About the Toolbox

This Toolbox provides guidance on physical infrastructure projects that make walking and biking to and from school safer and more accessible. The infrastructure “tools” in this document supplement the Pedestrian Safety Toolbox in the Milwaukee Pedestrian Plan. While many other infrastructure tools are available, these tools are proven to improve safety for students as they walk and bicycle to school.

A list of common standards and guidance documents for the design of bicycle and pedestrian facilities is included at the end of this Toolbox.

The Milwaukee Pedestrian Plan is available online: https://milwaukee.gov/pedplan

The City of Milwaukee built curb extensions in front of Clement Avenue School to improve safety for students after a person drove a car into three children in the crosswalk. School crossing signs and transverse crosswalk markings also increase the visibility of the crosswalk.

The School Safety Infrastructure Toolbox was prepared by Toole Design under the oversight of the City of Milwaukee Department of Public Works as part of the 2020 Safe Routes to School Strategic Plan development.
Safety Infrastructure Tool Selection Matrix

With so many tools available, it can be difficult to know which one(s) will have the greatest safety benefits. The table below will help in selecting the right tool for addressing common safety concerns near schools. The tools can be used together, and often greater safety gains can be expected when more than one tool is used.

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**Capital Improvements**
- Sidewalks
- Curb Ramps
- Curb Extensions
- Pedestrian Islands
- Speed Humps & Speed Tables
- Raised Crosswalks & Intersections
- Right-Turn Redesign
- Shared-Use Paths on School Site

**Signs and Markings**
- Lane Widths
- Road Diets
- Marked Crosswalks
- Yield to Pedestrian Signs
- Advance Yield Markings
- Speed Feedback Signs
- Stop Signs
- Parking Restrictions Signs
- Turning Vehicles Yield to Pedestrian Signs
- School Zones and School Crossing Signs

**Signals**
- Leading Pedestrian Intervals
- Protected Left Turns
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- Pedestrian Beacons
- Traffic Signals

**Other**
- Bicycle Parking
- Included in Milwaukee Pedestrian Plan Safety Toolbox
- Arrival-Dismissal Traffic Safety Plan
- Consider tool to address safety concern
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Curb Ramps

Description
Curb ramps provide people walking, people pushing strollers, and people in wheelchairs (or other mobility devices) with a smooth transition from the sidewalk to the street. Curb ramps are critical for providing access at intersections and midblock crossings for people with mobility and vision disabilities. Americans with Disabilities Act (ADA) guidelines require all crosswalks to have curb ramps that are accessible to people with disabilities. Curb ramps also benefit children on bicycles and people with strollers, grocery carts or suitcases.

Benefits
• Improves access for people walking, using mobility devices, and people pushing strollers.

Typical Application
• Whenever possible, curb ramps should align with the crosswalk to allow people to maintain a straight route into the crosswalk. In general, this means providing two separate curb ramps that are perpendicular to the street, instead of one diagonal ramp at the corner that serves two crosswalks.
• Curb ramps should be designed to avoid the accumulation of water or debris. Where possible, drain inlets should be located on the uphill side of the ramp.
• During winter, snow and ice must be cleared from curb ramps to provide an accessible route.

Considerations
• The two most common types of curb ramps are diagonal and perpendicular. Diagonal ramps are commonly found at the corners of intersections along the curve and often serve more than one crosswalk. Diagonal ramps are not preferred because they direct people into the intersection away from the most direct path. Perpendicular ramps are perpendicular to the street and direct people in the direction they wish to travel. Perpendicular curb ramps should be the standard design for all curb ramps in Milwaukee. When perpendicular ramps cannot be constructed due to design constraints, diagonal ramps are acceptable, but the justification for using a diagonal ramp shall be documented.
• Curb ramps should be designed to minimize the accumulation of water, leaves, debris, and ice. Regular maintenance may be necessary to maintain curb ramps free of these hazards.

School-Specific Recommendations and Considerations
• Designers should strive to use perpendicular curb ramps that are aligned with crosswalks at intersections near schools and at intersections with a crossing guard.

