

## The 4 E's: Engineering, Enforcement, Education and Encouragement

Different approaches are necessary at different schools to make it safer for children to walk and bike and to get more children to do so. However, most schools throughout Wisconsin and across the nation use a combination of engineering, enforcement, education and encouragement to achieve their goals.

### Engineering

THE BUILT ENVIRONMENT IS A large factor in whether children walk and bike to school. Well-designed and maintained facilities make it more likely that children will walk and bike to school and will improve safety for those that already do.

Not all improvements are expensive and some low-cost solutions are effective and easy to implement. For example, signs and paint are relatively low cost changes that can make a difference in safety. In addition, these smaller changes can help build momentum and support for larger more expensive changes such as new sidewalk, trails, bridges or traffic calming measures.



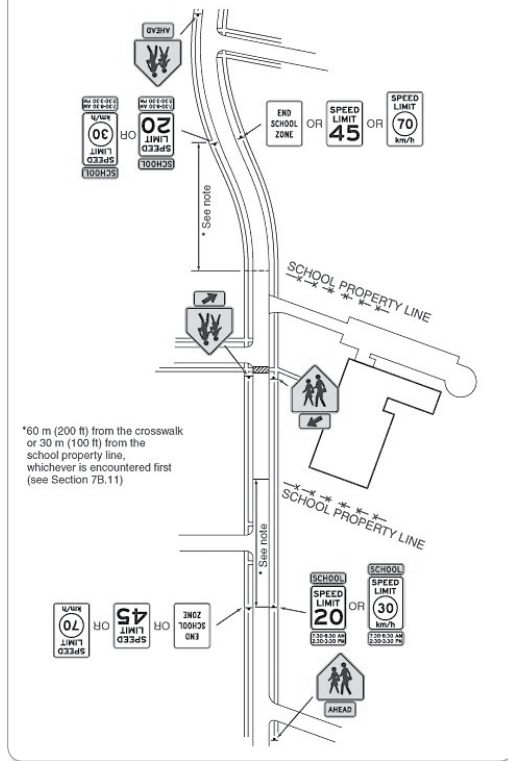
### School Zone Signs and Pavement Markings

The *Manual on Uniform Traffic Control Devices*, or MUTCD defines the standards used nationwide to install and maintain traffic control devices on all streets and highways.

The MUTCD is published by the Federal Highway Administration (FHWA) and all SRTS projects must be in compliance. The MUTCD can be found online at <http://mutcd.fhwa.dot.gov/>.

In addition, WisDOT, in conjunction with county, city and local governmental agencies collaborated to develop the Wisconsin Manual

Figure 7B-3. Examples of Signing for School Area Traffic Control with School Speed Limits



on Uniform Traffic Control Devices (WMUTCD). This manual provides additional information on how to properly install and use traffic control devices. The goal is to ensure that all traffic control devices and other related items built in Wisconsin are uniform. All SRTS projects must meet the standards set forth in these documents. The Wisconsin MUTCD can be accessed online at [http://dotnet/dtid\\_bho/extranet/manuals/wmutcd/index.shtml](http://dotnet/dtid_bho/extranet/manuals/wmutcd/index.shtml).

Properly placing signs and pavement markings within school zones can improve safety by providing more visible and clear direction to drivers. However, signs should not be over used, as too many signs can confuse drivers. In addition, once they are installed it is important keep them maintained and free from obstructions to keep them visible. Schools are increasingly using "Yield to Pedestrian" signs placed in the middle of the street. These signs can either be permanently installed in the roadway or with a portable base. Often schools use the signs only at the beginning and end of the school day. A school official or adult crossing guard can be responsible for putting them out and removing them as needed.

## Sidewalks

A safe walking route to school is difficult to establish without sidewalks. According to a study by the UNC Highway Safety Research Center, areas with paved sidewalks are 88.2% less likely to be a crash site than those without after accounting for traffic volumes and speed limits.

