *Pedestrian Hybrid Beacons* are flashing lights/signs activated by pedestrians used to enhance pedestrian and bicycle crossings of major streets at a midblock location, or an uncontrolled intersection with high speeds. They are an FHWA Safety Countermeasure that have been shown to reduce pedestrian crashes by 55 percent and total crashes by 29 percent.
- **Use In-Street Signage to Communicate to Drivers.** In-street crossing signage can be used in order to convey information about roadway rules and warn drivers about possible pedestrian activity at unsignalized intersections and midblock locations. "Yield to Pedestrian," and variations such as "Yield Here to Pedestrian" and "Turning Traffic Yield to Pedestrian" have been shown to increase yielding compliance.



RRFB with speed table, Philadelphia, PA

Source: DVRPC

Pedestrian Safety Elements

Pedestrian Refuge Islands

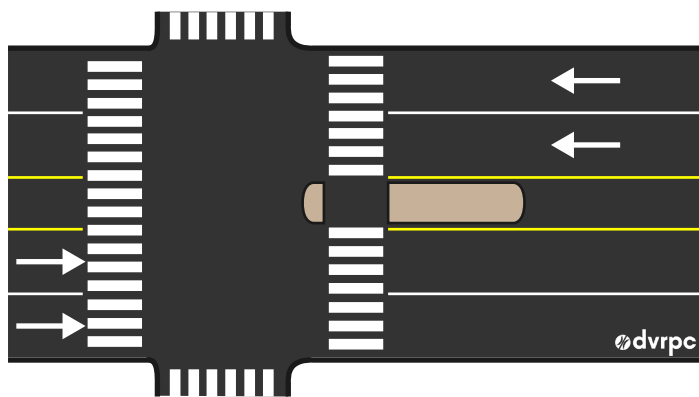


Overview

Pedestrian refuge islands provide a place for people to pause while crossing the street. They can be implemented on any street, but are especially important on wider streets with at least four total lanes. They can also be used at unsignalized intersections, streets with high speeds, and crossings that are used by children and elderly people. By limiting exposure to traffic, islands keep pedestrians safe. See Figure 54 for examples of pedestrian island criteria for different roadway conditions. Pedestrian refuge islands are a FHWA Proven Safety Countermeasure and have been shown to result in a 56 percent reduction in pedestrian crashes.

Examples

At an intersection, extend the median past the crosswalk



At a midblock crossing, use a staggered design

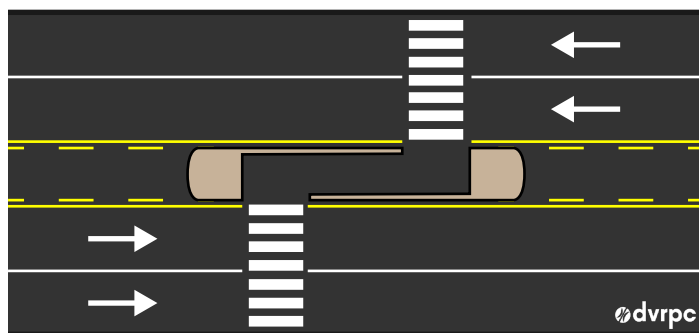


Figure 54 Crossing diagram

Best Practices

- **Shorten Long Crossings.** Implement when a pedestrian must cross four lanes of traffic or more. If the crossing uses a push-button actuator for a pedestrian crossing signal, place another at the refuge island.
- **Protect Pedestrians from Turning Vehicles.** At an intersection with a curbed median, a nose must be added to protect pedestrians from traffic. Extend the median past the crosswalk as shown in Figure 55. If a curbed median is not possible, consider using bollards to protect pedestrians.
- **Ensure Accessibility.** Islands should be at least 6' wide, to accommodate a person pushing a stroller or a bicycle, and ideally 40' long. The refuge space (where the crosswalk traverses the refuge island) should be at least as wide as the crosswalk; if this is not possible keep the crosswalk width and make the refuge as wide as possible. Place a detectable warning surface at the edges of the island to assist vision-impaired pedestrians in identifying the street.
- **Stagger Crosswalks at Midblock Crossings.** If being used at a midblock crossing, refuge islands should be staggered such that pedestrians are forced to face the traffic that they will be crossing.
- **Landscape Median Where Possible.** Pedestrian refuge islands are an opportunity to add landscaping elements to the street. Carefully consider visibility for all modes when selecting landscaping elements.

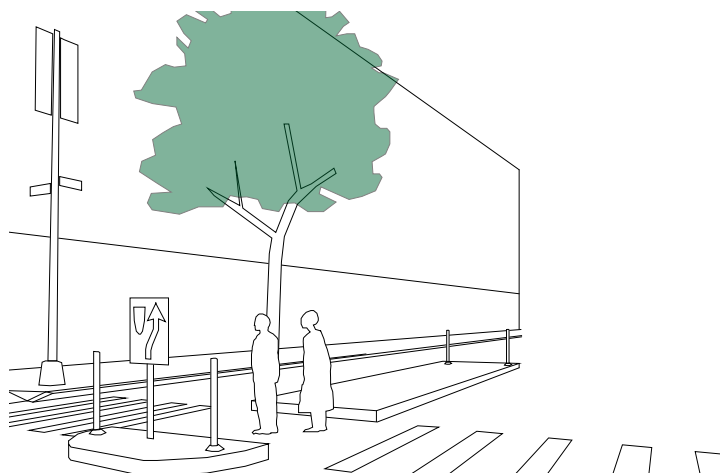


Figure 55 Crossing rendering

Source: DVRPC

Bike Facilities



Overview

Bike facilities create safer environments for bicyclists to use the roadway with motorized vehicles. These strategies aim to increase the visibility of bicyclists in the intersection and to manage the interaction between turning vehicles and bicyclists traveling through the intersection.

Best Practices

- **Designate Intersection Space for Bicyclists.** Allocating pavement for bicyclists increases their visibility, even if protection is typically not possible. Pavement should be allocated for bicyclists that are waiting at a red light with a bike box and for bicyclists crossing the intersection with intersection crossing markings.
 - *Bike Boxes* designate an area at the head of a traffic lane at signalized intersections for bicyclists to stop (see Figure 56). This allows bicyclists to stop in front of queuing motorized traffic during red signal phases. Signage to communicate the Bike Box should be added, including a “Yield to Bikes” post-mounted sign indicating the egress lane, a “Stop Here on Red” post-mounted sign at the stop bar, and a “Wait Here” pavement marking at the stop bar.
 - Bike Boxes must be 10’–16’ deep, and be green colored pavement with a bike symbol pavement marking. Bike Boxes should be accompanied with a 25’–50’ green painted ingress lane, and an egress lane in the intersection to highlight potential conflict.
 - *Intersection crossing markings* visibly mark areas of potential conflict between bicyclists and motorists (see Figure 57). Intersection crossing markings should match the width of the leading bike lane, and may emphasize potential conflict areas.
 - Intersection crossing markings must be at least 6” wide and 2’ long, spaced 2’–6’, bordering the bike lane or designated cycle space. It should be painted green within conflict areas, and ideally across the entire intersection.
- **Shift the Bike Lane to Increase Visibility.** The conflict between left-turning vehicles and bicyclists traveling

straight can be mitigated by shifting the bike lane as it approaches the intersection.

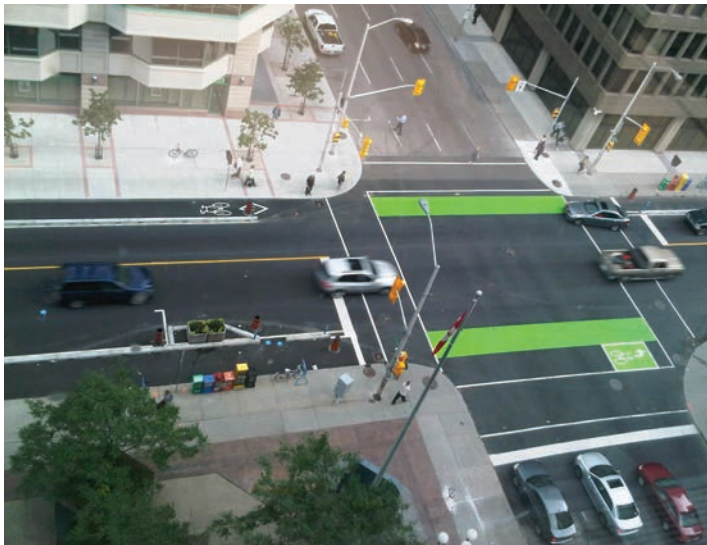
- With conventional bike lanes, bike lanes must be on the “inside” of vehicle turning lanes: A through bike lane must be on the left-hand side of a right turn lane, and the right-hand side of a left turn lane. This design standard requires a “mixing zone” where turning vehicles and bicyclists can move out of each other’s path before reaching the intersection.
- With protected bike lanes, which must become unprotected in the approach to the intersection, the bike lanes should shift closer to the travel lanes to increase visibility and eye contact. Alternatively, the bike lane can shift closer to the crosswalk if a turning wedge (see “Traffic Calming”) is included to slow right-turning traffic and ensure that the driver has a clear view of the bicyclist crossing. See NACTO’s *Don’t Give Up at the Intersection* (2019) for more guidance.



Figure 56 Bike box at intersection

Source: NACTO

Bike Facilities (continued)



Two stage turning boxes, Ottawa, CN

Source: NACTO

- **Provide Bike Signals.** Bike signals are separate signals for cyclists that create a safer traffic environment in the intersection for cyclists. Bike signals work alongside the traffic signals to create signal phases specific to the bike lanes. Bike signals can create a leading bike interval, allowing bikes to enter the intersection first for greater visibility for turning cars. Bike signals can also be coordinated with protected turn phases to segregate turning vehicles from conflicting cyclist through movements. See NACTO’s *Don’t Give Up at the Intersection* (2019) for more information.
- **Encourage Bicyclists to Take Left Turns in Phases.** Two-Stage Turning Boxes make left turns safer for cyclists by breaking the turning movement into two parts: first, crossing to the other side of the road, then turning left within the bike box and crossing the street. The two part turn requires two light signals to complete the turn. Designers can also consider a “jughandle turn” that is integrated into sidewalk space. Turning boxes could also be placed in the cross-street parking lane.
 - The boxes must be 9’ long and 3’ wide, painted green, have bicycle and turn arrow pavement markings, and have pavement markings through the intersection to indicate conflict areas.
- **Install No Right Turn on Red Signage.** Disallowing turning on red increases safety for all road users, especially at high use intersections. When paired with intersection bike facilities, it improves performance and keeps bicyclists using those facilities safe. Intersections with bike boxes and two-stage turning boxes must not allow right turn on red.



Figure 57 Intersection crossing markings

Source: NACTO

Traffic Calming Strategies



Overview

The goal of traffic calming at the intersection is to slow vehicles and ensure safety for all users of the intersection. There are two broad categories of vehicle movements that it may be desirable to calm: turning vehicles and vehicles traveling straight through the intersection. Raising the intersection and installing roundabouts can slow vehicles traveling straight. These strategies can also have benefits for calming turning vehicles. In addition, to calm right-turning vehicles, consider curb extensions (see “Curb Extensions”), turn wedges, and channelized right-turn lanes. To calm left-turning vehicles, consider pedestrian refuge islands (see “Pedestrian Refuge Islands”) and hardened centerlines. Roundabouts are a FHWA Proven Safety Countermeasure and have been shown to result in a 78–82 percent reduction in severe crashes.

Best Practices

- Raise the pavement.** Raised Intersections make drivers more aware of their surroundings by bringing the roadway to the level of the sidewalk, creating a ‘mixed’ environment (see Figure 58). They also can have placemaking benefits when executed with unique materials. Raised Intersections should include a slight lip with an otherwise flush sidewalk to warn vision-impaired pedestrians, since curb ramps are not needed. Installation requires careful evaluation of flowlines to ensure drainage to existing sewer inlets is not disrupted. Raised crosswalks are another option for slowing traffic at the intersection.
- Replace Controlled Intersections with Roundabouts.** Roundabouts are used to increase safety at intersections by sending all traffic around a circle in the same direction. Roundabouts keep speeds low and limit points of potential conflict in the flow of traffic. Converting a signalized intersection to a roundabout reduces crashes by 78 percent and converting a two-way stop to a roundabout reduces crashes by 82 percent. Roundabouts should be one lane on most roadways. Multi-lane roundabouts can be installed on roadways with more than 25,000 AADT. Roundabouts must be installed to current FHWA standards, which maximize their traffic calming and pedestrian safety benefits.



Raised intersection, Harrisburg, PA

Source: PennDOT



Figure 58 Raised intersection diagram

Source: NACTO

Traffic Calming Strategies (continued)



- **Use Mini Roundabouts at Uncontrolled and Low Volume Intersections.** Mini roundabouts are appropriate for minor, uncontrolled intersections to manage speed. If planted, mini roundabouts must be maintained to allow visibility to the other side. If bicycle facilities exist, they must clearly mark the bike route and wayfinding information. Mini Roundabouts typically span 15' from the corner curb to the center island.
- **Calm Right-Turning Travel Speeds.** Slowing vehicles taking right turns is critical to ensuring all road users can safely use the intersection.
 - *Turning wedges* are a low-cost alternative to a curb extension used to force vehicles to turn at slower speeds by creating a tighter turning radius at an intersection. They sometimes feature a modular speed bump or similar element that allows truck traffic to negotiate the turn while keeping car turning speeds slow.
 - *Channelized right turns* isolate the right turning lane, creating a separate lane with a less severe angle for vehicular traffic to complete a right turn. While they can significantly improve vehicular throughput, they tend to increase vehicular speed through the turn and decrease the propensity for turning vehicles to yield, making them a hazard to pedestrians. If a channelized right turn is needed, it should be designed to slow vehicles entering the channel and encourage visibility of pedestrians (see Figure 59). See the *New Jersey Complete Streets Design Guide (2017)* for more information. Designers should consider a right turn-only lane in lieu of a channelized right turn in order to better control speed and yielding.



Roundabout with pedestrian islands

Source: FHWA



Mini roundabout

Source: NACTO



Turning wedges can slow turning movements at crosswalks. Source: NYCDOT

Traffic Calming Strategies (continued)



- Calm Left-Turning Travel Speeds.** Slowing left-turning traffic requires the same approach as right-turn traffic calming: the radius of the turn must be decreased as much as possible. Strategies to do this include installing a “cap” on a pedestrian median island that extends toward the path of through moving vehicles on the cross street. This prevents left-turning vehicles from making a turn with a higher turning radius. A low-cost alternative to the pedestrian refuge island cap is a hardened centerline running down the centerline of the receiving street and extending beyond the crosswalk toward the path of through moving vehicles on the cross street. The centerline can be outfitted with delineator posts up to the crosswalk and use a modular speed bump beyond the crosswalk where there is concern that turning heavy vehicles will be unable to negotiate the smaller turning radius. See NACTO’s *Don’t Give Up at the Intersection* (2019) for more information.
- Redirect Traffic Onto Arterial Roads.** Diverters are raised islands or other vertical treatments used to limit access to an otherwise accessible vehicle lane. Diverters can be used to restrict vehicular traffic to a local road. In most cases, diverters will redirect traffic onto an arterial road.

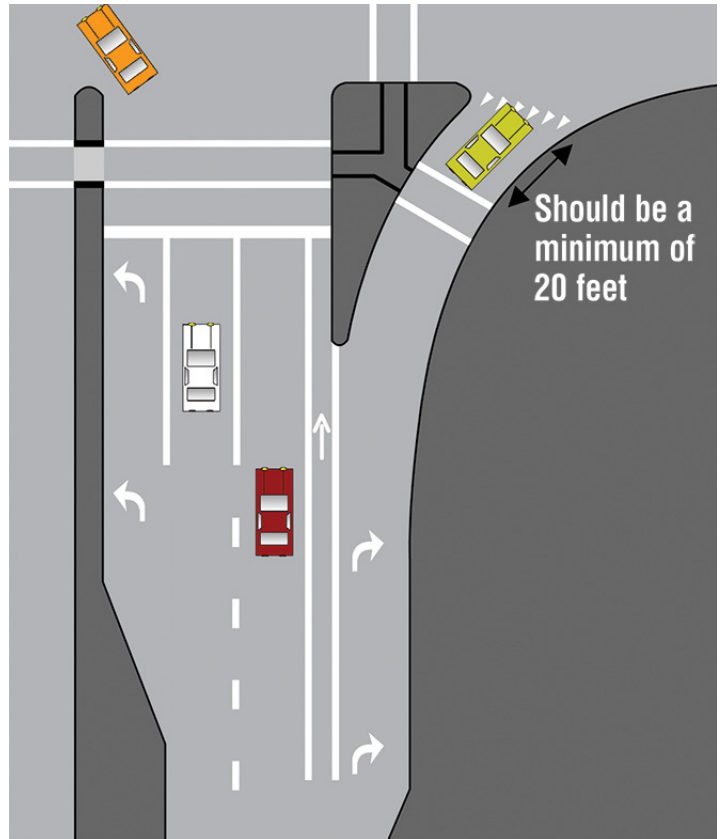


Figure 59 Channelized right turn diagram

Source: FHWA



Left-turn Traffic Calming in Boston, MA

Source: DVRPC



Implementation

Overview

Implementation of Complete Streets guidelines requires buy-in and coordination across multiple layers of city government and both for-profit and non-profit partners. This handbook overall is intended to provide a consistent framework for partners to reference in their work as it relates to Trenton's streets. This chapter provides strategies to align partners around the Complete Streets guidance provided throughout the handbook.

The focus of the strategies presented in this chapter is on actions that city government can take toward ensuring consistency with the guidelines of the handbook. This includes actions like incorporating the Complete Streets Typologies into the City's Land Development Ordinance and pursuing internal education for staff on the elements of a successful Complete Streets project.

Ultimately, successful Complete Streets implementation will require a concerted effort on the part of city government and partners, including the development industry and advocates who continue to push for project elements that ensure safe and comfortable facilities for all road users.

Formalize Process for Project Development and Review

Having a formal project development process that is specific to the type of project and whether the project is initiated by the city, a developer or other road owner or entity, is an important part of making Complete Streets a routine and predictable part of the city's ongoing day-to-day work.

Adopt Project Type Guidance

The Table of Design Elements by Project Type provides guidance on the types of design elements that should be considered based on project type (see Figure 60). Not every project can provide a full Complete Streets redesign. A repaving project, for instance, offers the opportunity to make many improvements through striping, but will not involve moving the curb or making significant changes to the sidewalk. This type of project, therefore, should focus on roadway improvements. A developer project that requires sidewalk reconstruction provides an opportunity to improve the pedestrian realm, but will not impact the roadway. This table is intended to provide guidance for how to use this handbook

depending on the type of project and how it impacts the right-of-way. The project types include:

- Safety project: projects initiated due to a safety concern, can include changes anywhere within the right-of-way
- Resurfacing: minimal roadway project, focused mainly on restriping and repair of existing asphalt
- Mill and pave: removal of existing asphalt and full replacement of right-of-way from curb to curb
- Road reconstruction: extensive roadway project up to and including moving curbs
- New road: construction of new roads, such as in new developments
- Sidewalk repair: minimal sidewalk project with no impact to the curb or roadway
- Sidewalk reconstruction: extensive sidewalk project up to and including moving curbs
- New sidewalk: construction of new sidewalks, such as along facilities that were built without a sidewalk, may impact roadway

The table indicates if consideration of the design element is required or not applicable. In some cases, the design element should be considered on an as needed basis, neither required nor inapplicable. In some other cases, a permanent installation of the design element is unlikely, but the interim strategy identified in the "Complete Streets Design Elements Guide" chapter should be evaluated.