Example of a diagonal curb ramp (top) and perpendicular curb ramps (bottom)
**Speed Humps & Speed Tables**

**Description**

Speed humps are vertical traffic control measures intended to reduce vehicle speeds. A speed table is longer than a speed hump and has a flat top. Placed mid-block, speed humps have been shown to effectively reduce overall traffic speeds. Speed humps or speed tables enable vehicles to proceed comfortably over the device at or below the speed limit but cause discomfort when traversed at excessive speeds.

**Benefits**
- Speed humps reduce motorist speeds.
- Speed humps may reduce crashes by up to 50%.

**Typical Application**
- Speed humps are typically installed only on residential streets, although in some circumstances, speed tables may be appropriate on streets with higher traffic volumes.
- The standard height of a speed hump in the City of Milwaukee is 4.5 inches above the street surface.
- The City of Milwaukee typically installs speed humps that are 12 feet wide. They are generally shaped like an arch gradually rising from 0 to 4.5 inches over 6 feet and then back to street level. Speed tables generally have a short ramp, between 3 and 6 feet, at the beginning and end of the flat top.

**Considerations**

- While speed humps are commonly referred to as "bumps" on signs and by the general public, speed bumps are taller with less gradual transitions. Speed bumps should never be installed on public streets.
- Along streets with an incline, designers should locate the speed hump where it can be clearly visible to people bicycling and driving. Additional pavement markings and signs may be needed to alert people bicycling.
- Speed humps should be used in series or supplemented by other traffic calming measures to effectively reduce speeds throughout a corridor or neighborhood. When used alone, speed humps may result in speed spiking which means that motorists drive at higher speeds between the humps.
- Installation should be coordinated with snow removal operations and emergency response agencies so that operators are aware of the presence of the speed humps.
- The Wisconsin supplement to the MUTCD recommends that the SPEED HUMP (W17-1) sign should be used in conjunction with the speed hump.

**School-Specific Recommendations and Considerations**

- In locations with higher traffic volumes, other traffic calming measures such as pedestrian islands and curb extensions should be considered to improve visibility for people crossing the street and slowing traffic at all times of day.

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Shared-Use Paths

Description
A shared-use path is a facility designed for and generally used by people walking, using mobility devices, bicycling, and other nonmotorized users. In Milwaukee, shared-use paths are paved. Shared-use paths are physically separated from motorized traffic and may be located adjacent to a street or in an independent right-of-way such as in a park, stream valley, greenway, along a utility corridor, or an abandoned railroad corridor. Shared-use paths must comply with the accessibility requirements of the Americans with Disabilities Act (ADA).

Benefits
• Physically separated from motor vehicles.
• Comfortable for people of all ages and abilities.
• Can provide shortcuts through neighborhoods (for example, connections between cul-de-sac streets).
• Can provide access to areas that are not directly accessible by the street network such as large parks, waterfronts, institutional campuses, museums, etc.

Typical Application
• Should be designed according to applicable best practices, such as the AASHTO Guide for the Development of Bicycle Facilities.
• The recommended width for a two-way shared-use path is 10 feet. If higher volumes of people are anticipated, wider paths are encouraged. In rare cases, a reduced width of 8 feet may be permitted; however, it should be discouraged and only used for the minimum length necessary.

Considerations
• Shared-use paths should be considered as part of a complete transportation network.
• Shared-use paths are designed for people walking, recumbent bicyclists, child bicyclists, typical upright adult bicyclists, electric scooter users, electric-assist bicyclists, and others, each of whom has different needs and travel speeds.
• Shared-use paths in the City of Milwaukee are paved.
• Path designs should adhere to best practices from AASHTO and should comply with the ADA.
• Enhanced street crossings should be considered where shared-use paths cross street.
• Lighting should be considered where paths are not adequately lit by nearby street or other lighting.
• Designers should consider enhanced signing and pavement markings where shared use paths cross driveways or intersections. Some confident bicyclists may choose to ride on the street instead of the shared use path.
• Shared use paths can have a life span of 20 years with regular maintenance.

School-Specific Recommendations and Considerations
• On school campuses, shared-use paths can provide dedicated space for walking and biking, often away from bus and personal vehicle loading areas.
Advance Yield Markings

Description
Advance yield lines are pavement markings placed in advance of an uncontrolled and unsignalized crosswalk and are used in conjunction with YIELD HERE TO PEDESTRIANS signs (MUTCD R1-5 or R1-5a). In Milwaukee, advance yield lines are typically installed at midblock crosswalks, crosswalks at free-flow ramps, and roundabouts. This treatment increases the distance between where motorists have yielded and the crosswalk, which improves the visibility of people in the crosswalk and helps reduce multiple-threat crashes. Multiple-threat crashes occur when a driver in one lane yields for a person in the crosswalk and a driver in an adjacent lane does not, striking the person in the crosswalk.

