

# NEW JERSEY Safe Routes to School



## How to Get Started

### ENGINEERING SOLUTIONS FOR DESIGNING YOUR SAFE ROUTES

#### Design Elements



Selecting appropriate design treatments for school neighborhoods creates environments that address the needs of all who use public rights-of-way: walkers, bicyclists, bus drivers and motorists. A well-designed network of streets and sidewalks reduces potential points of conflict, providing students with safe routes to school whether they are walking, bicycling or riding. Motorists should have a heightened sense of awareness and **respect** within school zones. Signs, paint on the road and artful approaches can make schools zones stand out, encouraging motorists to be on their best behavior.

This Design Elements Fact Sheet will assist communities in understanding the Engineering “E” of their Safe Routes To School (SRTS) program. Infrastructure upgrades can improve conditions for walking and bicycling to school, and even lead to reduced traffic speeds in school zones. This Fact Sheet describes typical design treatments that benefit pedestrians and bicyclists and calm traffic.

#### Beyond Design

A well-designed school neighborhood provides families with safe alternatives to vehicle travel, resulting in reduced traffic and improved air quality. However, design alone is not enough! Parents, community members, the school community and local law enforcement working together create a powerful force for change. New school policies, infrastructure improvements, ongoing maintenance and attitude shifts among parents and students all play a role in a successful SRTS program.

The development of a school travel plan, with a community working group committed to SRTS, can be the catalyst for change and is one of the building blocks for a successful SRTS program. Just as a master plan describes a community’s long term blueprint for the future, a school travel plan is a blueprint for describing how your program will improve the walking and bicycling experience of students and parents traveling to and from school. It identifies the changes that will be taken to allow students to walk and bike safely and more often and helps to identify the goals and measures associated with the implementation of your program. For more information on developing a basic travel plan for your school, please visit the New Jersey Department of Transportation’s SRTS Getting Started Toolbox at <http://www.state.nj.us/transportation/community/srts/started.shtm>.



## Designing for Pedestrians

Ideal conditions for school-aged pedestrians include low volumes of traffic moving at slow speeds, sidewalks and separation from traffic. According to Safe Kids Worldwide, children do not develop the skills they need to correctly gauge the speed of vehicles until at least age 10. Providing facilities for young walkers not only addresses their needs but can help make children’s movements more predictable to motorists.

**“83 percent of child pedestrian deaths occur at non-intersection locations.”**  
 - Safe Kids Worldwide (SKW). Pedestrian Safety. Washington (DC): SKW, 2007.

Type of Treatment	Where to implement?	What does it look like?	Effort
<p><b>Pavement Markings—</b>                      Words or symbols stenciled on pavement. Typical pavement markings messages include:</p> <ul style="list-style-type: none"> <li>• Slow School Zone</li> <li>• Yield to Peds</li> <li>• School Crossing Ahead</li> <li>• Ped Crossing</li> </ul>	<ul style="list-style-type: none"> <li>• In the roadway, at approaches to intersections/ crosswalks</li> <li>• On the sidewalk, at approaches to intersections</li> <li>• On shared use paths</li> </ul>		<p>Easy</p>
<p><b>Signs &amp; Signals—</b>                      School and pedestrian warning signs inform motorists where they are likely to encounter pedestrians waiting to cross a roadway. All bicycle, pedestrian and school signs should have a fluorescent yellow-green background with a black legend and border. Typical signs and signals include:</p> <ul style="list-style-type: none"> <li>• Yield to pedestrian</li> <li>• School Crossing</li> <li>• Countdown signals</li> </ul>	<ul style="list-style-type: none"> <li>• At traffic signals</li> <li>• Non-signalized intersections</li> <li>• Mid-block</li> </ul>		<p>IMPLEMENTATION</p>
<p><b>High Visibility Crosswalks</b>                      Boldly striped, colored, or textured crosswalks alert drivers to pedestrian areas and delineate exactly where pedestrians are intended to cross. High Visibility Crosswalks in combination with other traffic-calming treatments (see page 6) such as stop bars, should be considered along school routes. Crosswalks can be enhanced through:</p> <ul style="list-style-type: none"> <li>• Ladder, Zebra, Continental (piano bar) striping</li> <li>• Texture</li> <li>• Color - solid or patterned</li> </ul>	<ul style="list-style-type: none"> <li>• Signalized intersections</li> <li>• At major pedestrian crossings, i.e. along designated school routes</li> </ul>		<p>Complex</p>