Formalize Process for City-Led Projects

An example of a process for project development and review from the Boston Complete Streets Design Guidelines is shown in Figure 61. Trenton should develop their own process that details the steps from project initiation, project construction and through to maintenance. Such a process is most important for major projects involving construction or reconstruction, but also helpful for smaller projects that could follow a modified or abbreviated process. Importantly, a formal process can communicate to new and existing staff what stages of Complete Streets should be considered and by whom. Additionally, it makes clear who is responsible for the initiation

		Safety Project	Resurfacing	Mill and pave	Road reconstruction	New road	Sidewalk repair	Sidewalk reconstruction	New sidewalk
SIDEWALK	Sidewalk Zones	Frontage Zone	As Needed	Not Applicable	Not Applicable	Required	Required	Required	Required
		Pedestrian Zone	As Needed	Not Applicable	Not Applicable	Required	Required	Required	Required
		Greenscape-Furnishing Zone	As Needed	Not Applicable	Not Applicable	Required	Required	Required	Required
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	As Needed	Not Applicable	Not Applicable	Required	Required	Required	Required
		Sidewalk Cafes and Plazas	As Needed	Not Applicable	Not Applicable	Required	Required	Required	Required
		Street Trees	As Needed	Not Applicable	Not Applicable	Required	Required	Required	Required
		Street Furniture	As Needed	Not Applicable	Not Applicable	Required	Required	Required	Required
		Lighting	Required	Not Applicable	Not Applicable	Required	Required	Required	Required
		Bus Stop Amenities	As Needed	Not Applicable	Not Applicable	Required	Required	Required	Required
		Bike Parking	As Needed	Not Applicable	Not Applicable	Required	Required	Required	Required
CURB		Sidewalk Facing	Driveways / Entrances	Required	As Needed	As Needed	Required	Required	Required
			Curb Extensions	Required	Interim Strategy	Interim Strategy	Required	Required	Required
		Bus Loading Curb Extensions	As Needed	Interim Strategy	Interim Strategy	Required	Required	Required	
Road Facing	On-street Parking	As Needed	Interim Strategy	Interim Strategy	Required	Required	Required		
	Parklets	As Needed	Not Applicable	Not Applicable	Required	Required	Required		
	Loading Zones	As Needed	Interim Strategy	Interim Strategy	Required	Required	Required		
ROADWAY	Traffic Calming Strategies	Lane Narrowing	Required	Interim Strategy	Interim Strategy	Required	Required	Required	
		Vertical Deflection	Required	Interim Strategy	Interim Strategy	Required	Required	Required	
		Chicanes	Required	Interim Strategy	Interim Strategy	Required	Required	Required	
	Neckdowns	Required	Interim Strategy	Interim Strategy	Required	Required	Required		
	Transit	Dedicated Bus Lane	As Needed	Required	Required	Required	Required	Required	
Bikes	Bicycle Facilities	As Needed	Required	Required	Required	Required	Required		
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	Required	Required	Required	Required	As Needed	Required	
		Pedestrian Signals and Warning Signs	Required	Required	Required	Required	As Needed	Required	
		Pedestrian Refuge Island	Required	Not Applicable	Not Applicable	Required	Required	Required	
	Bicycle Safety and Priority	Bike Boxes	Required	Required	Required	Required	Required	Required	
		Two-stage Turning Boxes	Required	Required	Required	Required	Required	Required	
Traffic Calming	Vertical Deflection and Turn Calming	Required	Interim Strategy	Interim Strategy	Required	Required	Required		

■ Required
 ■ Interim Strategy
 ■ As Needed
 ■ Not Applicable

Figure 60 Table of elements to be considered in each project type

Source: DVRPC

Project Development and Review Process

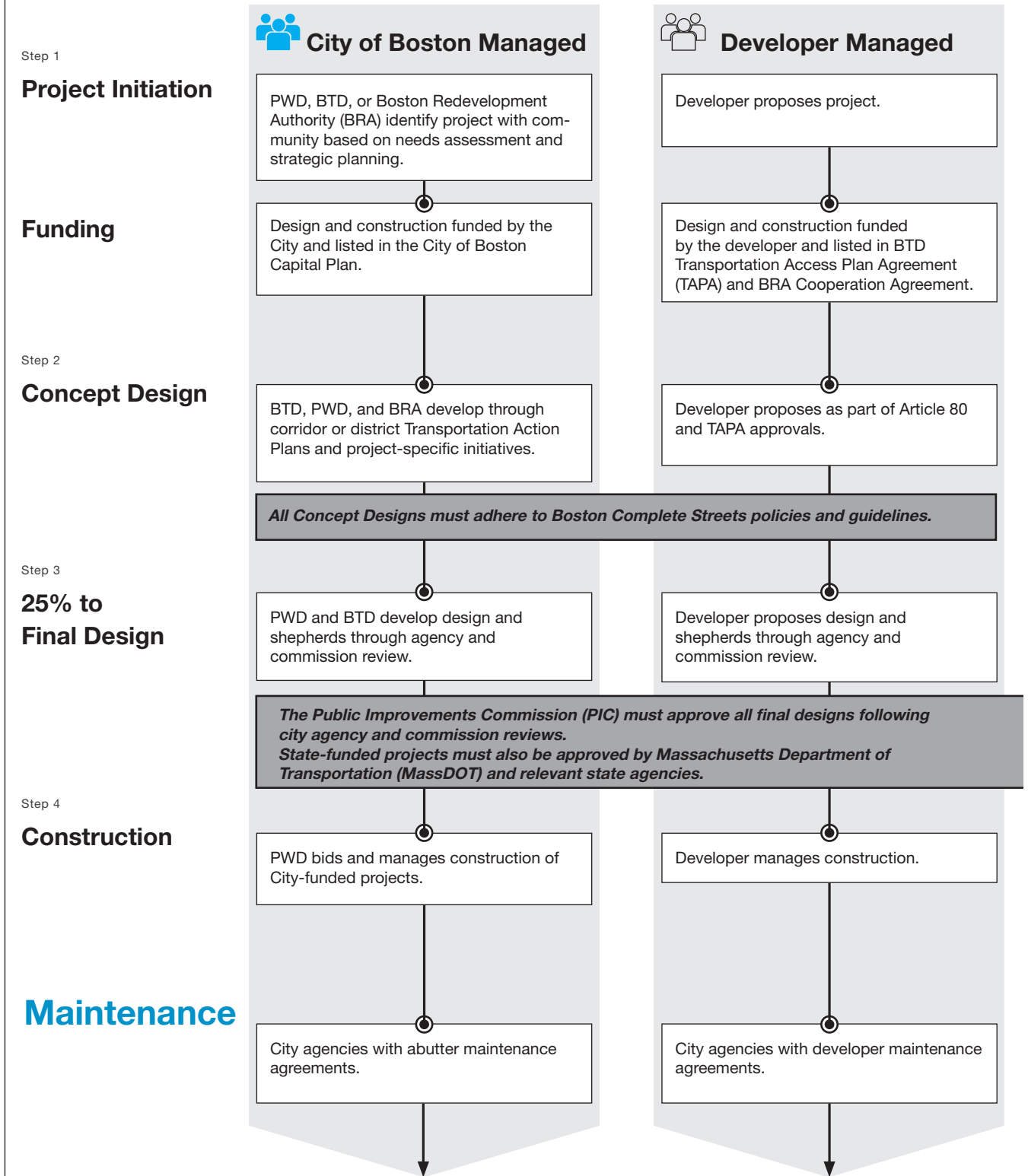


Figure 61 Project development and review process from the Boston Complete Streets Design Guidelines

Public Involvement



Community

Neighborhood, business and advocacy groups propose projects for consideration by the City, developers and State.

Extensive community and citizen advisory group meetings are held to inform the vision and review and select from concept design alternatives.

Community and abutter meetings are held to review design details and ROW impacts at 25% and 75%; MassDOT holds hearings for state-funded projects.

Project proponent appoints community liaison to address construction impacts.

Local residents and businesses participate in maintenance based on abutter agreements.

and review of Complete Streets checklists. It also clarifies what review bodies may be involved and what their roles might be. It would outline when and how to solicit community input on the Complete Streets elements included in a project. This is helpful in ensuring that projects are site-specific and will work and perform well in the long-term. A process can also address how interim design strategies could be part of project development and at what stage they should be constructed. Finally, a process could include how to share completed checklists with the community and inform the public on how final project decisions were made.

Plan for Coordination with Other Road Owners

To ensure that this guidance is adhered to on all streets, therefore creating a true network of Complete Streets, the city must coordinate with other road owners, like Mercer County and NJDOT, when they undertake projects in Trenton. This may take the form of the city asking for these other entities to meet specific design standards, like ensuring that lanes are no more than 10' or 11' and that pedestrian signals with leading pedestrian intervals are included. This coordination will be ongoing and would benefit from a formalized process with the city discussing upcoming projects with other roads owners as they begin developing them.

Source: *Boston Complete Streets Design Guidelines, 2013*

Embed Complete Streets in City Policy

In order to successfully implement the Complete Streets guidance laid out in this design handbook and its predecessors (like NJDOT's *Complete & Green Streets for All* guidebook), it must be embedded into city policy. By consistently and thoroughly weaving Complete Streets compliance into city policy and procedures, Trenton can foster a culture of adherence to Complete Streets principles in everything from routine restriping to working with developers to restoring sidewalks and pedestrian amenities.

The *Trenton Complete Streets Design Handbook* can be used to adapt existing city policy to better implement Complete Streets guidance. One way is to update to the Complete Streets Checklist used by Public Works staff and the city engineer for road projects. Another is include applicable elements in the city's Land Development Ordinance, which touches on requirements for the design of street-facing elements. Efforts should be made to identify additional key leverage points in the approval process of projects impacting the right-of-way where Complete Streets compliance can be ensured.

Update Complete Streets Checklist

Generally, checklists remind project designers and reviewers to consider the needs of all street users and are a good way to collect and share information about a project for various different city departments and committees. The City of Trenton's Public Works department has been using the NJDOT Complete Streets checklist since 2014. In July 2019 NJDOT released *Complete & Green Streets for All: Model Complete Streets Policy & Guide*. This document contains updated checklists that represent the current state of the practice and Trenton should use these in place of the previous checklist. The guide provides a separate checklist for each phase of a project. The checklist that is most pertinent to the guidance in this document is for the preliminary engineering phase and it is shown in Appendix A-1. Using the recommendations from this handbook, the checklist can be further tailored to the project and to Trenton. Depending on the type of street where a project will occur (Dense Residential, Neighborhood Mixed Use, etc.), there is an additional page that can be appended to the general checklist that provides a summary of the required and recommended design elements and asks the project manager to affirm that the necessary elements are included, and if not, provide an explanation of why they have been left

out. This makes part of the project review very straightforward for both designers and reviewers and ensures that the design guidance in this handbook is being adhered to. The Trenton-specific checklists based on this handbook are provided in the Appendix.

Incorporate the Complete Streets Design Handbook into Land Development Ordinance

Acting on a key recommendation from the *Trenton250* plan, the City is in the process of updating its Land Development Ordinance (LDO). The LDO dictates all matters relating to zoning, land use, building form, and other requirements around land development in the city. The guidelines provided in the *Trenton Complete Streets Design Handbook* should be referenced in the updated LDO so that land development is pursued in accordance with stipulations that ensure compliance with Complete Streets guidance.

Trenton250 specified that land development and zoning codes should align with the master plan in support of the goal of multimodal transportation in Trenton. A key element of this goal is redesign of the city's streets to Complete Streets standards. Articles 10, 11, and 12 of the proposed LDO set standards for site development, off-street parking and loading, and landscaping. Complete Streets guidance from the *Trenton Complete Streets Design Handbook* is closely related to these sections and should be considered alongside them by land developers. The handbook is a standalone document and does not need to be integrated into the proposed LDO, but must be referenced to ensure developers are accountable to the dictates of the document.

The Appendix contains checklists and guidance for building Complete Streets guidance into normal processes, and should be used throughout the implementation process.

Internal and External Education

An important part of implementing any policy or process is to educate the involved staff and decision makers about their role in it and why it was created in the first place. Staff and elected officials should understand how Complete Streets benefit Trenton and how incomplete streets create negative outcomes. Building ownership and buy-in encourages staff and officials to see opportunities and even to give constructive feedback about how implementation can be improved.

To that end, it is recommended that any Trenton staff that will play a role in project design, project funding, public outreach, and project management, are required to attend an orientation or other training on the *Trenton Complete Streets Design Handbook* and the updated Complete Streets checklists. Training can highlight how requirements have changed and what new requirements may be in place. Best practice suggests that these sessions are most successful when led by those of same or similar professions (i.e., elected officials speaking to other

elected officials, engineers training other engineers, etc).

It is additionally important to consider how Complete Streets design guidance is communicated to consultants who may be planning or designing on the city's behalf. Before work begins, consultants should have a clear understanding of the goals and requirements and make sure their work conforms to these expectations.

This training should be considered an ongoing process and it is important to do internal outreach especially as new staff is hired and elected officials change over. As projects are designed and constructed, goals and successes should be stressed and celebrated.

Specific education activities, adapted from the Smart Growth America and National Complete Streets Coalition's publication *Complete Streets Implementation: A Brief Guidebook*, are shown in Figure 62.

Figure 62 List of possible education activities

Source: *Complete Streets Implementation: A Brief Guidebook*, 2016

- Send a formal memo or email from leadership to staff about the new Complete Streets design handbook.
- Conduct formal staff training, potentially through:
 - Staff retreats,
 - Series of Complete Streets special training sessions,
 - Funded professional development with outside experts, and/or
 - On-the-job training.
- Provide training on non-transportation topics such as environment and public health benefits.
- Conduct informal mentoring-training within the transportation department.
- Provide training on technical aspects of the policy (e.g., engineering/design).
- Provide training on non-technical aspects of the policy (e.g., process changes within the department to consider all users of all abilities).
- Provide sensitivity training to learn about all users of the road such as those with disabilities.
- Develop systematic training in incorporating all users of all abilities for new staff.
- Include multiple departments in training, such as utilities, public health, transit agencies, and economic development.
- Training includes department heads, managers, and program staff.
- Engage with the community to explain the importance of Complete Streets policy, when and how it will be applied, from a multi-disciplinary view. Engage through:
 - Public meetings,
 - Presentations at city council meetings,
 - Video presentation available online,
 - Design charettes,
 - Printed materials such as newsletters, pamphlets, posters, and/or
 - Walking and/or biking audits or tours.
 - Educational campaigns, which may include information about new road markings and signs, coaching on sharing the road with other users, benefits of walking, biking, and taking public transportation.

Other Actions to Support the City's Ability to Implement the Handbook

Develop a City-Wide Bicycle Facility Plan

Although this handbook sets out general guidance for adding and designing bicycle facilities on Trenton streets, more detailed and coordinated planning needs to be done to determine recommended and feasible corridors for various bicycle treatments. Therefore, as a follow-up to this document, the city should develop a city-wide bicycle plan that could set out a recommended network based on existing road conditions, important destinations and community input. Bicycle facilities could then be implemented in a strategic way through resurfacing or larger capital projects. This plan would cover the entire city, rather than simply the downtown area covered in the 2016 Downtown Trenton Bicycle and Pedestrian Plan.

Hire A Dedicated Transportation Planning Staff Person

As budgets allow, a position could be created in the Department of Public Works or the Planning Department for a transportation planner whose main responsibility could be the management and implementation of Complete Streets in Trenton. This person could act as a liaison between planning and construction and provide professional expertise when reviewing or providing input on project development. This person could also review other Trenton city policies and procedures and look for opportunities to add activities or elements that support Complete Streets, like park maintenance and construction and work done by the school district. They could also manage internal and external education of stakeholders, staff, and citizens. Finally, this person could be tasked with monitoring the progress of Complete Streets implementation and periodically provide reports to stakeholders and staff.

Appendices

A: Complete Streets Checklists

Concept Development Checklist					
item to be addressed	checklist consideration	yes	no	n/a	required description
EXISTING BICYCLE, PEDESTRIAN AND TRANSIT ACCOMMODATIONS	<p>Are there accommodations for bicyclists, pedestrians (including ADA compliance) and transit users included on or crossing the current facility?</p> <p>Examples include (but are not limited to):</p> <ul style="list-style-type: none"> • Sidewalks • Signalized or protected crosswalks • Pedestrian-scale lighting • Multi-use trails • Public seating • Bike racks • Transit shelters 				
EXISTING BICYCLE AND PEDESTRIAN OPERATIONS	<p>Has the existing bicycle level of traffic stress and pedestrian suitability on the current transportation facility been identified?</p> <p>Have the bicycle and pedestrian conditions within the study area, including pedestrian and/or bicyclist treatments, volumes, important connections and lighting been identified?</p> <p>Do bicyclists/pedestrians regularly use the transportation facility for commuting or recreation?</p> <p>Are there physical or perceived impediments to bicyclist or pedestrian use of the transportation facility?</p>				

Figure 63 Concept development checklist 1

Source: Complete & Green Streets For All – Model Policy & Guide, 2019

Concept Development Checklist					
item to be addressed	checklist consideration	yes	no	n/a	required description
EXISTING BICYCLE AND PEDESTRIAN OPERATIONS (continued)	Have the existing volumes of pedestrian and/or bicyclist crossing activity at intersections including midblock and nighttime crossing been collected/provided?				
	Are there multi-use trails in the area that can be connected to this transit center/bus stop/network/area?				
EXISTING TRANSIT OPERATIONS	Are there existing transit facilities within the project area, including bus and train stops/stations?				
	Is the transportation facility on a transit route?				
	Is the transportation facility within two miles of "park and ride" or "kiss and go" lots?				
	Are there existing or proposed amenities including pedestrian seating/shelters, bicycle racks or parking available at these lots or transit stations? Are there bike racks on buses that travel along the facility?				
PUBLIC PARTICIPATION	Has there been a clear process for public participation?				
	Are project Concept Development Checklists currently available on-line?				
EXISTING MOTOR VEHICLE OPERATIONS	Are there existing concerns within the study area, regarding motor vehicle safety, traffic volumes/ congestion or access?				

Figure 64 Concept development checklist 2

Source: Complete & Green Streets For All – Model Policy & Guide, 2019

Concept Development Checklist					
item to be addressed	checklist consideration	yes	no	n/a	required description
EXISTING TRUCK/ FREIGHT OPERATIONS	Are there existing concerns within the study area, regarding truck/ freight safety, volumes, or access?				
EXISTING ACCESS AND MOBILITY	Are there any existing access or mobility considerations, including ADA compliance?				
	Are there any schools, hospitals, senior care facilities, educational buildings, community centers, residences or businesses of persons with disabilities within or proximate to the study area?				
LAND USE	Have you identified the predominant land uses and densities within the study area, including any main street, historic districts or special zoning districts?				
	Is the transportation facility in a high-density land use area that has pedestrian/bicycle/motor vehicle and transit traffic?				
MAJOR SITES	Have you identified the major sites, destinations, and trip generators within or proximate to the study area, including prominent landmarks, employment centers, recreation, commercial, cultural and civic institutions, schools, and public spaces?				

Figure 65 Concept development checklist 3

Source: Complete & Green Streets For All – Model Policy & Guide, 2019

Concept Development Checklist					
item to be addressed	checklist consideration	yes	no	n/a	required description
EXISTING STREETScape	Are there existing or planned street trees, planters, buffer strips, or other environmental enhancements such as drainage swales within the study area?				
RESURFACING	Can additional road uses be supported and/or safety improved by reconfiguring lanes within the same roadway width? Examples include but not limited to, lane narrowing, lane reconfiguration, lane reduction (road diet), on-street bicycle parking, high visibility crosswalks, painted curb extension, etc.				
EXISTING PLANS	Are there any comprehensive planning documents that address bicyclist, pedestrian or transit user conditions within or proximate to the study area? Examples include (but are not limited to): <ul style="list-style-type: none"> • School Travel Plans • Municipal or County Master or Redevelopment Plan • Local, County and Statewide Bicycle and Pedestrian Plans • Local, County and Regional Trail Plans • Sidewalk Inventories • MPO Transportation Plan • NJDOT Designated Transit Village 				
IMPERVIOUS COVER	Is there an opportunity to remove impervious surface as part of this project?				

Figure 66 Concept development checklist 4

Source: Complete & Green Streets For All – Model Policy & Guide, 2019

Concept Development Checklist					
item to be addressed	checklist consideration	yes	no	n/a	required description
PRIORITY COMMUNITIES	Does the project area include Priority Communities (as defined by Complete Streets)?				
SAFETY	Does the crash history of the study area include injuries and fatalities of all road users?				
STORMWATER MANAGEMENT	Does the project area have a history of flooding? Is the project area in a combined sewer system and subject to combined sewer overflows?				
	Does nonpoint source pollution from the project area generate runoff that flows into a critical water body?				
PUBLIC HEALTH	Does the Community Health Needs Assessment (CHNA) or Community Health Improvement Plan (County Health Department) identify need for health improvements in the project area? Examples include health in safe zones, increases in number/length of walking/ bicycling paths.				
Municipal or County Planner Sign-Off					
statement of compliance		yes	no	if NO, please describe why (refer to Exemptions Clause)	
The plan or roadway improvement accommodates bicyclists, pedestrians, transit users of all ages and abilities, and addresses the related public health, Priority Communities, and environmental goals as set forth in the [municipality/ county] Complete Streets Policy.					

Figure 67 Concept development checklist 4

Source: Complete & Green Streets For All – Model Policy & Guide, 2019

Preliminary Engineering Checklist

ITEM TO BE ADDRESSED	CHECKLIST CONSIDERATION	YES	NO	N/A	REQUIRED DESCRIPTION
<p>BICYCLIST, PEDESTRIAN, AND TRANSIT ACCOMMODATIONS</p>	<p>Does the proposed project design include accommodations for bicyclists described in the NJDOT Complete Streets Design Guide? Examples include (but are not limited to):</p> <p>Bicycle facilities:</p> <ul style="list-style-type: none"> • Bicycle path/bicycle lane/ bicycle route/bicycle boulevard • Bicycle actuation at signals (loop detectors and stencil or other means) • Signs, signals and pavement markings specifically related to bicycle operation on roadways or shared-use facilities • Bicycle safe inlet grates <p>Bicycle amenities:</p> <ul style="list-style-type: none"> • Call boxes (for trail or bridge projects) • Drinking fountains (also for trail projects) • Secure long term bicycle parking (e.g., for commuters and residents) • Secure short-term bicycle parking 				

Figure 68 Preliminary engineering checklist 1

Source: Complete & Green Streets For All – Model Policy & Guide, 2019

Preliminary Engineering Checklist		REQUIRED DESCRIPTION	N/A	NO	YES
ITEM TO BE ADDRESSED	CHECKLIST CONSIDERATION				
BICYCLIST, PEDESTRIAN, AND TRANSIT ACCOMMODATIONS (CONTINUED)	Does the proposed project design address accommodations for pedestrians? Examples include (but are not limited to): Pedestrian facilities: Sidewalks (preferably on both sides of the street); mid-block crosswalks; striped crosswalks; geometric modifications to reduce crossing distances such as curb extensions (bulb-outs); pedestrian-actuated traffic signals such as High Intensity Activated Crosswalk Beacons, Rapid Rectangular Flashing Beacons; dedicated pedestrian phase; pedestrian signal heads and pushbuttons; pedestrian signs for crossing and wayfinding, lead pedestrian intervals; high visibility crosswalks (e.g., ladder or zebra); pedestrian-level lighting; in-road warning lights; pedestrian safety fencing; pedestrian detection system; pedestrian overpass/underpass; and median safety islands for roadways with (two or more traffic lanes in each direction) Pedestrian amenities: Shade trees; public seating; drinking fountains				

Figure 69 Preliminary engineering checklist 2

Source: Complete & Green Streets For All – Model Policy & Guide, 2019

Preliminary Engineering Checklist

ITEM TO BE ADDRESSED	CHECKLIST CONSIDERATION	YES	NO	N/A	REQUIRED DESCRIPTION
BICYCLIST, PEDESTRIAN, AND TRANSIT ACCOMMODATIONS (CONTINUED)	Have you coordinated with the corresponding transit authority to accommodate transit users in the project design? Transit facilities: Transit shelters, bus turnouts Transit amenities: public seating, signage, maps, schedules, trash and recycling receptacles				
	BICYCLIST AND PEDESTRIAN OPERATIONS	Is the proposed design consistent with the desired future bicyclist and walking plans (e.g., Master Plan/ Elements) within the project area including safety, volumes, comfort and convenience of movement, important walking and/or bicycling connections, and the quality of the walking environment and/or availability of bicycle parking?			
TRANSIT OPERATIONS	Does the proposed design address the desired/anticipated future transit conditions within the project area, including bus routes and operations and transit station access to support transit usage and users?				