Benefits
- Increases visibility between people driving, walking, and bicycling.
- Reduces multiple-threat crashes.
- Advance yield lines may reduce vehicle-pedestrian crashes by up to 25%.3

Typical Application
- Advance yield markings at unsignalized crossings should be accompanied by YIELD HERE TO PEDESTRIANS signs.
- Advance yield markings should not be used at locations where drivers are required to stop in compliance with a STOP sign or traffic signal.
- Advance yield markings are most helpful at uncontrolled multi-lane crossings (at least two lanes in one direction).
- The City of Milwaukee typically installs advance yield markings 15 feet in advance of crosswalks.
- Parking should be prohibited in the area between the yield line and the crosswalk.

Considerations
- Advance yield markings are appropriate at midblock crossings, crosswalks at free-flow ramps, and roundabouts.
- When determining where to place advance yield lines and signs, consideration should be given to the number of lanes people walking and biking must cross, motor vehicle speeds, sight-lines, on-street parking, and turning movements.
- Advance yield lines may be staggered so that yield lines in one lane are closer to the crosswalk than the yield lines in the adjacent lane. Staggered lines can improve drivers’ views of people in the crosswalk, provide better sight distance for turning vehicles, and provide increased turning space for large vehicles.

School-Specific Recommendations and Considerations
- Advance yield markings should be considered on four-lane (or wider) streets at uncontrolled intersections where adult school crossing guards are posted.

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Stop Signs

Description
A STOP sign (MUTCD R1-1) is a regulatory sign that indicates when traffic is required to stop. At stop-controlled intersections, drivers must yield the right-of-way to people walking and biking as well as other drivers before proceeding. The primary purpose of a STOP sign is to regulate traffic and not to calm traffic or reduce speeding. However, there are several benefits to all street users as noted to the right.

Benefits
• STOP signs organize the rights-of-way for all street users at an intersection. In other words, STOP signs help everyone take turns when passing through an intersection.
• Stop-controlled approaches support walking by reducing vehicle speeds, providing gaps for pedestrians to cross streets, improving visibility at intersections, and reducing the number of severe crashes.
• Stop-controlled intersections may reduce the amount of time people must wait to cross streets where drivers do not otherwise yield to pedestrians at crosswalks as they are legally required to do.
• Stop bars, markings that indicate to drivers where they should stop at a stop-controlled intersection, can reduce encroachment by drivers into crosswalks.

Typical Application
• STOP signs are typically installed when specific requirements are met; refer to the Manual on Uniform Traffic Control Devices.
• STOP signs may be installed on any or all legs of an intersection. Where a minor street intersects with a major street, it is common to install STOP signs just on the minor street (two-way stop). Where traffic levels are relatively even between the intersecting streets, STOP signs may be installed on all intersection legs (four-way or all-way stop).

Considerations
• STOP signs should not be used to control speeds or traffic volumes.
• Stop lines at stop-controlled intersections should be located at least 8 feet in advance of crosswalks.
• The Milwaukee Common Council approves the locations of all STOP signs through legislation.
• At intersections where a full stop is not necessary at all times, consideration should be given to using less restrictive measures, such as YIELD signs (MUTCD R1-2).
• Where feasible, STOP signs should be limited on streets with bikeways, such as along bicycle boulevards, except where they help people walking or biking cross busy streets. Stopping and restarting often requires significant energy for people bicycling, so they may not comply with the signs.