## Designing for Pedestrians

Type of Treatment	Where to implement?	What does it look like?	Effort
<p><b>Pedestrian Activated Facilities</b></p> <p>Pedestrian activated lights and signs alert drivers and improve pedestrian crossing. Such as:</p> <ul style="list-style-type: none"> <li>• Illuminated crosswalks</li> <li>• Flashing Beacons</li> <li>• Rectangular Rapid Flashing Beacon (RRFB)</li> <li>• HAWK Signal</li> </ul>	<ul style="list-style-type: none"> <li>• RRFB is only used as a warning beacon to supplement a pedestrian or school crossing warning sign with a diagonal downward arrow</li> <li>• HAWK can only be used at mid-block crossings</li> <li>• High volume, non-signalized crossing locations</li> </ul>		<p>Easy</p>
<p><b>Shorter Crossings &amp; Refuge Areas</b></p> <p>Refuge areas provide an area for pedestrians to safely wait for an opportunity to continue crossing. Shorter crossings reduce the time pedestrians are exposed to traffic. This can be achieved through:</p> <ul style="list-style-type: none"> <li>• Curb Extensions—the horizontal extension of the sidewalk into the street</li> <li>• Median Refuge or Crossing Islands</li> </ul>	<ul style="list-style-type: none"> <li>• Intersections with high volumes of motor vehicles and/or pedestrians</li> <li>• Crosswalks where the crossing distance exceeds 60 feet</li> </ul>		<p>IMPLEMENTATION</p>
<p><b>Paths, Alleys &amp; “Cut-throughs”</b></p> <p>Paths (paved or earthen) or short-cuts can provide an alternate to using the streets and sidewalk network. These facilities can make neighborhood connections to schools that are both safe and pleasant when properly lighted and maintained.</p>	<ul style="list-style-type: none"> <li>• Cul-de-sac neighborhoods</li> <li>• Where there are opportunities i.e. worn paths or existing alleys</li> </ul>		
<p><b>Sidewalks &amp; Accessibility</b></p> <ul style="list-style-type: none"> <li>• Sidewalks should be at least 5' wide and free of obstructions</li> <li>• Curb ramps with textured surfaces, limited grades and cross slopes are part of the required design for accessibility.</li> </ul>	<ul style="list-style-type: none"> <li>• Roadways with higher traffic volumes and/or speeds to provide separation from adjacent motor vehicle traffic</li> <li>• As a link to pedestrian attractors i.e. schools or libraries</li> </ul>		



## Designing for Bicyclists



School aged-pedestrians feel most comfortable and safe when bicycling to school on roadways with low traffic volumes where vehicles are traveling at low speeds. Bike paths that separate the bicyclist from motor vehicle traffic are ideal for a school neighborhood. Roadways optimized for bicyclists, such as bike boulevards, can be another alternative.

Type of Treatment	Where to implement?	What does it look like?	Effort
<p><b>“Bicycle-safe” grates</b> Stormwater drainage grates allow water to pass through without trapping bicycle wheels.</p>	<ul style="list-style-type: none"> <li>Wherever drainage grates are required (new construction or retrofit) and bicycle traffic is possible</li> </ul>		<p>Easy</p>
<p><b>Parking</b> Provides cyclists with a convenient, secure place to leave their bicycle. Examples include:</p> <ul style="list-style-type: none"> <li>Racks</li> <li>Artistic/Custom racks</li> <li>Lockers</li> <li>Shelter/Covered</li> </ul>	<ul style="list-style-type: none"> <li>High visibility areas</li> <li>Schools</li> <li>Libraries</li> <li>Athletic fields</li> <li>Bus stops</li> <li>Train stations</li> </ul>		
<p><b>Signs</b> Signs can identify a roadway or network of roadways and paths recommended for bicycle travel. Examples include:</p> <ul style="list-style-type: none"> <li>Share the Road</li> <li>Bike Route</li> <li>Bike Crossing Ahead</li> </ul>	<ul style="list-style-type: none"> <li>Approaches to designated bikeways</li> <li>Roads accommodating bicycle traffic—should be appropriate to the facility or conditions</li> </ul>		
<p><b>Shared Use Roadway</b> Any roadway open to both bicycle and motor vehicle traffic. Preferably, a shared road is:</p> <ul style="list-style-type: none"> <li>Wide outside lanes (14 to 15 feet)</li> <li>Delineated striping at least 4 feet wide</li> </ul>	<ul style="list-style-type: none"> <li>On streets with low traffic volume (less than 1,200 vehicles/day)</li> <li>On streets/roads where there is no designated bicycle facility</li> <li>Not recommended for children under 12</li> </ul>		
<p><b>Pavement Markings</b> Words or symbols can be used to guide cyclists through conflict points and delineate space in roadway. This can be achieved through:</p> <ul style="list-style-type: none"> <li>Striping of bike lanes</li> <li>Color—solid or patterned</li> </ul>	<ul style="list-style-type: none"> <li>Along the length of a roadway to distinguish a designated bicycle facility from the travel lane</li> <li>In the roadway, at approaches to intersections</li> <li>On shared use paths</li> </ul>		



## Traffic Calming

Traffic calming measures can be categorized into volume control or speed control. Volume control targets minimizing volume or cut-through traffic through restricted turns, roadway closures or median barriers. Speed control measures include passive concepts such as gateways or streetscape that changes a driver's perception of a corridor and active concepts that force a driver to physically alter their travel path and slow down.