Figure 70 Preliminary engineering checklist 3

Source: Complete & Green Streets For All – Model Policy & Guide, 2019

Preliminary Engineering Checklist					
ITEM TO BE ADDRESSED	CHECKLIST CONSIDERATION	YES	NO	N/A	REQUIRED DESCRIPTION
MOTOR VEHICLE OPERATIONS	Does the proposed design address the desired future motor vehicle conditions within the project area, including volumes, access, important motor vehicle connections, appropriateness of motor vehicle traffic to the particular street (e.g., local versus through traffic) and the reduction of the negative impacts of motor vehicle traffic?				
TRUCK/FREIGHT OPERATIONS	Does the proposed design address the desired future truck conditions within the project area, including truck routes, volumes, access, mobility and the reduction of the negative impacts of truck traffic?				
ACCESS AND MOBILITY	Does the proposed design address accommodations for those with access or mobility challenges such as the disabled, elderly, and children, including ADA compliance? Examples include (but are not limited to): Curb ramps, including detectable warning surface; accessible signal actuation; adequate sidewalk or paved path (length & width or linear feet); acceptable slope and cross-slope (particularly for driveway ramps over sidewalks, over crossings and trails); and adequate green signal crossing time				

Figure 71 Preliminary engineering checklist 4

Source: Complete & Green Streets For All – Model Policy & Guide, 2019

Preliminary Engineering Checklist

ITEM TO BE ADDRESSED	CHECKLIST CONSIDERATION	YES	NO	N/A	REQUIRED DESCRIPTION
LAND USE	Is the proposed design compatible with the predominant land uses and densities within the project area, including any historic districts, main streets, or special zoning districts?				
MAJOR SITES	Can the proposed design support the major sites, destinations, and trip generators within or proximate to the project area, including prominent landmarks, commercial, cultural and civic institutions, and schools, public spaces?				
STREETSCAPE	Does the proposed design include landscaping, street trees, planters, buffer strips, or other environmental enhancements such as drainage swales?				
DESIGN STANDARDS OR GUIDELINES	Does the proposed design follow all applicable design standards or guidelines appropriate for bicycle and/or pedestrian facilities? Examples include (but are not limited to): American Association of State Highway and Transportation Officials (AASHTO) – A Policy on Geometric Design of Highway and Streets, Guide for the Development of Bicycle Facilities, Guide for the Planning, Design, and Operation of Pedestrian Facilities; Public Right-of-Way Accessibility Guide (PROWAG);				

Figure 72 Preliminary engineering checklist 5

Source: Complete & Green Streets For All – Model Policy & Guide, 2019

Preliminary Engineering Checklist		CHECKLIST	CONSIDERATION	YES	NO	N/A	REQUIRED	DESCRIPTION
ITEM TO BE ADDRESSED								
DESIGN STANDARDS OR GUIDELINES (CONTINUED)	Manual on Uniform Traffic Control Devices (MUTCD); Americans with Disabilities Act Accessibility Guidelines (ADAAG); National Association of City Transportation Officials (NACTO) – Urban Bikeway Design Guide; Urban Streets Stormwater Guide; New Jersey Department of Transportation (NJDOT) – Complete Streets Design Guide; Roadway Design Manual; Smart Transportation Guidebook; Rutgers University – Green Infrastructure Guidance Manual; ITE – Designing Walkable Urban Thoroughfares							
SAFETY	Does the proposed project design include elements from the FHWA Proven Safety Countermeasures? Examples include, but are not limited to, road diets, medians and pedestrian islands, lead pedestrian intervals, etc.							
STORMWATER MANAGEMENT	Has an impervious cover assessment been performed and have impervious surface areas been minimized while meeting engineering standards and guidelines?							

Figure 73 Preliminary engineering checklist 6

Source: Complete & Green Streets For All – Model Policy & Guide, 2019

Preliminary Engineering Checklist					
ITEM TO BE ADDRESSED	CHECKLIST CONSIDERATION	YES	NO	N/A	REQUIRED DESCRIPTION
STORMWATER MANAGEMENT (CONTINUED)	<p>Has an impervious cover reduction action plan been completed for the project area, and does the project design include elements to reduce the impacts of stormwater runoff from impervious surfaces?</p> <p>Examples include (but are not limited to):</p> <ul style="list-style-type: none"> • Bioretention and rain gardens • Bioswales • Stormwater planters • Tree filter boxes 				
Preliminary Engineering Sign-Off					
STATEMENT OF COMPLIANCE		YES	NO		If NO, please describe why (refer to Exemptions Clause)
The plan or roadway improvement accommodates bicyclists, pedestrians, transit users of all ages and abilities, and addresses the related public health, Priority Communities, and environmental goals as set forth in [municipality/county] Complete Streets Policy.					

Figure 74 Preliminary engineering checklist 7

Source: Complete & Green Streets For All – Model Policy & Guide, 2019

Maintenance Checklist					
Item to be addressed	Checklist consideration	yes	no	n/a	Required description
Street Cleaning	Does the street cleaning include the shoulder or roadway to the curb? Are the sidewalks cleaned on a regular basis?				
Snow Removal	Does snow plowing block or push snow into crosswalks, blocking clear access? Does the Municipality or County shovel out crosswalks or enforce residential requirements to clean snow from the crosswalk right of way? Can additional road uses be supported and/or safety improved by reconfiguring lanes within the same roadway width? Examples include (but are not limited to):				
	<ul style="list-style-type: none"> • Lane narrowing • Lane reconfiguration • Lane reduction (road diet) • On-street bicycle parking • High-visibility crosswalks • Painted curb extension, etc. 				
Stormwater Management	Does the maintenance plan include procedures to unobstruct drainage (e.g., inlets, curb-cuts, grates, etc.) into the green infrastructure facility? Has landscaping been maintained?				

Maintenance/Public Works Sign-Off			
Statement of Compliance	yes	no	If NO, please describe why (refer to Exemptions Clause)
The Municipality or County roadway maintenance and snow removal plan accommodates bicyclists, pedestrians, and stormwater management installations as set forth in [municipality/county] Complete Streets Policy .			

Figure 75 Maintenance checklist 1

Source: Complete & Green Streets For All – Model Policy & Guide, 2019

LOCATION: _____

TPOLOGY: DENSE RESIDENTIAL

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone	
		Pedestrian Zone ¹	5' - 6', sidewalk should be standard cast-in-place concrete
		Greenscape-Furnishing Zone	up to 6'
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas	
		Street Trees	small-medium stature, spaced at least 20' apart
		Street Furniture	may be placed by residents if Pedestrian Zone can be maintained
		Lighting	alternating across street, 75'-120' spacing
	Bus Stop Amenities	provide seating, add shelter if possible	
	Bike Parking		
CURB	Sidewalk Facing	Driveways / Entrances	no more than 10'-12' wide, 20'-40' from signalized intersections
		Curb Extensions	
		Bus Loading Curb Extensions	
	Road Facing	On-street Parking ²	parallel parking
		Parklets	
	Loading Zones		
ROADWAY	Traffic Calming Strategies ³	Lane Narrowing	maximum of 10', unless road used by buses
		Vertical Deflection	use speed cushions if road used by buses or heavy vehicles
		Chicanes	use where speeding is a problem
		Neckdowns	use in areas with high pedestrian volume, midblock crossings
	Transit	Dedicated Bus Lane	
Bikes	Bicycle Facilities ⁴	consider sharrows and creating Neighborhood Greenways	
INTERSECTION	Pedestrian	Crosswalks ⁵	continental style at all controlled intersections
	Safety and Priority	Pedestrian Signals and Warning Signs	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	
	Bicycle Safety and Priority	Bike Boxes	install at signalized intersections with bike facilities
		Two-stage Turning Boxes	use where there is high bike turning volumes and/or cycle tracks
Traffic Calming	Vertical Deflection and Turn Calming	use at intersections with Corridors and where speeding is a problem	

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or Not Applicable

Figure 76 Dense Residential typology checklist

Source: DVRPC

A: COMPLETE STREETS CHECKLISTS

LOCATION: _____

TPOLOGY: SINGLE FAMILY RESIDENTIAL

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone	Required
		Pedestrian Zone	5' - 6', sidewalk should be standard cast-in-place concrete
		Greenscape-Furnishing Zone	2'-6" - 4'
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas	As Needed
		Street Trees	small stature, spaced at least 25' apart
		Street Furniture	Required
		Lighting ¹	alternating across street, 75'-120' spacing
		Bus Stop Amenities	Required
		Bike Parking	Required
CURB	Sidewalk Facing	Driveways / Entrances	10'-12' wide, 20'-40' from signalized intersections
		Curb Extensions	use if visibility and/or speeding are issues
		Bus Loading Curb Extensions	Required
	Road Facing	On-street Parking	As Needed
		Parklets	Required
ROADWAY	Traffic Calming Strategies ²	Lane Narrowing	10', painted centerline not required
		Vertical Deflection	use speed cushions if road used by buses or heavy vehicles
		Chicanes	use where speeding is a problem
	Transit	Neckdowns	use in areas with high pedestrian volume, midblock crossings
		Dedicated Bus Lane	Required
		Bicycle Facilities ³	consider sharrows and creating Neighborhood Greenways
INTERSECTION	Pedestrian	Crosswalks	continental style at all controlled intersections
	Safety and Priority	Pedestrian Signals and Warning Signs	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	Required
	Bicycle Safety and Priority	Bike Boxes	As Needed
	Traffic Calming	Two-stage Turning Boxes	use where there is high bike turning volumes and/or cycle tracks
	Vertical Deflection and Turn Calming	use at intersections with Corridors and where speeding is a problem	

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A

Figure 77 Single-Family Residential typology checklist

Source: DVRPC

LOCATION: _____

TYPOLOGY: COMMERCIAL CORRIDOR

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone ¹	Required	2' - 6'
		Pedestrian Zone	Required	5' - 8', sidewalk should be standard cast-in-place concrete
		Greenscape-Furnishing Zone	Recommended	2'-6" - 8'
	Sidewalk Elements ²	Drainage/Green Stormwater Infrastructure	Recommended	stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas	As Needed	
		Street Trees	Recommended	small-medium stature, spaced at least 20' apart
		Street Furniture	Recommended	provide seating, waste receptacles at regular intervals
		Lighting	Recommended	alternating across street, 75'-120' spacing
		Bus Stop Amenities	Recommended	provide seating, add shelter if possible
		Bike Parking	Recommended	assess need for number of spots
CURB	Sidewalk Facing	Driveways / Entrances	As Needed	20'-24' wide, 100' from signalized intersections
		Curb Extensions	Recommended	
		Bus Loading Curb Extensions	As Needed	as needed with bus stops and limited sidewalk space
	Road Facing	On-street Parking	Recommended	shared parallel parking
		Parklets	Recommended	add where appropriate
ROADWAY	Traffic Calming Strategies ³	Lane Narrowing	Recommended	11' lanes recommended, consider 10' if not a bus route
		Vertical Deflection	As Needed	use speed cushions if road used by buses or heavy vehicles
		Chicanes	Not Recommended or N/A	
		Neckdowns	As Needed	use in areas with high pedestrian volume, midblock crossings
	Transit	Dedicated Bus Lane	As Needed	if space is available, place on the right side of the road
	Bikes	Bicycle Facilities ⁴	Recommended	use protected bicycle lanes or consider parallel routes
	INTERSECTION	Pedestrian	Crosswalks	Recommended
Safety and Priority		Pedestrian Signals and Warning Signs	Recommended	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	As Needed	assess need if road is four lanes or wider
Bicycle Safety and Priority		Bike Boxes	Recommended	install at signalized intersections with bike facilities
		Two-stage Turning Boxes	As Needed	use where there is high bike turning volumes and/or cycle tracks
Traffic Calming	Vertical Deflection and Turn Calming	Recommended		

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A

Figure 78 Commercial Corridor typology checklist

Source: DVRPC

A: COMPLETE STREETS CHECKLISTS

LOCATION: _____

TPOLOGY: DOWNTOWN COMMERCIAL CORRIDOR

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone ¹	Green	2' - 6'
		Pedestrian Zone	Green	8' - 12'
		Greenscape-Furnishing Zone	Green	2'-6" - 8', brick is the preferred paving material Downtown
	Sidewalk Elements ²	Drainage/Green Stormwater Infrastructure	Green	stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas	Green	
		Street Trees	Green	medium stature, spaced at least 25' apart
		Street Furniture	Green	provide seating, waste receptacles at regular intervals
		Lighting	Green	paired (not alternating) across street, 50'-80' spacing
CURB	Sidewalk Facing	Bus Stop Amenities	Green	provide seating, add shelter if possible
		Bike Parking	Green	if sidewalk space is limited, consider bike corral in a parking space
		Driveways / Entrances	Yellow	20'-24' wide, 100' from signalized intersections
	Road Facing	Curb Extensions	Green	use in high pedestrian traffic areas
Bus Loading Curb Extensions		Yellow	as needed with bus stops and limited sidewalk space	
ROADWAY	Road Facing	On-street Parking	Green	shared parallel parking
		Parklets	Green	consider in areas with high pedestrian activity
		Loading Zones ³	Green	30' loading zone in parking lane where frequent loading occurs
	Traffic Calming Strategies	Lane Narrowing	Green	11' for lanes with bus traffic, maximum 10' for all other lanes
		Speed Cushions	Green	use speed cushions if road used by buses or heavy vehicles
	Transit	Chicanes	Red	
		Neckdowns	Green	use in high pedestrian traffic areas
Bikes	Dedicated Bus Lane	Yellow	if space is available, place on the right side of the road	
	Bicycle Facilities ⁴	Green	buffered or protected bike lanes or consider parallel routes	
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	Green	continental style at all controlled intersections
		Pedestrian Signals and Warning Signs	Green	install countdown timers and LPIs at all signalized intersections
	Bicycle Safety and Priority	Pedestrian Refuge Island	Yellow	assess need if road is four lanes or wider
		Bike Boxes	Green	install at signalized intersections with bike facilities
	Traffic Calming	Two-stage Turning Boxes	Yellow	use where there is high bike turning volumes and/or cycle tracks
	Vertical Deflection and Turn Calming	Green		

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A

Figure 79 Downtown Commercial Corridor typology checklist

Source: DVRPC

LOCATION: _____

TPOLOGY: CONNECTOR CORRIDOR

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Zones	Frontage Zone	Yellow	none - 6'
		Pedestrian Zone	Green	5' - 8', sidewalk should be standard cast-in-place concrete
		Greenscape-Furnishing Zone	Green	2'-6" - 8'
	Elements	Drainage/Green Stormwater Infrastructure	Yellow	if possible, stormwater planter, tree trenches, rain gardens
		Sidewalk Cafes and Plazas	Yellow	
		Street Trees	Green	medium-large stature, spaced at least 25' apart
		Street Furniture	Red	
		Lighting ¹	Green	alternating across street, 75'-120' spacing
		Bus Stop Amenities	Green	provide seating, add shelter if possible
Bike Parking		Green	assess need for number of spots	
CURB	Facing	Driveways / Entrances	Yellow	20'-24' wide, 100' from signalized intersections
		Curb Extensions	Yellow	
		Bus Loading Curb Extensions	Yellow	as needed with bus stops and limited sidewalk space
	Road Facing	On-street Parking	Yellow	
		Parklets	Red	
ROADWAY	Traffic Calming Strategies ²	Loading Zones	Red	
		Lane Narrowing	Green	11' lanes recommended, consider 10' if not a bus route
		Vertical Deflection	Yellow	use speed cushions if road used by buses or heavy vehicles
	Transit	Chicanes	Red	
		Neckdowns	Red	
	Dedicated Bus Lane	Green	if space is available, place on the right side of the road	
Bikes	Bicycle Facilities ³	Green	use protected bike lanes or consider parallel routes	
	INTERSECTION	Pedestrian	Crosswalks	Green
Safety and Priority		Pedestrian Signals and Warning Signs	Green	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	Yellow	assess need if road is four lanes or wider
Bicycle Safety and Priority		Bike Boxes	Green	install at signalized intersections with bike facilities
		Two-stage Turning Boxes	Yellow	use where there is high bike turning volumes and/or cycle tracks
Traffic Calming	Vertical Deflection and Turn Calming	Green	prioritize where pedestrian volume is high	

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A

Figure 80 Connector Corridor typology checklist

Source: DVRPC

A: COMPLETE STREETS CHECKLISTS

LOCATION: _____

TYPOLGY: DOWNTOWN CONNECTOR CORRIDOR

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone ¹	Yellow	none - 6'
		Pedestrian Zone	Green	6' - 12'
		Greenscape-Furnishing Zone	Green	2'-6" - 8', brick is the preferred paving material Downtown
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	Yellow	if possible, stormwater planters, tree trenches, rain gardens
		Street Cafes and Plazas	Yellow	
		Street Trees	Green	medium or large stature, spaced at least 25' apart
		Street Furniture	Red	
		Lighting	Green	paired across street, 50'-80' spacing
		Bus Stop Amenities	Green	provide seating, add shelter if possible
		Bike Parking	Green	if sidewalk space is limited, consider bike corral in a parking space
CURB	Sidewalk Facing	Driveways / Entrances	Yellow	20'-24' wide, 100' from signalized intersections
		Curb Extensions	Yellow	as needed, only in high pedestrian traffic areas
		Bus Loading Curb Extensions	Yellow	as needed with bus stops and limited sidewalk space
	Road Facing	On-street Parking ²	Yellow	assess need, consider parking on one side only
		Parklets	Red	
ROADWAY	Traffic Calming Strategies	Loading Zones	Red	only if space is available and need is present
		Lane Narrowing	Green	11' for lanes with bus traffic, maximum 10' for all other lanes
		Vertical Deflection	Green	use speed cushions if road used by buses or heavy vehicles
	Bikes	Chicanes	Red	
		Neckdowns	Green	use in high pedestrian traffic areas, opportunity for gateways
		Dedicated Bus Lane	Yellow	if space is available, place on the right side of the road
INTERSECTION	Pedestrian Safety and Priority	Bicycle Facilities ³	Green	use buffered or protected bike lane or consider parallel routes
		Crosswalks	Green	continental style at all controlled intersections
	Bicycle Safety and Priority	Pedestrian Signals and Warning Signs	Green	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	Yellow	assess need if road is four lanes or wider
	Traffic Calming	Bike Boxes	Green	install at signalized intersections with bike facilities
		Two-stage Turning Boxes	Yellow	use where there is high bike turning volumes and/or cycle tracks
		Vertical Deflection and Turn Calming	Green	prioritize where pedestrian volume is high

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A

Figure 81 Downtown Connector typology checklist

Source: DVRPC

LOCATION: _____

TYPOLOGY: DOWNTOWN MINOR

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone ¹	2' - 6'
		Pedestrian Zone	6' - 12'
		Greenscape-Furnishing Zone	2'-6" - 8', brick is the preferred paving material Downtown
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	if possible, stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas	
		Street Trees	small or medium stature, spaced at least 20' apart
		Street Furniture	provide seating
		Lighting	paired across street, 50'-80' spacing
		Bus Stop Amenities	provide seating, add shelter if possible
		Bike Parking	if sidewalk space is limited, consider bike corral in a parking space
CURB	Sidewalk Facing	Driveways / Entrances	20'-24' wide, 100' from signalized intersections
		Curb Extensions	as needed, only in high pedestrian traffic areas
		Bus Loading Curb Extensions	as needed with bus stops and limited sidewalk space
	Road Facing	On-street Parking ²	shared parallel parking as needed
		Parklets	add in high pedestrian traffic areas
ROADWAY	Traffic Calming Strategies	Loading Zones ³	assess need, place at the beginning of a block
		Lane Narrowing	maximum 10' lanes
		Vertical Deflection	use speed cushions if road used by buses or heavy vehicles
	Transit	Chicanes	
		Neckdowns	use in high pedestrian traffic areas
		Dedicated Bus Lane	consider for bus routes, if space is available
		Bicycle Facilities ⁴	use most protection possible, but shared vehicle lanes permissible
INTERSECTION	Pedestrian	Crosswalks	continental style at all controlled intersections
	Safety and Priority	Pedestrian Signals and Warning Signs	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes	install at signalized intersections with bike facilities
		Two-stage Turning Boxes	use where there is high bike turning volumes and/or cycle tracks
Traffic Calming	Vertical Deflection and Turn Calming	use at intersections with Corridors and where speeding is a problem	

