New Jersey School Zone Planning Guide

Best Practices for School Zones and Safe Routes to School







U.S. Department of Transportation
Federal Highway Administration

October 2026

New Jersey School Zone Planning Guide

Prepared for:
The New Jersey
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Disclaimer

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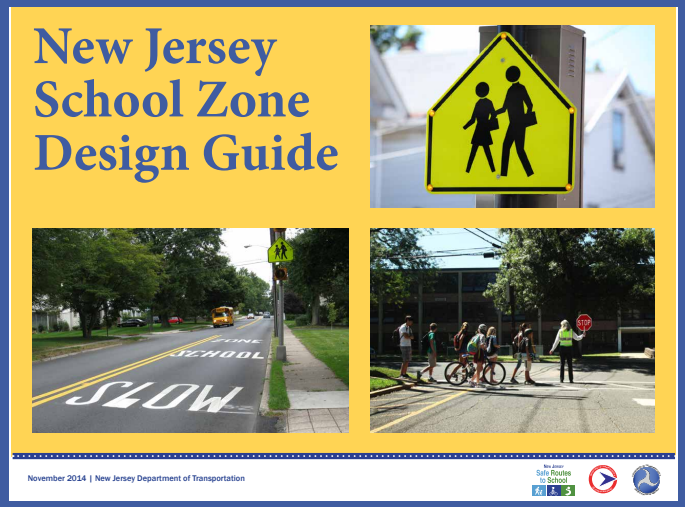
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EXECUTIVE SUMMARY

This updated New Jersey School Zone Planning Guide provides a comprehensive one-stop resource for school zone planning, roadway design, and community engagement. It captures significant changes and innovations since the original publication in 2014. The Guide's purpose remains the same: to support safer and more accessible travel for students whether they walk, ride a bicycle, use mobility devices, take transit or a school bus, or commute by car.

While roadway safety has always been part of the New Jersey Department of Transportation (NJDOT)'s core mission, the adoption of Target Zero in 2024 established a renewed commitment and a new metric for measuring progress towards the goal of eliminating traffic fatalities and serious injuries on New Jersey roads. School zones warrant particular attention within the Target Zero framework because they concentrate children, some of the most vulnerable road users, during predictable but operationally complex arrival and dismissal periods. The New Jersey School Zone Planning Guide presents strategies and solutions based on the most recent innovations, performance data, and regulatory changes. Implementing improvements and innovations will require coordination among school districts, municipalities, counties, the state, and the public to address safety both on school property and along the routes students travel to and from school.



2014 New Jersey School Zone Design Guide

The national Safe Routes to School context has also changed. In 2014, federal Safe Routes to School activities were limited to students in kindergarten through eighth grade; eligibility has since expanded to include students through grade 12. An update is needed to address the differing travel patterns, independence, trip distances, multimodal needs, and roadway contexts associated with middle and high school students, in addition to those of elementary school students.

Finally, the professional reference framework available to planners and engineers has evolved. The current Manual on Uniform Traffic Control Devices (MUTCD) includes new and revised national standards for traffic-control devices on public streets and highways, including devices used in school zones. Updated Accessible Design Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) also reinforce the need to provide routes and crossings that are usable by people with disabilities. And a growing library of guidance from organizations such as AASHTO and NACTO provides new and updated data-driven, context-sensitive tools to improve roadway safety for people of all ages and abilities.

Purpose and Intended Use

This Guide is intended to serve as a statewide resource that supports informed, context-sensitive decision-making; it is not a one-size-fits-all design standard. Although much of the Guide focuses on engineering measures, it also provides non-engineering guidance and holistic recommendations related to community engagement, maintenance, operations, accessibility, and inclusive design.

The Guide is intended for a broad audience, including school districts, school staff, parents and caregivers, advocacy groups, law-enforcement and public-health officials, and other community partners. It also serves as a resource for municipal and county engineers, planners, public works staff, and other practitioners responsible for planning, designing, operating, and maintaining the transportation environment around schools.

However, note that this Guide does not constitute a standard, specification, or regulation, nor is it intended to be a comprehensive reference for every aspect of student roadway safety. Inclusion of a measure in this Guide does not, by itself, justify its use at a particular location. Selection and application of treatments must be based on site-specific conditions, applicable laws and standards, and professional engineering judgment.

Scope of the School Zone Planning Guide

The Guide addresses school travel as a connected system extending from school grounds to surrounding streets. It combines policy, planning, design, operational, and implementation guidance to help make school travel safer, more accessible, and more supportive of active and multimodal transportation.

The Guide begins with the benefits of active travel and an overview of New Jersey's Safe Routes to School Program. It establishes a foundation in universal and inclusive design, provides school zone definitions, discusses school-route planning, and summarizes relevant laws and regulations. Following that is specific guidance on traffic-control devices, crossing guards, gap analyses, crossing treatments, pedestrian and bicycle facilities, traffic calming, and speed management.

The Guide also addresses issues that have become increasingly important in planning for student travel:

- Use of personal micromobility devices
- Conditions and needs associated with high schools under the expanded Safe Routes to School program
- Recommendations for school siting and site design
- Railroad crossings and highway interchanges near schools
- Maintenance considerations

The Guide concludes with an implementation-oriented framework for assessing existing conditions, identifying gaps, building partnerships, and advancing improvements.

What's New in This Edition

The revised Guide incorporates significant changes in transportation safety policy, national standards, professional design guidance, and student travel practices. It aligns school zone planning and design with NJDOT's Target Zero initiative and incorporates Safe System principles, which emphasize preventing fatal and serious-injury crashes through safer roadway design, safer speeds, and protections for vulnerable roadway users.

The Guide also updates its technical references to reflect current national standards and professional guidance. These include the 2023 Manual on Uniform Traffic Control Devices (MUTCD), the 2024 American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, and the 2021 AASHTO Guide for the Development of Pedestrian Facilities. These resources, among others, inform the school zone treatments and designs presented in the Guide.

Three new chapters expand the Guide's scope to address issues that were not included in the previous edition:

- Chapter 2, "Students, Caregivers, and Community Members," introduces universal-design principles to help ensure that school zones are safe, accessible, and functional for all users.
- Chapter 10, "Students and Micromobility," discusses student travel via e-mobility devices and presents best practices for riding, storing, and safely using such devices within New Jersey's legal framework.
- Chapter 11, "School Zones and Student Drivers," recognizes that older students may have different needs, levels of independence, and abilities than traditional Safe Routes to School groups, and provides guidance for designing school zones responsive to those conditions.

SUMMARY OF MAJOR CHANGES

- Aligns the Guide with NJDOT's **Target Zero** initiative and incorporates the **Safe System Approach.**
- Updates technical references from the 2009 MUTCD to the 2023 MUTCD; the 2012 AASHTO Bicycle Guide to the 2024 edition; and the 2004 AASHTO Pedestrian Guide to the 2021 edition.
- Adds a **universal-design chapter** focused on school zones that are safe, accessible, and functional for all users (Chapter 2: Students, Caregivers, and Community Members)
- Adds a **student-micromobility chapter** addressing New Jersey's regulatory framework and safer riding, storage, and use practices. (Chapter 10: Students & Micromobility)
- Adds a **high-school chapter** addressing the distinct travel patterns, independence, abilities, and travel modes of older students. (Chapter 11: School Zones and Student Drivers)

Table of Contents

1	**Introduction and Overview**	Page 1	Includes a discussion on the benefits of walking and bicycling to school and an overview of the NJ SRTS Program.
2	**Students, Caregivers, and Community Members**	Page 11	Presents universal design principles that ensure school zones are safe, accessible, and functional for all users, including students, families, and the broader community.
3	**What Is a School Zone?**	Page 31	Covers the definition of a school zone and includes a discussion of the statutes and laws related to pedestrians, bicyclists, and school area safety.
4	**MUTCD Traffic Controls for School Zones**	Page 51	Sets forth standards and guidance for the use of school zone signage, pavement markings, and related devices.
5	**Determining Placement of Crossing Guards**	Page 64	Provides guidance on how to identify the locations where crossing guards are needed.
6	**Crossing the Street**	Page 78	Focuses on intersection and midblock crossing improvements.
7	**Along the Street**	Page 89	Focuses on the streetscape elements that enhance the pedestrian and bicyclist environment including sidewalks and bikeways that facilitate travel along the street.
8	**Traffic Calming**	Page 100	Highlights the engineering techniques that have been proven to be effective in reducing vehicle speeds and volumes.

9	**Students and Bicycling**	Page 128	Discusses some ways that bicycling to school can be encouraged and made safer.
10	**Students and Micromobility**	Page 149	Discusses current micromobility laws and best practices for student use.
11	**School Zones and Student Drivers**	Page 158	Focuses on student drivers and school zones, examining how student driving influences safety and traffic operations while discussing strategies and regulations that support safe travel to and from school.
12	**The School Site and School Grounds**	Page 167	Presents the key pedestrian and bicycle safety elements of locating a well-designed school site.
13	**Crime Prevention Through Environmental Design**	Page 179	Discusses the potential to reduce the dangers associated with walking and bicycling to school through the careful design and manipulation of the physical environment of the school site.
14	**Schools Near Railroad Crossings**	Page 187	Focuses on the unique concerns related to students crossing railroads on their way to and from school.
15	**Schools Near Highway Ramps**	Page 196	Discusses the dangers pedestrians and bicyclists face crossing ramps and design solutions to improve visibility, reduce vehicular speeds and reduce pedestrian and bicyclist exposure.
16	**Maintenance and Other Improvements**	Page 201	Includes a discussion of maintenance issues and provides examples of prioritization of school zones for municipal snow shoveling.
17	**How to Start Improving Your School Zone**	Page 211	Includes a discussion of the steps needed to improve the conditions for students walking and bicycling to school.

Note: References to statutes, regulations, standards, and guidance documents are current as of October 2026. Cited laws, regulations, and technical guidance in this Guide should be verified before application.

01 Introduction and Overview

The NJ School Zone Planning Guide provides guidance for the community of people, government and schools involved in the effort to enable and encourage children, including those with disabilities, to walk and bicycle to school.

Purpose of the New Jersey School Zone Planning Guide

This Guide is intended to be used as a resource for school boards, school administration, police, parents and engineers to advance the goals of the NJ Safe Routes to School (SRTS) Program.

The focus of the School Zone Planning Guide is on engineering measures that can be utilized to make the environment to, from, and around schools a place where students, their parents and caregivers feel safe and want to walk and bicycle. Engineering measures include physical improvements to the transportation infrastructure in the vicinity of the school and on school property. These improvements are intended to improve access and safety for travel by walking and bicycling and to minimize conflicts with motorized traffic. They are typically designed to address specific problems or needs that have been identified and can range from simple sidewalk replacement/ repair to more complex traffic-calming devices, such as roundabouts or speed humps. Additionally, there is some programmatic guidance in the Planning Guide.

The Planning Guide is based on:

- NJDOT Complete Streets Design Guide
- NJDOT Roadway Design Manual
- The Federal Highway Administration's (FHWA) 2023 Manual on Uniform Traffic Control Devices (MUTCD),
- The American Association of State Highway and Transportation Officials (AASHTO) 2024 Guide for the Development of Bicycle Facilities
- 2021 AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities
- National Center for Safe Routes to School Online Guide
- The National Center for Safe Routes to School and the Institute of Transportation Engineers (ITE) SRTS Briefing Sheets
- The Target Zero strategy and the Safe System Approach

SAFE ROUTES TO SCHOOL (SRTS) PROGRAM MISSION

The NJ Safe Routes to School (SRTS) Mission is to partner with schools and communities to prioritize and implement opportunities for people to walk, bike or travel by other wheeled devices. By focusing on improvements to support active travel by youth, we believe we can create conditions that are safe, healthy, equitable, and appealing for all. [1]



Students walking to school in Woodbridge, NJ. Image: VTC

[1] About New Jersey's Safe Routes to School Program, https://www.saferoutesnj.org/about-safe-routes-to-school/

Health, Safety, and Transportation

Building an environment that supports children's ability to walk or bicycle to school safely achieves a wide range of benefits for students, the school, and the community. These benefits include reduced traffic in the vicinity of schools, improved air quality, creation of safer, calmer streets and neighborhoods, and increased physical activity among students and families, contributing to healthier lifestyles.

Today, fewer children are walking and bicycling to school, and more children are at risk of becoming overweight and obese compared to children 30 years ago. The U.S. Department of Health and Human Services recommends that children engage in 60 minutes or more of physical activity each day and that the bulk of this physical activity comes through aerobic exercise. By walking or bicycling to school, children can easily incorporate exercise into their day and increase their overall physical activity. Children who walk one mile to and from school each day get approximately two-thirds of the recommended level of 60 minutes of physical activity a day. Plus, research shows that children who walk to school have higher levels of physical activity throughout the day and are more likely to get the full 60 minutes of activity in a day.

Many children do not currently walk or bike to school due to safety concerns. This guide is intended to assist communities in identifying and developing solutions to those safety concerns. Proper design and focus on the school zone through the SRTS Program can lead to a decrease in the number of pediatric pedestrian injuries for school-aged children.

[1] The Five (5) Es include: Engineering, Education, Enforcement, Encouragement, and Evaluation.

In New Jersey, the SRTS Program was centered around a comprehensive 5Es[1] approach in the past. Since 2020, SRTS has continued to value and incorporate the 5Es program while expanding to embrace the SAFE framework. The SAFE framework represents Sustainable, Accessible, Fair, and Engaging. The new framework expands the concept of "safe." The SAFE framework not only helps students bike or walk to school safely but also ensures that designated routes are supported by all affected constituencies. The program aims to create an inclusive and fair environment for all while building meaningful community connections.

Walking and bicycling are important to New Jersey because they...



Image: New Jersey Bicycle & Pedestrian Master Plan (2016)

NJ Safe Routes To School (SRTS) Overview

History of the NJ SRTS Program[1]

In 2003, the New Jersey Department of Transportation's Office of Bicycle and Pedestrian Programs utilized on-call consultant support and a statewide Technical Advisory Committee to develop a SRTS Program. In 2004, NJDOT launched a series of SRTS pilot demonstration programs in varied community settings around the state. At the same time, the Department initiated the Safe Streets to School Program and in 2006, awarded approximately $5 million in state funds to 60 infrastructure projects to improve safety around schools.

Safe Routes to School was established as a federal program under the Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) in 2005. The NJDOT designated a full-time SRTS Coordinator, developed its first SRTS Strategic Plan, and initiated a competitive grant Program to fund local and statewide engineering, enforcement, education, and encouragement projects to enable elementary school students to walk and bike to school safely.

In 2012, Congress passed a new transportation bill: Moving Ahead for Progress in the 21st Century (MAP-21). Under this legislation, SRTS has been combined with two other programs (Transportation Enhancements and Recreational Trails) under the Transportation Alternatives Program.

NJDOT has elected to continue SRTS as a standalone federal-aid program. It is currently administered by the NJDOT, in partnership with the North Jersey Transportation Planning Authority (NJTPA), the Delaware Valley Regional Planning Commission (DVRPC) and the South Jersey Transportation Planning Organization (SJTPO).

As of October 2014, NJDOT had awarded more than $19 million in federal SRTS funds to 129 projects at 212 schools in 98 communities across New Jersey. Another $5 million supported these local projects with statewide programs.

In 2015, the Fixing America's Surface Transportation (FAST) act, maintained the Transportation Alternatives structure and continued eligibility for SRTS projects.

In 2021, the Infrastructure Investment and Jobs Act (IIJA) codified the SRTS Program in the U.S. Code and expanded eligibility for projects to include high school students (grades K-12), whereas the prior program only covered grades K-8.

In 2024, NJDOT announced $21.1 million for 23 grants under the Safe Routes to School (SRTS) program. The Department also announced the SRTS Design Assistance Program, which makes consultant engineering services available to assist Local Public Agencies (LPAs) with the development of plans, specifications, and estimates (PS&E) for their SRTS projects.

[1] NJDOT Safe Routes to School Programs. https://www.nj.gov/transportation/community/srts/programs.shtm

NJ Safe Routes To School Program Timeline

2004 — SRTS pilot demonstration programs launched in New Jersey.

2005 — Safe Routes to School was established as a federal program under the Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) in 2005.

2006 — About $5 million awarded to fund 60 infrastructure projects to improve safety around schools in New Jersey.

2012 — Moving Ahead for Progress in the 21st Century (MAP-21) bill passed. NJDOT elected to continue SRTS as a standalone federal-aid program under the Transportation Alternatives Program (TAP).

2014 — Awarded $19 million in federal SRTS funds to 129 projects at 212 schools in 98 communities across New Jersey.

2015 — Safe Routes to School remains eligible across federal transportation programs.

2021 — The Infrastructure Investment and Jobs Act (IIJA) codified the SRTS Program in the U.S. Code and expanded eligibility for projects to include grades K-12.

2024 — NJDOT announced $21.1 million for 23 grants under the Safe Routes to School (SRTS) program.

WHY IMPROVE WALKING AND BICYCLING ROUTES TO AND FROM SCHOOL?

- Improvements provide a safer environment for the whole community — 24 hours a day, not just before and after school.
- Walking and bicycling to school reduces the amount of greenhouse gas emissions released as it reduces the number of students that are driven to school.
- Over time, bicycle and pedestrian improvements can save tax dollars.
- Walking and bicycling are fun, healthy, non-polluting, friendly, educational, and economical!



A Walking Shuttle in Livingston, NJ.

How does the NJ SRTS Program work today?

The overall SRTS Program is overseen by the SRTS Coordinator in the NJDOT's Bureau of Safety Improvement Programs (BSIP). The SRTS Coordinator is responsible for monitoring all aspects of the program. This includes managing the non-infrastructure program, participating in the SRTS infrastructure grant program solicitation and selection process and helping to ensure that state and federal requirements are met. The federally funded SRTS grant program is administered by NJDOT's Division of Local Aid and Economic Development. It is operated as a competitive grant program in which proposals from applicants to develop and implement infrastructure projects are solicited and evaluated.

The Alan M. Voorhees Transportation Center (VTC), working closely with NJDOT, operates the NJ Safe Routes Resource Center (NJSRRC) which provides services, training, coordination, and technical assistance directly to regional planning organizations, schools and school districts, and local and regional governments.

In 2011, NJDOT implemented the New Jersey Safe Routes to School Non-Infrastructure Technical Assistance Program. This program is a cooperative venture involving New Jersey's eight Transportation Management Associations (TMAs), the NJSRRC, and NJDOT. NJDOT provides federal funding, program administration and oversight; the NJSRRC provides services, training, evaluation, and technical assistance to all eight NJ TMAs.

As the primary point of contact for the SRTS Program in their service areas, SRTS Regional Coordinators at each TMA work directly with schools, local governments, and community organizations to advance walking and bicycling initiatives. TMAs provide educational programming, planning assistance, and technical support, including assistance with School Travel Plans. They also coordinate a variety of non-infrastructure activities and events, such as pedestrian safety assemblies, bicycle rodeos, walking school buses, and Walk and Bike to School Day celebrations, helping communities create safer and more accessible routes for students.

As part of this program, all New Jersey municipalities and K-12 schools are eligible to receive free, non-construction related services. TMAs are also charged with prioritizing disadvantaged communities in their outreach efforts to allow for an equitable distribution of services.

RESOURCES

NJ Safe Routes to School Program
Telephone: 609-649-9395
Website: https://njdotlocalhub.nj.gov/local-aid-econ-dev/grant-programs/federal-programs/safe-routes-to-school/

New Jersey Safe Routes Resource Center
Telephone: 848-932-7901
Email: srts@ejb.rutgers.edu
Website: www.saferoutesnj.org

The National Center for SRTS
Website: www.saferoutesinfo.org/

Safe Routes Partnership
Website: https://saferoutespartnership.org/

The Official Web Site of International Walk to School
Website: www.iwalktoschool.org/

Walk, Bike & Roll to School
Website: www.walkbiketoschool.org/

Centers for Disease Control and Prevention (CDC) Kids Walk to School
Website: https://stacks.cdc.gov/view/cdc/11316

Which New Jersey Transportation Management Associations (TMAs) Are Responsible for School Zone Improvements?

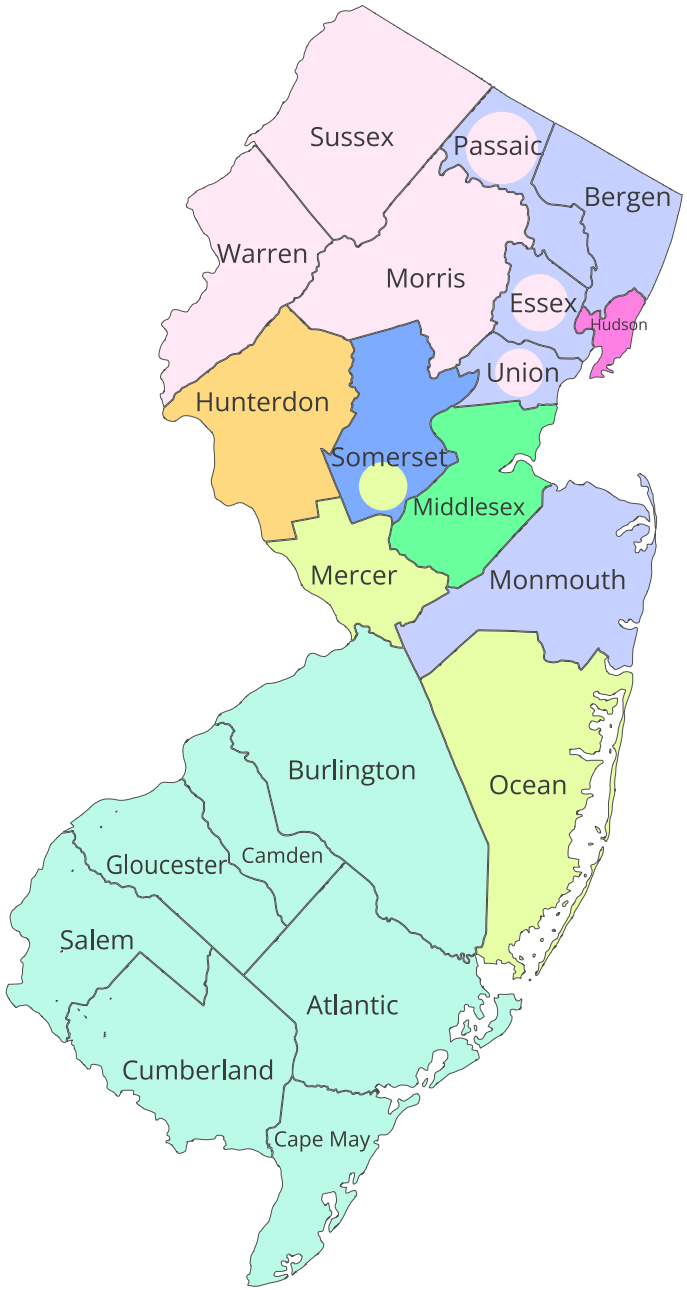
Avenues in Motion
Phone: (973) 267-7600
https://avenuesinmotion.org/

goHunterdon
(908) 788-5553
https://gohunterdon.org/

RideWise
(908) 704-1011
https://ridewise.org/

Greater Mercer TMA
(609) 452-1491
https://gmtma.org/

Cross County Connection TMA
(856) 596-8228
https://www.driveless.com/



EZ Ride
(201) 939-4242
https://ezride.org/

Hudson TMA
(201) 324-6222
https://hudsontma.org/

Keep Middlesex Moving
(732) 745-4465
https://kmm.org/

Note that Passaic County, Essex County, Union County, and Somerset County are served by two Transportation Management Associations (TMAs). Visit Find your Safe Routes to School Coordinator for detailed information.

Which Jurisdiction is Responsible for Improving School Zones?

This section identifies which governing body controls and has the ability to improve school property and the areas around the school property. It distinguishes between control of school property, control of the lands and properties around the school property, and the roads leading to and surrounding school property. Additionally, it speaks to private property in the area near the school zone.

Note, this section does not detail administration or rule setting for schools, rather, this section discusses the responsibilities of different levels of government in regard to the control of land and transportation in and around the school.

Introduction: The United States of America is a federal system, meaning that power is shared between the federal government and state governments[1]. Government is further divided at the state level. In New Jersey, there is the state government, county governments, local governments, and school districts. School districts are a distinct jurisdiction that are often, but not always, coterminous with the municipality in which they reside[2].

For the purposes of this Guide, it is important to make the distinction as to which level of government has control, and the ability to improve, a part of the School Zone or areas proximate to the School Zone.



School District



Municipal



County



State



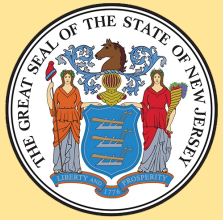
Federal

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1. Constitution Annotated: Analysis and Interpretation of the U.S. Constitution provided by the United States Congressional website (constitution.congress.gov). See Intro. 7.3 Federalism and the Constitution. Accessed on February 10, 2026.
2. See N.J.S.A. §18A:8-1 and N.J.S.A. §18A:13-34 (et seq). Accessed on February 9, 2026 via https://lis.njleg.state.nj.us/



Great Seal of the United States of America.
Image: National Museum of American Diplomacy



Great Seal of New Jersey Image: www.nj.gov

Five (5) Levels of Government: There are five (5) levels of government that are relevant to school zones and the surrounding area: school district, municipal, county, state, and federal.

School District

The **school district** controls the school grounds within the district. The school district and Board of Education are the primary stewards for improvements to the school grounds. School districts do not have control over public roads.

The logo for Lower Township School District. Image: Lower Township School District.

Municipal

The **municipality** controls and regulates land within its municipal boundaries. It is responsible for improvements within the right-of-way of locally controlled roads. For improvements to land in the municipality that is locally controlled, the municipality and its governing body are responsible for improvements.



Somerville High School in Somerville, NJ is located on local roads.

County

Schools are often located along **county** roads. In these instances, the road and right-of-way are controlled by the county, and improvements to them are the responsibility of the county-level governing body.



Walter F. Robinson School in Bayonne, NJ has frontage on John F. Kennedy Boulevard, a county road in Hudson County, and on West 31st Street, a local road controlled by the City of Bayonne. Image: www.homes.com

State

Schools are often located along, or near **state** roads. In these instances, the road and right-of-way are controlled and maintained by the state, and improvements to them are the responsibility of the New Jersey Department of Transportation (NJDOT).



Montague Township School in Montague, NJ is located on Route 206, a state road. Image: Nearmap, dated October 1, 2025.

Federal

The **federal government** controls federal properties, such as military bases, that may reside within a school district. The school district, municipality, county, and state do not control these facilities, even when within their geographic boundaries.



Joint Base McGuire-Dix-Lakehurst is a military base that spans Burlington and Ocean counties and is located within portions of eight (8) municipalities. Image: U.S. Army.

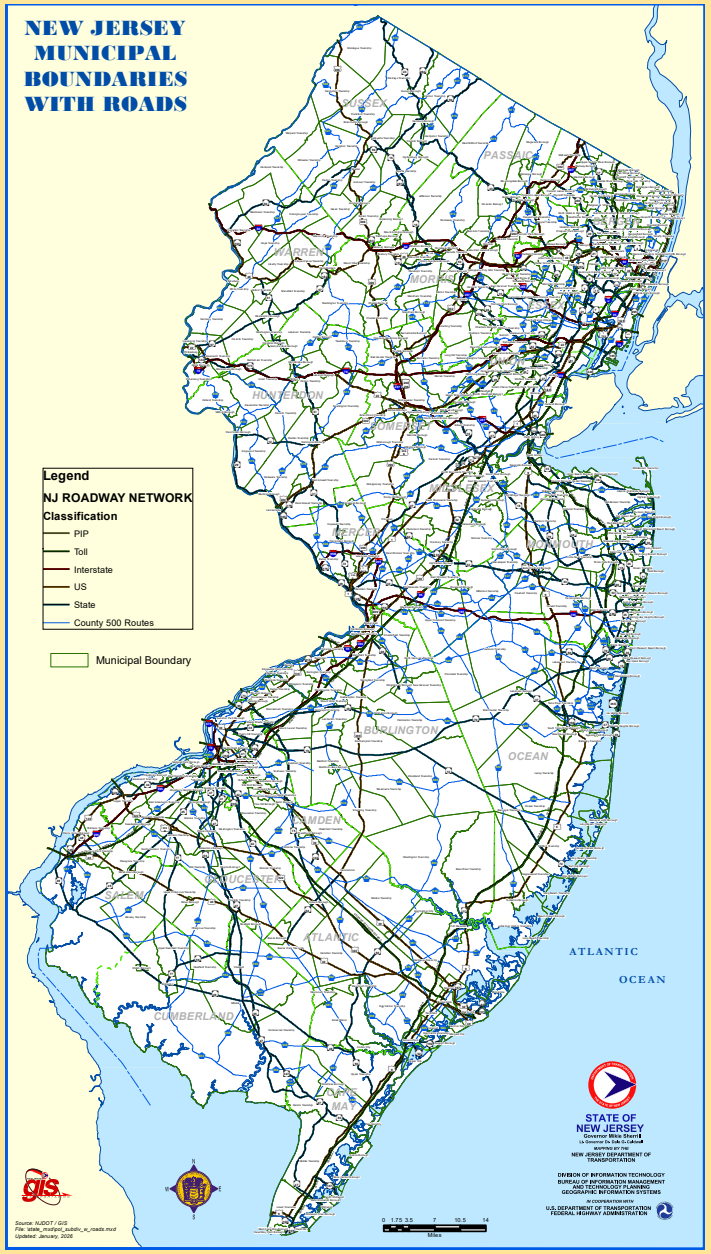
Road Jurisdiction: For the purposes of this guide, jurisdiction over roadways adjacent to the school grounds or proximate to the school grounds is critically important. For engaged stakeholders and members of the community that want to advocate or facilitate safety improvements, it is important to understand the jurisdiction of the road or roads that need improvement:

- Locally controlled roads are under municipal jurisdiction. Improvements go through the local governing body;
- County-controlled roads are under county jurisdiction. Improvements go through the governing body of the county;
- State roads are under state jurisdiction. Improvements go through the NJDOT.

Often, jurisdiction is complex, as different parts of the same road network may be controlled by different agencies or levels of government and school properties may have frontages abutting different roads under different jurisdiction. It is critical that all relevant stakeholders cooperate to make improvements. This includes representatives from the school district, municipality, county, and state, and where necessary the federal government, working together to improve roadways and routes near and adjacent to school zones to improve the safety and comfort of all routes to and from school zones.

Private vs. Public Property: It is important to distinguish between private and public property. Public property includes property owned by any of the levels of government discussed herein. Properties adjacent to, or proximate to, school zones are often privately owned. School districts do not have direct control over these properties, though these properties may impact commuting to and from school.

In some cases, the municipality may be able to regulate certain nuisances, or make improvements to mitigate nuisances, which may impact routes to school. In other instances, something seemingly benign, like a lawn sprinkler that activates during the time when students go to school and affects their walk to school, may not be controlled. In these instances, the school district may consider engaging in dialogue with neighboring property owners to resolve any conflict regarding commuting to and from school.



New Jersey Municipal Boundaries with Roads. Image: NJDOT

02 Students, Caregivers, and Community Members

Schools are unique community anchors that generate predictable surges of activity during arrival, dismissal, and after-hours events. These patterns create complex safety and mobility challenges that require thoughtful planning and design. Because students, caregivers, staff, and community members all use school zones differently, accessibility and inclusivity must be central to school zone planning principles. This chapter outlines the needs of each user group and offers guiding principles for creating school environments that are safe, accessible, and welcoming for all.

Introduction

Schools occupy a unique and powerful place in our communities. Unlike most other civic buildings, they generate predictable surges of activity, drawing high concentrations of students and caregivers during morning arrival and afternoon dismissal. These peak periods create complex transportation and safety dynamics that require careful planning and design. Schools also function far beyond the traditional school day. Evenings and weekends often bring athletic events, performances, community meetings, and other activities, reinforcing the role of schools as multi-purpose community hubs.

Designing safe and accessible school zones therefore requires a clear understanding of the diverse characteristics and needs of the people who use them. Students of different ages and abilities, caregivers, staff members, and community members accessing shared facilities all experience school environments differently. Effective planning and design of school zones must also account for people with disabilities and mobility differences, ensuring that accessibility is treated as a foundational principle.

This chapter provides an overview of the key characteristics and needs of each group, identifies where those needs converge and diverge, and outlines guiding principles to inform the planning and design of safe, accessible, and welcoming school environments for all.



Schools serve all members of the community. Haviland Avenue Elementary School in Audubon, NJ. Image: Cross County Connection TMA

Note: This chapter references a greater number of citations than other chapters in this guide. For readability purposes, citations are listed in an endnotes section, rather than through footnotes.

Key Characteristics

This section describes key characteristics of students, caregivers, school staff members, and community members that are important to consider when planning and designing school zones, focusing on differences between these groups. These characteristics are summarized on page 22.

What to know about students in general?

Have Different Physical and Cognitive Needs than Adults.
Despite our best efforts, we tend to see things through our own physical and cognitive lens. As a result, when adults plan and design school zones they sometimes overlook or misconstrue the needs of students. They differ in their physical development, cognitive processing, risk perception, and lived experience.

Have Diverse Needs, Abilities, and Travel Behaviors.
Students are a highly diverse group. A first grader has very different capabilities and needs than a sixth grader, and both differ significantly from a high school senior. Students with disabilities, including autism spectrum disorder, vision disabilities, or mobility impairments, may experience the built environment in ways that are distinct both from adults and from their non-disabled peers.

More susceptible than adults to mistakes that can lead to crashes.
Students of all ages are more susceptible than adults to mistakes that lead to crashes. At the elementary school level, students lack full awareness of traffic dangers and have trouble multitasking and navigating complex traffic situations. Students at this age tend to think in simple rules, e.g., "If the light is green, I'm safe."[1] They often struggle to accurately judge motor vehicle speeds and identify safe gaps in traffic.[2] In addition, they may have difficulty coordinating cognitive and motor skills.[3] For instance, a child riding a bicycle may focus on balancing or maintaining a straight line and lack the cognitive capacity to attend simultaneously to traffic hazards or to a stop sign. They may also have a narrower field of vision due to still-developing peripheral vision processing, which can result in not seeing vehicles approaching from the side.[4] Additionally, due to their shorter stature, students may have difficulty seeing over obstructions like parked cars and may not notice oncoming vehicles.



Students and caregivers walk to school in Collingswood School District

Middle and high school students have more experience with traffic situations and have outgrown some of the cognitive and physical limitations of younger students; however, they may still face developmental and experiential limitations that affect their safety in traffic. Compared to adults, they have less experience navigating roadways as pedestrians or bicyclists, and a less developed prefrontal cortex, which affects their ability to regulate impulses and make good decisions.[5] National and state data consistently show that teens experience higher per-capita pedestrian and cyclist crash rates than adults, underscoring their heightened exposure and vulnerability on the roadway.[6, 7]

More vulnerable to crash forces than young and middle-aged adults.
Due to their size, students are more vulnerable to crash forces and experience more severe injuries in the event of higher-speed crashes than young or middle-aged adults. Their growing bodies make them more susceptible to impacts from all types of injuries, and students and adolescents often develop post-traumatic stress disorder after a crash.[8,9,10,11]

May use school zone outside traditional arrival and dismissal periods.
Students of all grade levels may arrive or depart outside the times when traffic flows are highest around the school and crossing guards and school staff members are present to support safe access. For example, many elementary school students attend before- or after-care programs at school due to caregiver work schedules, and many middle and high school students participate in before- and after-school sports, clubs, and other activities.



School bus in Parsippany Hills High School, Morris Plains, NJ

Health and long-term development affected by street design.
When streets feel unsafe for walking, bicycling, or taking transit, caregivers are more likely to drive students to school and other activities. This pattern can reduce daily physical activity and, over time, contribute to broader public health concerns. The percentage of U.S. students and adolescents (2-19 years) has nearly quadrupled in the last 50 years and currently stands at nearly 20% of U.S. students and adolescents (2-19 years).[12]

In addition, the ability to travel independently to school can play an important role in helping students mature, build confidence, and develop a sense of personal agency. Independent mobility is important for all students, including those with disabilities.[13]

May use streets and sidewalks for play and socializing.
For students of all ages, streets are more than a way of getting from point A to point B. For younger students, especially in residential neighborhoods, they may serve as spaces for outdoor play. For adolescents, who are sometimes excluded from playgrounds and other youth-oriented spaces, they may serve as important social environments. [14]

What to know about elementary school students?

Smaller than older students and adults.

Elementary school students are physically smaller than older students and adults, which makes them harder for drivers to see, particularly near larger vehicles or in areas with limited sightlines. Their smaller stature also means they are more vulnerable in the event of a crash and more likely to sustain severe or fatal injuries.

Slower than older students and young and middle-aged adults.

Elementary school students have slower perception–reaction times and slower walking speeds than older students and adults when walking with a caregiver.[15, 16] Perception-reaction time is the amount of time it takes a person to detect and recognize a stimulus (such as a WALK signal or gap in traffic) and then begin a physical response (such as beginning to cross). Because this process takes longer for younger students, they take more time to determine when it is safe to cross and to initiate movement. After entering the roadway, their slower walking speeds mean they also require more time to reach the opposite side.



Livingston Ave road diet before and after at New Brunswick Ciclovia. Image: VTC



Kids playing in the street during temporary street closure at New Brunswick Ciclovia. Image: VTC

Less predictable than older students and adults.
Elementary school students can be less predictable than older students and adults because their ability to recognize traffic hazards and control impulses is still developing. For example, a child may impulsively run into the street to retrieve a ball without looking for cars, making it more difficult for drivers to anticipate their actions.

Usually travel with caregivers but beginning to build independence.
Most elementary school students travel to school under the supervision of a caregiver or other adults. At the same time, they are beginning to build independence. As students grow, they gradually gain more freedom, often first by walking or bicycling to school with caregivers. Some five- to eight-year-old students can cross streets and cycle in environments where motor vehicle traffic is very low speed or infrequent.[17]



Tatem Elementary School after school.

What to know about middle school students?

Larger than young students but not yet adult-sized.
Physically, middle school students are larger than younger elementary school-aged students but are still generally smaller than adults, which can affect their visibility to drivers, particularly near larger vehicles.

Faster than young students but walk more slowly in groups.
Middle school students tend to walk more quickly than younger students and have faster perception–reaction times.[18] However, they may move more slowly when traveling in groups, which is common at this age.[19]

More predictable in some respects than young students but still less predictable than adults.
Compared with younger students, middle-school-aged youth are more likely to have received traffic safety education and gained sufficient experience to demonstrate more adult-like and consistent road-crossing judgment and timing, which can make them more predictable as pedestrians in certain situations. However, because their executive function is still developing, they are more likely than adults to take risks. Middle school students may also contend with new distractions, such as cell phone use or socializing with peers on the way to school, which may result in less predictable behavior.[20,21]

More likely than young students to travel independently.
Compared to elementary school students, middle school youth are more likely to travel to school independently or in groups of peers by walking, bicycling, or public transit. They may also travel further to school due to the larger size of middle school attendance areas.



Students walk and bike home at Collingswood Middle School.

What to know about high school students?

Close to adult size but brains still developing.

High school students are closer to adulthood in physical size and cognitive development than middle school students, but their brains, particularly executive function and risk assessment capacities, are still developing. Most are near adult height and walk at speeds comparable to adults. They have faster perception–reaction times than younger students. However, developmental factors continue to influence judgment, impulse control, and decision-making.

Many travel independently.

Many high school students travel independently to school by walking, bicycling, using transit, or driving. In addition, they may travel further to school due to the larger size of high school attendance areas and walk zones.[22]

Some are beginner drivers.

Some high school students drive to school. While access to a vehicle increases autonomy, it also introduces new risks. Teen drivers are more likely than experienced adult drivers to make mistakes that result in crashes due to limited driving experience, underdeveloped hazard perception skills, and still-maturing executive function. Risk-taking behaviors and peer influence can further increase crash risk.



Students cross the street at Collingswood High School.

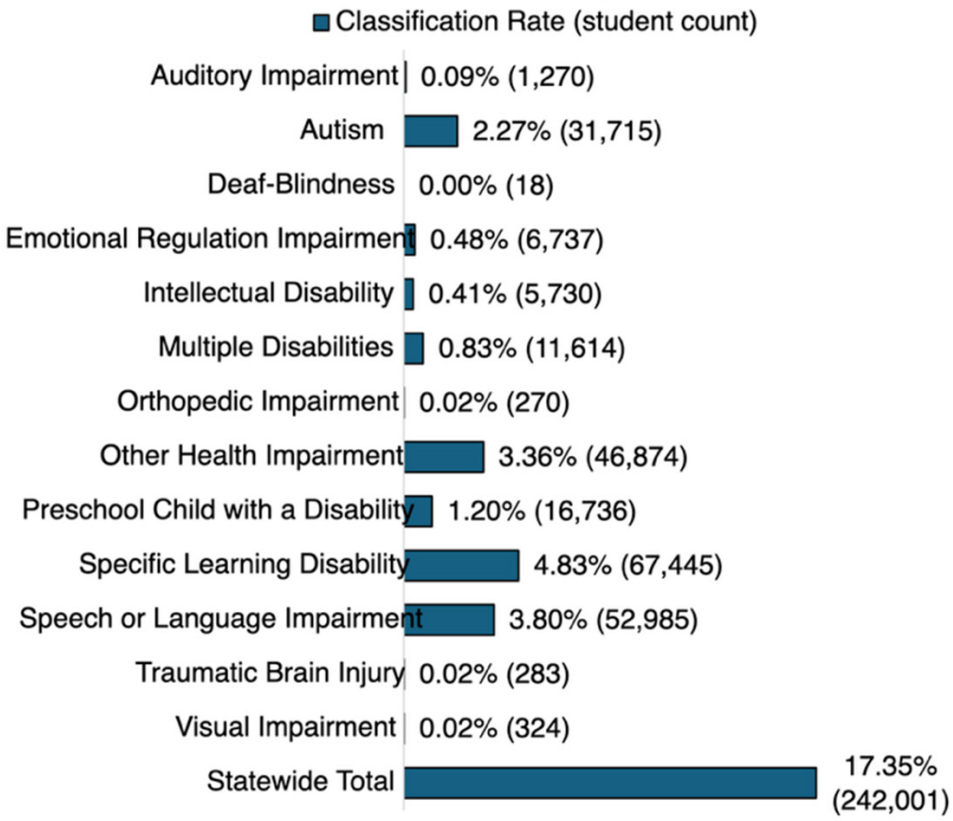
What to know about students with disabilities?

Part of every school community.
The federal Individuals with Disabilities Education Act (IDEA) requires that students with disabilities receive a free and appropriate public education in the least restrictive environment possible. This means most students with disabilities are educated alongside their non-disabled peers in general education schools. In New Jersey, more than one in six public school students (17.35%) have a disability under IDEA that adversely affects their academic performance, thus requiring an Individualized Education Program.[23]

Have diverse needs.
IDEA recognizes multiple disability categories, including autism spectrum disorder, deafness, hearing impairment, intellectual disability, specific learning disability, speech or language impairments, and visual impairments, including blindness. Students may also exhibit sensory processing differences. These conditions may influence how students perceive, interpret, and respond to elements of the built environment. For example, a student with autism spectrum disorder may experience sensory overload when walking adjacent to a busy roadway, particularly if the sidewalk or pathway they are on is not separated from traffic by a buffer area.

May be slower than non-disabled peers.
Students with disabilities may walk or roll more slowly than their non-disabled peers due to physical, sensory, cognitive, or fatigue-related factors that affect mobility, balance, coordination, endurance, or the need for adaptive equipment.

May be more likely to be adversely affected by uneven surfaces and changes in level than non-disabled peers.
Students with disabilities may use mobility aids, such as wheelchairs and crutches, which make it difficult or impossible for them to navigate across changes in level that to a non-disabled person may seem small, e.g., less than 1 inch. They may also be more likely to trip, slip, and fall due to balance and coordination issues, sensory impairments, and other reasons.



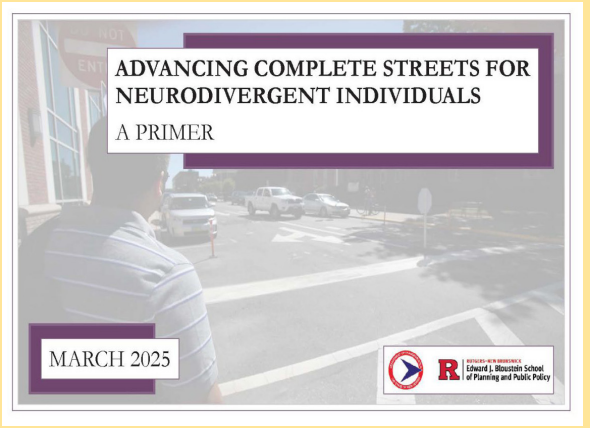
Statewide Classification Rate of Students with IEPs Aged 3–21, reported October 15, 2024. Image: New Jersey Department of Education.

May be more susceptible to mistakes than non-disabled peers.
Students with disabilities may be more susceptible to mistakes that result in a crash than their non-disabled peers. Some may have more difficulty identifying unsafe situations, judging vehicle speeds or gaps in traffic, or understanding complex traffic environments. Others may experience greater challenges coordinating movements. Students with visual or hearing impairments may be dependent on accessible signals, tactile cues, or clear wayfinding to navigate safely.

More likely than non-disabled peers to travel with a caregiver.
At all ages, students with disabilities are more likely than non-disabled students to travel to school with a caregiver or via specialized transportation. However, some may travel independently as pedestrians, cyclists, or transit riders if safe, accessible infrastructure is provided.[24]

COMPLETE STREETS AND INDIVIDUALS WITH DISABILITIES IN NEW JERSEY

Policy is evolving to better address the needs of individuals with disabilities in New Jersey, including students. In 2023, following years of advocacy and research, New Jersey enacted Senate Bill 147 (S-147), which requires the New Jersey Department of Transportation to update its Complete Streets policies, procedures, and design guidelines to provide safe access for all users, including individuals with autism spectrum disorder and intellectual and developmental disabilities. Prior to this update, the state's Complete Streets law referenced pedestrians, cyclists, and individuals with mobility disabilities but did not explicitly address the needs of people with cognitive and developmental disabilities. This legislative change reinforces the need for school zone planning guidance that incorporates accessibility, predictability, sensory considerations, and clear communication for students with a wide range of abilities.





What to know about caregivers?

Many students, especially younger students and students with disabilities, travel to school with a caregiver. Caregivers may include parents, grandparents, other relatives, older siblings, babysitters, or others responsible for escorting students.

May use a variety of modes to access school.

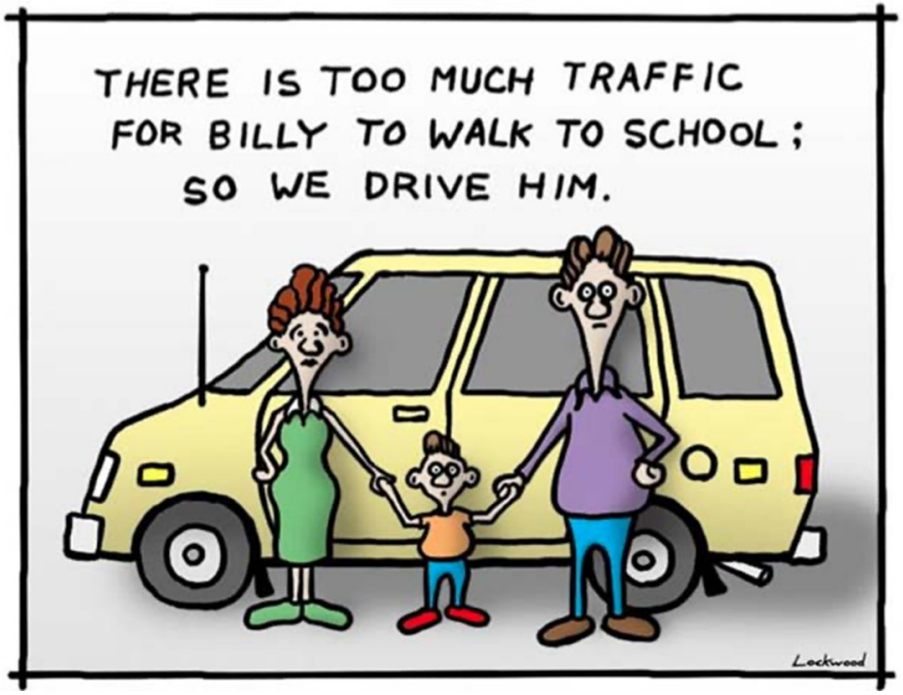
Caregivers travel to and from schools in a variety of ways, including walking, bicycling, taking transit, or driving. The modes they choose are influenced by many factors, including their abilities and preferences, travel distance, weather conditions, perceived safety and comfort, vehicle availability, work schedules, and the need to link multiple errands into a single trip.

Often arrive at school prior to dismissal.

Caregivers typically arrive before dismissal to be present when their student is released. The availability of comfortable places to wait can therefore affect their mode choice.

Their perceptions of safety affect student travel behavior.

When caregivers perceive streets as unsafe, they often choose to drive their student to school, even if they live close enough to walk or cycle independently and would otherwise be capable of doing so, which can result in more traffic near the school and exacerbate the perception that walking and bicycling are unsafe.



When caregivers of students who live close enough to walk or bicycle to school decide to drive them because of safety concerns, it can create a "vicious cycle" that exacerbates those concerns. Image: Ian Lockwood

What to know about school staff members?

Typically arrive before school arrival and leave after school dismissal.

School staff members typically arrive before most students to prepare for the day, coach sports teams, attend meetings, and help manage the arrival process. They often also stay after dismissal for similar reasons. As a result, their commutes to and from school often occur in low-light or dark conditions.

May use a variety of modes to access the school.

While many staff members are likely to live beyond a convenient walking or bicycling distance from school, some may live close enough to consider these modes if conditions are safe and comfortable. Others may be able to commute by transit. Staff members who choose to cycle may prefer cargo bikes, e-bikes, and other nontraditional cycle types that make it easier to carry school supplies and other materials.

What to know about community members

Often access schools outside school operating hours.

School buildings and grounds often function as community assets and are used for sports practices, recreational play, arts and cultural events such as concerts or theater performances, civic activities including public meetings and polling, summer school, and other programs. Many of these activities occur outside regular school hours, including evenings, weekends, and times of year when school is not in session.

May be any age or ability.

Community members who use school sites may be of any age or ability. The types of facilities available on a school campus can influence who is most likely to access it outside of school hours. For example, if a site includes a public playground, young students and their caregivers are likely to access the campus during these times. In some cases, adults may accompany students; in others, students may arrive independently.



Students crossing street in Parsippany Hills High School, Morris Plains, NJ

Summary of Key Characteristics for School Zone Planning and Design by Group

Group	Key Characteristics
Students in general 	• Not small adults. • Highly diverse. • More susceptible than adults to mistakes that can lead to crashes. • More vulnerable to crash forces than young and middle-aged adults. • May use school zone outside traditional arrival and dismissal periods. • Health and long-term development affected by street design. • May use streets and sidewalks for play and socializing.
Elementary School Students 	• Smaller than older students and adults. • Slower than older students and young and middle-aged adults. • Less predictable than older students and adults. • Usually travel with caregivers but beginning to build independence.
Middle School Students 	• Larger than young students but not yet adult-sized. • Faster than young students but walk more slowly in groups. • More predictable than young students but still engage in impulsive behavior. • More likely than young students to travel independently.
High School Students 	• Close to adult size but brains still developing. • Many travel independently. • Some are beginner drivers.

Group	Key Characteristics
Students with Disabilities 	• Part of every school community. • Have diverse needs. • May be slower than non-disabled peers. • May be more likely to be adversely affected by uneven surfaces and changes in level than non-disabled peers. • May be more likely than non-disabled peers to make mistakes that contribute to crashes. • More likely than non-disabled peers to travel with a caregiver.
Caregivers 	• May use a variety of modes to access school. • Often arrive at school prior to dismissal. • Their perceptions of safety affect student travel behavior.
School Staff Members 	• Typically arrive before school arrival and leave after school dismissal. • May use a variety of modes to access the school.
Community Members 	• Often access schools outside school operating hours. • May be any age or ability.

Cross-Cutting Needs

The process of planning and designing school zones requires navigating a range of constraints while balancing the needs of diverse groups. This section outlines cross-cutting needs that should inform school zone and campus design and identifies the school contexts (elementary, middle, and high school) in which these needs are most critical. Table 1 summarizes these needs by user group.

Low motor vehicle operating speeds

Low motor vehicle operating speeds (ideally 15-20 mph) are needed in all school contexts on streets adjacent to schools and along school pedestrian and bicyclist access routes to support driver reaction time and reduce the severity of crashes should they occur.[25] Extensive research demonstrates a direct relationship between vehicle speed and pedestrian injury severity and fatality risk.[26] This risk is elevated for students due to their limited experience navigating traffic and developmental factors that affect judgment, perception, and reaction time. Younger elementary and middle school students are particularly vulnerable because of their smaller stature, which makes them harder to see, and are more likely to sustain head and traumatic brain injuries.[27]

Enhanced visibility at intersections and crossings

Enhanced visibility at intersections and crossings is needed in all school contexts but particularly for elementary and middle school students, who are smaller and less visible to drivers. It is also critical for individuals with disabilities who use mobility aids, such as wheelchairs, which position them lower to the ground and make them harder for drivers to see. School zones that incorporate features such as raised crosswalks, curb extensions, and parking restrictions at intersection and crossing locations improve sightlines and make it easier for drivers to see and yield to students crossing the street.

Simple, clear pedestrian and cyclist crossings

Simple, clear pedestrian and bicyclist crossings are needed in all school contexts and are particularly important for elementary school students and students with disabilities, who may have difficulty determining where to position themselves in the roadway while crossing, dividing their attention among multiple tasks, judging gaps in traffic, or anticipating turning vehicles. Effective strategies include high-visibility marked crosswalks and bicycle lane continuation markings that clearly define where pedestrians and bicyclists should travel through an intersection; pedestrian refuge islands that allow users to focus



A parent with a child crosses the street. Image: VTC

on one direction of traffic at a time; accessible pedestrian signals that provide both audible and visual indications of when it is safe to cross; and restrictions on permissive motor vehicle turns to reduce conflicts and decision-making complexity.

More pedestrian crossing time

More pedestrian crossing time is particularly needed for elementary school students and caregivers, middle school students crossing in groups, students and adults with disabilities, and older adult caregivers and community members, who tend to walk more slowly. Signalized pedestrian crossing designs that provide more crossing time than the minimum required in the Manual on Uniform Traffic Control Devices (MUTCD) and Accessible Design Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) can help avoid situations where individuals accessing the school are still in the crosswalk when the signal changes and opposing traffic is released. [28]

Continuous, physically separated pedestrian and bicycling facilities

Continuous, physically separated facilities are needed in all school contexts on streets where motor vehicle speeds exceed 10 mph to reduce the likelihood that students walking or bicycling will inadvertently enter the roadway, discourage motor vehicles from encroaching on pedestrian and bicycling space, and improve pedestrian and cyclist comfort. [29]

Accessible pedestrian and bicycling facilities

Accessible pedestrian and bicycling facilities that meet or exceed minimum accessibility standards in PROWAG and other national and state-level guidance are needed in all school contexts to accommodate students, staff members, and caregivers with disabilities. They are critical, particularly in the elementary school context, for caregivers who may push their child to school in a stroller.

Wider pedestrian and cyclist facilities

Pedestrian and bicyclist facilities, including sidewalks, pathways, bicycle lanes, and crosswalks--should be wide enough to comfortably accommodate expected volumes during peak arrival and dismissal times in all school contexts. Wider facilities are particularly needed on the school campus, on streets adjacent to schools, and along key pedestrian and cyclist access routes. Even where expected volumes are relatively low, facilities should be wide enough to enable caregivers to walk or cycle side-by-side with students and provide flexible space for informal play and social interaction.



Bicycle Parking in Verona. Image: VTC

Buffered sidewalks and pathways

Buffers are linear spaces between the sidewalk pedestrian through zone and adjacent motor vehicle or bicycle lanes. They are needed on pedestrian and bicyclist routes on arterial and collector roads in all school contexts to increase pedestrian safety and comfort and along local roads in elementary school contexts to address the tendency of young students to dart out unexpectedly into the roadway by providing extra room before they reach traffic.

Comfortable places to rest on school pedestrian and bicycling routes

Comfortable, well-placed seating areas are needed on school pedestrian and bicycling access routes to enable students and adults who tire more easily, such as younger students, students with disabilities, older adults, and pregnant women, to stop and catch their breath before proceeding on to school or home.

Comfortable places to wait on the school campus

Caregivers need comfortable, shaded places to wait on school campuses ahead of dismissal. When such places are absent, caregivers are more likely to drive, even if they live within a reasonable walking or bicycling distance, since cars provide protection from the sun and other weather conditions.

Bicycle parking spaces that can accommodate non-standard bicycles

Bicycle parking spaces that can accommodate non-standard bicycles are needed in all school contexts. Many families, students, and staff rely on bicycles that are larger or differently configured than standard two-wheel models. Examples include cargo bikes, trail-a-bikes, tricycles, and adaptive cycles. Larger bicycle parking spaces are particularly needed at the elementary school level, where caregivers are most likely to cycle with a child on or attached to their bicycle.

Safe routes to transit stops

Members of the school community who use transit to access the school need safe and comfortable pedestrian routes between their homes and transit stops and between transit stops and school entrances. Safe routes from transit stops are particularly important at the high school level, since high school students are more likely than younger students to be allowed to take transit. School staff members may also rely on transit to access the school.

Safe access outside traditional school arrival and dismissal times

All members of the school community need to be able to safely access school campuses outside traditional arrival and dismissal times, including in the evenings, on weekends, and at times when school is not in session. School zones must therefore be designed to support safe, comfortable travel even when crossing guards and staff are not present, and to ensure visibility and security in dark and low-light conditions.

Enhanced personal security

Personal security includes freedom from crime, assault, harassment, and profiling. Personal security is a top concern for caregivers of young students and students with disabilities, who may have a harder time identifying dangerous situations and may not know how to react if confronted. Personal security may also be a top concern among caregivers of students of color or with other differences that might make them more likely to be targeted. If caregivers perceive personal security risks on school pedestrian and bicycling routes, they are unlikely to allow their students to walk or cycle to school independently. Providing enhanced personal security requires a multi-pronged approach that includes community outreach, attention to infrastructure design, e.g., good lighting on walking and bicycling routes, and programmatic interventions.

Guiding Principles for School Zones

Considering the diverse user groups and needs described above, the following principles should guide school zone planning.

Design for students, caregivers, staff members, and communities

School zone and school site designs should respond to the characteristics and needs of the students at the school, their caregivers, school staff members, and the broader community.

Pursue an inclusive process

Students, caregivers, staff members, and community members should be engaged in the school zone planning process. Engagement is critical for understanding the diverse needs of these groups. Students can make an important contribution to understanding school zone needs, particularly at the elementary and middle school levels.

Promote safe speeds

Safe speeds are particularly needed along school routes and on streets adjacent to schools. School zones with speed limits of 20 mph or lower are recommended.

Design for multimodal access

School zones should encourage and enable safe walking and bicycling through provision of separated pedestrian and bicycling facilities and crossings. School zones are safer when students, caregivers, staff members, and community members choose to travel by walking, bicycling, school buses, or transit. Enabling and encouraging the use of non-car modes can also relieve traffic congestion at school arrival and dismissal times, which often coincide with peak commute times, and reduce the space dedicated to parking.

Design for 24/7/365 access

Schools serve many functions within a community. The school zone should be designed for safe access during all times and seasons. Designs should account for both peak and off-peak conditions.

Conclusion

School zones that prioritize safe, comfortable multimodal access for students, caregivers, staff, and the broader community can help prevent fatal and serious crashes, ease traffic congestion, promote healthy child development, better support families navigating daily routines, and enhance livability for all community members.



Students cross street in Parsippany Hills High School, Morris Plains, NJ

TIPS FOR INCLUSIVE SCHOOL ZONES

Who to engage:

- School administrators
- Teachers and paraprofessionals
- Caregivers
- Students
- People with disabilities
- Community members, e.g., community associations



Key questions:

- What types of facilities are located on the school site, e.g., classrooms, auditorium, gym, ballfields, playground?
- What types of people might need to access them?
- At what times of day, days of the week, months of the year?
- Where are people coming from?
- What routes and modes do they use?
- What safety and accessibility challenges do they face currently or what would need to change for them to walk, or bicycle, or use transit to access the school instead of driving?
- How might the area around the school (or the school itself) change in the future, e.g., due to new development or school re-purposing/expansion?
- What is needed to ensure safe access once those changes happen?