Type of Treatment	Where to implement?	What does it look like?	Effort
<b>Speed Control—Passive</b>			<i>Easy</i>
<p><b>Visual Cues</b> Visual prompts give drivers the perception that they are entering a traffic calmed area without using active roadway treatments. Examples include:</p> <ul style="list-style-type: none"> <li>• Streetscaping</li> <li>• Rumble stripes</li> <li>• Textured/colorized pavement</li> <li>• Variable Message Sign with speed radar</li> </ul>	<ul style="list-style-type: none"> <li>• Residential neighborhoods</li> <li>• School zones</li> <li>• Downtowns and other developed nodes</li> </ul>		
<p><b>Street Design</b> Creating a physical environment where the driver slows down as a reaction to design changes in the roadway. Examples include:</p> <ul style="list-style-type: none"> <li>• Narrowed lanes</li> <li>• Rumble strips</li> <li>• On-street parking</li> </ul>	<ul style="list-style-type: none"> <li>• Approaches to mini roundabouts</li> <li>• Approaches to mid-block crosswalks</li> <li>• Approaches to intersections</li> <li>• Along streets and roads that need traffic speed reductions</li> </ul>		
<b>Volume Control</b>			
<p><b>Physical Diverters</b> Obstructions used to manage traffic volumes by physically controlling what turns and through movements are permitted at intersections and along roadways. This can be achieved through:</p> <ul style="list-style-type: none"> <li>• Full street closure</li> <li>• Partial street closure</li> <li>• Diagonal diverters</li> <li>• Median barriers</li> <li>• Forced turn islands</li> </ul>	<ul style="list-style-type: none"> <li>• Residential neighborhoods with high volumes of non-local traffic</li> <li>• School zones</li> <li>• At main street approaches where it is unsafe to make a left turn to and/or from the side street</li> </ul>		<p><i>Complex</i></p>

## Traffic Calming

Type of Treatment	Where to implement?	What does it look like?	Effort
<b>Speed Control—Active</b>			 <p>Easy</p> <p>Complex</p>
<p><b>Vertical Deflection</b> A raised roadway treatment that forces the motorist to slow down to avoid physical damage to their car's underbody. Such as:</p> <ul style="list-style-type: none"> <li>• Speed humps/tables</li> <li>• Raised crosswalks</li> <li>• Raised intersections</li> <li>• Speed cushions</li> </ul>	<ul style="list-style-type: none"> <li>• Residential neighborhoods</li> <li>• School zones</li> <li>• Downtowns and other developed nodes</li> <li>• Not permitted on roads above 35 mph</li> </ul>		
<p><b>Horizontal Deflection</b> Treatment that uses horizontal deflection to limit the speed a vehicle can safely travel through an intersection or along a roadway. Such as:</p> <ul style="list-style-type: none"> <li>• Full/Mini Roundabouts</li> <li>• Chicanes</li> <li>• Center island medians</li> <li>• Realigned intersections</li> </ul>	<ul style="list-style-type: none"> <li>• Dependent on road width</li> <li>• Residential neighborhoods</li> <li>• School zones</li> <li>• Downtowns and other developed nodes</li> <li>• Where vertical deflection is not applicable</li> </ul>		
<p><b>Constrictions</b> Horizontal extension limiting vehicle speed by narrowing the travel way. Such as:</p> <ul style="list-style-type: none"> <li>• Curb extensions</li> <li>• Neckdowns</li> <li>• Chokers</li> <li>• Raised Median Gateways</li> <li>• Pedestrian Refuge Islands</li> </ul>	<ul style="list-style-type: none"> <li>• Dependent on road width</li> <li>• Residential neighborhoods</li> <li>• School zones</li> <li>• Downtowns and other developed nodes</li> </ul>		

## References

- Manual on Uniform Traffic Control Devices (MUTCD) <http://mutcd.fhwa.dot.gov/>
- Guide for the Planning, Design, and Operation of Pedestrian Facilities, American Association of State Highway and Transportation Officials (AASHTO), July 2004
- Guide for the Development of Bicycle Facilities, American Association of State Highway and Transportation Officials (AASHTO), 1999.
- Pedestrian Compatible Planning and Design Guidelines, New Jersey Department of Transportation, April 1996.
- Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines, New Jersey Department of Transportation, April 1996.

For more information on the tools and resources available for your Safe Routes to School Program, please visit:

The New Jersey Safe Routes to School Toolbox

<http://www.state.nj.us/transportation/community/srts/started.shtml>