School-Specific Recommendations and Considerations
• Because STOP signs primarily regulate traffic, additional safety and traffic calming measures may be needed around schools with very active intersections during arrival and dismissal times. At all-way stop-controlled intersections, drivers often need to quickly perform right-of-way decisions such as yielding to pedestrians and other drivers. Uncertainty in these decisions can create confusion for both drivers and people walking. In many cases, a school crossing guard can help organize these movements by indicating who must yield the right-of-way.
• Other traffic calming measures such as pedestrian islands may be better suited to provide multiple benefits of improving visibility for people crossing, allowing two-stage crossings at intersections, and slowing traffic.
Parking Restriction Signs

Description

Parking may be restricted by limiting the amount of time that a driver may park or stop by removing parking altogether. Parking restrictions can be used to improve visibility between people walking, bicycling, and driving, and to create space for school drop-off and pick-up activities. Removing parking space(s) at an intersection can improve the visibility of the crosswalk. Generally, vehicles should not be located within at least 20-25 feet of an intersection to provide adequate sight lines. State law prohibits parking within 15 feet of a crosswalk, regardless of if the crosswalk is marked or not.

Benefits

- When parking restrictions are used to improve visibility of crosswalks, vehicle-pedestrian crashes may be reduced by up to 70%. 4
- Parking restrictions can be used to provide space for school drop-off and pick-up activities.

Typical Application

- School drop-off and pick-up areas.
- Approaches to intersections and crossings where parked vehicles block visibility of pedestrians, or where stopped motorists block curb ramps or crosswalks.
- Approaches to intersections and crossings with high numbers of people walking or biking.
- Intersections and crossings with high frequencies of pedestrian-vehicle conflicts.

Considerations

- In some cases, it may be necessary to provide physical street barriers to prevent motorists from parking near crosswalks, such as curb extensions, or interim measures such as planters or vertical flexible delineators.
- Community stakeholders, such as nearby property owners and business who might be impacted by parking space removal, should be notified about proposed changes to on-street parking and given the opportunity to comment.
- Parking restrictions without physical barriers usually require enforcement efforts such as ticketing.
- Parking restrictions can either be implemented on a permanent basis or during certain times of day.
- The Milwaukee Common Council approves the proposed changes to on-street parking and given the opportunity to comment.

Parking Restriction Signs

Example Signs to Accommodate Family Parking (Driver walks students to/from the school entrance)

Example Signs to Accommodate Drop-off/Pick-up (Driver remains in vehicle)

Example Signs to Improve Visibility of Crosswalks (All stopping, standing, and parking prohibited)

School Zones and School Crossing Signs

Description
School zone signs and school crossing signs can alert drivers that children are likely to be crossing the street and can increase the visibility of key crosswalks, especially where adult school crossing guards are posted. The Wisconsin supplement to the MUTCD (Part 7, Traffic Controls for School Areas) establishes the school zone signing requirements according to Wisconsin State Law.

Benefits
- School Zone and School Crossing signs increase awareness of the presence of the school.
- School Crossing Signs increase visibility of crosswalks, which can reduce pedestrian crashes.
- SCHOOL SPEED LIMIT signs support law enforcement in efforts to reduce speeding near schools.

Typical Application, using Wisconsin MUTCD Guidance

School Zones
- Install School Zone Ahead assemblies one block ahead on streets adjacent to the school with a school crossing or reduced speed limit.
- Install the END SCHOOL ZONE sign at least one block after the school.
- Residential blocks in Milwaukee are approximately 300 to 500 feet long. If there are no cross streets in the near vicinity of the school, use a distance of about 400 feet.

Turning Vehicles Yield to Pedestrians Signs

Description
At traffic signals where people cross the street while parallel vehicles are also moving (known as concurrent pedestrian phases), turning vehicles do not always yield to people in the crosswalk as required. TURNING VEHICLES YIELD TO PEDESTRIANS signs (MUTCD R10-15) may be used to remind drivers to yield to people walking and biking as they turn across the crosswalk.

Benefits
- Crashes with pedestrians occur far more often with turning vehicles than with vehicles going straight.
- Right turning vehicles often have a green traffic signal at the same time that pedestrians have a walk signal, as illustrated in the graphic.
- TURNING VEHICLES YIELD TO PEDESTRIANS signs remind drivers of their obligation to yield to people walking and biking in the crosswalk.