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A

Figure 82 Downtown Minor typology checklist

Source: DVRPC

A: COMPLETE STREETS CHECKLISTS

LOCATION: _____

TYPOLOGY: NEIGHBORHOOD MIXED USE

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone	2' - 6'
		Pedestrian Zone	5' - 12', sidewalk should be standard cast-in-place concrete
		Greenscape-Furnishing Zone	2'-6" - 8'
	Sidewalk Elements ¹	Drainage/Green Stormwater Infrastructure	stormwater planters, tree trenches, rain gardens
		Sidewalk Cafes and Plazas	
		Street Trees	small or medium stature, spaced at least 20' apart
		Street Furniture	provide seating, waste receptacles at regular intervals
		Lighting ²	alternating across street, 75'-120' spacing
		Bus Stop Amenities	provide seating, add shelter if possible
		Bike Parking	if sidewalk space is limited, consider bike corral in a parking space
CURB	Sidewalk Facing	Driveways / Entrances	20'-24' wide, 100' from signalized intersections
		Curb Extensions	as needed, only in high pedestrian traffic areas
		Bus Loading Curb Extensions	
	Road Facing	On-street Parking ³	shared parallel parking, 7'-9' wide
		Parklets	Consider in areas with high pedestrian activity
ROADWAY	Traffic Calming Strategies ⁴	Loading Zones	30' long, use as needed
		Lane Narrowing	11' for lanes with bus traffic, maximum 10' for all other lanes
		Vertical Deflection	use speed cushions if road used by buses or heavy vehicles
		Chicanes	
	Transit	Neckdowns	use in high pedestrian traffic areas
		Dedicated Bus Lane	if space is available, place on the right side of the road
		Bicycle Facilities	consider sharrows or parallel routes with high quality facilities
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	continental style at all controlled intersections
		Pedestrian Signals and Warning Signs	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	
	Bicycle Safety and Priority	Bike Boxes	install at signalized intersections with bike facilities
		Two-stage Turning Boxes	use where there is high bike turning volumes and/or cycle tracks
Traffic Calming	Vertical Deflection and Turn Calming	use at intersections with Corridors and where speeding is a problem	

Figure 83 Neighborhood Mixed Use typology checklist

Source: DVRPC

LOCATION: _____

TYPOLOGY: INDUSTRIAL ACCESS

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	STIPULATIONS AND GUIDANCE
SIDEWALK	Sidewalk Zones	Frontage Zone ¹	none - 6'
		Pedestrian Zone	5' - 6', sidewalk should be standard cast-in-place concrete
		Greenscape-Furnishing Zone	
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure ²	if possible, stormwater planter, tree trenches, rain gardens
		Sidewalk Cafes and Plazas	
		Street Trees	medium or large stature, spaced at least 20' apart
		Street Furniture	
		Lighting	alternating across street, 75' - 120' spacing
		Bus Stop Amenities	provide seating, add shelter if possible, especially at popular stops
Bike Parking			
CURB	Sidewalk Facing	Driveways / Entrances	20'-24' wide, 100' from signalized intersections
		Curb Extensions	as needed
		Bus Loading Curb Extensions	
	Road Facing	On-street Parking ³	as needed, 9'-10' minimum to accommodate trucks
		Parklets	
ROADWAY	Traffic Calming Strategies	Loading Zones	80' long and 9'-10' minimum to accommodate trucks
		Lane Narrowing	maximum 11' lanes
		Vertical Deflection	speed cushions preferred because of truck traffic
		Chicanes	
	Transit	Neckdowns	
		Dedicated Bus Lane	
		Bicycles	Bicycle Facilities ⁴
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	continental style at all controlled intersections
		Pedestrian Signals	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes	install at signalized intersections with bike facilities
		Two-stage Turning Boxes	use where there is high bike turning volumes and/or cycle tracks
Traffic Calming	Vertical Deflection and Turn Calming	design to not impede truck traffic	

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A

Figure 84 Industrial Access typology checklist

Source: DVRPC

A: COMPLETE STREETS CHECKLISTS

LOCATION: _____

TYPOLOGY: PARK

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE	
SIDEWALK	Sidewalk Zones	Frontage Zone			
		Pedestrian Zone		5' - 6', sidewalk should be standard cast-in-place concrete	
		Greenscape-Furnishing Zone			
		Drainage/Green Stormwater Infrastructure			
	Sidewalk Elements	Sidewalk Cafes and Plazas			
		Street Trees			
		Street Furniture		provide seating	
		Lighting ¹		alternating across street, 50'-80' spacing	
		Bus Stop Amenities			
		Bike Parking		assess need for number of spots	
CURB	Sidewalk Facing	Driveways / Entrances			
		Curb Extensions			
		Bus Loading Curb Extensions			
	Road Facing	On-street Parking			
		Parklets			
ROADWAY	Traffic Calming Strategies ²	Lane Narrowing		10' painted centerline not required	
		Vertical Deflection		use speed humps/tables to slow traffic if speeding is an issue	
		Chicanes			
		Neckdowns			
	Transit	Dedicated Bus Lane			
	Bikes	Bicycle Facilities ³		consider shared-use path	
	INTERSECTION	Pedestrian Safety and Priority	Crosswalks		
			Pedestrian Signals and Warning Signs		
Pedestrian Refuge Island					
Bicycle Safety and Priority		Bike Boxes			
	Two-stage Turning Boxes				
Traffic Calming	Vertical Deflection and Turn Calming				

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A

Figure 85 Park typology checklist

Source: DVRPC

LOCATION: _____

TYPOLOGY: ALLEY

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	✓	STIPULATIONS AND GUIDANCE	
SIDEWALK	Sidewalk Zones	Frontage Zone	Not Recommended or N/A		
		Pedestrian Zone	Recommended	5' - 6'	
		Greenscape-Furnishing Zone	As Needed		
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	As Needed	if possible, stormwater planters, tree trenches, rain gardens	
		Sidewalk Cafes and Plazas	Not Recommended or N/A		
		Street Trees	As Needed	if possible, small stature, spaced at least 20' apart	
		Street Furniture	Not Recommended or N/A		
		Lighting ⁴	Recommended	where space is available, alternating across street, 50' spacing	
		Bus Stop Amenities	Not Recommended or N/A		
		Bike Parking	Not Recommended or N/A		
CURB	Sidewalk Facing	Driveways / Entrances	As Needed		
		Curb Extensions	Not Recommended or N/A		
		Bus Loading Curb Extensions	Not Recommended or N/A		
	Road Facing	On-street Parking	As Needed	as needed, 7'-9' wide	
		Parklets	Not Recommended or N/A		
ROADWAY	Traffic Calming Strategies ²	Lane Narrowing	Recommended	no wider than 10' lanes, painted centerline not required	
		Vertical Deflection	As Needed	use if speeding is an issue	
		Chicanes	Not Recommended or N/A		
		Neckdowns	Not Recommended or N/A		
	Transit	Dedicated Bus Lane	Not Recommended or N/A		
		Bikes	Bicycle Facilities	Not Recommended or N/A	
	INTERSECTION	Pedestrian Safety and Priority	Crosswalks	Not Recommended or N/A	
			Pedestrian Signals and Warning Signs	Not Recommended or N/A	
Pedestrian Refuge Island			Not Recommended or N/A		
Bicycle Safety and Priority		Bike Boxes	Not Recommended or N/A		
	Two-stage Turning Boxes	Not Recommended or N/A			
Traffic Calming		As Needed	consider raised crosswalks if speeding is a problem		

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended or N/A

Figure 86 Alley typology checklist

Source: DVRPC

A: COMPLETE STREETS CHECKLISTS

LOCATION: _____

OVERLAY: TRANSIT

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	✓	STIPULATIONS
SIDEWALK	Sidewalk Zones	Frontage Zone		refer to underlying typology
		Pedestrian Zone	█	8' - 12'
		Greenscape-Furnishing Zone	█	8' at bus stops
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	█	special attention to grade/pooling if loading bumpout is built
		Sidewalk Cafes and Plazas		refer to underlying typology
		Street Trees	█	site trees to not block view of approaching buses
		Street Furniture	█	provide seating
		Lighting	█	50' spacing
Bus Stop Amenities	█	add shelter if possible		
Bike Parking	█	if space limited, consider installing a bike corral in a parking space		
CURB	Sidewalk Facing	Driveways / Entrances	█	restricted use
		Curb Extensions	█	use with bus stop
		Bus Loading Curb Extensions	█	as needed with bus stops and limited sidewalk space
	Road Facing	On-street Parking	█	assess need, minimize in proximity to bus loading
		Parklets	█	use caution around bus stops to avoid interfering with operations
	Loading Zones	█	assess need, minimize when possible	
ROADWAY	Traffic Calming Strategies	Lane Narrowing	█	11' for lanes with bus traffic
		Vertical Deflection	█	use speed cushions if road used by buses or heavy vehicles
		Chicanes	█	
		Neckdowns		refer to underlying typology
	Transit	Dedicated Bus Lane	█	if space is available, place on the right side of the road
	Bikes	Bicycle Facilities	█	use most protection possible, consider parallel routes
INTERSECTION	Pedestrian Safety and Priority	Crosswalks	█	continental style at signalized intersections
		Pedestrian Signals and Warning Signs	█	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	█	assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		refer to underlying typology
		Two-stage Turning Boxes		refer to underlying typology
Traffic Calming	Vertical Deflection and Turn Calming	█	design to not impede bus operations	

█ Required
 █ Recommended
 █ As Needed
 █ Not Recommended/Not Applicable

Figure 87 Transit overlay checklist

Source: DVRPC

LOCATION: _____

OVERLAY: TRAIL ACCESS

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	✓	STIPULATIONS
SIDEWALK	Sidewalk Zones	Frontage Zone		refer to underlying typology
		Pedestrian Zone		refer to underlying typology
		Greenscape-Furnishing Zone	█	2'-6" - 8'
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	█	
		Sidewalk Cafes and Plazas		refer to underlying typology
		Street Trees	█	
		Street Furniture		
		Lighting	█	50' spacing
CURB	Sidewalk Facing	Bus Stop Amenities	█	provide seating, add shelter if possible
		Bike Parking	█	assess need for number of spots
		Driveways/Entrances		refer to underlying typology
	Road Facing	Curb Extensions	█	if possible
Bus Loading Curb Extensions			refer to underlying typology	
On-street Parking		█		
Parklets			refer to underlying typology	
ROADWAY	Traffic Calming Strategies	Loading Zones	█	30' long, near trail entrance for passenger vehicles
		Lane Narrowing		refer to underlying typology
		Vertical Deflection	█	consider raising midblock crossings at trail entrance
	Transit	Chicanes		refer to underlying typology
		Neckdowns		refer to underlying typology
		Dedicated Bus Lane		refer to underlying typology
	Bikes	Bicycle Facilities	█	use most protection possible
		Crosswalks ²	█	continental style at signalized intersections or trail entrances
INTERSECTION	Pedestrian Safety and Priority ¹	Pedestrian Signals and Warning Signs	█	install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island	█	assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		refer to underlying typology
		Two-stage Turning Boxes		refer to underlying typology
Traffic Calming	Vertical Deflection and Turn Calming	█		

█ Required █ Recommended █ As Needed █ Not Recommended/Not Applicable

Figure 88 Trail Access overlay checklist

Source: DVRPC

A: COMPLETE STREETS CHECKLISTS

LOCATION: _____

OVERLAY: PARK ACCESS

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	✓	STIPULATIONS
SIDEWALK	Sidewalk Zones	Frontage Zone		refer to underlying typology
		Pedestrian Zone		6' minimum, 8' preferred
		Greenscape-Furnishing Zone		2'-6" - 8'
	Sidewalk Elements	Drainage/ Green Stormwater Infrastructure		
		Sidewalk Cafes and Plazas		refer to underlying typology
		Street Trees		
		Street Furniture		
		Lighting ⁴		50' spacing
		Bus Stop Amenities		provide seating, add shelter if possible
		Bike Parking		consider a bike corral in an on-street parking space, if needed
CURB	Sidewalk Facing	Driveways / Entrances		refer to underlying typology
		Curb Extensions		if space allows
		Bus Loading Curb Extensions		refer to underlying typology
	Road Facing	On-street Parking		
		Parklets		refer to underlying typology
	Loading Zones		30' long, near park entrance for passenger vehicles	
ROADWAY	Traffic Calming Strategies	Lane Narrowing		refer to underlying typology
		Vertical Deflection		consider raising midblock crossings
		Chicanes		refer to underlying typology
	Transit	Neckdowns		refer to underlying typology
		Dedicated Bus Lane		refer to underlying typology
Bikes	Bicycle Facilities		use most protection possible	
INTERSECTION	Pedestrian Safety and Priority ²	Crosswalks ³		continental style at signalized intersections or park entrances
		Pedestrian Signals and Warning Signs ⁴		install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island		assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		refer to underlying typology
		Two-stage Turning Boxes		refer to underlying typology
Traffic Calming	Vertical Deflection and Turn Calming			

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended/Not Applicable

Figure 89 Park Access overlay checklist

Source: DVRPC

LOCATION: _____

OVERLAY: SCHOOLS

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	✓	STIPULATIONS
SIDEWALK	Sidewalk Zones	Frontage Zone		refer to underlying typology
		Pedestrian Zone		refer to underlying typology
		Greenscape-Furnishing Zone	█	2'-6" - 8'
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	█	
		Sidewalk Cafes and Plazas		refer to underlying typology
		Street Trees	█	
		Street Furniture	█	
		Lighting	█	50' spacing
		Bus Stop Amenities	█	provide seating, add shelter if possible
CURB	Sidewalk Facing	Bike Parking	█	consider a bike corral in an on-street parking space, if needed
		Driveways / Entrances		refer to underlying typology
		Curb Extensions	█	if possible
	Road Facing	Bus Loading Curb Extensions		refer to underlying typology
		On-street Parking	█	
ROADWAY	Traffic Calming	Parklets	█	refer to underlying typology
		Loading Zones	█	30' long, near school entrance for passenger vehicles
		Lane Narrowing		refer to underlying typology
	Transit	Vertical Deflection	█	consider raising midblock crossings at school entrance
		Chicanes		refer to underlying typology
	Bikes	Neckdowns		refer to underlying typology
		Dedicated Bus Lane		refer to underlying typology
INTERSECTION	Pedestrian Safety and Priority ²	Bicycle Facilities	█	use most protection possible
	Pedestrian Safety and Priority ⁴	Crosswalks ²	█	continental style at all signalized intersections
		Pedestrian Signals and Warning Signs	█	install countdown timers and LPIs at all signalized intersections
	Bicycle Safety and Priority	Pedestrian Refuge Island	█	assess need if road is four lanes or wider
		Bike Boxes		refer to underlying typology
Traffic Calming	Two-stage Turning Boxes		refer to underlying typology	
	Vertical Deflection and Turn Calming	█		

█ Required
 █ Recommended
 █ As Needed
 █ Not Recommended/ Not Applicable

Figure 90 Schools overlay checklist

Source: DVRPC

A: COMPLETE STREETS CHECKLISTS

LOCATION: _____

OVERLAY: STATION AREA

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	✓	STIPULATIONS
SIDEWALK	Sidewalk Zones	Frontage Zone		refer to underlying typology
		Pedestrian Zone		minimum 8'
		Greenscape-Furnishing Zone		2'-6" - 8'
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure		
		Sidewalk Cafes and Plazas		
		Street Trees		
		Street Furniture		
		Lighting		50' spacing
		Bus Stop Amenities		provide seating, add shelter if possible
		Bike Parking		assess need for number of spots
CURB	Sidewalk Facing	Driveways / Entrances		refer to underlying typology
		Curb Extensions		if possible
		Bus Loading Curb Extensions		refer to underlying typology
	Road Facing	On-street Parking		
		Parklets		place away from bus stops to reduce potential conflicts
	Loading Zones		30' long, near park entrance for passenger vehicles	
ROADWAY	Traffic Calming Strategies	Lane Narrowing		refer to underlying typology
		Vertical Deflection		refer to underlying typology
		Chicanes		refer to underlying typology
		Neckdowns		refer to underlying typology
	Transit	Dedicated Bus Lane		refer to underlying typology
Bikes	Bicycle Facilities		use most protection possible	
INTERSECTION	Pedestrian Safety and Priority	Crosswalks		continental style at all signalized intersections
		Pedestrian Signals and Warning Signs		install countdown timers and LPIs at all signalized intersections
		Pedestrian Refuge Island		assess need if road is four lanes or wider
	Bicycle Safety and Priority	Bike Boxes		refer to underlying typology
		Two-stage Turning Boxes		refer to underlying typology
Traffic Calming	Vertical Deflection and Turn Calming			

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended/ Not Applicable

Figure 91 Rail Station Area overlay checklist

Source: DVRPC

LOCATION: _____

OVERLAY: LIMITED ACCESS TRANSITION

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	✓	STIPULATIONS
SIDEWALK	Sidewalk Zones	Frontage Zone		refer to underlying typology
		Pedestrian Zone		refer to underlying typology
		Greenscape-Furnishing Zone	█	2'-6" - 8'
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	█	
		Sidewalk Cafes and Plazas		refer to underlying typology
		Street Trees	█	
		Street Furniture	█	
		Lighting	█	50' spacing
		Bus Stop Amenities	█	provide seating, add shelter if possible
		Bike Parking		refer to underlying typology
CURB	Sidewalk Facing	Driveways / Entrances		refer to underlying typology
		Curb Extensions	█	may be paired with gateway elements (see "Gateway" below)
		Bus Loading Curb Extensions		refer to underlying typology
	Road Facing	On-street Parking		refer to underlying typology
		Parklets		refer to underlying typology
ROADWAY	Traffic Calming Strategies ⁴	Loading Zones		refer to underlying typology
		Lane Narrowing		refer to underlying typology
		Vertical Deflection	█	
		Chicanes	█	
	Transit	Neckdowns	█	
		Dedicated Bus Lane		refer to underlying typology
	Bikes	Bicycle Facilities ²	█	use most protection possible
		Pedestrian Safety and Priority	Crosswalks	█
	Pedestrian Signals and Warning Signs		█	install countdown timers and LPIs at all signalized intersections
	Pedestrian Refuge Island		█	assess need if road is four lanes or wider
Bicycle Safety and Priority	Bike Boxes		refer to underlying typology	
	Two-stage Turning Boxes		refer to underlying typology	
Traffic Calming	Vertical Deflection and Turn Calming	█		

█ Required
 █ Recommended
 █ As Needed
 █ Not Recommended/ Not Applicable

Figure 92 Limited Access Transition overlay checklist

Source: DVRPC

A: COMPLETE STREETS CHECKLISTS

LOCATION: _____

OVERLAY: COMBINED SEWER

Are you including all required elements (refer to included table)? Yes or No

If not, describe why. _____

Are you including most or all recommended elements (refer to table)?

Yes or No

If not, describe why.