When designing a sidewalk, it is helpful to provide a buffer zone so that children are not walking right next to traffic. A buffer between the road and the sidewalk also creates a place for snow in the winter. The buffer zone is often just a strip of grass and trees. However, in some instances a bicycle lane, parked vehicles or items such as benches, lighting and newspaper boxes serve as the buffer.

When planning a new sidewalk the minimum required width is five feet. However, a six-foot sidewalk allows for two people to walk side-by-side while still allowing space for a pedestrian traveling in the opposite direction. In addition, a wider sidewalk should be considered where large numbers of walkers are expected such as adjacent to school grounds.

It is also important to monitor sidewalks to ensure they are well maintained. Poorly maintained sidewalks can create tripping hazards and difficulties for pedestrians in wheelchairs or with strollers or walkers. In addition, poorly maintained landscaping along sidewalks can make it difficult for pedestrians to use the sidewalk or be seen by other users.

## Curb Ramps and Truncated Domes

ADA guidelines recommend two curb ramps at each corner rather than one curb ramp in the center. Two ramps guide sidewalk users along a safe, direct line of travel across the road.

ADA guidelines require that a truncated dome warning strip is placed along the bottom of all new curb ramps. These small, flattened domes can be felt underfoot and by cane serving as a warning that pedestrians are transitioning from sidewalk to road.

The Wisconsin DOT Facilities Development Manual (WisDOT FDM) states that for state and federal projects the standard width of ramps is 5 feet wide and the maximum grade is 8.3%. In addition, all new and altered intersections shall include truncated domes. Ramps need to have a minimum 4' by 4' landing on the top, which is not to exceed a 2% slope in any

one direction. The WisDOT FDM section includes the ADA requirements and also contains Wisconsin state law related to curb ramps. This information is available online at <http://roadwaystandards.dot.wi.gov/standards/fdm/11/11-25-30.pdf>.

A summary of other pedestrian access issues can be found online at <http://www.dot.wisconsin.gov/projects/state/docs/ped-ada.pdf>.

***In Eau Claire, neighborhoods built in the 1960s are missing curb ramps at many intersections along designated Safe Routes to School. In order to more safely guide students through these crossings, Eau Claire began replacing curbs with in-line ramps where possible. This usually requires building two ramps at each corner as single ramps pointing to the center of the intersection tend to lead bicyclists out into the middle of the intersection and into traffic.***

***Eau Claire continues to add curb ramps to neighborhood streets as they feel a Safe Route to School must accommodate wheeled travelers to encourage families to walk and bike to school. Eau Claire has found young students cross the road from nearby driveways when curb ramps are not present at the street crossing. Often, this results in bicyclists riding in the street against the flow of traffic until their return to the sidewalk can be made. In addition, many babies and toddlers in strollers join parents on the walk to school. Parents can be discouraged when their baby strollers or toddler's trike has to be lifted over a curb to continue the journey.***

### **Bicycle Facilities**

Bicycling is an important way for children to get to and from school especially if they live too far from school to walk. Use of on-street facilities is most appropriate for upper level elementary school students and older children who have sufficient bicycle skills and knowledge. In many communities most bicycling occurs on neighborhood streets where children live and go to school. However, trails and pathways can complement this network of neighborhood streets. The Wisconsin Bicycle Facility Design Manual covers the basic design features and approaches for accommodating bicyclists from improving roadways to designing separate multi-use paths. This manual includes all the design specifications that SRTS projects must meet when constructing a bicycle facility. The manual is online at <http://www.dot.wisconsin.gov/projects/state/docs/bike-facility.pdf>.

### **Multi-Use Paths**

Paths can connect neighborhoods directly to schools and in some instances decrease the distance that children need to travel.

### **Pedestrian Bicycle Bridges and Tunnels**

Sometimes a bridge or tunnel can help connect neighborhoods and schools when major freeways or major multi-lane high-speed arterials exist. However, bridges and tunnels are very costly to build and if the bridge or tunnel is not convenient it may not be used. In addition, it is important to consider security issues, drainage problems, lighting and maintenance issues that are unique to these facilities.