Considerations
- There is no available research to support whether installing TURNING VEHICLES YIELD TO PEDESTRIANS signs is an effective tool at decreasing crashes with pedestrians. Therefore, it is recommended that such signs be used in conjunction with Leading Pedestrian Intervals (see the Milwaukee Pedestrian Plan, page 72).
- Right-Turn-on-Red Restrictions are another proven safety countermeasure that reduces the rate of turning vehicle collisions with pedestrians (see the Milwaukee Pedestrian Plan, page 74).
School Speed Limits
- DPW should determine if a reduced speed limit is desired on streets with school zones.
- If reduced speed limits are desired, the School Speed Limit assembly should be installed.
- The minimum distance between the School Speed Limit assembly and the School Crossing assembly is 200 feet. For reduced speed limits of 30 mph or higher, the 200-foot distance should be increased (see illustration on next page).
- The END SCHOOL ZONE sign is typically placed as close as practical across the street from the School Speed Limit assembly facing the opposite direction.

School Crossings
- The School Crossing assembly should be installed at all uncontrolled crosswalks immediately adjacent to the school site. Install School Crossing signs near the school at crosswalks where adult school crossing guards are posted, or on other routes that are known to have many students crossing during arrival and dismissal.
- School Crossing signs shall NOT be installed on approaches controlled by STOP or YIELD signs, or at signalized intersections.

Considerations
- In many cases, a crossing guard may be stationed at a crosswalk several blocks from the school on a busy street. The Milwaukee Police Department Safety Division maintains a list of all crossing guard locations in the City. School zone, school speed limit signs, and school crossing signs should be established around such crosswalks, even if they are several blocks from the school.
- A School Zone Assembly may be installed on the cross street near the school with a supplemental arrow (W16-5P or W16-6P) to alert motorists turning into the school zone that children may be present.

Example illustration of placement of School Zone and School Crossing signs
Traffic Signals

Description
Traffic signals are electrically operated traffic control devices that assign the right-of-way to roadway users at intersections. Similar to stop signs, they create gaps in the traffic flow to allow people walking and biking to cross the street at locations where users would otherwise experience long delays or have difficulties crossing the street safely. The MUTCD sets the requirements for where traffic signals can be installed on motor vehicle, bicycle, and pedestrian traffic volumes, among other factors.

Benefits
• Traffic signals can help create gaps in the flow of traffic so that people walking and biking can safely cross streets.
• Traffic signals improve pedestrian safety if they are installed in a way that prioritizes walking and bicycling (see considerations below) and reduces delay.
• In general, signals that provide dedicated cycles for left turning vehicles, longer cycle lengths for people walking, or traffic signals installed in conjunction with marked crosswalks and pedestrian countdown signals are associated with improved pedestrian safety.5


Typical Application
• Traffic signals should be installed in locations that currently meet or are projected to meet MUTCD guidelines. Designers should use the MUTCD’s school crossing guidelines in locations where a traffic signal is being considered near schools.
• Install marked crosswalks and advance stop bars at all signalized intersections to reduce vehicle encroachment into crosswalks. Use the Crosswalk Marking Policy from the Milwaukee Pedestrian Plan to determine the type of crosswalk marking. In most cases, the crosswalk should be a high visibility crosswalk marking.
• Provide pedestrian signal heads at every signalized crossing. There is always the potential for pedestrian use at intersections, even if no sidewalks or crosswalks are present. Pedestrians should always be considered in new and modified signal design projects.

Considerations
• Use fixed time signals as opposed to actuated signals.Requiring people walking to push a button to activate the pedestrian signal (actuation) should only occur at locations where there are few people walking and biking throughout the day. Using fixed signals increases the predictability for all users of the street network. Actuation should be accessible to pedestrians of all abilities.
• Short signal cycle lengths minimize delay for all street users in urban environments. Signal cycle lengths of 60-90 seconds are ideal for urban areas, and reduce the likelihood that pedestrians will cross the street before receiving a walk signal.
• Minimize the number of signal phases. While separating traffic through signal phasing may have safety benefits, additional phases increase wait times for everyone by increasing the overall length of the signal cycle.
• Implement Leading Pedestrian Intervals (LPIs) in areas where many people walk, including, but not limited to, schools, parks, senior centers, community centers, business districts, and major transit hubs, and intersections where many drivers are turning right (see the Milwaukee Pedestrian Plan, Page 72).

5 Right Turn on Red Restrictions (Milwaukee Pedestrian Plan, Page 74) should be considered when one or more of the following conditions apply:
• An exclusive pedestrian phase;
• A leading pedestrian interval (LPI);
• High volumes of people walking and biking;
• Where bicycle two-stage turn queue boxes are installed;
• Poor sight distances and visibility;
• Locations where poor intersection geometry causes unexpected conflicts;
• Locations on the Pedestrian High Injury Network (see the Milwaukee Pedestrian Plan); or
• Locations with a reported crash history.