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24 The term “cyclist” is used instead of “bicyclist” because “bicyclist” implies a person who rides a standard two-wheeled pedal cycle, whereas many people, includingchildren, older adults, and people with disabilities ride pedal cycles that are non-standard or have more than two wheels. “Cyclist” is therefore a more inclusive term.
25 Motor vehicle operating speeds are the speed which motor vehicles typically travel on a roadway. This speed may or may not correspond to posted speed limit. Evenlower operating speeds (10 mph) are needed in shared spaces, such as parking lot aisles, where pedestrians, cyclists, and motor vehicle drivers are likely to mix. .
26 Tefft, Brian C. “Impact Speed and a Pedestrian’s Risk of Severe Injury or Death.” Accident Analysis & Prevention, vol. 50, Jan. 2013, pp. 871–878. Elsevier, https://doi.org/10.1016/j.aap.2012.07.022.
27 Harmon, K. J., Hancock, K. A., Waller, A. E., & Sandt, L. S. (2020). Selected characteristics and injury patterns by age group among pedestrians treated in North Carolinaemergency departments. Traffic Injury Prevention, 21(sup1), S157–S161. https://doi.org/10.1080/15389588.2020.1829912
28 The MUTCD and PROWAG require the pedestrian clearance interval to be calculated based on a maximum pedestrian walking speed of 3.5 ft/s but allow for theclearance interval to be based on lower walking speeds. MUTCD Section 4I.06 specifically recommends that, “Where pedestrians who walk slower than 3.5 feet persecond, or pedestrians who use wheelchairs, routinely use the crosswalk, a walking speed of less than 3.5 feet per second should be considered in determining thepedestrian clearance time.”
29 In international practice, speeds of 15 kph/10 mph are recommended for shared spaces where pedestrians, cyclists, and motor vehicle drivers are expected to mix. See, for example, Furth, Peter G. Speed Management in the Netherlands. 20 May 2025, Northeastern University, https://bpb-us-e1.wpmucdn.com/sites.northeastern.edu/dist/e/618/files/2025/05/Speed-Management-in-Netherland.pdf. PDF

03 What Is a School Zone?

There are generally three zones around the school one must think about when applying safety standards for walking and bicycling routes to school: the state statutory definition of school zone, the student catchment area or enrollment boundary, and the routes that students take to school.

The State Statutory Definition of School Zone

Title 39 of the New Jersey Statutes Annotated (N.J.S.A.) contains the laws that control every publicly maintained roadway, as well as the majority of laws that govern bicycle and pedestrian matters. It also includes two definitions for "school zone." N.J.S.A. 39:1-1 describes a school zone as:

1. The section of roadway adjacent to a school, or
2. Where school crossings have been established in the vicinity of a school, upon which are maintained appropriate "school signs" in accordance with specifications adopted by the chief administrator and in accordance with law. "School crossing" means that portion of a publicly-maintained roadway where school students are required to cross the roadway in the vicinity of a school.

The focus of this Planning Guide is on engineering measures that can be utilized to make the environment around schools a place where children, caregivers, and their parents feel safe and want to walk, bicycle, and utilize other forms of permitted micromobility appropriate to the age of the student. Because the first statutory definition is limited to the area around the school and the second statutory definition is confined to crossings, both of these definitions of "school zone" are too restrictive for the purposes of this Guide.

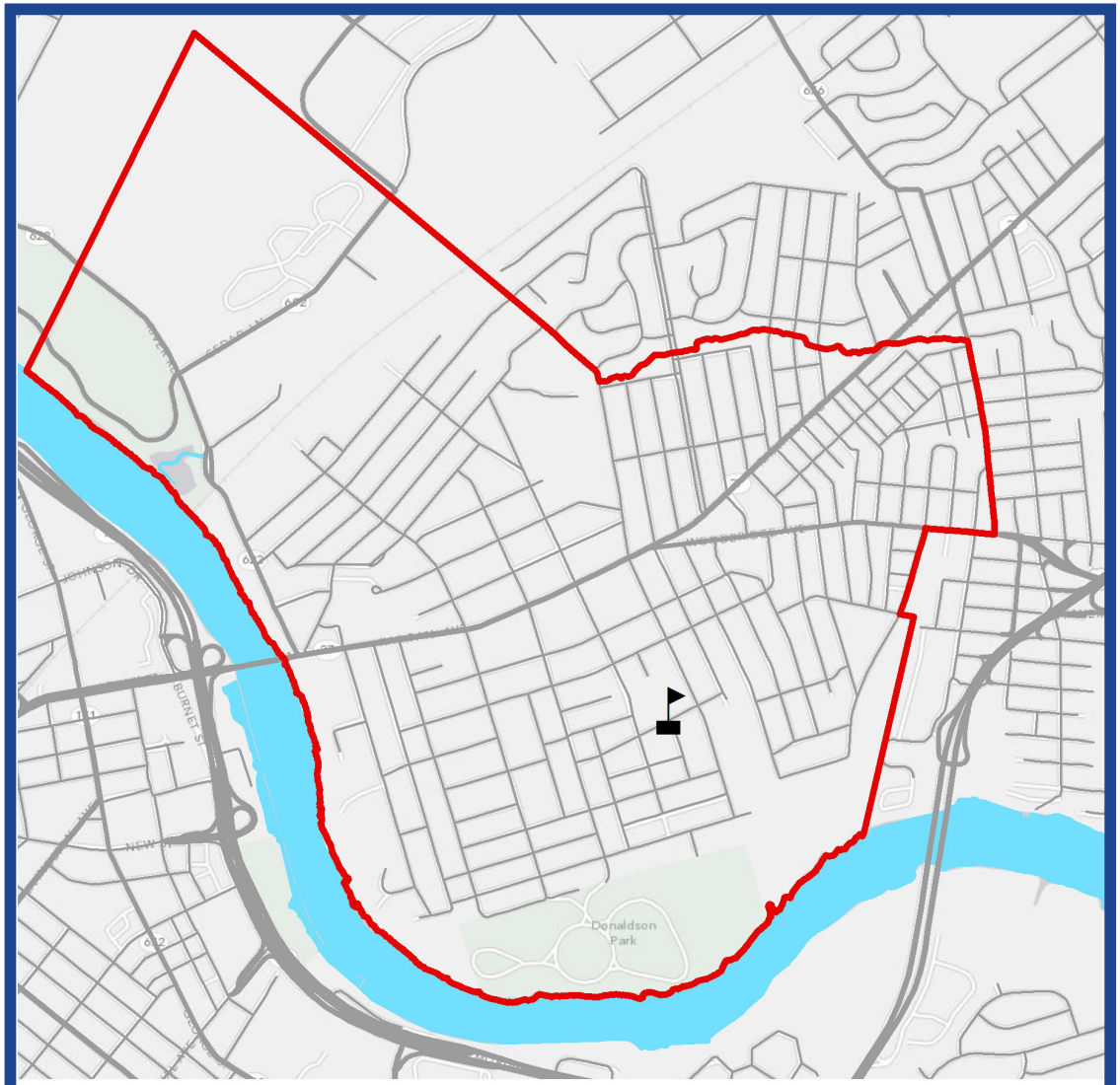


The four (4) streets adjacent to the Ocean Road School in Point Pleasant constitute the School Zone. Ocean Road, usually 35 mph, slows to 25 mph in the School Zone.

Map of Ocean Road School Zone in the Ocean Road Elementary School Travel Plan. Image: Greater Mercer TMA

Student Catchment Area or Enrollment Boundary

The student catchment area or enrollment boundary refers to the geographic area from which students are eligible to attend a local school. This area is the theoretical outside limit for a "school zone." For schools with a geographically expansive catchment area, some students will live too far away from school to reasonably be expected to walk or bike. In addition, the growth of charter and magnet schools has made applying an enrollment boundary more difficult because these schools can typically draw from anywhere within a school district. Therefore, the student catchment area, as a practical matter, and for the purposes of this Planning Guide, could cover too much territory to function as the school zone.

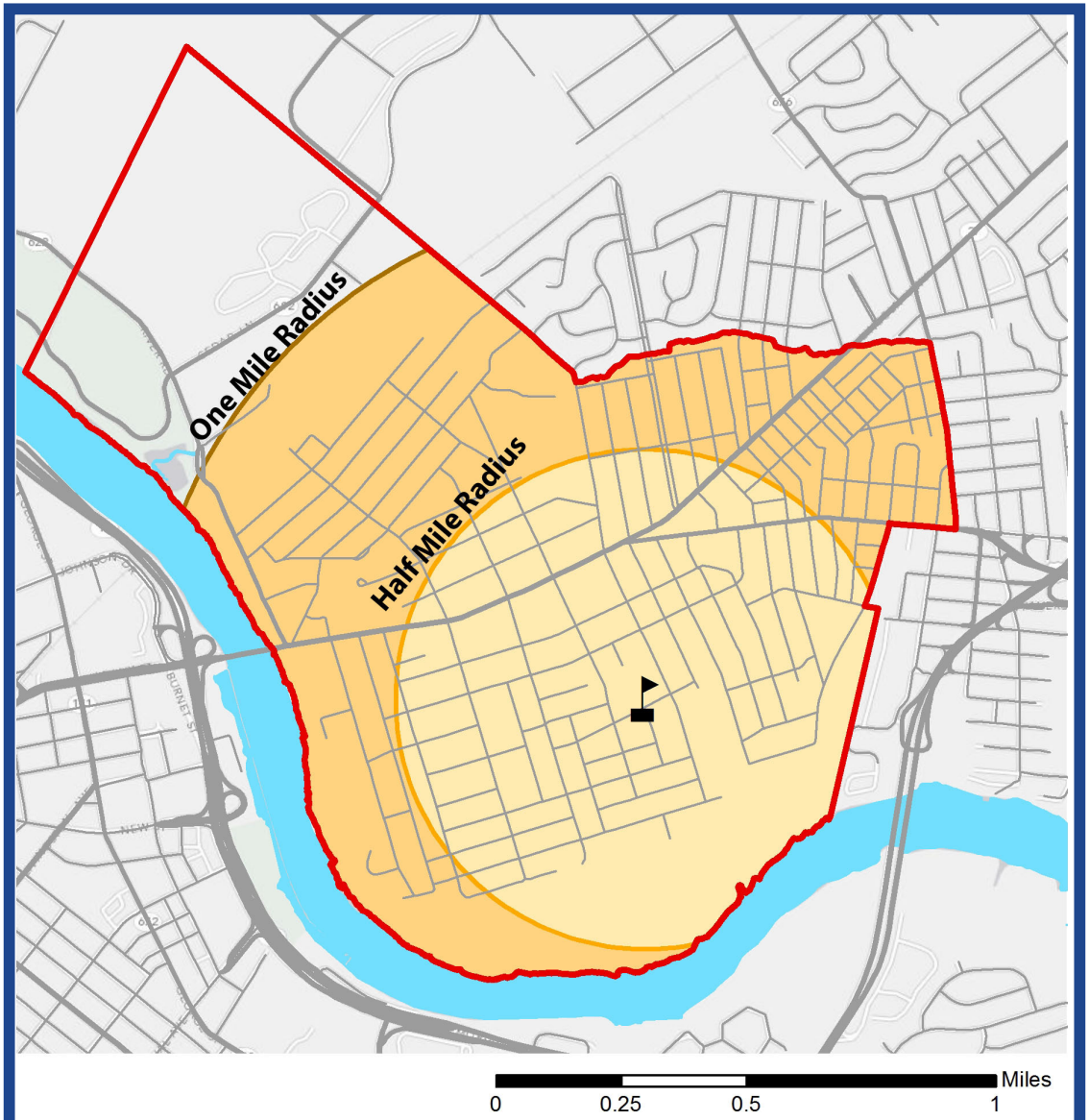


Student Catchment Area in Highland Park, NJ

The student catchment area, also known as the enrollment boundary, is indicated in red.

School Walking Zone

The concept of "school zone" that is the focus of this design guide is best described by the term "school walking zone." The school walking zone can be defined as the area surrounding a school that includes the public rights of way that are most frequently and intensively used by students and others accessing the school, especially by walking or by bicycle. In this design guide, unless otherwise specified, the term "school zone" is synonymous with the term "school walking zone."



School Walking Zone in Highland Park, NJ

With half-mile radius shown in light orange and one-mile radius shown in darker orange.

School walking zones vary in size depending on local policies, context and the student enrollment boundary. While there is no established definition of a school walking zone, a number of sources provide guidance regarding the extent of a school walking zone.

- Under the FHWA program guidance for the federal Safe Routes to School (SRTS) funding program, projects and activities must be located or take place within two miles of a primary, middle, or high school (grades K – 12).
- New Jersey does not require school districts to fund transportation for public elementary and middle school students living within two miles of their school or for high school students living within 2.5 miles of their school.
- The MUTCD defines a school zone as "a designated roadway segment approaching, adjacent to and beyond school buildings or grounds, or along which school-related activities occur."
- The NJ Safe Routes Resource Center recommends a school walking zone covering the area within at least one half-mile of the school.
- The National Center for Safe Routes to School general rule of thumb is that the walking boundary is one half-mile to one mile around an elementary school, and sometimes further for middle and high schools.

For this Guide, the term school zone or school walking zone refers to the area within approximately a one-mile radius of a school – a distance easily covered by most elementary students on foot or bike. This area should be adjusted as needed to take into account local conditions, such as the extent of the school catchment area, traffic conditions, geographic constraints and other local concerns. During the course of determining the school walking zone, it is likely that conditions that are problematic to pedestrians and bicyclists will be discovered which may need to be remedied by applying the design guidance contained in this document.

SCHOOL BUSING

New Jersey Administrative Code (N.J.A.C.) 6A:27 sets forth the rules governing the transportation of students to and from school. A school district is required to provide busing only to those students who live more than 2 miles from their public elementary and middle schools and more than 2.5 miles from their public high schools and to certain special education students. Boards of education are not required by law to provide busing for students who live less than 2 miles (elementary or middle school students) or 2.5 miles (high school students) from school, even for safety reasons. However, many districts have opted to bus students who live below these distance thresholds, a service known as "courtesy" busing or non-mandated busing. Some districts help defray the cost of courtesy busing by charging the student's parents or legal guardians for this service. Municipalities may also contract with boards of education for this service and charge parents. This service is called "subscription" busing.

State law (N.J.S.A. 18A:39-1.5) requires school districts that provide courtesy busing to adopt a policy addressing the busing of students who walk along hazardous routes between their homes and schools. The policy must include a list of hazardous routes that require courtesy busing and the criteria used in designating the routes as hazardous. In New Jersey, routes are considered hazardous based on criteria such as high-traffic volume, traffic speed, roads with blind curves or steep inclines and declines, lack of sidewalks, presence of bridges and train tracks, and busy roads or highways that must be crossed to reach the school. School districts must work with municipal officials and police officers when designating a route hazardous.

For more information visit, www.state.nj.us/education/finance/transportation/

Common questions about school zones

Is there any relationship between a drug-free, drunk-driving free or smoke-free school zone and a school walking zone?

No, there is no relationship. Drug-Free / Drunk-Driving Free / Smoke-Free School Zones include the areas on or within 1,000 feet of property used for school purposes and which is owned or leased to any elementary or secondary school or school board. Any Drug-Free / Drunk-Driving Free / Smoke-Free School Zone map must be created and adopted by the municipality. The map is intended to be used as evidence in prosecutions arising under the criminal laws of the state (N.J.S.A. 2C:35-7).

How do you designate a school zone?

Designating a school zone or school walking zone is accomplished by local action, often on an ad hoc basis by, for example, a SRTS working group as part of the process of developing a Safe Routes to School (SRTS) Travel Plan. School zone boundaries can be formalized by the school board or a municipality by formal adoption of the SRTS Travel Plan or by ordinance.

School zones, as defined by New Jersey statute, do not need to be adopted by municipal ordinance or resolution; however, designated school crossings can be adopted by municipal ordinance or resolution. A municipality may choose to designate crossings as school crossings where special emphasis is needed due to a combination of the number of crossing school children, geometry of the approaching roadways, approach speed, and traffic volumes. Special emphasis could include placement of an adult school crossing guard, installing signage, pavement markings or a signal.

What is the school zone speed limit? Who determines the speed limit?

Establishing and enforcing the proper school zone speed limit is crucial. The speed limit in New Jersey, unless otherwise posted, is 25 miles per hour (mph) when passing through a school zone during recess, when the presence of children is clearly visible from the roadway, or while children are going to or leaving school, during opening or closing hours (N.J.S.A. 39:4-98). Because it is established by statute, a 25 mph school zone speed limit does not require an ordinance and approval from NJDOT.

However, not all school speed limit zones are 25 mph. Local authorities, with reference to roadways under their jurisdiction, may by ordinance, or in the case of county authorities, by ordinance or resolution, designate a reasonable and safe speed limit that is less than or greater than 25 mph after an engineering and traffic investigation. The establishment of school speed limits should always be done in coordination with the agency having jurisdiction over the roadway in question, particularly if the limits are less than or greater than 25 mph [N.J.S.A. 39:4-98(c)].

In addition to statutory requirements, guidelines from organizations such as the National Association of City Transportation Officials (NACTO) emphasize the importance of safe speeds in school zones. Their ***Designing Streets for Kids*** (2020) guide recommends reducing speed limits to 20 mph within all school zones.

How is a reduced school speed zone designated?

A reduced speed zone is designated through signing supplemented with striping. A school zone should be marked with special signing to alert drivers of the high concentration of children. School crossing signs, speed signs, and school zone pavement markings remind drivers to treat the area with special care and attention.



School Zone Speed Limit.

When does "when children are present" apply?

Speed limit signs will often say "When students are present," so what does this mean? "When students are present" does not apply at all times in a school zone.

The Superior Court of New Jersey has determined the lower speed limit in a school zone is only applicable:

» During school hours, but only during recess, when students are clearly visible from the roadway,

» When students are going to or leaving school during opening or closing hours of school (State of New Jersey v. Floyd)

» Regardless of the time of day or year, drivers should always be alert and on the lookout for students when driving near schools, parks or other attractions.

However, research shows "When children are present" is not a clear indicator to drivers and should be used in concert with other traffic control devices.

CRITERIA FOR SAFE SPEED LIMIT DESIGN

According to N.J.S.A. 39:4-98, when designating reasonable and safe speed limits for a street under its jurisdiction, as part of an engineering and traffic investigation, a municipality or county shall consider, but not be limited to, the following criteria: crash history; residential density; the presence, or lack, of sidewalks; the prevalence of entry and exit ways for business and commercial establishments; whether school students walk adjacent to the street on their way to and from school; the proximity of recreational or park areas, schools, community residences, family daycare homes, child care centers, assisted living facilities or senior communities; and input from the school district and other community representatives.

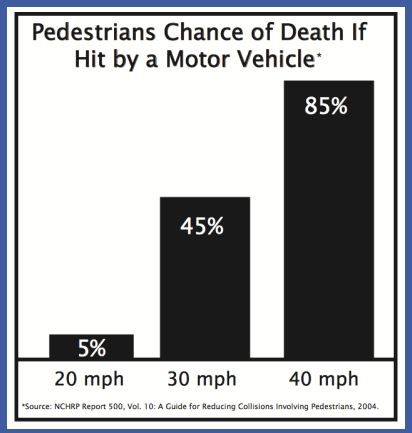
CITY WIDE SPEED REDUCTION IN HOBOKEN: FROM CAMPAIGN TO IMPLEMENTATION

In October 2010, the City of Hoboken launched a "Twenty is Plenty" driving and pedestrian safety public awareness campaign to encourage drivers to consider driving no faster than 20 mph despite the 25 mph speed limit on most Hoboken streets. The campaign was inspired by the "20's Plenty for Us" effort started in Britain.



In 2022, the City of Hoboken implemented a new citywide speed limit, reducing the speed limit on all City and County roads from 25 mph to 20 mph. This reduced speed limit aims to make streets safer for all modes of transportation in furtherance of the City's Vision Zero goal to eliminate all traffic-related deaths and injuries by 2030. In terms of school zones, this is an "above and beyond" approach. It encompasses all school zones within the City as well as all streets generally.





Visit https://www.hobokennj.gov/resources/twenty-is-plenty for more information

WHERE SHOULD THE SCHOOL SPEED LIMIT ZONE BEGIN AND END?

NJDOT has adopted the federal Manual on Uniform Traffic Control Devices (MUTCD) for rules and regulations concerning the placing, specification, location and maintenance of highway and traffic signs and markings (N.J.S.A. 39:4-183.27). According to the 2023 MUTCD, the beginning point of a reduced school speed limit zone should be at least 200 feet in advance of the school grounds or a school crossing; however, this 200-foot distance should be increased if the reduced school speed limit is 30 mph or higher. The maximum beginning point of a reduced school speed limit zone should not be greater than 500 feet in advance of the school grounds or a school crossing (MUTCD Section 7B.05).

The speed limit in New Jersey, unless otherwise posted, is 25 mph when passing through a school zone (N.J.S.A. 39:4-98). Therefore, many school speed limit zones may be as short as 400 ft. However, the beginning and end points of a school speed limit zone should be determined based on the location of other traffic control devices, features and locations where children cross the roadway.

LEGAL CRITERIA FOR SAFE SPEED LIMIT DESIGN

According to N.J.S.A. 39:4-98, when designating reasonable and safe speed limits for a street under its jurisdiction, as part of an engineering and traffic investigation, a municipality or county shall consider, but not be limited to, the following criteria: crash history; residential density; the presence, or lack, of sidewalks; the prevalence of entry and exit ways for business and commercial establishments; whether school children walk adjacent to the street on their way to and from school; the proximity of recreational or park areas, schools, community residences, family day care homes, child care centers, assisted living facilities or senior communities; and input from the school district and other community representatives.

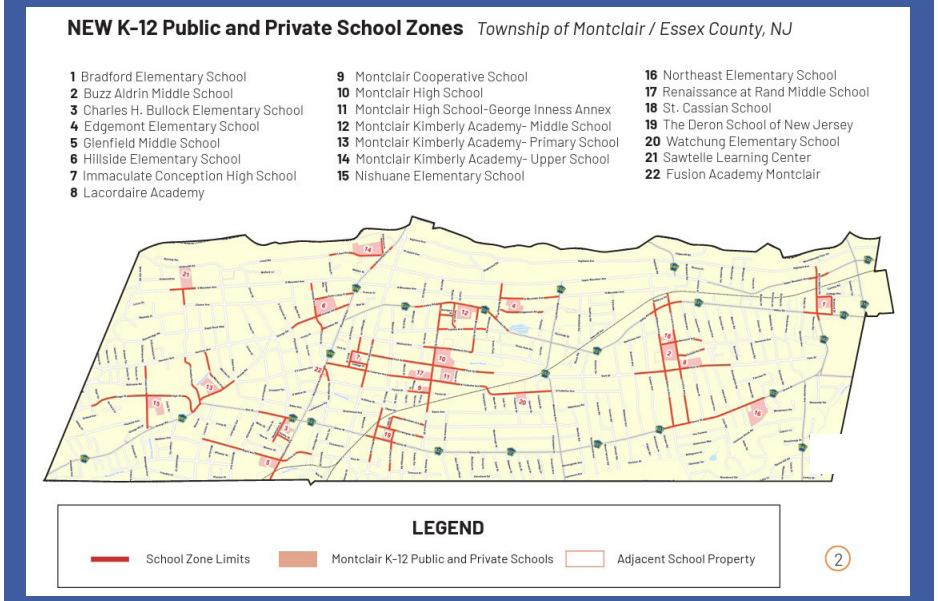
WHAT IS SAFEST SPEED LIMIT IN A SCHOOL ZONE?

The National Association of City Transportation Officials (NACTO) provides a blanket recommendation in urban areas for reducing speed limits to under 20 miles per hour. Because this guide focuses on School Zones, and not cities more generally, this recommendation should apply to streets within the School Zone. As indicated elsewhere in this chapter, the City of Hoboken has implemented a 20 mph speed limit city-wide. The Township of Montclair has implemented a 20 mph speed limit in all school zones.

For municipalities exploring reducing speeds to 20 mph, see prior sections in this chapter for information relating to reducing speeds below the statewide minimum of 25 mph.

MONTCLAIR 20 MPH SCHOOL ZONES

In June of 2024 (following the adoption of Township Ordinance O-24-21) Montclair Township implemented a permanent reduction of speed limits in all school zones, reducing them from 25 miles per hour to 20 mph. The five (5) mph reduction makes a significant difference for vulnerable users. This initiative is part of a Vision Zero program aimed at eliminating all pedestrian fatalities and severe injuries.

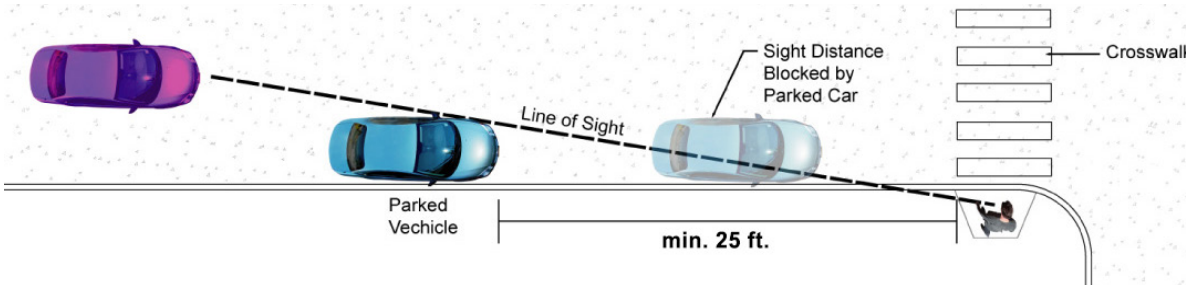


Visit https://www.montclairnjusa.org/files/sharedassets/public/v/1/government/boards-and-commission/documents/vision-zero/speed-matters-vzm-oct-newsletterfnl.pdf for more information

What other traffic laws relate to school zones?

Restricting parking in advance of crosswalks and corners improves visibility of the crossing for both drivers and pedestrians. According to N.J.S.A. 39:4-138, parking is not permitted:

- Within an intersection;
- On a crosswalk;
- Within 50 feet of a "stop" sign; or
- Within 25 feet of the nearest crosswalk or side line of a street or intersecting highway or within 10 feet of the nearest crosswalk or side line of a street or intersecting highway, if a curb extension or bulb-out has been constructed at that crosswalk.



Recommended Parking Setback for Sight Distance.

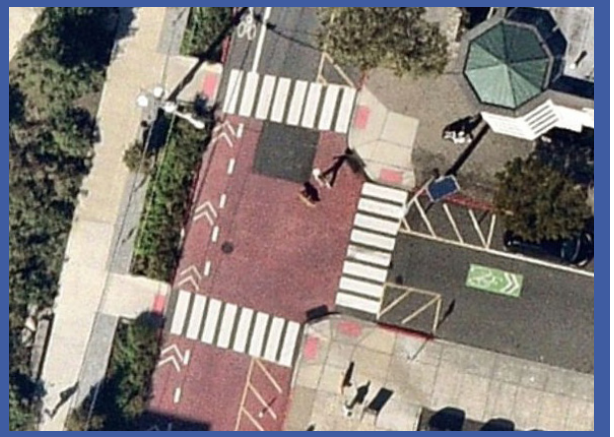
DAYLIGHTING: AN AFFORDABLE WAY TO CLEARLY MARK WHERE DRIVERS CANNOT LEGALLY PARK

A practice known as "daylighting" refers to clearly indicating no-parking areas near intersections, crosswalks, in close proximity to stop signs, or other parts of the street where parking is already prohibited.

By daylighting these parts of the street, it is clear to motorists where they are not permitted to park. Additionally, pylons or other barriers can be placed making it physically difficult for automobiles to park where they are not permitted. There are "quick-build", affordable methods of daylighting, as well as more permanent methods.



The City of New Brunswick has begun installing plastic pylons in the no-parking area, a practice called "daylighting." The cost of purchasing and installing the standard-use pylons is minimal and can be done in-house with little delay. Image: VTC



The City of Hoboken has permanent striping of areas that use "daylighting" through striping on the street as seen in this example from the intersection of Adams Street and 12th Street. Image: Nearmap (May 1, 2025)

Quick-Build Safety Projects in School Zones

Quick build countermeasures offer a low cost, practical strategy for addressing immediate safety concerns in school zones. In January 2025, MetroPlan Orlando developed a Quick Build Guide[1] which provides practical information that can be applied to school zones.

When planning the implementation of a quick-build countermeasure, it is important to consider whether a treatment is intended for spot application, defined as at a location specific treatment based on the crash history, or systemic application, defined as treatment across multiple similar locations based on a systemic analysis. In some cases, treatments may serve both purposes.

The Quick Build Guide classifies countermeasures into seven categories. Each category can be translated into school zone strategies to address various safety concerns:

School Zone Safety Concerns	Countermeasures
Crossing time and safety	Signal
Lane visibility, wayfinding	Signing and Striping
Protected bicycle lane, bike box	Bikeways
Sidewalk, curb extension	Pedestrian Facilities
Intersection conflict, separated protection	Intersections and Roadways
Speed related crashes	Speed Management
Road visibility	Remove Obstruction from Sightlines

Because many quick-build treatments are temporary, they provide a good opportunity for agencies to test and evaluate safety outcomes before advancing to permanent infrastructure improvements. Additionally, they serve as opportunities to build community awareness about various road safety treatments in a manner that allows the community to engage with the project by contributing to its construction and testing its utility.



Quick build example. Image: City of Orlando



Quick build example. Image: Fehr & Peers

[1] MetroPlan Orlando "Quick Build Guide" (01/2025). https://metroplanorlando.gov/wp-content/uploads/Quickbuild-Guide.pdf

Quick-Build Countermeasures in Jersey City

Jersey City utilized quick-build countermeasures, exemplified in a demonstration project on Bergen Avenue. The project served as community engagement when the City prepared it bicycle master plan. The City utilized a quick-build approach that allowed for a faster timeline, lower-cost materials, and manageable interventions to inform long-term changes. By implementing the quick-build pilot project, the City facilitated public feedback and real-time evaluation without having to construct a permanent improvement.

This chart illustrates the progression of an iterative approach to project delivery. Though not all projects need to follow this exact model, it can be helpful to see how each project phase may inform the next, and how elements like materials and the project delivery mechanism differ as projects achieve various levels of permanence.









	DEMONSTRATION (1 day - 1 month | $)	PILOT (1 month - 1 year | $$)	INTERIM DESIGN (1 year - 5 years \| $$$)	LONG-TERM/CAPITAL (5 years - 50 years | $$$$)
Project Leaders	Can be led by anyone (city, citizen group, or both!)	Government / organizational leadership + involvement required	Government / organizational leadership + involvement required	Government / organizational leadership + involvement required
Permission Status	Sanctioned or unsanctioned	Always sanctioned	Always sanctioned	Always sanctioned
Materials	Low-cost, typically low-durability. Can be borrowed or easily made	Relatively low-cost, but semi-durable materials	Low-moderate cost materials, designed to balance flexibility with maintenance needs	High-cost permanent materials that cannot easily be adjusted
Public Involvement	Public input + public action	Public input, champion engagment, government / organizational stewardship	Public input, government / organizational stewardship	Public input, government / organizational stewardship
Flexibility of Design	High: organizers expect project to be adjusted and removed.	High: organizers expect proj-ect to be adjusted; it may be removed if it does not meet goals	Moderate: organizers expect project to be adjusted, but it is intended to remain in place until capital upgrades are possible	Low: project is considered a permanent capital upgrade that is unlikely to be adjusted significantly once installed
Collect data to refine approach for current or future projects?	Recommended	Always	Always	Always - project performance can inform future investments

Terms and diagram format based on PeopleForBike's "Quick Builds for Better Streets," which defines the pilot / interim time intervals above as "Quick Build" projects. To access Quick Builds for Better Streets, visit: bit.ly/QuickBuildsReport (Images: Street Plans).

Visit https://cdnsm5-hosted.civiclive.com/UserFiles/Servers/Server_6189660/File/Community/Transportation/BikewayDesignGuide.pdf for more information

Is designating school walking and/or bicycling routes required by law?

New Jersey state laws and regulations do not require school districts to have walking or bicycling plans that designate particular routes to school. Therefore, there is no official or uniform process for designating a school walking or bicycling route.

Who is responsible for developing school walking and/or bicycling routes?

There is no singular entity responsible for developing school walking or bicycling routes. A school route map should be developed through a partnership between the school and surrounding community ideally as part of the development of a comprehensive Safe Routes to School (SRTS) School Travel Plan. A SRTS School Travel Plan "maps out" how to improve pedestrian and bicycle travel to and from school by identifying where students currently walk and bike, where students would walk and bike if they could, and what changes need to be made so that students can and will walk and bike to school. A SRTS School Travel Plan should be prepared by a team of school officials, municipal representatives, local law enforcement, parents, students, safety advocates and other interested parties responsible for student safety.

As discussed in Chapter 1, implementation and decision making may require coordination between multiple levels of government, including the school district, municipality, county, and the state.

Mapping the neighborhood is one of six elements of a School Travel Plan. Other elements include: school description, working group/partnerships, walk/bike barriers, opportunities, goals and actions, and evaluation. For more information, visit the NJ SRTS Resource Center at: https://www.saferoutesnj.org/creating-a-school-travel-plan-2/



GET POINTS WITH YOUR SCHOOL TRAVEL PLAN

Though applications to receive NJDOT SRTS grants do not require a School Travel Plan, schools that have completed a School Travel Plan will be eligible for extra points for submitting the Plan in the application for SRTS infrastructure grant funding. While the preparation of a SRTS Travel Plan is not an eligible activity for New Jersey SRTS funding, schools and municipalities can receive assistance in developing school travel plans from the Safe Routes to School Regional Coordinators at their Transportation Management Association (TMA). You can find your Regional Coordinator on the NJ Safe Routes Resource Center website at https://www.saferoutesnj.org/find-your-srts-regional-coordinator/

To receive consideration for Silver level SRTS Recognition, share your School Travel Plan with the NJ Safe Routes to School Resource Center by emailing it to srts@ejb.rutgers.edu. For more information on the Recognition Program Levels, visit https://www.saferoutesnj.org/about-the-safe-routes-to-school-recognition-program/

Municipalities and school districts registered to Sustainable Jersey can include School Travel Plans as part of the submission requirements to receive certification. For more on Sustainable Jersey, visit https://www.sustainablejersey.com/





RECOMMENDATIONS FOR A SCHOOL ROUTE PLAN

The federal MUTCD recommends that a school route plan for each school serving elementary to high school students should be prepared in order to develop uniformity in the use of school area traffic controls and to serve as the basis for a school traffic control plan for each school (MUTCD, Section 7A.02) Section 7A.02 specifically has guidance on School Route Plans and School Crossings, with a visual example of a School Route Plan Map as Figure 7A-1(beginning on page 969)

The school route plan should be developed by the school, law enforcement and traffic officials responsible for school pedestrian safety and should include a map. The map should show:

- Streets;
- The school;
- Existing traffic controls, including:
  - Signalized intersections;
  - Stop or yield sign approaches;
  - Crossing guard locations;
- Established school walk routes, and;
- Established school crossings including marked crosswalks.

How should school walk routes and school bicycle routes be developed?

Before routes can be designated, a team of school administrators, parents, teachers, students, municipal engineers and planners, and elected officials should comprehensively evaluate safety concerns along these potential routes. Steps in this process include:

1. **Inventory existing conditions, barriers, and opportunities in the school zone and surrounding neighborhood**
2. **Identify suggested school routes**
3. **Create and distribute the maps to the school community**
4. **Work with community partners to make recommended improvements**
5. **Reevaluate the routes**

Step 1 Inventory existing conditions, barriers, and opportunities in the school neighborhood

- Start with a base map that shows the location of the school and the surrounding neighborhood. The area evaluated will vary depending on the extent of the selected school walking zone. It is recommended that all the routes within one half mile to one mile of the school are assessed. The team can use paper road maps or use the NJ Safe Routes Resource Center online tools to map out the school zone.https://www.saferoutesnj.org/mapp
- Conduct a walk and/or bike assessment to identify existing facilities and safety concerns that could impact students walking and bicycling to and from school. While the walk and bike assessments are very similar, the challenges pedestrians and bicyclists face can be very different. For example, a few minor cracks in the sidewalk might be fine if you are walking, but a smooth road surface which is free of debris that can cause flat tires is much more important for bicyclists. Also, a walk assessment can identify areas where crosswalks are faded or missing, however it will not indicate whether or not there is a safe place to lock bicycles at school. Therefore, it is important to conduct both walk and bike assessments. More information, including downloadable materials for conducting a walk and bike assessment, is available at https://www.saferoutesnj.org/conducting-walk-bike-assessments/

Step 2 Identify suggested travel routes

- A recommended route should be selected on the basis of community input, traffic patterns, traffic volume, speed limits, road hazards, high crime areas, and the existence of sidewalks, paths, crosswalks, bicycle lanes, traffic signals and crossing guards. The chosen route should limit the number of street crossings and provide the greatest separation between students and traffic.
- Sometimes the safer route is not the most direct. However, routing students more than a block or two out of their way should be avoided or they will likely ignore them selected route. When determining the feasibility of requiring children to walk a longer distance to a street crossing with an existing traffic signal, the MUTCD recommends considering the following factors: the availability of adequate sidewalks or other pedestrian walkways to and from the location with existing control, the number of students using the crossing, the age levels of the students using the crossing and the total extra walking distance. Located in Section 7A.02 School Route Plans and School Crossings, under subsection 09 (page 970).
- Ultimately, every street in a school zone should be a walking or bicycling route. However, until that vision is achieved, identifying suggested walking and bicycling routes can help steer people to safer routes.



A Safe Routes to School Travel Plan Kick-off Meeting in Collingswood, NJ.

Step 3 Create and distribute the maps to the school community

- The map can be posted on the school website or handed out to parents and students.

Step 4 Work with community partners to make recommended improvements

- Seldom are school walk or bicycle routes ever completely free from safety risks. Once created, these maps can help municipalities and school administrators identify priorities for where sidewalk and roadway investments should be targeted.

Step 5 Reevaluate the routes

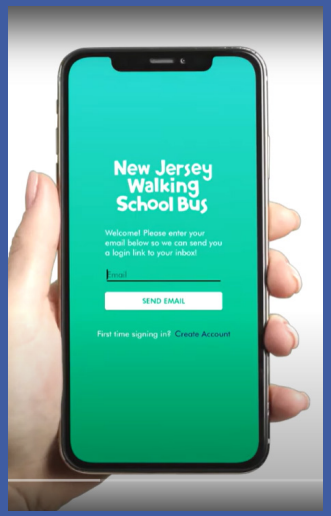
- Once developed, the routes need to be reassessed annually by the team of school administrators, parents, teachers, students, municipal engineers and planners, and elected officials to ensure they are still meeting the needs of the student population. This can be accomplished by periodically completing walk and bike assessments, which can help evaluate progress in reaching SRTS goals.

NEW JERSEY WALKING SCHOOL BUS APP

The New Jersey Walking School Bus app was developed with funding from NJDOT in partnership with New Jersey Safe Routes to School and Greater Mercer TMA.

The app helps parents connect to form walking groups (or "Walking School Busses") for students. It enables families to organize walks, assign parent leaders, and communicate through in-app messaging. Additionally, it tracks walking distances and calculates CO2 emissions saved by participants. The app makes it easy for parents to connect and provides a safe monitoring system for children walking to school, alerting parents when the Walking School Bus reaches its destination.

For more information, visit:
https://gmtma.org/walking-school-bus/



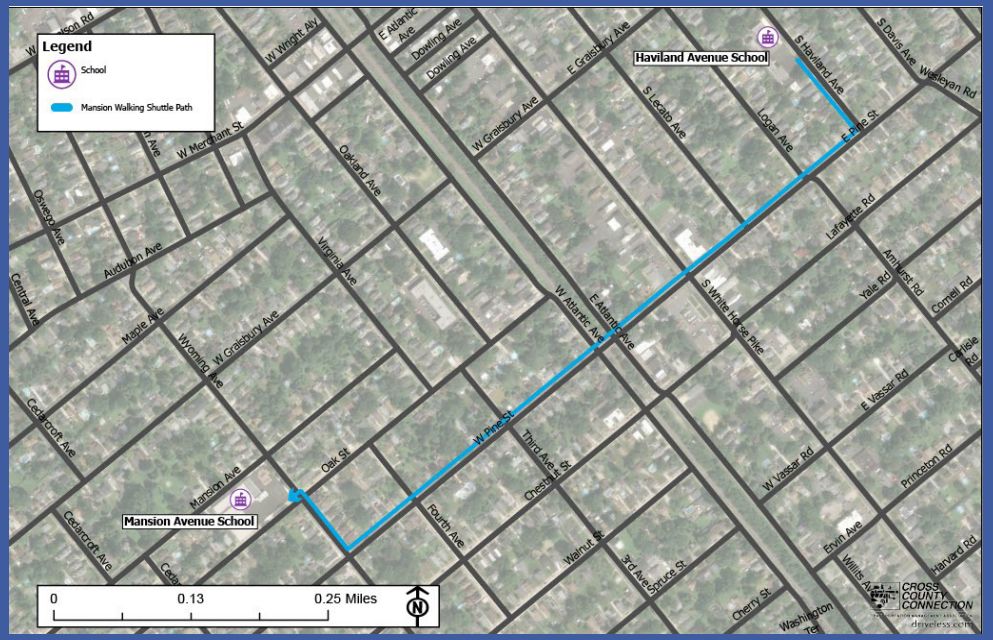
For more information on establishing a school walking route refer to School Route Maps and the Tools to Create Them developed in 2007 by the Pedestrian and Bicycle Information Center (PBIC). The resource is available at http://guide.saferoutesinfo.org/engineering/school_route_maps_and_the_tools_to_create_them.cfm

The School Administrator's Guide to School Walk Routes and Student Pedestrian Safety by the Washington Traffic Safety Commission and Washington State Department of Transportation suggests processes for developing and maintaining school walk routes. The Guide can be downloaded from www.wsdot.wa.gov/NR/rdonlyres/5463FD69-F7B9-477D-B9AA-D21CEEFCF722/0/SchoolAdminGuide.pdf.

AUDUBON BOROUGH "WALKING SHUTTLE"

Audubon Borough in Camden County is split in half by White Horse Pike, a state road with heavier and faster vehicle traffic than the rest of the municipal-owned roads in Audubon. Due to the additional safety concerns of young students crossing White Horse Pike, the Audubon School District hosts a student-led "Walking Shuttle" for students attending Mansion Avenue Elementary School, which serves students in grades 3 through 6timing.

During the school year, students who travel from the east side of the White Horse Pike can join the "Walking Shuttle." At 8:05 A.M., students meet at the blacktop of Haviland Avenue Elementary School and walk together down Pine Street to cross the White Horse Pike, with the assistance of crossing guards along the way, to arrive at Mansion Avenue Elementary School. Student Safeties are positioned at each crossing guard post along Pine Street and will join the "Walking Shuttle" as it passes their post. When the school day ends, students may use the "Walking Shuttle" to travel back down Pine Street to cross back over the White Horse Pike under staff supervision.



Top: The "Walking Shuttle" route in Audubon Borough. Bottom: Students utilizing and promoting the "Walking Shuttle" in Audubon. Image: Cross County Connection TMA







MONTCLAIR BIKE BUS

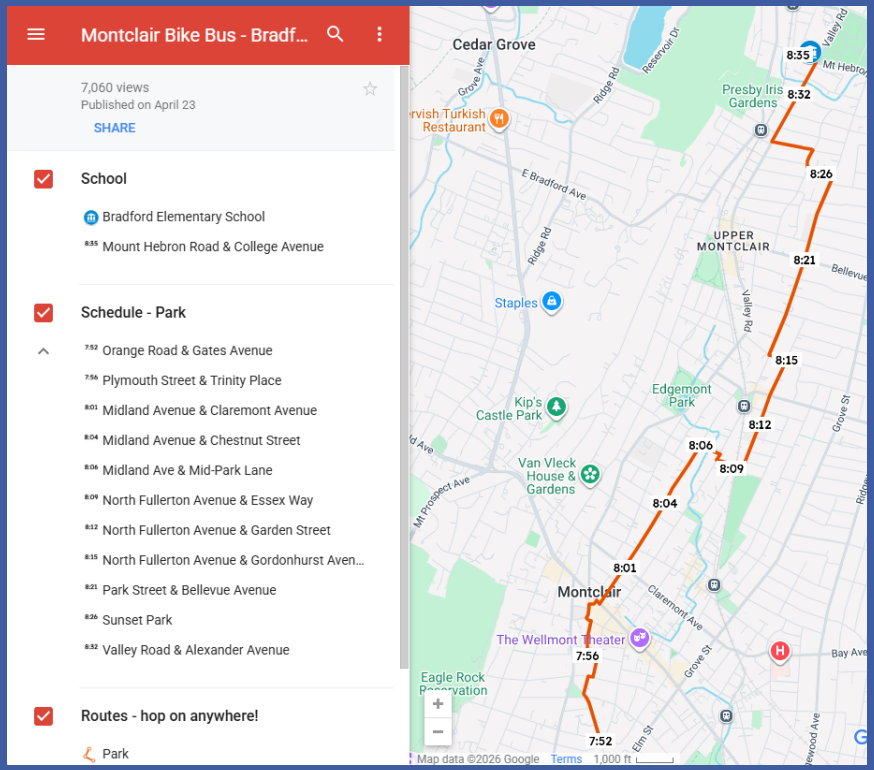
Montclair Bike Bus is a group organized by parents and community to ensure students have fun and safe routes to school. The group's initiatives include:

- Community support in local towns and schools.
- Route planning, timetables, and helpful tools for riders.
- Hosting community events.
- Advocating for transportation infrastructure and redesign recommendations.

Currently, there are 11 schools with bike bus routes, including Bradford, Bullock, Buzz, Edgemont, Glenfield, Hillside Express, Hillside and Nishuane, Northeast, Renaissance, and Watchung.

It is simple to join the group by checking the preferred routes and the timetable along the route. The map at the left bottom is an example to show a route to Bradford Elementary School. There are 11 stops with its timetable to join along the route. During the riding, the group always has adults at the front and back of the bus to ensure safety and follow the traffic laws.

For more information, visit Montclair Bike Bus.





Friday's ride in Montclair. Image: Montclair Bike Bus Instagram Account

Additional statewide pedestrian related laws that are applicable to school zones

N.J.S.A. 39:4-32 to 39:4-36

Drivers and pedestrians are responsible for each other's safety.

Drivers must:

- Stop and remain stopped while a pedestrian is in a marked crosswalk. [N.J.S.A. 39:4-36(a)(1)]
- Stop and remain stopped for pedestrians crossing within the adjacent crosswalk into which the motorist is turning right from either a red signal, stop or yield sign. [N.J.S.A. 39:4-36(a)(1) and (2)]
- Stop and remain stopped if a pedestrian is within one lane of their half of roadway. [N.J.S.A. 39:4-36(a)(1)]
- Not overtake and pass a vehicle that is stopped to permit a pedestrian to cross the roadway. [N.J.S.A. 39:4-36(a)(3)]
- Yield to pedestrians at unmarked crosswalks at an uncontrolled intersection. [N.J.S.A. 39:4-36(a)]
- Exercise due care for the safety of any pedestrian upon a roadway. [N.J.S.A. 39:4-36(a)(5)]

As of 2010, drivers now risk $200 fines, 15-day community-service sentences and four points if they fail to bring their vehicles to complete stops at crosswalks to allow pedestrians to pass in front of them. The new law, N.J.S.A. 39:4-36(b), provides that when a collision occurs between a vehicle and a pedestrian within a marked crosswalk, or at an unmarked crosswalk at an intersection, there shall be permissive inference that a driver did not exercise due care for the safety of the pedestrian. The law also specifies that a pedestrian crossing on a "Go" or green signal has the right of way over all vehicles, including those making turns.

Pedestrians must:

- Not leave a "curb or other place of safety" by walking or running into the path of a vehicle which is so close that it is impossible for the driver to yield or stop. [N.J.S.A. 39:4-36(a)(2)]
- Yield to drivers when crossing a road at any point other than within a marked or unmarked crosswalk at an intersection.[N.J.S.A. 39:4-36(a)(4)]
- Not cross a roadway against the "stop" or red signal at a crosswalk, whether marked or unmarked, unless otherwise specifically directed to go by a traffic or police officer, or official traffic control device. [N.J.S.A. 39:4-32(a)]
- Walk on sidewalks where they are provided and accessible. (N.J.S.A. 39:4-34)
- Walk along the extreme left side of a highway or its shoulder when possible facing approaching traffic, when practicable, if there is no sidewalk. (N.J.S.A. 39:4-34)
- Exercise due care for his/her safety. [N.J.S.A. 39:4-36(a)(5)]
- Not cross any highways having roadways separated by a median barrier except where provision is made for pedestrians to cross. (N.J.S.A. 39:4-34)
- Cross intersections at crosswalks where traffic is directed by a police officer or traffic signal. (N.J.S.A. 39:4-33)

Pedestrians risk fines and community service if they fail to yield the right of way to motorists anywhere except at crosswalks [N.J.S.A. 39:4-36 (b)].

N.J.S.A. 40:67-16.7 Temporary closing of streets for ingress and egress to school or for provision of recreational facilities

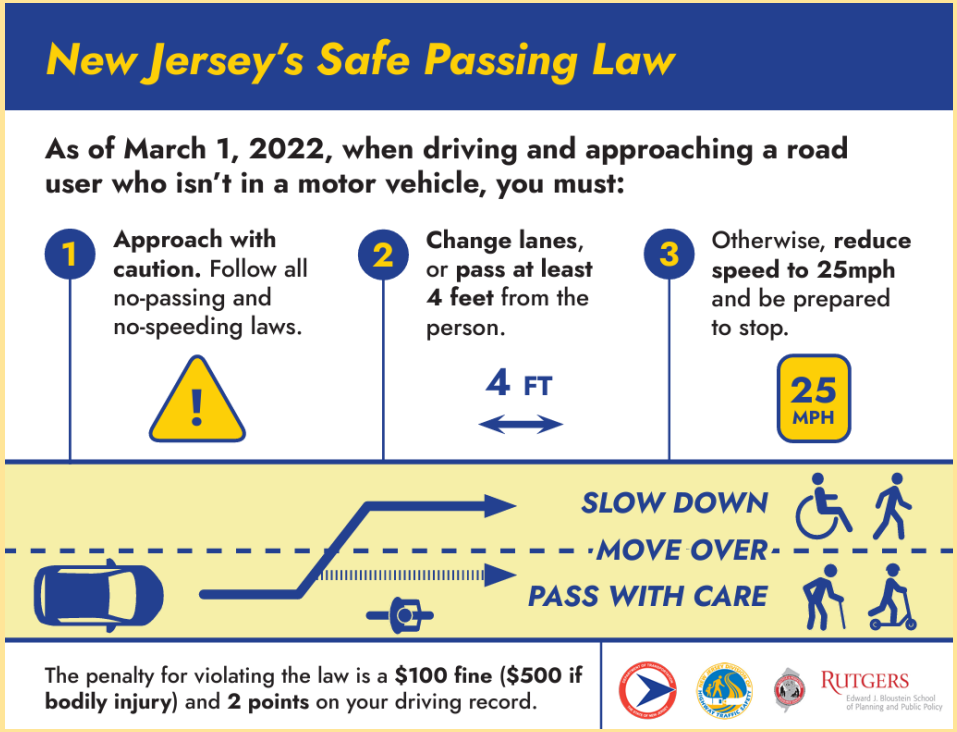
The governing body of any municipality may, by ordinance, authorize the chief executive officer or officer in charge of streets (for municipalities lacking a chief executive officer) to close any portion of any street within the block upon which a school is located if a safety problem exists for ingress and egress to any school or associated recreational facilities for school children. The time of temporary closure shall not exceed one (1) hour between 7:30 and 10:00 A.M., two (2) hours between 11:00 A.M. and 2:00 P.M. and one (1) hour between 2:30 and 4:30 P.M. on days when school is in session. The closed portion of the street may also be used by students for recreational purposes under proper supervision, including police supervision during those hours. The ordinance shall provide for the posting of proper warning signs in the affected street indicating that it is closed and the reason for the closure.

NEW JERSEY'S SAFE PASSING LAW

New Jersey's Safe Passing Law went into effect on March 1, 2022 (N.J.S.A. 39:4-92.4). The law provides clear rules of the road for all motorists when interacting with vulnerable road users (people on foot, bicycle, scooter, in a wheelchair, or otherwise not in a car, bus, or truck).

Drivers are required to use "due caution" whenever they encounter vulnerable people on the road, meaning:

- Drivers must move over a lane (if there's one to move into) while following all current no-passing and no speeding laws.
- On a single-lane road, drivers must provide a distance of at least 4 feet to safely pass a vulnerable road user.
- If 4 feet is not possible, drivers must slow to 25 mph and be prepared to stop until they can pass safely without endangering those sharing the road.
- Violating the law results in a $100 fine (causing bodily injury results in a $500 fine and 2 motor vehicle points).



Visit https://njbikeped.org/new-jerseys-safe-passing-law/ for more information

STREET SMART NJ

Street Smart NJ is a public awareness and behavioral change campaign focused on pedestrian safety. Launched in 2013 and coordinated by the North Jersey Transportation Planning Authority (NJTPA), the campaign aims to raise awareness of pedestrian and motorist laws while changing behaviors that contribute to pedestrian and cyclist crashes and fatalities. Since its inception, more than 200 communities have participated in Street Smart NJ.



Visit https://bestreetsmartnj.njtpa.org/ for more information

04 MUTCD Traffic Controls for School Zones

This chapter sets forth standards and guidance for the use of school zone signage, pavement markings and related devices throughout the State of New Jersey. This guide is based upon the standards and guidance presented in the 2023 Manual on Uniform Traffic Control Devices (11th Edition). The recommendations include typical solutions that are generally applicable, keeping in mind the unique needs of each school environment. The location of signage and distances relative to the school grounds noted here should be considered "best practice." This chapter ends with a series of tables that act as easily accessible resources regarding school zone signage and traffic control devices.

Standard Signage and Pavement Markings for School Zones

The following signs and pavement markings are recommended for use in school zones. School warning signs and any supplemental plaques used in association with these warning signs shall have a fluorescent yellow-green background with a black legend and border unless otherwise noted. Refer to the 2023 MUTCD for full guidance. A PDF of the manual is available at https://mutcd.fhwa.dot.gov/pdfs/11th_Edition/mutcd11theditionhl.pdf.

School Zone Sign Assembly (MUTCD Section 7B.02)

This sign assembly should be used on all approaches that enter a school zone. Guidance on the placement of school zone sign assembly is found in MUTCD Section 7B.02 (Placement examples for school zone signage are shown in figures 7B-2 through 7B-5). This sign is an assembly of two signs and includes the School sign (S1-1) and the SCHOOL Marker sign (S4-3P) below (it is noted that the SCHOOL Marker is optional). The marker sign should always be used to distinguish this warning sign from the School Crossing sign assembly. The downstream end of a designated school zone may be identified with an END SCHOOL ZONE (S5-2) sign.

Many jurisdictions also find it beneficial to use this sign to advise road users that they are approaching a school that is adjacent to a highway or where additional care is needed, even if no school crossing is involved and the speed limit remains unchanged. This is permissible.



S1-1

S4-3P

School Zone Sign Assembly

School Crossing Sign Assembly (MUTCD Section 7B.03)

This sign assembly is used to identify a crosswalk that is not protected by a stop or yield sign or a traffic signal. This sign is used primarily within the reduced school speed zone and/or along established school walking routes and/or where a significant student crossing exists. The School Crossing sign assembly consists of a School sign (S1-1) supplemented with a diagonal downward arrow (W16-7P) plaque pointing left or right at the crosswalk, depending on where the sign is installed. Guidance on the placement of the school crossing sign assembly can be found in the MUTCD Section 7B.03, Figure 7B-2. When used outside of the reduced school speed zone, this sign must be accompanied by the School Advance Crossing sign assembly.



S1-1



W16-7P

School Crossing Sign Assembly

School Advance Crossing Sign Assembly (MUTCD Section 7B.03)

This sign assembly is used exclusively in conjunction with the School Crossing sign assembly as a means of advanced warning. This sign assembly is only used when the school crosswalk exists outside of the posted reduced school speed zone, and therefore acts in lieu of the School Zone sign assembly in those areas. This sign assembly should precede the School Crossing sign assembly in each direction by enough distance to allow a motorist to stop before the crosswalk. For example, a motor vehicle traveling on a level surface at a rate of 30 miles per hour (mph) will need approximately 200 feet to stop before a crosswalk. This distance will change depending on speed and roadway conditions. See Table 2C-3 in the MUTCD for advanced placement guidelines.



S1-1



W16-9P

School Advance Crossing Sign Assembly

Marked Crosswalk (MUTCD Section 7C.01)

MUTCD recommends that crosswalks should be marked at all intersections on established routes to school where there are substantial conflicts between motorists, pedestrians, and bicyclists. Due to their visibility and durability, high-visibility crosswalk styles, including longitudinal bar, ladder, and bar pair are preferred over other styles. Marked crosswalks in school zones which are not protected by signalization or stop control should always be accompanied by the School Crossing sign assembly. Additional protection may include in-street crosswalk signs, refuge islands, raised crosswalks and/or flashing beacons.

Marked crosswalks alone, without other measures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness of the crossing, and/or provide active warning of pedestrian presence, should not be installed across uncontrolled roadways where the speed limit exceeds 40 mph and either:

- The roadway has four or more lanes of travel without a raised median or pedestrian refuge island and an ADT (average daily traffic) of 12,000 vehicles per day or greater; -or-
- The roadway has four or more lanes of travel with a raised median or pedestrian refuge island and an ADT of 15,000 vehicles per day or greater.

Figure 3C-1. Crosswalk Markings

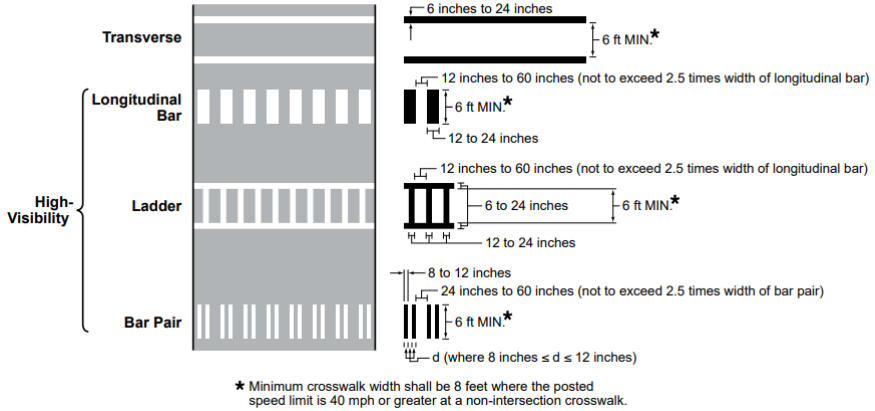


Image: MUTCD 11th Edition

School Sign Assembly



S1-1

The School Area Sign warns road users that they are approaching a school area. A School Area may include school buildings or grounds, a school crossing, or school-related activity adjacent to the roadway.



S4-3P =

School Zone Assembly, used to warn road users that they are approaching a designated school zone (**note, as stated earlier, the SCHOOL marker is optional**).



W16-9P =

School Advance Crossing Assembly, used to warn road users that they are approaching a crossing where school children cross the roadway



W16-7P =

School Crossing Assembly, used to warn approaching road users of the location of a crossing where school children cross the roadway

DISTRACTED DRIVING IN SCHOOL ZONES

Distracted driving (including talking or texting on cell phones, general cell phone use, utilizing the vehicle display for GPS for navigation or listening to music, eating) around schools can adversely impact safety for children walking and bicycling to school and influence parent decisions about how children will get between home and school. Research indicates that the probability and severity of a crash taking place are strongly influenced by driver attention. Various studies have documented an almost six times greater risk when dialing a phone and 23 times greater risk when texting. Other studies show that using a cell phone while driving delays your reaction time as much as having a blood alcohol concentration of .08, the legal limit for drunk driving.