### **Bicycle Racks**

Providing a convenient and safe place for bicycles to park is important. A good bicycle rack should keep the bicycle upright by supporting the frame without bending the wheel and should allow for proper locking with both the frame and at least one wheel secured. Bicycle racks should be placed on hard surfaces that will not become muddy after rains. Also, racks should be placed in locations that will discourage vandalism and do not require children to ride through car and bus traffic to access. In addition, some schools have established a "lock library" where children who forget their locks can check one out to use for the day. For more information on bicycle rack design and placement see the recommendations compiled by the Association of Pedestrian and Bicycle Professionals at <http://www.bicyclinginfo.org/pdf/bikepark.pdf>.

***In Osceola, new residential areas were developed without creating safe routes to school. In one instance, students who wanted to walk or bike to school had to travel 2 miles and cross 23 intersections plus downtown business park driveways to get there. Osceola's SRTS Planning process led to a plan for a multi-use path that decreased the travel distance to school to less than one mile and reduced the number of intersection crossings for over 25% of their students.***



*Responding to concerns about unsafe crossings, Eau Claire constructed curb extensions like the one pictured above. The new design reduces traffic speed, makes pedestrians more visible to cars and lessens the crossing distance, all of which increase pedestrian safety.*

## Street Crossings

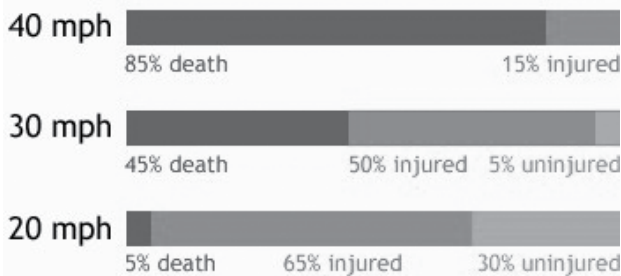
When developing street crossings consider how to slow motor vehicle speeds, reduce crossing distances, and place traffic controls appropriately.

Curb extensions, which extend the curb out from the sidewalk and into the street typically at an intersection, are commonly used to make streets easier to cross. Curb extensions reduce the distance pedestrians must walk in the street and can also make children more visible. However, not all streets will accommodate curb extensions. Pay particular attention to streets that have bike lanes as curb extensions can make bicycling more difficult.

Pedestrian islands are also used to simplify a crossing by breaking it into two pieces. These can be located at an intersection or midblock. By breaking the crossing into two stages, crossing islands improve pedestrian wait time, reduce crossing distance and allow pedestrians to cross one direction of traffic at a time. If these are placed near a school it is important that they are designed to accommodate groups of children crossing at one time.

Countdown Pedestrian Signals help by giving pedestrians information on how much time remains for crossing. The flashing DON'T WALK is often not enough information, especially for children. The countdown signal timer shows the number of seconds remaining to cross the street. Some studies have shown that countdown signals reduce the number of stragglers in the street when the signal changes.

### Pedestrian Injuries at Impact Speeds



## Slowing Down Traffic

Slowing down traffic is integral to improved pedestrian safety. Slowing down traffic reduces the chance of pedestrian or bicyclist injury as drivers have the ability to stop over a shorter distance. The severity of the crash is also much lower at slower speeds. There are many design solutions that can be used to slow traffic.

Many local agencies have used speed humps to slow down traffic. Modern speed humps are 12 to 14 feet wide and are rounded. They are most often used on neighborhood streets. It is necessary to work with the fire, police and streets departments to ensure that emergency vehicles and snow plows are not impeded.

Raised Pedestrian Crosswalks calm traffic by extending the sidewalk across the road and bringing motor vehicles to the pedestrian level. The raised crosswalks allow the pedestrian to cross

at a nearly constant grade without the need for a curb ramp. In addition, raised crosswalks can be used in school parking lots both slowing traffic and providing a safer crossing for pedestrians.