School-Specific Recommendations and Considerations
• Ensure that pedestrian signals provide enough time for people walking to cross the street. Consider reducing typical walking speed assumptions to 2.8-3.0 feet per second as recommended by applicable best practices, particularly in areas near schools, community centers, and senior housing.
• Installing two curb ramps per corner that are aligned with crosswalks can help shorten crossing distances for children.
• Pedestrian signals at intersections where crossing guards are posted may need to account for the time it takes for the crossing guard to walk to and from their position in the center of the street.
• Provide streetlights on all four corners to properly illuminate crosswalks. Children are smaller and more difficult for motorists to see, especially in darker conditions that may occur at school start times during winter months.
Bicycle Parking

Description
Provision space to park bicycles is key to increasing the rate of people bicycling. Bicycle parking is necessary at destinations commonly accessed by bike, including schools, parks, libraries, commercial districts, and grocery stores.

Benefits
- Provides places to secure bicycles, reducing bicycle theft.
- Ensures that bicycles are parked in locations that provide accessible walkways, and spaces for other uses.
- Adequate bicycle parking placed near destinations and building entrances encourages proper parking of bicycles and reduces the locking of bicycles to trees, benches, fences, railings, and other fixed objects.

Typical Application
- Short-term bicycle parking—defined as parking for up to two hours—should be located within 50 feet of the entrance it serves.
- Long-term bicycle parking—defined as parking for greater than two hours—can be further from the entrance, but ideally offers increased security and is covered.

Considerations
- Bicycle racks should support bicycles upright without putting stress on the wheels. The racks should provide two points of contact with the frame. Racks should accommodate a variety of bicycles and attachments and allow locking of the frame and at least one wheel to the rack. The City of Milwaukee Bicycle Space Parking Ordinance provides more details on requirements for bicycle racks.

School-Specific Recommendations and Considerations
- Install bicycle racks at schools in locations where they are visible to those inside the school, for example, outside the school office or within range of security cameras.
- Around elementary schools, it is preferable to install bike racks that provide a well to hold the wheel, in addition to two points of contact. Younger students often have difficulty holding their bikes up while they lock them; they usually use cable combination locks, not keyed U-locks; they may not be able to thread the lock through the frame of their bicycle due to the design of many children's bicycles; and finally, children's bicycles often do not use "quick release" levers to attach the wheel to the frame. Therefore, it is important to install bicycle parking that permits locking only the bicycle wheel (not the frame and wheel) to the rack.
- The City of Milwaukee Bicycle Space Parking Ordinance sets forth the following minimum number of bicycle parking spaces. These may need to be increased for schools with high percentages of students who bike:
  - One long-term bicycle parking space per classroom
  - One short-term bicycle parking space per classroom.
Arrival-Dismissal Traffic Safety Plan

Description

An arrival-dismissal traffic safety plan is a description of the desired behavior of students and families during morning drop-off and afternoon pick-up around the school. Parents and caregivers driving to school commonly engage in behaviors that put students at risk, such as parking too close to crosswalks restricting visibility (or blocking the crosswalk itself), making U-turns or backing up near the school. An arrival-dismissal traffic safety plan helps schools address these negative behaviors and promote positive and safe operations around schools.

Once developed, distributing the plans helps inform parents and caregivers about how to travel safely to and from school. Traffic Safety Plans set expectations of behavior and help parents and caregivers understand the procedures and rules (which make them more likely to behave safely).

Benefits

- Addressing the unsafe behaviors of parents and caregivers during arrival and dismissal improves safety for students arriving on foot or by bicycle.
- Developing a guide with the input of parents, teachers, and neighbors can help improve relations between the school and the neighborhood. Once everyone agrees to the new arrival and dismissal procedures, laying out the new rules on paper can help reduce conflicts between families or neighbors during stressful drop-off and pick-up times.
- The process of developing the plan can identify whether procedures can be improved at a school (such as dismissing walkers first) or whether additional changes are needed, such as revised parking restriction signs.
- Arrival-dismissal traffic safety plans tell parents and caregivers what they should and should not do.