Distractions draw driver attention off the road and away from the primary task of driving. This lengthens reaction time and puts pedestrians, bicyclists, drivers and passengers at greater risk. Research from Safe Kids USA shows that one out of every six drivers in school zones is distracted by the use of cell phones, eating, drinking, smoking, reaching behind, grooming and reading. The study, "Characteristics of Distracted Drivers in School Zones: A National Report," consisted of more than 40,000 observational road-side surveys conducted by local Safe Kids researchers in 20 locations across the United States. Use of electronics (such as cell phones, smartphones and other devices) was the leading category of distraction while driving, at 9.8%.

Findings from the study include:

- The majority of distracted drivers were observed during the afternoon school zone hours as compared to the morning hours.
- Distracted drivers appeared more frequently in school zones without flashing lights and in school zones that had a daily traffic volume of 10,000 or more cars.
- Drivers of larger vehicles such as sports utility vehicles, pickup trucks, and minivans were more distracted than car drivers.

The study also found that having a law on the books may somewhat decrease the prevalence of distracted driving. The study, which covered communities in 15 states, showed that those states with laws regulating cell phone or hand-held electronic device use in a vehicle were 13% less likely to have distracted drivers in school zones. New Jersey law bans the use of hand-held devices and texting for all drivers (N.J.S.A. 39:4-97.3). Hands-free cell phone use is also prohibited for bus drivers and novice drivers. New Jersey defines novice drivers as those under the age of 21 with a GDL or a provisional license.

In New Jersey, responses to distracted driving include:

- Engineering: Focusing on lower speed limits and enhancing the use of traffic-calming measures.
- Enforcement: Increasing enforcement of driving laws and using new technology to support enforcement efforts.
- Education and Encouragement: Raising public awareness and promoting programs that encourage Safe Routes to School.
- Policy: Developing model policies and prioritizing school zones within programs such as Target Zero.

Resource:

- Safe Kids USA, "Characteristics of Distracted Drivers in School Zones: A National Report"
- National Center for Safe Routes to School, "Getting Results: SRTS Programs That Reduce Speeding and Distracted Driving."

Optional Signs and Pavement Markings for School Zones

School Speed Limit Sign Assembly and END SCHOOL SPEED LIMIT Sign (MUTCD Section 7B.05)

This sign assembly is used where a reduced school speed limit zone has been established. The School Speed Limit assembly is placed at or as near as practical to the point where the reduced school speed limit zone begins. However, the School Zone sign assembly must be installed in advance of the first School Speed Limit sign assembly. In addition, the downstream end of a designated reduced speed school zone should be identified with an End School Speed Limit sign. A standard Speed Limit sign showing the speed limit for the section of highway that is downstream from the authorized and posted reduced school speed limit zone may be mounted on the same post above the END SCHOOL SPEED LIMIT sign (S5-3).



School Speed Limit Sign Assembly



End School Speed Limit Sign

Warning Beacons (MUTCD Section 4S.03)

Warning Beacons can be used to call attention to a School Speed Limit sign assembly or a School Zone sign assembly. Flashing yellow beacons are one of the most effective safety improvements a school can make, as they have been shown to decrease vehicle speeds an average of five to seven miles per hour in school zones. The "When Flashing" marker should be used if the sign is automated with a flashing beacon. If not automated with a beacon, the marker sign should read "When Children are Present." Signs that list school times may be too small and complex to be comprehended by a passing driver and don't take into account variations in school hours for holidays and other circumstances.

This system is most effectively applied to arterial and/or multi-lane roadways where drivers would not otherwise note school zone signage due to traffic conditions, speed of travel, and competing signage. The flashing lights should be timed to correspond to school arrival and dismissal times. Warning beacons may also be used with the School Crossing Sign Assembly or School Advance Crossing Sign Assembly.

ALTERNATIVES TO THE "WHEN CHILDREN ARE PRESENT" MARKER

The "When Children Are Present" marker (S4-2P) shown in the image to the left is sometimes substituted with:

- When Flashing;
- Fines Higher;
- Specified days/times.





RRFB with school zone sign in Washington Township High School, NJ. Image: Cross County Connection TMA

Pavement Word, Symbol, and Arrow Markings (MUTCD Section 7C.02)

This pavement marking should be used as an additional warning where vehicle speeds are a concern. It should be placed in proximity to reduced school speed zones or School Speed Limit sign assemblies. These markings are most effective on single lane local or collector streets, where they are visible from a distance and not obscured by heavy vehicle traffic. This application offers a cost-effective alternative to flashing beacons and may be more appropriate in a residential environment where flashing beacons may not be desirable.



"Slow School" pavement markings on Glenwood Avenue in East Orange, NJ.

In-Street Crosswalk Signs (MUTCD Section 7B.03)

The In-Street Pedestrian Crossing (R1-6a) sign or the In-Street School Children Crossing (R1-6c) sign may be used at mid-block crosswalks that are not protected by stop signs or signalization. If the In-Street Pedestrian Crossing (R1-6a) sign is used at a school crossing, a 12 x 4-inch SCHOOL (S4-3P) plaque may be mounted above the sign. The sign is placed on the yellow centerline immediately adjacent to (not within) the crosswalk. It should be placed on the side of the crosswalk from which most vehicles approach or as geometry permits. They are more effective on unsignalized two-lane low-speed streets than on multi-lane high-speed streets. They can be easily damaged and need to be reset or replaced when struck. When portable in-street signs are used for school crossings, they should be monitored by a school official or school crossing guard.



R1-6a



R1-6c

Vertical Reflective Strip (MUTCD Section 2A.21 and 7B.01)

Reflective strips should be used at stop-controlled intersections that have crosswalks within the school zone and along school walking routes to call extra attention to stop signs. Reflective fluorescent yellow-green strips may be used on School Area signs. MUTCD Section 7B.01 notes that school warning signs (including the "SCHOOL" portion of the School Speed Limit sign and associated supplemental plaques) shall have a fluorescent yellow-green background and that signs used for school area traffic control shall be retro-reflective or illuminated.

The strip shall be at least 2 inches in width and placed for the full length of the post from the sign within 2 feet above the edge of the roadway. The color of the strip must match the sign background, except that the color of the strip for YIELD and DO NOT ENTER signs shall be red.



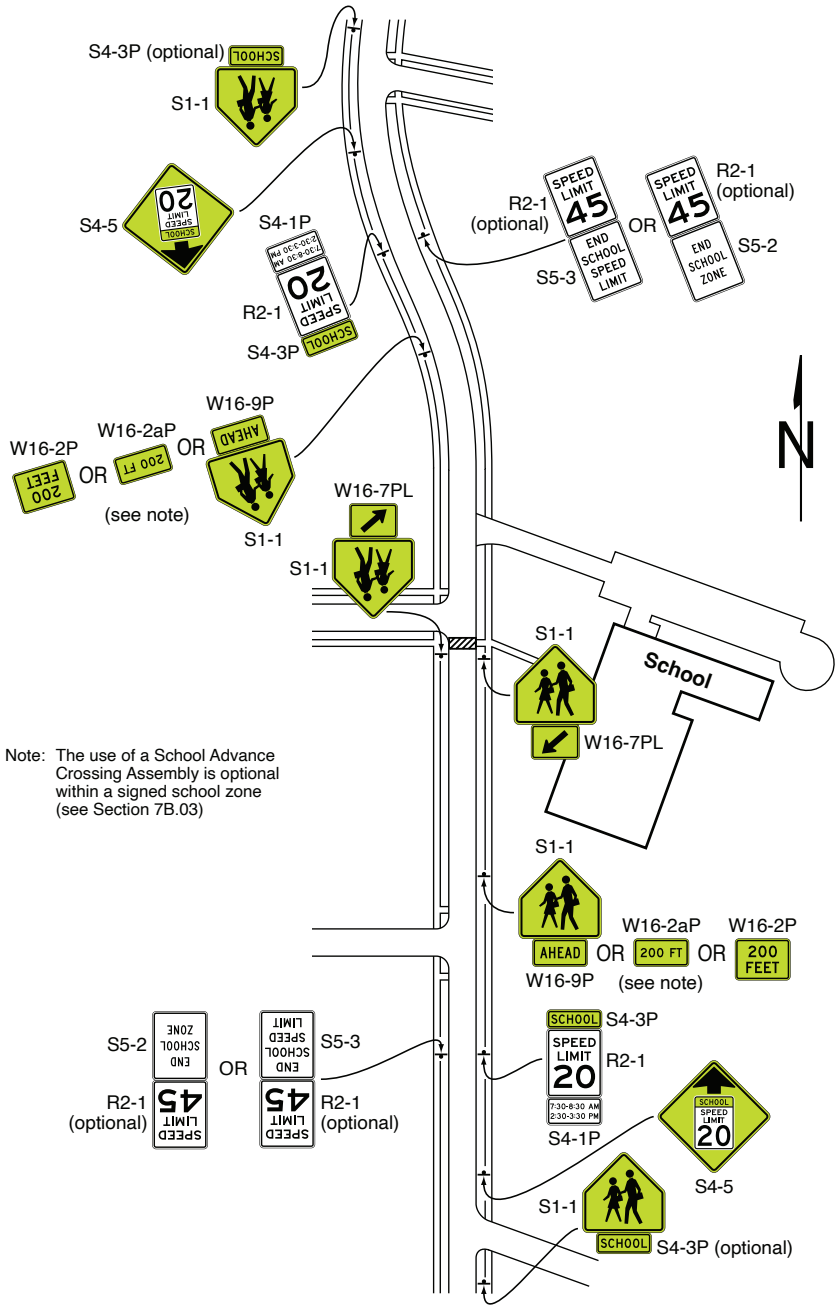
A stop sign with a reflective sign post strip next to a school sign with no reflective post strip in Hope, NJ.

Sign Placement

While the MUTCD provides guidance for the type of signage and its application, the placement of school zone signage is often dictated by standards set forth by state and local jurisdictions. New Jersey has no such standards; therefore the location of signs and distances relative to the school zone recommended here should be considered "best practice." Refer to the diagram for sign placement. Signs should be used judiciously, as over use may lead to driver noncompliance and excessive signs may create visual clutter.



Collingswood Middle and High School, NJ.



Example of Signing for a School Zone with a School Speed Limit and a School Crossing. Image: MUTCD 11th Edition

Signage Selection Matrix

Signs must be selected in response to the type of roadway and pedestrian crosswalk facilities located within proximity of a school. The following matrix should be used as a guide for signage options.

	Local or Collector Street	Arterial Street or Multi-Lane Street	Streets w/ Speed Limit 30 mph or above	Midblock Crosswalk within School Zone	Midblock Crosswalk Outside of School Zone
School Warning Sign (S1+S4-3P)	●	●	●		
Crosswalk Advance Warning Sign (S1+W16-9P)	○				●
School Crossing Sign (S1+W16-7P)				●	●
In-Street Crosswalk Sign (R1-6c)				○	○
School Speed Limit Sign (S4-3P + R2-1 + S4-2P) or (S4-4P)			●		
RRFB or Flashing Beacon		○	○		
Slow School Pavement Marking	○		○		
Oversized Signage		○	○		

● **Optional Application** ○ **Standard Application**

Size of School Signs (MUTCD Table 7B-1)

The sizes of signs and plaques to be used on conventional roadways in school areas shall be as shown in the table below. The sizes in the Conventional Road column shall be used unless engineering judgment determines that a minimum or oversized sign size would be more appropriate. The sizes in the Minimum column shall be used only where traffic volumes are low and speeds are 30 mph or lower, as determined by engineering judgment. The sizes in the Oversized column should be used on roadways that have four or more lanes with posted speed limits of 40 mph or higher. The sizes in the Oversized column may also be used at other locations that require increased emphasis, improved recognition or increased legibility.

Table 7B-1. School Area Sign and Plaque Sizes

Sign	Sign Designation	Section	Conventional Road	Minimum	Oversized
School	S1-1	7B.02	36 x 36	30 x 30	48 x 48
School Bus Stop Ahead	S3-1	7B.04	36 x 36	30 x 30	48 x 48
School Bus Turn Ahead	S3-2	7B.04	36 x 36	30 x 30	48 x 48
Reduced School Speed Limit Ahead	S4-5, S4-5a	7B.05	36 x 36	30 x 30	48 x 48
School Speed Limit XX When Flashing	S5-1	7B.05	24 x 48	—	36 x 72
End School Zone	S5-2	7B.02	24 x 30	—	36 x 48
End School Speed Limit	S5-3	7B.05	24 x 30	—	36 x 48
Yield (Stop) Here for School Crossing	R1-5a, R1-5c	7B.03	36 x 36	—	—
In-Street Ped or School Crossing	R1-6, R1-6a, R1-6b, R1-6c	7B.03	12 x 36	—	—
Overhead School Crossing	R1-9b, R1-9c	7B.03	90 x 24	—	—
Speed Limit (School Use)	R2-1	7B.05	24 x 30	—	36 x 48
Begin Higher Fines Zone	R2-10	7B.06	24 x 30	—	36 x 48
End Higher Fines Zone	R2-11	7B.06	24 x 30	—	36 x 48

Plaque	Sign Designation	Section	Conventional Road	Minimum	Oversized
Time of Day X:XX to X:XX AM X:XX to X:XX PM	S4-1P	7B.06	24 x 12	—	36 x 18
When Children Are Present	S4-2P	7B.06	24 x 12	—	36 x 18
School	S4-3P	7B.02, 7B.05	24 x 9	—	36 x 12
When Flashing	S4-4P	7B.05, 7B.06	24 x 12	—	36 x 18
Days of Week Mon-Fri	S4-6P	7B.05	24 x 12	—	36 x 18
All Year	S4-7P	7B.02	24 x 12	—	30 x 18
Fines Higher	R2-6P	7B.06	24 x 18	—	36 x 24
Fines Double	R2-6aP	7B.06	24 x 18	—	36 x 24
$XX Fine	R2-6bP	7B.06	24 x 18	—	36 x 24
XX Feet (2-line)	W16-2P	7B.02, 7B.03	24 x 18	—	30 x 24
XX Ft (1-line)	W16-2aP	7B.02, 7B.03	24 x 12	—	30 x 18
Directional Arrow	W16-5P	7B.02, 7B.03	21 x 15	—	30 x 21
Advance Turn Arrow	W16-6P	7B.02, 7B.03	21 x 15	—	30 x 21
Downward Diagonal Arrow	W16-7P	7B.02, 7B.03	21 x 15	—	30 x 21
Ahead	W16-9P	7B.02, 7B.03	24 x 12	—	30 x 18

Notes: 1. Larger sizes may be used when appropriate
2. Dimensions are shown in inches and are shown as width x height
3. Minimum sign sizes for multi-lane conventional roads shall be as shown in the Conventional Road column

Image: FHWA MUTCD, 11th Edition, Part 7 (Traffic Control for School Areas)

OUTDATED MUTCD SIGNS COMMONLY FOUND IN SCHOOL ZONES

This table highlights traffic control devices that are no longer compliant with current MUTCD standards but may still appear in school zones. It includes examples of outdated signs, their typical usage scenarios, and the recommended modern replacements.

OLD TRAFFIC CONTROL DEVICE	USE SCENARIO	NEW TRAFFIC CONTROL DEVICE
 **S1-1 sign** yellow color	Vehicular approach to school zone or other area of heavy pedestrian movements of school children	 **S1-1 sign** with either “AHEAD” or “XXX FEET” plaque, fluorescent yellow-green color
 **S1-2 sign** yellow color (sign with depiction of crosswalk lines is no longer in MUTCD)	School crossing (crosswalk in school zone)	 **S1-1 sign** with downward-pointing arrow plaque, fluorescent yellow-green color

OLD TRAFFIC CONTROL DEVICE	USE SCENARIO	NEW TRAFFIC CONTROL DEVICE
 **W11-2 sign** Yellow color	Vehicular approach to crosswalk or other area of heavy pedestrian movements	 or **W11-2 sign** With either "AHEAD" or "XXX FEET" plaque, fluorescent yellow-green color
 **W11-2A sign** Yellow color (sign with depiction of crosswalk lines is no longer in MUTCD)	Crosswalk or other area of heavy pedestrian movements	 or **W11-2 sign** With downward arrow plaque, fluorescent yellow-green color, pointing left or right at the crosswalk

OLD TRAFFIC CONTROL DEVICE	USE SCENARIO	NEW TRAFFIC CONTROL DEVICE
 Round flashing signal indications (arrangements may vary) accompanying W11-2 Pedestrian sign, W11-15 Trail Crossing sign, or S1-1 School sign (This is still acceptable, however, RRFBs are an FHWA Proven Safety Countermeasure)	Pedestrian crossing, or school crossing, requiring augmentation by flashing signals	 **Rectangular Rapid Flashing Beacon ("RRFB")** With either W11-2 Pedestrian sign, W11-15 Trail Crossing sign, or S1-1 School sign
 Some agencies have installed these post-mounted (like typical traffic signs); this is not supported by MUTCD	"Stop For Pedestrians" vertical panel	 Sign is intended to be installed on a flexible stanchion within the pavement, at or near the crosswalk

OLD TRAFFIC CONTROL DEVICE	USE SCENARIO	NEW TRAFFIC CONTROL DEVICE
  	Crosswalk with warning of NJ state law requiring motorists to stop for (not "yield to") pedestrians in crosswalk	  

05 Determining Placement of Crossing Guards

The proper placement of well-trained crossing guards is one of the most effective methods to improve student and crossing guard safety at crossings. There are many factors that contribute to the need for a crossing guard at a particular location, including the age of students, road conditions (width, number of lanes), sight distances, presence or absence of traffic control devices, vehicle speed, traffic and pedestrian volumes, truck traffic, location of crossing, and crash history.

How to Identify the Locations where Crossing Guards are Needed

Provisions for hiring and training qualified crossing guards have long been established in New Jersey State Law (N.J.S.A. 40A:9-154.1 - 40A:9-154.4). According to State statute, "*the chief of police or other chief law enforcement officer of a municipality shall have the right to position school crossing guards on any street or highway within the municipality; provided, however, that such guards may be stationed only when it is necessary to control or direct vehicular or pedestrian traffic during those time periods of a school How to Identify the Locations where Crossing Guards are Needed day when it is necessary to control traffic.*" It is recommended that the identification of adult school crossing guard locations involve not only the police department, but also the traffic engineering and/or planning departments, school representatives, and parents.

According to the NJ Safe Routes to School Resource Center, "Every school day, over 6,400 crossing guards throughout New Jersey assist hundreds of thousands of children walking and biking to and from school."

There are no specific state guidelines or criteria in New Jersey to determine which crossings require an adult crossing guard (though a Model Policy can be found at www.njcrossingguards.org and MUTCD guidance can be found on the following page). The design and implementation of an adult school crossing guard program is largely a local decision and no set of guidelines can cover all the unique conditions that may describe crossing locations. The police department along with the municipality's traffic engineering and/or planning department and school representatives should determine the criteria for locations that need crossing guards, and then gather the information about local conditions that will be used to determine the need for the crossing guards.



A crossing guard stops traffic for pedestrians in a school zone.

MUTCD ADULT CROSSING GUARDS - WHO SHOULD DO IT AND WHERE SHOULD THEY GO?

The 2023 Manual on Uniform Traffic Control Devices (MUTCD) provides the following guidance relating to crossing guards:

- Who should be a crossing guard
- The equipment a crossing guard must use
- Where crossing guards should be assigned

Who should be a crossing guard?

Section 7D.01
"High standards for selection of adult crossing guards are essential because they are responsible for the safety of and the efficient crossing of the street by school children within and in the immediate vicinity of school crosswalks."

Section 7D.01
"Jurisdictions should have policies and procedures for the qualifications, selection, and training of adult crossing guards."



A high-visibility vest and stop paddle.
Source: www.njcrossingguards.org

What equipment must crossing guards use?

Section 7D.02.01 - 05
"Law enforcement officers performing school crossing supervision and adult crossing guards shall wear high-visibility retroreflective safety apparel labeled as ANSI 107-2020 standard performance for Class 2, Type R, as described in Section 6C.05.

Adult crossing guards shall not direct traffic in the usual law enforcement regulatory sense. In the control of traffic, they shall pick opportune times to create a sufficient gap in the traffic flow. At these times, they shall stand in the roadway to indicate that pedestrians are about to use or are using the crosswalk, and that all vehicular traffic must stop.

Adult crossing guards shall use a STOP paddle. The STOP paddle shall be the primary hand-signaling device.

The STOP paddle shall comply with the provisions for a STOP/SLOW paddle except both sides shall be a STOP face.

The paddle shall be retroreflective or illuminated when used during hours of darkness."

Where should crossing guards be placed?

Section 7D.01.01
"Adult crossing guards may be used to provide gaps in traffic at school crossings where an engineering study has shown that adequate gaps need to be created and where authorized by law."

Section 7A.02.07
"The frequency of gaps in the traffic stream that are sufficient for student crossing is different at each crossing location. When the delay between the occurrences of adequate gaps becomes excessive, students might become impatient and endanger themselves by attempting to cross the street during an inadequate gap. In these instances, the creation of sufficient gaps needs to be considered to accommodate the crossing demand."



A New Jersey crossing guard.
Source: www.njcrossingguards.org

What information should be collected when identifying the locations where crossing guards are needed?

Adult school crossing guards should be assigned to school crossings only after the need is established. While there are a variety of criteria that can be applied to determine the need for a crossing guard, the criteria utilized must be applied consistently to allow a community to provide crossing guards where schools need them the most. In order to guarantee that the criteria are applied consistently, it is recommended that the municipality adopt a policy outlining the guidelines. Developing a uniform procedure of study and analysis can also help the municipality avoid complaints and questions surrounding crossing guard site selection.

The Safe Routes to School National Partnership recommends that local communities consider collecting the following information when identifying guard placement:

The age of the students who are crossing

Generally, younger children need more assistance than older children because they have a more difficult time judging the speed and distance of approaching vehicles and may be tempted to cross when it is unsafe.

The width of the street and the number of lanes of traffic students must cross

Wide streets with multiple lanes of traffic typically require the use of two or more adult school crossing guards. If only one crossing guard is assigned to a multi-lane street, it is important for the crossing guard to remain in the center of the roadway while assisting students and be aware of what is happening in every lane before directing students to enter the crosswalk.

The sight distance at the crossing

These conditions are measured from the students' and drivers' perspectives using actual vehicle operating speeds. Sight distance can be affected by temporary obstructions, such as parked vehicles and piled snow near the crossing.

Safe gaps in traffic

Available gaps in traffic are a primary factor in determining the need for a crossing guard. Start by identifying if the gaps are long and frequent enough to allow safe crossing opportunities. The Institute of Transportation Engineer (ITE) School Trip Safety Program Guidelines state that on average, at least one adequate gap should occur each minute to allow for children to cross without undue delay or risk. However, other factors, such as volume of child pedestrians, should also be considered when determining the need for adult school crossing guards or other traffic control. If traffic volumes during crossing hours do not correspond to enough safe gaps, some method to interrupt traffic should be considered, such as a crossing guard or traffic signal. See the following section on How to Conduct a Gap Study.



Crossing guard at an unsignalized mid-block crossing.

Presence of traffic control devices, including traffic signals, signs and pavement markings

The sufficiency of traffic control devices, if present, should be evaluated to determine if they allow enough time for safe pedestrian crossing. For example, a signalized intersection at a school crossing location should always have WALK/DON'T WALK signals.

The speed of vehicles at the crossing

Vehicles that travel faster require greater stopping distances, and younger children have more difficulty than adults in judging the speed of a fast-approaching vehicle.



Younger students walking to school.

MODEL MUNICIPAL CROSSING GUARD POLICY
HTTPS://WWW.NJCROSSINGGUARDS.ORG/

The model policy was developed as a guide for New Jersey municipalities seeking to adopt a School Crossing Guard Policy and can be downloaded at https://www.njcrossingguards.org/tools/. The model policy includes the following section on crossing guard placement.

In New Jersey, crossing guard placement is determined by the municipality through traffic engineering studies and consultation with the local school district. Sites where a school crossing guard may be needed are surveyed by the Police Department and the Engineering Department following requests or observations made by the school crossing guard supervisor, school officials, and/or concerned parents.

1. The request for establishing a new school crossing guard post should be put in writing to the school crossing guard supervisor who, in response, conducts an observational survey of the location during key times.

2. The request for a school crossing guard at a prospective location will be approved or denied based on the evaluation of all available data. The school crossing guard supervisor will coordinate all studies to be conducted and confer with the appropriate transportation authority (i.e., municipal, county, state).

3. The Police Department will conduct an annual survey to identify locations requiring school crossing guards or the police department will use school district attendee addresses to determine crossing guard posts on an annual basis.

Volumes of traffic and pedestrians

Local transportation planning or engineering departments can provide or help collect this data. Vehicle counts may be readily available, but pedestrian counts will likely need to be collected. The number of students currently using pedestrian facilities as well as the projected pedestrian demand based on school demographics or improvements to infrastructure should be determined.

The attendance boundary and walk zone for each school

The distances that walk zones extend from schools as well as policies regarding the provision of bus service can impact the number of children walking to school and the routes they take.

Crash history of the crossing

The type and time of day that each crash occurs at a specific location should be recorded and analyzed.

The distance the crossing is from a school and the type of adjacent land use

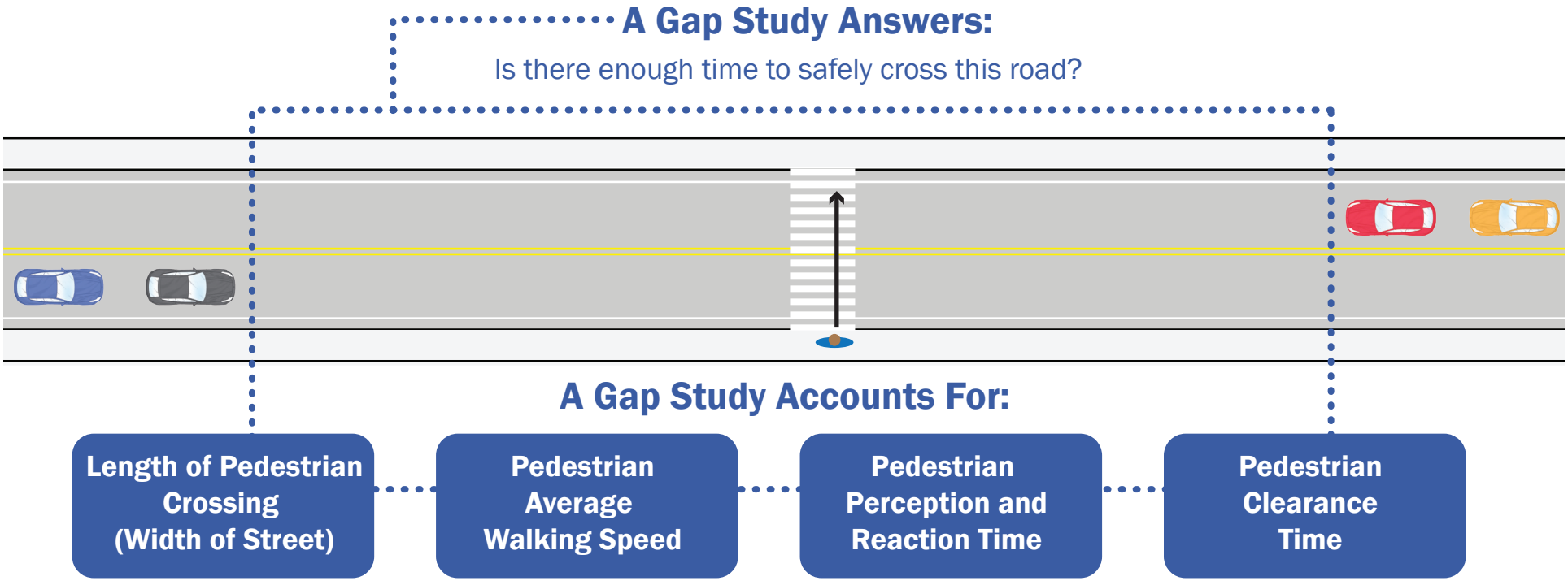
A crossing in close proximity to a school within a residential neighborhood may attract more student pedestrians than, for example, a crossing located farther from a school surrounded by non-residential land uses.



High volume student crossing in Collingswood, NJ.

How to Conduct a Gap Study

Available gaps in traffic are a primary factor in determining the need for a crossing guard. Gap studies provide a method of quantitative analysis for road crossing opportunities accounting for the duration of gaps in motor vehicle traffic, the length of the pedestrian crossing (width of street), and pedestrian average walking speed, perception and reaction time, and clearance time in order to determine where crossing guards are needed to ensure safe crossing. According to the Institute of Transportation Engineer (ITE) School Trip Safety Program Guidelines, an acceptable gap may be defined as the minimum time between vehicles that 85% of all groups of pedestrians waiting to cross a street will accept as adequate to cross the street. On average, at least one gap should occur each minute to allow for children to cross without undue delay or risk.



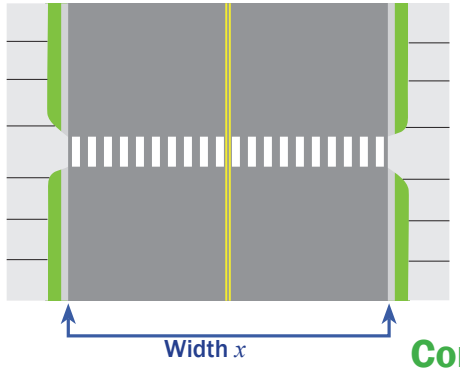
Gap studies consist of determining the number of rows of pedestrians in the predominant (85th percentile) pedestrian group size, determining the length of a minimum adequate gap, measuring the number and size of gaps in the traffic stream, and determining the sufficiency of adequate gaps. The minimum safe crossing time, the gap, is calculated using the following formula:

$$\text{Gap} = \frac{\text{Width of Street}}{\text{Average Walking Speed}} + \text{Perception and Reaction Time} + \text{Pedestrian Clearance Time}$$

Width of Street

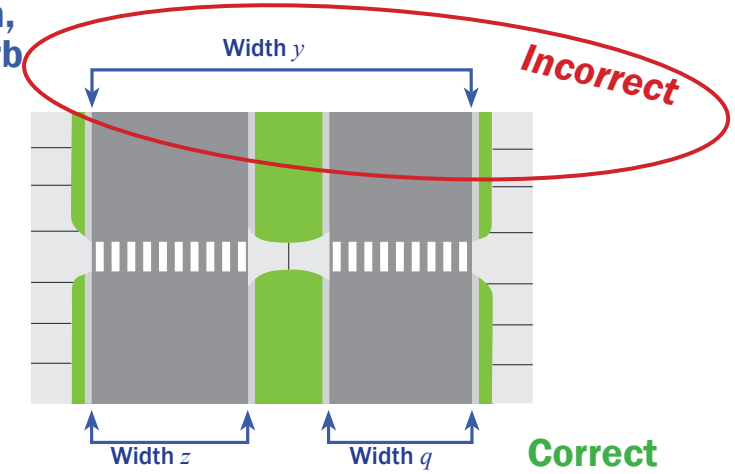
The crossing distance is normally measured from one curb to the other. If the roadway is divided such that the median provides a safe haven for the school crossing, a minimum adequate gap will be determined for each half of the crossing.

Without median, measure curb to curb.



Correct

With median, measure curb to curb on either side.



Correct

Average Walking Speed

The 2009 MUTCD assumes a walking speed of 3.5 feet per second, but allows consideration of slower walking speeds to accommodate slower pedestrians such as those in wheelchairs or those with visual impairments. Large groups of children as well as children hand-assisted by adults also have slower walking speeds. Therefore, the slower 3 feet per second walking speed should be assumed as the average walking speed (MUTCD Section 4E.06).

3
feet per second

Perception and Reaction Time

Physical and cognitive abilities of young children differ from the abilities of adults. In general, gap studies add 3 seconds to account for the time required for a child to look both ways, make a decision, and begin walking across the street.

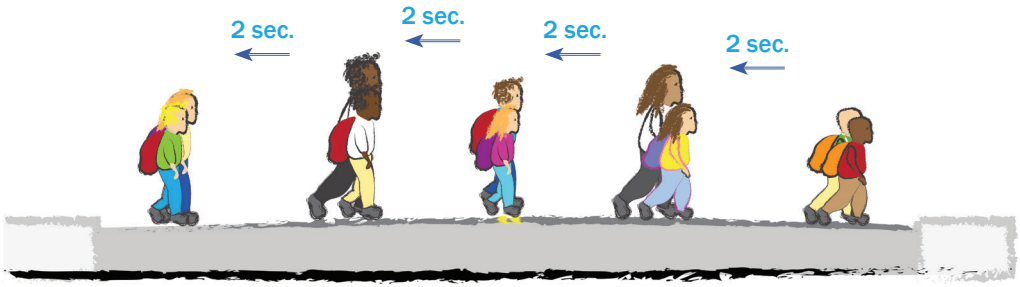
3
seconds

Pedestrian Clearance Time

Pedestrian clearance time is the additional time (in seconds) required to clear large groups of students from the roadway. Children are assumed to cross the roadway in rows of five with two-second time intervals between each row. The clearance time is equal to 2(N - 1) where N is the number of rows in 85th percentile group size, 1 represents the first row and 2 is the time interval between rows in seconds.

$$2(N-1)$$

- 2: seconds between each row
- N: number of rows in 85th percentile of group size
- 1: first row is subtracted from calculation



Calculating Pedestrian Clearance Time: How to determine "N", the number of rows in the 85th percentile pedestrian group size

The survey should begin upon arrival of the first child and end when the last one has crossed the street. The field survey portion of the study must be done under normal conditions involving the weather, school schedule, nearby traffic generator schedule, etc.



Pedestrian Group Survey Size

The observer should count the students as they gather into groups to wait for a gap in the traffic and record the sizes of the groups in the table below. It is important to record the number of children because the school crossing signal warrant in the MUTCD includes a requirement of a minimum of 20 students during the highest crossing hour (MUTCD Section 4C.06 Warrant 5, School Crossing).

Pedestrian Group Size Survey

Location: Crossing Main St @ Maple Ave, Anytown, NJ

Date: 05/15/13 | Time from: 7:30 AM | Time to: 9:00 AM | Observer: Liz W.

Street Width: 35' | Raised Median: No | Width of median: N/A

Notes:

Group Size	Number of Students in Each Group	Number of Groups	Cumulative Number of Groups	# of Rows (N)
5 or less	2, 2, 4, 3, 5, 2, 3, 4	8	8	1
6 – 10	6, 8, 6, 7, 7	5	13	2
11 – 15	12, 11, 14	3	16	3
16 – 20	17, 19	2	18	4
21 – 25				5
26 – 30				6
31 – 35				7
36 – 40				8
41 – 45				9
46 – 50				10
	Total Students:	**Total Number of Groups:**	18 × 0.85 = 15.3	**N =** 3

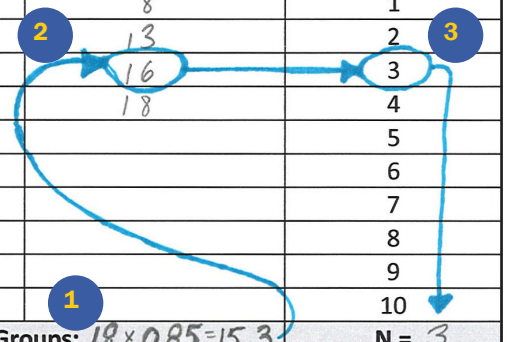
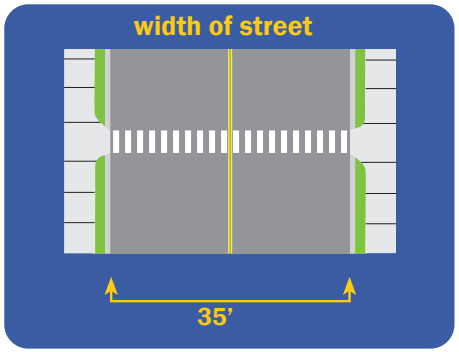


Table adapted from Iowa DOT's Office of Traffic Safety Form 1 – Pedestrian Group Size Survey

In order to obtain the 85th percentile group size:

1. Multiply the cumulative total number of groups by 0.85.
2. Fit the product of 1 within the series of ranges established in the Cumulative Number of Groups column. In this case, 15.3 fits between 13 and 16, so assign it to the row with 16.
3. The N value for 16 groups is 3. The N value of 3 will be used to complete your Gap Study.

Example: Determining the Minimum Adequate Gap



average walking speed: **3** feet per second

perception and reaction time: **3** seconds

pedestrian clearance time: **2(N-1)** where N=3 (see calculation on previous page)

$$\text{Gap} = \frac{\text{Width of Street}}{\text{Average Walking Speed}} + \text{Perception and Reaction Time} + \text{Pedestrian Clearance Time}$$

$$= \frac{35}{3} + 3 + 2(3-1)$$

$$= 18.67$$

$$\approx 19 \text{ seconds}$$ **Minimum Adequate Gap for Safe Crossing**

After the minimum adequate gap is calculated, the actual gaps in traffic must be measured. The length of each gap greater than the minimum (19 seconds in the example above) is recorded. If there is at least one safe gap per minute of crossing time, there may be no need for any special traffic controls. If, however, there is not at least one safe gap per minute, officials should consider using an adult crossing guard or traffic signal to create safe gaps.

What are the Guidelines for School Crossing Guard Use?

As is true for all traffic control measures, certain warrants must be met before adult guards are employed. An adult crossing guard should be considered when:

1. A school crossing guard is more feasible and economical than either a pedestrian bridge or tunnel or a traffic signal specifically installed to handle the crossing problem; and/or

2. There are special hazards, at either signalized or non-signalized locations, which can be properly handled only by adult supervision. These hazards include unusual conditions such as complicated intersections, heavy vehicular turning movements and high vehicular approach speeds; and/or

3. A change in school routes is imminent, thus requiring protection at the location for only a limited time. An example would include construction within a city which detours the preferred school route to another location that may need additional control.

Specific criteria regarding number of students, traffic volume and roadway condition vary depending on location. In addition to providing guidelines from New Jersey, the following section of this chapter contains information regarding adult crossing guards produced by the State of California.



Crossing guard wearing a retroreflective jacket. Image: Newton Police Department, NJ



Crossing guard wearing a retroreflective jacket and helping children cross the street in Montclair, NJ. Image: VTC



A retroreflective safety vest. Image: VTC

Examples of Guidelines for Crossing Guard Deployment

CALIFORNIA CRITERIA FOR ADULT CROSSING GUARDS (CALIFORNIA MUTCD 2026 EDITION, SECTION 7D.01 ADULT CROSSING GUARDS)

Adult Crossing Guards normally are assigned where official supervision of school pedestrians is desirable, while they cross a public highway, and at least 40 school pedestrians for each of any two hours (not necessarily consecutive) daily use the crossing, while going to, or from, school.

Adult crossing guards can be considered under the following conditions:

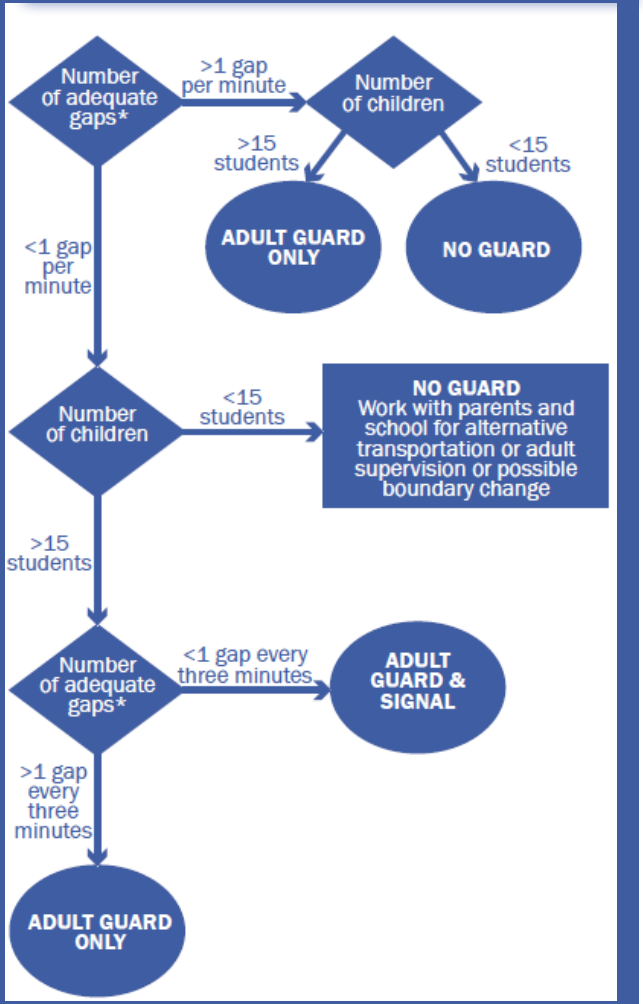
1. At uncontrolled crossings where there is no alternate controlled crossing within 600 feet; and
   a. In urban areas where the vehicular traffic volume exceeds 350 during each of any two hours (not necessarily consecutive) in which 40 or more school pedestrians cross daily while going to or from school; or
   b. In rural areas where the vehicular traffic volume exceeds 300 during each of any two hours (not necessarily consecutive) in which 30 or more school pedestrians cross daily while going to or from school. Whenever the critical (85th percentile) approach speed exceeds 40 mph, the guidelines for rural areas should be applied.
2. At stop sign-controlled crossings:

Where the vehicular traffic volumes on undivided highways of four or more lanes exceeds 500 per hour during any period when the school pedestrians are going to or from school.

3. At traffic signal-controlled crossings:
   a. Where the number of vehicular turning movements through the school crosswalk exceeds 300 per hour while school pedestrians are going to or from school; or
   b. Where justified through analysis of the operations of the intersection.
4. At pedestrian hybrid beacon-controlled crossings.

Consider discontinuing the use of Adult Crossing Guards at crossings when they no longer meet the conditions under which they were initially used.

FLOW CHART DEPICTING THE PROCESS FOR PLACEMENT OF A SCHOOL CROSSING GUARD IN THE CITY OF SPRINGFIELD, MO



Source: Training Manual for School Crossing Guards

What is the process for requesting new adult crossing guards?

All requests for new adult crossing guards should be directed to the school district or the police department. The school district will make the request to the police department, who will arrange the collection of the necessary data to thoroughly study the location. The school crossing guard supervisor within the police department will coordinate all studies to be conducted and confer with the appropriate transportation authority (i.e., municipal, county, state).

If the standards are met for placing a crossing guard, the police department will explore funding options available for hiring a new crossing guard. When the funds are budgeted, the new adult crossing guard will be placed. If the standards for a new crossing guard are not met, the police department will notify the school district that the standards were not met.

Annual Reviews

In New Jersey, the governing body of any municipality may appoint school crossing guards for terms not exceeding one year and may revoke such appointments for cause and after proper hearing before the chief of police or other chief law enforcement officer of the municipality (N.J.S.A. 40A:9-154.1). In order to allocate crossing guards in the most effective manner, the police department should conduct an annual survey to identify locations that require school crossing guards. During these annual reviews the placement and/or removal of school crossing guards should be reviewed by both a representative of the engineering department and the school district. It is important for police officers to document their process and decisions for assigning or removing a crossing guard post.

Decommissioning a Crossing Guard Post

As student populations shift or age out of the need for crossing guard assistance with crossing streets, crossing guard posts may need to be moved or decommissioned. When decommissioning a post, the municipality should use the same criteria used to determine if a crossing guard is necessary at a particular location. Factors should include the number of students, the age of students, road conditions (width, number of lanes), sight distances, presence or absence of traffic control devices, vehicle speeds, traffic and pedestrian volumes, truck traffic, location of crossing, and crash history.

If appropriate, the municipality should perform a gap study of the crossing location to look at the width of the street and the pedestrians' average walking speed, perception and reaction time, and clearance time. If officials find that there is at least one adequate gap in the traffic per minute to allow for safe crossing, the decommissioning may be justified on this basis.

Officers may work with the schools and/or may contact the families affected to explain the change and to inform walkers of alternative routes to school. The critical points to remember when decommissioning a post are to document the decision made, the reasons behind the decision, and to inform the community of the change in a timely manner.



A crossing guard helps students cross the street. Image: www.njcrossingguards.org

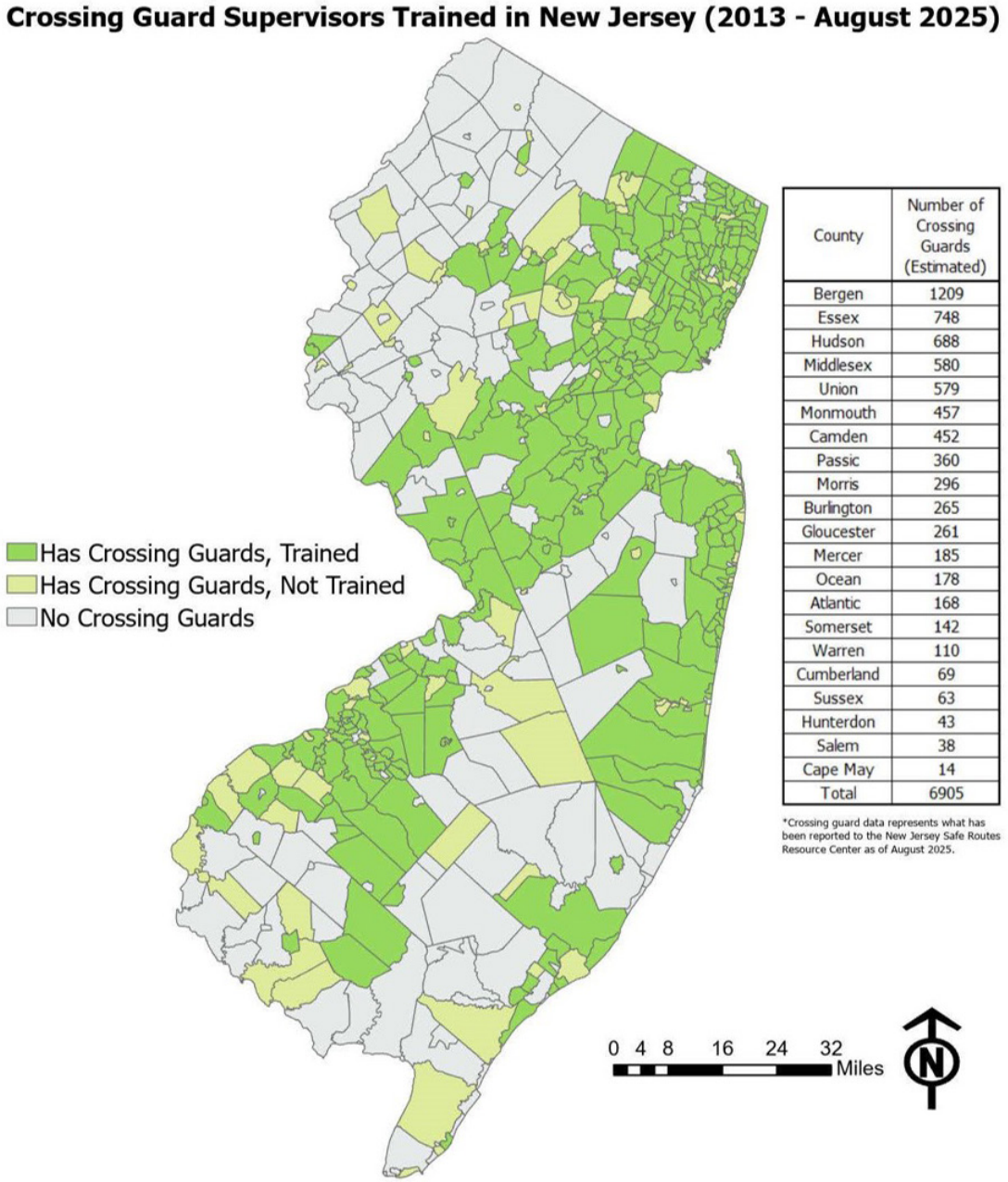
WANT TO LEARN MORE? CHECK OUT: WWW.NJCROSSINGGUARDS.ORG

The NJ Safe Routes Resource Center compiles resources and tools to support school crossing guards and to assist traffic safety officers at www.njcrossingguards.org. New Jersey Safe Routes to School conducts training programs for Municipal Police Traffic Safety Officers that supervise school crossing guards. This program is jointly sponsored by NJDOT and NJDHTS. The "*Crossing Guard Train the Trainer*" class instructs supervisors on uniform and comprehensive training to help crossing guards perform their duties more effectively and safely. The website is a comprehensive source of information for supervisors and crossing guards, containing reports, relevant laws and guidance, training schedule and sign-up, educational videos, and tools.

The website also provides information for scheduling direct, in-person training for crossing guards[1]. The training includes a discussion of traffic laws, gap assessment, proper crossing procedures, uniforms and equipment, expectations, duties, and conditions at the post.

All of this information is available at https://www.njcrossingguards.org/

1 Note that while the supervisor "Train the Trainer" program is funded by the NJDOT and NJDHTS at no cost to participants, direct training for crossing guards requires a fee and is not a free service.



County	Number of Crossing Guards (Estimated)
Bergen	1209
Essex	748
Hudson	688
Middlesex	580
Union	579
Monmouth	457
Camden	452
Passic	360
Morris	296
Burlington	265
Gloucester	261
Mercer	185
Ocean	178
Atlantic	168
Somerset	142
Warren	110
Cumberland	69
Sussex	63
Hunterdon	43
Salem	38
Cape May	14
Total	6905

*Crossing guard data represents what has been reported to the New Jersey Safe Routes Resource Center as of August 2025.

Crossing Guard Supervisors Trained in New Jersey from 2013 - 2025. Image: New Jersey Safe Routes to School

06 Crossing the Street

Whether walking or rolling, a student's journey to school will more than likely require crossing one or more streets. This chapter discusses design treatments that improve safe street crossing.

Introduction

Per the Safe Routes to School Guide, maintained by the National Center for Safe Routes to School (saferoutesinfo.org), the development of safe crossings for children is guided by several principles, including:

1. Establish or identify good crossing locations.
2. Reduce crossing distances.
3. Provide crossings that are direct, so that children with physical and visual impairments can easily negotiate them.
4. Use appropriate traffic controls such as marked crosswalks, traffic signals, and warning signs or flashers.
5. Slow motor vehicle speeds.

This chapter covers treatments and practices that can be used to provide safer street crossings within school zones, including marked crosswalks, curb ramps, Hardened Center Lines, and other pedestrian safety features.

INSTRUCTIONS FOR DRIVERS REGARDING PEDESTRIAN SAFETY

The 2025 New Jersey Driver's Manual emphasizes that pedestrians are the most vulnerable roadway users and that motorists are responsible for maintaining pedestrian safety while safety is a shared responsibility.

Relative to pedestrians in crosswalks, New Jersey motorists must:

- Stop for pedestrians in marked crosswalks.
- Watch for pedestrians when turning on red.
- Obey speed limits.
- Be sure not to block or park in crosswalks.
- Keep the vehicle's windshield clean for maximum visibility.
- Always be alert for pedestrians.
- Be aware of areas where pedestrians are most likely to appear (near schools, town centers, residential neighborhoods, parks).
- Never pass another vehicle that has stopped for a pedestrian.
- Stop for all pedestrians in a crosswalk even if they began crossing with a proper signal and they are still in the crosswalk when the signal changes.

The New Jersey Safe Passing Law

The New Jersey Safe Passing Law, effective March 1, 2022, requires drivers to change lanes when passing pedestrians, bicyclists, or other vulnerable road users whenever possible; if changing lanes is unsafe or impractical, motorists must slow to 25 mph and provide at least four feet of passing distance.

Marked Crosswalks

A crosswalk is a designated area for pedestrians to cross a roadway. It can be:

- The part of the roadway at an intersection that aligns with the lateral lines of sidewalks on opposite sides.
- Any portion of a roadway marked as a pedestrian crossing with pavement lines, possibly enhanced by different textures, styles, or colors.
- Marked crosswalks are an essential tool for helping pedestrians move safely, conveniently, and predictably across roadways. A marked crosswalk can benefit pedestrians by directing them to cross at locations where appropriate traffic control, such as traffic signals or school crossing guards, are currently located or can be located in the future. It should be noted, however, that marked crosswalks, in and of themselves, do not slow traffic or reduce pedestrian crashes. In most cases, marked crosswalks should be used in conjunction with other pedestrian safety devices such as pedestrian signals or signage to increase visibility and driver awareness. Refer to Chapter 4 of this document for MUTCD standards on marked pedestrian crosswalks.

General guidelines include:

- Marked crosswalks should be designed to minimize crossing distances and should be straight to make them easier for people with visual impairments to navigate.
- The decision to mark a crosswalk at an uncontrolled location should be guided by an engineering study. Factors considered in the study should include:
  1. Total number of approach lanes,
  2. The presence of a median,
  3. The distance from adjacent signalized intersections or other controlled crossings,
  4. Projected pedestrian and bicyclist volumes,
  5. Pedestrian and bicyclist paths of travel,
  6. Pedestrian ages and abilities,
  7. Pedestrian and bicyclist delays,
  8. Location or frequency of public transit stops,
  9. Average daily traffic (ADT),
  10. Speed limit or the 85th-percentile speed,
  11. The horizontal and vertical geometry of the crossing location,
  12. The possible consolidation of multiple crossing points,
  13. The availability of street lighting, and
  14. Other appropriate factors.

UNMARKED CROSSWALKS

Crosswalks exist at all legs of all intersections but not every crosswalk is marked with painted lines. In fact, most are unmarked. In New Jersey, the driver of a vehicle must **stop and stay stopped** for a pedestrian crossing the roadway within any marked crosswalk, and they shall **yield** the right-of-way to a pedestrian crossing the roadway within an unmarked crosswalk at an intersection (N.J.S.A. 39:4-36(a)).



Pedestrians crossing at an unmarked crosswalk in Trenton, NJ. Image: VTC

- According to the 2023 MUTCD guideline, marked crosswalks alone (without other substantial treatments) should not be installed across uncontrolled roadways where the speed limit exceeds 40 miles per hour or:
  - The roadway has four or more lanes of travel without a raised median or pedestrian refuge island and an average daily traffic (ADT) of 12,000 vehicles per day or greater;
  - The roadway has four or more lanes of travel with a raised median or pedestrian refuge island and an ADT of 15,000 vehicles per day or greater;
  - At a mid-block crosswalk where the posted speed limit is 40 mph or greater, the minimum width of the crosswalk shall be 8 feet. School-related crosswalks should be 10 to 15 feet wide or wider at crossings with high numbers of students.

Crosswalks located in school zones should be checked annually before the start of the school year. If necessary, fresh paint, inlay tape, or thermoplastic should be applied and other improvements made to keep the crosswalks in good condition. Although initially more costly than paint, both inlay tape and thermoplastic are more cost effective in the long run. Inlay tape is recommended for new and resurfaced pavement, while thermoplastic may be a better option on rougher pavement surfaces. Both inlay tape and thermoplastic are more visible and less slippery than paint when wet.



High-visibility crosswalk in New Brunswick, NJ. Image: VTC



High-visibility crosswalk in Haviland Avenue Elementary School, NJ. Image: Cross County Connection TMA

Curb Ramps

Curb ramps provide pedestrians with a means of negotiating changes in elevation between the sidewalk and roadway. This is especially important for people using wheelchairs, strollers, walkers, crutches, handcarts, and pedestrians who have trouble stepping up and down high curbs. Per the Accessible Design Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG), curb ramps must be installed at all intersections and at mid-block locations to access on-street accessible parking spaces, where provided, and at all new passenger loading zones.

PROWAG guidelines state that curb ramps should be perpendicular wherever possible, where each corner has two ramps installed perpendicular to the face of the curb (vs. a single ramp facing diagonally into the intersection). In doing so, the curb ramps lead directly along the line of travel, guiding pedestrians into the crosswalk rather than into the middle of the intersection. This design is especially desirable for pedestrians with those with visual impairments.



Intersections should have two perpendicular, ADA-compliant curb ramps per corner as shown in the above image from Asbury Park, NJ. Image: VTC

Curb ramps and crosswalks should be clear of obstacles, and removal of conflicting elements should be prioritized. No new poles, utilities, or other impediments should be placed in curb ramp return areas. When a corner is retrofitted with new curb ramps, the crosswalk markings may have to be moved so that the curb ramp fully aligns within the crosswalk.

Chapter §305 of PROWAG requires detectable warning surfaces to consist of raised truncated domes in a square or radial grid pattern.



Diagonal curb ramps are undesirable, as they force pedestrians into the intersection and are more difficult for people with visual impairments to determine the correct crossing location and travel direction. Image: VTC

Parking Restrictions

In New Jersey, parking is not permitted within 50 feet of a stop sign or within 25 feet of a crosswalk, unless a curb extension exists at the crosswalk (N.J.S.A. 39:4-138). According to the National Center's Safe Routes to School Guide, restricting parking at corners will improve visibility of the crossing for both drivers and pedestrians. The Guide states that, at a minimum, 30 feet should be kept clear in advance of marked crosswalks to help pedestrians and drivers see each other better. While distances greater than 30 feet are generally better, parking restrictions have to be balanced with the need of the motorists. For example, if parking is severely restricted or completely removed near schools, motorists may ignore all parking restrictions.



School days parking restrictions.

Curb Extensions

Curb extensions narrow the roadway by providing an extension of the sidewalk area into the parking lane thereby reducing crossing distances and pedestrian exposure to motor vehicles. This design also brings pedestrians out from behind parked motor vehicles and helps pedestrians and drivers to better see each other. Smaller children who are often invisible behind parked motor vehicles and may take longer to cross the street would particularly benefit from curb extensions. For main streets, reducing the crossing time permits the green-light time for the major street traffic to be increased proportionately (AASHTO, 2024).

A curb extension also can slow turning vehicles and prevent drivers from illegally parking on or near a crosswalk. Curb extensions must be designed to accommodate drainage. There are cases where curb extensions may not be needed or desirable on every leg of an intersection, such as when the street is narrow, parking is not permitted, or the curb would interfere with a bicycle lane or the ability of fire trucks or other large vehicles to negotiate a turn (AASHTO, 2024).

On streets with on-street parking or shoulders, curb extensions can be used to extend the sidewalk or curb line into the parking lane or shoulder, which reduces the effective street width at the intersection.

Curb extensions can also:

- Reduce the crossing distance for both pedestrians and bicyclists.
- Slow right-turning motorists.
- Improve the sight distance and sightlines for pedestrians, bicyclists, and motorists.
- Create adequate space for curb ramps and landings where the existing sidewalk space is narrow.
- Provide additional storage space for pedestrians and bicyclists waiting to cross.
- Prevent parked cars from encroaching into the crosswalk area.
- Be composed of painted markings.



A mid-block stormwater curb extension example, Route 45 in Woodbury, NJ. Image: NJDOT



Curb extensions on River Street in Hoboken, NJ. Image: VTC



Painted curb extensions at the intersection of 2nd Street and Marin Boulevard in Jersey City, NJ. Image: VTC

Pedestrian Refuge Islands and Medians

Medians and islands help pedestrians cross streets by providing refuge areas that are physically separated from the automobile path of travel. A median separates opposing lanes of traffic, while an island is a protected spot within a crosswalk for pedestrians to wait to continue crossing the street or to board transportation such as a bus. Medians and islands reduce the crossing distance from the curb and allow pedestrians to cross during smaller gaps in traffic. Medians and islands are useful to pedestrians who are not able to judge distances accurately. Medians and islands also help people with slow walking speeds cross long intersections with short signal cycles. These benefits are especially important for children, who tend to cross streets more slowly and have less experience with crossings than adults. Because medians and islands separate traffic into channels going in specific directions, they require crossing pedestrians to watch for traffic coming in only one direction at a time.

Based on PROWAG R302.2.1 Medians and Pedestrian Refuge Islands' standard, the clear width of pedestrian access routes crossing medians and pedestrian refuge islands shall be 60 inches (1525 mm) minimum. For shared-use paths that cross medians and pedestrian refuge islands, the clear width must be at least 60 inches (1525 mm) or match the full width of the crosswalk, whichever is greater.