		ELEMENT	✓	STIPULATIONS
SIDEWALK	Sidewalk Zones	Frontage Zone		Consider permeable paving
		Pedestrian Zone		Consider permeable paving
		Greenscape-Furnishing Zone	Required	2'-6" - 8', outfit with GSI projects
	Sidewalk Elements	Drainage/Green Stormwater Infrastructure	Recommended	
		Sidewalk Cafes and Plazas		refer to underlying typology
		Street Trees	Recommended	strongly recommended, pair with tree trenches
		Street Furniture		refer to underlying typology
		Lighting		refer to underlying typology
Bus Stop Amenities			refer to underlying typology	
Bike Parking			refer to underlying typology	
CURB	Sidewalk Facing	Driveways / Entrances		refer to underlying typology
		Curb Extensions	Recommended	outfit with GSI projects, where possible
		Bus Loading Curb Extensions		refer to underlying typology
	Road Facing	On-street Parking	Recommended	install porous asphalt in parking lane
		Parklets		refer to underlying typology
ROADWAY	Traffic Calming Strategies	Loading Zones		refer to underlying typology
		Lane Narrowing		refer to underlying typology
		Vertical Deflection		refer to underlying typology
		Chicanes	Recommended	outfit with GSI projects, where possible
	Transit	Neckdowns	Recommended	outfit with GSI projects, where possible
		Dedicated Bus Lane		refer to underlying typology
		Bicycle Facilities		refer to underlying typology
INTERSECTION	Pedestrian Safety and Priority	Bicycle Facilities		refer to underlying typology
		Crosswalks		refer to underlying typology
		Pedestrian Signals		refer to underlying typology
	Bicycle Safety and Priority	Pedestrian Refuge Island	Recommended	outfit with GSI projects, where possible
		Bike Boxes		refer to underlying typology
Traffic Calming	Two-stage Turning Boxes		refer to underlying typology	
	Vertical Deflection and Turn Calming		refer to underlying typology	

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended/ Not Applicable

Figure 93 Combined Sewer overlay checklist

Source: DVRPC

B: Master List of Design Elements

Complete Streets Typologies

		Dense Residential	Single-Family Residential	Commercial Corridor	Connector Corridor	Downtown Commercial Corridor	Downtown Connector Corridor	Downtown Minor	Neighborhood Mixed Use	Industrial Access	Park	Alley	
Sidewalk Elements	Frontage Zone			2' - 6'	none - 6'	2' - 6'	none - 6'	2' - 6'	2' - 6'	none - 6'			
	Pedestrian Zone	5' - 6', sidewalk should be standard cast-in-place concrete	5' - 6', sidewalk should be standard cast-in-place concrete	5' - 8', sidewalk should be standard cast-in-place concrete	5' - 8', sidewalk should be standard cast-in-place concrete	8' - 12'	6' - 12'	6' - 12'	5' - 12', sidewalk should be standard cast-in-place concrete	5' - 6', sidewalk should be standard cast-in-place concrete	5' - 6', sidewalk should be standard cast-in-place concrete	5' - 6'	
	Greenscape-Furnishing Zone	up to 6'	2' - 6" - 4'	2' - 6" - 8'	2' - 6" - 8'	2' - 6" - 8', brick is the preferred paving material Downtown	2' - 6" - 8', brick is the preferred paving material Downtown	2' - 6" - 8', brick is the preferred paving material Downtown	2' - 6" - 8'				
	Drainage/Green Stormwater Infrastructure	stormwater planters, tree trenches, rain gardens	stormwater planters, tree trenches, rain gardens	stormwater planters, tree trenches, rain gardens	if possible, stormwater planter, tree trenches, rain gardens	stormwater planters, tree trenches, rain gardens	if possible, stormwater planters, tree trenches, rain gardens	if possible, stormwater planters, tree trenches, rain gardens	stormwater planters, tree trenches, rain gardens	if possible, stormwater planter, tree trenches, rain gardens		if possible, stormwater planters, tree trenches, rain gardens	
	Sidewalk Cafes and Plazas												
	Street Trees	small-medium 25-50', spaced at least 20' apart	small < or = 25', spaced at least 25' apart	small-medium 25-50', spaced at least 20' apart	medium-large 25-50', spaced at least 25' apart	medium < or = 25', spaced at least 25' apart	medium or large < or = 25', spaced at least 25' apart	small or medium < or = 25', spaced at least 20' apart	small or medium < or = 25', spaced at least 20' apart	medium or large < or = 25', spaced at least 20' apart		if possible, small < or = 25', spaced at least 20' apart	
	Street Furniture	may be placed by residents if Pedestrian Zone can be maintained		provide seating, waste receptacles at regular intervals		provide seating, waste receptacles at regular intervals		provide seating	provide seating, waste receptacles at regular intervals			provide seating	
	Lighting	alternating across street, 75'-120' spacing	alternating across street, 75'-120' spacing	alternating across street, 75'-120' spacing	alternating across street, 75'-120' spacing	paired (not alternating) across street, 50'-80' spacing	paired across street, 50'-80' spacing	paired across street, 50'-80' spacing	alternating across street, 75'-120' spacing	alternating across street, 75'-120' spacing		alternating across street, 50'-80' spacing	where space is available, alternating across street, 50' spacing
	Bus Stop Amenities	provide seating, add shelter if possible		provide seating, add shelter if possible	provide seating, add shelter if possible	provide seating, add shelter if possible	provide seating, add shelter if possible	provide seating, add shelter if possible	provide seating, add shelter if possible	provide seating, add shelter if possible			
	Bike Parking			assess need for number of spots	assess need for number of spots	if sidewalk space is limited, consider bike corral in a parking space	if sidewalk space is limited, consider bike corral in a parking space	if sidewalk space is limited, consider bike corral in a parking space	if sidewalk space is limited, consider bike corral in a parking space	if sidewalk space is limited, consider bike corral in a parking space		assess need for number of spots	

Required Recommended As Needed Not Recommended/Not Applicable

Figure 94 Sidewalk typology master table

Source: DVRPC

Overlays

		Transit	Trail Access	Park Access	Schools	Rail Station Area	Limited Access Transition	Combined Sewer	
Sidewalk	Sidewalk Elements	Frontage Zone	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	Consider permeable paving	
		Pedestrian Zone	8' - 12'	refer to underlying typology	6' minimum, 8' preferred	refer to underlying typology	minimum 8'	refer to underlying typology	Consider permeable paving
		Greenscape-Furnishing Zone	8' at bus stops	2'-6" - 8'	2'-6" - 8'	2'-6" - 8'	2'-6" - 8'	2'-6" - 8'	2'-6" - 8', outfit with GSI projects
		Drainage/ Green Stormwater Infrastructure	special attention to grade/pooling if loading bumpout is built						
		Sidewalk Cafes and Plazas	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology		refer to underlying typology	refer to underlying typology
		Street Trees	site trees to not block view of approaching buses						strongly recommended, pair with tree trenches
		Street Furniture	provide seating						refer to underlying typology
		Lighting	50' spacing	50' spacing	50' spacing	50' spacing	50' spacing	50' spacing	refer to underlying typology
		Bus Stop Amenities	add shelter if possible	provide seating, add shelter if possible	provide seating, add shelter if possible	provide seating, add shelter if possible	provide seating, add shelter if possible	provide seating, add shelter if possible	refer to underlying typology
		Bike Parking	if space limited, consider installing a bike corral in a parking space	assess need for number of spots	consider a bike corral in an on-street parking space, if needed	consider a bike corral in an on-street parking space, if needed	assess need for number of spots	refer to underlying typology	refer to underlying typology

Required
Recommended
As Needed
Not Recommended/Not Applicable

Figure 95 Sidewalk overlay master table

Source: DVRPC

Complete Streets Typologies

		Dense Residential	Single-Family Residential	Commercial Corridor	Connector Corridor	Downtown Corridor	Downtown Corridor	Downtown Milior	Neighborhood Mixed Use	Industrial Access	Park	Alley
Curb	Driveways / Entrances	no more than 10'-12' wide, at least 20' from signalized intersections	10'-12' wide, at least 20' from signalized intersections	20'-24' wide, 100' from signalized intersections	20'-24' wide, 100' from signalized intersections	20'-24' wide, 100' from signalized intersections	20'-24' wide, 100' from signalized intersections	20'-24' wide, 100' from signalized intersections	20'-24' wide, 100' from signalized intersections	20'-24' wide, 100' from signalized intersections	20'-24' wide, 100' from signalized intersections	
	Curb Extensions		use if visibility and/or speeding are issues			use in high pedestrian traffic areas	as needed, only in high pedestrian traffic areas	as needed, only in high pedestrian traffic areas	as needed, only in high pedestrian traffic areas	as needed		
	Bus Loadings Curb Extensions							as needed with bus stops and limited sidewalk space				
	On-street Parking	parallel parking						shared parallel parking as needed	shared parallel parking, 7'-9' wide	as needed, 9'-10' minimum to accommodate trucks		as needed, 7'-9' wide
	Loading Zones								30' long, use as needed	80' long and 9'-10' minimum to accommodate trucks		
Road Facing	Parklets							add in high pedestrian traffic areas	Consider in areas with high pedestrian activity			
	Drainage and Green Stormwater Infrastructures	if possible	if possible	if possible	if possible	if possible	if possible	if possible	if possible	if possible	if possible	if possible

■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended/Not Applicable

Figure 96 Curb typology master table

Source: DVRPC

Overlays

		Transit	Trail Access	Park Access	Schools	Rail Station Area	Limited Access Transition	Combined Sewer	
Curb	Sidewalk Facing	Driveways / Entrances	restricted use	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	
		Curb Extensions	use with bus stop	if possible	if space allows	if possible	if possible	may be paired with gateway elements	outfit with GSI projects, where possible
	Road Facing	Bus Loading Curb Extensions	as needed with bus stops and limited sidewalk space	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
		On-street Parking	assess need, minimize in proximity to bus loading					refer to underlying typology	install porous asphalt in parking lane
		Loading Zones	assess need, minimize when possible	30' long, near trail entrance for passenger vehicles	30' long, near park entrance for passenger vehicles	30' long, near school entrance for passenger vehicles	30' long, near park entrance for passenger vehicles	refer to underlying typology	refer to underlying typology
	Drainage and Green Stormwater Infrastructure	Parklets	use caution around bus stops to avoid interfering with operations	refer to underlying typology	refer to underlying typology	refer to underlying typology	place away from bus stops to reduce potential conflicts	refer to underlying typology	refer to underlying typology
		Stormwater Infrastructure		refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
				refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
				refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology

Required

Recommended

As Needed

Not Recommended/Not Applicable

Figure 97 Curb overlay master table

Source: DVRPC

Complete Streets Typologies

Roadway		Dense Residential	Single-Family Residential	Commercial Corridor	Connector Corridor	Downtown Commercial Corridor	Downtown Connector Corridor	Downtown Minor	Neighborhood Mixed Use	Industrial Access	Park	Alley
Traffic Calming Strategies Vertical Deflection Lane Reductions Speed Humps Speed Tables Speed Cushions Chicanes Neckdowns Dedicated Bus Lane Transit Bikes	Lane Narrowing	maximum of 10', unless road used by buses	10', painted centerline not required	11' lanes recommended, consider 10' if not a bus route	11' lanes recommended, consider 10' if not a bus route	11' for lanes with bus traffic, maximum 10' for all other lanes	11' for lanes with bus traffic, maximum 10' for all other lanes	11' for lanes with bus traffic, maximum 10' for all other lanes	11' for lanes with bus traffic, maximum 10' for all other lanes	maximum 11' lanes	10', painted centerline not required	no wider than 10' lanes, painted centerline not required
	Vertical Deflection	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	use speed cushions if road used by buses or heavy vehicles	speed cushions preferred because of truck traffic	use speed humps/tables to slow traffic if speeding is an issue	use if speeding is an issue
	Lane Reductions			if possible, 4 existing lanes required		if possible, 4 existing lanes required		if possible, 4 existing lanes required	if possible, 4 existing lanes required			
	Speed Humps	use to slow traffic	use to slow traffic								use to slow traffic	
	Speed Tables			use if trucks are infrequent	use if trucks are infrequent	use if trucks are infrequent	use if trucks are infrequent	use if trucks are infrequent	use if trucks are infrequent	use if trucks are infrequent		
	Speed Cushions	use if trucks or buses are frequent	use if trucks or buses are frequent	use if trucks are frequent	use if trucks are frequent	use if trucks are frequent	use if trucks are frequent	use if trucks are frequent	use if trucks are frequent	use if trucks are frequent	must use speed cushions due to truck traffic	
	Chicanes	use where speeding is a problem	use where speeding is a problem									
	Neckdowns	use in areas with high pedestrian volume, midblock crossings	use in areas with high pedestrian volume, midblock crossings	use in areas with high pedestrian volume, midblock crossings		use in high pedestrian traffic areas	use in high pedestrian traffic areas, opportunity for gateways	use in high pedestrian traffic areas	use in high pedestrian traffic areas	use in high pedestrian traffic areas		
	Dedicated Bus Lane			if space is available, place on the right side of the road	if space is available, place on the right side of the road	if space is available, place on the right side of the road	if space is available, place on the right side of the road	if space is available, place on the right side of the road	if space is available, place on the right side of the road	if space is available, place on the right side of the road		
	Transit											
Bicycle Facilities	consider sharrows and creating Neighborhood Greenways	consider sharrows and creating Neighborhood Greenways	use protected bicycle lanes or consider parallel routes	use protected bike lanes or consider parallel routes	buffered or protected bike lanes or consider parallel routes	use buffered or protected bike lane or consider parallel routes	use most protection possible, but shared vehicle lanes permissible	consider sharrows or parallel routes with high quality facilities	strongly consider parallel routes	consider shared-use path		

Figure 98 Roadway typology master table

Source: DVRPC

Overlays

		Transit	Trail Access	Park Access	Schools	Rail Station Area	Limited Access Transition	Combined Sewer
Roadway	Lane Narrowing	11' for lanes with bus traffic	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
		refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	
	Lane Reductions	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
	Vertical Deflection	use speed cushions if road used by buses or heavy vehicles	consider raising midblock crossings at trail entrance	consider raising midblock crossings	consider raising midblock crossings at school entrance	refer to underlying typology		refer to underlying typology
	Speed Humps	11'	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology		
	Speed Tables		refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology		
	Speed Cushions		refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology		
	Chicanes	must use speed cushions due to bus traffic	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology		outfit with GSI projects, where possible
	Neckdowns	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology		outfit with GSI projects, where possible
	Transit	Dedicated Bus Lane	if space is available, place on the right side of the road	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
Bikes	Bicycle Facilities	use most protection possible, consider parallel routes	use most protection possible	use most protection possible	use most protection possible	use most protection possible	use most protection possible	refer to underlying typology

Required

Recommended

As Needed

Not Recommended/Not Applicable

Figure 99 Roadway overlay master table

Source: DVRPC

Complete Streets Typologies

Intersection		Dense Residential	Single-Family Residential	Commercial Corridor	Connector Corridor	Downtown Commercial Corridor	Downtown Connector Corridor	Downtown Minor	Neighborhood Mixed Use	Industrial Access	Park	Alley
Traffic Calming	Vertical Deflection and Turn Calming	Use at intersections with Corridors and where speeding is a problem	Use at intersections with Corridors and where speeding is a problem	Use at intersections with Corridors and where speeding is a problem	Use at intersections with Corridors and where speeding is a problem	Use at intersections with Corridors and where speeding is a problem	Use at intersections with Corridors and where speeding is a problem	Use at intersections with Corridors and where speeding is a problem	Use at intersections with Corridors and where speeding is a problem	Use at intersections with Corridors and where speeding is a problem	Use at intersections with Corridors and where speeding is a problem	Use at intersections with Corridors and where speeding is a problem
	Raised Intersections			if possible		if possible		if possible	if possible			
	Raised Crosswalks	Use at intersections with Corridors and midblock crossings	Use at intersections with Corridors and midblock crossings	Consider at midblock crossings	Consider at midblock crossings	Consider at midblock crossings	Consider at midblock crossings	Use at intersections with Corridors and midblock crossings	Use at intersections with Corridors and midblock crossings			
	Roundabouts		if possible								if possible	
	Right-turn Traffic Calming	Use at intersections with Corridors and where turning speeds are a problem	Use at intersections with Corridors and where turning speeds are a problem		Prioritize where pedestrian volume is high		Prioritize where pedestrian volume is high	Use at intersections with Corridors and where turning speeds are a problem	Use at intersections with Corridors and where speeding is a problem	Use at intersections with Corridors and where speeding is a problem	[As needed] Design to not impede truck traffic	
Required	Left-turn Traffic Calming	Use at intersections with Corridors and where turning speeds are a problem	Use at intersections with Corridors and where turning speeds are a problem		Prioritize where pedestrian volume is high		Use at intersections with Corridors and where turning speeds are a problem	Use at intersections with Corridors and where turning speeds are a problem	Use at intersections with Corridors and where speeding is a problem	Design to not impede truck traffic		
	Diverter	Use at intersections with Corridors to limit access	Use at intersections with Corridors to limit access		Prioritize where pedestrian volume is high		Use at intersections with Corridors to limit access					

Required Recommended As Needed Not Recommended/Not Applicable

Figure 102 Intersection typology master table

Source: DVRPC

Overlays

Intersection		Transit	Trail Access	Park Access	Schools	Rail Station Area	Limited Access Transition	Combined Sewer
Traffic Calming	Vertical Deflection and Turn Calming	design to not impede bus operations						refer to underlying typology
	Raised Intersections	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
	Raised Crosswalks							refer to underlying typology
	Roundabouts		refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology	refer to underlying typology
	Right-turn Traffic Calming						prioritize where pedestrian volume is high	N/A
Left-turn Traffic Calming							N/A	
Diverter								N/A

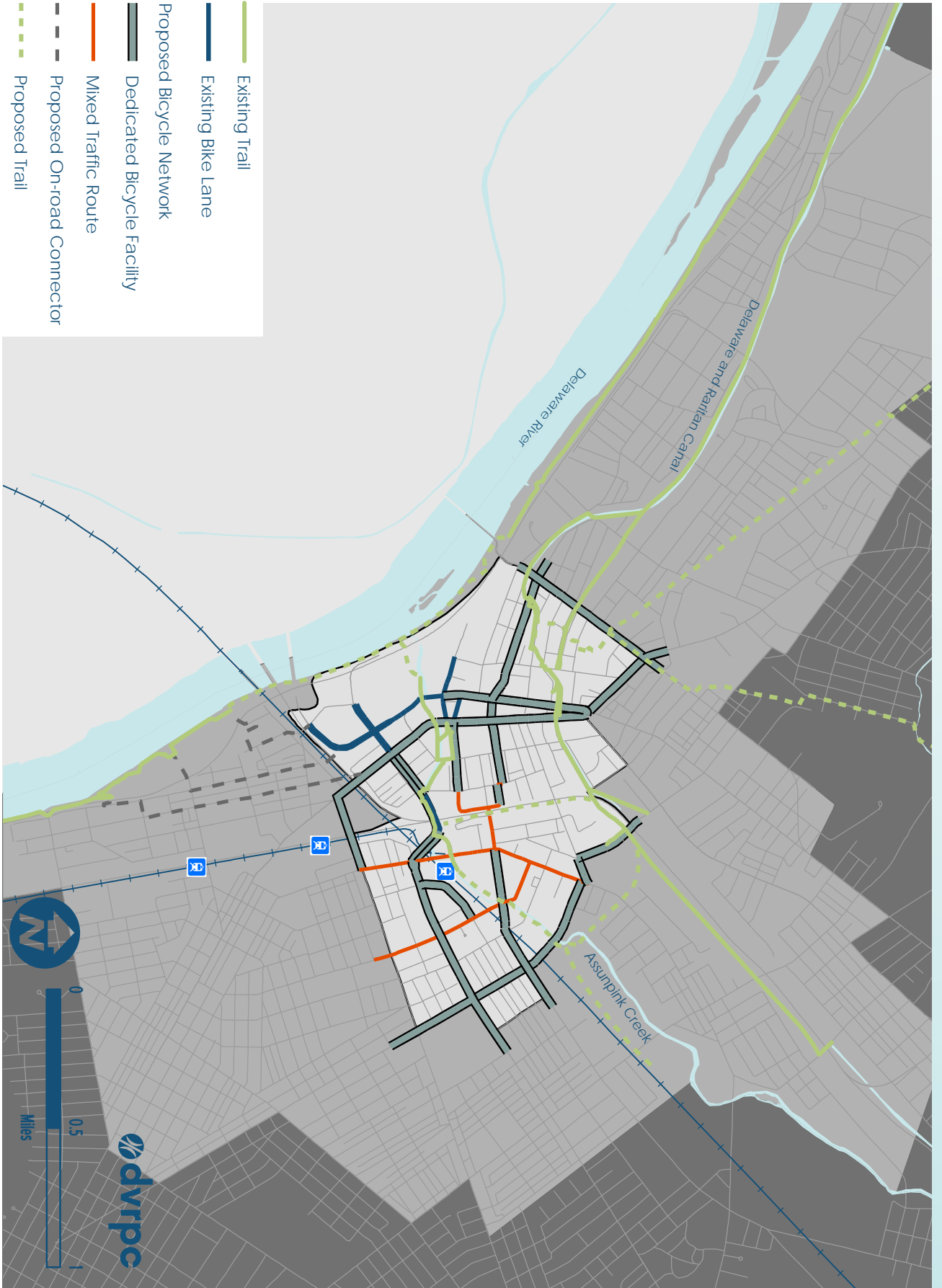
■ Required
 ■ Recommended
 ■ As Needed
 ■ Not Recommended/Not Applicable

Figure 103 Intersection overlay master table

Source: DVRPC

***C: Downtown Trenton Bicycle and
Pedestrian Plan Maps***

FIGURE 63: Complete Existing and Recommended Active Transportation Network



Sources: NJDOT, DVRPC, Mercer County, City of Trenton

Figure 104 Downtown Trenton Bicycle & Pedestrian Plan comprehensive recommendations