Traffic circles are another way to help slow traffic on local and collector streets. Traffic islands are not typically used at school crossings but can be used at another location along a Safe Route slowing traffic along the entire street. Traffic islands often include landscaping to make them more visible and more aesthetically pleasing to a neighborhood.

### **Enforcement**

ENGINEERING IMPROVEMENTS ALONE WILL NOT guarantee a safer driving, bicycling and walking environment. For that reason *Safe Routes to School Programs* should partner with local law enforcement agencies to help ensure good driving, bicycling and walking behavior.

Although many people see enforcement merely as police officers writing tickets, *Safe Routes to School* recognizes that local law enforcement can be involved in a variety of ways. One strategy is to increase the presence of police officers around schools to discourage dangerous driving or other unlawful activity. Further, they can help evaluate traffic problems and create practical solutions. Police officers can also help educate students, parents and the community about safety issues.

### **Law Enforcement**

An important first step is to ensure that officers have received proper training before starting an enforcement campaign. In Wisconsin officers can take a course entitled *Wisconsin Pedestrian/Bicycle Law Enforcement Training* designed to improve safety by educating law enforcement about pedestrian and bicycle rights. This course provides information about the most common violations that cause pedestrian and bicycle crashes, what violations need better enforcement, and how to raise awareness about accident prevention. Law enforcement officers played a great role in designing this course.

FOR MORE INFORMATION ON THE *Wisconsin Pedestrian/Bicycle Law Enforcement Training* see the last section of the Toolkit entitled Additional Funding and Related Programs.

### **Officers who attended the Wisconsin Pedestrian/Bicycle Law Enforcement training in Green Bay in June 2007 said:**

***“Excellent course of instruction, many concepts were explained that after years of law enforcement were not thought of.”***

***“The field work supplemented the lecture nicely.”***

***“This class turned out to be a much better class than I anticipated it to be. When officers are not clear on the bike/ped laws it’s easy to not take any enforcement action.”***

***In Milwaukee, the Police Department used staggered enforcement around six pilot schools to determine the most common traffic violations. Enforcement was increased in areas where speeding, failing to yield to pedestrians, and other violations were frequently occurring. Milwaukee also established a school crossing guard program to help students safely cross the street.***

### ***Speed Trailers and Radar Speed Signs***

Speed trailers and signs show drivers how fast they are going with the goal of slowing drivers down. These devices can often collect speed data throughout the day as well as conduct traffic counts. This information can be used to measure their effectiveness (does traffic really slow down over time in response to the trailer or sign?) as well as to identify times during the day when more enforcement is needed.

***The City of Wauwatosa installed a solar powered school crossing sign coupled with a radar feedback sign in the late fall of 2006. The sign was placed well in advance of the school crossing thus giving drivers sufficient time to slow down. Background data was collected before activating the sign and a decrease in speed was noted the first few days after activation although more time is needed to fully evaluate the long-term benefits.***

***Wauwatosa intends to install speed radar feedback signs at additional locations and will be evaluating whether these signs can play a role in decreasing speeds, which was found to be a major issue near their schools. In order to enhance effectiveness, the speed display signs will only be activated during school crossing hours. In addition, all of the devices will be equipped with data gathering capabilities. This way, should the data show that speeds during crossing times are excessive, the police will be dispatched to do targeted enforcement.***



### ***Education***

LAW ENFORCEMENT OFFICERS CAN ALSO play a key role in other parts of a *Safe Routes to School* program. They can be important partners in education programs aimed at children, parents and neighbors.