Pedestrian refuge islands and medians. Image: VTC

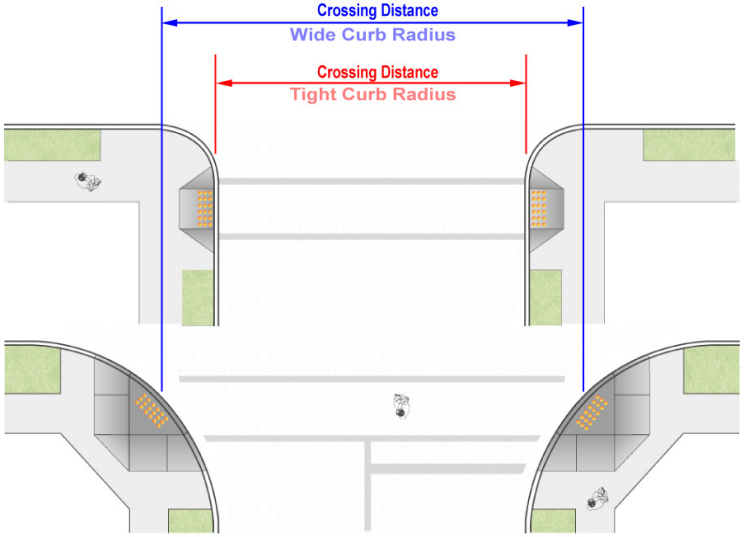


Pedestrian refuge islands and medians in South Park. Image: VTC

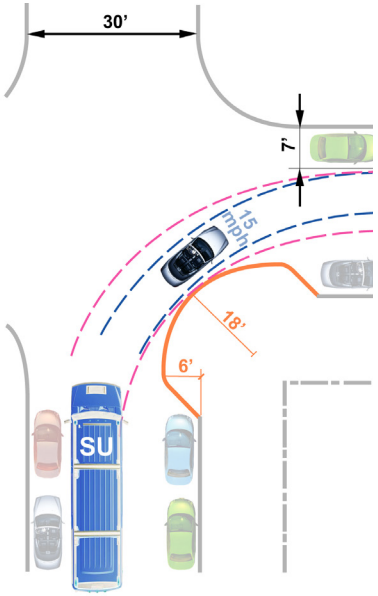
Tight Curb Radii

Reducing the curb radius "extends" the curb/sidewalk into the intersection. This design decreases the number of crash conflicts by reducing the speed of the turning vehicles and allows for the pedestrian to see and be seen. It also shortens the crossing distance so the pedestrian spends less time in the street with less exposure to conflicts with motor vehicles.

The Safe Routes to School Guide states that when designing curb radii, consider the area motor vehicles actually need when turning. In other words, the needs of all road users including pedestrians, bicyclists, buses, trucks and cars should be considered in designing or retrofitting corner turn radii. Instead of assuming that every corner needs to be cut back, look at other factors such as on-street parking and bicycle lanes to determine how much space a turning motor vehicle will need. The effective radius should take into account the width of parking lanes and bicycle lanes on both streets. Large trucks do not need to stay on their half of the street when turning onto local streets. There is no need to design for the largest vehicle that might ever use a street, especially for residential streets within neighborhoods.



Crossing Distance (Wider vs. Tighter Curb Radii).



Single Unit (SU) Truck Turning Radii vs. Personal Car Turning Radii.

Hardened Center Lines

Centerline and lane line hardening uses vertical or mountable elements placed along the centerline of two-way streets or lane lines on multi-lane streets to guide vehicles into a single receiving lane and discourage wide or high-speed turns. By slowing both left and right turns and encouraging near-90-degree turning movements, hardened centerlines reduce turning conflicts and improve safety at locations such as multi-lane streets, uncontrolled intersections or mid-block crossings, and areas with advanced stop bars.

These treatments can be implemented quickly using flexible materials such as rubber islands, modular speed humps, or delineator posts, or incorporated into constructed median or crossing islands in more permanent projects. However, flexible materials may require ongoing maintenance, and hardened elements must be carefully designed using swept-path analysis to ensure access for emergency vehicles, trucks and other large vehicles, especially where the hardened line extends through crosswalks and into intersections.



Hardened Center Lines in Jersey City, NJ. Image: Hudson County Complete Street Demonstration Project

Slow Turn Wedges

Left turns can increase the risk of pedestrian crashes. Slow-turn wedges are a traffic-calming treatment that uses posts placed within the intersection to force drivers to slow down and follow the proper path when making left turns. This type of traffic-calming device can only be installed at locations where a one-way road intersects with a two-way road or another one-way road.



Slow Turn Wedges in Brooklyn, NY. Image: The City of New York

Pedestrian and Bicycle Bridges and Underpasses

There are locations where a pedestrian bridge or underpass is the only way for pedestrians and bicyclists to safely cross the road, such as when children would otherwise be forced to cross freeways or major multi-lane arterial streets to get to or from school. According to the Federal Highway Administration's (FHWA) Designing Sidewalks and Trails for Access Guide, pedestrian bridges and underpasses are most efficient in areas where pedestrian attractions such as shopping centers, large schools, recreational facilities, parking garages and other activity centers are separated from pedestrian generators by high-volume and/or high-speed arterial streets.

However, the benefits of bridges and underpasses must be weighed against their substantial costs, which can be $2 million or more. The convenience of bridges and underpasses should also be considered. They require the pedestrian to change elevation and expend energy, and they may require pedestrians and bicyclists to follow an indirect path. As a result, there may be some resistance to using them. Some schools station crossing guards at such facilities to ensure that students use them. Pedestrian Overpasses and Underpasses should also comply with the PROWAG, including section R203.7.



A pedestrian bridge connects Millburn Middle School with the athletic fields across Old Short Hills Road (CR 527). The bridge also serves as a gateway to downtown. Image: Bing Maps



A pedestrian bridge in Haddon Heights, NJ. Image: Cross County Connection TMA

Rectangular Rapid Flashing Beacons (RRFBs)

Rectangular rapid flashing beacons (RRFBs) are active warning devices used to alert motorists of crossing pedestrians at uncontrolled crossings. They remain dark until activated by pedestrians, at which point they emit a bright, rapidly flashing yellow light, which cautions drivers to stop. The Manual on Uniform Traffic Control Devices (MUTCD) suggests that RRFBs can significantly increase yielding rates over standard pedestrian warning signs, thereby increasing pedestrian safety.

RRFBs should be installed on both the right and left sides of the crosswalk, or in a median if available; however, because decreased effectiveness may result from overuse, RRFBs should be limited to locations with the most critical safety concerns, such as pedestrian and school crosswalks with uncontrolled vehicle approaches. RRFBs are now officially part of MUTCD 11th edition (Chapter 4L).



An RRFB in Collingswood, NJ.



An RRFB on Canal Point Blvd in West Windsor, NJ.



RRFB with school zone sign in Washington Township High School, NJ. Image: Cross County Connection TMA

Pedestrian Hybrid Beacons

The pedestrian hybrid beacon [formerly referred to as the High intensity Activated crossWalK (or HAWK)] is a pedestrian-activated warning device located on the roadside or on mast arms over mid-block or unsignalized pedestrian crossings. The beacon head consists of two red lenses above a single yellow lens. The beacon head is "dark" until the pedestrian desires to cross the street. At this point, the pedestrian will push an easy-to-reach button that activates the beacon. After displaying brief flashing and steady yellow intervals, the device displays a steady red indication to drivers and a "WALK" indication to pedestrians, allowing them to cross a major roadway while traffic is stopped. After the pedestrian phase ends, the "WALK" indication changes to a flashing orange hand to notify pedestrians that their clearance time is ending. The hybrid beacon displays alternating flashing red lights to drivers while pedestrians finish their crossings before once again going dark at the conclusion of the cycle.

The pedestrian hybrid beacon is a potential solution for mid-block or unsignalized crossing locations where neighborhoods are located on the opposite side of a wide or busy street from a school. It is often difficult to get drivers to stop or yield to pedestrians at uncontrolled crossings on high volume, high speed, or multi-lane roadways, even if crosswalk markings and advance pedestrian warning signs are installed. At the same time, there may not be enough pedestrians crossing to warrant a full traffic signal. The warrants for the pedestrian hybrid beacon are much easier to meet, compared to the warrants of a full traffic signal.

Pedestrian hybrid beacons should only be used in conjunction with a marked crosswalk. In general, they should be used if gaps in traffic are not adequate to permit pedestrians to cross, if vehicle speeds on the major street are too high to permit pedestrians to cross, or if pedestrian delay is excessive. Transit stops and school locations may be good places to consider using the pedestrian hybrid beacon. Chapter 4J of the MUTCD contains a section on the pedestrian hybrid beacon and when and where it should be installed. Practitioners should follow the MUTCD guidelines.

Since the pedestrian hybrid beacon is a traffic control device many people are not yet familiar with, effort should be made to perform outreach to the public before implementation so there is no confusion about how the beacon operates and what drivers and pedestrians should do when encountering it.



Pedestrian Hybrid Beacon. Image: VTC

07 Along the Street

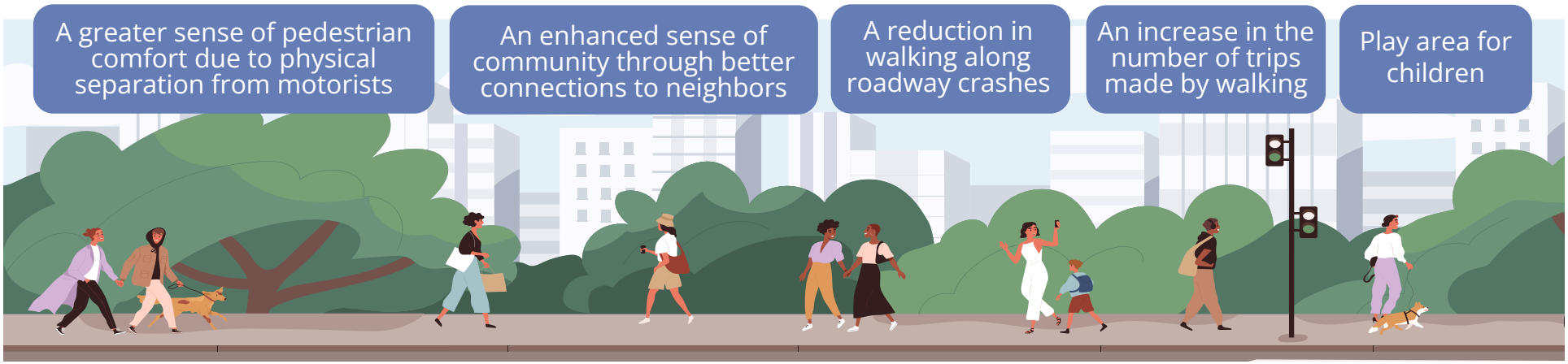
This section describes the types of infrastructure that should be in place along school routes to make walking and bicycling to school safer.

Sidewalks

In communities with sidewalks, it is often more convenient to choose walking as a transportation mode or a recreational activity. For children, sidewalks provide an essential environment for safe, independent mobility. In addition, sidewalks can provide a safe, communal play area for a variety of games and activities including drawing with chalk, playing hopscotch, and learning to bicycle or roller skate, among others.

Most sidewalks in New Jersey are constructed by landowners as part of the development process. They may also be built by a state, county, or local agency in connection with roadway construction or reconstruction or as an independent project. The State's Residential Site Improvement Standards (RSIS) set forth sidewalk requirements for residential development in the state. No comparable set of standards exists for non-residential developments. Streets that do not have sidewalks, particularly those on routes where children walk or bicycle to school, should be identified and assessed to determine if retrofitting these streets with sidewalks is appropriate. It is possible that a street with a very low volume of traffic and low vehicle speeds may not need sidewalks in order to be a safe route for pedestrians. Where feasible, sidewalks should be provided on both sides of the street. A sidewalk on only one side forces pedestrians to either walk in the street or cross the street twice to get to the side with a sidewalk and back again.

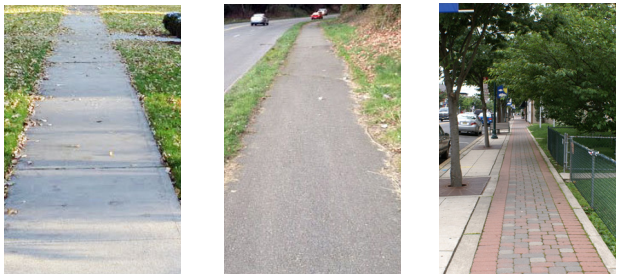
Sidewalk Benefits



Considerations for Sidewalks

Sidewalk Surface Types

Sidewalks can be surfaced with a variety of materials to accommodate varying budgets and contexts. While urban, suburban, and heavily used sidewalks are typically made of concrete, less expensive walkways may be constructed of asphalt, crushed stone, or other materials if they are properly maintained and accessible (usable by those with disabilities or those pushing carts or strollers). Concrete is more expensive than asphalt to install, but it lasts longer and requires less maintenance, which may make it a better value in the long run. Although brick pavers may appeal to some designers, they can require more maintenance and create a tripping hazard condition. Pavers may also pose a problem to pedestrians in wheelchairs if the bricks settle or become lifted. Safe sidewalk surfaces should be firm, stable, and slip-resistant.



Examples of concrete, asphalt and brick paver sidewalks.

Sidewalk Widths

The width of a sidewalk depends primarily on the number of pedestrians who are expected to use the sidewalk at a given time — high-use sidewalks should be wider than low-use sidewalks. According to the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (2021), recommended sidewalk widths are as follows:

- 5 feet pedestrian zone if a buffer is present between the sidewalk and roadway.
- 6 feet where the sidewalk is directly adjacent to the curb.
- 8 feet or more in dense urban or commercial environments or near high pedestrian volumes.

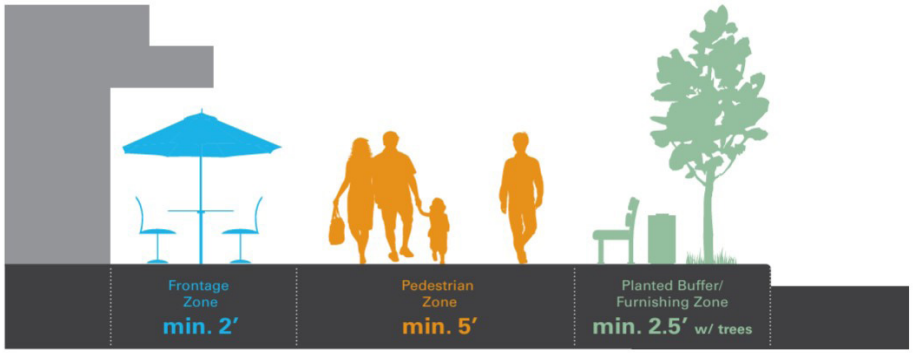
Every attempt should be made to locate streetlights, utility poles, sign posts, fire hydrants, mail boxes, parking meters, bus benches, and other street furniture out of the sidewalk.

When that is not possible, sidewalk furnishings and other obstructions should be located consistently so that there is a clear travel zone for pedestrians with visual impairments. A wider sidewalk should be provided to accommodate this line of obstructions.

While wider sidewalks are strongly recommended, minimum accessibility standards are established by PROWAG:

- The continuous clear width of pedestrian access routes shall be 48 inches (1220 mm) minimum, exclusive of the width of any curb.
- Where the pedestrian access route is less than 5 feet wide, PROWAG also requires 5’ x 5’ turning spaces every 200 ft if sidewalk is less than 5 feet wide.

At a State level, the NJDOT Complete Streets Design Guide also provides guidance for sidewalk widths, as can be seen in the following image.



Sidewalk Zones. Image: New Jersey Complete Streets Design Guide

Sidewalk Buffer Zones

Buffers between pedestrians and motor vehicle traffic are important to provide greater levels of comfort, security, and safety to pedestrians. Consistent with the AASHTO 2021 Guide for Planning, Design, and Operation of Pedestrian Facilities, sidewalk buffers are part of a three-zone sidewalk corridor that includes the buffer zone, pedestrian through zone, and frontage zone. The buffer zone serves both a functional and safety role. Plantings, utilities, transit stops, signage, and lighting provide useful amenities for pedestrians while also serving as a barrier between people and automobiles.

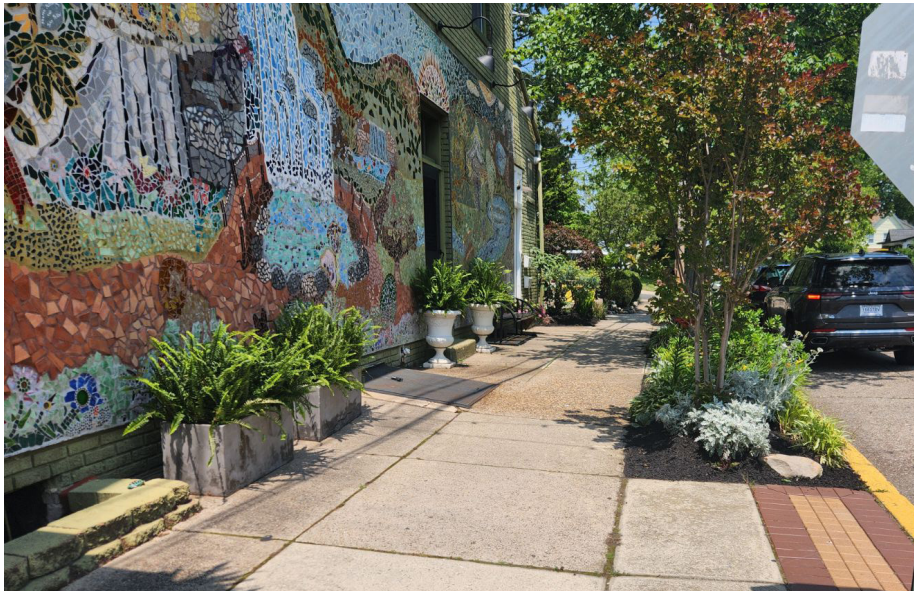
Buffer width should vary based on street context, speed, and traffic volume to achieve desired pedestrian level of service (LOS). The buffer zone also emphasizes vertical elements such as trees, bollard, parked cars, and their influence on perceived safety and comfort rather than prescribing only physical distance.

In general, there are four types of sidewalk buffers:

1. Planting strip of grass and trees - This is the preferred buffer as it provides a more pleasant, shaded environment for walking.
2. Bicycle lane - Whether or not a planting strip is possible, a bicycle lane can provide or add to an acceptable buffer between pedestrians and motor vehicles.
3. Parked cars - Parking spaces, especially when parked vehicles are present, provide a great buffer between pedestrians and moving vehicles; however, parked cars also create a visual screen for motorists who are not looking for pedestrians that want to cross midblock.
4. Street furniture - Examples include benches, newspaper boxes, street lighting, and public art.

If a sidewalk buffer does not exist, an effort should be made to provide a wider sidewalk. A wider sidewalk allows pedestrians to better avoid the splash zone (area subjected to spray from vehicles traveling through water). It also provides a snow storage area and a more comfortable separation between moving vehicles and pedestrians. At minimum, sidewalks should be 5 feet wide when a buffer is provided, and 6 feet wide when directly adjacent to the curb.

Guidelines for sidewalk buffers are available in the FHWA's Designing Sidewalks and Trails for Access (Section 4.1.2) at www.fhwa.dot.gov/environment/sidewalk2/sidewalks204.htm and AASHTO's Guide for the Planning, Design, and Operation of Pedestrian Facilities (Section 3.3.2.1).



Sidewalk with a planting strip on Stratford Avenue in Haddon Township, NJ.

Other Sidewalk Design Considerations

- Objects such as signs placed in or adjacent to sidewalks should maintain sufficient vertical clearance to avoid injury to pedestrians. In general, PROWAG allows signs lower than 7' to protrude up to 4" into a pedestrian circulation route. For accessibility reasons, e.g., to accommodate people who are blind or have low vision, it may be appropriate to place pedestrian wayfinding and information signs where they can be more easily read.

- Bushes, trees, and other landscaping should be maintained to prevent encroachment into the sidewalk. Jurisdictions should adopt ordinances requiring local property owners to trim the landscaping along their frontage to maintain clear and unobstructed sidewalks.

- Per FHWA guidelines, guy wires and utility tie-downs should not be located in or across sidewalks at heights below seven feet. When placed adjacent to sidewalks or pedestrian walkways, the guy wires should be covered with a bright yellow (or other high-visibility) plastic guard to make the wire more visible to pedestrians. Guy wires of any color will not be visible to blind pedestrians and must not be located within the pedestrian route.



Sidewalk in Somerville, NJ. Image: VTC

- Bus shelters should be placed beyond the pedestrian walking zone and should not obstruct the flow of pedestrians along the sidewalk. Where buses are unable to pull to the curb due to parking, jurisdictions should consider installation of bus bulbs to enable buses to stop in-lane or location bus stops near intersections and crossings where curb ramps are already present, rather than introducing curb ramps that confuse pedestrians who are blind or have low vision.

- Benches and other street furniture should be placed outside the walking paths to maintain the accessibility of the walkway and to provide good pedestrian service.

- Street lighting improves pedestrian visibility and personal security and should be provided on school access routes. On streets with a large number of trees, street lighting scaled to pedestrians (low lights) illuminates the sidewalks even after the trees grow quite large. Street lighting improves safety by allowing pedestrians and motorists to see each other. It also contributes to aesthetics. Two-sided lighting should be considered along wide streets. Two-sided lighting consists of two light fixtures on one light pole. One fixture illuminates the roadway and the other illuminates the sidewalk or pedestrian realm. It is especially important to provide lighting at pedestrian crossings. Lighting can also be helpful along streets adjacent to the school grounds to minimize vandalism and improve security. While most school walking activity occurs during daylight hours, the morning school trip in the middle of winter often occurs during hours of darkness, and school activities often occur during nighttime hours.

On-Street Bicycling Facilities

Bicycling is an important way for children to travel to and from school. Bicycling can help students who live too far from school to walk comfortably to participate in active transportation. An important thing to remember is that the use of on-street facilities is more appropriate for older children who have sufficient bicycle handling skills and knowledge of bicycle and traffic safety rules than it is for young children just learning to ride.

A considerable amount of all bicycling occurs on the street system, and for children especially, most will occur in the streets near where they live. Children of all ages will bicycle to school if given the opportunity. When designating bicycle routes to encourage bicycling to school, all age groups should be targeted including elementary, middle, and high school students.

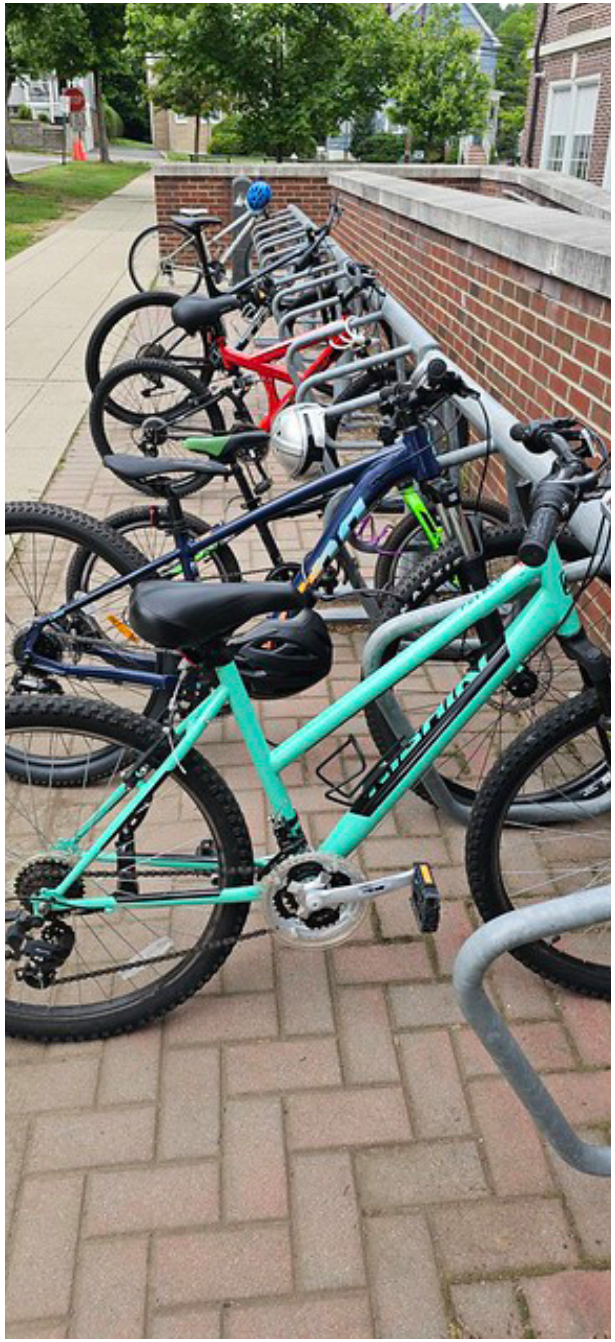


The Montclair Bike Bus.
Image: montclairbikebus.org

Young students often have minimal riding skills, little experience, and limited physical capabilities. Students also often have an inappropriately high level of confidence, or at least fearlessness, in their riding skill and lack judgment regarding safe bicycling practices. To support bicycle use rather than auto travel for short local trips by students and others, enhanced bicycle accommodations must be provided. On-street facilities, such as bicycle lanes, are more appropriate for upper elementary school, junior high and high school students who have sufficient bicycle-handling skills and knowledge of bicycle and traffic safety rules. Off-street or separated facilities such as trails and cycle tracks are more appropriate for younger elementary school students.



On-street bicycle facilities in Asbury Park.
Image: VTC



On-street bicycle facilities in Asbury Park.
Image: VTC

Bicycle Lanes

Bike lanes provide a striped and stenciled lane for one-way bicycle travel on roadways. They offer a comfortable space for older or more experienced children to ride. Typically, bicycle lanes are installed on roadways with higher traffic speeds and volumes than residential streets. Where bike lanes are directly serving a school, however, communities may elect to stripe them on low-traffic residential streets to provide an additional level of visibility for younger cyclists. Per the Safe Routes to School Guide from the National Center for SRTS, NJDOT CSDG, and the AASHTO Bike Guide 2024:

- The preferred width of bicycle lanes next to a curb should be five feet.
- Bicycle lanes located next to motor vehicle parking should be at least seven feet wide.
- Bicycle lanes can be four feet wide on streets.
- Bicycle lanes located between through lanes and turn lanes should be at least five feet wide.
- To allow occasional passing or side-by-side bicycling, bicycle lanes should be at least six and one half feet wide.
- Bicycle lanes should not be wide enough to accommodate a motor vehicle, as drivers may attempt to use a wide bicycle lane as a travel lane.
- Bicycle lanes should be designated through the use of signs or painted symbols and, if appropriate, motor vehicle parking restrictions.



Painted Bicycle Lane in Hoboken. Image: VTC



Bicycle Lane in Asbury Park. Image: VTC

Shared Lane Markings

Shared Lane Markings (SLM) (sometimes known as "sharrows") are placed in a travel lane to indicate that motorists and bicyclists are sharing the road. Sharrows assist bicyclists by helping them to position themselves in the appropriate part of the travel lane, away from the curb, or, where there is parking and opening of car doors. They also help motorists by alerting them that bicyclists are likely to be using the lane with them. More experienced bicyclists have comfort with this action, while less experienced bicyclists, including children, may not have the ability, confidence, or comfort to do so making sharrows less ideal for these riders.

Shared lanes are different than a dedicated bicycle lane, which has a solid white line separating the car lane from the bicycle lane. Sharrows are used when the roadway width is insufficient for a dedicated lane. According to the NJDOT CSDG sharrows should be placed on roadways with a speed limit of 25 mph or less. Information on Shared Lane Markings, including proper placement, can be found in Section 9E.09 of the 2023 Manual on Uniform Traffic Control Devices (MUTCD).



"Sharrow" in Hackettstown, NJ.

The use of SLMs on school bicycling routes should be carefully evaluated, as they may not provide sufficient comfort or safety for children biking to school. Communities should prioritize lower-speed environments or the provision of separated bicycle facilities where feasible.

Paved shoulders

Paved shoulders can provide safety and operational benefits for road users. They help reduce edge deterioration, minimize ongoing maintenance needs, and provide space for temporary vehicle storage. However, paved shoulders are not bikeways or travel lanes, and are typically not an appropriate bicycling facility for children. Based on AASHTO 2024 Bike Guide, paved shoulders may be used by stopped vehicles, pedestrians, slow-moving vehicles. The Guide recommends the following shoulder widths for accommodating bicycling, where practical considering terrain and motor vehicle volumes:

- On roads with high motor vehicle volumes or a high percentage of heavy vehicles (10 percent of AADT), a shoulder width of 10 feet recommended, with 12 feet preferred.
- Where bicyclists are intended to be fully accommodated within a shoulder, a minimum usable shoulder width of 4 feet (paved and clear of rumble strips) should be provided to accommodate the bicyclists' operating space.



Paved shoulder in Warren County.

Shared-Use or Multi-Use Paths

Multi-use paths, sometimes known as shared-use paths, are parallel and adjacent to a roadway or on their own separated right of way and add to the connectivity of the pedestrian and bicycle network. Paths can sometimes connect neighborhoods directly with schools and thereby shorten the distance children must walk or bicycle. However, paths must be designed properly, especially where they intersect roadways, to minimize the risk of pedestrian and bicyclist crashes. Guidelines for designing paths are available in the FHWA Designing Sidewalks and Trails for Access Part 2 and in the American Association of State Highway and Transportation Officials' (AASHTO) Guide for the Development of Bicycle Facilities, 2024 edition.

- A minimum width of 10 feet is recommended under most conditions for two-directional shared-use paths
- Widths less than 11 feet can significantly limit passing and side-by-side social use and are generally appropriate only in constrained conditions or for lower-volume paths.
- Widths of 11 to 12 feet or greater are recommended where higher user volumes are anticipated and three operational lanes are desired.
- According to the NJDOT CSDG, 8 feet can be considered in certain circumstances such as places with low bicycle traffic, pedestrian use is not frequent, and for a short distance due to physical constraints.

According to the Safe Routes to School Guide from the National Center for SRTS:

- Abandoned rail lines and utility corridors often make excellent corridors for multi-use paths.
- Pavement for multi-use paths can be asphalt or concrete.
- Measures should be taken to keep motor vehicles off of the path, while maintaining access for maintenance vehicles.
- Agencies should monitor conditions along the path for maintenance and repair.



Students use a multi-use path. Images: VTC



Students use a multi-use path to get to school in Chesterfield, NJ. Images: NJDOT

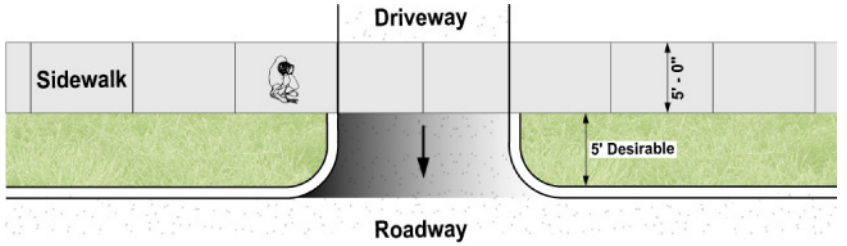
Driveways

Designing driveway crossings for pedestrians can improve the walking environment, improve visibility and reduce conflicts between drivers and pedestrians. Reducing the number of driveways can make it easier for people with disabilities to access and walk on the sidewalk. Per the National Safe Routes to School Guide, the following principles should be applied to driveway design in the areas around schools:

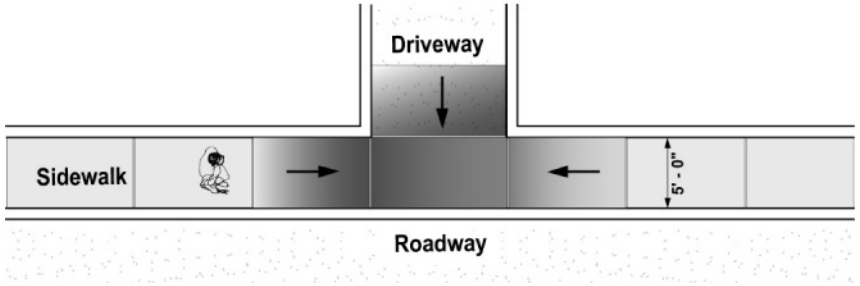
- The sidewalk continues across the driveway at the same elevation or level.
- The driveway apron does not go through the sidewalk.

Ramps may be necessary for pedestrians to cross the street at intersections but the rest of the sidewalk network should be continuous and at one level. Providing a level, continuous sidewalk not only brings the sidewalk up to the standards of universal access for persons in wheelchairs or on crutches, but also changes driver behavior. The driver exiting or entering such a driveway is more aware that they are crossing a sidewalk, will proceed more slowly and is more likely to stop.

Fewer driveways and narrower driveway crossings provide improved pedestrian safety, especially in busy commercial zones. School walking routes should keep busy driveway crossings to a minimum. If young students are required to cross a busy school driveway, an adult should be assigned to monitor or direct the students at the driveway.



Good example - sidewalk continues across driveway apron.



Bad example – driveway apron goes through the sidewalk.

Wayfinding Along School Routes

Wayfinding signage and markings provide direction to students and parents and mark roads as preferred travel routes. Wayfinding could include paint markings designating preferred corridors by color or markers, such as the one pictured to the right, that designate safe travel routes. These markings and signs also increase visibility of walking routes among the community and encourage more children to walk or bike to school. This guide recommends wayfinding markings or signage to be placed on primary school travel corridors.



Fizzy the Dragon points the way for students on Walk and Bike to School Day in Chesterfield, NJ. Image: NJDOT



Pavement markings indicate the school walking route in Trenton. Image: VTC

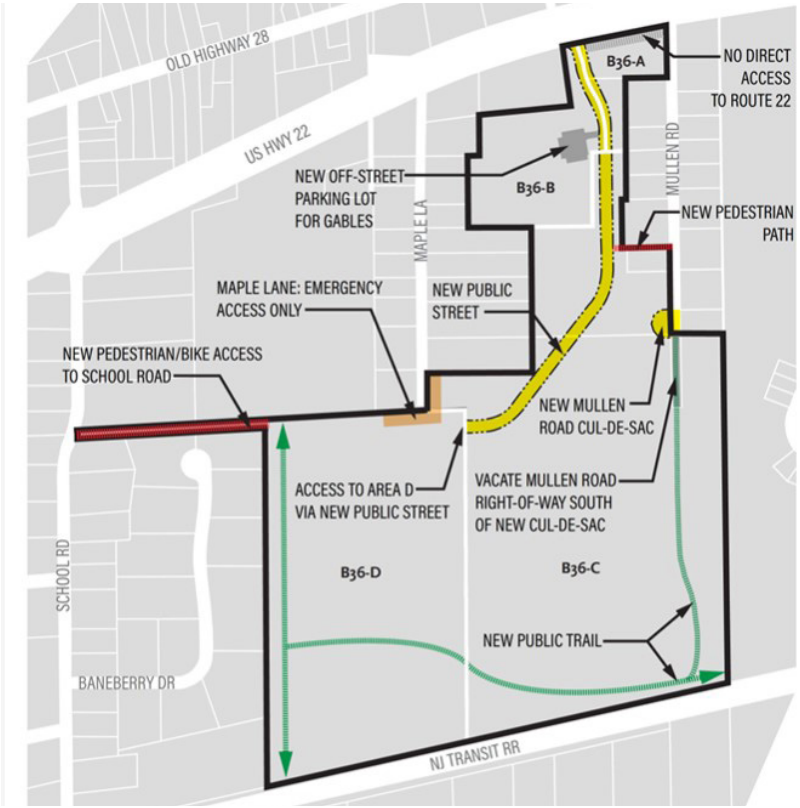


School wayfinding sign in Canada. Image: Ontario Active School Travel

Along the Trail

Trails can serve as important transportation corridors for students traveling to and from school. Currently, multi-use trails are eligible for both Safe Routes to School (SRTS) funding and the Transportation Alternatives Set-Aside (TA) Program, making them an important component of active transportation planning.

Some communities have also found success using New Jersey's Local Redevelopment and Housing Law to implement creative transportation solutions involving trails. The Block 36 Redevelopment Plan in Readington, New Jersey envisions a mixed-use, mixed-income residential development with a public trail and pedestrian and bicycle connection to School Road. School Road has a sidewalk that leads to the Whitehouse School at the intersection of School Road and Whitehouse Avenue.



The Block 36 Redevelopment Plan contains a new public trail (green) and a new pedestrian and bicycle connection (red) to School Road.

Image: Clarke Caton Hintz and Readington Township, NJ.

THE WOODBINE SCHOOL DISTRICT TRAVEL PLAN CONTAINS TRAIL CONNECTIONS FOR STUDENTS

The Woodbine School District in Cape May County provides an example of how trails can support student travel. Located in a small, rural community in northwestern Cape May County, the district developed a Student Travel Plan that incorporates trail-based recommendations.

In 2024, the school reported that approximately 40% of students walk or bike to school. To grow the number of students that feel comfortable walking to school, the plan contains trail-related infrastructure recommendations to enhance safety and accessibility for students:

- Install a Rectangular Rapid Flashing Beacon (RRFB) at the Woodbine Railroad Trail crossing at Dehirsch Avenue and Washington Avenue to improve visibility and driver awareness.
- Stripe and clearly mark crosswalks at trail access points along Lincoln Avenue, Jefferson Avenue, Monroe Avenue, and Heilprin Avenue to strengthen connections between neighborhoods, trails, and the school.
- Install trail crossing warning signage to alert motorists at key trail–road intersections.
- Extend existing multi-use trails to improve continuity and access.

08 Traffic Calming

By design, traffic calming is a self-enforcing traffic management approach that forces motorists to alter their speed or direction of travel. The purpose of traffic calming is to improve safety, especially for pedestrians and bicyclists, and to improve the "livability" of streets for residents and visitors. Enhanced multimodal safety is one of the most fundamental benefits of traffic calming. By decreasing the volume and/or reducing the speed of motor vehicles, the number and severity of crashes is greatly diminished.

What techniques are used in traffic calming?

Traffic-calming techniques consist of engineering interventions, enforcement mechanisms, educational programs, and more. This chapter focuses on engineering techniques that make roadways in school zones safer. Traffic-calming measures are either passive or active, and can generally be divided into three (3) groups based on the goal they are designed to achieve: speed control, volume control, and safety enhancement.

Speed control measures include passive concepts such as gateways or streetscapes that change a driver's perception of a corridor, and active concepts that force a driver to physically alter their travel path and reduce their speed. Volume control is intended to minimize motor-vehicle volumes or cut-through traffic by restricting turns or deploying roadway closures or median barriers. Safety enhancements, such as in-pavement lighting or raised crosswalks, are designed to make drivers more aware of pedestrian spaces while reducing speeds, and are typically implemented in tandem with other techniques.

Education and enforcement programs should be used as proactive measures to mitigate risks and crashes before they occur, complementing engineering efforts.

National Traffic Calming ePrimer

The United States Department of Transportation (USDOT) and the Federal Highway Administration's (FHWA) National Roadway Safety Strategy has two elements that inform this chapter: The Safe System Approach and the FHWA Proven Safety Countermeasures.



Speed Hump in Princeton, NJ. Image: VTC

Safe System Approach

The Safe System Approach (SSA) is a framework for roadway safety that aims to eliminate all fatalities and serious injuries on our transportation network. It acknowledges that even one death on our roadways is unacceptable. Adopted by the New Jersey Department of Transportation (NJDOT) as part of its commitment to reach zero deaths on all roadways, SSA shifts the focus from individual behavior to system-wide responsibility. Instead of limiting safety to select projects, SSA embeds it into every aspect of transportation planning and design.



Image: U.S. Department of Transportation. (2022).

U.S. Department of Transportation
Federal Highway Administration

SSA is grounded in six guiding principles and five elements that are different from the traditional approach to safety. It recognizes that humans will make mistakes and so roadways must be designed in a way that prevents serious injuries and fatalities. This Guide utilizes the Safe System Approach as a guiding framework for road safety as it relates to school zones in New Jersey.

A practical complement to the Safe System Approach in the United States are the FHWA Proven Safety Countermeasures, a collection of interventions that make roads safer for all users. Many of the traffic-calming and road safety solutions discussed in the Guide are also FHWA Proven Safety Countermeasures. The Federal Highway Administration (FHWA) has identified 23 countermeasures and strategies with proven effectiveness in reducing crash rates and/or crash severity. These are context- and user-specific strategies or interventions that can make significant improvements to the safety of a road system when appropriately applied within a jurisdiction. They are identified by the FHWA symbol to the left.

SAFE SYSTEM APPROACH IN NEW JERSEY

In New Jersey, all counties and several municipalities have adopted, or are in the process of adopting, the Safe System Approach to eliminate traffic fatalities and serious injuries. As noted earlier, New Jersey has also adopted the SSA as part of its commitment to eliminate fatalities and serious injuries on New Jersey roads. The Safe System Approach is often adopted and implemented in coordination with Target Zero or safety initiatives.

All of New Jersey's 21 counties have adopted the Safe System Approach. Many municipalities, including Hoboken and West Orange, have adopted the Safe System Approach at the local level, and in partnership with their counties, are prioritizing data-driven safety strategies to inform roadway design improvements.

Principles of the Safe System Approach

Death/Serious Injury is Unacceptable: While no crashes are desirable, the Safe System Approach focuses on crashes that result in death and serious injuries, since no one should experience either when using the roadway system.

Humans Make Mistakes: People will inevitably make mistakes that can lead to crashes, but we can design and operate the roadway system to anticipate human mistakes to avoid death and serious injuries.

Humans Are Vulnerable: Humans are disproportionately at risk of injury or death in collisions with vehicles than drivers or passengers of those vehicles. The management of kinetic energy transfer to within survivable limits is important for understanding how to design and operate the road system consistently with the Safe System philosophy.

Safety is Proactive: In addition to crash-based analysis, transportation agencies should use proactive tools to identify and mitigate latent risks in the roadway system, rather than waiting for crashes to occur and reacting afterwards.

Redundancy is Crucial: Reducing risks requires that all parts of the roadway system are strengthened, so that if one part fails, people are still protected.

Responsibility is Shared: System managers, vehicle manufacturers, law enforcement, post-crash personnel, and system users all have a responsibility to promote safe behavior and ensure that crashes don't lead to fatal or serious injuries.

Elements of the Safe System Approach



Safer Road Users: The Safe System Approach addresses the safety of all road users, including those who walk, bike, drive, ride transit, and travel by other modes. All road users are considered equal regardless of how they choose to travel. Each road user has a responsibility to operate, to the best of their ability, within the boundaries set by system managers, and education and enforcement can help to modulate user behavior.



Safer Vehicles: Safe vehicles include "active" safety measures, to help prevent crashes from occurring, such as autonomous emergency braking; and "passive" safety measures, which protect occupants when a crash does occur, such as seat belts and airbags.



Safer speeds: Put simply, humans are unlikely to survive high-speed crashes. Adjusting speeds can accommodate human injury tolerances in 3 ways: reducing impact forces, providing additional time for drivers to stop, and improving visibility.



Safer Roads: Safe roads are designed and operated to prevent crashes and keep impacts on the human body at tolerable levels. Road design and operations should be thought of as a continuum, where safe system aligned design or countermeasures will improve safety performance (reduce crashes) incrementally.



Post-Crash Care: This includes and emphasizes the role of first responders, crash investigation, and medical care for all involved parties. Crash reporting practices, such as complete data collection and documentation of road user behavior and infrastructure and sharing data across agencies or organizations can help lead to a greater understanding of the holistic safety landscape, and thus lead to improved investments in safety.

NEW JERSEY'S GOAL: ZERO TRAFFIC FATALITIES

In January 2025, the Target Zero Commission Law (P.L.2024, c.109) established the New Jersey Target Zero Commission (TZC) and set a goal to eliminate fatalities and serious injuries on New Jersey roads.

The TZC developed the New Jersey Target Zero Action Plan, released in 2025, with a collaborative group comprising Commission members, policymakers, engineers, planners, advocates, law enforcement, academic institutions, local leaders, subject-matter experts, and members of the public. According to the bill, the TZC is tasked with the responsibility "to study, examine, and review all aspects of traffic safety with a particular focus on access, equity, and mobility for all road users using the safe system approach and to advise the Governor, the Legislature, and the Department of Transportation regarding policies, programs, research, and priorities to help achieve the goal of eliminating traffic fatalities and serious injuries." [1]

The Action Plan is organized under the five Safe System Approach elements - Safer People, Safer Roads, Safer Speeds, Safer Vehicles, and Post-Crash Care with two additional elements, Safer Land Use and Coordinated Implementation, to complete the Target Zero Framework for New Jersey. The Action Plan outlines 72 actions to reach the Target Zero goal and specifies which organizations lead and/or support each action. Each of the proposed actions fits into at least one of the seven elements within the New Jersey Target Zero Framework.

Visit https://dot.nj.gov/targetzero/ to learn more about implementation and updates.



Target Zero Commission October 2026 Public Hearing at Rowan University. Image: NJDOT



New Jersey's Target Zero Framework. Image: New Jersey Target Zero Action Plan

[1] https://dot.nj.gov/targetzero/pdf/NJ_Target_Zero_Action_Plan_2025.pdf

FHWA Proven Safety Countermeasures

A collection of 23 countermeasures and strategies provides solutions for key safety focus areas, including roadway departure, intersections, pedestrian safety, and crosscutting strategies that address multiple safety needs. These countermeasures are designed for all road users and all roadway types. Agencies are encouraged to implement these strategies to help achieve their safety goals.

Pedestrian


Crosswalk Visibility Enhancements


Leading Pedestrian Interval


Medians and Pedestrian Refuge Islands in Urban and Suburban Areas


Rectangular Rapid Flashing Beacons (RRFB)


Walkways


Pedestrian Hybrid Beacons

Roadway Departure


Enhanced Delineation for Horizontal Curves


Longitudinal Rumble Strips and Stripes on Two-Lane Roads


Median Barriers


Roadside Design Improvements at Curves


SafetyEdge℠


Wider Edge Lines

Intersections



Backplates with Retroreflective Borders



Roundabouts



Dedicated Left- and Right-Turn Lanes at Intersections



Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections



Corridor Access Management



Reduced Left-Turn Conflict Intersections



Yellow Change Intervals

Crosscutting



Lighting



Road Safety Audit



Local Road Safety Plans



Pavement Friction Management

Additional Safety Strategies

In addition to the proven safety countermeasures, there are additional safety strategies to consider while planning for safety to and from school zones. The additional safety strategies are roadway reconfigurations ("road diets"), bicycle lanes, appropriate speed limits, speed safety cameras, and variable speed limits.

Icon source: USDOT Federal Highway Administration

What does Traffic Calming do?

The deployment of traffic-calming strategies and plans often combines a range of techniques to make roadways safer depending on the context of the roadway and the resources available for deployment. Deployment often uses a combination of **passive** and **active** traffic-calming techniques.

Passive traffic-calming techniques can include visual prompts that give drivers the perception that they are entering a traffic-calmed area. Examples include streetscaping and/or landscaping, textured/colorized pavement, on-street parking, striped bicycle lanes or variable message signs with speed radar. Passive traffic calming also includes creating a physical environment where the driver reduces speed as a reaction to changes in the roadway. Examples include narrowed lanes, rumble strips, and on-street parking. Active traffic calming could include vertical deflection, i.e., raised roadway treatments that force the motorist to slow down, such as speed humps/tables, raised crosswalks, or raised intersections. Active traffic calming could also include horizontal deflection to limit the speed a vehicle can safely travel through an intersection or along a roadway, such as full or mini-roundabouts, chicanes, or center island medians. Lastly, active traffic calming could also include constrictions, horizontal extensions that limit vehicle speed by narrowing the travel way such as curb extensions, neck-downs, bulb-outs, or pedestrian island refuges.

Effective traffic-calming strategies often include using more than one measure. Traffic -calming decisions should be made using a systematic approach. Measures should be appropriately spaced and any secondary effects of the installations must be considered.

When this guide was first published in 2014, there were a handful of representative communities in New Jersey that had developed traffic-calming programs or implemented traffic-calming measures, including Hoboken, Maplewood, Fair Lawn, Woodbury, Haddonfield, Camden, Montclair, and Lawrence Township. In the decade since, traffic calming has been widely deployed in communities throughout New Jersey through statewide, countywide, and local safety initiatives.



> *"Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users."*
>
> **Institute of Traffic Engineers**

Types of Traffic-Calming Measures Best Suited for School Zones

The following section describes and illustrates various traffic-calming measures which can be employed in and around school zones. Each measure contains a description, a list of benefits and drawbacks associated with each measure, and an estimated cost range for each treatment. The intent is to provide the reader with a quick indication of what might be expected if each measure is implemented.

At the end of this chapter is a detailed matrix in the form of a table providing an overview of the more detailed descriptions provided in this section.

Gateways

Description: Asigning and/or landscaping treatment to alert motorists they are entering a lower speed environment and they should expect bicyclists, pedestrians, and other vulnerable road users. A gateway treatment can be used at entrances to school zones, neighborhoods, commercial areas, town centers, or busy places of activity. Gateways can be as simple as signs and landscaping. They are typically supplemented with other traffic-calming measures such as curb extensions, sometimes referred to as "bulb-outs" or "bump-outs", public art and raised crosswalks.
Benefits: Can simultaneously increase awareness of vulnerable road users and be an attractive streetscape element. They can be designed with the school, neighborhood, or community in mind by incorporating local branding.
Drawbacks: Can require routine maintenance.
Costs: Varies



Gateway to downtown Collingswood on Haddon Avenue, including aesthetic features and safety infrastructure, including a pedestrian refuge and bollards.

Pavement Markings/Stencils

Description: Pavement markings are another means to alert or inform a motorist of a condition or a potential situation. Painted lines and symbols need to be selected and placed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). One example is "SCHOOL" or "PED XING" pavement marking legends within the travel lanes. Crosswalks can be used to alert motorists of pedestrian activity. Bicycle lanes can be striped and on-street parking can be delineated. Pavement markings are also used in conjunction with signs and other measures.
Benefits: Low cost and easy to install. Can increase motorist awareness of pedestrians and bicyclists.
Drawbacks: Requires regular maintenance. Not visible when roads are snow-covered.
Costs: Low. Average quality markings cost $7.00/sf. Longer lasting markings $15.00/sf.



Pavement markings in Asbury Park delineating shared bicycle facilities and parking spaces. Image: VTC

Stationary Radar Signs/ Speed Display Boards/ Speed Feedback Signs

Description: Radar signs are interactive signs that draw motorists' attention to their speed and the road's legal speed limit. They work by informing motorists when they are exceeding the speed limit, and motorists may wonder if law enforcement can see their speed reading. They can be used in residential areas, school zones, construction zones, or other safety zones. Radar signs can be permanently mounted on signposts or in temporary installations using self-contained trailers.

Benefits: Radar signs are proven to reduce traffic speeds, even years after their initial installation. They are particularly effective on high-volume arterials, where physical measures would restrict traffic flow, as well as local roads and in school zones.

Drawbacks: Radar signs do not reduce traffic speeds as much as physical measures. Motorists' compliance is voluntary. Enforcement is still necessary.

Costs: $6,000 - $16,000 each



Temporary speed feedback trailer in Somerville, NJ.



Permanent speed feedback sign in Dunellen, NJ. Image: NJDOT

Signage

Description: Traffic signs are used to alert or inform motorists of a condition or a potential situation. Signs need to be selected and placed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Speed limit signs, pedestrian/bicycle/school crossing signs, and in-street pedestrian crossing signs are used by municipalities to warn motorists of high pedestrian activity, and can help to reduce speeds. Signs are also used in conjunction with other measures such as pavement markings.

Benefits: Typically low cost. Increases awareness.

Drawbacks: Can clutter the roadway especially on residential streets. In-street signs are prone to being struck or may need to be removed at night and placed back during the day. Overall effectiveness can vary.

Costs: $180-$540 for average sign



In-Street Stop for Pedestrians Sign with SCHOOL plaque mounted above the sign in Glen Ridge, NJ.

Textured and Colored Pavements

Description: Paving materials such as brick, cobbles, stamped concrete or concrete pavers can be used to delineate separate space for pedestrians or bicyclists. The variety of color and texture signal to drivers that they are traveling in a pedestrian-centric zone. Some projects include colored and textured pavement along the entire calmed roadway. However, limiting the special pavement to edges, such as on-street parking lanes or center line is preferred. Stamped concrete or concrete pavers are preferred to bricks or blocks for pedestrian zones or bicycle paths because they offer a smoother travel surface and can be more durable. Striping may still be necessary to maximize visibility for motorists in inclement weather or darkness.

Benefits: Textured pavements attract the driver's attention visually, audibly, and physically, and are ideal for residential and neighborhood shopping areas. They are permanent and effective and can add to the aesthetic identity of a neighborhood.

Drawbacks: Some materials, particularly cobblestones, present a hazardous riding surface to bicyclists and may be uncomfortable for pedestrians, especially those in wheelchairs. Loose or uneven installations of paving stones pose a tripping hazard to pedestrians and should be regularly inspected, increasing maintenance costs over ordinary asphalt or concrete pavement.

Costs: Low to Moderate. Costs vary depending on materials used and size of paving area.



Textured crosswalk in Dunellen, NJ.



Textured crosswalk in Jersey City, NJ. Image: VTC

Landscaping

Description: Landscaping defines pedestrian and vehicle areas, reduces the visual width of the roadway, and provides a more pleasant street environment for all. Landscaping can include trees, bushes and/or planters which can be planted in the buffer area between the sidewalk and the street. Landscaping is often used in conjunction with other traffic-calming measures such as roadway narrowing, traffic islands, and sidewalk improvements.
Benefits: Landscaping increases motorists' awareness and can help define a neighborhood identity. Its installation is long term and increases the quality of life of a community.
Drawbacks: Depending on the design, the installation and maintenance costs can be high. Maintenance costs can be minimized by choosing appropriate plants and providing adequate space for them to grow.
Costs: Moderate to high - varies depending on scale and materials/plantings



Landscaped buffer in Montclair, NJ. Image: Arterial

Rumble Strips

Description: Rumble strips are raised buttons, or engraved depressions in the pavement, or grooves closely spaced on the roadway surface to create noise and vibration. They are typically installed to alert drivers of an upcoming curve or speed change. They are also commonly placed in the shoulders of freeways to alert drivers who might veer or drift off the road. They are also placed in the centerline area to alert drivers who may be drifting into oncoming traffic.
Benefits: Rumble strips are a permanent method to alert motorists they are entering an area with high pedestrian activity or other safety concerns. They do not require any additional right of way and their installation does not disrupt existing traffic patterns. They are inexpensive.
Drawbacks: Rumble strips are effective only through the noise and vibration they create. This same noise and vibration are their biggest detraction, particularly in residential areas. Drivers can more easily ignore rumble strips than other calming methods that vertically or horizontally deflect vehicles. Without adequate signage, rumble strips could startle motorists, potentially creating a hazardous condition. They also require increased maintenance; particularly during roadway re-paving.
Costs: $10 - $15/linear foot



Raised transverse rumble strips in Newark, NJ

Road Diets

Description: A Road Diet, or roadway reconfiguration, can improve safety, calm traffic, provide better mobility and access for all road users, and enhance overall quality of life. A Road Diet typically involves converting an existing four-lane undivided roadway to a three-lane roadway consisting of two through lanes and a center two-way left-turn lane (TWLTL). Often, two bicycle lanes can be created using the width of the eliminated vehicular travel lane.

Benefits: Reduction of crashes, traffic calming, improved visibility for left-turning motorists and reduced speeds, fewer lanes for pedestrians to cross, opportunities to install pedestrian refuge islands, bicycle lanes, on-street parking, or transit stops.

Drawbacks: In some cases, can increase traffic congestion and block travel lanes.

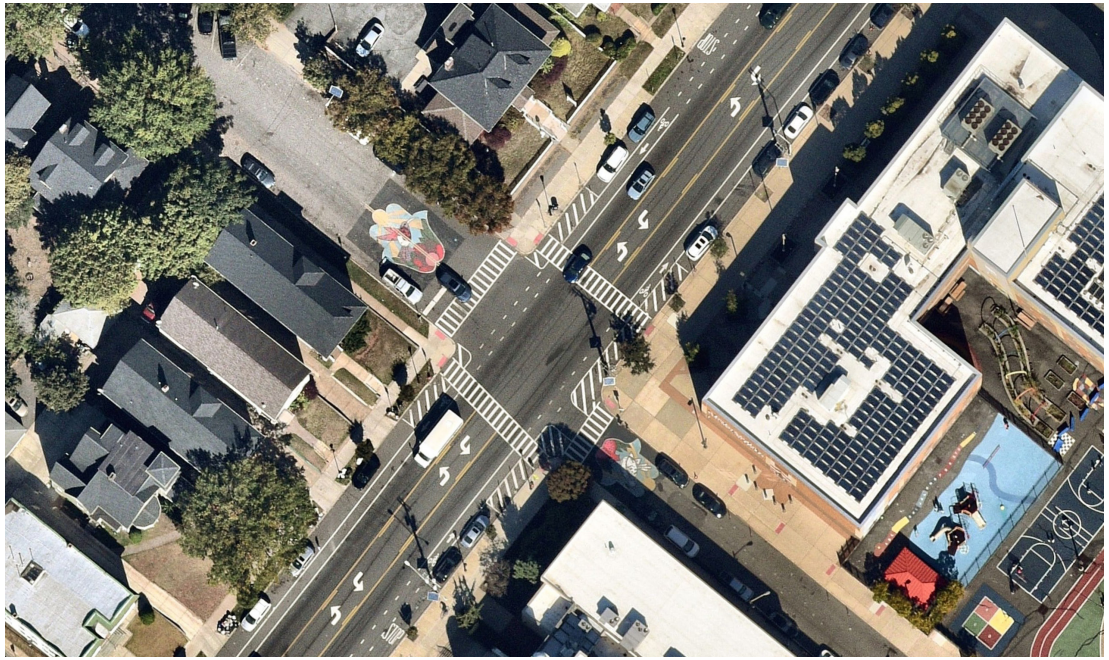
Costs: Can be a low-cost safety solution when planned in conjunction with a simple pavement overlay, and the reconfiguration can be accomplished at no additional cost. Technically the road diet configuration may involve a slightly higher cost for pavement markings.

Livingston Avenue Road Diet

Following the the preparation of a study by Voorhees Transportation Center in 2014, the City of New Brunswick implemented a road diet along Livingston Avenue (County Route 691) in 2020. The aerials to the right show the portion of Livingston Avenue near AC Redshaw Elementary School at the intersection with Delevan Street.



2019 aerial image of Livingston Avenue near AC Redshaw Elementary School in New Brunswick, NJ. Image: Nearmap, dated September 27, 2019, accessed February 23, 2026.



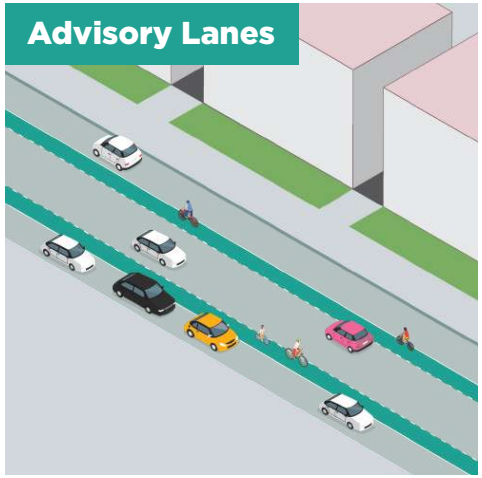
2025 aerial image of Livingston Avenue near AC Redshaw Elementary School in New Brunswick, NJ. Image: Nearmap, dated October 5, 2025, accessed February 23, 2026.

JERSEY CITY TRAFFIC CALMING TOOLKIT

In 2024, the City of Jersey City developed a Traffic Calming Toolkit to help planners, engineers, and community members understand and apply traffic-calming measures to improve safety across the city. The toolkit is organized into two main sections. The first categorizes treatments by location type, including local streets, collector streets, arterial streets, signalized intersections, directional stop-controlled intersections, and multi-way stop-controlled intersections. The second section categorizes treatments by type of traffic-calming measure, such as corridor treatments, intersection treatments, pedestrian treatments, bicycle treatments, and placemaking treatments.

Users begin by identifying applicable treatments based on the Location Type, and then narrow down the options to select the most appropriate treatment type. Each treatment includes a detailed description of its characteristics, such as its purpose, design description, relative cost, installation time, applicable locations, impacts, safety benefits, and relevant design guidance.

Advisory Lanes



Purpose
Allow motorists to temporarily enter bike lane to provide sufficient space for oncoming traffic to safely pass on streets with limited width to install dedicated bike facilities.

Description
A bike lane with a dashed outside stripe indicating that vehicles may traverse the bike lane, if necessary, but should watch for and yield to cyclists, as with any bike facility.