Typical Application

- Each arrival-dismissal traffic safety plan should address all of the typical vehicular drop-off and pick-up activities that occur at the school, whether those spaces are within the school parking lot or on the streets adjacent to the school. For example, elementary schools typically need 1) access routes for students arriving on foot or bike, 2) space to accommodate school bus loading and unloading, 3) space for drivers who are parking and walking their children into or from the building, and 4) space for drivers who are dropping off or picking up students without exiting their vehicle. It is helpful to have separate spaces for each activity at the school.
- The arrival-dismissal traffic safety plan can be developed in five steps:
  1. Gather Information. Ask a school staff person or volunteer to summarize current procedures and problems. An online form can be used to collect information such as the number of school buses, the grades and number of students at the school, and the existence of special programs at the school (preschool, afterschool) that affect arrival and dismissal.
  2. Plan and Conduct an Observation. Prepare and use tally sheets to document the number of times unsafe behavior is observed (such as driver U-turns, backing up, not yielding, or students crossing mid-block).
  3. Brainstorm Solutions. Invite the right people to the brainstorming session, including the school principal, interested parents and staff, neighbors, City staff, and possibly local community groups or local police officers. Bring the findings from the observation to the meeting and suggest possible solutions. Solutions will often need to address multiple “Es” of Safe Routes to school, including Encouragement (to reduce the number of vehicles), Education (of both parents and students), and Engineering (such as changing parking restriction signs or street configurations).
     - Before leaving the meeting, try to agree to rules and procedures for the arrival-dismissal traffic safety plan, and schedule a timeline for implementation.
  4. Communicate the New Rules. One of the main tools for communication will be a circulation plan that can be distributed to families and staff. It’s helpful to include a simple map of the campus showing the desired pick up and drop off behavior and locations. To decrease copying costs, the flyer should be legible in black and white.
  5. Implement Changes. Some changes may be easy to implement by using cones to delineate pick up or drop off areas, or by adding staff supervision at arrival or dismissal. Other solutions may require changes to parking restriction signs or street configurations. The best model is to introduce the new rules via a flyer at the end of the school year, implement the changes over the summer, and then start using the new arrival dismissal procedures in the fall.
    - Schools can distribute arrival-dismissal traffic safety plans to parents through the school handbook, via email, or through backpack mail.
    - Arrival and departure procedures require updates; it is recommended that they be reviewed annually.
Considerations

- Arrival-dismissal traffic safety plans should address all modes of travel including waking, bicycling, school bus, transit, and family vehicles.
- Schools should be encouraged to communicate their arrival-dismissal traffic safety plans each school year using a variety of methods. For example, school staff may include it in the school handbook, send handouts home with students, post to the school website, include in school newsletters, text to families, present at parent events, post on social media, or email.
- The safety of students who walk or bicycle is the primary goal.
- It is important to find ways to organize multiple modes of travel.
- Increasing driver convenience and relieving traffic congestion often worsen conditions for people walking and biking and should not be a primary focus.
- Decisions about in-school circulation (how students get to breakfast, where students are dismissed, which doors remain unlocked, etc.) should be considered together with external circulation choices.
- Pick-up and drop-off by car most often requires staffing supervision to function safely.
- Making U-turns and backing up are among the least safe things for drivers to do during arrival and dismissal.

Standards and Guidelines

Guidelines—such as the National Association of City Transportation Officials (NACTO) suite of design guides—are intended to help implement innovative designs. The most relevant standards and guidelines are described below. Guidelines focused on bicycle and transit design are included because street designs for people bicycling and using transit often also benefit people walking.

Pedestrian Guidelines

NACTO Urban Street Design Guide – 2013
The Urban Street Design Guide provides cities with state-of-the-practice solutions to design complete streets in urban settings. The Urban Street Design Guide recognizes the direct relationship between street design and economic development and emphasizes safety for all traffic modes. The Urban Street Design Guide is not intended to be a comprehensive guide for the geometric design of the street, rather it covers design principles to meet the complex needs of cities. The Urban Street Design Guide references the Manual on Uniform Traffic Control Devices (MUTCD).