***In Prairie du Chien the police department partners with the Gundersun-Lutheran Clinic to hold a Bicycle Safety Day for children ages 4–14. The event includes a bike safety check, bike safety training, a safety discussion led by a local police officer along with a prize giveaway that includes two kid's bicycles. The Gundersun-Lutheran Clinic helps staff the event and provides bicycles and helmets for the skills training. The Prairie du Chien Police Department has a Bicycle Patrol Unit interested in educating citizens about bicycle safety. The Bicycle Safety Day provides one way for them to reach out to the children in their community.***

*In Milwaukee, the Bicycle Federation of Wisconsin worked with six pilot schools to develop their own bicycle and pedestrian education program. This program was taught to more than 1,400 students. There was a 37% increase in bike safety knowledge as well as an increase in bike travel to school as a result of this effort. The curriculum that was developed for this program is available online at [www.bfw.org](http://www.bfw.org).*

*In Madison, the Bicycle Federation of Wisconsin worked with both Cherokee and Sherman Middle Schools to provide bicycle education and encouragement through after school Bike Clubs. The Bike Clubs focused on learning safe bicycle skills as well as topics such as bicycle maintenance. Bike Clubs were marketed as a fun after school activity attracting participants and providing a setting to teach them safe bicycling skills*

*Teachers at Shorewood Hills Elementary School in Madison work with the UW Hospital and the ThinkFirst program to stress the importance of bicycle safety—especially wearing a helmet. Safety presentations are given to second and third graders and helmets are made available to those who need them. Find out more about ThinkFirst at [www.thinkfirst.org](http://www.thinkfirst.org).*

*At DC Everest Junior High School in Weston, school administrators plan to add a unit on pedestrian safety to their Physical Education curriculum. Teachers will work with the police department's community safety officer to teach the course. In addition, walking and bicycling safety tips will be added to the school newsletter and a bike safety event will be held at one school in the fall.*

### ***Bicycle and Pedestrian Education***

If children are already walking and biking to school or if you're looking to begin an encouragement program children should receive bicycle and pedestrian education. Before beginning a bicycle education program it is important that the potential instructors are well trained. Instructors interested in teaching a one-day bicycle rodeo can take a free course titled Teaching Safe Bicycling through the Wisconsin Department of Transportation's Bureau of Transportation Safety. In addition, the Bicycle Federation of Wisconsin has developed a bicycle and pedestrian education curriculum for those who want to go beyond just a short rodeo.

#### ***Things to remember about children and bicycling:***

- » Children have a narrower field of vision than adults, about 1/3 less.
- » Children cannot easily judge a car's speed and distance.
- » Children assume that if they can see a car then its driver must be able to see them. However, children are easily hidden from view by parked cars and other objects.
- » Children cannot readily tell the direction a sound is coming from.
- » Children may be impatient and impulsive.
- » Children can concentrate on only one thing at a time.
- » Children have a limited sense of danger.
- » Children often mix fantasy with reality.
- » Children imitate the (often bad) behavior of others, especially older children and adults.

When teaching bicycle skills ensure that all participants wear helmets. Teaching children the importance of wearing a helmet is critical and a habit that should be instilled at an early age. In addition, make sure your volunteers set a good example by wearing their helmets when riding.

### **Environmental and Health Education**

Children and parents can also learn about the health and environmental benefits of walking and biking. The impact of motor vehicle use on air quality and the long-term health benefits of daily physical activity can be stressed.

*In Middleton the Assistant City Planner and a Police Sergeant worked with two high school teachers to add SRTS curriculum to their Environmental Studies classes. The high school students conducted student and parent surveys and brainstormed ways to incorporate the “E’s” to improve the safety of children at each of the school district’s six elementary and two middle schools. Students worked in small groups to create educational posters, brochures, maps and safety guidelines. The students’ work not only helped them better understand important transportation issues but also helped raise awareness of SRTS among City and School District officials. In addition, the students’ work was used to create Middleton’s SRTS application.*

*At Middleton’s Northside Elementary School, the City and School will be working together to educate parents about how their travel choices affect air quality. Parents are often concerned about the safety of their children walking or biking to school during times of high vehicle congestion. However, high numbers of idling and slow-moving vehicles also generate exhaust emissions that negatively impact air quality. In addition to being inhaled by all students as they travel to or wait to enter the building, these vehicle emissions also get into building air intake systems where they are likely to linger long after the vehicles have left.*