Cost
$ $ $

Installation Time

Applicable Locations

- Street Type: Local Streets
- Cartway Width: One- and two-lane streets
- Traffic Volume: Less than 3,000 daily vehicles
- Speed Limit: 25 MPH
- Roadway Grade: Less than 8 percent
- Heavy Vehicles: Less than 5 percent

Impacts

- Volume Impacts: Bike volumes may increase.
- Crash Reduction Impacts: Advisory bike lanes have been shown to reduce crashes by 36 – 44%.[1]

Safety Benefits

- Provides designated space for cyclists.
- Allows vehicles to safely pass when necessary.
- May have a speed reduction effect on motor vehicles.[2]

Design Guidance

- The minimum width of an advisory bike lane is 6 feet adjacent to parking, or 4 feet curb-adjacent exclusive of gutter. A desirable width is 7 feet.
- The minimum width of the un-laned 2-way motorist space should be 12 feet between the bike lanes. The maximum width is 18 feet.

Advisory Lane treatment page example.
Find more information at Jersey City Traffic Calming Toolkit

Speed Humps

Description: Speed humps are rounded, raised areas across the roadway that cause vehicles to reduce speeds. They are usually found on neighborhood streets (low-volume), not on major roadways or primary emergency vehicle routes. Speed humps should terminate before the gutter pan or curb, so as to not interfere with proper stormwater drainage. They are sometimes broken up to allow a clear path for bicyclists or emergency vehicles, and include signage and paint markings so that they are visible.
Benefits: Speed reduction. Relatively low-cost. Easy to test.
Drawbacks: Increased noise.
Increased maintenance costs. Requires additional costs for signage. Extra care is required when snowplowing.
Costs: $2,500



Speed hump in front of an elementary school in West Orange, NJ.

Speed Tables

Description: Speed tables are midblock traffic-calming devices that raise the entire wheelbase of a vehicle to reduce its traffic speed. Speed tables are longer than speed humps and flat-topped, with a height of 3–3.5 inches and a length of 22 feet.
Benefits: Speed reduction.
Drawbacks: It can be challenging to get buy-in from local and regional emergency services and first responders as speed tables can be perceived as reducing emergency response times.
Costs: $20,000



Speed Table in Northampton, Massachusetts. Image: Northampton Massachusetts

Raised Crosswalks

Description: Raised crosswalks are ramped speed tables spanning the entire width of the roadway, often placed at midblock crossing locations. The crosswalk is demarcated with paint and/or special paving materials. These crosswalks act as traffic-calming measures that allow the pedestrian to cross at grade with the sidewalk.
Benefits: Speed reduction. Increase visibility of and for pedestrians.
Drawbacks: Noise. Maintenance. Need for signage. May require revisions to stormwater systems
Costs: $40,000



Raised crosswalk at Somerville School in Ridgewood, NJ.

Raised Intersections

Description: Raised intersections are raised areas of roadway, including crosswalks that are higher than the surrounding roadway approaches. Like speed humps, they deflect both the wheels and frame of traversing vehicles. The entire intersection is at sidewalk grade, putting pedestrians and vehicles on the same plane.
Benefits: Speed reduction. Improved safety. Reduction in cut-through traffic. The gentle ramps that lead to the intersection are designed to avoid damage to large vehicles and emergency response vehicles.
Drawbacks: Increased roadway noise. Higher maintenance costs. Required signage costs and aesthetics. May require revisions to stormwater systems
Costs: High ($80,000 - $120,000 each)



Raised intersection, Princeton, NJ.

Mini-Roundabouts / Mini-Traffic Circles / Modern Roundabouts

Description: Another variation used in residential traffic calming is the mini traffic circle, which is a raised circular island constructed in the center of residential or minor street or intersections. These are generally not intended for use where one or both streets are arterial streets. Motorists must reduce speed to maneuver around the circle, which helps reduce the frequency and severity of crashes. Mini-circles are commonly landscaped, most often at locations where the neighborhood has agreed to maintain the plants. In locations where landscaping is not feasible, traffic circles can be enhanced through specific pavement materials. Mini-circles are an intersection improvement as well as a traffic-calming device and can take the place of stop or yield signs. A modern roundabout is a form of circular intersection in which traffic travels at low speeds counterclockwise around a central island. Vehicles entering a roundabout must yield, or stop if needed, to circulating traffic. The lower design speed of roundabouts is likely to improve yielding, safety, and comfort for pedestrians and bicyclists. In settings with large numbers of children, lowering vehicle speed has great potential for injury prevention.
Benefits: Slows traffic. Reduces cut-through traffic. Can provide a gateway or identity to a neighborhood. Does not alter the path of pedestrians or bicyclists.
Drawbacks: In some cases, design techniques may be employed to mitigate impacts on emergency access, for example, by providing mountable curbs or aprons at the edges of traffic circles or medians. A single roundabout used in isolation will not significantly calm traffic. A coordinated system of multiple traffic circles or other calming measures is preferred.
Costs: $45,000 - $110,000 each

- Roundabouts and Traffic circles are an incredible opportunity for green infrastructure. Mini-roundabouts can be home to small plants and trees while the largest roundabouts can even host small landscaping features or even micro-parks! Additionally, roundabouts can be an effective tool to mitigate stormwater runoff. Consult your local botanist/arborist before planting anything.

- Roundabouts can reduce fatalities and injuries from crashes compared to traditional two-way stop-controlled intersections by up to 82%.

Chicanes

Description: A chicane is a set of two or more curb extensions/islands on alternating sides of a roadway or approach that narrow and realign the roadway for short segments. Since the street is no longer straight, drivers must slow down to negotiate the roadway. Two-way traffic and full access for larger vehicles and emergency services can be maintained. A chicane effect can be created using various methods, including concrete curbs, landscaped areas or alternating diagonal and parallel parking.
Benefits: By creating a "slalom" effect, chicanes reduce vehicle speeds and discourage cut-through traffic. These methods can improve the appearance and function of the street.
Drawbacks: Concrete chicanes complicate street maintenance and stormwater drainage. Must be able to maintain required clearances for emergency vehicle and bus access.
Costs: $10,000 - $30,000 (paint versus physical diverter)



Roadway with a chicane. Image: Google map

Curb Extensions / Bulb Outs

Description: Curb extensions, sometimes referred to as "bulb-outs" or "bump-outs" narrow the roadway by extending the curb at key intersections and mid-block locations.
Benefits: Slows traffic. Reduces turning speeds. Increases pedestrian safety by reducing crossing distance and increasing pedestrian visibility. Can be lengthened to create landscaped areas or transit stops.
Drawbacks: Relatively high initial costs. Potential loss of on-street parking. Increased maintenance costs. Complicates plowing and street sweeping operations. Can hinder drainage. Can impact turning movements for large trucks and may not be feasible in some areas for this reason.
Costs: $25,000 per corner of intersection



Curb Extension in Montclair, NJ. Image: VTC

Pedestrian Refuge Islands

Description: Concrete or landscaped islands typically located down the center of a roadway or at a roadway entrance.
Benefits: Landscaped or concrete traffic islands and medians can reduce speeds by narrowing drivable travel lane widths. They can improve pedestrian accommodation by providing a mid-block pedestrian refuge at crossings. They complement improved crosswalks, and can allow a pedestrian to cross each direction of travel separately. A minimum 6-foot width is desirable. They can also reduce pedestrian crossing width. They can be used to provide a visual enhancement or gateway to promote neighborhood identity.
Drawbacks: Traffic islands and medians may reduce parking and driveway access, and the narrower road may also increase motor vehicle/bicycle conflicts.
Costs: $4,000



Pedestrian Refuge Island in Cherry Hill, NJ. Image: VTC

Roadway Closures

Description: The most extreme form of traffic diversion, a permanent roadway closure interrupts the traffic grid pattern by creating dead-end or cul-de-sac street segments. A street closure is accomplished by installing a physical barrier that blocks a street to motor vehicle traffic and provides some means for vehicles to turn around. Full street closures should be used only in the rarest of circumstances. Neighborhoods with cul-de-sac streets require extensive out-of-the-way travel, which is not a mere convenience issue, but has serious implications for impacts on other streets, which should be studied before implementation. If a roadway is closed, it should always allow for the free through movement of all pedestrians, including wheelchair users, and bicyclists. Local emergency services should be consulted when planning a roadway closure.
Benefits: This treatment works very well where all other calming attempts have failed.
Drawbacks: Street closures divert all through traffic onto other nearby roadways in the network.
Costs: Low, varies depending on materials, and landscaping



This permanent roadway closure in Ocean City, NJ preserves bicycle and pedestrian access.

Diverters

Description: Several types of diverters, such as semi-diverters and diagonal diverters, may be used to restrict traffic flow and discourage cut-through traffic. Diagonal diverters, also called turning movement diverters, can be installed at the intersection of a neighborhood street with a major street or collector to prevent cut–through traffic. They prevent straight–through movements and allow right turns only into and out of the neighborhood.
Benefits: Diverters reduce through traffic without preventing pedestrian access. They can also be designed to allow bicycle and emergency vehicle traffic.
Drawbacks: Do not work well on arterials, highways, other main roadways and transit routes.
Costs: $25,000 - $150,000



This landscaped median along Haven Avenue in Ocean City, NJ allows right turns only for motor vehicles.

Turn Restrictions

Description: This treatment uses signage to restrict certain turns at intersections to influence travel patterns. For example, a "No Left Turn" sign at an intersection is intended to prevent left turns. This measure is applicable on streets where cut-through traffic exists. This method can be tailored to be applicable during the most problematic times by defining a time period for the restriction.
Benefits: Low cost.
Drawbacks: This treatment does not work well for high-volume intersections with many turning movements, because it is difficult to enforce.
Costs: Low



Turning right on red is restricted during school hours at this intersection.

Temporary Circulation Changes (Street Closures and One-Way Streets)

Description: Temporary street closures during student arrival and departure times can improve the efficiency and safety of the drop off and pick up of students at school. Temporary closures eliminate motor vehicles in areas congested with pedestrians, bicyclists, and perhaps buses. Another similar technique is to designate a street as one-way during arrival and departure time. Signs are essential for this method.
Benefits: Work well at densely developed neighborhood schools.
Drawbacks: This treatment may create traffic problems on other streets. Requires staff to set up and take down temporary traffic devices for each implementation.
Costs: Low



Temporary roadway closure in front of the Bullock School in Montclair, NJ.

School Streets

Description: The concept of School Streets originates from NACTO's Streets for Pandemic Response and Recovery guide. School Streets are roads surrounding schools that are temporarily closed to through motor vehicle traffic during arrival and dismissal times. They create shared spaces using temporary barriers at school entrances to provide safe waiting areas while still allowing necessary vehicular access.
Benefits: Increase safety, air quality and health and well-being
Drawbacks: Might displace traffic congestion to nearby roads, operational challenges for some schools. Requires staff to set up and take down temporary traffic devices for each implementation.
Costs: Low



School Streets on Clinton Avenue, Ridgewood, NJ. Image: School Zone Safety Strategies

Hardened Center Lines

Description: Vertical or mountable elements placed along the centerline of two-way streets or lane lines on multi-lane streets to guide vehicles into a single receiving lane and discourage wide or high-speed turns.
Benefits: Slowing high-speed turning traffic in pedestrian areas
Drawbacks: High-speed turns in conflict with pedestrians
Costs: Low



Hardened Center Lines in Jersey City, NJ. Image: Hudson County Complete Street Demonstration Project

Slow Turn Wedges

Description: Left turns can increase the risk of pedestrian crashes. Slow-turn wedges are a traffic-calming treatment that uses posts placed within the intersection to force drivers to slow down and follow the proper path when making left turns. This type of traffic-calming device can only be installed at locations where a one-way road intersects with a two-way road or another one-way road.
Benefits: Increase safety, and speed reduction.
Drawbacks: High-speed turns in conflict with pedestrians
Costs: Low (if implemented using striping and modular equipment)



Slow Turn Wedges in Brooklyn, NY. Image: The City of New York

INTERSECTION MURALS AND AESTHETIC SURFACE TREATMENTS

Per the MUTCD FAQ, aesthetic surface treatments and intersection murals are not considered traffic control devices and therefore are not governed by the MUTCD, except where they interact with or adversely affect official traffic control devices. While such treatments may increase intersection visibility, the use of colors is limited to those that do not conflict with MUTCD color provisions. As a result, school-specific colors may not always be permitted. The final design and installation must ensure that the crosswalk striping is visible to all users. In addition, before installation of any street artwork, verify current FHWA policy and regulations especially if federal funding is involved.



Intersection mural at the intersection of Holmes Street and High Street in Belleville, NJ. Image: VTC

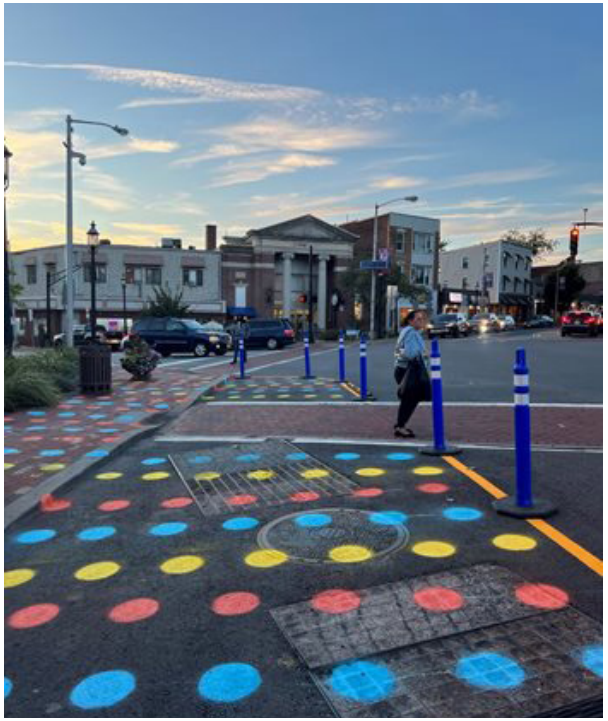
Temporary Demonstrations for Traffic Calming and Complete Streets

Temporary demonstration projects help communities test the feasibility and effectiveness of potential roadway improvements before permanent installation. Communities across the country have increasingly implemented these projects as a way to evaluate design concepts in real-world conditions. This approach can highlight potential project shortcomings, broaden public engagement, test interventions, and inspire community support and action. The North Jersey Transportation Planning Authority (NJTPA), in partnership with the Hudson Transportation Management Association (Hudson TMA), created the Complete Streets Demonstration Library to support low-cost, quick-build projects. The purpose of the program is to encourage and expand the use of temporary demonstration projects as a planning and engagement tool. The goals of these projects include:

- Testing street design interventions, such as bicycle lanes, corner curb extensions or "bump-outs," pedestrian plazas, "parklets" in place of on-street parking spaces, and other safety, placemaking, and traffic-calming features.
- Engaging communities through education on safer street design, placemaking, active transportation, and the collection of real-time public feedback.
- Evaluating impacts on street performance, user behavior, and overall safety.



Pilot Bicycle Lanes in Asbury Park, NJ. Image: VTC



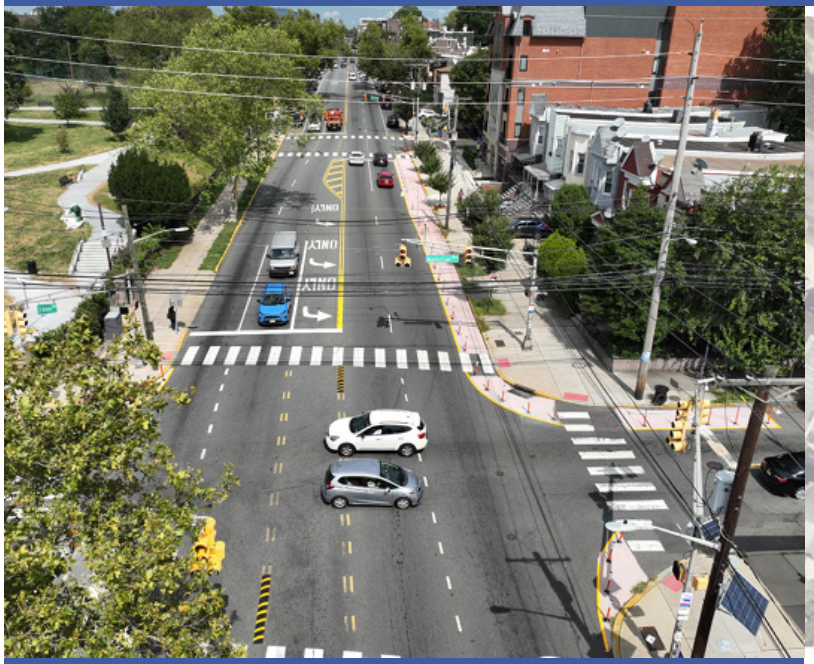
Temporary Curb Extension in West Orange, NJ. Image: NJTPA

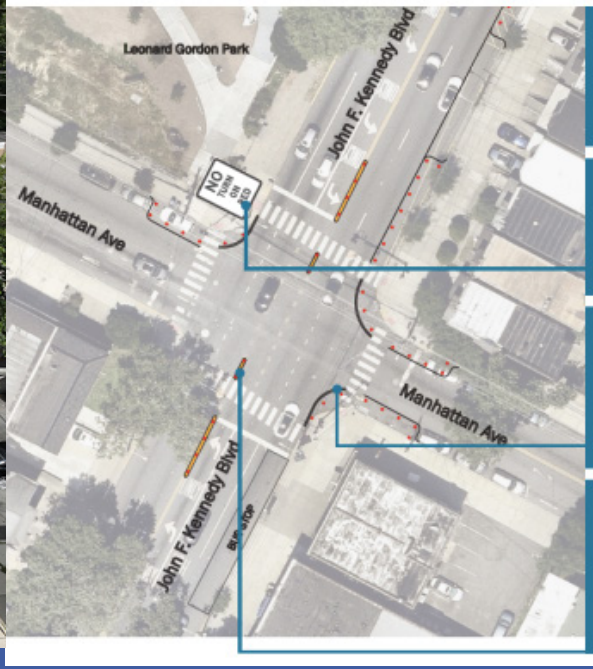
HUDSON COUNTY COMPLETE STREETS DEMONSTRATION PROJECTS

In 2024, Hudson County developed its Vision Zero Safety Action Plan to eliminate fatal and serious-injury crashes. The project follows the following policy and design strategy considerations:

- Making streets safer for people walking and bicycling through Complete Streets improvements.
- Fixing common risks on roads by adding clear markings, lights, and signs.
- Adding simple safety measures like turning lanes, rumble strips, and brighter road markings along high-crash corridors.
- Providing Safe Routes to School and improved public transit services for underserved communities.
- Conducting community outreach and education when making changes that are new to communities.

On September 7, 2024, the project team installed a temporary demonstration project featuring curb extensions, a hardened centerline, and signal timing adjustments to create an all-pedestrian phase. These treatments are designed to improve safety and accessibility for people who use active transportation. Although temporary, the demonstration provided valuable insight into how these treatments could improve traffic safety and inform future improvements in Hudson County.





ALL-PEDESTRIAN PHASE
A signal timing strategy that allows pedestrians to cross all intersections simultaneously, with no vehicle movement.

TURN RESTRICTIONS
During this duration of the demonstration project, signs were installed prohibiting Right-On-Red.

BUMP-OUTS/CURB EXTENSIONS
An extension of the sidewalk at the intersection that narrows roadways, shortens crossings, and improves safety and walkability.

CENTERLINE HARDENING
A barrier installed on the double yellow line to prevent lane crossing, reducing head-on collisions and calming turns. The demo also included a short section in front of the crosswalk.

Source and find more information: https://www.hcnj.us/visionzero/safety-plan/

Summary Matrix: Traffic Calming Measures for School Zones

This summary matrix lists the traffic-calming measures described in this chapter and provides a brief description of each measure, the issue it is intended to address, what it is best used for and not intended to be used for, an idea of cost (where available), and other considerations regarding the measure. This cost information has been updated using the NJDOT Transportation Alternatives Program 2026 Cost Estimate Guidelines and Recommendations for Pedestrian, Bicycle and Traffic Calming Projects.

Measure	Description	Issue	Best For	Not Used For	Costs	Considerations
Gateway	A signing and/or landscaping treatment to alert motorists they are entering a special area with increased conflicts. Gateways are typically supplemented with other traffic-calming measures.	Speed Reduction	Entrances to school zones, neighborhoods, commercial areas, town centers, or busy places of activity.	Isolated higher-volume arterials and highways	Varies	Generally expensive and can require routine maintenance.
Pavement Marking/ Stencil	Markings lines and symbols need to be selected and placed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Some examples include: A "SCHOOL" legend can be installed on a travel lane in advance of a school area with high pedestrian activity. Crosswalks can be used to alert motorists of pedestrian activity.	Speed Reduction	Roadways with wide rights of-way that would benefit from slower speeds and improved pedestrian safety	Isolated higher-volume arterials and highways	Low Average quality markings cost $7.00/ sf. Longer lasting markings $15.00/sf.	Pavement markings are typically used in conjunction with signs and other measures. Require regular maintenance and may not be visually aesthetic. Not visible when roads are snow-covered.
Stationary Radar Sign / Speed Display Board / Speed Feedback Sign	Radar signs are interactive signs that draw motorists' attention to their speed and the road's legal speed limit. They work by informing motorists when they're exceeding the speed limit. They can be used in residential areas, school zones, construction zones, or other safety zones. Radar signs can be permanently mounted on signposts or temporary installations can be mounted on self-contained trailers.	Speed Reduction	High volume and high speed arterials and highways; residential areas, school zones, construction zones, or other safety zones	Streets where speeding is not a concern	$6,000 - $16,000 each	Radar signs do not slow traffic as much as physical measures. Motorists' compliance is voluntary. Enforcement is still necessary.

Measure	Description	Issue	Best For	Not Used For	Costs	Considerations
Textured and Colored Pavement	Paving materials such as brick, cobbles, or concrete pavers can be used to identify a traffic calmed area. The variety of color and texture signal to drivers that they are traveling in a pedestrian-centric zone. Bricks or blocks are sometimes also used to provide the same traffic-calming benefits as rumble strips, delineating crosswalks and pedestrian zones.	Speed Reduction	Residential and neighborhood shopping areas	Isolated higher-volume arterials and highways	Moderate to High. Costs vary depending on materials used and size of paving area.	Some materials, particularly cobblestones, present a hazardous riding surface to bicyclists. Loose or uneven installations of paving stones pose a tripping hazard to pedestrians and should be regularly inspected, increasing maintenance costs over ordinary asphalt or concrete pavement.
Landscaping	Landscaping defines pedestrian and vehicle areas, reduces the visual width of the roadway, and provides a more pleasant street environment for all. Landscaping can include trees, bushes and/or planters which can be planted in the buffer area between the sidewalk and the street. Landscaping is often used in conjunction with other traffic-calming measures.	Pedestrian Safety, Speed Reduction	Residential and neighborhood shopping areas	Isolated higher-volume arterials and highways	Moderate to high - varies depending on scale and materials/ plantings	Depending on the design, the installation and maintenance costs can be high. Right-of-way impacts may be significant as well.
Rumble Strip	Rumble strips are raised buttons or grooves closely spaced on roadway surface to create noise and vibration. They are typically installed to alert drivers of an upcoming curve or speed change. They are freeways, or along center lines of roadways, to alert drivers who risk leaving the roadway or cross into oncoming traffic.	Speed Reduction	Isolated higher-volume arterials and highways; areas with high pedestrian activity and safety concerns	Residential areas; Bicycle paths / lanes	$10 to $15 per linear foot	Rumble strips are effective only through the noise and vibration they create. This same noise and vibration are their biggest detraction, particularly in residential areas. Drivers can more easily ignore rumble strips than other calming methods that vertically or horizontally deflect vehicles. Without adequate signage, rumble strips could startle motorists, potentially creating a hazardous condition. They also require increased maintenance, particularly during roadway re-paving.

Measure	Description	Issue	Best For	Not Used For	Costs	Considerations
Signage (regulatory and warning)	Traffic signs can be used to alert or inform motorists of a condition or a potential situation. Signs need to be selected and placed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Speed limit signs, pedestrian/bicycle/school crossing signs, and in street-pedestrian crossing signs are often used by municipalities to warn motorists of high pedestrian activity, and can help to reduce speeds.	Speed Reduction	All types of roadways (in moderation)	-	Low $180-$540 for an average sign	Signs are also used in conjunction with other measures such as pavement markings. Can be considered to clutter the roadside especially on a residential street. In-street signs are susceptible to being struck or may need to be removed at night and placed back during the day. Overall effectiveness can vary.
Narrowed Lane	Studies have shown that wider travel lanes allow for faster vehicular travel speeds. Conversely, drivers naturally travel more slowly when navigating narrow travel lanes, providing a more subtle calming effect than other physical calming methods.	Speed Reduction	All types of roadways	-	Varies depending on method of narrowing the roadway. Low if striping only.	Excess right-of-way can be shifted to providing wider sidewalks, bicycle lanes, or on-street parking. Simple roadway restriping to achieve roadway narrowing is inexpensive.
Road Diet	A "road diet", or roadway reconfiguration, can improve safety, calm traffic, provide opportunities to install pedestrian refuge islands, bicycle lanes, on-street parking, or transit stops, and enhance overall quality of life. A road diet typically involves converting an existing four-lane undivided roadway to a three-lane roadway consisting of two through lanes and a center two-way left-turn lane (TWLTL).	Speed Reduction, Pedestrian Safety	Four-lane undivided roadways with histories of left turn or sideswipe crashes, and/or high pedestrian and bicycle usage.	Arterial corridors with very heavy through traffic volumes, or with no pedestrian/ bicycle demand	Varies. Can be a low-cost safety solution when planned in conjunction with a simple pavement overlay, and the reconfiguration can be accomplished at minimal additional cost	On corridors with significant left turn volumes, "road diet" typically does not significantly impact capacity, though traffic engineering study may be requested to demonstrate to the public and/or municipal officials

Measure	Description	Issue	Best For	Not Used For	Costs	Considerations
Speed Hump/Speed Table	Speed humps are rounded raised areas across the roadway that require vehicles to reduce speeds.	Speed Reduction	Neighborhood streets	Arterials, highways, other main roadways	$2,500 (hump) to $20,000 (table)	Can interfere with transit, snow plow, and emergency vehicle operations. Speed humps increase roadway noise and wear on vehicle suspensions. Highly visible warning signage and pavement markings required.
Raised Crosswalk	Raised crosswalks are elongated speed humps that feature a marked crosswalk at the same elevation as the adjacent sidewalks. Crosswalk markings or contrasting crosswalk materials (pictured) show this element is also a crosswalk.	Pedestrian Safety; Speed Reduction	Areas where pedestrian traffic takes priority over vehicular traffic	Arterials, highways, other main roadways	$40,000	As both a marked crosswalk and a traffic calming-element, raised crosswalks provide a superior safety advantage to pedestrians. Raised crosswalk can also impact stormwater flow.
Raised Intersection	Similar to raised crosswalks, except the entire intersection is at sidewalk grade	Pedestrian Safety; Speed Reduction	Areas with heavy pedestrian traffic, such as shopping areas and college campuses.	Arterials, highways, other main roadways	$80,000 - $120,000	Raised intersections provide a barrier-free crossing for pedestrians and slow all vehicles, including emergency vehicles and transit buses. Raised intersections can also impact stormwater flow.
Mini Roundabout Modern Roundabout	Motorists must reduce speed to maneuver around the circle, which helps reduce speeds and the frequency of crashes.	Speed Reduction	Neighborhood streets that have a history of high speeds and high crash rates at intersections	Intersections with dispro-portionate volume on approaches	$45,000 (Mini Roundabout) $110,000 (Neighborhood traffic circle)	Can provide a gateway or neighborhood identity.

Measure	Description	Issue	Best For	Not Used For	Costs	Considerations
Chicane	Sets of two or more alternating curb bulb outs or extensions that narrow and realign the roadway.	Speed Reduction and Cut-Through Traffic	Neighborhood streets that experience high speeds or heavy cut-through traffic volume	Arterials, highways, other main roadways	$30,000	Concrete chicanes complicate street maintenance and drainage and may require additional right-of-way to construct. Chicanes created through pavement striping are cost-effective and easy to implement, but also less effective. On-street parking can be alternated from side-to-side along the street.
Curb Extension ("Bulb-Out" or "Bump-Out")	Briefly narrow the roadway by extending the curb at intersections or mid-block locations Reduces vehicle travel speeds due to narrowed travel lanes. Reduces crosswalk lengths.	Pedestrian Safety; Speed Reduction	Areas with pedestrian traffic and wider roadway cross sections; Village environments	Arterials; Narrow streets or areas with high volumes of large truck turns	$25,000 per corner of intersection	May require eliminating some on-street parking and may hinder street plowing and sweeping operations.
Pedestrian Refuge Island	Concrete or landscaped islands and medians slow travel speeds by narrowing lanes and also improve pedestrian accommodation by providing a pedestrian refuge at crossings, allowing pedestrians to cross each direction of travel separately.	Pedestrian Safety; Speed Reduction	Roadways with wide rights-of-way that would benefit from slower speeds and improved pedestrian safety	Already narrow roads, or roadways with frequent driveways	$4,000	Islands and medians can provide a visual enhancement or gateway to promote neighborhood identity. They may reduce parking and driveway access and may increase motor vehicle conflicts with bicycles.
Roadway Closure	The most extreme form of traffic diversion, roadway closures interrupt the traffic grid pattern by creating dead-end or cul-de-sac street segments.	Cut-Through Traffic	Neighborhood streets where all other calming attempts have failed	Arterials, highways, other main roadways, transit routes, and anywhere street continuity is desired	Low, varies depending on materials, and landscaping	Street closures divert all through traffic onto other nearby roadways in the network. Traffic impacts of a roadway closure should be studied when considering implementation.

Measure	Description	Issue	Best For	Not Used For	Costs	Considerations
Diverter	Several types of diverters, such as semi-diverters and diagonal diverters, may be used to restrict traffic flow and discourage cut-through traffic.	Cut-Through Traffic	Neighborhood streets that experience high cut-through traffic volume	Arterials, highways, other main roadways and transit routes	$25,000 - $150,000	Diverters reduce through traffic without preventing pedestrian access. They can also be designed to allow bicycle traffic.
Turn Restriction	Restricting certain turns at intersections to influence travel patterns.	Cut-Through Traffic	Low-volume turning movement	High-volume intersections and turning movements	Low	Can be difficult to enforce without physical improvements to intersection geometry.
Temporary Circulation Changes	Temporary street closures during student arrival and departure times can improve the efficiency and safety of the drop off and pick up of students at school. Temporary street closures eliminate motor vehicles in areas congested with pedestrians, bicyclists, and perhaps buses.	Cut-Through Traffic; Congestion during school arrival/ dismissal	Low volume neighborhoods with comprehensive grid network; High cut-through neighborhoods	Isolated higher-volume arterials; Transit routes; Major emergency response routes	Low	Circulation changes will have secondary impacts on adjacent roadways that must be considered.
School Streets	Roads surrounding schools that are temporarily closed to through motor vehicle traffic during arrival / dismissal times. They create shared spaces using temporary barriers at school entrances to provide safe waiting areas while still allowing necessary vehicular access.	Traffic congestion and queuing adjacent to schools, causing pedestrian conflicts	Neighborhood streets with low through traffic volumes	High- volume arterial streets	Low	Need staff to deploy and retrieve traffic control devices, for each implementation

Measure	Description	Issue	Best For	Not Used For	Costs	Considerations
Hardened Center Lines	Vertical or mountable elements placed along the centerline of two-way streets or lane lines on multi-lane streets to guide vehicles into a single receiving lane and discourage wide or high-speed turns.	High-speed turns in conflict with pedestrians	Slowing high-speed turning traffic in pedestrian areas	Areas with low pedestrian demand	Low	Modular equipment subject to damage from vehicles including snow plows
Slow Turn Wedges	Posts placed within the intersection to force drivers to slow down and follow the proper path when making left turns. This type of traffic-calming device can only be installed where a one-way road intersects with a two-way road or another one-way road.	High-speed turns in conflict with pedestrians	Slowing high-speed turning traffic in pedestrian areas	Areas with low pedestrian demand, or approaches with no left turns	Low (if implemented using striping and modular equipment)	Only for installation on one-way street approaches. Modular equipment subject to damage from vehicles including snow plows

09 Students and Bicycling

Bicyclists have unique characteristics. They operate as vehicles yet are as vulnerable as pedestrians when involved in crashes. Student bicyclists have varied levels of ability, depending on age and skill level. Some will feel comfortable riding in the street, while others prefer riding on bicycle lanes or paths. Bicycling can help students who live too far from school to walk comfortably to participate in active transportation. Note that all the bicycle facilities should be installed after conducting a formal study and following a data-driven process.

Introduction

The *Safe Routes to School Guide* maintained by the National Center for Safe Routes to School at saferoutesinfo.org recommends that schools encourage more bicycling by teaching bicycle safety, offering bicycle repair classes, and providing adequate bicycle parking facilities that shield bicycles from inclement weather and discourage theft. This chapter discusses some ways that bicycling to school can be encouraged and made safer, including by providing:

- Bicycling accommodations to and from school,
- Bicycle storage at school,
- Bicycle safety education, and
- Programs and special events to encourage bicycling to school.

Bicycle Accommodations

Children often have minimal riding skills, little experience and limited physical capabilities. Children also often have an inappropriately high level of confidence, or at least fearlessness, in their riding skill and lack judgment regarding safe bicycling practices. To support bicycle use as a healthier and safer alternative to auto travel for short local trips by students and others, enhanced bicycle accommodations must be provided. On-street facilities, such as bicycle lanes, are more appropriate for upper elementary school and older children who have sufficient bicycle-handling skills and knowledge of bicycle and traffic safety rules. Off-street or separated facilities such as trails and bicycle tracks are more appropriate for younger elementary school children. The benefits, drawbacks, and typical applications of bicycle accommodations, including on- and off-street facilities, bicycle tracks, intersection treatments, signing, striping, and other bicycle-related treatments, are discussed in this section.

DESIGN GUIDELINES

NJDOT Complete Streets Design Guide, The American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, the Manual on Uniform Traffic Control Devices (MUTCD), the NJDOT Pedestrian and Bicycle Compatible Design Guidelines (AASHTO Bike Guide), the Federal Highway Administration (FHWA) Designing Sidewalks and Trails for Access, Best Practices Design Guide, and the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide should be followed during planning, design, and construction projects to ensure that appropriate bicycle facilities are provided.

On-Street Bicycle Facilities

Conventional Bicycle Lanes

Description: A portion of the roadway that has been designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists. Most common bicycle facility in use in the United States.
Benefits: Enables bicyclists to ride at their preferred speed without interference from motor vehicle traffic conditions; facilitates predictable behavior and movements between bicyclists and motorists; visually reminds motorists of bicyclists' right to the street.
Drawbacks: Not all users will be comfortable in a bicycle lane; when next to on-street parking there is a risk of bicyclists getting 'doored', which is when a driver or passenger inadvertently opens their car door into the path of an oncoming bicyclist; greater enforcement is required to prevent motorists from parking in the bicycle lane, and brush/yard waste piled in shoulders which are designated as bicycle lanes.
When to Use/Typical Application: Consistent with the AASHTO Bike Guide and the NJDOT CSDG , bicycle lanes should be typically 5 -7 feet wide. Six feet of width is recommended where speeds are greater than 30 mph. Width may reduce to 4 feet on streets with no curbs.



Conventional bicycle lane in Hoboken, NJ. Image: VTC

Buffered Bicycle Lanes

Description: A buffered bicycle lane is a conventional bicycle lane paired with a designated buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane.
Benefits: Provides greater offset between motor vehicles and bicyclists; provides space for bicyclists to pass another bicyclist without encroaching into the adjacent motor vehicle travel lane; encourages bicyclists to ride outside of the door zone when buffer is between parked cars and bicycle lane; appeals to a wider cross-section of bicycle users.
Drawbacks: Reduces the natural "sweeping" effect of passing motor vehicles, potentially requiring more maintenance.
When to Use/Typical Application: Consistent with the AASHTO Bike Guide, buffered bicycle lanes should be considered on streets with high-traffic volume, regular truck traffic, high parking turnover and higher speed limits. Per the AASHTO Bike Guide, this facility improves comfort on roads > 6,000 ADT or > 30 mph; buffer width scales with speed. Refer to the NJDOT CSDG for bikeway selection guidance.



A buffered bicycle lane in Newark, NJ. Image: VTC

Contraflow Bicycle Lanes

Description: A contraflow bicycle lane is a bicycle lane designed to allow bicyclists to ride in the opposite direction of motor vehicle traffic. It converts a one-way traffic street into a two-way street: one direction for motor vehicles and bicycles, and the other for bicycles only. A contraflow lane is separated from opposing traffic with yellow center-line striping.
Benefits: Decreases trip distance, the number of intersections encountered, and travel times for bicyclists by eliminating out-of-direction travel; limits dangerous wrong-way riding by allowing cyclists to safely ride in the opposite direction of cars; reduces sidewalk riding.
Drawbacks: May introduce additional conflict points as motorists may not expect on-coming bicyclists.
When to Use/Typical Application: Where it would provide substantial savings in out-of-direction travel and/or direct access to high-use destinations; where there will be fewer conflicts when compared to a route on other streets; when there are few intersecting driveways, alleys, or streets on the side of the street with the contraflow bicycle lane; where bicyclists can effectively and conveniently make transitions at the termini of the lane.



A contraflow bicycle lane in Newark, NJ. All vehicular traffic on this roadway moves in the opposite direction. Image: BikeNewark

Advisory Bicycle Lanes

Description: An advisory bicycle lane is similar to a conventional bicycle lane, but is used only on narrow, low-volume, low-speed streets. An advisory bicycle lane is marked with a solid white line on the right (next to parked cars) and a dashed line to the left. These markings give priority to bicyclists in these lanes, but are also available to motorists if space is needed to pass oncoming traffic. These are also known as "suggestion lanes."
Benefits: Provides bicyclists a designated place to ride while also allowing motorists to use the space to pass oncoming traffic; reminds people that the road is a shared space; directs bicyclists where and how to ride; reduces motorist encroaching on bicyclists.
Drawbacks: Unfamiliarity with the treatment can lead to confusion.
When to Use/Typical Application: Roads that are too narrow for conventional bicycle lanes; roadways with low traffic volume; only used on roads without marked centerlines; used in both rural and urban areas. Consistent with the AASHTO Guide for the Development of Bicycle Facilities (2024) < 25 mph preferred (35 max); < 3,000 ADT preferred (6,000 max). Considered "experimental" by FHWA/MUTCD; use of advisory bicycle lanes must be formally requested.



Advisory bicycle lanes in Washington DC. Image: District Department of Transportation

Protected Bicycle Lanes

Description: Protected bicycle lanes, also referred to as separated bicycle lanes, are bicycle facilities that provide physical separation between bicyclists and motor vehicle traffic. These facilities are designed to accommodate users of all ages and abilities and can be implemented across a wide range of street contexts. Elements such as medians, parked cars, barriers, guide rail, curbs, or flexible delineators serve as buffers and provide varying levels of protected separation between bicycle lanes and general-purpose travel lanes. Converting a conventional or constrained bicycle lane to a protected bicycle lane can be expected to reduce motor vehicle–bicycle crashes by more than 50%.

Benefits: More attractive for bicyclists of all levels and ages; dedicates and protects space for bicyclists; eliminates risk and fear of collisions with over-taking vehicles; reduces risk of 'dooring' compared to a bicycle lane; prevents double parking; keeps motorists from easily entering the cycle track.

Drawbacks: Snow removal and street sweeping may require special equipment; requires considerations at crossings of driveways and intersections.

When to Use/Typical Application: Consistent with the AASHTO Bike Guide and NJDOT CSDG, separated bicycle lanes may be appropriate along roads that have high vehicle speeds and high-traffic volume, but few intersections, driveways, and other junctions; along streets with high bicycle volumes; the desirable separated bicycle lane width is 5 feet practical minimum, 6.5 - 8 feet recommended, 10 feet maximum per direction; vertical separation through mountable curb and edge lines. The preferred and minimum width of the buffer with on-street parking is 3 feet. The minimum width permitted without parking is 1.5 feet.



A protected bicycle lane that separates people on bicycles from automobiles using concrete barriers in Jersey City, NJ. Image: VTC



A protected cycle track in New Brunswick, NJ. Image: VTC

Off-Street Bicycle Facilities

Shared-Use or Multi-Use Paths

Description: A shared-use path is physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or an independent right-of-way. Multi-use paths accommodate a variety of non-motorized users, most often bicycle and pedestrian traffic. Paths are an addition, and complementary, to the roadway network.
Benefits: Completely separated from motor vehicle traffic; can provide users with shortcuts; can provide an enjoyable recreational opportunity; have few intersections and as a result is safer for bicyclists than facilities located alongside or on roadways; appeals to users of all ages and abilities.
Drawbacks: Rarely the most direct means of transportation; shared-use paths attract a variety of user groups who often have conflicting needs.
When to Use/Typical Application: Minimum recommended width is 10 feet; 11–12 feet or more where peak-hour volumes exceed 300 users or where inline skating or e-bike use is expected. Minimum 5 feet of lateral separation from roadways, or vertical barrier where constrained. Shared- use paths are subject to the accessibility requirements of the Americans with Disabilities Act (ADA).



Peters Brook Greenway in Somerville, NJ is an example of a shared-use path with off-road facilities. Image: VTC

Sidepaths

Description: A sidepath is a specific type of shared-use path that runs adjacent to the roadway.
Benefits: Provides an element of separation from motor vehicles; appeals to a wide variety of users.
Drawbacks: A two-way sidepath on one side of the road may need additional road crossings; bicyclists using the roadway may be harassed by motorists who believe bicyclists should be on the sidepath; there are potential conflicts with motorists at driveways and intersections.
When to Use/Typical Application: Where right-of-way or other physical constraints prohibit path alignment in independent rights-of-way and there are no practical alternatives for improving the roadway or accommodating bicyclists on nearby parallel streets; when the sidepath can be built with few street and/or driveway crossings; when the adjacent roadway has relatively high-volume and high speed traffic. The minimum recommended distance between a path and the roadway curb is 5 feet. When the separation is less than 5 feet, a physical barrier or railing should be provided. Utilizing or providing a sidewalk into a shared-use path is undesirable. Sidepaths are discouraged where traffic volumes exceed 6,000 ADT, posted speeds exceed 35 mph, sufficient setback exists for alternative facilities, or driveway density exceeds 20 per mile.



Example of a sidepath in Cherry Hill, NJ. Image: VTC

Intersection Treatments

Grade Separated Crossings

Description: A grade separated crossing provides continuity of a bicycle/ pedestrian facility over or under a barrier. There are two main types of grade-separated crossings: overpasses (bridges) and underpasses.
Benefits: A grade-separated crossing is a safe way for bicyclists and pedestrians to cross rivers, streets, and railroads.
Drawbacks: Many bicyclists and pedestrians will not use an overpass that is inconvenient. Instead, they may choose a time-saving, and sometimes more hazardous crossing. Fencing or other controls may be required to reinforce the safe crossing point. Also, the need for ADA compliance results in long and/or snaking zig-zag ramps which can require significant additional right-of-way.
When to Use/Typical Application: A grade separated crossing should be considered when a bicycle facility meets a barrier, such as an active railroad, stream, or freeway, and continuity of the route is desired. When a heavily utilized multi-use pathway intersects with a high volume multi-lane roadway, it is desirable to provide an overpass or an underpass to separate multi-use pathway users from conflicts with motor vehicle traffic.
Consistent with the AASHTO Guide for the Development of Bicycle Facilities (2024), the need for grade separation is based on motor vehicle volumes, operating speeds, and crossing distance, and is most appropriate at:

- Multi-lane arterial roadways with posted speeds greater than 40 mph and volumes exceeding 15,000 ADT, or
- Complex interchanges where safe at-grade crossings are difficult to achieve.



An underpass along the Middlesex Greenway, NJ. Images: VTC



A bicycle and pedestrian overpass spanning Route 1 in Lawrence Township. The overpass is part of the Delaware and Raritan Canal State Park trail. Image: VTC.

Bicycle Crossing Markings

Description: Bicycle crossing markings, also known as "crossbikes" or "crosswalks for bicycles," are pavement markings adjacent to the crosswalk indicating space for bicycles to cross major intersections. They increase the visibility of bicycles at intersections and encourage motorists to yield right-of-way to bicyclists waiting to cross.

Benefits: Provides greater visibility for bicyclists at intersections; informs all roadway users of where bicyclists should cross; separates modes to reduce conflicts.

Drawbacks: Bicycle Crossing Markings will have higher than normal wear based on the level of crossing auto traffic.

When to Use/Typical Application: Where main bicycle routes cross relatively minor collectors; where cross traffic has to yield right-of-way to crossing bicyclists; not appropriate where speeds exceed 30 mph unless signalized. Applicable to all bikeway types (e.g. bicycle lanes, separated bicycle lanes, and shared-use paths) where bicycle crossings intersect motor vehicular traffic, including multi-leg or offset intersections.



A crossbike in Ocean City.



A crossbike in Jersey City. Image: Hudson County Office of Digital Information

Signing and Striping

Shared Lane Markings or Sharrows

Description: A shared lane marking or "sharrow" is a road marking used to indicate a shared lane environment for bicycles and automobiles. It is not a facility type but is used to support a complete bicycle network. Shared lane markings are most appropriate for lower volume, lower speed streets.
Benefits: Reinforces the legitimacy of bicycle traffic on the street; assists bicyclists with lateral positioning away from the door zone and other hazards; may be configured to offer directional and wayfinding guidance; requires no additional street space; reduces the incidence of sidewalk riding and wrong-way riding.
Drawbacks: Does not dedicate exclusive use for bicyclists.
When to Use/Typical Application: When there is insufficient width to provide bicycle lanes; on a steep downgrade; shared lane markings are recommended on streets with 25 mph speed or less; sharrows shall not be used on shoulders or in designated bicycle lanes; they should be placed immediately after an intersection and spaced at intervals not greater than 250 feet thereafter. Placement guidance varies by context and typically includes: centered within the travel lane where lane widths are less than 14 feet; minimum of 4 feet from the curb face; 11 feet from the curb where adjacent to parking.



Sharrows in Long Branch, NJ. Image: VTC



A sharrow marking in Princeton, NJ. Image: VTC

Wayfinding Signs and Markings

Description: A bicycle wayfinding system consists of comprehensive signing and/or pavement markings to: designate a system of routes; designate a continuous or preferred route; provide location-specific guidance.
Benefits: Indicates to bicyclists and motorists that they are on a designated bikeway; identifies the best routes to destinations; pavement markings can be installed to help reinforce routes and directional signage and to provide bicyclist positioning and route branding benefits; under urban conditions, pavement markings may often be more visible than signs to users of the route.
Drawbacks: When used alone, bicycle route signs convey little meaning. They should include destinations and distances.
When to Use/Typical Application: Signs are typically placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes; signs should be oriented so bicyclists have sufficient time to comprehend the sign and change their course, when needed. AASHTO Guide for the Development of Bicycle Facilities (2024) specifies sign size, mounting height (7 feet minimum in urban settings), placement frequency (≤ ½ mi), and consistency with local jurisdictional numbering systems.



Hoboken Terminal Wayfinding Sign In Hoboken. Image: VTC



Trail Wayfinding Sign in Cherry Hill, NJ. Image: VTC



Newark Bikeways Wayfinding Sign. Image: www.bikenewark.org

Bicycles Allowed Use of Full Lane Sign (R9-20)

Description: The BICYCLES ALLOWED USE OF FULL LANE sign may be used in locations where it is important to inform road users that bicyclists might occupy the travel lane.

Benefits: Reinforces the law to both motorists and bicyclists that bicyclists may occupy the travel lane.

Drawbacks: Fear that the sign could mislead inexperienced bicyclists into operating in situations that are beyond their ability.

When to Use/Typical Application: The BICYCLES ALLOWED USE OF FULL LANE sign may be used on roadways where no bicycle lanes or adjacent shoulders usable by bicyclists are present and where travel lanes are too narrow for bicyclists and motor vehicles to operate side by side; the sign may be used in addition to or instead of the Shared Lane Marking.



R9-20

Image: MUTCD

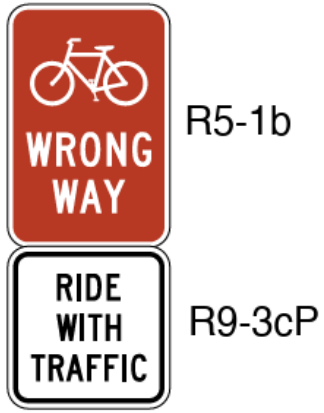
WRONG WAY RIDING Sign (R5-1B)

Description: The bicycle WRONG WAY and RIDE WITH TRAFFIC signs are used to remind bicyclists that bicycles are vehicles and when operated on a roadway they should travel in the same direction as other roadway traffic.

Benefits: Reinforces the legal requirement of bicyclists to ride with traffic.

Drawbacks: Can contribute to sign clutter if not mounted back-to-back with other signs.

When to Use/Typical Application: For locations where wrong-way riding by bicyclists is frequently observed; this sign and plaque may be mounted back-to-back with other signs to minimize visibility to other traffic; the RIDE WITH TRAFFIC plaque should be used only in conjunction with the Bicycle WRONG WAY sign, and should be mounted directly below the Bicycle WRONG WAY sign.



Bicycle Boulevards

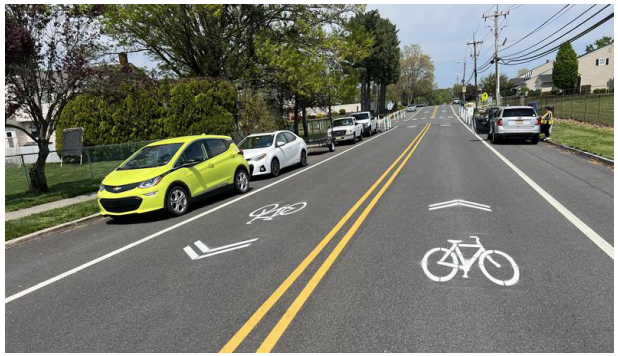
Description: A bicycle boulevard is a low-volume and low-speed street that has been optimized for bicycle travel through treatments such as traffic calming, signage and pavement markings, and intersection crossing treatments. These treatments allow through movements for cyclists while discouraging similar through trips by non-local motorized traffic. Motor vehicle access to properties along the route is maintained.

Benefits: Bicycle boulevards are effective at increasing bicycling levels and perceptions of safety and can be accomplished with minor changes to street configuration; slower vehicle speeds accomplished with traffic-calming measures reduce risk of serious collisions; since they are shared facilities, no additional street width is needed; bicycle boulevards can be combined with neighborhood greening efforts to enhance street closures and traffic circles with trees and landscaping.

Drawbacks: Residents and officials often raise concerns related to traffic reduction and calming such as access to property, impact on traffic patterns, enforcement issues with motorcycles and mopeds, and emergency response.

When to Use/Typical Application: Bicycle boulevards are best suited for two-lane residential streets where vehicle traffic can be restricted to low volumes and slow speeds. Ideally they are parallel to major streets that can provide an alternative without lengthy deviation. Consistent with the AASHTO Guide for the Development of Bicycle Facilities (2024), bicycle boulevards function most effectively within grid networks. In suburban or non-grids environment, short segments non-grid environments may be needed to bridge cul-de-sacs to maintain route stay direct.

Examples of Bicycle Boulevards

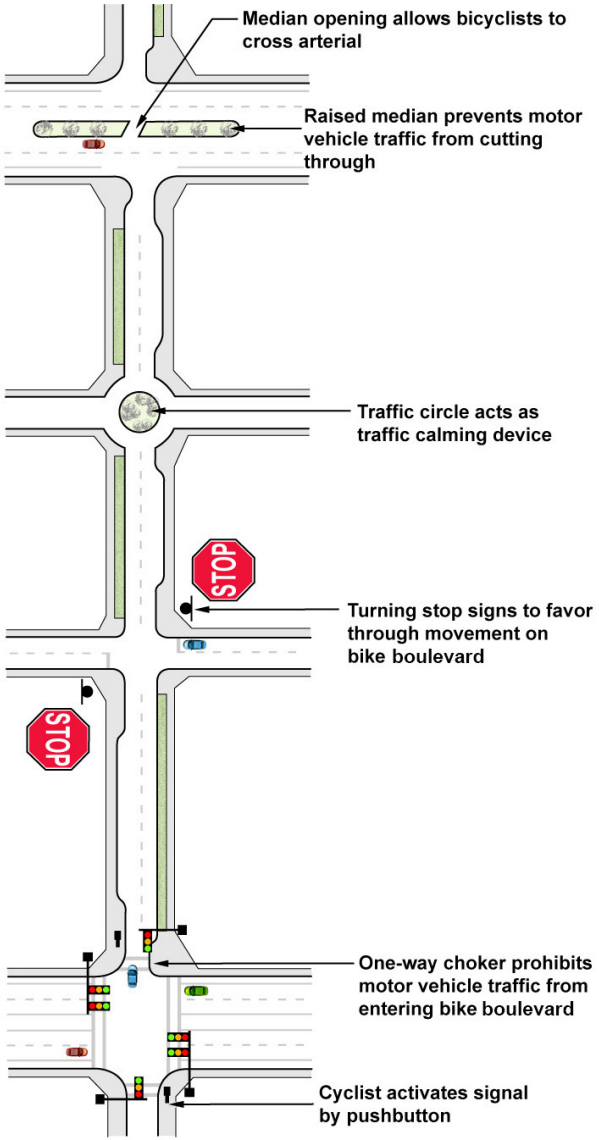


Temporary Bicycle Boulevard in Evesham Township, NJ. Image: Cross County Connection TMA



Bicycle Boulevard Demonstration Project in Voorhees Township, NJ. Image: Cross County Connection TMA

Elements of a Bicycle Boulevard



Elements of a Bicycle Boulevard.

Bicycle Storage at Schools

Once they reach school, students must have a secure place to park their bicycles, preferably one that also provides protection from the elements. Not having a well-planned bicycle parking option can lead to several undesirable outcomes such as theft, damage, and locked bicycles becoming an obstacle to critical safety infrastructure (like emergency exits, hand rails, and fire hydrants) or damaging fragile trees or landscaping. In terms of bicycle racks and bicycle storage, the Safe Routes to School Guide maintained by the National Center for Safe Routes to School at saferoutesinfo.org uses the Bicycle Parking Guidelines from the Association of Pedestrian and Bicycling Professionals (APBP):

NEW JERSEY SCHOOL BICYCLE PARKING GUIDE

The New Jersey School Bicycle Parking Guide provides information to help schools make appropriate decisions when purchasing and installing racks. Schools should utilize the Guide to prepare materials or lessons to show students how to lock their bicycle properly.

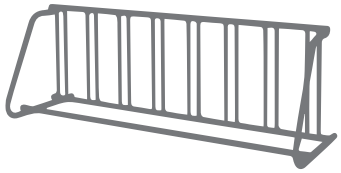
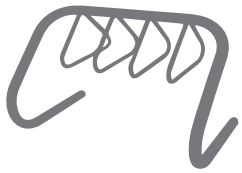
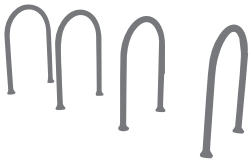
When selecting bicycle parking, schools should consider factors such as security, weather protection, ease of use, and capacity. School location and the ages of riders are also important considerations when determining the most appropriate type of bicycle rack.

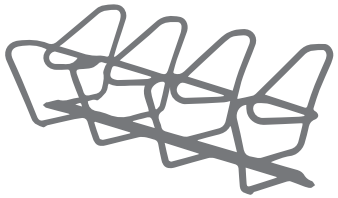
Subject to available space and budget, recommended bicycle rack types include inverted U-racks and grid racks, depending on priorities related to security, usability, and capacity. While rack appearance may be considered, functionality should take precedence over aesthetics.

Additional guidance, including rack selection considerations and installation best practices, is available at: https://www.saferoutesnj.org/school-bicycle-parking-guide/.

- **The Rack Element** is the part of the bicycle rack that supports one bicycle. A good bicycle rack element holds the bicycle frame without bending the wheel and should have no moving parts. Rack elements are typically constructed of metal in an inverted U-shape, which allows for a variety of bicycle sizes and locks.
- **The Rack** is one or more rack elements joined on any common base or arranged in a regular array and fastened to a common mounting surface. It should be anchored so that it cannot be stolen with the bicycles attached and so that it provides easy, independent bicycle access. Inverted U-shaped rack elements mounted in a row should be placed on 30-inch centers, allowing two bicycles to be secured to each rack element (one per side).
- **The Rack Area** is a bicycle parking lot where racks are separated by aisles. It may contain one or more racks. If possible, the rack area should be protected from the elements using any combination of structures, like a wall and awning. Avoid locating a bicycle rack area on grass or dirt as a rainy day can turn the bicycle parking lot into a mess. A preferred solution would be to locate the bicycle rack area on a concrete pad.
- **The Rack Area Site** is the relationship of the rack area to a building entrance and approach. Locate the bicycle rack area within visibility of the building entrance it serves and consider the route bicyclists use to approach that entrance. Bicycle rack areas should be sited in a space that discourages vandalism and maximizes use, while avoiding conflicts with driveways, buses, and large numbers of pedestrians.

Ideally, rack areas should be sited as close, or closer than, the nearest car parking space and provided near all high-traffic building entrances. It is preferable to choose multiple locations that are more convenient to users than one large rack area. The following table, which extends to the following page, contains a matrix of different bicycle racks and shelters, with pros and cons.

Rack Type	Pros	Cons
Grid Rack 	• Easy to use • Portable • Inexpensive • Wheelwell increases stability (when used properly)	• Frequently used incorrectly, which may induce wheel damage • Frequently sited incorrectly • Bicycles may be parked too densely • Incompatible with U-Locks • Does not meet APBP guidelines
Wave Rack 	• Attractive • Portable option • Inexpensive	• Moderate ease-of-use • Frequently used incorrectly • Frequently sited incorrectly • One touch point • Inefficient use of space • Does not meet APBP guidelines
Coat Hanger Rack 	• Attractive • Two touch points • Portable option • Relatively inexpensive • Meets APBP guidelines	• Bicycles may be parked too close together • Some versions do not accommodate all bicycle sizes • Top bar may limit usability with some bicycles
Inverted U-Rack 	• Attractive • Easy to use • Two touch points • Portable option • Flexibility of placement • Relatively inexpensive • Meets APBP guidelines	• In-ground installation requires additional capital expense • Round-tubed versions may be vulnerable to cutting (designs with horizontal bars may be more secure)

Rack Type	Pros	Cons
Wheelwell Dock Rack 	• Easy to Use • Portable • Inexpensive • Wheelwell increases stability (when used properly)	• Frequently used incorrectly, which may induce wheel damage • Frequently sited incorrectly • Bicycles may be parked too densely • Incompatible with U-Locks • Does not meet APBP guidelines
Artistic/Creative Rack 	• Attractive • May provide branding opportunities. • Possibility of community design input	• May not have two touch points. • May not accommodate all bicycle types • May be expensive • Does not meet APBP guidelines
Artistic/Creative Rack 	• Easy to use • Two touch points • Design provides stability • Portable option • High-density • Meets APBP guidelines	• Can be expensive



Bicycle rack in a high-visibility area at Buzz Aldrin Middle School in Montclair, NJ. Image: School Bicycle Parking Guide/NJ Safe Routes to School Center.



Egg Harbor City Community School has covered bicycle parking. Image: Cross County Connection TMA

Bicycle Safety Education

A comprehensive, on-bike program can be an ideal method for teaching bicycle skills and safety, but finding time to conduct the program can be a challenge. With the busy schedules of today's families, holding classes after school and on the weekends may not lead to high levels of participation. To reach the greatest number of children, bicycle education can be incorporated into the regular school day. Fitting bicycle education within the curriculum of physical education (PE) classes is a cost-efficient way to teach bicycle safety to a large cross section of students and young people. The following are examples of ongoing programs:

- The Ewing Police Department invited children aged 4–12 to the 2025 Community Fest Bike Rodeo. The event focused on teaching children the rules of the road and providing safety tips for both riders and their bicycles.

- The City of Summit hosted two bike rodeos and a pedestrian safety fair in October 2025 as part of the Mayor's Wellness Campaign. During these events, Avenues in Motion representatives performed helmet fit checks and basic bicycle maintenance inspections. Participants also learned about the city's new bicycle and e-bike ordinances.

- The Township of Nutley hosted a Bike Rodeo in June 2025, where residents learned bicycle safety tips and participated in bike-handling courses.