NACTO Designing Streets for Kids – 2020
Designing Streets for Kids provides child-focused design guidance to inspire leaders, inform practitioners, and empower communities around the world to consider their city from the eyes of a child. The guidance in Designing Streets for Kids captures international best practices, strategies, programs, and policies that cities around the world have used to design streets and public spaces that are safe and appealing to children from their earliest days. The guidance also highlights tactics for engaging children in the design process, an often-overlooked approach that can dramatically transform how streets are designed and used.

FHWA Achieving Multimodal Networks – 2016
Achieving Multimodal Networks is a resource for practitioners seeking to build multimodal transportation networks. The publication highlights ways to apply the design flexibility found in current national design guidance to address common street design challenges and barriers. It focuses on reducing multimodal conflicts and achieving connected networks so that walking and bicycling are safe, comfortable, and attractive options for people of all ages and abilities.

Chapter 5 of the Wisconsin DOT’s Guide to Pedestrian Best Practices features the most complete guidance in Wisconsin on designing pedestrian facilities. It includes guidance on pedestrian facility design as well as how streets can be designed to positively impact pedestrian accommodations. It reinforces the guidance from the 2004 Guide for the Planning, Design, and Operation of Pedestrian Facilities with additional depth and detail on nearly all topics in that guide.
Arrival and Dismissal Planning Guides

Keep Calm and Carry on to School: Improving Arrival and Dismissal for Walking and Biking – 2018
This short brief from the Safe Routes to School National Partnership lays out key principals and steps to improving arrival and dismissal at school. It also includes best practices and considerations to support the safety of students walking and bicycling, for vehicle drop-off and pick up areas, and operational and programmatic strategies.

Improve Your School Arrival and Departure Procedures – 2013
Feet First, a Seattle-based non-profit, developed this detailed guide as part of Seattle’s Vision Zero initiative to end traffic deaths and serious injuries. The guide’s intended audience is a school staff-person or volunteer with limited experience and requires only the use of Microsoft PowerPoint software for creating the layout of the circulation plan. The appendix to the guide offers many resources, including sample tally sheets for traffic observations, and common elements and text that can be used in circulation plans.

Other Guides

Manual on Uniform Traffic Control Devices (MUTCD) – 2009
The MUTCD is issued by the Federal Highway Administration of the U.S. Department of Transportation to specify the standards by which traffic signs, road surface markings, and signals are designed, installed, and used. These specifications include the shapes, colors, fonts, sizes, etc., used in pavement markings and signs. All traffic control devices must generally conform to these standards. The manual is used to ensure traffic control devices conform to the national standard.

AASHTO Green Book – 2018

Wisconsin Facilities Development Manual (FDM) – 2018
The Wisconsin FDM provides policy, procedural requirements, and guidance encompassing the facilities development process within the Wisconsin Department of Transportation, Division of Transportation Systems Development (DTS&D). It is applicable to all types of improvements on the state trunk highway system and other street/highway systems where federal or state funds may be used for improvements. Adherence to the FDM’s requirements provides for the uniform development of transportation systems and plans that reflect sound engineering practice and sensitive environmental concern. Chapter 11, Section 46 of the FDM details design requirements for bicycle and pedestrian accommodation.

NACTO Transit Street Design Guide – 2016
The NACTO Transit Street Design Guide provides guidelines on developing transit facilities and designing city streets to prioritize transit, improve transit service quality, and support other goals related to transit. The guide also includes recommendations on integrating transit with other modes and the design of specialized transit street elements.

The AASHTO Guide for the Development of Bicycle Facilities is a resource for the design, development, and maintenance of safe on- and off-street bicycle facilities. The Guide presents a set of best practices for designing streets that comfortably accommodate a variety of user types. The information in the Guide is not intended to serve as design standards, nor is it all encompassing. Rather, it aims at providing guidance that should be used in conjunction with other regulations such as the Manual on Uniform Traffic Control Devices (MUTCD). The guide is undergoing a substantial revision and expansion, expected to be completed in 2020.

FHWA Separated Bike Lane Planning & Design Guide – 2015
The Separated Bike Lane Planning and Design Guide is issued by the Federal Highway Administration (FHWA) and provides guidelines for one- and two-way separated bike lanes. The guide provides case studies to aid in implementation. The guide also identifies data to collect before and after separated bike lane projects.
City of Milwaukee School Safety Infrastructure Toolbox