*Middleton intends to undertake an educational campaign about this important issue to raise awareness among members of the school community. In addition, Middleton will be measuring changes in travel behavior and air quality before and after the campaign. It is their hope to develop a program that can be used at other schools.*



### **Personal Safety Education**

Many communities and schools use their *Safe Routes to School Programs* as an opportunity to teach children a variety of ways to stay safe. Fear of abduction or assault is a common worry for parents that prevent them from allowing their children to walk or bike to school. *SRTS programs* need to address parents’ perceptions of this danger as well as teach children about the real dangers that exist. Many schools work with local law enforcement agencies to teach children about stranger danger. In addition, walking school buses can be started as a way to address parents’ fears by creating a reliable way for children to walk to school under adult supervision. In addition some schools teach about bullying and violence prevention along with bicycle and pedestrian safety.

**Superior has numerous rail lines throughout the city that create safety hazards for children walking and bicycling to school. Superior plans to teach children about railroad safety using materials from Operation Lifesaver. For information about this program, visit [www.oli.org](http://www.oli.org).**

*Milwaukee and Madison have been working on a program called StreetShare. This program is designed to educate and encourage motorists to respect pedestrian and bicycling rights including yielding to pedestrians at a crosswalk, driving within the speed limit and sharing the road with bicyclists and other users. Companies, municipalities and individuals sign a pledge agreeing to behave accordingly. To find out more go to [www.streetshare.org](http://www.streetshare.org).*

*Marshfield plans to educate their students about safe walking and bicycling through art. Elementary school students will develop art that reflects important safety messages through a program called Safety Art. Middle School students will work with local businesses to develop an ad campaign focusing on the importance of driver awareness.*

*Midvale Elementary School in Madison created a "Safe Arrival to School" program by working with school staff, parents and neighbors. The group identified safety concerns and then worked with the Madison Health, Police, and Traffic Engineering Departments to implement solutions. In addition to creating well marked drop-off and pick-up locations for driving parents, a brochure was created to help parents and students work together to come to school safely. The brochure is printed in both English and Spanish and is distributed to the whole school community.*



*The Superior School District and the Metropolitan Interstate Council cosponsored a BE ALERT billboard campaign. These signs were posted from September 15 through October 15th at three locations near local schools.*

### **Educating Drivers**

Parents, neighbors and other community members may drive near the school each day. All of these people can help or hinder safety near the school. For that reason it is important to educate drivers so that they travel at safe speeds, yield to pedestrians and bicyclists and stop at stop signs. This will help create a bicycle and pedestrian friendly environment near the school.

Many communities also sponsor yard sign campaigns with messages such as "Drive 25, Keep Kids Alive" that remind drivers to slow down. This is one way to encourage individuals to make their own commitment to driving the speed limit.

Radio or Public Service announcements during prime commute times can also be effective. Combining these with an overall media campaign that includes newspaper articles or television features can really make an impact both drawing attention to the importance of safe driving and highlighting your local SRTS program.

Special attention may need to be given to parents who frequently drive their children to school as all too often they contribute to safety problems. A variety of tools can be used.

Well established methods such as articles in backpack newsletters, on school Web sites and in e-mails sent to parents can be effective. Some schools hand out information flyers to parents as they drive up to the school. In addition, clear signage and pavement markings can guide parents safely through the school area. In addition, a *SRTS* committee may want to invite the school PTO to address this issue as often times parents are unaware how their own driving behavior creates risks .

### ***Encouragement***

ENCOURAGEMENT IS ANOTHER KEY COMPONENT of a *Safe Routes to School* Program. Convincing children as well as parents that walking and biking to school is safe, fun and healthy can be difficult especially since parents and children may be reluctant to alter their already established routine. That is why it is important to offer walking and biking activities and events that are fun, safe and easy. And, encouragement activities can often be easy as well as inexpensive to start. Communities often start their encouragement programs by holding a *Walk to School Day* event.