HELMET LAW IN THE STATE OF NEW JERSEY

Title 39:4-10.1
"A person under 17 years of age shall not operate, or ride upon a bicycle as a passenger, unless that person is wearing a properly fitted and fastened bicycle helmet. This requirement shall apply to a person who rides upon a bicycle while in a restraining seat which is attached to the bicycle, or in a trailer towed by the bicycle."

RESOURCES

- **Greater Mercer TMA Bike and Pedestrian Safety Presentations**
  GMTMA staff deliver customized presentations for students on a variety of bicycle and pedestrian safety topics. These presentations focus on teaching essential safety skills while keeping learning engaging and fun.

  Even if you reside outside of a specific local service area, other Transportation Management Associations (TMAs) can assist you statewide. You can locate your regional contact by visiting the Safe Routes NJ Regional Coordinator Finder.

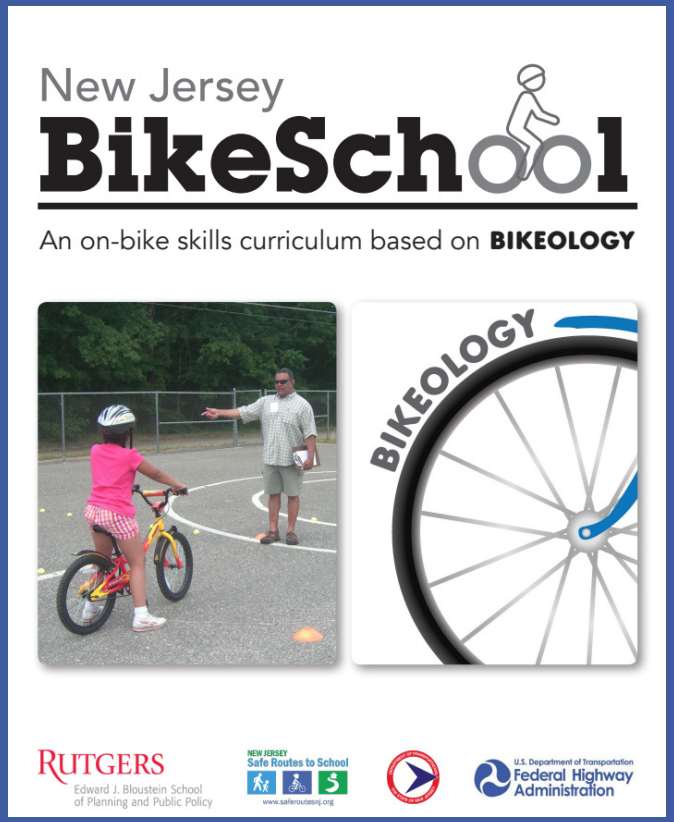
- **Middlesex County Bicycle Rodeos**
  Bicycle rodeos are community-based events designed to teach children fundamental bicycling skills and traffic safety laws. Keep Middlesex Moving (KMM) is the designated Transportation Management Association (TMA) for Middlesex County. The organization coordinates with schools and local partners in Middlesex County to plan bike rodeos, prepare safety courses, lead events, and train volunteers.

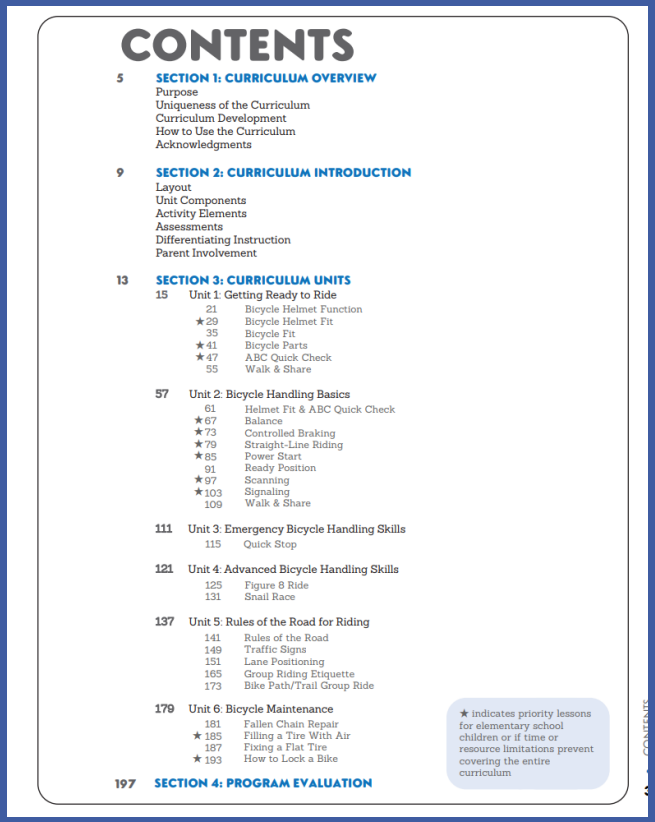
  Find more information at: Keep Middlesex Moving

SPOTLIGHT: NJ BIKE SCHOOL CURRICULUM

The NJ Bike School Curriculum equips physical education teachers and recreation specialists with the knowledge and resources needed to deliver on-the-bicycle safety education for students in grades 6–12. The curriculum outlines essential preparation steps and minimum skill benchmarks for teaching safe bicycle riding, with a focus on developing recreational-level riding skills.

The curriculum is unique in that it aligns with National Standards for K–12 Physical Education, has been proven effective in improving students' bicycle safety knowledge and skills, and is designed to accommodate a wide range of student ability levels. It can be implemented in various settings—including schools, after-school programs, clubs, and camps—depending on available time and resources. Instructors are encouraged to cover as much content as possible, but at minimum should teach the skill-based activities in Units 1, 2, and 3. These units provide the foundational skills necessary for safe bicycling and should be completed consecutively before moving on to additional units, regardless of students' prior experience.





CONTENTS

5 SECTION 1: CURRICULUM OVERVIEW
Purpose
Uniqueness of the Curriculum
Curriculum Development
How to Use the Curriculum
Acknowledgments

9 SECTION 2: CURRICULUM INTRODUCTION
Layout
Unit Components
Activity Elements
Assessments
Differentiating Instruction
Parent Involvement

13 SECTION 3: CURRICULUM UNITS
15 Unit 1: Getting Ready to Ride
21 Bicycle Helmet Function
★29 Bicycle Helmet Fit
35 Bicycle Fit
★41 Bicycle Parts
★47 ABC Quick Check
55 Walk & Share

57 Unit 2: Bicycle Handling Basics
61 Helmet Fit & ABC Quick Check
★67 Balance
★73 Controlled Braking
★79 Straight-Line Riding
★85 Power Start
91 Ready Position
★97 Scanning
★103 Signaling
109 Walk & Share

111 Unit 3: Emergency Bicycle Handling Skills
115 Quick Stop

121 Unit 4: Advanced Bicycle Handling Skills
125 Figure 8 Ride
131 Snail Race

137 Unit 5: Rules of the Road for Riding
141 Rules of the Road
149 Traffic Signs
151 Lane Positioning
165 Group Riding Etiquette
173 Bike Path/Trail Group Ride

179 Unit 6: Bicycle Maintenance
181 Fallen Chain Repair
★185 Filling a Tire With Air
187 Fixing a Flat Tire
★193 How to Lock a Bike

197 SECTION 4: PROGRAM EVALUATION

★ indicates priority lessons for elementary school children or if time or resource limitations prevent covering the entire curriculum

Find more information at https://www.saferoutesnj.org/wp-content/uploads/2020/07/FINAL-NJ-Bikeschool-Curriclum-with-Bikeology.pdf

Bike-to-School Programs and Special Events

There are several activities or events that could be held to focus attention on bicycling to school:

- Participate in National Bike to School Day each May as part of the League of American Bicyclists' National Bike Month celebration. May is also usually recognized as New Jersey Walk and Bike to School Month through an annual proclamation by the Governor.

- Make Earth Day a "Bike-to-School Day"; this could also be used to help encourage walking to school. After Earth Day, each Wednesday for the rest of the school year celebrate walk- or bike-to-school Wednesday. In Linwood, for example, school officials take part by meeting children at a local park one-half hour before classes begin and walking with them to school.

- Another example of a special event is "Transition Day" in Fair Haven. On the last day of classes, school officials and graduating 3rd graders take a ceremonial ride from Viola L. Sickles Elementary School to the Knollwood Middle School to mark the transition to 4th grade. Parents, police, and the school superintendent all take part in this annual event. Along the route, parents hold up signs to celebrate their child's completion of the 3rd grade and at Knollwood School 4th graders welcome the arriving group.



Students bicycling from elementary to middle school on "Transition Day" in Fair Haven, NJ. Image: NJDOT

HUDSON COUNTY TMA PROVIDES MULTIPLE PROGRAMS TO ENCOURAGE BICYCLING TO SCHOOL

The Hudson TMA offers several programs that support bicycle education. The organization provides three key initiatives: the Bike Safety Presentation, Bike to School, and the Hudson Bike School.

- **Bike Safety Presentation**: Offered in the spring, this presentation features TMA staff demonstrating the use of safety gear, proper signaling, and other essential bicycle skills and safety tips.
- **Bike to School:** TMA staff provide bicycle safety training and assistance when schools and families seek to establish a "bike train" to and from school.
- **Hudson Bike School:** The TMA has developed a comprehensive bicycling curriculum for use in elementary schools. The curriculum can be integrated into a school's physical education program at no cost. TMA staff train physical education teachers and supply the curriculum materials.
- School districts and municipalities can partner with their local TMA to bring regional bicycling programs to local schools.



Hudson County TMA Bike to School Program, NJ. Image: Hudson County TMA

COLLINGSWOOD SCHOOL DISTRICT BICYCLING POLICY

Students in grades 3–12 are allowed to ride bicycles to school. Students must comply with all applicable state and local laws when riding a bicycle. Each school's principal may develop rules for the operation of student bicycles on school grounds. Bicycle parking should be in a designated area outside the school building. The school principal may revoke a student's bicycling privileges if the student fails to follow state, local, or school rules.



A student departing from Collingswood Middle School on a bicycle.

MODEL BICYCLING TO SCHOOL POLICY

The NJ Safe Routes Resource Center at the Alan M. Voorhees Transportation Center (VTC) at Rutgers University - with NJDOT and the National Policy and Legal Analysis Network to Prevent Childhood Obesity (NPLAN) - developed a model bicycling to school policy that can be adopted by school districts around the state to encourage bicycle safety and bicycling to school. The model policy, along with a model walking to school policy, is available from the SRTS Toolbox on the NJ Safe Routes Resource Center website (https://www.saferoutesnj.org/walking-bicycling-policies/). The model bicycling policy includes the following safety guidelines:

For children in 3rd grade and below:

- Students should be accompanied by an adult when bicycling to or from school, as well as complying with the other conditions below.
- Parents are strongly cautioned to exercise great care and supervise carefully since children in 3rd grade and below are unlikely to have the developmental and judgment skills for unsupervised bicycling.

For children in 4th grade and above:

- The District should provide bicycle education to teach traffic skills and rules as well as improved judgment in individual and group bicycling. Every child should take this training or a similar bicycle safety course before riding in traffic.
- Students who ride bicycles to and from school should have written consent from a parent or legal guardian and agree to the conditions listed below.

Students should follow state law and safety guidelines for bicyclists:

1. According to N.J. state law, anyone under 17 that rides a bicycle or is a passenger on a bicycle must wear a helmet (N.J.S.A.39:4-10.1). Any student without a helmet will have their bicycle confiscated by the Building Administrator until a parent or guardian picks it up. Noncompliance with this rule will result in disciplinary action.
2. In New Jersey, bicycles are defined as vehicles under the state motor vehicle code contained in N.J.S.A. 39:4-10, et.seq. Parents and students should be aware of these state bicycling laws and follow them at all times. Riders should follow the rules of the road including but not limited to:
   a. Obeying all traffic lights and signals (N.J.S.A. 39:4-14.1),
   b. Using hand signals before making turns,
   c. Only one rider per seat – never let a friend ride on the handlebars or wheel pegs (N.J.S.A. 39:4-12),
   d. Stopping and looking left, right, then left again before leaving driveways or entering any street,
   e. Riding with traffic (N.J.S.A. 39:4-14.2) and not too close to parked cars – doors can open suddenly,
   f. Riding where drivers can see you and not swerving between cars,
   g. Equipping the bicycle with a bell or other audible device that can be heard at least 100 feet away, but not a siren or whistle (N.J.S.A. 39:4-11), and
   h. Using headlights and taillights visible at 500 feet – white in the front and red in back - if you must ride at dawn, dusk or after dark (N.J.S.A.39:4-10).

3. Bicycles ridden to school should be roadworthy and regularly maintained. Students should test tires for air before riding. Additionally, the brakes must be functional (N.J.S.A. 39:4-11.1). While at school, all students must comply with these rules:

- Bicycles may not be ridden on school grounds during arrival and dismissal; they must be walked.
- Bicycles must be parked in the racks provided. Students must bring and use bicycle locks.
- Helmets must be stored in locker, backpack, or attached to bicycle.
- Students are not to interfere with any bicycles, helmets, or other equipment (steal, unlock quick releases, bounce helmets, etc.).

RESOURCES

Design Guidance

- National Center for Safe Routes to School Guide, On-street Bicycle Facilities, guide.saferoutesinfo.org/engineering/on-street_bicycle_facilities.cfm
- MUTCD 2023 Edition Part 9. Traffic Control for Bicycle Facilities, https://mutcd.fhwa.dot.gov/pdfs/11th_Edition/mutcd11theditionhl.pdf
- NACTO Urban Bikeway Design Guide, https://nacto.org/publication/urban-bikeway-design-guide/
- APBP Bicycle Parking Guidelines, www.apbp.org/resource/resmgr/publications/bicycle_parking_ guidelines.pdf

Education and Encouragement

- NJ Safe Routes Resource Center has links to lesson plans and bicycle assembly program information, https://www.saferoutesnj.org/
- Bike to School Day, www.walkbiketoschool.org/
- League of American Bicyclists, National Bike Month, bikeleague.org/bikemonth

10 Students and Micromobility

Micromobility and e-mobility have become increasingly important topics in New Jersey. The purpose of this chapter is to introduce readers to the regulatory landscape for these vehicles and provide guidance relating to best practices within New Jersey's legal framework for how students should ride, store, and remain safe while utilizing these devices.

What is Micromobility?

The New Jersey Micromobility Guide, developed by the NJDOT and Voorhees Transportation Center, defines micromobility as "*...a range of compact, electric- and human-powered devices designed for short-distance travel. This includes traditional bicycles, e-bikes, e-scooters, and other low-speed wheeled devices. Micromobility devices are compact and lightweight, and they act as an extension of a person's mobility beyond walking without the costs and space constraints of a motor vehicle*."

While the Micromobility Guide developed by NJDOT and VTC includes bicycles, for the purposes of this chapter, the focus will be on e-bikes, e-scooters, and other low-speed wheeled devices (bicycles are covered in detail in the previous chapter).

Micromobility in School Zones

This chapter focuses on designing for micromobility users in school zones. It discusses micromobility regulations that are relevant to school-aged children, types of devices, best practices in design for students using micromobility, information for parents and caregivers, and additional resources.



Students riding e-bikes Image: VTC.

NEW JERSEY MICROMOBILITY GUIDE



The Micromobility Guide serves as a resource repository for laws, safety, and best practices for New Jersey's micromobility users. The Guide is geared toward micromobility devices found in Title 39, the laws governing transportation on roadways in New Jersey. The Guide was prepared by NJDOT and the Voorhees Transportation Center and can be accessed here: https://njbikeped.org/new-jersey-micromobility-guide-2025/

Micromobility Regulations in New Jersey that are Relevant to School-aged Children

The regulatory environment for micromobility in New Jersey is dynamic, having changed significantly while this update to the New Jersey School Zone Guide was being prepared.

The primary sources of regulations are:

- Title 39 of the New Jersey General and Permanent Statutes. Title 39 is titled *Motor Vehicles and Traffic Regulation*.
- A bill signed on January 19, 2026 (S4834) that amended Title 39 and created a new regulatory framework for micromobility in New Jersey.

The dynamic nature of micromobility regulation means that laws and rules may change while this version of the Guide is in use. This chapter seeks to include best practices relating to students and micromobility in addition to providing an overview of the current regulatory environment as of October of 2026. Best practices should remain relatively constant even if regulations change.

S4834 - A NJ Law Regulating Motorized Bikes

S4834 changes how electric bicycles are regulated in New Jersey.

- The law establishes two principal categories for electric bicycles: Low-Speed Electric Bicycles and certain electric bicycles regulated as Motorized Bicycles. The law also creates a separate category for higher-powered Electric Motorized Bicycles (E-Motos).
- Operators of motorized bicycles must possess either a valid driver's license or a motorized bicycle license, and low-speed electric scooters remain excluded from the motorized bicycle definition.
- The new licensing and registration requirements took effect in July of 2026, and the NJ MVC E-bike and Moped Manual was released the same month and provides additional guidance.

Definitions (Updates to Title 39:1-1)

A vehicle's appearance or the seller's use of the term "e-bike" does not necessarily determine how it is classified under New Jersey law.

Low-speed electric bicycle

A two-wheeled bicycle with fully operable pedals and an electric motor that provides assistance only while the rider is pedaling and stops providing assistance at 20 mph. This generally corresponds to what was previously called a Class One (1) e-bike.

Motorized bicycle or moped

A pedal bicycle equipped with a small gasoline engine or certain electric motors. This category includes:

- Electric bicycles that are operated using a throttle
- Pedal-assist bicycles capable of providing assistance above 20 mph, up to 28 mph
- Throttle-capable bicycles with a maximum motor-powered speed of no more than 28 mph.

Throttle-operated electric bicycles, formerly marketed as Class Two (2) in New Jersey, are now generally regulated as a motorized bicycle, even if its maximum speed is only 20 mph.

Electric motorized bicycle (E-Moto)

A two-wheeled vehicle with operable pedals, an electric motor greater than 750 watts, and the capability to exceed 28 mph is instead treated as a motorcycle, making it subject to motorcycle licensing, registration, insurance, and operating requirements.

Changes (Updates to Title 39:4-14.3 to 39:4-14.16)

Minimum Age and License Requirements

- No one younger than 15 may operate a low-speed electric bicycle or motorized bicycle in New Jersey.
- A person who is 15 or 16 years old must have a valid motorized bicycle license or learner's permit.
- A person who is 17 or older must have a valid basic driver's license, motorized bicycle license, or motorized bicycle permit.

Someone who already holds a valid New Jersey driver's license does not need a separate e-bike license.

Rideshare systems which already require users be 16 or older are exempt, meaning users do not need a license or permit to use vehicles which are part of these systems.

Registration and Identification

Privately owned low-speed electric bicycles, motorized bicycles, and electric motorized bicycles must be registered with the New Jersey Motor Vehicle Commission (MVC); note that electric motorized bicycles must be registered as motorcycles as opposed to the new registration process used for low-speed electric bicycles and motorized bicycles. Registrations must be renewed annually.

Insurance

A motorized bicycle and electric motorized bicycle must have liability insurance. A low-speed electric bicycle must be registered but does not require insurance.

Helmets

For low-speed electric bicycles, New Jersey law requires a properly fitted and fastened helmet for operators and passengers under 17 years of age. Children riding in cargo bicycles must also wear helmets.

For all motorized bicycles and electric motorized bicycles, a properly fitted and fastened helmet is required regardless of the operator's age.

Permitted and Restricted Locations

Low-speed electric bicycles may generally be used on streets, roads, highways, and bicycle paths, but local bans exist. Unless specifically permitted by the responsible agency, these e-bikes may not be used on natural-surface trails.

Motorized bicycles may not be operated on:

- Interstate highways
- Public highways divided by a median
- Roads with speed limits above 50 mph
- Active railroads

Path and trail rules should be checked separately. A motorized bicycle should not be assumed to be permitted even if low-speed e-bikes are allowed.

MICROMOBILITY DEVICES THAT STUDENTS MAY UTILIZE TO COMMUTE TO AND FROM SCHOOL

Low-speed electric bicycle (commonly known as an e-bike)

Description: A two-wheeled bicycle with fully operable pedals and an electric motor that provides assistance only while the rider is pedaling and stops providing assistance at 20 mph.

Legal Classification: A "low-speed electric bicycle" pursuant to N.J.S.A. §39:1-1.

Age Limits: Consult current New Jersey Motor Vehicle Commission guidance and local school policies.



Pedal-assist electric bicycle in Princeton, NJ. Image: VTC



Electric bike-share station in Jersey City, NJ. Image: VTC

Low-speed electric scooter (commonly known as an e-scooter)

Description: A scooter with a floorboard that is stood upon that can propel the rider with or without human propulsion. Has a maximum speed of 19 mph.

Legal Classification: A "low-speed electric scooter" pursuant to N.J.S.A. §39:1-1.

Age Limits: None, but all persons under 17 years of age are required to wear a helmet while operating the device.



A young person riding an e-scooter in Netcong, NJ. Image: VTC



Parked e-scooters in New Brunswick, NJ. Image: VTC

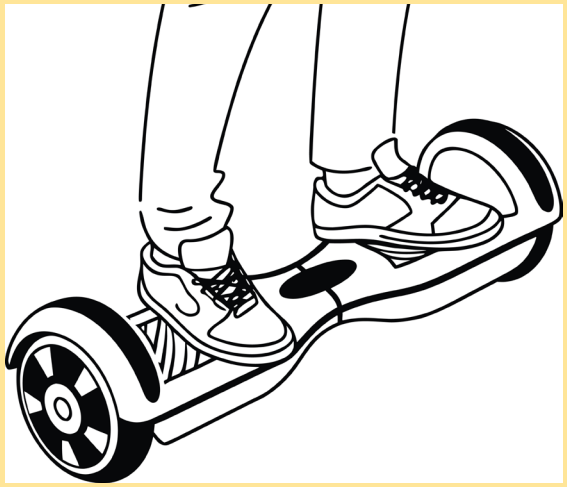
MICROMOBILITY DEVICES THAT STUDENTS MAY UTILIZE TO COMMUTE TO AND FROM SCHOOL

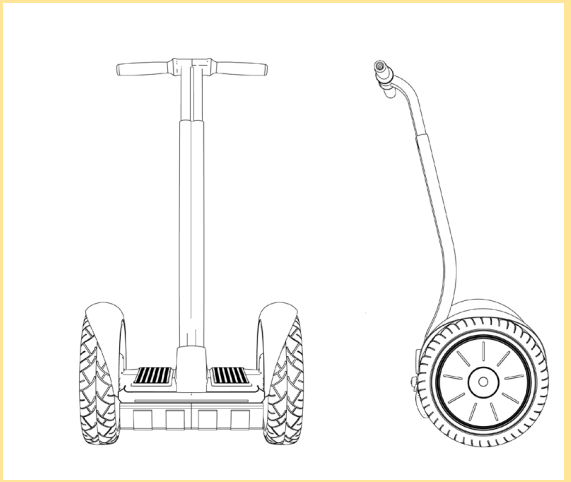
Hoverboards and Self-balancing Scooters

Description: These devices include self-balancing two-wheeled devices designed to transport one person. They operate at speeds under 20 mph. These commonly include hoverboards and self-balancing scooters.

Legal Classification: An "Electric personal assistive mobility device" pursuant to N.J.S.A. §39:4-14.10.a.

Age Limits: Must be 16 years or older, though exceptions are made for operators with a mobility-related disability.





Skateboards, Roller Skates, and Roller Blades

Description: Human-propelled wheeled devices worn on the feet with a set of wheels.

Legal Classification: All three modes are defined as "Roller skates" pursuant to N.J.S.A. §39:4-10.5.1.a

Age Limits: None, but all persons under 17 years of age are required to wear a helmet while operating these devices.





Child learning to ride a skateboard at the Bayonne Skate Park. Image: City of Bayonne Division of Recreation

Where are students permitted to ride micromobility devices?

Motorized bicycles (including many throttle-operated e-bikes)	E-scooters	Hoverboards and Self-balancing Scooters	Skateboards, roller blades, and roller skates
Used on the street, though they are prohibited by law from being ridden on public highways divided by a grass or concrete median or with posted speed limits in excess of 50 mph. Before the passage of S4834, Class 1 and Class 2 low-speed electric bicycles were generally permitted where bicycles were allowed. S4834 retains low-speed electric bicycles as a separate category but regulates many throttle-operated electric bicycles as motorized bicycles. According to N.J.S.A. 39:4-14.3(2)(a), motorized bicycles are not permitted on any road with a posted speed limit of 50 mph or higher, and it is possible to prohibit motorized bicycles on roads with posted speed limits of 40 mph or higher. Motorized bicycles should be ridden on public roads with posted speed limits under 50 mph, and it is possible to prohibit motorized bicycles on roads with posted speed limits of 40 mph or higher.	E-scooters are permitted to be ridden on public streets, sidewalks, and in facilities otherwise designed for bicycles, such as bicycle lanes. E-scooters are prohibited from blocking pedestrian access on sidewalks, requiring e-scooter users to be aware of pedestrians while riding on sidewalks. E-scooters are not permitted on trails that are designated for non-motorized vehicles. In these cases, even if non-motorized bicycles are permitted, e-scooters are not.	Hoverboards and self-balancing scooters are permitted to be ridden on public streets, sidewalks, and in facilities otherwise designed for bicycles, such as bicycle lanes. Hoverboards and self-balancing scooters are prohibited from blocking pedestrian access on sidewalks, requiring e-scooter users to be aware of pedestrians while riding on sidewalks. Hoverboards and self-balancing scooters are not permitted on trails that are designated for non-motorized vehicles. In these cases, even if non-motorized bicycles are permitted, self-balancing scooters and hoverboards are not.	Municipalities are empowered to regulate the operation of skateboards, roller skates, and roller blades on municipally-owned roads and public properties under their jurisdiction, though blanket bans of these vehicles on public roads are not allowed. Every user of these devices should confirm local regulations in their municipality. Users of skateboards, roller blades, and roller skates are permitted to ride in public streets and in facilities where bicycles are permitted. Whether they are permitted to ride on sidewalks is dependent on local regulations.

School Zones and Micromobility

Which schools should prepare for which forms of micromobility?

Due to statutory age restrictions on certain types of micromobility, not every school will need to prepare for every form of micromobility.

Currently, motorized bicycles are not usable by students under the age of 15, and hoverboards and self-balancing scooters are not usable by students under the age of 16. By and large, high schools should be designing for these vehicle types. Students in elementary, intermediate, and middle schools will not typically be permitted to ride them, and so may not need to factor them into school zone planning to the same extent.

All schools should incorporate design that is friendly to the use of low-speed e-scooters, skateboards, roller skates, and roller blades, as students of all ages are permitted to use them.

Alternatively, schools may also implement school- or district-wide policies prohibiting students of certain grades or ages from riding certain types of micromobility to school. This is up to local policy makers and depends on local factors.

Helmets

All motorized bicycle, hoverboard, and Segway users are required by law to wear helmets regardless of the age of the rider. On the other hand, riders of low-speed e-scooters, skateboards, roller blades, and roller skates are only required to wear helmets under the age of 17 years.

Regardless of student age, schools should require that all students using micromobility wear helmets.

Schools that actively encourage more students to utilize micromobility as an alternative to other types of transportation should be proactive in not only requiring helmets, but providing helmets to students that need them, and ensuring safe places for students to store their helmets at school.

EZ RIDE TMA E-SCOOTER AND E-BIKE EDUCATION FOR STUDENTS

The EZ Ride TMA offers E-Bike and E-Scooter safety presentations for students in Bergen, Essex, Monmouth, Passaic, and Union Counties. These classes are done in partnership with schools, as well as other municipal departments and community organizations.

Programs are held for students of all ages from pre-school to high school seniors. The content of these sessions include how to use the device, safety education, and information about equipment.

For more information, visit the EZ Ride website:

https://ezride.org/transportation/bikepedestrian-program/safety-presentations/



An EZ-Ride e-scooter learning session in Newark, NJ. Image: EZ-Ride.

Where should students park or store their larger micromobility vehicles?

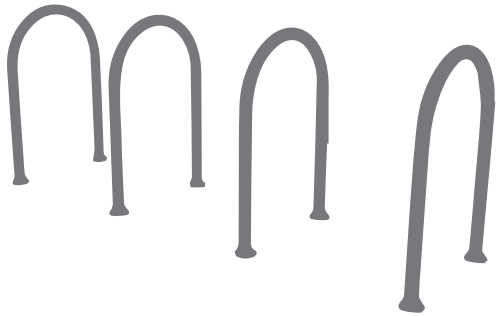
For larger micromobility vehicles, including motorized bicycles, e-scooters, and Segways, schools should allocate dedicated parking facilities and determine whether shared parking facilities or separated parking facilities are feasible for their school.

Parking facilities for micromobility devices, like bicycles, should be heavy, fixed objects that are bolted to the ground. Signage should clearly indicate where students are permitted to park their micromobility devices.

Shared parking facilities: Shared parking facilities refer to one type of parking fixture which is usable by different micromobility users, including e-bikes, e-scooters, or Segways. Bicycles can be included in this group, too. In fact, the most likely parking fixtures to be found at schools are bicycle parking racks.

If the school plans to permit students to utilize micromobility devices to travel to and from school, and they intend to allow those students to utilize bicycle racks or other universal parking racks to park their devices, the school should ensure that the parking fixture can be used by a variety of micromobility users, including e-bike, e-scooter, and Segway users.

The inverted u-rack, shown in the following image, is an example of a parking fixture intended for bicycles that can be utilized by e-scooter users.



Dedicated parking facilities: Alternatively, a school may choose to provide dedicated parking facilities for specific devices. These will most commonly come in the form of bicycle racks for bicyclists and e-bike riders, and dedicated parking facilities for e-scooter users, as shown in the following images.



Where should students park or store their smaller micromobility vehicles?

For smaller devices including hoverboards, skateboards, roller blades, and roller skates, schools can take different approaches for storage.

These can be stored indoors in smaller storage facilities, including lockers, or designated storage facilities for specific types of micromobility devices.

PROPERLY LOCKING MICROMOBILITY DEVICES

The New Jersey Micromobility Guide recommends two types of locks, including a U-lock and a cable lock, for locking e-bikes and e-scooters. The U-lock is the sturdier option, but heavier and less flexible. Cable locks are less secure, but have more utility, particularly when parking racks are crowded.



Micromobility Safety Education

In school programs

School District that permit students to ride micromobility devices to school should consider formal educational programs to teach e-bike, e-scooter, and other micromobility device safety. Safety education should include:

- Educating students on safe riding, including using a helmet.
- The responsibility of riders.
- Safe use of equipment and regular safety checks to ensure devices are functioning properly.
- Making sure that students are aware of safety risks for vulnerable road users.
- Educating students on where they can safely ride.

Outside expertise

School District's may consider contacting outside organizations to assist with educational programs. Organizations to consider for assistance educating students on micromobility safety include the local Transportation Management Association (TMA) or the Voorhees Transportation Center.

Parents and Caregivers

For parents or caregivers considering allowing children to utilize micromobility to travel to and from school, it is critical to teach proper safety early.

Ensure that students are using safe equipment and know how and where to ride. If parents and caregivers are unsure or unaware regarding the use of micromobility devices, this may be a suitable opportunity to learn alongside your child and model proper safety for them as you consider allowing them to ride to and from school independently.

Making it fun, rodeos and shared rides

Schools and communities can build a culture of safety for all modes of transportation, including micromobility, by making riding fun and social.

The same techniques recommended for bicyclists, bicycle rodeos or shared rides, can work just as well for micromobility users. There is road safety in numbers for vulnerable road users, especially when the group of riders is practicing safe riding practices modeled by the adults in their community.

SAFE CHARGING PRACTICES FOR ELECTRIC MICROMOBILITY VEHICLES

If the school does permit charging on school grounds, the following safety precautions should be observed:

Prevent Fires. Ensure that students are utilizing the appropriate batteries to prevent the possibility of lithium ion battery fires. If there are available resources, provide students the suboptimal batteries with safe and proper batteries to prevent fires. The Voorhees Transportation Center recommends that consumers choose batteries that are UL certified.

RESOURCES

New Jersey State Policy Lab: Safer E-Biking and Understanding Micromobility blog: https://bloustein.rutgers.edu/njspl-safer-e-biking-and-understanding-micromobility/

UL Solutions: https://www.ul.com/there-e-bike-your-future

National Fire Protection Association: https://www.nfpa.org/education-and-research/energy-transition/ebikes

The New Jersey Micromobility Guide: https://njbikeped.org/new-jersey-micromobility-guide-2025/

11 School Zones and Student Drivers

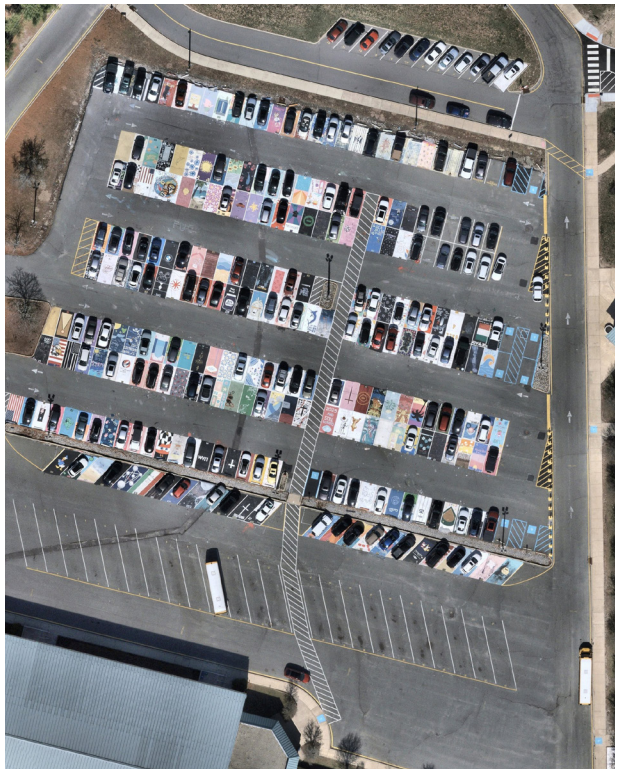
Learning to drive remains a rite of passage for many American teens. For those with access to a car, driving to school can offer a new level of freedom and relieve caregivers from drop-off/pick-up responsibilities, which is why caregivers often support students driving to school. Yet student drivers can also heighten safety risks in school zones, which is why they are an important consideration for school zones, particularly in the high school context.

Introduction

In 2021, the Safe Routes to School (SRTS) program was recodified at the national level through the Infrastructure Investment and Jobs Act (IIJA) to include high school students through 12th grade.

While traditionally SRTS efforts have been focused on walking and bicycling, this guide recognizes that student driving also plays an important role in school transportation, particularly for high school students. Student drivers and their travel patterns and decisions can influence traffic flow, parking demand, and safety within school zones.

Understanding how to safely accommodate student drivers is an important component of school zone planning. It is important to continue roadway safety education and engagement in high schools.



The senior student parking lot of Central Regional High School in Bayville, NJ. Seniors are permitted to paint their parking spaces. Image: Nearmap, dated March 18, 2025, accessed February 24, 2026.

HOW OLD DO YOU HAVE TO BE TO DRIVE IN NEW JERSEY?

New Jersey teenagers can obtain a special learner's permit at age 16 if they are enrolled in a behind-the-wheel driver training course offered at either their high school or an independent licensed driving school.

Following an initial exam and behind-the-wheel instruction with a licensed driving instructor, they can receive a probationary driver's license at age 17. Once they turn 18 and have had one year of driving practice, they can upgrade the probationary license to an official basic driver's license.[1]

Note: This chapter references a larger number of citations than other chapters in this guide. For readability purposes, citations are listed in an endnotes section, rather than through footnotes.

Teen Driver Crash Facts

Motor vehicle crashes are the leading cause of death for American teenagers. [2] Per mile driven, national fatal crash rates for teen drivers aged 16-19 are nearly three times those for drivers aged 20 and over, with the risk highest for teens aged 16-17. Male drivers aged 16-19 are at particularly high risk, with a fatal rate three times that of female drivers the same age. [3]

New Jersey-specific statistics generally follow this national pattern. A 2023 report by the Governors Highway Safety Association (GHSA) found that in 2021, the rate of fatal crash involvement per licensed driver was more than twice as high for New Jersey drivers under age 21 as for drivers 21 and over,[4] a finding that likely understates the risk posed by young drivers in New Jersey, since nationally teen drivers log about half as many miles per capita as adult drivers.[5] Additionally, the 2013–2017 New Jersey Young Drivers Report — the most recent such report available — found that male drivers accounted for 55% of crashes of all severities compared to 45% for female drivers. [6]

Over the past two decades, New Jersey has enacted laws and policies that have substantially reduced the risk posed by teen drivers. The same GHSA report found that in 2021 New Jersey had the fourth-lowest fatal crash involvement rate for under-21 drivers in the nation — a 43% decline from 2002. This progress is widely attributed to the state's Graduated Driver Licensing (GDL) law, enacted in 2001 and considered among the most comprehensive in the country. However, despite this progress, fatal crashes involving teen drivers remain unacceptably common. According to the New Jersey Attorney General's Office, there were 77 such crashes in the state in 2024.[7]

Teen Driver Risk Factors

According to the US Centers for Disease Control and Prevention (CDC), a variety of factors contribute to teen drivers being at higher risk, including: [8]



Inexperience: Due to a lack of experience, teenagers are more likely to underestimate dangerous situations and make critical errors that can lead to serious or fatal crashes.



Not Using Seatbelts: Teenagers tend to buckle up less frequently than adults. Among teen drivers and passengers 16–19 years of age who were killed in car crashes in 2020, 56% were not wearing a seat belt at the time of the crash. [9]



Distractions: Although distractions such as texting or using a cell phone while driving are common among all drivers, they are especially dangerous for younger, inexperienced motorists. Cell phone use is one of the most common distractions, increasing crash or near-crash risk by up to seven times.[10]



Speeding: Teenagers are more likely to speed and allow shorter distances between vehicles. In 2020, 35% of male drivers and 18% of female drivers (ages 15–20 years) who were involved in fatal crashes were speeding at the time of the crash.[11]



Impairment: Driving under the influence of alcohol or drugs significantly increases crash and fatality risk. In 2020, 29% of drivers ages 15–20 who were killed in motor vehicle crashes had been drinking.

Many of these risk factors are linked to teens' developing brains. The prefrontal cortex - the part of the brain that correlates with decision-making and risk-taking - is not fully developed until age 25.[12] This results in heightened risk seeking, greater susceptibility to peer pressure, and greater susceptibility to distraction, all of which contribute to unsafe driving behaviors. Adolescent biorhythms are also different than adults, and teenagers experience fatigue and drowsy driving more than older motorists.

Teen Driver Crash Types and Contributing Circumstances

According to a 2014 study of nationally representative crash causation data provided by the National Highway Traffic Safety Administration, teen drivers are involved in certain crash types more often than adults. The image on the right shows the top five teen crash types nationally and the share of serious teen and adult crashes for each type.[13] As shown in the figure, teen drivers appear more likely than adult drivers to be involved in:

- rear-end crashes,
- turning left into the path of an oncoming vehicle, and
- the two roadway departure crash types.

According the 2014 study, the propensity of young drivers to be involved in these crash types is related to the risk factors described above. For example, teens are more likely to be involved in rear-end crashes because they tend to follow too closely and are more easily distracted. Likewise, teens are more likely to be involved in roadway departure crashes because they tend to overcompensate through lack of experience.

These conclusions are generally supported by statistics from the 2013–2017 New Jersey Young Drivers Report indicating that "driver inattention" was the single most reported circumstance contributing to young driver crashes, reported as a factor in 39% of teen driver crashes, followed by "following too closely," reported in 12% of crashes (Page 163).[14] Speeding is another critical safety issue for teen drivers. According to the New Jersey Attorney General's Office, in 2024, speeding was a factor in 33% of fatal crashes involving a teen driver.[15]

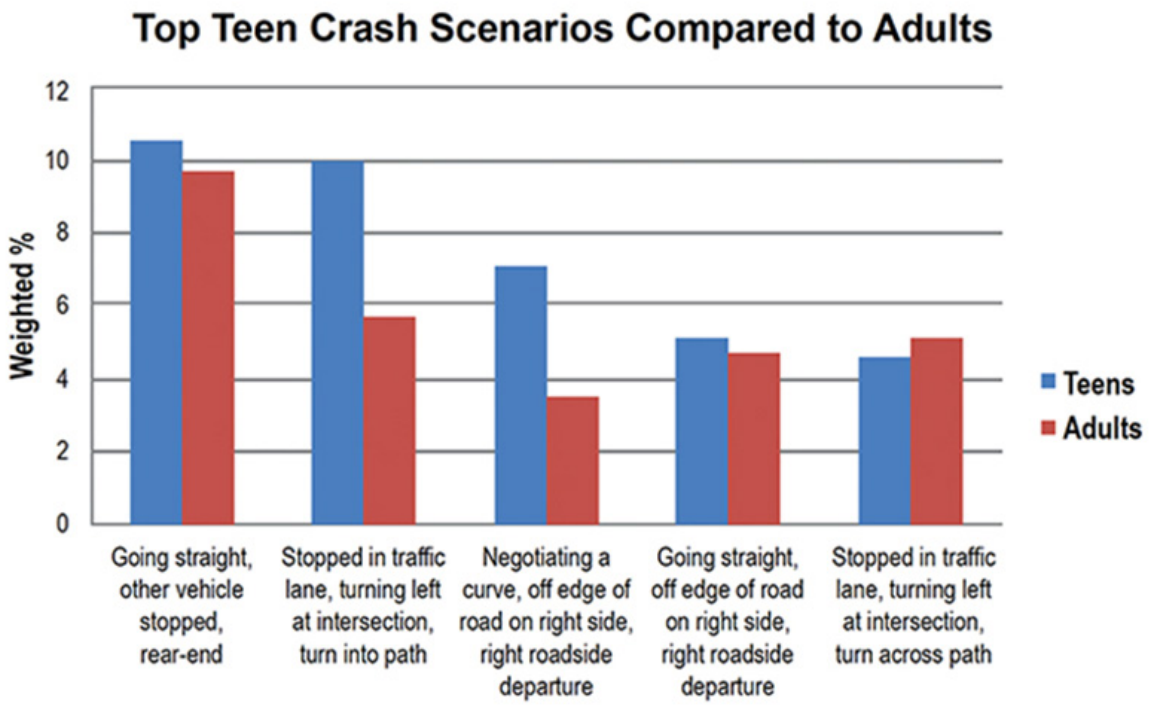


Image: McDonald, Catherine C., et al. "comparison of teen and adult driver crash scenarios in a nationally representative sample of serious crashes." Accident Analysis & Prevention, vol. 72, Nov. 2014, pp. 302–308. ScienceDirect, ScienceDirect, *https://doi.org/10.1016/j.aap.2014.07.016.*

	CONTRIBUTING CIRCUMSTANCE	
DRIVER ACTION	DRIVER INATTENTION	16,239
	FOLLOWING TOO CLOSELY	4,992
	FAILED TO YIELD ROW TO VEHICLE/PEDESTRIAN	3,391
	UNSAFE SPEED	2,856
	IMPROPER LANE CHANGE	1,508
	IMPROPER TURNING	1,045
	BACKING UNSAFELY	943
	FAILED TO OBEY TRAFFIC SIGNAL	817
	OTHER DRIVER/PEDALCYCLIST ACTION	702
	FAILED TO OBEY STOP SIGN	591
	IMPROPER PASSING	565
	OTHER DISTRACTION INSIDE VEHICLE	383
	DISTRACTED - HAND HELD ELECTRONIC DEVICE	227
	FAILURE TO KEEP RIGHT	218
	OTHER DISTRACTION OUTSIDE VEHICLE	174
	IMPROPER PARKING	70
	DISTRACTED - HANDS FREE ELECTRONIC DEVICE	63
	DISTRACTED BY PASSENGER	62
	IMPROPER USE/FAILED TO USE TURN SIGNAL	56
	WRONG WAY	52
	IMPROPER USE/NO LIGHTS	20
	FAILURE TO REMOVE SNOW/ICE	6
VEHICLE FACTORS	BRAKES	280
	TIRES	140
	OTHER VEHICLE FACTORS	118
	STEERING	84
	WHEELS	45
	WINDOWS/WINDSHIELD	27
	MIRRORS	5
	VEHICLE COUPLING/HITCH/SAFETY CHAINS	5
	DEFECTIVE LIGHTS	4
	SEPARATED LOAD/SPILL	3
	WIPERS	0

	CONTRIBUTING CIRCUMSTANCE	
ROAD/ENVIRONMENTAL FACTORS	ROAD SURFACE CONDITION	1,452
	ANIMALS IN ROADWAY	644
	SUNGLARE	136
	OBSTRUCTION/DEBRIS IN ROAD	101
	PHYSICAL OBSTRUCTIONS (VIEWING, ETC)	62
	TRAFFIC CONGESTION - REGULAR	56
	OTHER ROADWAY FACTORS	47
	RUTS, HOLES, BUMPS	33
	TRAFFIC CONGESTION - PRIOR INCIDENT	26
	CONTROL DEVICE DEFECTIVE OR MISSING	9
	IMPROPER WORK ZONE	3
	IMPROPER/INADEQUATE LANE MAKINGS	0
PEDESTRIAN FACTORS	OTHER PEDESTRIAN FACTORS	0
	NONE	0
	WALKING IN ROAD WHEN SIDEWALKS PRESENT	0
	WALKING ON WRONG SIDE OF ROAD	0
	FALURE TO YIELD ROW	0
	RUNNING/DARTING ACROSS TRAFFIC	0
	INATTENTIVE	0
	DARK CLOTHING/LOW VISIBILITY TO DRIVE	0
	CROSSING WHERE PROHIBITED	0
	FAILED TO OBEY TRAFFIC CONTROL DEVICE	0
OTHER	UNKNOWN	799
	OTHER	238
	NONE	11,603

Contributing Circumstances of Young Drivers in Crashes (n = 41,816), 2017. Image: 2013 - 2017 New Jersey Young Drivers Report

Ways to Mitigate Teen Driver Crash Risks through Design

The risk factors and crash types associated with teen drivers can be reduced through the thoughtful design or retrofit of school campuses and surrounding streets. This is particularly important given the high concentration of student pedestrians and cyclists, who—like student drivers—are relatively inexperienced, more prone to distraction, and thus more likely to misjudge situations and make mistakes.

School Campus Design

Strategies for mitigating teen driver crash risks through school campus design focus on reducing driver speeds, reducing the number of potential conflict points between student drivers and vulnerable road users, and ensuring pedestrian and cyclist crossings are highly visible and encourage driver yielding. Recommended strategies include:

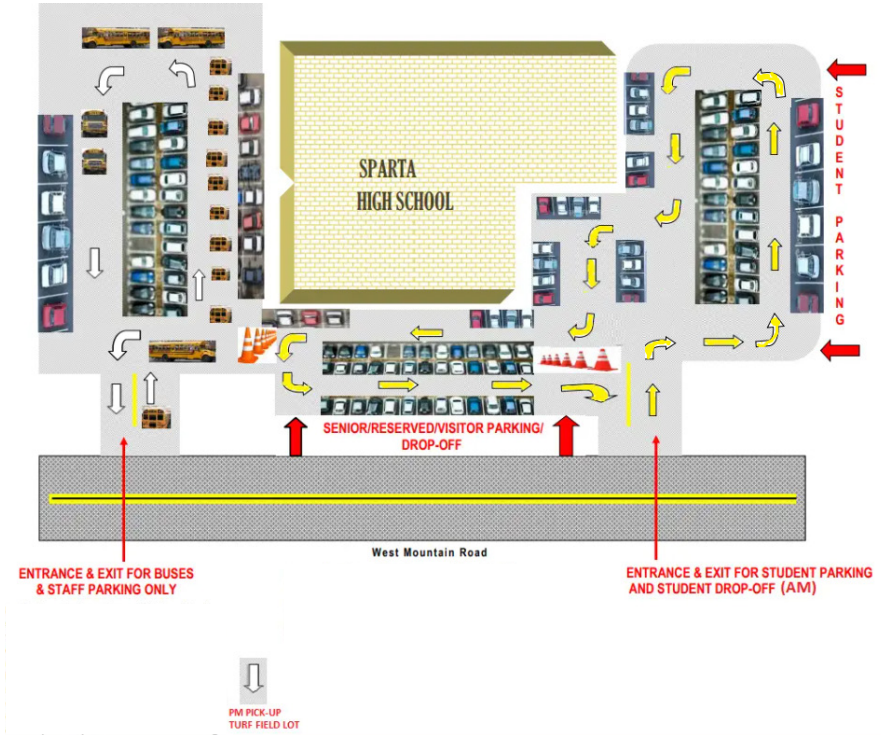
- Separate student driver routes from bus loops, pick-up/drop-off zones, pedestrian and bicyclist routes, and parking areas:
  - Provide a separate ingress/egress on school campuses for student drivers where feasible.
  - Locate bicycle parking away from student parking areas.
- Use one-way circulation and channelization to simplify movements and make them more predictable.
- Locate student parking areas away from school buildings to reduce student driver traffic along the building frontage, where pedestrians are most concentrated.
- Design parking aisles and circulation roads for lower speeds, supported by signage, pavement markings, and traffic-calming measures.
  - Speed limits in campus parking lots should be set at 5 mph and clearly indicated with signage and pavement markings.
  - Traffic-calming measures can include raised crosswalks, speed tables, speed humps, curb extensions, and avoidance of long straightaways.



Parking aisles and circulation roads for lower-speed circulation at Collingswood High School, NJ.



Separated parking space for Collingswood High School, NJ.



Separated one-way circulation at Sparta High School, NJ. Image: Sparta High School Traffic Control Plan

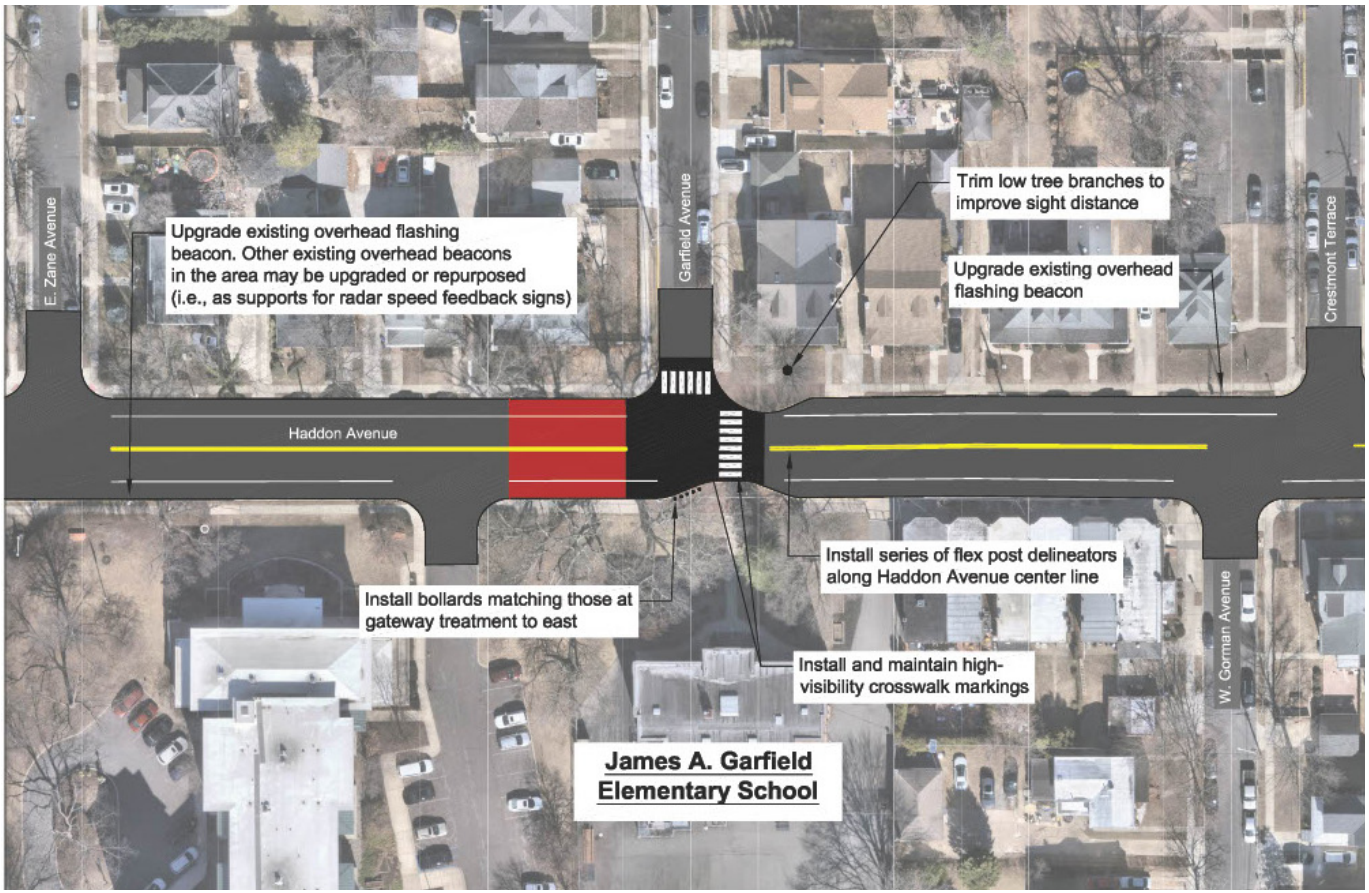
- Provide separated pedestrian pathways and marked crosswalks along key pedestrian desire lines between school entrances and drop-off/pick-up zones, transit stops, and pedestrian facilities on adjacent streets.
  - Pathways and crosswalks should be ADA-compliant.
  - Pathways should be separated from roadways by curbs.
  - Crosswalks should be marked with high-visibility crosswalk markings, provide clear, unobstructed sightlines between drivers and crossing pedestrians, and include physical measures to encourage driver yielding and reduce pedestrian exposure, such as raised crosswalks, curb extensions, pedestrian refuge islands, signage and RRFBs.

- Provide good lighting at campus entry and exit locations, in parking lots, along pedestrian pathways, and at crosswalks to support safety during early mornings, evenings, and special events.

School Zone Street Design

Similar strategies can be implemented on adjacent streets and key pedestrian and bicycling access routes to mitigate teen driver crash risks.

- Work with local and state authorities to implement traffic calming on school approaches.
- Design pedestrian crossings near schools to slow drivers and increase vulnerable road user visibility.
  - Measures such as high-visibility markings, leading pedestrian intervals (LPIs), pedestrian refuge islands, speed tables, and curb extensions should be explored.
- Provide adequate, quality lighting.
- Implement separated pedestrian and bicycling facilities.



James A. Garfield Elementary School Street design engineering on Hadden Ave, Collingswood, NJ.
Image: Borough of Collingswood Safe Routes to School Travel Plan

Ways to Mitigate Teen Driver Crash Risks through Policies, Programs, and Education

Schools can mitigate student driver crash risks through a variety of policies and programs, including:

- Encourage other transportation modes.
  - These can include walking, rolling, bicycling, school buses, and public transportation.

- Provide free or discounted public transit passes to students.
  - Arlington Transit (ART) and Washington Metropolitan Area Transit Authority (WMATA) provide free Metrobus routes for public school students in Arlington, Virginia via the iRide Student Fare Free Program. [16]
  - Southeastern Pennsylvania Transportation Authority (SEPTA) provides local school districts with Student Fare Cards for qualifying students to travel to and from school on any modes of public transit. [17]

- Make student driving less attractive through parking and operational policies.
  - Require permits for student parking, limit their number, and charge a fee. The funds collected can be applied to strategies supporting non-car modes, such as free or discounted transit passes.
  - Dismiss student drivers from school last, which can also reduce conflicts between student drivers and other vulnerable road users (pedestrians, bicyclists, bus riders, etc.) during peak dismissal times. Alternatively, give early dismissal to students who walk or bike to school.

- Provide behind-the-wheel driver training courses in high schools to help students satisfy state driver's license requirements and involve caregivers.
  - Some public high schools have removed these courses, forcing students into private driving schools, which can be expensive and inequitable.
  - Caregivers can help reinforce safety messages.

- Emphasize driver safety.
  - Require students and their caregivers to sign a safe driver pledge, e.g., to always wear a seatbelt, avoid using cell phones and other distractions while driving, comply with speed limits and other traffic laws, limit other teen passengers, etc.
  - Specify that parking permits and other privileges will be revoked for unsafe behaviors or failure to follow rules.

- Support school staff and be consistent with enforcement.
  - Administrators and teachers often help with compliance with rules in school zones and should have support to enforce the rules consistently.

- Provide education on pedestrian, bicycle, e-bike, and micromobility safety.
  - As identified in the Target Zero Action Plan, proposed legislation would establish comprehensive Pre-K-12 road safety education, helping students understand vulnerable road user safety and potentially reducing teen driving crashes.

Conclusion

Teen drivers are a critical group to consider when planning and designing safe school zones, particularly at high schools where many students are newly licensed and beginning to drive independently. By coordinating policies, programs, education, and design strategies around high school campuses and adjacent streets, communities can reduce crash risks and create a safer environment for all road users.

ENDNOTES

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16 Arlington Public Schools. iRide Student Fare Free Program. https://www.apsva.us/transportation-services/public-transportation/
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12 The School Site and School Grounds

There are two elements related to school location: the school site and the school grounds. The school site refers to the school's location within the community, while the school grounds refer to the placement of buildings, facilities, and circulation areas on the school property. Both the location of the school within the community and the design of the school grounds should support the safe arrival and departure of all students. Everyone should remember that even children arriving by school bus, transit, or private automobile will be entering the school building on foot. Safety treatments can also function as both green infrastructure and safety infrastructure, offering stormwater management benefits while improving transportation safety.

School Site

Schools are centers of their communities in addition to being educational facilities, providing neighborhood playgrounds and meeting space for all residents. Site selection is critical if these community functions are to be served. Ideally, schools should be centrally located in a community. Important elements of a school location identified by the American Association of State Highway Transportation Officials (AASHTO) Guide for the Planning, Design, and Operation of Pedestrian Facilities, 5th Edition include:

- The school site is centrally located in the community; most children live within one mile.
- Pedestrian and bicycle access is available from all directions.
- Sidewalks, bicycle lanes, and trails on adjacent streets or through neighborhoods connect to the school property.

The NJ School Development Authority (NJ SDA) Real Estate Practices Manual

Developed in 2009, the Real Estate Practices Manual represents a culmination of lessons learned in addressing many of the land acquisition and development challenges faced by New Jersey in its school construction program. The manual explains the typical site planning, site selection, preconstruction and land acquisition steps and processes that the NJ SDA follows before a project is funded for design and construction by the State. It describes the roles and responsibilities of the various stakeholders in school site selection and development, and the interdependent decisions required of them. The manual is available for download at www.njsda.gov/Content/Business/forms/RE_Manual.pdf

U.S. EPA SCHOOL SITING GUIDELINES

U.S. EPA's school siting guidelines can help local school districts and community members evaluate environmental factors to make the best possible school siting decisions. Go to https://www.epa.gov/sites/default/files/2015-06/documents/school_siting_guidelines-2.pdf, for more information.

Key Considerations in School Site Selection

There are no minimum acreage criteria for schools in New Jersey. In many of New Jersey's older cities, land parcels are small, and it usually requires the assemblage of numerous parcels to accumulate sufficient land to build a school. New Jersey law only requires that the land be of sufficient size to meet the educational needs of the student enrollment and the faculty.

According to the NJ SDA Manual, specific land requirements for building size, outdoor physical recreation space and parking need to accommodate the school's educational model and unique circumstances. This is best managed through a partnership between the school district, design professionals and the local community that the school serves. Some of the site-specific factors that are considered by the SDA in site selection and that also affect safe pedestrian and bicyclist accessibility are listed to the right.

Selection Criteria Evaluated by NJ SDA for Proposed School Sites

Location Considerations

- Sustainability is considered in site selection
- Site encourages safe pedestrian access for the community
- Centrally located to balance transportation options
- Compatible with current and probable future zoning regulations
- Close to libraries, parks, and other community services
- Favorable orientation to wind and natural light
- Sensitive to open space needs of the community

Accessibility Considerations

- Access and dispersal roads
- Natural obstacles, such as creeks and rivers
- Access for emergency response vehicles, sanitation vehicles
- Road widening and traffic improvements are minimized

Safety Considerations

- Highway proximity, in particular highway ramps (see page 112)
- Railroad proximity
- Airport proximity
- High-voltage power line proximity
- High-pressure utility lines
- Proximity to dumps, junkyards, landfills, chemical plants, refineries, fuel storage tanks, nuclear plants
- Proximity to gasoline stations, automobile repair shops, dry cleaners, nail salons
- Proximity to metal manufacturers, hazardous air pollution emitters, incinerators, prisons
- Social hazards in the neighborhood, such as bars or areas with high crime rates



The entrance to the Belleville School #7 in Belleville, NJ. Image: VTC



The entrance to the Collingswood Middle and High School complex in Collingswood, NJ.