FIGURE 26: Recommended On-Road Bicycle Network



Sources: NJDOT, DVRPC, Mercer County, City of Trenton

D: Typology and Overlay Maps

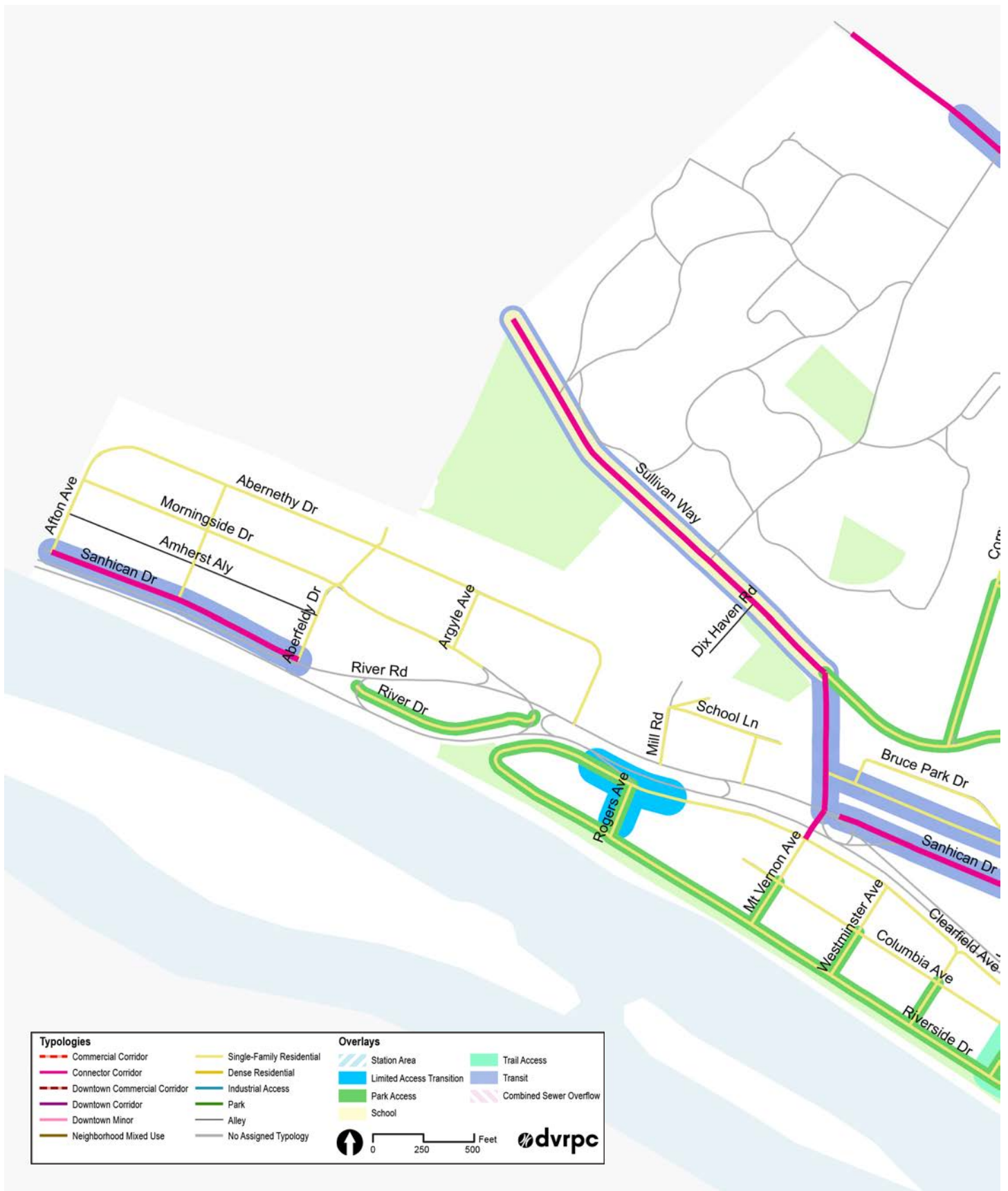


Figure 107 Combined typology and overlay map 1

Source: DVRPC, 2021

D: TYPOLOGY AND OVERLAY MAPS

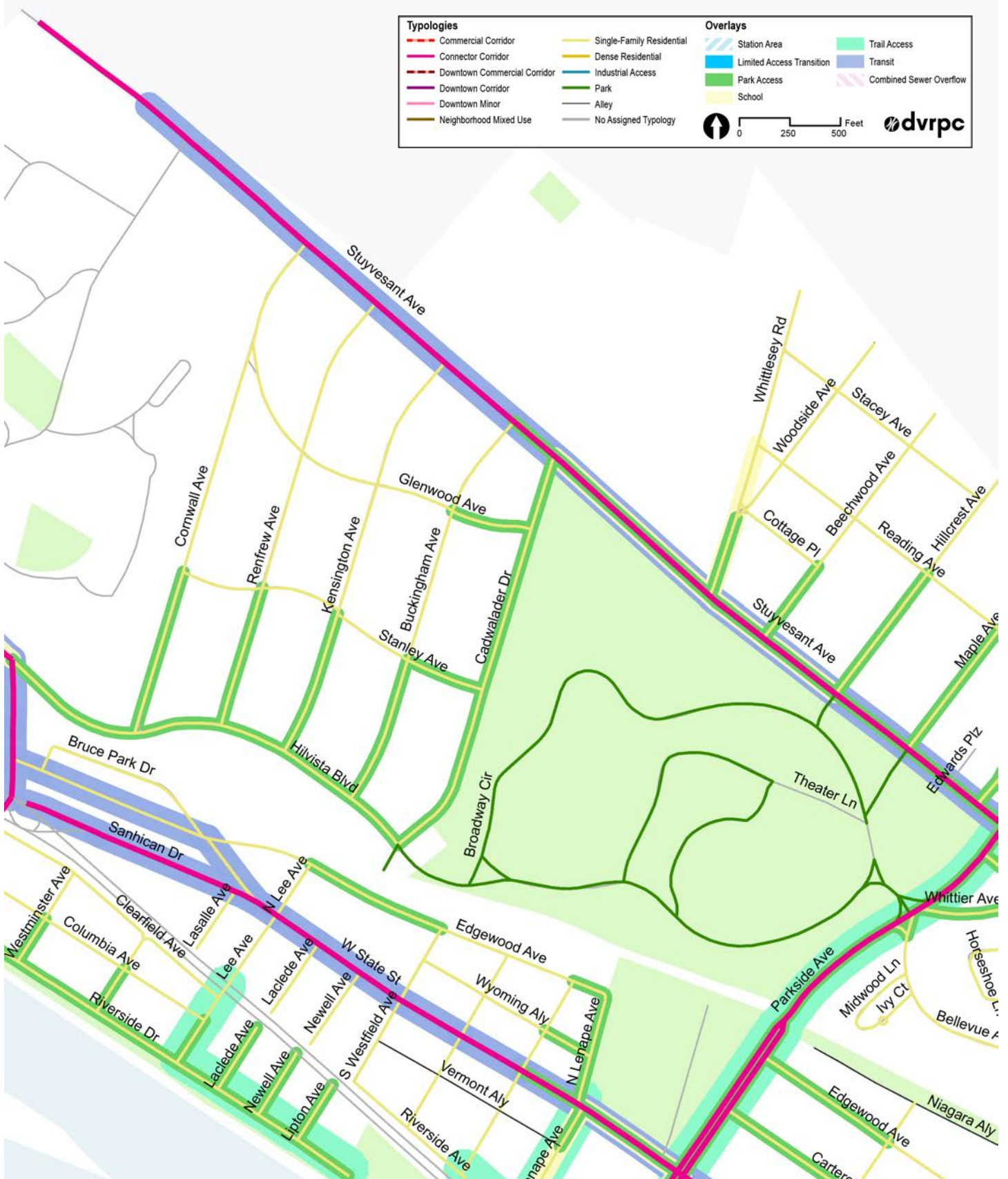


Figure 108 Combined typology and overlay map 2

Source: DVRPC, 2021

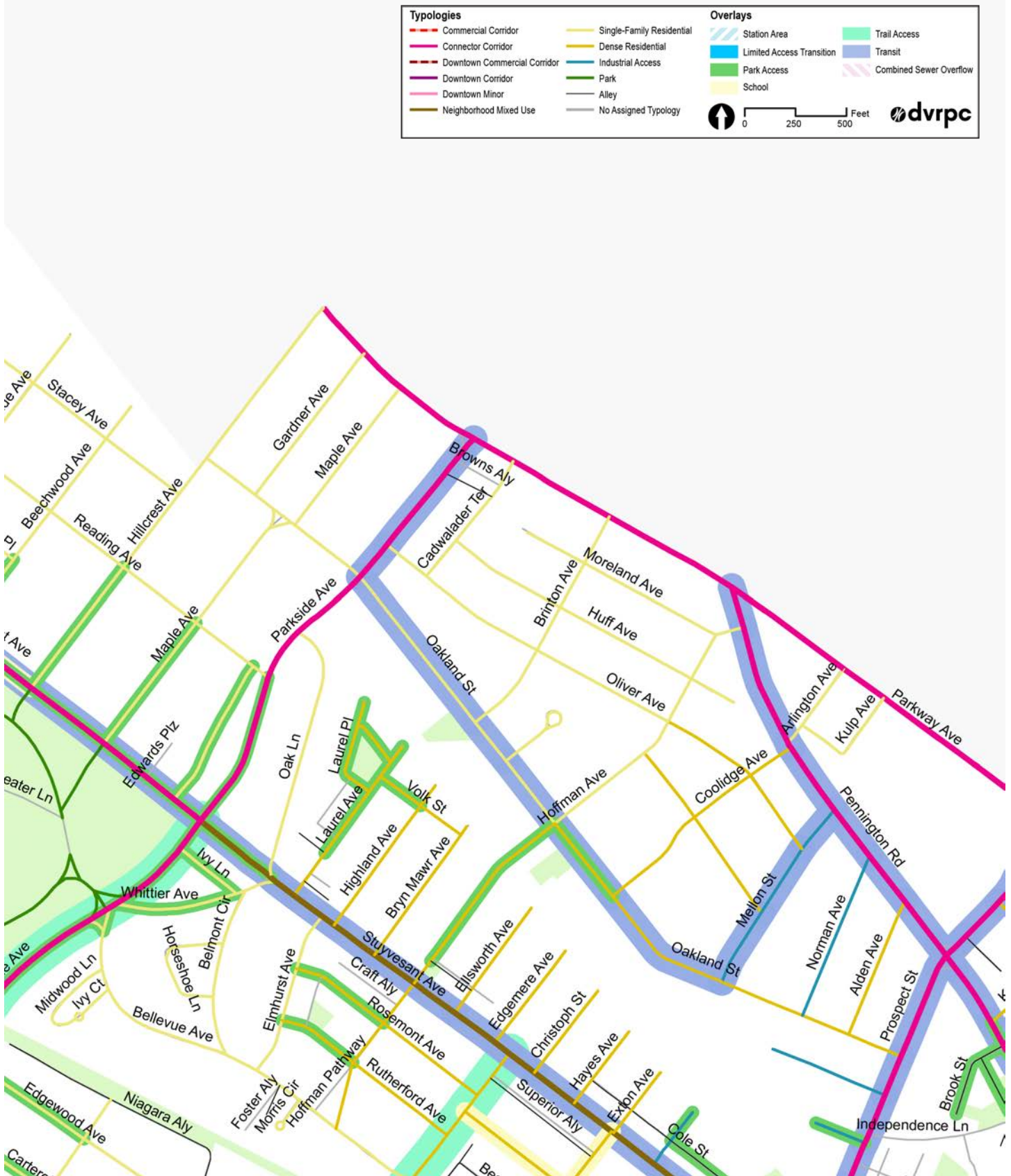


Figure 109 Combined typology and overlay map 3

Source: DVRPC, 2021

D: TYPOLOGY AND OVERLAY MAPS

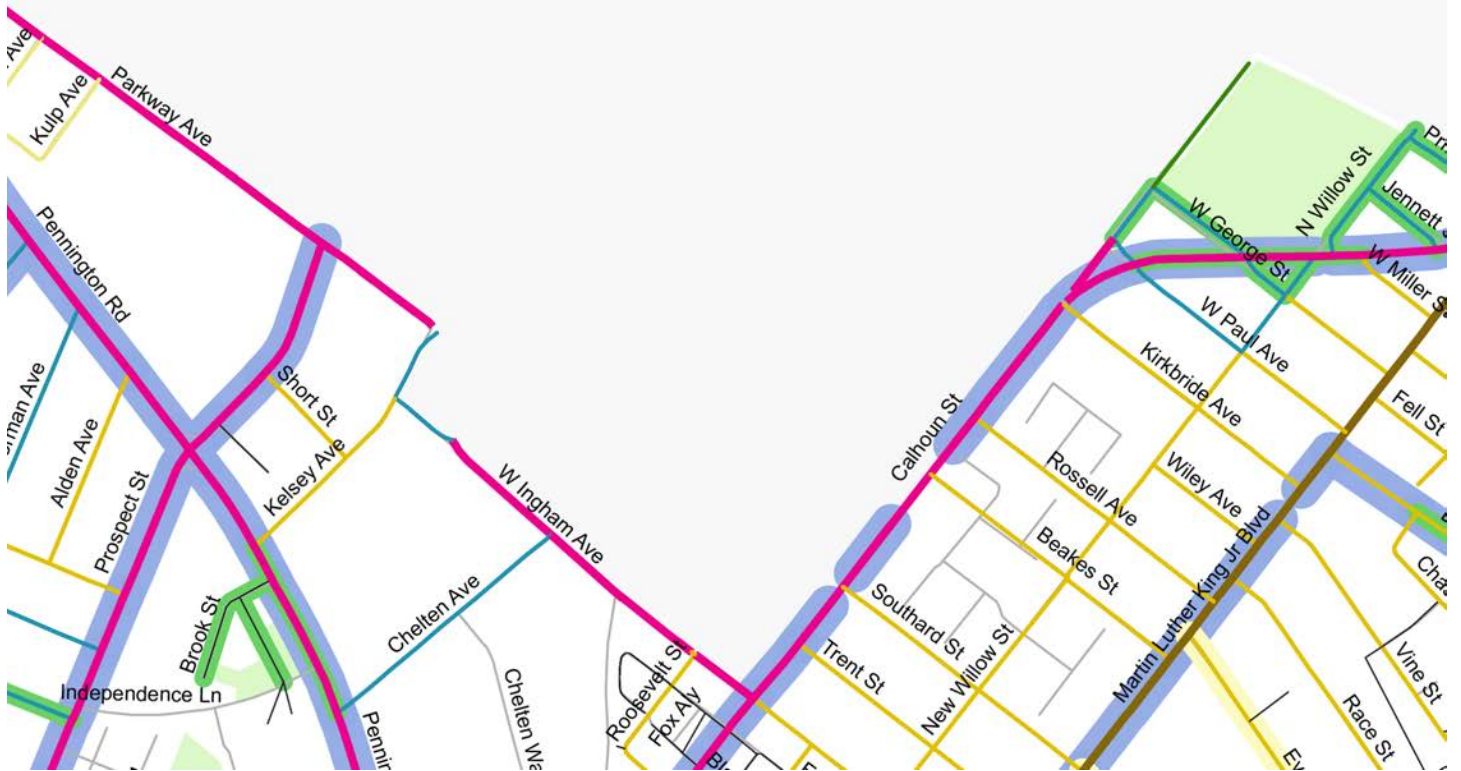
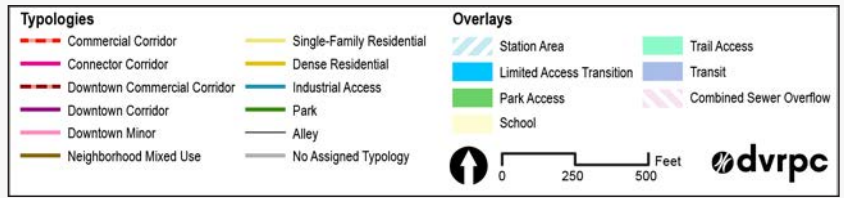