Evaluating Adaptive Reuse Options

Older school buildings located in established neighborhoods often offer easy accessibility for students walking or bicycling to school and can serve to sustain established neighborhoods by providing a center for community activity. Because of these health and community benefits, the NJ SDA Manual recommends careful consideration of refurbishing existing school properties before deciding to demolish and build a new school elsewhere.



Since 1928, neighborhood children have walked to Cochran Elementary School in Williamsport, PA, which was renovated and expanded in 2001. It is generally less expensive to renovate an existing school than build a new one, especially considering the cost of land acquisition and development. Image: Renovate or Replace? by the Pennsylvania Dept. of Education

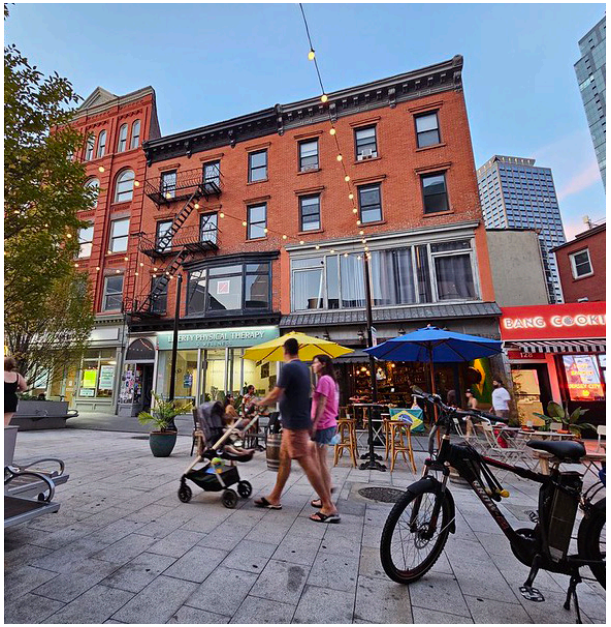
The APA identifies Smart Growth as that which supports choice and opportunity by promoting efficient and sustainable land development, incorporates redevelopment patterns that optimize prior infrastructure investments, and consumes less land that is otherwise available for agriculture, open space, natural systems, and rural lifestyles.

American Planning Association (APA)

Smart Growth

The NJ SDA Manual recommends the integration of Smart Growth principles into educational facility planning. Smart Growth is defined by the United States Environmental Protection Agency (U.S. EPA) as a development that serves the economy, the community and the environment. The U.S. EPA recognizes a number of key attributes of Smart Growth, including:

- Mixed land uses,
- Compact building designs,
- Walkable neighborhoods,
- Development of communities with a strong sense of place,
- Integration of open space,
- Use of infill development strategies, and
- Consideration of balanced transportation options.



Walkable neighborhood in Jersey City. Image: VTC



Bicycle storage at Hoboken PATH station. Image: VTC

School Grounds

The following information has been adapted from the Safe Routes to School Briefing Sheet 6 – School On-Site Design by the Institute of Transportation Engineers (ITE). The briefing sheet is available at www.pedbikeinfo.org/pdf/SRTSlocal_ITEbriefingsheetsALL.pdf

A well-designed school site should support the safe arrival and departure of all students, including pedestrians and bicyclists. According to ITE, some of the key elements that should be considered to promote the safety of bicyclists and pedestrians are:

- Separation of pedestrians, bicycles, parent cars, and buses
- Bicycle access and storage
- Location of school entrances
- Design and operation of drop-off/pick-up zones
- Design and operation of bus zones
- Driveways and internal roadway networks
- Parking
- Traffic control devices.

Separation of Pedestrians, Bicyclists, Parent Cars, and Buses

Separating or eliminating conflicts between students arriving on foot or bicycle from those arriving by buses and motor vehicles is necessary to reduce a student's exposure to traffic. Adequate physical space should be provided for each mode by which students arrive at school.

Bicycle Access and Storage (See Bicycle Storage at Schools in Chapter 9 as a reference)

Secure and effective bicycle parking is a crucial factor in encouraging children to bicycle to and from school. Bicycle racks should be designed to enable both wheels to be secured with a U-lock or padlock and cable. Racks should be covered by shelters when possible to protect bicycles from the elements. All bicycle parking areas should be easily accessible and conveniently located in well-lit areas near school building entrances. It is advantageous to provide secure bicycle parking at more than one location, especially if there are multiple entrances or exits, so that bicyclists do not have to cross campus to access a bicycle rack.



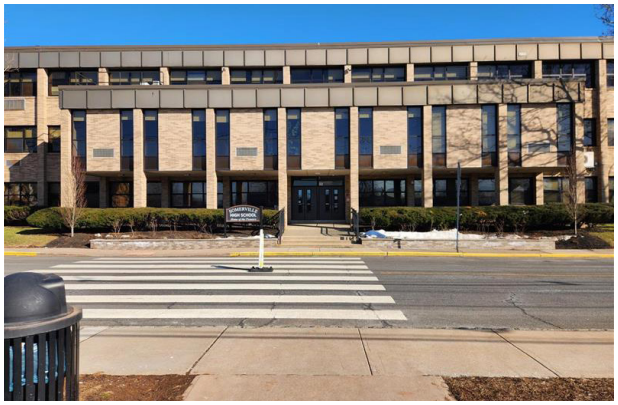
Bicycle parking at the Orchard School in Ridgewood, NJ is easily accessible but low security and unprotected from the weather.

NJ DEFINITION OF SCHOOL GROUNDS

The definition of "school grounds" as described in N.J.A.C. 6A:16-1.3 includes land, portions of land, structures, buildings, and vehicles, when used for the provision of academic or extracurricular programs sponsored by the school district or community provider and structures that support these buildings, such as school district wastewater treatment facilities, and other central service facilities including, but not limited to, kitchens and maintenance shops. School grounds also includes other facilities as defined in N.J.A.C. 6A:26-1.2, such as playgrounds, and recreational areas owned by local municipalities, private entities, or other individuals during those times when the school district has exclusive use of a portion of such land.

Location of School Entrances

Building entrances should be located with consideration for pedestrian desire lines. This entails determining the directions and points from which pedestrians are likely to approach the building and then identifying whether the design has inadvertently placed any unacceptable traffic conflicts or obstacles in the pedestrians' routes. For safety, the location of the front door to the school should face a traffic-calmed street. However, this is not always possible. An example of such an undesirable conflict is a school entrance that funnels pedestrians toward an uncontrolled midblock location, a road with sidewalk gaps, a roadway with nearby ramps or jughandles, or across a busy driveway. The location of school entrances should be adjusted to direct pedestrians towards preferred street crossings and avoid unnecessary driveway crossings.



Somerville High School's main entrance is clearly marked by a wide, visible crosswalk leading from the opposing sidewalk.

Location of School Automobile Entrances

Students arriving and departing in private motor vehicles should exit and enter cars in designated zones to minimize pedestrian/vehicle conflicts.

Well-designed drop-off and pick-up zones can minimize illegal standing or parking near schools and help prevent problems such as blocking bus driveways and traffic flow on adjacent roadways. Drop-off/pick-up zones should be one-way in a counter-clockwise direction so that students are loaded and unloaded directly to the curb/sidewalk.



Signage for motor vehicle drop-off at Collingswood Middle School.

Design and Operation of Bus Zones

School bus operations function best when they are separated from all other transportation activities. Signs, pavement markings, gates, and/or orange cones may be used to provide this separation, but some education and enforcement will also be needed. Enforcement of drop-off and pick-up policies and procedures can be performed by a variety of people. Schools around the country have had success utilizing law enforcement officers, school personnel or parent volunteers.

When new drop-off and pick-up plans are implemented, assistance may be requested from law enforcement officers to make sure traffic flows smoothly during the first few days.

Implementing a new plan may also require more volunteers or monitors to regulate parent activity in the first few days. Drivers who are not following proper procedure can receive warnings from school personnel, parents or law enforcement officers.



A designated school bus stop location for drop-off in front of Thomas Sharp Elementary School in Collingswood, NJ.

Driveways and Internal Roadway Networks

School driveways should conform to local design and access management guidelines for number, spacing, location, and layout. According to the ITE School On-site Design Guidelines, directives specific to schools include the following:

- Separate driveways should be used for bus traffic and other motor vehicle traffic.
- The predominant direction of traffic and student origins should be considered when selecting the location of driveways so that most drivers will turn right when exiting the school grounds.
- Students should not be required to cross busy driveways to access the school building.
- The roads within the school site should have a maximum grade of five percent to avoid configurations that could impair a motorist's vision.
- Buildings, landscaping, fences, block walls, and school signs should always permit adequate sight distances for drivers and pedestrians.
- Driveways should be located so as to avoid interlocking left turns with other streets or bus driveways.



Bus traffic should have separate driveways from other motor vehicle traffic.

Parking

General parking guidance for schools is to separate parking areas (student, staff, visitors, and buses) from student loading/unloading areas and delivery loading zones, and to separate student pedestrians and bicyclists from both.

The NJ SDA Real Estate Practices Manual considers adequate parking for teachers, staff, and visitors as part of the site selection, but generally parking is regarded as subordinate to the need for adequate outdoor educational space where constraints in available land do not allow for the optimal creation of both play space and parking. When this situation arises, the Manual recommends creative parking alternatives such as cooperative agreements with the municipality for on-street parking, off-site parking, or the use of underground parking options.

Traffic Control Devices

In addition to physical layout, schools can use traffic cones and other channelizing devices to control on-site traffic patterns. Examples of practices include the following:

- Placing traffic cones for traffic control or access restriction. Cones can be used to create a single-lane queue in the drop-off/pick-up zone. This practice is desirable because it minimizes the potential for pedestrian/vehicle conflicts; however, it can be used only if there is enough capacity to process the queue efficiently using only one through lane.
- Placing cones or a traffic gate to restrict vehicles, typically parent vehicles, from accessing a zone designated for other uses (for example, parking, bus loading, pedestrian/bicycle zone).
- Replacing faded or discolored traffic cones with new orange cones.



Cones are used to create a single-lane queue in the car drop-off/pick-up zone at Kilmer School in Trenton, NJ.

Other Safety Considerations on School Grounds

Student Safety Patrols

Student safety patrols enhance enforcement of drop-off and pick-up procedures at school by increasing safety for students and traffic flow efficiency for parents. Such efforts allow students to participate in promoting traffic safety where they learn skills they can use in their everyday lives. Having a student safety patrol program at a school requires approval by the school and a committed teacher or parent volunteer to coordinate the student trainings and patrols. Before beginning a program, school officials should be contacted for approval of the program and to determine how liability issues will be addressed. Safety patrol members are typically selected by teachers and principals and are usually students in the fourth, fifth and sixth grades.



Student safety patrol members provide crossing assistance at an intersection near Audubon school. Image: Cross County Connection TMA

AAA Mid-Atlantic and the Mid-Atlantic Foundation for Safety and Education support the program by providing safety patrol materials and equipment worn by all AAA School Safety Patrols. In addition, the Mid-Atlantic Foundation for Safety and Education sponsors five AAA School Safety Patrol Officers' Training Camps in conjunction with local police departments each summer.

Each year, AAA School Safety Patrols are recognized with an Outstanding AAA School Safety Patrol Awards Luncheon throughout the AAA Mid-Atlantic territory. Selection criteria for choosing an Outstanding AAA School Safety Patrol include leadership, sound academics, promptness, neatness and industriousness. Recent New Jersey honorees have included students from Lafayette Township School, Ogdensburg School, Wenonah Elementary School, and McFarland Intermediate School (Bordentown).



Audubon walking shuttle ponchos. Image: Cross County Connection TMA



Audubon walking shuttle. Image: Cross County Connection TMA

No Idling Zones

Diesel emissions include fine particles commonly called soot. These pollutants are known to cause asthma, bronchitis, lung cancer, heart disease, and premature death. Diesel exhaust ranks among the air pollutants that pose the greatest risk to public health. Research has shown that fine particles are harmful because they bypass the body's natural defense mechanisms and penetrate deep into the lungs.

The "Stop the Soot" campaign (www.stopthesoot.org) was started by the New Jersey Department of Environmental Protection's (NJ DEP) Bureau of Mobile Sources to bring attention to the problem of poor air quality caused by the idling of motor vehicles (i.e., automobiles, trucks, buses, school buses, construction vehicles, and equipment, etc.). **New Jersey regulation (N.J.A.C. 7:27-14) prohibits engines, including those in cars, vans and school buses, from idling for more than three minutes in most instances;** however, NJ DEP is urging school districts and school bus drivers to go beyond the minimum and implement best practices to reduce harmful diesel emissions. These best practices include turning off engines when waiting to load and unload students, replacing old buses in the fleet first as they often release the most emissions, and using new buses for long routes.

One way to help reduce soot is by eliminating all engine idling. NJ DEP's anti-idling awareness campaign encourages school districts, school bus companies, and parents to sign a no-idling pledge and to eliminate idling within designated school and no idling zones. To date, more than 100 individual schools, charter schools, and school districts throughout the state have signed the "No Idling Pledge" as a way of demonstrating that reducing idling is important to the health of their students, drivers, and school employees.



Signs can remind drivers to turn off their engines during pick-up and drop-off in Parsippany Hills High School, Morris Plains, NJ.

WHY IS IT BAD TO IDLE VEHICLES?

Idling vehicles contribute to air pollution and emit air toxins, which are pollutants known or suspected to cause cancer or other serious health effects. Monitoring at schools has shown elevated levels of benzene, formaldehyde, acetaldehyde and other air toxics during the afternoon hour coinciding with parents picking up their children. Children's lungs are still developing, and when they are exposed to elevated levels of these pollutants, children have an increased risk of developing asthma, respiratory problems and other adverse health effects. Limiting a vehicle's idling time can dramatically reduce these pollutants and children's exposure to them.

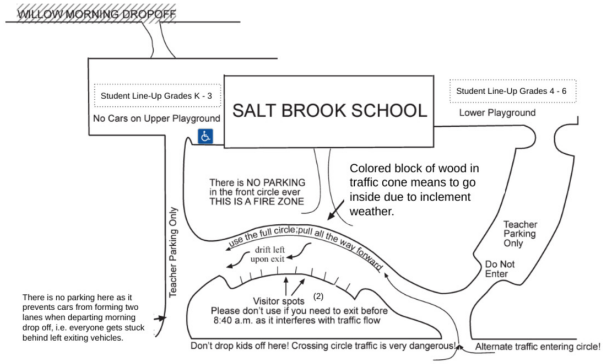
For more information visit https://www.epa.gov/schools/idle-free-schools-toolkit-healthy-school-environment

School Grounds Safety Strategies

Satellite Drop-Off

Satellite drop-offs encourage parents to drop off students at designated locations within walking distance of the school. This strategy helps redistribute congestion and pollution away from school entrances while allowing students to get physical activity as they walk from the drop-off location to the school.

Successful satellite drop-off programs require coordination among multiple stakeholders, including school staff, PTA members, parents, and transportation or planning professionals, to identify safe and appropriate drop-off locations. Depending on the school context, there may be multiple satellite drop-off locations. In general, satellite drop-offs can range from informal arrangements to more structured programs with defined schedules, multiple drop-off sites, and designated walking routes to school.



Salt Brook PTA DROP-n-GO satellite drop off program, Salt Brook PTA, NJ. Image: Salt Brook PTA

Street Closures

Street closures involve the temporary restriction of motor vehicle traffic to prioritize walking and bicycling during student arrival and departure times. Closures are typically implemented by installing physical barriers that block motor vehicle access. Depending on the school layout and operational needs, street closures may prohibit all vehicular traffic or allow access only for school buses while restricting private vehicles.

Street closures are often paired with complementary strategies such as satellite drop-offs. By reducing conflicts between vehicles, pedestrians, and bicyclists, street closures help make school drop-off and pick-up periods safer, more orderly, and more predictable.



Street closure in Bound Brook, NJ. Image: VTC

Temporary One-Ways

Temporary one-way operations restrict vehicle travel to a single direction during school arrival and departure periods. These configurations are established using barriers and typically require coordination among local residents, school administrators, and municipal officials. Limiting vehicle movement to one direction helps streamline traffic flow, improve predictability, and reduce unsafe drop-off maneuvers and street-crossing behaviors near schools.



Temporary one-ways. Image: School Zone Safety Strategies

ELECTRIC BUSES

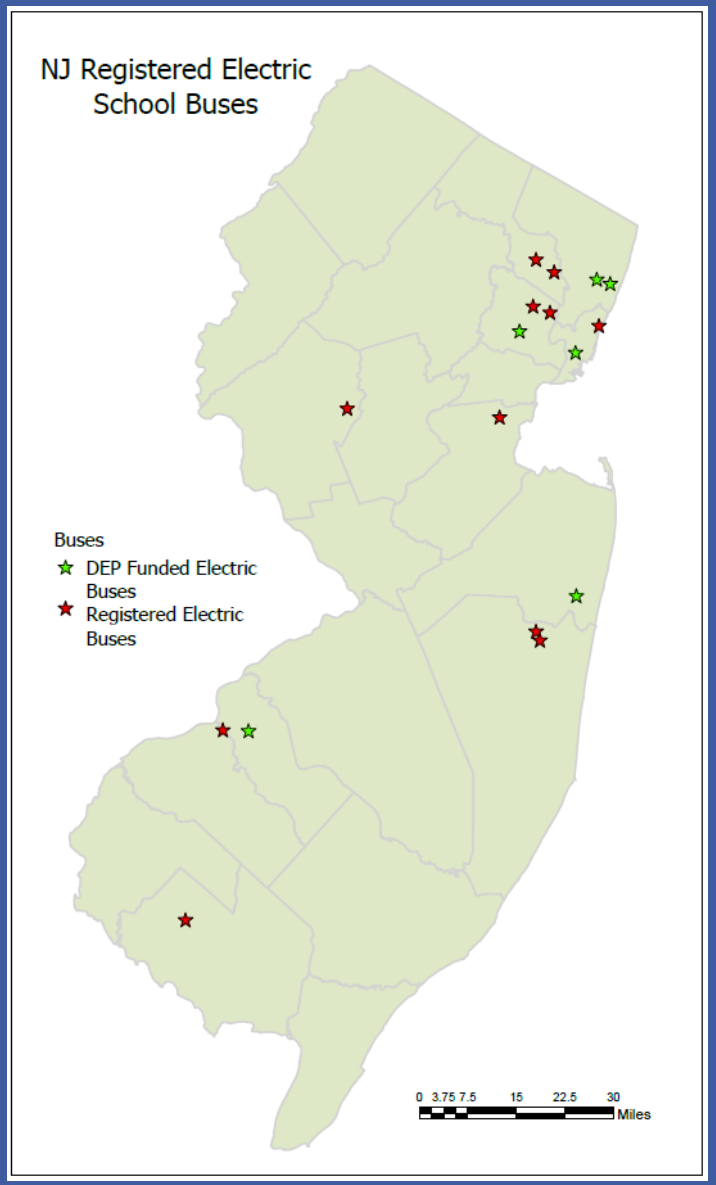
School transportation and the built environment around schools play a critical role in supporting safe, healthy, and sustainable travel for students. In New Jersey, public school districts are required to provide transportation for elementary students (grades K–8) who live more than 2 miles from school, and for high school students (grades 9–12) who live more than 2.5 miles from school. School buses therefore represent an essential part of the state's educational and transportation system.

Statewide, there are approximately 217,000 registered school buses, and more than 99% of them operate using fossil fuels. The predominance of diesel-powered buses negatively affects surrounding communities through air pollution, emissions, and noise.

To address these environmental and public-health impacts, the New Jersey Department of Environmental Protection (NJ DEP) created the Electric School Bus Grant Program, which funds the replacement of diesel school buses with battery-electric buses under P.L. 2022, c.86.



Electric bus charging, NJ. Image: NJ DEP



NJ Registered electric school buses. Image: NJ DEP

Sustainability and School Safety

What is green infrastructure?

Green infrastructure refers to treatments that use filtration, infiltration, and evaporation to absorb rainwater where it falls. Green infrastructure can create multiple benefits beyond stormwater management alone. When well-designed on site, these practices can provide cleaner water and air, protect against extreme weather, support diverse habitats, and create beautiful spaces for people to enjoy. Below are several ways green infrastructure can reduce environmental hazards [1]:

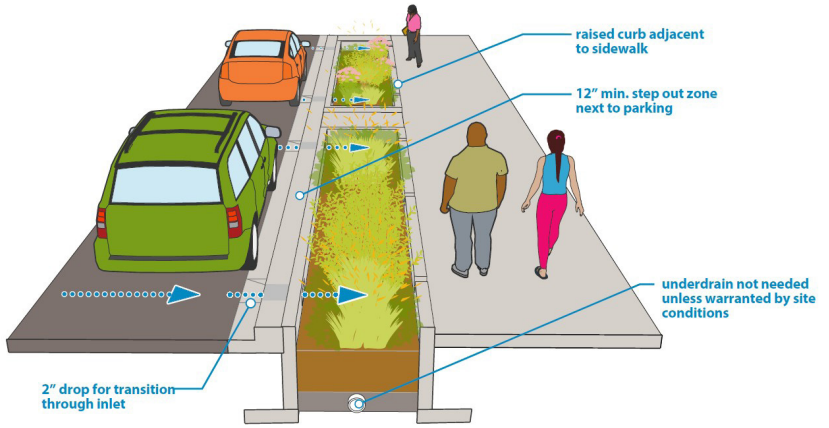
- Improves Water Quality: Green infrastructure can be designed to capture stormwater and filter out pollutants.
- Reduces Localized Flooding: These practices help stormwater infiltrate into the ground, slowing, capturing, and temporarily storing runoff.
- Improves Air Quality: Green infrastructure often includes trees and other vegetation, which help improve air quality by filtering air pollutants and fine particulate matter.
- Reduces the Heat Island Effect: Developed areas such as cities and towns generate more heat than rural areas. Green infrastructure can reduce these temperatures by providing shade, moisture, and reflective surfaces. [2]

Dual purpose sustainability infrastructure that doubles as safety infrastructure

One of the key features and benefits of green infrastructure is its ability to reduce stormwater runoff. Often, treatments reducing runoff are some of the physically larger treatments (e.g., pedestrian refuge island, roundabouts, or raised medians), which have space for foliage or natural environments. The list of treatments below can serve as both safety interventions and sustainability interventions:

- Pedestrian Refuge Islands
- Diverters
- Roundabouts
- Road Diets
- Complete and Green Streets
- Gateways and Landscaping
- Multi-Use Paths
- Roadway Closures

These treatments contribute to, or create opportunities to contribute to, an increase in green infrastructure in a community.



An example of green infrastructure that also serves as a safety treatment for pedestrians. Image: Minneapolis Street Guide

[1] https://www.epa.gov/green-infrastructure/about-green-infrastructure
[2] https://www.epa.gov/green-infrastructure/environmental-benefits-green-infrastructure

NEW JERSEY GREEN INFRASTRUCTURE PROGRAMS

Environmental challenges such as flooding, stormwater, and extreme heat are known barriers to walking and bicycling to school that increase risk during student travel. New Jersey offers several programs that support green infrastructure and provide opportunities to align sustainability efforts with roadway safety improvements around schools:

Green Streets and Stormwater Infrastructure Mapping Grant Program: Supports municipalities in developing green stormwater infrastructure (such as green streets) and in mapping stormwater systems to improve resilience and reduce runoff.

Safe Routes to School (SRTS) Infrastructure Grants: Funds safety projects that can integrate green design elements, including traffic-calming features, plantings, and stormwater-management components.

Sustainable Jersey for Schools



Awards points to schools for implementing green infrastructure initiatives such as rain gardens, tree planting, and sustainable landscaping.

Notably, municipalities and schools that meet the requirements of the NJ Safe Routes to School Recognition Program can also earn points toward Sustainable Jersey and Sustainable Jersey for Schools certification.

- NJ Stormwater Best Management Practices Manual: https://dep.nj.gov/stormwater/bmp-manual/
- Green Streets and Stormwater Infrastructure Mapping Grant Program: https://dep.nj.gov/grantandloanprograms/green-streets-stormwater-infrastructure-mapping-grant-program/
- Safe Routes to School (SRTS) Infrastructure Grants: https://www.saferoutesnj.org/safe-routes-to-school-grants/
- Sustainable Jersey for Schools: https://www.sustainablejerseyschools.com/
- Urban Street Stormwater Guide from NACTO: https://nacto.org/publication/urban-street-stormwater-guide/
- New Jersey Green Infrastructure Municipal Toolkit: https://gitoolkit.njfuture.org/

13 Crime Prevention Through Environmental Design

Careful design and manipulation of the physical environment around and at the school site have the potential to reduce crime concerns, both real and perceived. Such manipulation is referred to as Crime Prevention Through Environmental Design (CPTED).

Introduction

With roots in city planning, architecture, criminology, and sociology, CPTED emphasizes design of outdoor school spaces based on the application of three fundamental concepts believed to reduce the occurrence and fear of crime: (1) the ability to survey surroundings (to see and be seen), (2) the ability to control access, and (3) the creation of a sense of ownership and school community identity. Through the utilization of these concepts, CPTED has the potential to reduce both the real and perceived dangers associated with walking and bicycling to school, while bolstering community identity and creating a safe and welcoming environment.

The Ability to Survey Your Surroundings

How important is it to see and be seen? As we move through the environment, we are constantly surveying our surroundings. Whether deliberate or unconscious, our ability to observe the environment around us contributes to our personal perceptions of safety and danger. For schools, the pursuit of safety is paramount. In order to maintain a safe outdoor environment, school administrators, teachers, parents, students and security cameras, if installed, should have the ability to clearly survey their surroundings at all times. This includes opportunities to see from adjacent properties or the site perimeter onto the site, and opportunities to see parking, walkways and other areas of the site. Examples of design elements that support our ability to survey our surroundings include:

- lighting that improves the ability to observe activity and identify individuals,
- building location and orientation that creates views, and
- judicious selection and location of trees, shrubs and other plant species, combined with regular maintenance, which can minimize the conflict between lighting and landscaping and ensure that views on, off and around the site are preserved.

COMMON ENVIRONMENTAL ELEMENTS OF SCHOOLS

- Pedestrian and Bicycle Access
- Vehicular Access
- Trees and Shrubbery
- Topography
- Fencing
- Lighting
- Maintenance
- Signage
- Gathering Space
- Activity Space

The Need to Control Access

Access to the school begins in the landscape well before anyone has reached the front door. It includes the sidewalks, paths and driveways as well as the fences, trees, hedges, and signs around the school. Parents and teachers, and possibly crossing guards and students, can also serve as access control by paying attention to the people and activities around them. By offering cues about who belongs in a place, when they are supposed to be there, where they are allowed to be while they are there, what they should be doing, and how long they should stay, CPTED measures can be employed to control access to school grounds by authorized users on foot, bicycle, or in cars. It can also create opportunities to deny access to unauthorized users. In essence, by controlling access to the school environment, not just the school building, school safety can be increased while the opportunities for unwanted activities and behaviors are diminished.



Image: NJDOT

Creating a Sense of Ownership and Identity



This wall mural at Hawthorne Elementary School in Newark creates a unique visual identity for the school community.

Schools have an identity created by the students, faculty, staff and surrounding community. CPTED practices encourage this community identity to be physically expressed and present in the landscape through clear signage, clear boundaries and other indicators of territorial ownership. In other words, CPTED recognizes the potential to augment safety and discourage crime by clearly marking the school community's territory. The consistent use of colors or materials, in buildings, paved surfaces, light fixtures, and landscaping, can be used to create an identity. This sends the message that the school is a place with an identity, an active community, and a purpose, reducing the likelihood of vandalism and incivility within the school environment.

Application of CPTED to Common Environmental Elements

In broad terms, most of our school environments are composed of a number of similar elements: a school building; a series of pedestrian access elements (including sidewalks, pathways, stairways, and ramps); a series of vehicular access elements (including driving lanes, parking lots, emergency lanes, and delivery access); a schoolyard (consisting of recreational facilities and gathering spaces defined by topography, trees, shrubbery, benches, fences, and retaining walls); and signage that tells users and visitors the accepted ways to move through and use this combination of elements. These physical elements are at work creating the overall school environment at day and night, on weekdays and weekends, in summer and during the school year. The following list considers such elements from the perspective of CPTED, in which the design and configuration of these elements can be employed to reduce the likelihood of crime while enhancing safety and school identity.

Pedestrian and Bicycle Access

Walking and bicycling should be a viable means of transportation for students in a range of settings: urban, suburban or rural. This means that schools must understand the pedestrian and bicycle networks that lead to their doors in a manner consistent with CPTED principles. In urban settings, students using these means of travel will likely access their school building from the street or sidewalk. Bicycle lanes and sidewalks should maintain high levels of visibility and clear sightlines and should be well-signed, well-lit, and well-maintained (free from cracks, debris, trash, puddles, and other obstacles). In more rural and suburban settings, the schoolyard may cover several acres and adjoin many other parcels of land, from which potential pedestrian and bicycle paths may have access. To encourage pedestrian and bicycle travel to and from the school, it is important to maintain these access points. The schoolyard, however, should not become a through-way for pedestrian and bicycle travelers not affiliated with or approved by the school. Pedestrian and bicycle access points should be clearly marked as part of the school territory.



Poor example: The slope in front of this school does little to control or enhance pedestrian access. As a result, it becomes both a safety concern (for the potential to slip and fall) as well as a maintenance concern (for the potential to track mud into the school).



Good example: The system of retaining walls, stairs, and ramps creates clearly defined access for pedestrians, allowing them to move safely, efficiently, and cleanly.

Vehicular Access

Cars, trucks, and buses that enter the school environment should be visible to school administrative personnel when school is in session and the building is accessible. This means that vehicular access is likely to be limited and placed within the view of the school office. The number and size of driveways should be limited and sidewalks should continue across driveway aprons.

Trees and Shrubbery

Trees and shrubs are an important part of the school site, contributing to environmental quality in a number of ways such as reducing air and noise pollution, providing protection from the rain and sun, and encouraging wildlife and plant diversity. Trees also create safer walking environments by forming and framing visual walls and by providing distinct edges to sidewalks and streets. In consideration of CPTED, trees and shrubbery should be employed to create spatial boundaries for the school site without inadvertently creating hiding spaces or limiting sightlines. For instance, a line of trees or a low hedge can create a spatial boundary at the edge of school property. However, shade trees should be "limbed up" and shrubs should be removed when they have been planted in a way that creates hiding places in the landscape. Weeping-branched trees should be avoided for their natural tendency to create a hiding space.



Poor example: The shrubbery adjacent to this sidewalk is overgrown and blocks this student's view into the schoolyard.



Good example: The trees along the left-hand side of this sidewalk create a visual boundary between the sidewalk and the road. The tree canopy is maintained high enough that eye-level views are not impeded.

Topography

Topography, or the act of grading the land to a desired configuration, is a part of most construction processes that relate to building schools, recreational, and transportation facilities. Therefore, the manipulation of topography in consideration of CPTED would prioritize the creation of clear sightlines and perimeter boundaries, while eliminating the potential for hiding spaces.



Poor example: The sightlines of these two students from the sidewalk to the schoolyard are blocked by the height of the grassy slope.



Good example: This configuration creates a clear site line from the sidewalk to the school entrance.

Fencing

Fencing can be used to define the spatial boundary of the school site, to control access, and to guide school users to a desired point of entry. However, fencing school property in such a way that prohibits the public from accessing outdoor school facilities like ball fields, walking tracks or playgrounds may be detrimental to the health of local residents. Fencing is available in a wide variety of materials and colors and should maintain a high level of visibility, clearly delineate school boundaries, and physically express the presence of the school community. Solid stockade or wall-style fencing should be avoided in favor of more permeable styles like wrought iron or chain link. Long stretches of fencing should be addressed from an aesthetic perspective to avoid creating the impression of the school building as a prison-like facility or as a fortress intended to keep community members out.



Poor example: Although this chain link fencing is visually permeable, the unfortunate side effect of its height, configuration, and barbed wire holders is an impression of the school as a prison-like facility.



Good example: This painted aluminum fencing mounted on brick piers is both visually permeable and visually appealing. Its integration with the school's sign helps to underscore the importance of the school as an institution and a community.

SHARED USE AGREEMENTS

The SRTS National Partnership encourages school districts and local government entities to utilize shared-use agreements (SUA) to set forth the terms and conditions for the shared-use of school property after regular hours. With SUA schools can continue to provide students and the local community with the facilities needed to maintain active and healthy lifestyles, while minimizing concerns about costs, vandalism, security, maintenance, and liability. For more on SUA, visit www.saferoutespartnership.org/state/bestpractices/shareduse

Lighting

Lighting is widely perceived to create a safe environment out of a dangerous one. Lighting improves the ability to observe activity and identify individuals as well as the ability to survey one's surroundings. However, the provision of lighting in a school environment when school activities are not in session may attract unauthorized users. Therefore, it may be wise to employ motion-sensitive technology in lighting the school grounds. Motion-sensitive lighting around the school environment would achieve the following: the dark environment would discourage unauthorized nighttime usage; authorized users would be provided with sufficient light as a result of their movement; and unauthorized users would be highly detectable as a result of their movement.

Maintenance

Proper maintenance is a sign of guardianship and territoriality which reinforces community identity. By properly maintaining the school environment through mowing and edging; removal of dead trees, trash, and debris; and upkeep of fences, benches, and painted, paved, and mulched surfaces, the school will be less likely to incur vandalism and other unwanted activities. Graffiti should always be removed in a timely manner to discourage further incidents. Well-maintained trees and landscape will create a pleasant environment, including the environmental benefits of cooling shade, progressive storm-water management and inviting outdoor spaces. Well-maintained sidewalks and bicycle routes will also encourage walking and bicycling.



Poor example: This poorly maintained sidewalk is a hazardous impediment for pedestrians and is likely impassable for a wheelchair. It sends the message that this space is not cared for.



Good example: This well-maintained sidewalk, which shows a recent repair, is safe for passage on foot or in a wheelchair. It sends the message that this space is highly cared for.

Signs

Signs are an excellent tool for communication. From signs, we learn how to navigate spaces ("SLOW DOWN") and how to behave culturally ("NO TALKING IN THE LIBRARY"). We learn where things are located, who is in charge of them and what type of environment we are in. Signs around schools, therefore, represent a major opportunity not only to control access and direct arrivals, but to communicate territoriality and community values. Signs around the school should be clear and coherent: they are a profound visual cue that can be used to encourage a safe environment.



These signs clearly identify Ivy Hill Elementary School in Newark.



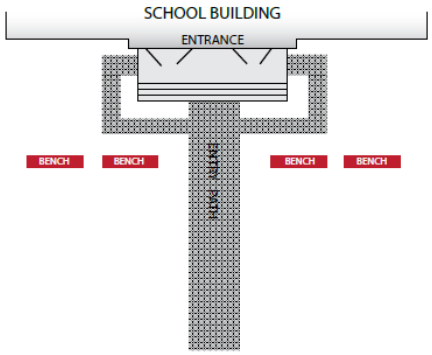
This 'Safe Corridor' sign in Camden expresses the importance of keeping children safe as they make their way to and from school.



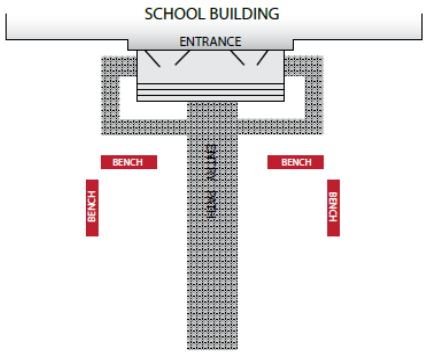
The signs placed on this school building in Montclair communicate a set of values associated with the school building.

Gathering Space

The more eyes there are on the environment, the more likely people will feel safe walking and bicycling. By creating outside gathering spaces that encourage interaction, people are more likely to be engaged in the outdoor environment, reducing the threat of crime. A simple consideration of this point is the way that benches can be arranged in outdoor spaces. A linear bench arrangement encourages solitude rather than interaction. In contrast, a pair of benches positioned at a 90-degree angled to each other creates a space for interaction.



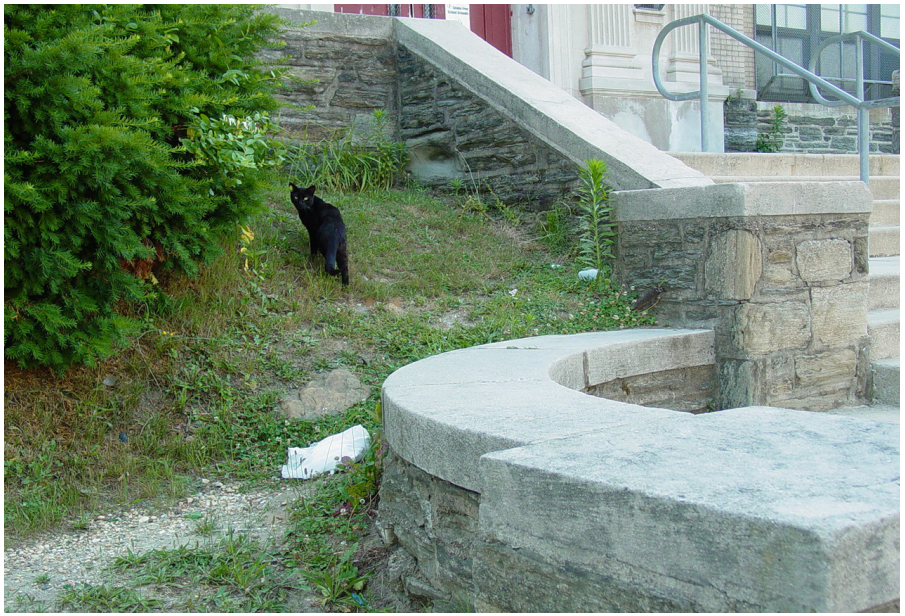
Poor example: The benches in this diagram are placed in a parallel configuration. This does not encourage interaction and it is likely that the benches will see little use.



Good example: The benches in this diagram are opposed in a perpendicular relationship. This configuration forms a space which encourages interaction. These benches are likely to be used by students, energizing the space and the schoolyard, and increasing safety through "eyes on the street."

Activity Space

One of the most effective ways to prevent crime is to encourage, support and engage in positive activity. At its best, the school is a place for safe and positive activity, including organized and pick-up sports, school gardening programs, arts and crafts programs, and music and theater performances. By creating an environment in which such activities take place, the likelihood of crime is likely to decrease.



Poor example: This space adjacent to a school building shows signs of wear and offers little in the way of positive activity.



Good example: This space adjacent to a school building shows signs of care and creates the opportunity for positive activity.

RESOURCES

For more information on CPTED, please review the following sources:
National Crime Prevention Council: https://www.ncpc.org/
National Clearinghouse for Educational Facilities: https://safesupportivelearning.ed.gov/resources/american-clearinghouse-educational-facilities
National Institute of Justice Research Report, Physical Environment and Crime, by Ralph B. Taylor and Adele V. Harrell, https://www.ojp.gov/pdffiles/physenv.pdf
Centers for Disease Control and Prevention: https://www.cdc.gov/

14 Schools Near Railroad Crossings

There are over 1,000 miles of light and commuter railroad tracks and 2,400 miles of freight railroad tracks crisscrossing New Jersey. These tracks run throughout the state, in major cities, small towns, residential and commercial areas and near parks and schools. Almost 44% of the 3,765 schools in New Jersey are located within a half mile of either active freight or passenger rail. Many students attending the 1,644 schools located within a half mile of an active rail line must cross rail tracks while walking or bicycling to and from school.

Common Issues at Railroad Crossings

Common issues at railroad-highway grade crossings include:[1]

1. Bicyclists, wheelchair users, caregivers pushing strollers, and others that "roll" may catch a wheel in the flangeway gap if the crossing is not perpendicular to the roadway (Note: While not indicated in the graphic to the right, bicycle and wheelchair tires may get caught in flangeway gap, especially at skewed crossings.)
2. Limited sightlines and visibility may not allow pedestrians and other vulnerable road users to see approaching trains.
3. Crossing gates for vulnerable road users may not be provided resulting in illegal crossings across tracks and roadways.

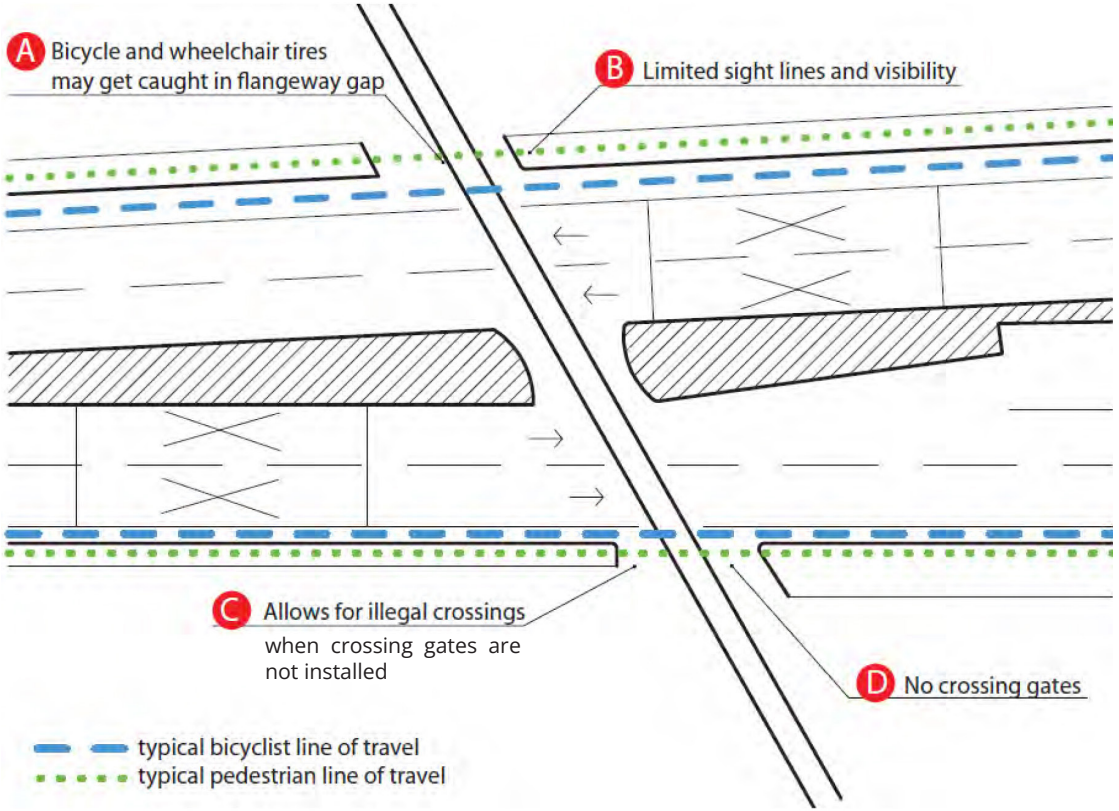


Image: Modified from Caltrans, Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians

[1] California Department of Transportation (Caltrans), Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians (2010).

Safety at Highway-Grade Pedestrian Crossings

A wide variety of passive and active devices may be used to supplement highway-related active control devices to improve pedestrian and bicyclist safety at highway-rail crossings. All pedestrian and bicyclist facilities should be designed to minimize crossing time, and devices should be designed to avoid trapping pedestrians and bicyclists between sets of tracks. The following devices should be considered at crossings within school zones as well as areas with high pedestrian traffic volumes, high train speeds, frequent rail service, extremely wide crossings, complex highway-rail grade crossing geometry, inadequate sight distance, and/or multiple tracks.

Passive Traffic Control Devices

Passive traffic control devices do not indicate the approach or presence of a train. Rather, their purpose is to identify and direct attention to the location of a crossing and provide static messages of warning or guidance to permit drivers and pedestrians to take appropriate action. Passive traffic control devices consist of regulatory signs, warning signs, guide signs, and supplemental pavement markings.

Passive devices include:

- **Sidewalks** should lead pedestrians to desired crossing locations at designated railroad crossings. Lack of sidewalks at rail crossings can be hazardous to pedestrians. This often results in pedestrians either walking over the rails outside the paved crossing, which could result in tripping, or walking in the roadway which presents the risk of collision with roadway traffic.
- **Fencing** and other barrier materials, such as landscaping, are recommended by the Federal Railroad Administration (FRA) to funnel pedestrian traffic to the desired crossing point where grade crossing warning devices are located.



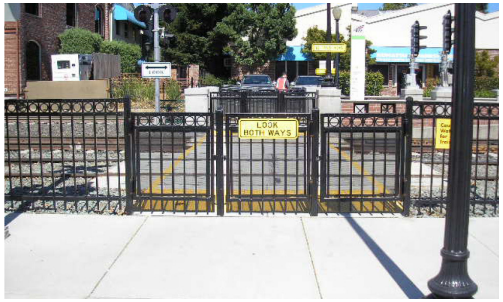
Fencing at NJ TRANSIT's Aberdeen Matawan Station.



Example of a clear, concise warning message communicated by this pavement marking. Image: FRA, Guidance on Pedestrian Safety at or Near Passenger Stations

- **Pavement markings** can be used effectively to remind pedestrians of the need to be aware of trains approaching on any track and in either direction. When pavement marking messages are used, FRA recommends that the pavement marking should extend the full width of the pathway or sidewalk, so as to maximize the conspicuity and applicability of the warning message.

- **Swing gates** (sometimes used in conjunction with flashing lights and bells) alert pedestrians to the tracks they will cross and force them to pause. Swing gates deter people from continuing unimpeded across the tracks without unduly restricting their ability to exit from the railroad right-of-way. The swing gate requires pedestrians to pull the gate to enter the crossing and push the gate to exit the protected track area; therefore, a pedestrian cannot physically cross the track area without pulling and opening the gate. It is recommended that the gates be designed to return to the closed position after the pedestrian has passed. Swing gates should be supplemented with proper signage mounted on or near the gates.

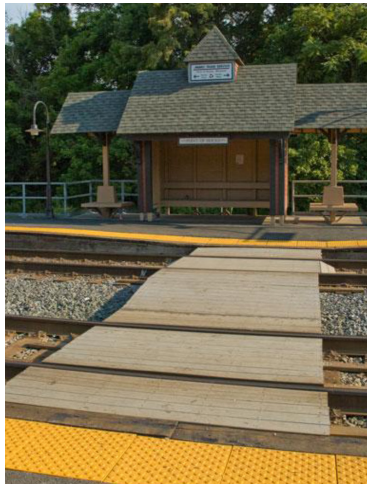


Example of a swing gate. Image: California Public Utilities Commission, Pedestrian-Rail Crossings In California



An emergency exit swing gate is used in conjunction with an automatic pedestrian gate. It is designated for use only as an escape route for a pedestrian that remains between the track and a lowered automatic pedestrian gate. Image: FHWA

- **Detectable warning surfaces** consisting of raised, truncated domes in a square or radial grid pattern, compliant with the Accessible Design Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) Section R305, should be installed at pedestrian crossings on either side of the tracks to indicate when pedestrians enter and exit the track area. Detectable warning surfaces placed in advance of the crossing provide warning to individuals with visual impairments of the presence of the crossing. Detectable warnings should extend 24 inches in the direction of travel, and cover the full width of the designated pedestrian pathway. (See PROWAG R305: Detectable Warning Surfaces)



Example of visually contrasting surface materials at a pedestrian crossing. Image: FRA, Guidance on Pedestrian Safety at or Near Passenger Stations

- **Standard Signs** notify pedestrians and bicyclists of regulations and provide warning and needed guidance at crossings. According to the MUTCD, the minimum mounting height for post-mounted signs adjacent to pathways and sidewalks should be 4 feet, measured vertically from the bottom of the sign to the elevation of the near edge of the pathway or sidewalk surface (Section 8E.03). At light rail crossings used by school children, NJDOT has installed lowered warning signs (at three and a half feet) along with signs at the regular height. [2]

Examples of MUTCD Standard Signs



R15-1

The Grade Crossing (R15-1) sign, commonly identified as the Crossbuck sign, requires road users to yield the right-of-way to rail traffic at a grade crossing. At a minimum, one Crossbuck sign shall be used on each approach to every highway-rail grade crossing, alone or in combination with other traffic control devices.



R15-2P

If automatic gates are not present and if there are two or more tracks at a grade crossing, the number of tracks shall be indicated on a supplemental Number of Tracks (R15-2P) plaque.



R15-8

At grade crossings, the LOOK (R15-8) sign may be mounted as a supplemental plaque on the Crossbuck support, or on a separate post in the immediate vicinity of the grade crossing on the railroad or light rail track (LRT) right-of-way.

[2] Metaxatos, P., & Sriraj, P. S. (2013). Pedestrian/bicyclist warning devices and signs at highway-rail and pathway-rail grade crossings. Informally published manuscript, University of Illinois, Chicago, IL, Retrieved from www.utc.uic.edu/research/projects/GradeCrossingSafety.html

- **Nonstandard Signs –** There is a wide variety of nonstandard signage in use near stations and along the railroad right of- way. These nonstandard signs are intended to discourage pedestrians from trespassing on the railroad right-of-way, encourage pedestrians to utilize designated crossing points, and warn pedestrians of the possibility that trains may be approaching.



Example of a nonstandard sign in Garfield, NJ. Photo also shows how the sidewalk leads pedestrians up to the designated, desired crossing point.

YOUNGER PEDESTRIANS

Studies have found that younger pedestrians are more likely to pay attention to active signs (flashing lights and gates that activate or change upon the approach or presence of a train)[3] while older pedestrians notice passive signs more frequently (signs, pavement markings and other devices that do not indicate the approach or presence of a train). Another study examining violations at gated highway-rail grade crossings found that children younger than eight years old were more likely to violate gated highway-rail grade crossings and cross in the absence of older children and adults. However, the presence of more people increased the likelihood of a violation for individuals older than eight years old. [4]

[3] Metaxatos, P., & Sriraj, P. S. (2013).Pedestrian/bicyclist warning devices and signs at highway-rail and pathway-rail grade crossings. Informally published manuscript, University of Illinois, Chicago, IL, Retrieved from www.utc.uic.edu/research/projects/GradeCrossingSafety.html

[4] Khattak A., and Z. Luo (2010). Pedestrian and Bicyclist Violations at Highway-Rail Grade Crossings. Transportation Research Board Annual Meeting, Paper 11-1443. https://trid.trb.org/View/1091943

Active Traffic Control Devices

Active traffic control devices inform pedestrians, bicyclists and motorists of the approach or presence of a train. Audible and visual warnings should be used at or near passenger stations, where appropriate, to guide pedestrians to proper crossing points and also to indicate when it is appropriate to cross the tracks in order to get to the correct station platform to board the desired train.

Active devices include:

A **flashing light signal assembly** can be used in conjunction with entry/exit swing gates or alone. An **audible warning device** (mechanical or electronic bell) is required with a flashing light signal assembly warning device. The audible warning device is sounded while the warning device (flashing light signals) is activated to provide notice to pathway users and bicyclists. Flashing-light signals shall operate for at least 20 seconds before the arrival of any rail traffic (MUTCD Section 8E.07).

Figure 8E-7. Example of a Flashing-Light Signal Assembly at a Pathway or Sidewalk Grade Crossing

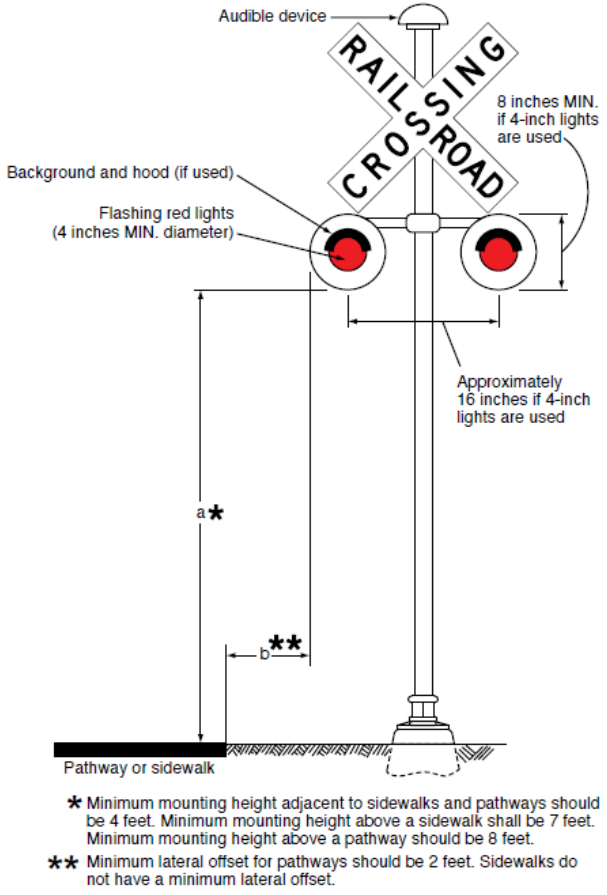


Image: MUTCD 11th Edition

RAILROAD – HIGHWAY ENGINEERING STANDARDS AND GUIDELINES

FHWA's Railroad-Highway Grade Crossing Handbook (2019) provides guidance on pedestrian crossings. Additional guidance is provided by the MUTCD (USDOT/FHWA 2023, Part 8), and Code of Federal Regulations 49. Crosswalk markings at intersections where pedestrians cross LRT tracks in mixed-use alignments are covered by the provisions of MUTCD Chapter 3C rather than by the provisions of Chapter 8. New Jersey follows the MUTCD and FHWA's Railroad-Highway Grade Crossing Handbook for engineering standards and guidelines.

A **pedestrian gate** is an automatic gate that offers an active, positive barrier to discourage pedestrians from entering the rail right-of-way during train movements. When used at pedestrian-rail at-grade crossings, each automatic gate should be approximately three feet above the pathway when in the horizontal position. NJ TRANSIT is currently evaluating the effectiveness of "gate skirts," which create an additional barrier below an activated grade-crossing gate to deter pedestrians from "ducking" under. Gate arms should be fully retro-reflectorized on both sides and should have vertical stripes alternately red and white at 16-inch intervals measured horizontally.

In the normal sequence of operation, unless constant warning time detection or other advanced system requires otherwise, the flashing-light signals and the lights on all vehicle and pedestrian gate arms (in their normal upright positions) shall be activated immediately upon detection of approaching rail traffic. Gate arms shall start their downward motion not less than 3 seconds after the flashing-light signals start to operate, reaching the horizontal position at least five (5) seconds before the arrival of the rail traffic, and shall remain in the down position as long as the rail traffic occupies the grade crossing. When the rail traffic clears the grade crossing, and if no other rail traffic is detected, gate arms shall ascend to the upright position, at which point the flashing-light signals and the lights shall cease operation (MUTCD Section 8D.03).



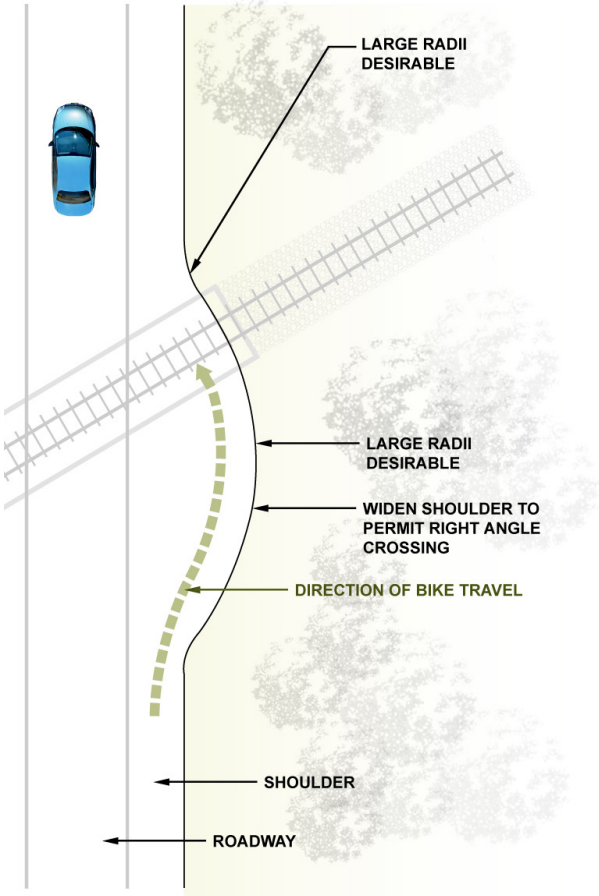
Students waiting behind a pedestrian gate to cross the tracks in Garfield, NJ.



Pedestrian gate with "gate skirt" being tested at the Aberdeen- Matawan Train Station.

Modifying the Intersection

Crossing rail tracks on a bicycle or in a wheelchair can often be tricky, especially with narrow wheels that can get caught between the rails. Bicyclists and pedestrians in wheelchairs can be accommodated at an at-grade railroad crossing by modifying the intersection to provide for a close to 90-degree crossing. This will help keep a front wheel from getting caught in the tracks. This is indicated in the image to the right.





Kansas City has installed signs warning of track hazards. Image: BikeWalkKC.org

Signage at These Intersections

The MUTCD sign that is most appropriate in these instances, W10-12 (shown below), is not directly geared towards bicyclists, pedestrians, and other vulnerable road users. Rather, it warns road users that a rail crossing runs diagonally across the road they are traveling on.

Jurisdictions do create their own warning signs for this purpose, like those from Jersey City shown below, though these signs are not included in the MUTCD.



W10-12

NATIONAL CENTER FOR SRTS POSITION ON RAILROAD CROSSINGS

In keeping with NHTSA and other federal guidelines, the National Center for Safe Routes to School does not advise students to avoid crossing railroad tracks, but recommends that if the need for crossing the tracks does arise, that to the greatest extent possible, the following conditions be met:

1. appropriate at-grade crossings are implemented in accordance with relevant federal, state, and local guidelines;
2. appropriate supplemental safety devices (e.g., pedestrian signals, pavement markings) be incorporated into the project; and
3. that children be accompanied by a responsible adult and use extreme caution when traveling over such areas.





Signs located along Jersey Avenue in Jersey City, NJ where the Hudson-Bergen Light Rail tracks diagonally intersect with the street. Image: Google Maps Street View

How are recommendations for pedestrian and bicyclist safety improvements made?

The appropriate traffic control system to be used at a pedestrian-rail at-grade crossing should be determined by an engineering study performed by a diagnostic team. The diagnostic team should include representatives from the railroad companies, the roadway authority, and the regulatory authority (state and/or federal). In general, the railroad is responsible for the crossbucks, flashing light signals, and gate mechanisms and the roadway authority is responsible for all advance warning signals and markings, and other supplemental signs.

Diagnostic teams are typically convened when:

- There has been a federal or state grant allocated,
- There are proposed or imminent changes to the physical or operating characteristics of the railroad or roadway,
- There have been complaints/requests for safety evaluations (railroad, local agencies, school districts, citizens), or
- It has been recommended by routine inspections.

Criteria used to select warning devices

There is no commonly accepted method to quantify the risk to a pedestrian of being struck by a train at a highway-rail crossing with pedestrian access. However, the Federal Railroad Administration promotes utilizing a risk-based analysis approach.[5] This means looking for potential hazards or undesired events that may involve pedestrians walking in or near passenger rail stations. Hazard identification is a "What if?" activity that looks for potential causes and results of incidents.

The hazard management team "brainstorms" to come up with as many credible hazards as possible for use in a risk-based hazard analysis. The multidisciplinary team should consider the physical characteristics of the station area and associated walking paths in or near the station when identifying these hazards. This includes pedestrian attractors. Destinations include schools, train stations, bus stops, retail commercial centers, and residential communities. Planned development and zoning should be considered as indicators of future pedestrian activity with special consideration to accessibility needs for individuals with disabilities.

Criteria for selecting warning devices are usually determined on a case-by-case basis. In New Jersey, the diagnostic review process examines several criteria to determine the need for safety upgrades including:[6]

- Train speed;
- Number of trains;
- Frequency of trains;
- Railroad traffic patterns;
- Surface conditions;
- Pedestrian volumes;
- Proximity to schools;
- Sight distance for pedestrians approaching the crossing;
- Pedestrian collision experience at the crossing;
- Skew angle of the crossing relative to the railroad tracks; and
- Surrounding land use.

5 USDOT FRA (2012). Guidance on Pedestrian Crossing Safety at or Near Passenger Stations.
6 Metaxatos, P., & Sriraj, P. S. (2013). Pedestrian/bicyclist warning devices and signs at highway-rail and pathway-rail grade crossings. Informally published manuscript, University of Illinois, Chicago, IL, Retrieved from www.utc.uic.edu/research/ projects/GradeCrossingSafety.html

RESOURCES: RAIL SAFETY EDUCATION PROGRAMS

Operation Lifesaver

Operation Lifesaver is a non-profit, international, public education program. Educational brochures and videos, coloring books for children and other materials are available on the Operation Lifesaver Web site. In addition, every state has an Operation Lifesaver coordinator who can provide information about highway-rail grade crossing safety and trespass prevention activities, including scheduling a free safety presentation at your school. If you are interested in arranging a presentation, please visit Operation Lifesaver's Web site at https://oli.org/site/nj/about-nj-ol



NJ TRANSIT Safety Education Program

Schools and community groups can take advantage of NJ TRANSIT's free statewide safety education presentations for all age groups. High school driver education teachers can request a free program package for the classroom developed to help teen motorists safely share the road with trains, buses and light rail. Contact the NJ TRANSIT Safety Education Program to learn more about the program. E mail safety@njtransit.com or visit https://www.njtransit.com/safety-education-program

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15 Schools Near Highway Ramps

Highway ramps are locations where motor vehicles enter or exit a limited-access roadway from a secondary roadway. Ramps are often designed to encourage high-speed, free-flow turning movements and can be a major barrier to providing safe pedestrian and bicycle access along the secondary or local roadway. Other types of roadway approaches that present challenges to pedestrians and bicyclists similar to those posed by ramps include traffic circles, right-turn slip lanes or triangular "pork-chop islands" and "jug handles." The design treatments presented in this chapter can be utilized to address safety hazards associated with ramps as well as other types of roadway links that carry traffic, often at higher speeds, between intersecting roadways.

Common Issues at Highway Ramps

Ramps are in effect intersections that pose threats to pedestrians and cyclists similar to 'at-grade' intersections. They can be dangerous places for pedestrians and bicyclists to travel, especially in places where the motorized traffic travels at high speeds or when the crossing is wide and unprotected. Even highly skilled pedestrians and bicyclists can find that negotiating high-speed, free-flow jug handle locations and ramps is challenging. Less experienced pedestrians and bicyclists, such as children, may face particular difficulty. More than 10% of New Jersey schools are located within 1,000 feet of a highway entrance or exit ramp.



The crosswalks are unmarked and curb ramps absent at this ramp, located one block from an elementary school in Camden. Image: Cambridge Systematics

TERRELL JAMES' LAW

A856, signed into law on January 13, 2008, as P.L. 2007, Chapter 308, prohibits construction of a highway entry or exit ramp within 1,000 feet of a school, grades kindergarten through 12, or construction of a school within 1,000 feet of a highway ramp, unless there is no "feasible or prudent alternative." The regulation is named "Terrell James' Law," in memory of an 8-year-old who was hit and killed by a motor vehicle in 1997 in front of his elementary school which was located near a playground and two highway ramps in Newark, NJ.

Common issues at highway on- and off-ramps include:[2]

1. Poor sight distance often exists due to an acute intersecting angle that leads drivers to focus primarily on other motor vehicle traffic, as well as other factors such as the placement of guide rails, poles and signal boxes and overgrown vegetation.
2. Crosswalks are not usually marked across ramps.
3. Ramp traffic is not controlled, and motorists traveling at high speed are not likely to yield to bicyclists or pedestrians.
4. If the outside lane or shoulder is not wide enough, bicycle facilities are often not provided through an interchange area.
5. Bicyclists may not use the best travel path when navigating through the intersection.
6. Bicyclists must weave through free-flow turning traffic traveling at a much higher speed. This interaction is exacerbated with multi-lane ramps.
7. Sidewalks are sometimes not provided or only provided on one side of a crossroad.
8. Common issues associated with multi-lane free-flow on- and off-ramps:
   - Motor vehicles travel at high speeds, resulting in a large speed differential with pedestrians and bicyclists.
   - With multi-lane ramps and lanes with dual destinations, pedestrians and bicyclists have difficulty judging when a vehicle in the inside lane will be turning or traveling straight.

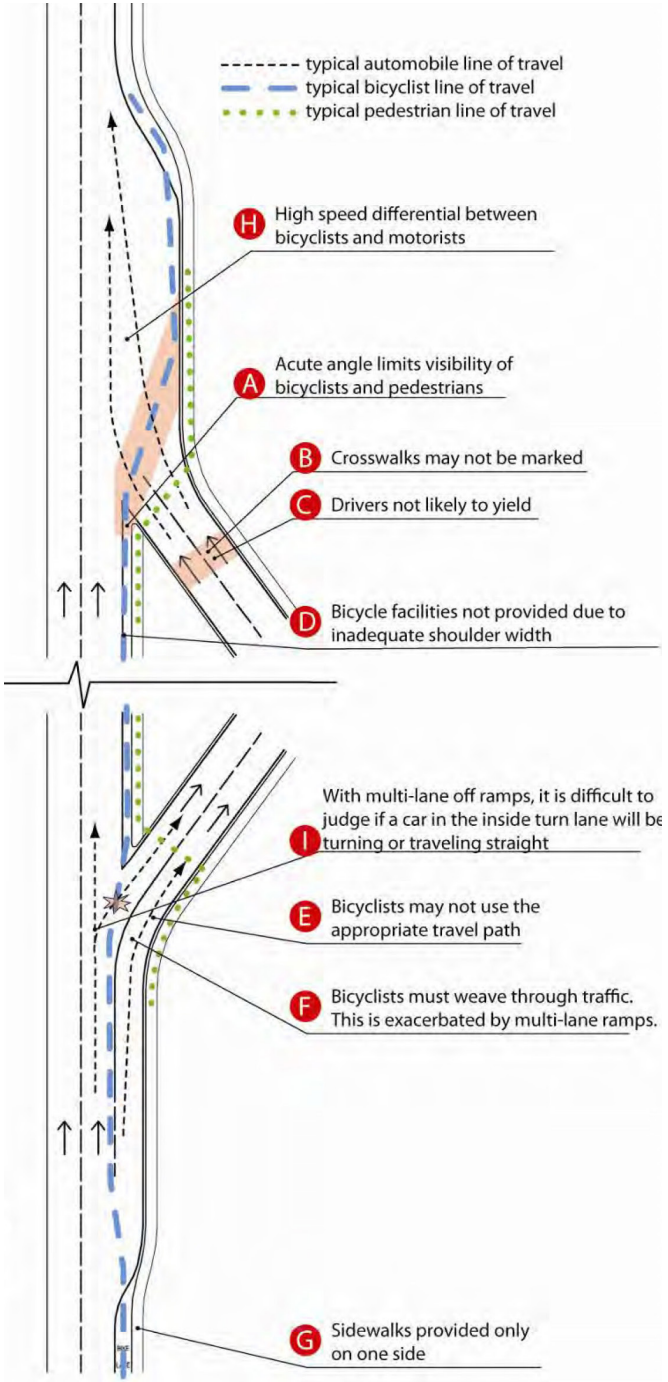


Image: Caltrans

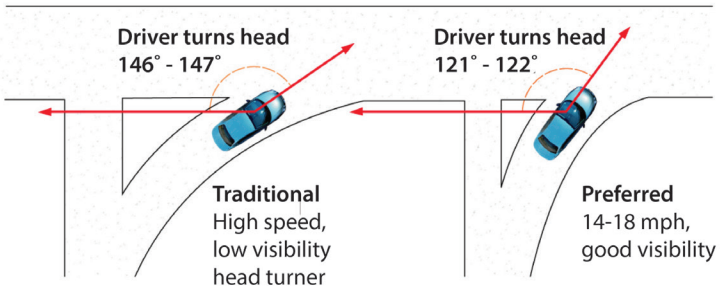
[2] Common issues based on Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians, 2010 by Caltrans. https://dot.ca.gov/-/media/dot-media/programs/safety-programs/documents/ped-bike/f0018151-intersection-guide-bicycles-pedestrians-a11y.pdf

Design Features that Improve Safety at Highway Ramps

Many of the safety issues in the vicinity of highway ramps and schools in New Jersey can be resolved or lessened by implementing design features that reduce vehicular travel speeds, improve visibility and reduce pedestrian exposure to vehicular traffic.

Methods to reduce vehicular travel speeds include:

- reconfiguring the ramp intersection (eliminating free-flow ramps or modifying the ramps to intersect the crossroad at or close to a 90-degree angle);
- designing the exits for 20 mph at the ramp and street intersection in urban situations;
- adding traffic-calming configurations, such as reduced curb radii and adding landscaping features; and
- adding rumble strips on the off-ramp reminds drivers through sound and physical vibration how fast they are traveling and the need to slow down.



Designing right turn slip lanes with tighter angles reduces vehicular travel speeds and improves visibility.

Design features that improve visibility include:

- striping high-visibility crosswalks where ramps intersect with local roads;
- utilizing reflective or illuminated pavement markings;
- installing pedestrian scale lighting, warning signs and pedestrian-actuated beacons;
- placing a crossing guard at the location during school hours; and
- at traffic signals, restrict right turns on red (RTOR), and implement leading "head start" intervals for pedestrians and bicycles

Reduce potential for conflicts between pedestrians/bicyclists and vehicles:

- constructing physically separated facilities such as sidewalks, raised medians, refuge islands, and off-road paths and trails; and
- reducing the width of the traveled way (narrow lanes, use only single right-turn lanes).



Seattle DOT installed a refuge median and curb extension at this right turn lane which narrows the travel way and forces motorists to slow down. Image: SeattleBikeBlog.com

SPOTLIGHT: SPEEDWAY ELEMENTARY SCHOOL IN NEWARK, NJ

Opened in 2010, the new Speedway Elementary School (named after its former home on Speedway Avenue) was built at the intersection of two busy roads, South Orange Avenue and Oraton Parkway, near ramps for the Garden State Parkway. Initial plans for the school included a pedestrian bridge across South Orange Avenue to help students safely cross to Vailsburg Park for recess, but the cost of the bridge, as well as Green Acres regulations, prevented the bridge from being built.

In the long run, more active traffic-calming measures are the ideal solution. In the short term, parents and members of the Safe Streets, Safe Kids coalition worked with: Speedway administrators to develop a safety plan; with the City to ensure that crossing guards will be present; and with county freeholders on basic infrastructure improvements, such as additional signage and high-visibility crosswalks.



The aerial shows the location of the Speedway School in relation to South Orange Avenue, Oraton Parkway and the Garden State Parkway. Image: Google



High-visibility crosswalks have been installed in the area. In addition, there is no right turn on red (RTOR) allowed from South Orange Avenue to Oraton Parkway. Image: Google Street View



A crossing guard has been stationed at the intersection of South Orange Avenue and Oraton Parkway.



New signs have been installed along South Orange Avenue.

Best Practice: Right Angle Intersections

Unless unusual circumstances exist, in urban and suburban environments, and other areas where significant numbers of pedestrians are expected or desired, free-flow turning movements should be avoided. Instead, right-angled intersections should be constructed where the exit or entrance ramp meets the cross street. The intersection should also be controlled by a stop sign or signal.

These characteristics cause motorists to at least slow down before turning, increasing the likelihood that they will see and stop for pedestrians and bicyclists. If an impact occurs, severity is lessened because of slower vehicular speeds.



This high-speed ramp has been replaced with a 90-degree intersection. Image: California Department of Transportation

In addition, perpendicular intersections usually result in shorter crosswalks, helping reduce the amount of time pedestrians need to cross active travel lanes.

NJDOT Roadway Design Manual

The NJDOT Roadway Design Manual sets the standard for state roadway design, and is frequently adopted as the de facto standard by county and local governments. Section 7 of the Manual addresses interchanges. The guidelines for interchange ramps (Sec. 7.04.5) include recommendations that consider the needs of pedestrians.

In the Ramps subsection titled "Location of Ramp Intersection on Cross Road," the Manual recommends avoiding sharp curves where an off ramp terminal intersects the local street and recommends that it "is often better to provide a near 90 degree intersection with stop sign control."

This recommendation agrees with the best practice to use stop signs or signals at ramp terminals and for ramp terminals to intersect local roads at right angles.

The NJDOT Roadway Design Manual is available at https://dot.nj.gov transportation/eng/documents/RDM/

RESOURCES

AASHTO's 2024, *Guide for the Development of Bicycle Facilities, 5th Edition, and 2004, Guide for the Planning, Design, and Operation of Pedestrian Facilities, 5th Edition*

FHWA, 2023, *Manual on Uniform Traffic Control Devices for Streets and Highways 11th Edition* https://mutcd.fhwa.dot.gov/kno_11th_Edition.htm

FHWA, 2006, *Federal Highway Administration University Course on Bicycle and Pedestrian Transportation.* https://www.fhwa.dot.gov/publications/research/safety/pedbike/05085/

TCRP, 2006, I*mproving Pedestrian Safety at Unsignalized Crossings*, TCRP Report 112/ National Cooperative Highway Research Program (NCHRP) Report 562, https://walkinginfo.org/onlinepubs/nchrp/nchrp_rpt_562.pdf

California Dept. of Transportation, 2010, *Common issues based on Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians.* https://dot.ca.gov/-/media/dot-media/programs/safety-programs/documents/ped-bike/f0018151-intersection-guide-bicycles-pedestrians-a11y.pdf

16 Maintenance and Other Improvements

Proper maintenance is essential to promote user safety, to ensure ease of access, and to encourage the use of a designated route, especially in school zones.

Why is maintenance important?

All facilities require regular maintenance to reduce the damage caused over time by the effects of weather and use. However, many maintenance issues can be reduced if properly addressed in the planning and design phases before construction even begins. It is recommended that an overall plan/schedule for the continued maintenance, repair and replacement of pedestrian and bicyclist safety related infrastructure along school walking routes and within school zones be developed, adopted and implemented. The plan should include criteria and guidelines for the maintenance of pedestrian and bicyclist-related facilities, such as sidewalks, crosswalks, bicycle lanes, shoulders, signs, signals, lighting, storm drains and multi-use paths. The extent and frequency of maintenance schedules will vary greatly depending on the location, amount of use, and resources available.

The plan should clearly specify the frequency of maintenance activities and how reported maintenance concerns will be addressed. The development of the plan should be coordinated between the Departments of Public Works, Engineering and Planning, the School District, and the agencies that have jurisdiction over the rights-of-way included within the school zone.



Installing high-visibility crosswalks in Hoboken, NJ.

AMERICANS WITH DISABILITIES ACT (ADA)

ADA/Accessible designs must be regularly maintained and should not be neglected or allowed to degrade to a condition where they cannot be used or must be avoided during travel. State and local government facilities should follow requirements of the 2010 ADA Standards for Accessible Design. This manual addresses sidewalks, walkways, and other pedestrian transportation routes that are located within a public right-of-way. Accessibility requirements for pedestrian facilities within the public right-of-way are also addressed in the U.S Access Board's Accessible Design Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG). The 2010 ADA Standards for Accessible Design require, to the maximum extent possible, that newly designed and constructed or altered State and local government facilities must:

- Provide a continuous, unobstructed path of travel that is accessible to and usable by individuals with disabilities.
- Maintain accessible routes from the public street, sidewalk and public transportation stops to the accessible building or facility entrance they serve.
- Keep walking surfaces cleared (of snow and any obstructions) to a minimum width of 36 inches.

Roadway Maintenance

In general, the school district is responsible for providing ongoing maintenance of pedestrian and bicycle facilities and traffic control elements on the school site; public and private property owners are typically responsible for repairs and reconstruction of the sidewalk within the street right-of-way adjacent to their property; local jurisdictions are responsible for maintaining facilities and traffic control elements at intersections and mid-block crossings; and the governmental entity with authority over the roadway is responsible for maintaining the roadway.

Elements that affect pedestrian and bicyclist travel to school should be inspected annually. Assessments should also be completed after a catastrophic event, such as a flood or storm.

This includes making sure:

- Signs are legible and information is current. Signs should be removed or replaced when messages are no longer needed, the content of the information has changed, or schools' walking routes or traffic patterns have changed. For example, all in-street crosswalk signs at mid-block crosswalks should reflect the State's Stop for Pedestrians law. Any remaining signs informing motorists to Yield to Pedestrians should be replaced.
- Traffic control devices, signals and lighting fixtures are functioning and meet current standards and guidelines.
- Pavement markings and crosswalks are clearly visible. Installing stencils with thermoplastic may cost more initially, but these materials will last longer than paint and reduce long-term maintenance costs. In addition, thermoplastic is less slippery than paint when wet.
- Sidewalks are smooth and in good repair. Concrete is more expensive than asphalt to install but it lasts longer and requires less maintenance, which may make it a better value in the long run.
- Landscaping and vegetation are not impeding pedestrian use and/or obstructing a pedestrian's or a driver's view.
- Roadway shoulders are clear of debris and potholes.
- Storm grates are removing stormwater run-off from streets, in good working order, flush with the pavement, and are bicycle safe, with openings small enough to prevent a bicycle wheel from falling into the slots of the grate.



Example 1: Pavement Marking Maintenance



Example 2: Sidewalk Maintenance



Example 3: Sidewalk Vegetation Maintenance

How should roadway and sidewalk conditions be assessed?

Each municipality should have a current inventory and condition assessment of its roadways and sidewalks including information on the location of various deficiencies. Development of an inventory requires coordination with the County and State Departments of Transportation. This inventory can be used to set priorities for repair and replacement along with associated costs for budgeting and funding purposes.

In order to maintain accessible conditions, current and potential problems must be identified through an objective assessment process. There are many methods available for identifying maintenance needs on existing sidewalks. For example:

- larger municipalities may devote a branch of their public works department to sidewalk evaluation and roadway maintenance;
- a municipality may establish an improvement program that identifies sites requiring improvements, access or maintenance; and
- residents and visitors may identify and report maintenance problems.

COLLABORATIVE APPROACHES TO REPORTING NEIGHBORHOOD ISSUES

For a maintenance program to be effective, it must identify all conditions that can impede pedestrian access or diminish safety and quickly respond with repairs. Residents living in an area can often identify issues more rapidly than a centralized agency. The following techniques have been used successfully by a variety of municipalities to obtain maintenance input from users:

- SeeClickFix.com - SeeClickFix allows anyone to file a public report online or via a mobile phone. The issue is then available for public view, comment and resolution. This enables citizens, community groups, media organizations and governments to take care of and improve their neighborhoods. Government entities responsible for the public space become more accountable to the public by acknowledging problems and providing effective communication about solutions.
- Non-Emergency System Call Centers - Operated by the municipality (public works, independent service agency, etc.) to field “city service” calls such as potholes, graffiti removal, fallen trees, broken street lights or disabled traffic signals, etc. These systems are in place in Chicago, New York, Houston and Dallas. These are often accessible by dialing “311”; however, jurisdictions such as Jersey City have their own website and phone number. Jersey City’s service is called the “Resident Response Center”, and functions like 311 systems found in other cities. More information can be found here: https://www.jerseycitynj.gov/residentresources/rrc
- Online Forms – Many jurisdictions throughout the state have forms on their websites that allow residents to report roadway maintenance issues. For example, potholes, tall grass, and other maintenance concerns on a state highway can be reported to NJDOT through the Department’s website, https://www.njdotproblemreporting.nj.gov/
- Hotlines – All 21 counties in New Jersey have a number that residents can call to report issues on county routes. The phone numbers are available at www.state.nj.us/transportation/commuter/potholecounty.shtm

Who is responsible for sidewalk construction and maintenance in New Jersey?

The following information on sidewalk construction and maintenance comes from a 2006 report[1], Constructing, Maintaining and Financing Sidewalks in New Jersey, prepared by the Voorhees Transportation Center for the New Jersey Department of Transportation.

Sidewalk Management

Sidewalks provide an essential environment for safe, independent mobility, especially for children. However, sidewalks are a complicated issue due to multiple jurisdictions (local, county, and state), ambiguous responsibility for construction, reconstruction and maintenance, and contested liability. For sidewalks to be effectively maintained and properly repaired, responsibility for sidewalk management activities needs to be defined. Conversely, most of the problems involving sidewalk management result from ambiguity over responsibility or the lack of a responsible party. This combination of factors has led to a fragmented sidewalk network in New Jersey.

Sidewalk Maintenance

Municipalities play the most important role in assuring that sidewalks are constructed, inspected, properly maintained and repaired or reconstructed when needed. Chapter 65 of Title 40 provides the broad structure for sidewalk law in New Jersey; N.J.S.A. 40:65-1 gives municipalities the authority to adopt ordinances providing for sidewalk improvements and repairs such as construction, paving, and curbing.

This statute states that this work may be funded and performed by:

- the municipality;
- the adjacent property owner; or
- the municipality and the adjacent property owner.

The statute also authorizes municipalities to adopt standards for sidewalk construction and to inspect sidewalks. The law is worded to allow municipal construction, repair and improvement of sidewalks along all highways, whether the highway is a municipal street or a county or state highway.



Sidewalk closed for repairs. Image: VTC



Example of a discontinuous sidewalk.

The statute requires that municipalities secure county approval prior to constructing a sidewalk along a county highway, but does not explicitly require municipalities to secure state approval before constructing a sidewalk along a state highway. However, state approval may be required under N.J.A.C. 16:47 when construction is located within a state highway's right-of-way.

[1] The report is currently being updated.

When homeowners and businesses are responsible for sidewalk maintenance, they might decide to hire a contractor, perform repairs on their own or have the city do the repair. Homeowner associations in some neighborhoods address right-of-way maintenance as a group to minimize the cost to individual members. In some areas, the city will subsidize sidewalk repairs for property owners. Local laws may also dictate whether or not a homeowner must hire a professional contractor to undertake sidewalk repair. Regardless of the approach for sidewalk maintenance, municipal inspectors should review and approve all repairs to guarantee that the improved sidewalk meets pedestrian access needs and the requirements of the ADA.



Sidewalk ready to be poured. Image: VTC

Sidewalk Construction

In New Jersey, the cost of constructing and reconstructing sidewalks is typically borne by the landowner when it is required as part of a development, and by the State, county or local agency when constructed as part of road construction or reconstruction. Municipalities may assign all, a portion of, or none of the costs of constructing sidewalks to the abutting property owners. NJDOT Local Aid funding has also been used for municipal sidewalk-only projects. Sidewalks might not be constructed during development or road construction if the developer seeks an exception from the Residential Site Improvement Standards (N.J.A.C. 5:21-1.1, et.seq.) or local site plan requirements, or if the State or county has not identified a need in the project scoping process. As more municipalities and counties in New Jersey adopt Complete Streets Policies, sidewalks are more frequently recognized as essential elements of the public right-of-way and are being incorporated into the initial design of a project. For more on Complete Streets Policies, visit NJDOT's Complete Streets web-page, or the NJDOT Bicycle and Pedestrian Resource Center.

Development Review: Residential Site Improvement Standards (RSIS) and Municipal Master Plans

According to the RSIS, sidewalks shall be provided on both sides of the street when the minimum lot size in the development is smaller than two acres and the development is located within two miles of a school, regardless of road classification (N.J.C.A. 5:21-4.5). Since there is no comparable set of statewide standards establishing requirements for nonresidential developments, the circulation element to the municipal master plan can provide further guidance regarding where and when sidewalks and walkways should be constructed and how they should be designed. A municipality should identify locations for proposed sidewalks on the Circulation Plan Map within the municipality's adopted Master Plan. RSIS is also featured in the Target Zero Action Plan, where updating the standards is included under the 'Safer Land Use' objective category.



New sidewalk. Image: VTC

BEST PRACTICES FOR MAXIMIZING THE LIFE EXPECTANCY OF SIDEWALKS

Sidewalks, like other transportation infrastructure, are a major public investment. It is less costly to maintain sidewalks than to undertake major repair and reconstruction. Also, regular preventive maintenance of a sidewalk can extend the lifetime of the facility and delay the need for more extensive repairs. The average service life of a sidewalk depends on a variety of factors including environmental conditions, materials, design standards, construction quality and maintenance standards. If best practices are undertaken throughout the life cycle of the sidewalk, the expected service life is 80 years for concrete and 40 years for asphalt. Best practices for maximizing the life expectancy of sidewalks include:

- Providing adjacent trees with adequate room for root growth. This includes selecting the appropriate tree species for the proposed planting space to avoid conflicts later with sidewalks and other infrastructure.
- Providing good drainage across the sidewalk.
- Care should be taken to keep a sidewalk, walkway, or trail ice-free once snow has been shoveled. Using rock salt to melt ice should be avoided. Rock salt can damage concrete sidewalks, especially when they may not have been installed correctly or sufficiently cured. Instead, municipalities should advise property owners to use an environmentally friendly ice-melt pellet or de-icer.

Winter Maintenance Practices (snow removal, sanding)

Winter maintenance of pedestrian and bicyclist facilities is both a safety and an accessibility issue. Icy or snow-covered sidewalks are dangerous, especially when pedestrians are forced to walk in the street. Bicycle lanes with snow obstructions force bicyclists onto travel lane with cars that will feel unsafe for young riders and inexperienced bicyclists. In New Jersey, the responsibility of routine maintenance and snow and ice removal is typically assigned to the abutting property owner by local ordinance. Some cities and boroughs do operate programs to remove snow from downtown streets and similar areas that have inadequate space to store snow.

Winter Maintenance Management Plans

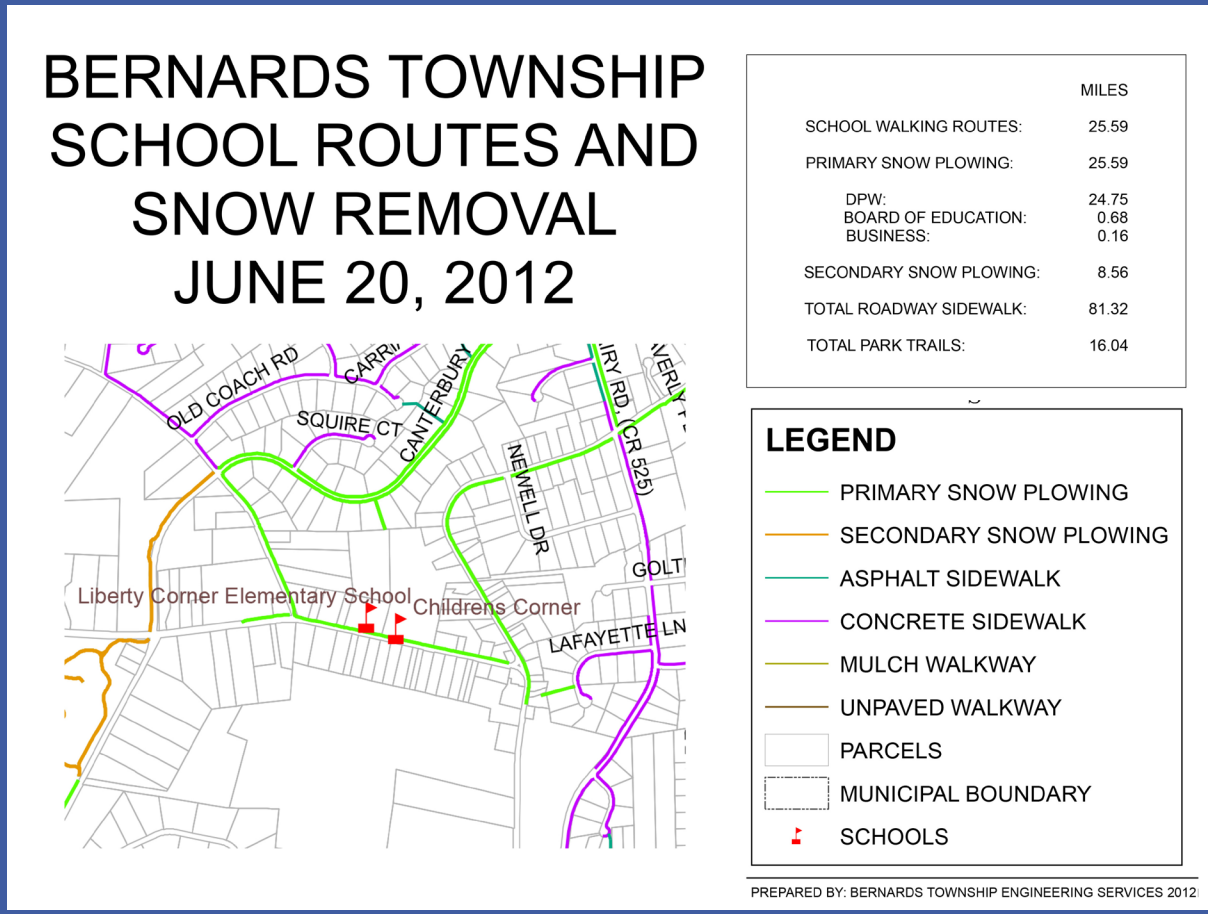
Local governments should adopt and routinely update winter maintenance–management plans or amend municipal emergency operations plans to address and delineate responsibilities for snow/ice removal—including pedestrian and bicycle facilities. Having a plan for snow and ice removal can also help prevent and minimize exposure to liability. While snow and ice removal is typically the responsibility of the abutting property owner in New Jersey, municipalities should consider taking on snow removal responsibility along identified routes to school. Municipalities should also inform residents of any designated school routes and give priority to helping those who need assistance with snow removal or other sidewalk repairs, such as elderly or disabled residents.



Snow blocks the child's path. Image: VTC

SPOTLIGHT: TOWNSHIP OF BERNARDS SCHOOL ROUTES AND SNOW REMOVAL POLICY

In August 2012, the Bernards Township Committee adopted a resolution delineating and formalizing the Township's Policy on Walking Routes to School, as well as setting primary and secondary priority status to the various routes to be cleared of snow and ice by the Township's Department of Public Works (Resolution #2012-0355). The Department of Public Works is responsible for snow and ice clearing of approximately 25 miles of primary sidewalks and approximately 8 miles of secondary sidewalks throughout the Township. The policy also dictates that the routes will be periodically re-evaluated and recommendations will be made if needed. The primary and secondary locations to be cleared are shown on the "Bernards Township School Routes and Snow Removal Map" dated June 20, 2012.



Bernards Township School Routes and Snow Removal Map.

Snow Removal Ordinances

Many local governments require property owners to remove snow/ice from an abutting sidewalk after a winter storm. The laws regarding snow and ice rules and regulations vary across the state. Municipalities may have different time limits on how long sidewalks can remain covered and where the snow can and cannot be shoveled. Often these ordinances and/or maintenance plans do not fully address the need to clear snow from other adjacent pedestrian facilities, such as curb ramps, crosswalks, pedestrian islands/ medians, transit stops/shelters, walkways on bridges, and year-round trail systems. In addition, higher mounds of snow frequently develop at street intersections, blocking crosswalks and reducing intersection sight distance.



A pedestrian is stranded in the street by snow blocking the mid-block crosswalk.

Curb ramps are rarely shoveled out, severely restricting mobility for disabled persons and making street crossings hazardous for all pedestrians. Abutting property owners often fail to remove snow from this area, and usually ordinances requiring property owners to shovel snow do not address the crosswalk area. Local ordinances should be revised and updated to address all pedestrian facilities and not just the sidewalk.

Liability

New Jersey sets different standards of liability depending upon whether the abutting property is owned by a private individual or a public entity and, if private, whether the use of the abutting property is commercial or residential. While commercial property owners have a duty to inspect for and remove snow and ice on the adjacent sidewalk, in general, a residential property owner or occupant is not liable for damages resulting from a failure to clear ice or snow from the sidewalk in front of the property. However, if the hazardous condition was aggravated by the action of the owner or occupant when clearing the sidewalk of snow or ice, the owner (or occupant) may be held liable. [1]

Nevertheless, it is recommended that residents clear the snow and ice from the sidewalks and paths along their property. If being a good neighbor is not incentive enough, many local municipalities have ordinances that require property owners to remove snow and ice, and failure to comply with these ordinances can lead to a fine. It does not lead, however, to an imposition of liability for injuries sustained by pedestrians unless the property owner or occupant had done a poor job at clearing the sidewalk of snow or ice.

Enforcement of ordinances requiring private property owners to clear adjacent sidewalks within a certain time period is often lax or non-existent. Local governments that fail to maintain accessible pedestrian facilities or enforce local ordinances may be at greater risk for liability or non-compliance with the ADA. To minimize risk and control this exposure, it is critical to ensure that if a jurisdiction has a sidewalk snow-removal ordinance, the ordinance is consistently enforced.



It is important to clear all bicycle and pedestrian related facilities of snow.

[1] VTC and Charles Carmalt, PP, AICP, Constructing, Maintaining and Financing Sidewalks in New Jersey (2006), 63. http://njbikeped.org/portfolio/constructing-maintaining-and-financing-sidewalks-in-new-jersey/

EXAMPLES OF WINTER MAINTENANCE MANAGEMENT PLANS

Bloomington, Minnesota

The City of Bloomington has a comprehensive Snow Response Program. As part of the program, city ordinances are referenced that address responsibilities for clearing snow from pedestrian facilities. While the City ordinance requires property owners to clear snow and ice from sidewalks, over 250 miles of sidewalks in the City are cleared by the city's Park Maintenance Department. The city code specifies a priority system that requires Park Maintenance to clear pedestrian facilities as follows (City of Bloomington, n.d.):

- **First priority:** School walking areas, heavily used wheelchair-accessible areas, and high use areas along main roads
- **Second priority:** Walks expanding out from a school and along major roads
- **Third priority:** Residential and industrial areas

It is clearly communicated that extreme weather events and long-term snowfall may cause the city to return to high priority areas before getting to the lower priority areas. Also, Bloomington's plan notifies citizens to keep obstructions—such as trash cans— off sidewalks so crews can complete their job more efficiently and quickly (City of Bloomington, n.d.).

Longmont, Colorado

The City of Longmont's Snow- and Ice-Control Plan provides guidelines for snow operations deployment, deployment levels, personnel responsibility, snow-plowing priorities, safety and training considerations, use of equipment, and environmental protection. The plan emphasizes the need to ensure motorist safety, cost effectiveness, environmental benefits, and operational logistics.

Deployment levels are based on factors such as expected accumulation, air and ground temperature, potential for back-to-back storms. Deployment levels consider the need for pedestrian accessibility in downtown areas and school zones. A snow team leader is assigned to each anticipated snow event and is responsible for deploying snow teams based on the category for four deployment levels as follows (City of Longmont, 2010):

- **Level 1** – Little or no accumulation is predicted; no back-to-back storm events predicted—limited deployment of on-call staff is on an as-needed basis.
- **Level 2** – 0- to 6-inch accumulation predicted; possible back-to-back storms—Entire maintenance staff required for 12-hour on and 12-hour off shifts. Fleet mechanics are placed on-call, and one sanitation truck is ready for deployment. Limited and/ or targeted snow removal operations are possible along the Downtown area and school zones based on conditions.
- **Level 3** – 6- to 15-inch accumulation predicted; regardless of multiple storm events—Entire snow team is called on for duty. Other city staff assistance and private contractors may be required. School zones are cleared curb-to-curb; walk-to-school routes may be cleared by staff/contractors.
- **Level 4** – 15-inch or greater accumulation; additional accumulation expected—Entire snow team is called on for duty; additional city staff and private contractors are called for duty; school zones cleared curb-to-curb by staff/ contractors and walk to-school routes cleared by staff/contractors. A level 4 deployment is triggered by:
  - Declaration of snow emergency by city manager
  - Activation of city's emergency operations center where "incident commander" takes charge of operations

http://longmontcolorado.gov/departments/departments-n-z/transportation/street-maintenance/snow-removal

Communicating With Your Neighbors

Students walking or bicycling to school may occasionally encounter avoidable barriers along their routes, such as active sprinklers, overgrown vegetation, or loose dogs. While school districts are limited in their ability to require private property owners to limit these obstacles, they are able to communicate with them and invite them to have a conversation with the school district about the importance of safety along routes to school.

The National Center for Safe Routes to School website has a resource called "Strategies for Reaching Neighbors." While it focuses on engaging neighbors during the Safe Routes to School (SRTS) planning process, the strategies are applicable to school districts regardless of whether they are in plan preparation or not. The recommendations ensure that routes remain safe, comfortable, and predictable for all students.

The National Center for Safe Routes to School provides several strategies for effectively communicating with neighborhood residents and encouraging their support:

- Attend neighborhood group meetings to introduce the SRTS program, explain goals, and invite neighbors to share their needs and concerns. In one California community, neighbors were invited to a "pruning party," where supplies and assistance were provided to trim vegetation obstructing sidewalks. When disagreements arise regarding trimming trees or bushes, local officials can help resolve conflicts by enforcing relevant ordinances.
- Host an open house for neighbors and parents to learn more about SRTS, ask questions, and understand how they can contribute to a safer walking environment.
- Install informational signs in highly visible locations around the neighborhood to raise awareness about SRTS activities and remind residents to maintain safe and walkable pathways.
- Distribute flyers to homes near the school. Some communities have also mailed SRTS information with utility bills to reach a wider audience and encourage participation.



Stafford Township Safe Routes to School Public Workshop, NJ. Image: Stafford Township

17 How to Start Improving Your School Zone

The safety, health and well-being of children are the concern and the responsibility of the entire community. Parents, school districts, city and county officials (including engineers, planners, public works and law enforcement) all play a role in student pedestrian and bicycle safety everywhere, and especially around schools.

Introduction

Community members must work together to develop and maintain walk and bike to school travel plans. This partnership approach to student pedestrian and bicycle safety benefits the entire community. Improving walk and bike to school routes with added sidewalks, widened shoulders, bicycle lanes or other improvements creates a safer environment for everyone 24 hours a day.

Working collaboratively with community members ensures that pedestrian and bicycle safety concerns can be addressed by a variety of solutions including engineering improvements, law enforcement efforts, and education. This section provides an overview of the steps involved in the creation of a comprehensive student pedestrian and bicycle travel plan.

School Travel Plan Process



Find a Champion

Start by taking the reins or finding an individual or group to take up the challenge to improve your school's travel environment.

Seek Out Your Regional SRTS Coordinator

Safe Routes to School Regional Coordinators from eight Transportation Management Associations (TMAs) throughout New Jersey are ready, willing and able to offer advice and assistance in kicking off Safe Routes to School programs in communities from all 21 counties. Find your SRTS Regional Coordinator at https://www.saferoutesnj.org/find-your-srts-regional-coordinator/

Prepare a School Travel Plan

A key question to be answered before moving forward is: Does your school have a Safe Routes to School (SRTS) Travel Plan? If yes, collect as much information as you can based on previous SRTS efforts and build on those resources. You should also look to see what issues and solutions have been previously discussed and determine their status before moving forward. If you do not have a School Travel Plan, enlist your Regional Coordinator to help you create one.

Host a Kickoff Meeting

Once your champions have been identified and taken on the commitment to making changes, host a kickoff meeting for the project. Invite others who feel the same to form a task force. Be proactive about including people or organizations that can positively contribute to the process of implementing your vision such as your local department of public works. Together, craft your vision, establish next steps and assign responsibility.



Kickoff Meeting for the Borough of Collingswood Safe Routes to School Travel Plan.

Define your Vision

Creating a vision at the onset will lead to the setting of goals and determining strategies for implementing them. Use your vision statement as an expression of what you want to see in the long-term as a result of the task force's work. Your goals and strategies for implementation should be geared towards achieving that outcome.

Map the Issues

The first task should be to inventory the areas in the vicinity of the school, especially the primary access routes used by students. Task force members should walk the school neighborhood, identify the major issues and document all findings through photos or maps. There are many tools available to evaluate walking and bicycling conditions within the school zone. Before completing any walking or bicycling assessment, you will need to obtain two maps: A School Neighborhood Map and a School Site Map. These maps can be easily generated online at https://www.saferoutesnj.org/mapping-your-neighborhood/

Once your mapping exercise has been completed, identify high priority problem locations on a map and ask others in the community to contribute their thoughts on the issues.

Sample Vision Statement

The Anytown Safe Routes to School Task Force will strive to bring awareness of the Safe Routes to School Program to the schools, identify infrastructure improvements necessary to make walking and bicycling to school safer, encourage more students to walk or bike to school through activities and events, enforce traffic laws, and incorporate walking and bicycling education into the school curriculum.



Map Example. Image: Cross County Connection TMA

Consult with Others to Generate Solutions

There are numerous ways to approach solutions to school zone planning. Create one central list that starts with the high priority locations and works its way down to lower priority locations. Work with local experts, law enforcement or municipal, county and state engineers to identify strategies. Separate your strategies into short-term, low-cost solutions, and long-term, high-cost solutions.

After creating your prioritized list of improvements and locations, and discussing it with members of your community, you may find that some issues can be easily solved with either short-term or temporary fixes. For instance, if speeding is identified as an issue you may want to install a speed radar feedback sign in the school zone as one of your solutions.

However, there are some solutions that will require going through a more in-depth process. If changing the speed limit within the school zone is proposed as a solution, speeding must be verified through a speed study initiated by the police department. The results of that study will determine, for example, if a change in the speed limit is warranted or if the introduction of traffic calming is necessary to support a lowering of the speed limit.

If missing sidewalks are an issue, the municipal engineer will need to be contacted and included in the conversation (if they are not already on your task force). In general, anything that requires construction will require additional study and can take time to secure funding, create the design, and obtain the proper permitting necessary for construction.

Example of an Action Plan Matrix

Montclair Safe Routes to School Program
Safe Routes to School Travel Plan – Bradford Elementary School

Action Plan Matrix – Bradford School Neighborhood Specific

Timeframe Definition	Cost Definition
Short-term = less than 3 months	**Low** = Less than $2,000
Mid-term = between 3 to 6 months	**Medium** = between $2,000 and $10,000
Long-term = longer than 6 months	**High** = more than $10,000

No.	Action	Partners	Timeframe	Cost
Lead Entity: Principal				
1	Create a school pavement "quilt" to define the drop-off zone along College Avenue	Township/Board of Education/PTA	Mid-term	Low
2	Order and install "No Idling Zone" signs around the school	Township/NJDEP/ Board of Education	Short-term	Low
3	Install "Pull up" signage in the red zone to reinforce use of the entire curb length	Township/Board of Education	Short-term	Low
4	Invite NJ TRANSIT to give their SAFETY RULES! Assembly presentation every year	Board of Education	Short-term/ ongoing	Low
5	Utilize the school website to advance Safe Routes to School safety campaign/messages	Board of Education	Short-term/ ongoing	Low

Decide What, When and How to Collect and Measure

You will not be able to measure change in the school environment if you do not know what to look for and where to look for it. Set up mechanisms to establish your baseline so that you will be able to measure impacts before, during, and after changes have been made to the school zone. Information on traffic volumes, speeds, crashes, yielding percentage at crosswalks, and number of students walking or bicycling to school can all be relevant to measuring impact resulting from infrastructure improvements.



Pneumatic tubes can record speeds and volumes.

Use the Results of Initial Efforts to Inform Next Steps

Take the results you have identified and interpret the findings to inform the next steps. For example: Since the implementation of the use of temporary in-roadway "Stop for Pedestrian" crossing signs, has there been an increase in the percentage of motorists who stop for pedestrians in that particular crosswalk? If your results show a dramatic increase, it may show that a permanent installation is warranted. If there is no change in the percentage of motorists stopping for pedestrians, then you may want to consider other solutions for this site.

Be an Original

Transportation and safety issues are unique to each school zone. It is important to recognize that while your school zone and its physical attributes (crosswalks, traffic control signs, etc.) may resemble that of many other neighborhood streets, they are not the same. Your school zone is distinctive and should be designed to be the place where the safety of student travel takes precedence over a roadway's functional classification. The solutions proposed and implemented should be customized to fit your school neighborhood, population and priorities.

Start Small

Creating any type of program that is volunteer based or minimally funded is difficult. Instead of jumping in headfirst, take your time and start when and where you feel most comfortable. To build momentum, start with the little wins or the low-hanging fruit that you know can easily be attained in a short amount of time.

Bring in Reinforcements

Utilize available resources to build your program such as the TMAs and Safe Routes Resource Center. They currently offer assistance in hosting bicycle and pedestrian events such as a walk/bike to school day, organizing educational events such as bicycle safety lessons, and developing planning and policy documents such as a walkability assessment.

Keep Your Eyes on the Prize

All your planning efforts are intended to lead to one ultimate goal: improving the overall access and safety conditions for families walking and bicycling to school. If implemented in conjunction with other programmatic strategies, these physical improvements will elevate walking and/or bicycling as safe, healthy and convenient options to getting to school.

WOODBINE SCHOOL DISTRICT: MAPPING INFRASTRUCTURE IMPROVEMENTS

Woodbine School District
Year plan was completed: 2024
Municipality: Borough of Woodbine,
County: Cape May

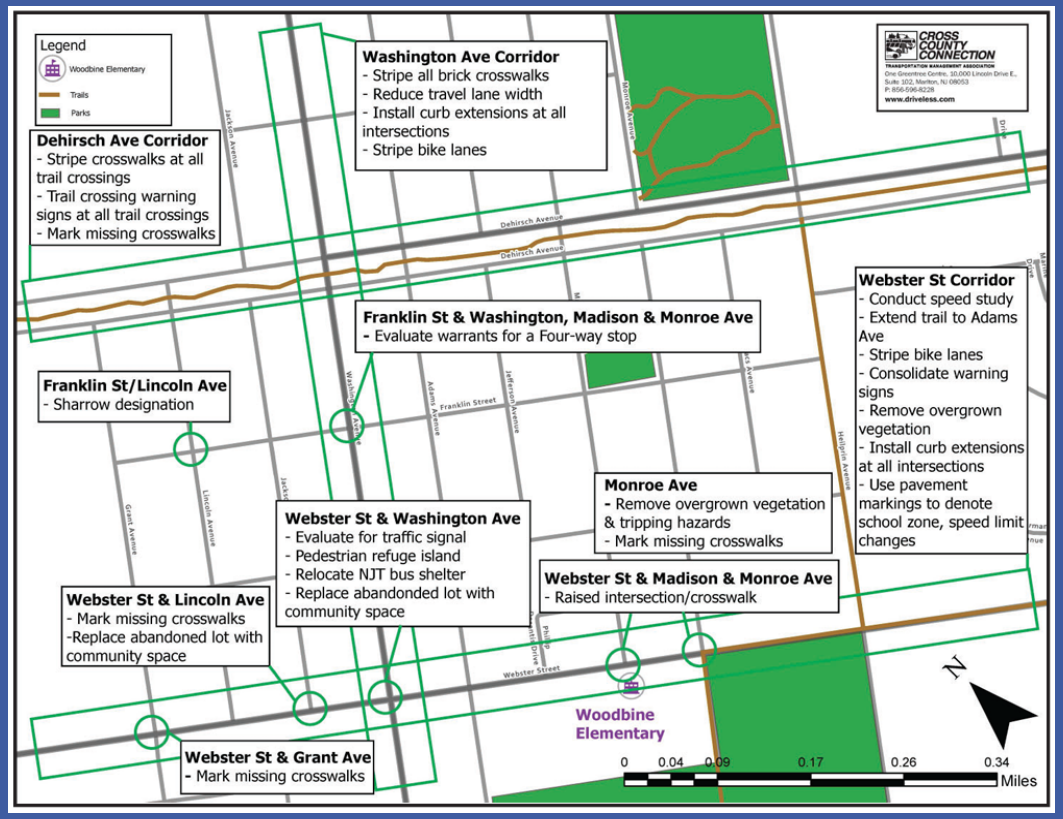
The Woodbine School District Travel Plan connects school policy, route analysis, and funding strategies in a clear and replicable way. The plan builds on existing policy and school travel planning going back over a decade. Infrastructure recommendations were made following an in-depth existing conditions assessment of the school's walking routes and walk audit.

In consultation with a Student Travel Plan Working Group, the project team for the plan provided infrastructure recommendations across six (6) categories, including:

Traffic Studies: Speed studies, warrant evaluations for traffic signals, and warrant evaluations for stop signs.

Traffic-Calming Measures: Reducing travel lane width, raised intersections and crosswalks, curb extensions, and pedestrian refuge islands.

Warning Signs, Pavement Markings, and Beacons: RRFBs, marking missing crosswalks, striping brick crosswalks, consolidating warning signs, and using pavement markings.



The Woodbine School District Student Travel Plan contains a map indicating the locations where infrastructure improvements are recommended. Image: Arterial

Removing Sidewalk Obstructions: Removing overgrown vegetation and tripping hazards.

Community Placemaking: Replacing abandoned lots with pocket parks or playgrounds and relocating bus shelters.

Improving Bicycle Facilities: Share the road designations using sharrows, striping bicycle lanes, extending multi-use trails, installing trail warning signs, striping all trail crosswalks, and revising the Borough Complete Streets Policy.

NETCONG ELEMENTARY SCHOOL: PRIORITIZING EDUCATION AND ENCOURAGEMENT

Netcong Elementary School Travel Plan

Year plan was completed: 2024
Municipality: Netcong
County: Morris

The Netcong Elementary School Travel Plan is a continuation of planning efforts dating back to 2006 and 2016. It showcases the School District and Borough's commitment to student safety, fitness and health, and reducing vehicular traffic.

The plan contains a robust set of encouragement and education programs including:

Ask the Community to Pitch In: The Administration will write to parents to suggest that their children walk, bicycle, or carpool as much as possible to and from school.

Netcong PTA Walk and Roll Club: The School District will continue to promote monthly Netcong PTA Walk and Roll Club events including International and statewide "Walk to School Day" events.

Bicycle Rodeos: The Administration will continue to work with the PTA, Borough Police Department, Northern New Jersey SafeKids, and Avenues in Motion to run annual bicycle rodeos.

Walking and Bicycling as Part of the Curriculum: The School District will promote walking to school by organizing bicycle and pedestrian lesson plans and education programs.

Partnering with Law Enforcement: The School District will partner with the Netcong Police Department on two (2) educational initiatives, leveraging school and municipal websites and social media to:

- Provide public anti-idling law education to parents, school staff, community members and delivery trucks/commercial vehicles, and;
- To provide education on traffic laws including no texting, cell phone use, stop and stay stopped for pedestrians and obeying crossing guards to school staff, parents and community members.

Finally, the School District will be active in distributing the School Travel Plan to the school community.



Where to Find Funding

There are several places to seek funding for SRTS infrastructure improvements including:

Federal Programs

There are several federal programs under which funding for infrastructure improvements would be eligible.

The Transportation Alternatives Program (TA or TAP) is the largest federal source for trail and greenway funding under MAP-21, the most recent federal transportation funding law. Transportation Alternatives is a combination of two core active transportation programs from SAFETEA-LU—Transportation Enhancements and Safe Routes to School (SRTS). While Transportation Alternatives projects are federally funded, the funds are administered by the New Jersey Department of Transportation and the state's three Metropolitan Planning Organizations (MPOs): the Delaware Valley Regional Planning Commission (DVRPC), the South Jersey Transportation Planning Organization (SJTPO), and the North Jersey Transportation Planning Authority (NJTPA). Funding categories include: bicycle and pedestrian facilities; safe routes for non-drivers; abandoned railroad corridors for trails; environmental mitigation activity including stormwater mitigation; and community improvement activities including vegetation management, historic preservation, archaeological activities related to transportation projects, and boulevard construction.

To the right is a table listing possible infrastructure improvements and corresponding federal programs under which they would be eligible for funding. Note: All federal funding comes with specific procedures and requirements so be sure to check eligibility prior to completing the application.

In New Jersey, the creation of school-related traffic regulations pertaining to mid-block crosswalks, school speed limits, bicycle lanes, etc. must follow a regulatory process. This regulatory process is set forth in N.J.A.C. 16:27-4.1 through N.J.A.C. 16:27-5.1.

Regulatory Process

Desired Improvement	Program Eligible for funding under MAP-21
Crosswalk, new or retrofit	TAP, CMAQ, STP, HSIP, NHPP, UZA, 5310
Sidewalks, new or retrofit	TAP, CMAQ, STP, HSIP, NHPP, UZA, 5310
Traffic calming	TAP, STP, HSIP
Police patrol	TAP, UZA
Trail/highway intersection	TAP, CMAQ, STP, HSIP, RTP, NHPP
Bicycle parking facilities	TAP, CMAQ, STP, UZA, SGR, 5311, BBF
Spot improvement program	TAP, CMAQ, STP, HSIP
Bicycle lanes on roadway	TAP, CMAQ, STP, HSIP, NHPP, UZA,
Trail/highway intersection	TAP, CMAQ, STP, HSIP, RTP, NHPP
Signal improvements	TAP, CMAQ, STP, HSIP, NHPP
Curb cuts and ramps	TAP, CMAQ, STP, HSIP, NHPP, UZA, 5310
Paved Shoulders	TAP, CMAQ, STP, HSIP, NHPP, UZA
Safety brochure/book	CMAQ, STP, RTP, UZA, 402

Abbreviation	Program
402	State and Community Highway Safety Grant Program
5310	Enhanced Mobility of Seniors and Individuals with Disabilities
5311	Formula Grantsfor Rural Areas, Rural Transit Assistance Program, and Public Transportation on Indian Reservations
BBF	Bus and Bus Facilities
CMAQ	Congestion Mitigation and Air Quality Improvement
HSIP	Highway Safety Improvement Program
NHPP	National Highway Performance Program
RTP	Recreational Trails Program
SGR	State of Good Repair Grant Program
STP	SurfaceTransportation Program
TAP	Transportation Alternatives Program
UZA	Urbanized Area Formula Program

NJ SRTS Program

Federal funding is periodically made available for infrastructure projects through the NJ Department of Transportation. Infrastructure projects may include the planning, design and construction or installation of sidewalks, crosswalks, signals, traffic-calming and bicycle facilities. Visit the NJDOT website for more information, www.state.nj.us/transportation/community/ srts/funding.shtm

County and Municipal Funding

Many low-cost engineering solutions such as new signs or fresh paint on crosswalks can easily be incorporated into the work plan for a local or county public works department. Do research to identify existing funds that are currently targeted to transportation, safety or health issues - like Capital Improvement Projects and operating budgets.

Additional Funding Resources

- Funding Pedestrian and Bicycle Planning, Programs and Projects is a compilation of funding sources by the NJ Safe Routes to School; https://www.saferoutesnj.org/grants-funding-overview/
- NJ Local Aid Resource Center provides NJ counties and municipalities with project planning, grant applications, and project delivery guidance to help improve local transportation infrastructure; https://njdotlocalhub.com/local-aid-econ-dev/

Complementing Infrastructure Changes with Programmatic Efforts

SRTS continues to value and incorporate the 5Es program. Engineering solutions should be the result of a comprehensive planning process, guided by the SAFE framework (Sustainable, Accessible, Fair, and Engaging). Any physical improvements to the school zone should be accompanied by programmatic improvements.



International Walk to School Day in West Orange.

- Participate in International Walk to School Day and National Bike to School Day.
- Introduce bicycle, pedestrian and traffic safety into the curriculum.
- Utilize the school website to relay important information about changes to the school zone.
- Use the school handbook to include clear information about expected, safe behavior within the school zone for motorists, walkers, bikers, and bus riders. Ask that both the parent/guardian and the student sign off that they have read the information.
- Create and hang banners near school entrances that include the rules of the school zone.
- Create a school-wide pledge that asks parents and students to walk, bike, drive, take transit or the school bus safely.
- Ask the school board to pass a policy that supports walking and bicycling to school.
- Address walking and bicycling to school as a way to meet daily physical activity goals as part of your school wellness policy.
- Conduct school traffic counts.
- Host safety forums/presentations.

COMPLETE STREETS AND SAFE ROUTES TO SCHOOL: BUILDING SAFER COMMUNITIES

Complete Streets are designed and operated to enable safe access for all users – pedestrians, bicyclists, motorists and transit riders of all ages and abilities. Instituting a Complete Streets policy ensures that agencies routinely design and operate the entire right of way to enable safe access for all users.

A community with a Complete Streets policy considers the needs of children every time a transportation investment decision is made. Roads near schools and in residential neighborhoods are designed and altered to allow children, the most vulnerable users of our streets, to travel safely. Complete Streets and Safe Routes to School have numerous synergies, so it is only natural for them to work together to advocate for and to strengthen the practice of safely walking and bicycling to and from schools and throughout our communities.



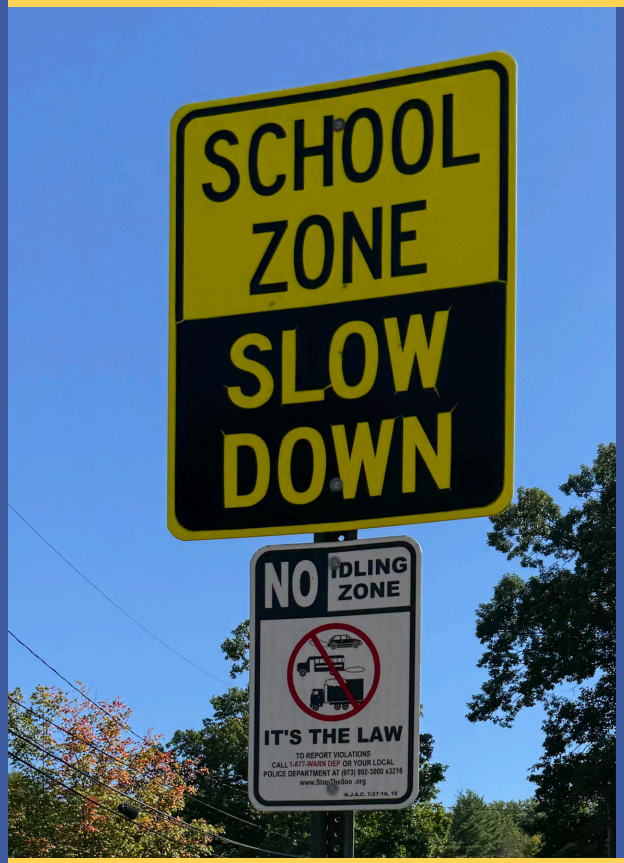
Ocean Avenue through Deal, NJ is an example of a Complete Street in a suburban setting with wide sidewalks and street lighting appropriate to the context. Image: Parsons Brinckerhoff

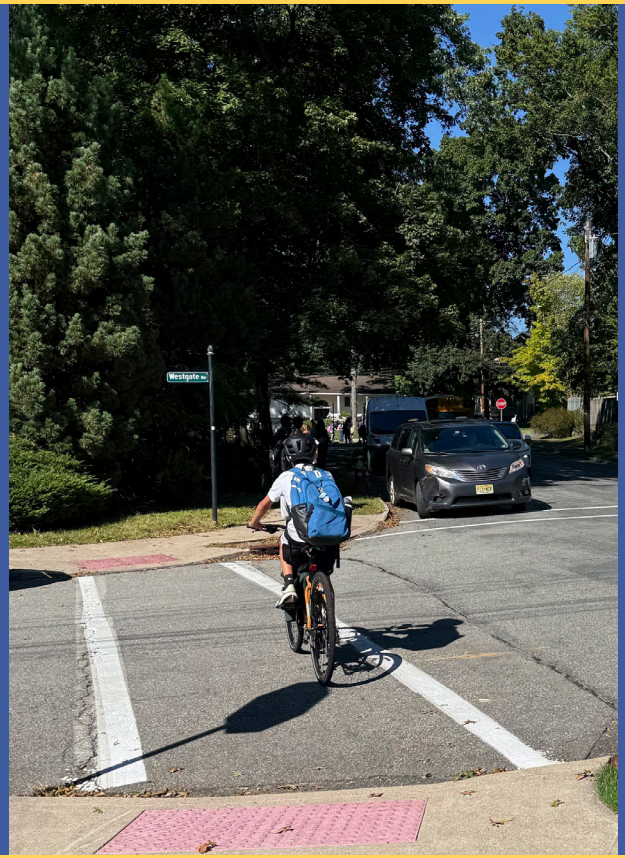


Main Street in Califon, NJ is an example of a Complete Street in a more rural setting. Image: Parsons Brinckerhoff

There are several resources in New Jersey that can help with developing and implementing local Complete Streets policies, including:

- The New Jersey Department of Transportation Complete Streets website includes information on success stories, workshops, etc.
- The New Jersey Bicycle and Pedestrian Resource Center collects all adopted Complete Streets policies around New Jersey.







DEPARTMENT OF TRANSPORTATION
THE STATE OF NEW JERSEY