Figure 110 Combined typology and overlay map 4

Source: DVRPC, 2021

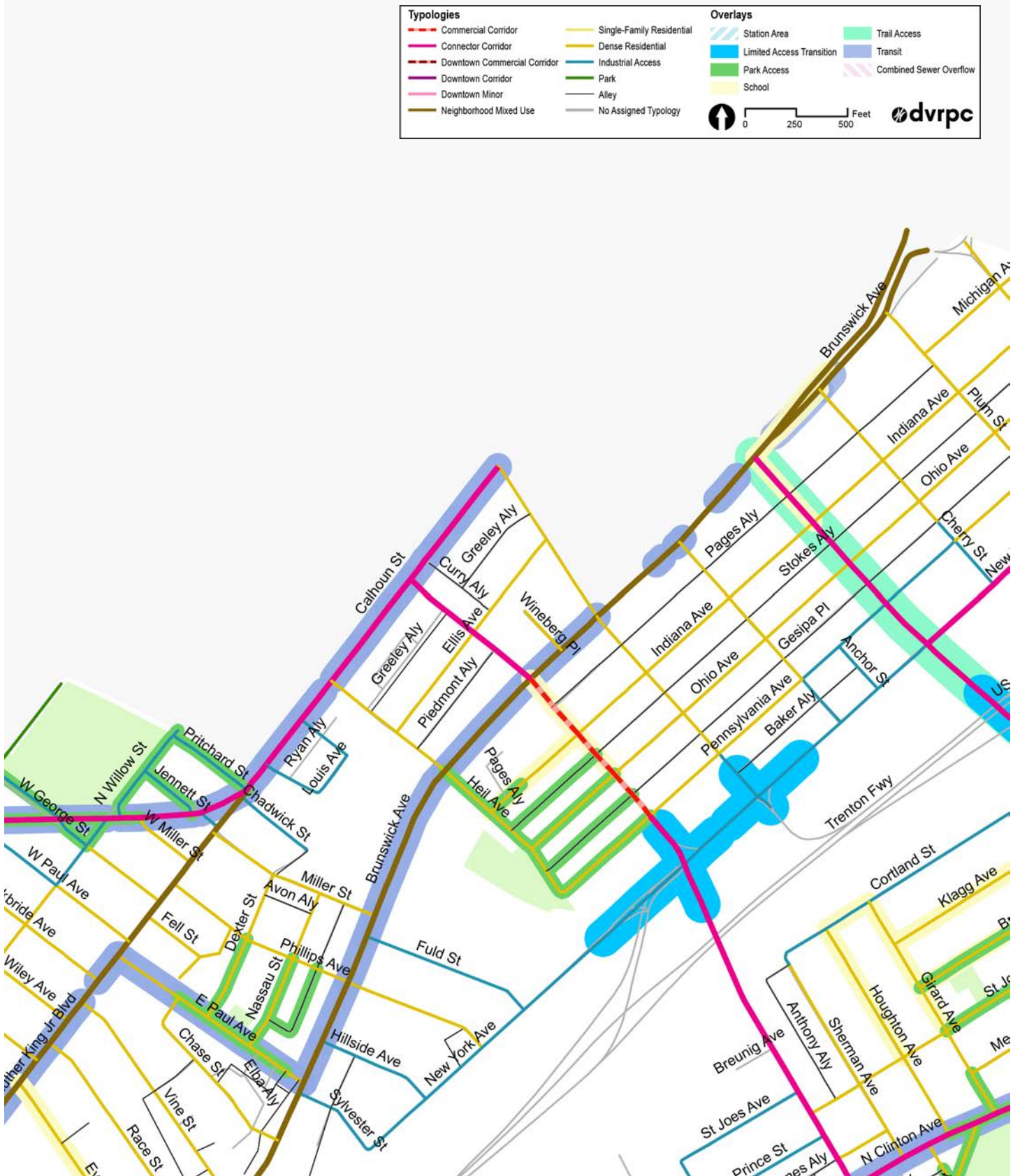


Figure 111 Combined typology and overlay map 5

Source: DVRPC, 2021

D: TYPOLOGY AND OVERLAY MAPS

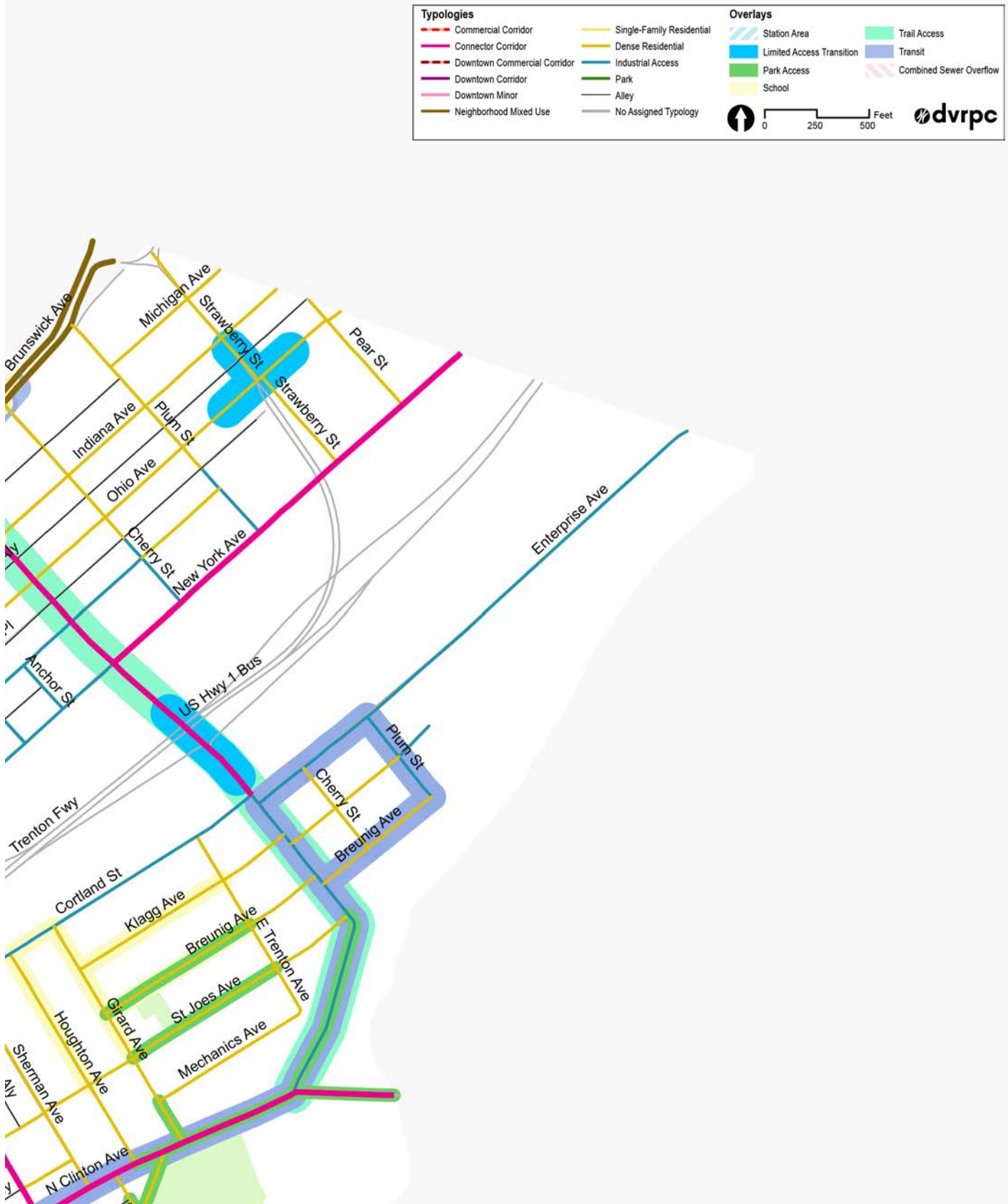


Figure 112 Combined typology and overlay map 6

Source: DVRPC, 2021

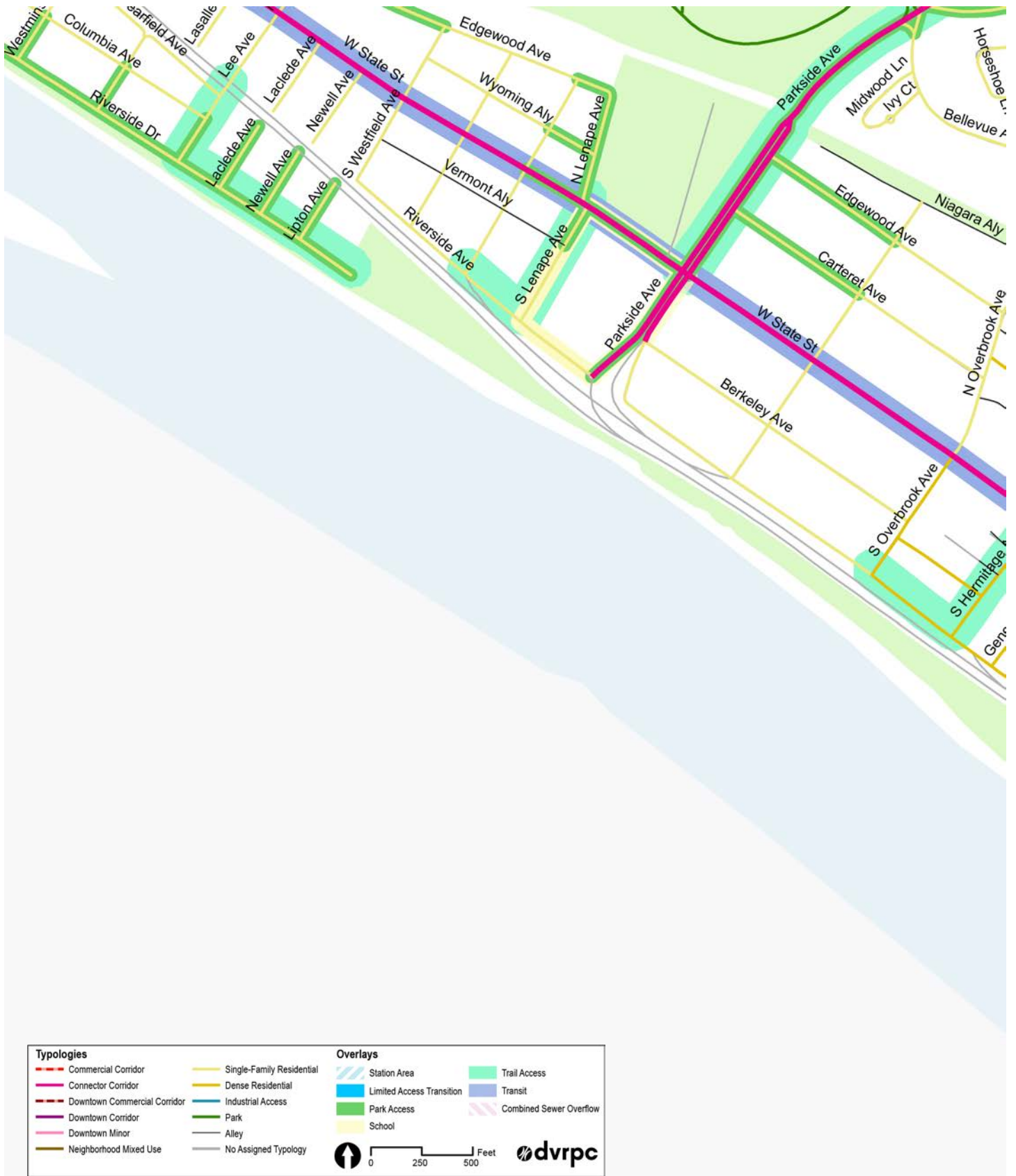


Figure 113 Combined typology and overlay map 7

Source: DVRPC, 2021

D: TYPOLOGY AND OVERLAY MAPS

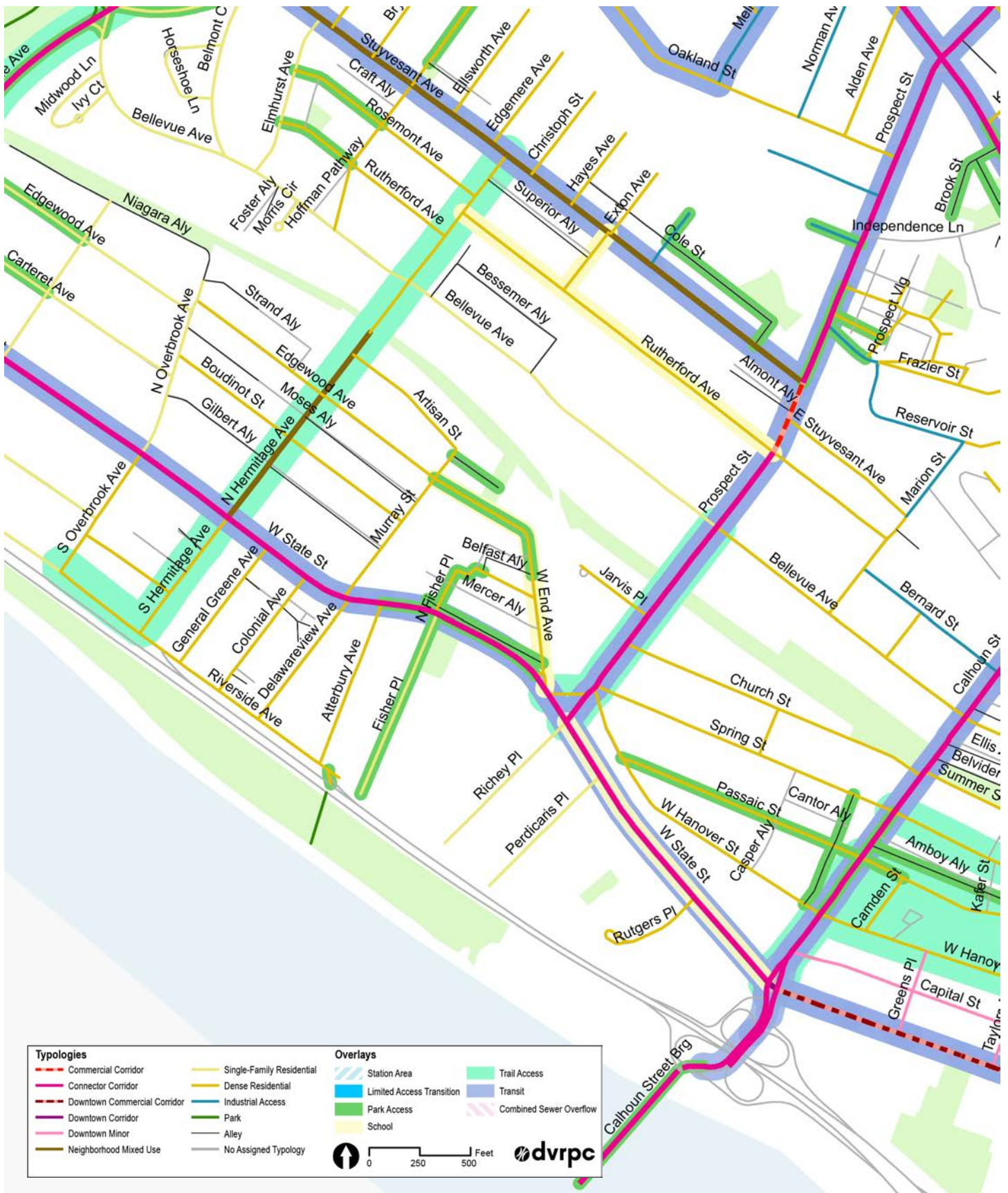


Figure 114 Combined typology and overlay map 8

Source: DVRPC, 2021

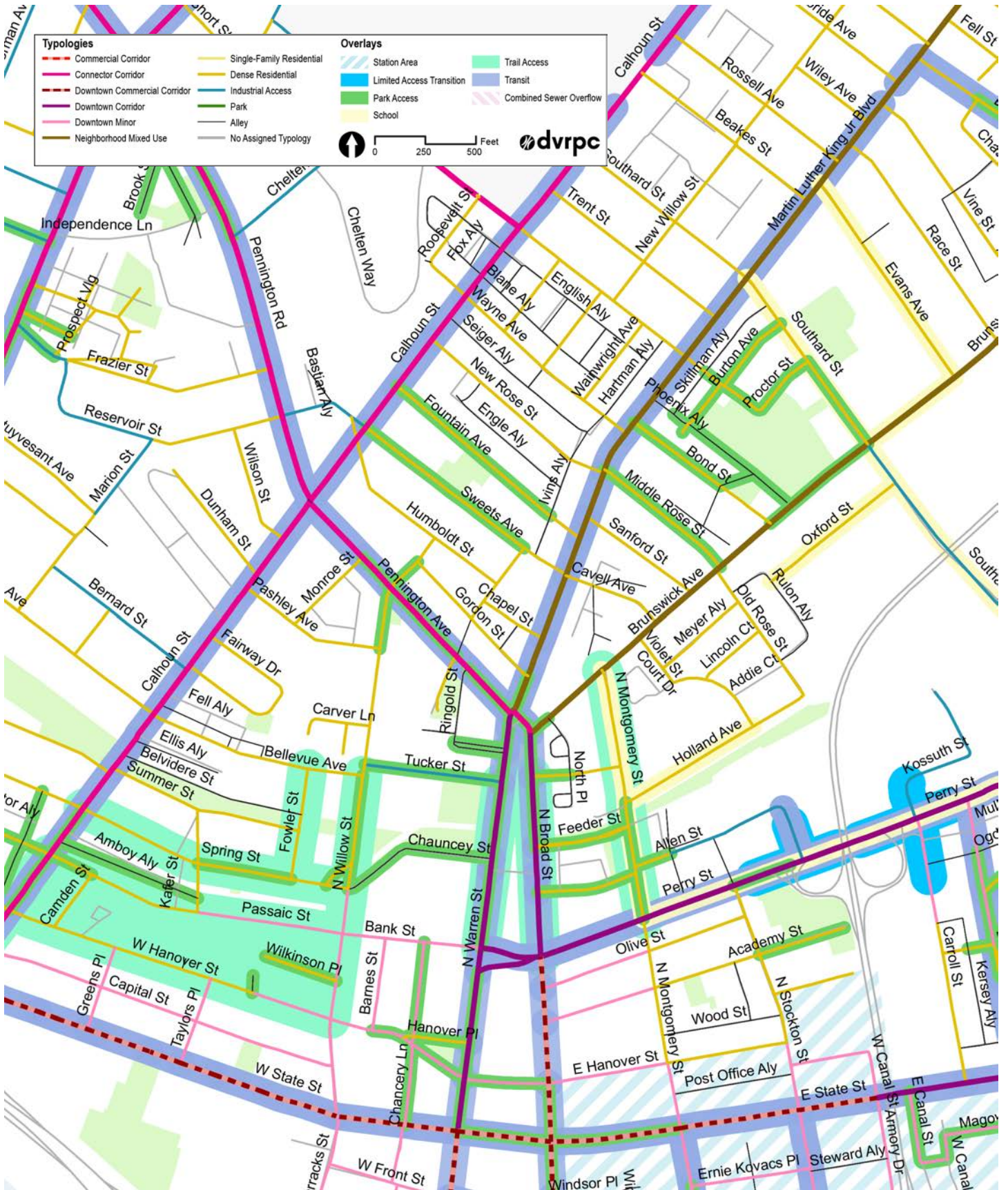


Figure 115 Combined typology and overlay map 9

Source: DVRPC, 2021

D: TYPOLOGY AND OVERLAY MAPS

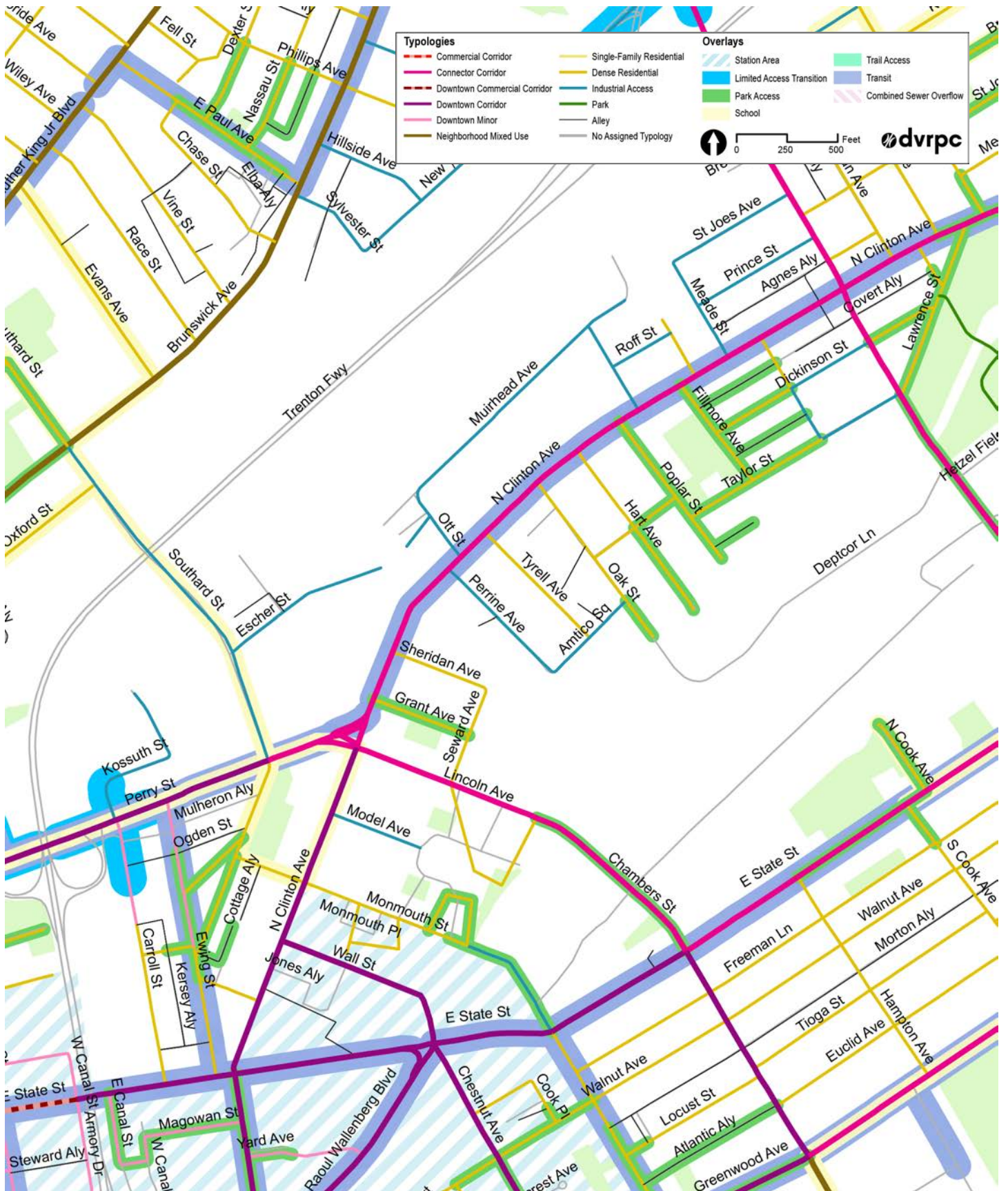


Figure 116 Combined typology and overlay map 10

Source: DVRPC, 2021

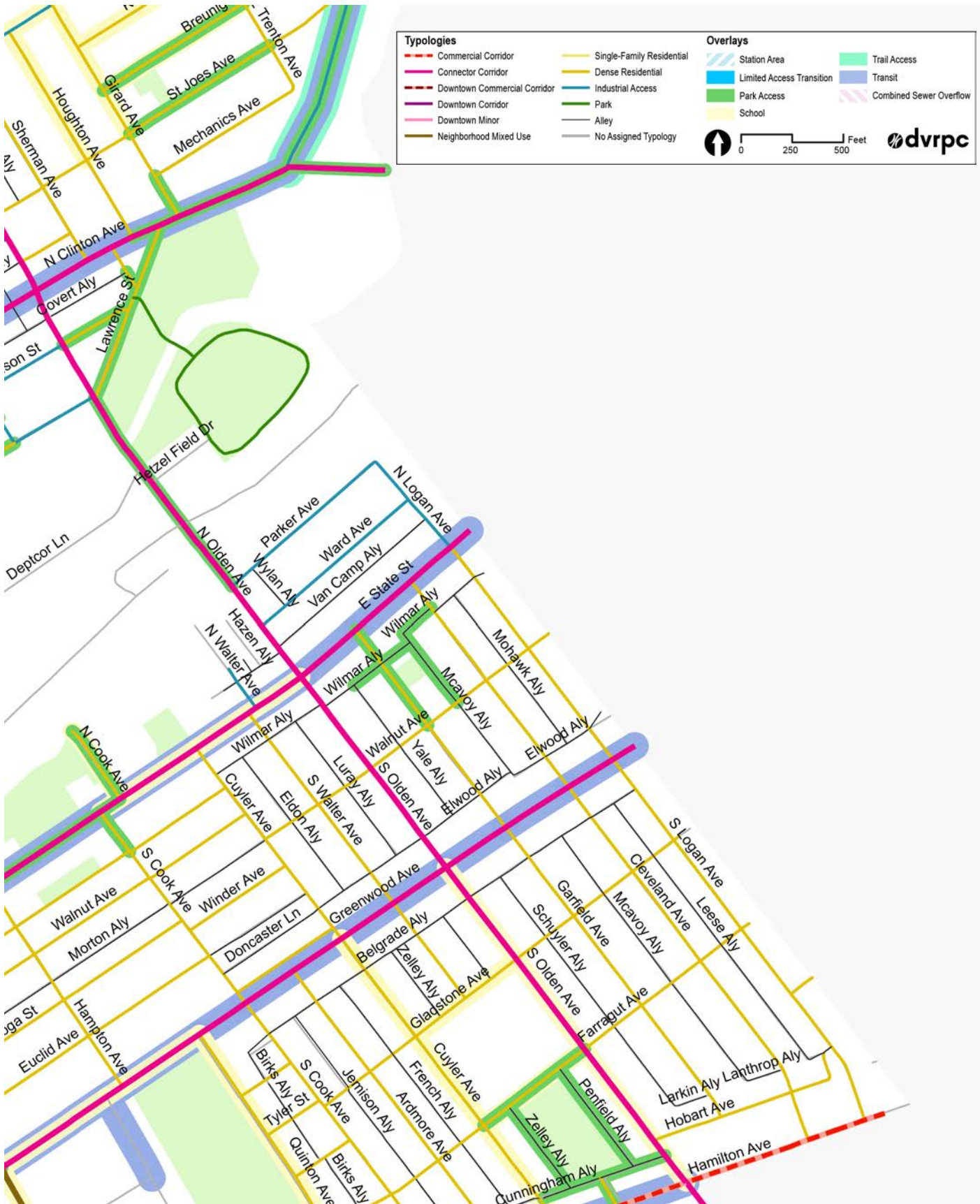


Figure 117 Combined typology and overlay map 11

Source: DVRPC, 2021

D: TYPOLOGY AND OVERLAY MAPS

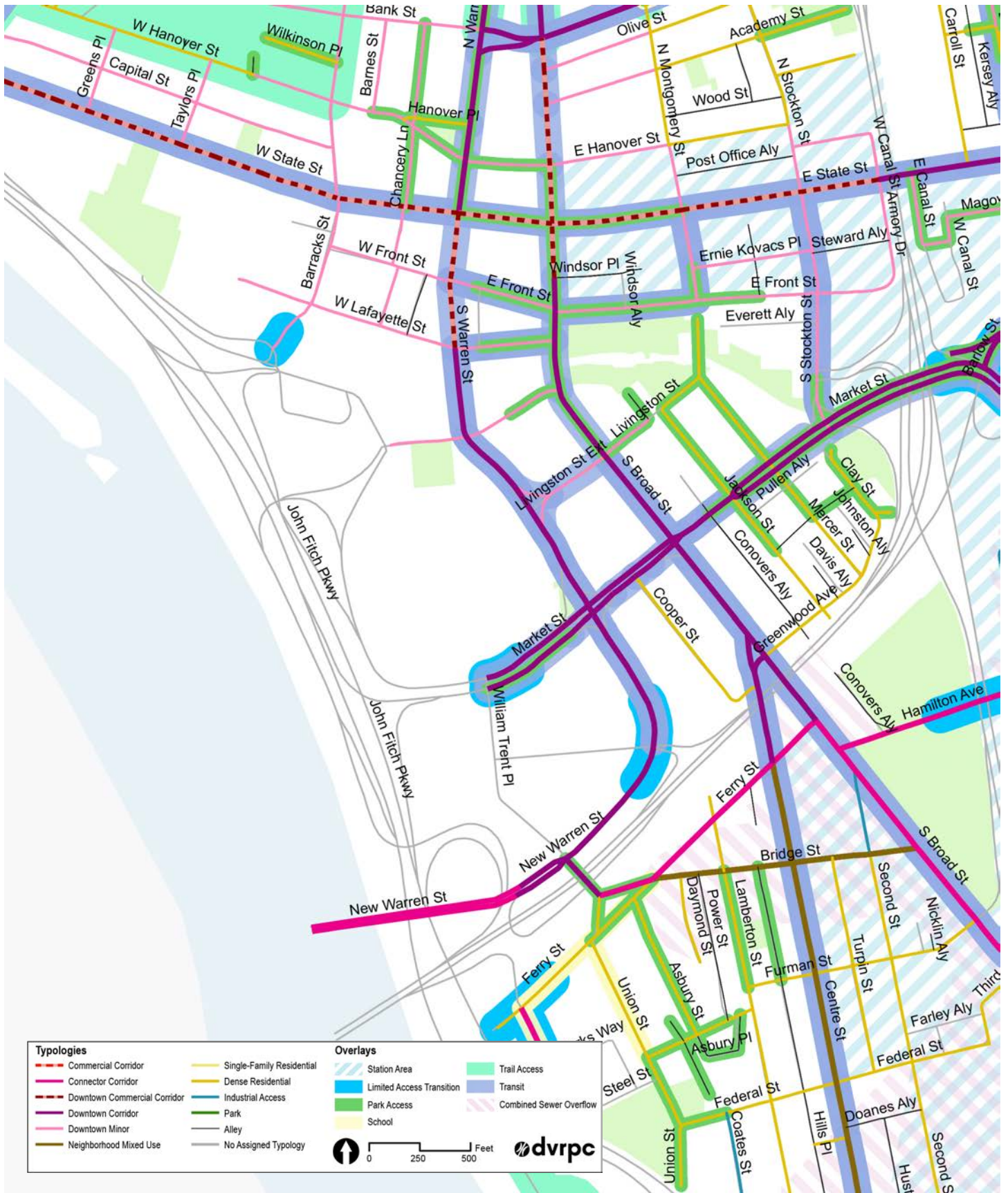


Figure 118 Combined typology and overlay map 12

Source: DVRPC, 2021

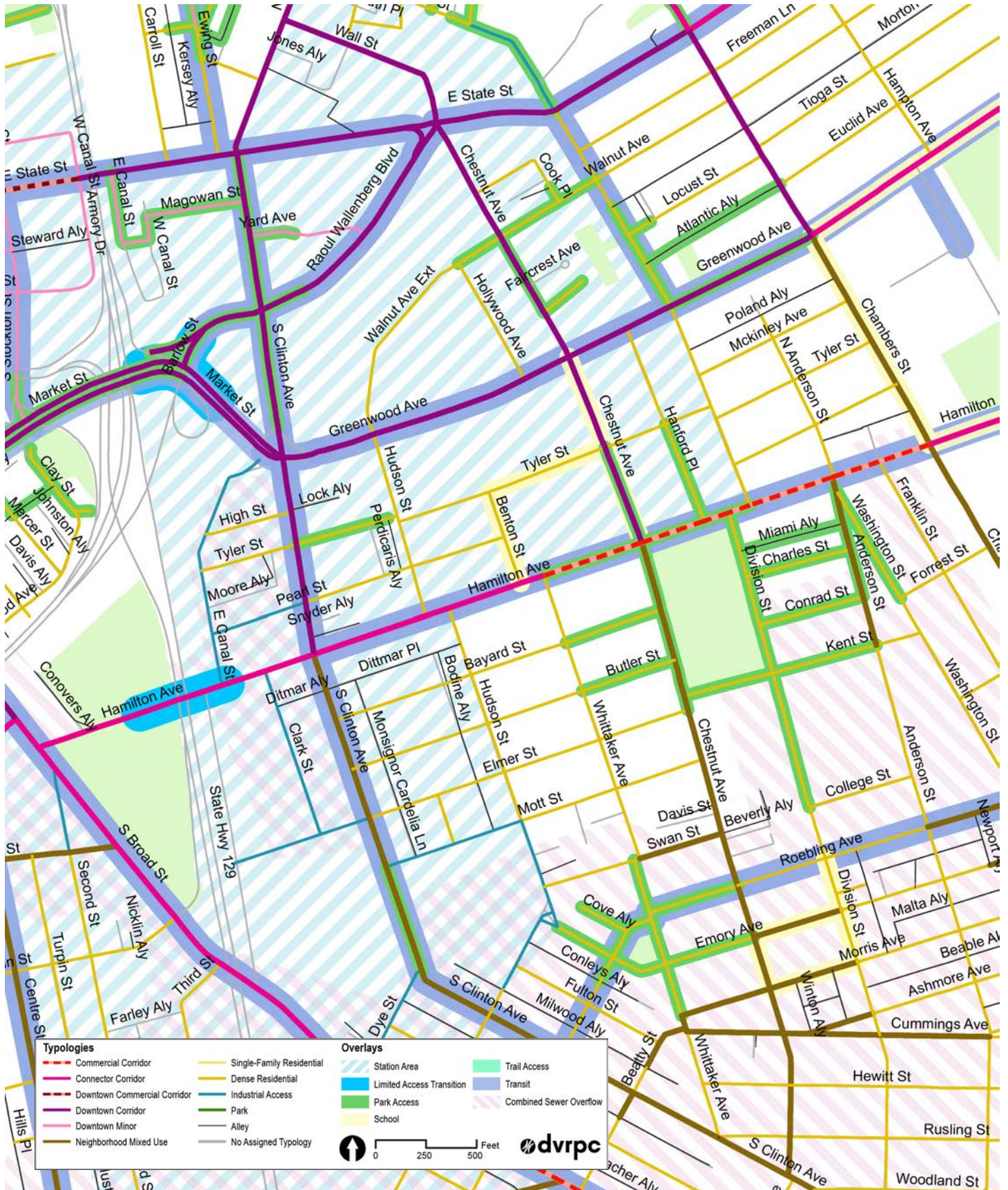


Figure 119 Combined typology and overlay map 13

Source: DVRPC, 2021

D: TYPOLOGY AND OVERLAY MAPS

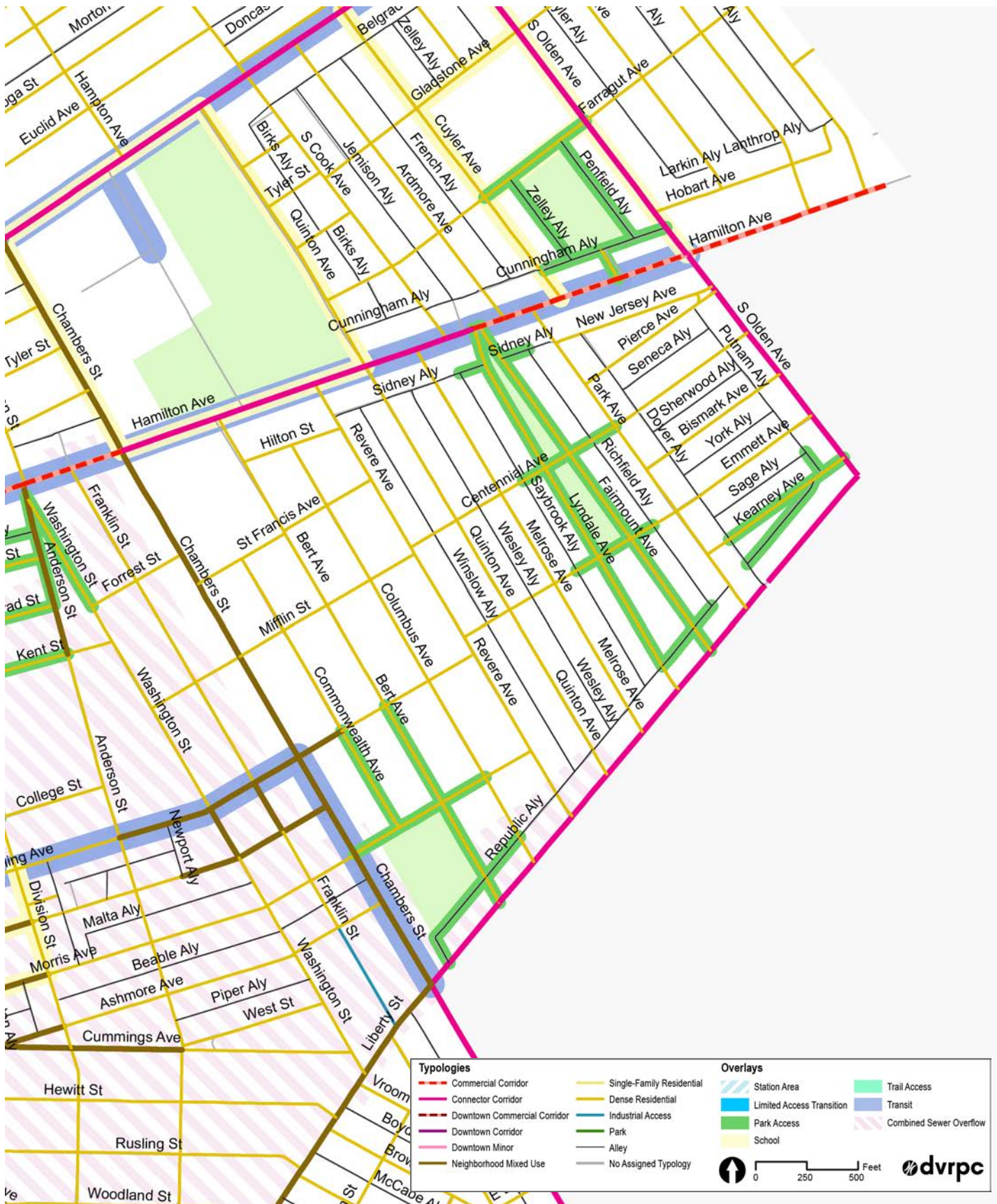


Figure 120 Combined typology and overlay map 14

Source: DVRPC, 2021

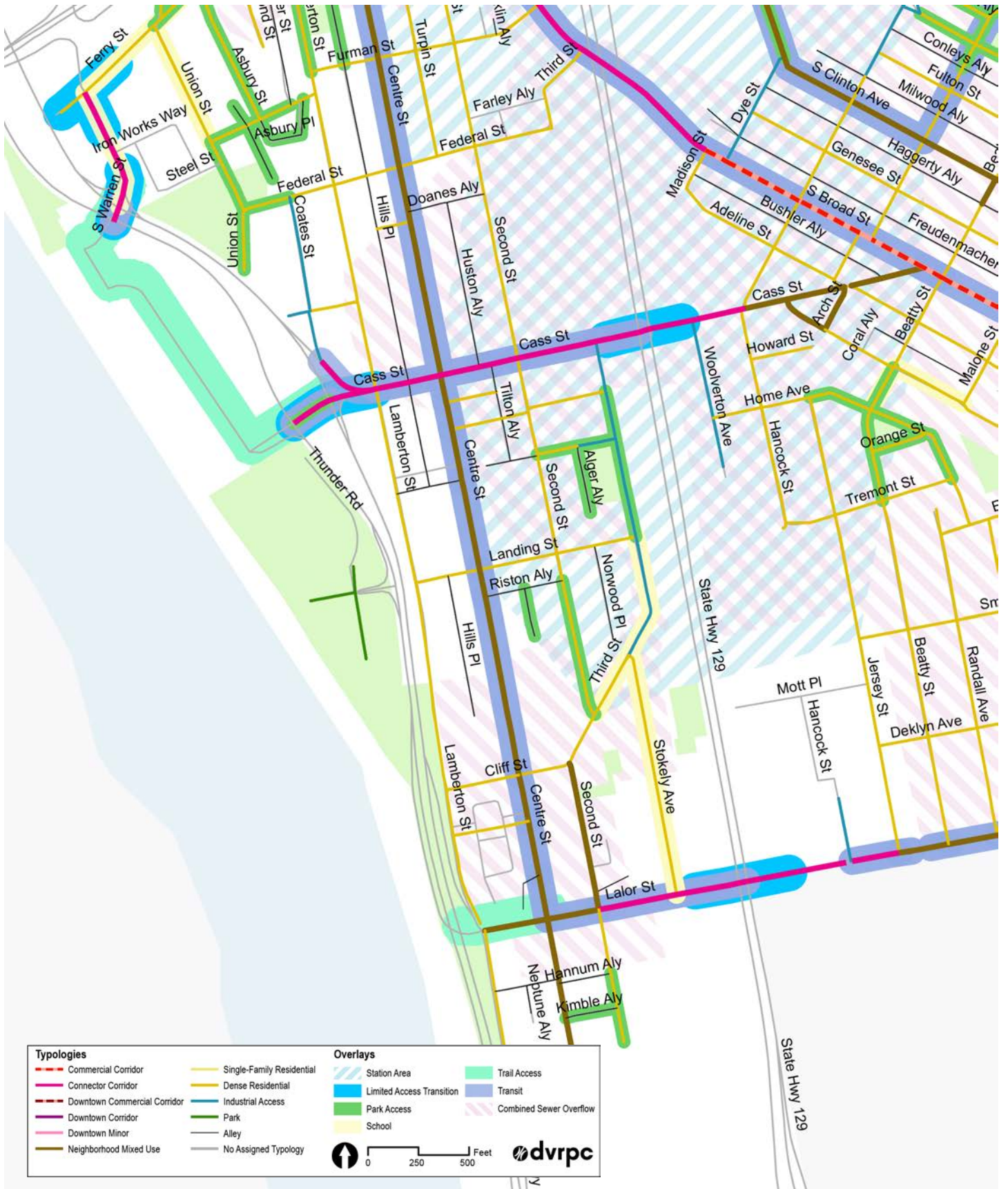


Figure 121 Combined typology and overlay map 15

Source: DVRPC, 2021

D: TYPOLOGY AND OVERLAY MAPS

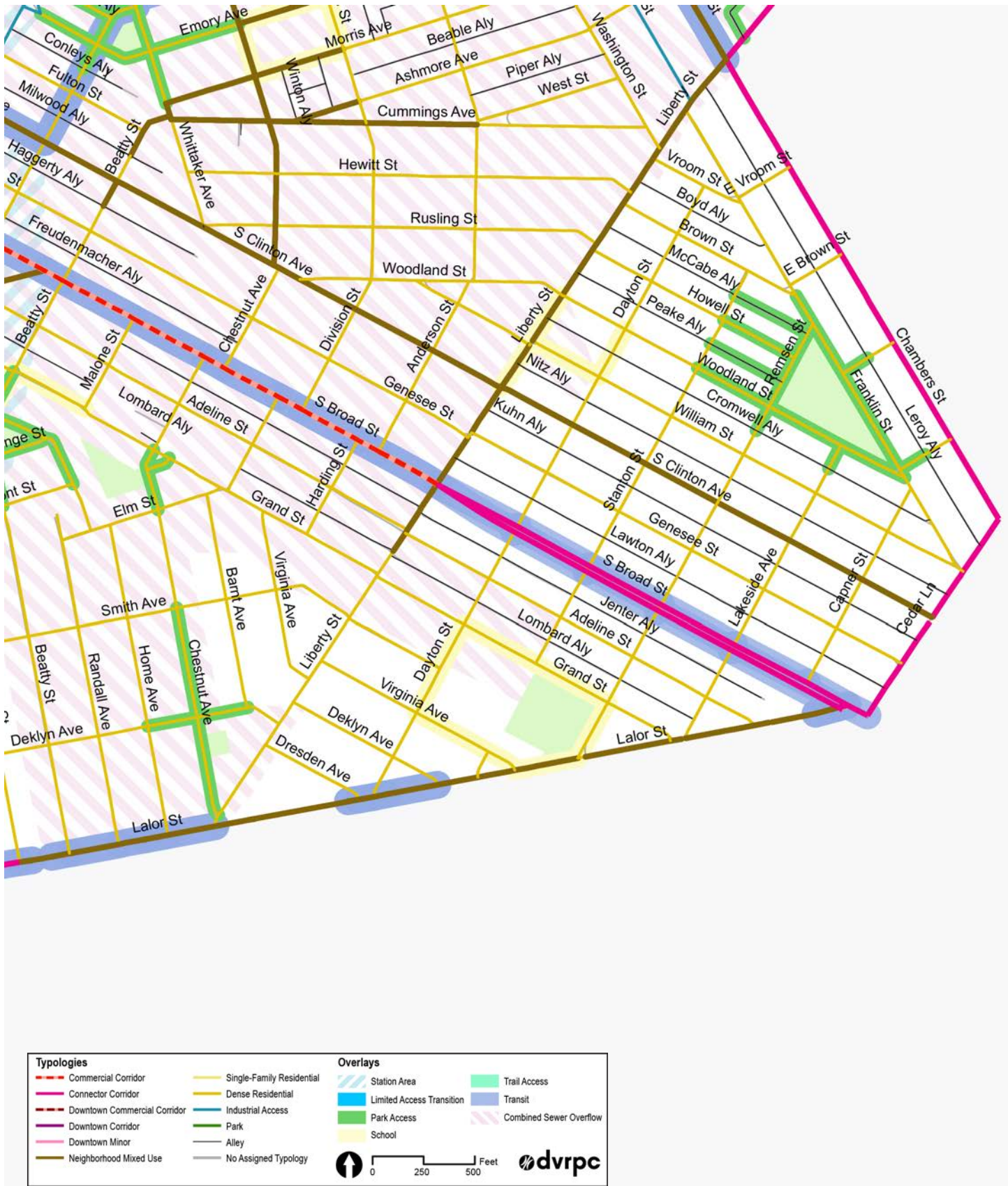


Figure 122 Combined typology and overlay map 16

Source: DVRPC, 2021

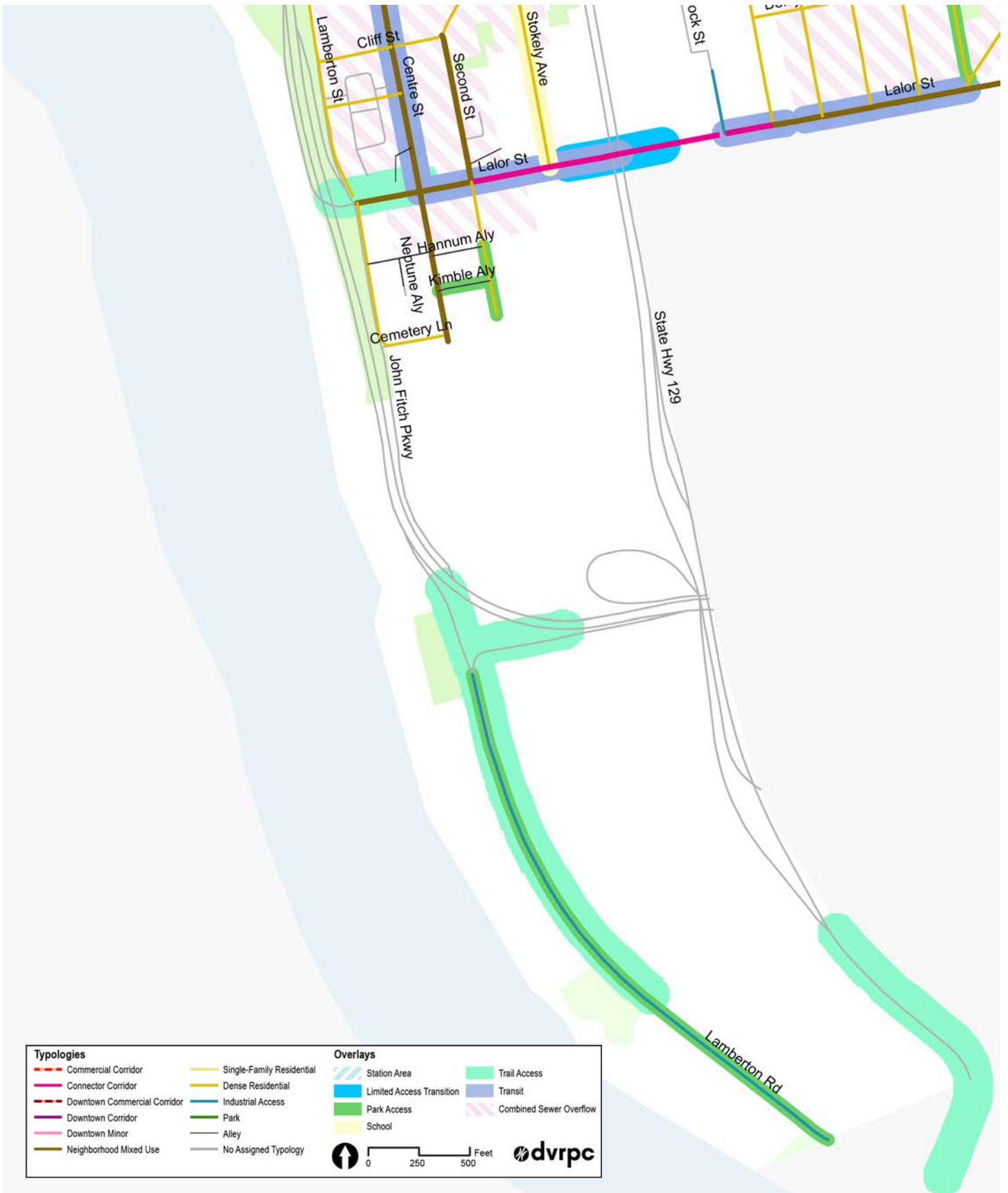


Figure 123 Combined typology and overlay map 17

Source: DVRPC, 2021

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ABSTRACT

The *Trenton Complete Streets Design Handbook* was created by the Delaware Valley Regional Planning Commission in collaboration with the City of Trenton, Mercer County, NJDOT, and additional community stakeholders. The handbook proposes a series of design treatments and overlays, along with implementation steps, to implement Complete Streets on a variety of different street typologies.

GEOGRAPHIC AREA COVERED

Trenton, New Jersey

KEY WORDS

Bicycle, Pedestrian, Trails, City of Trenton, Complete Streets

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