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.

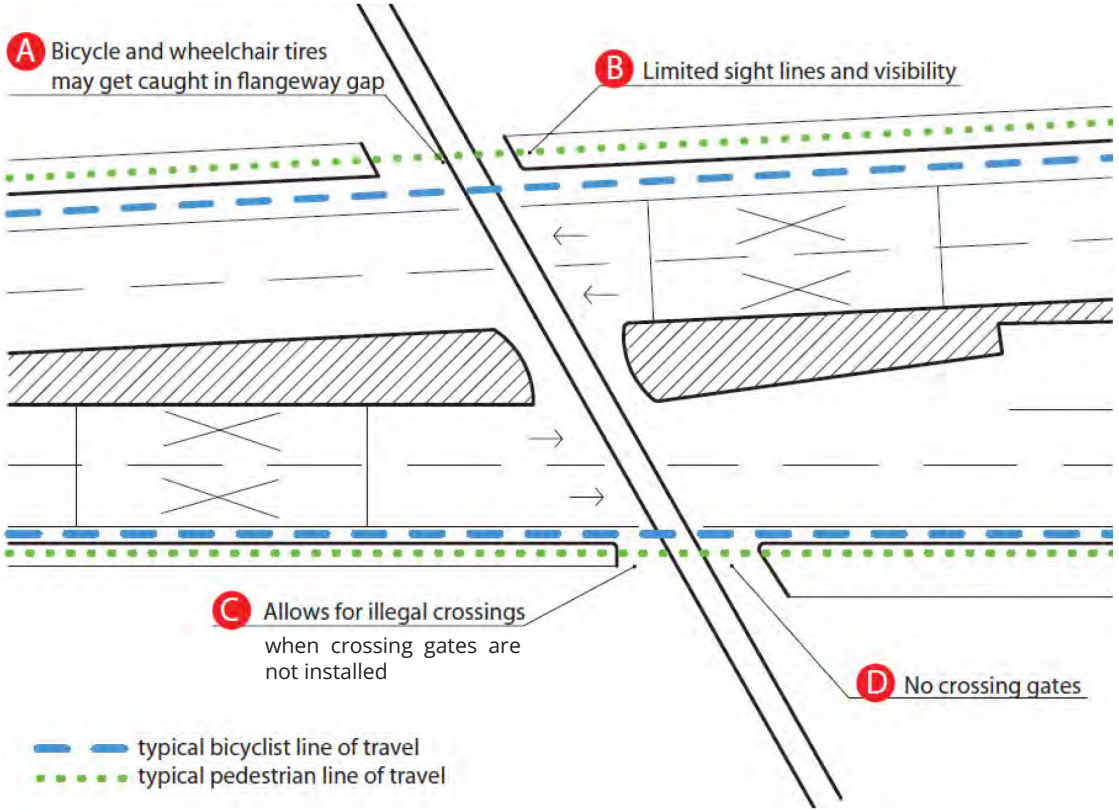


Image: Modified from Caltrans, Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians

[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.



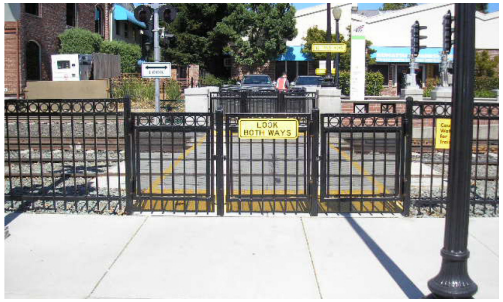
Fencing at NJ TRANSIT's Aberdeen Matawan Station.



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.

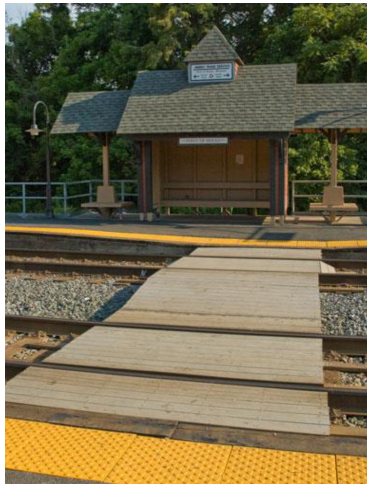


Example of a swing gate. Image: California Public Utilities Commission, Pedestrian-Rail Crossings In California



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

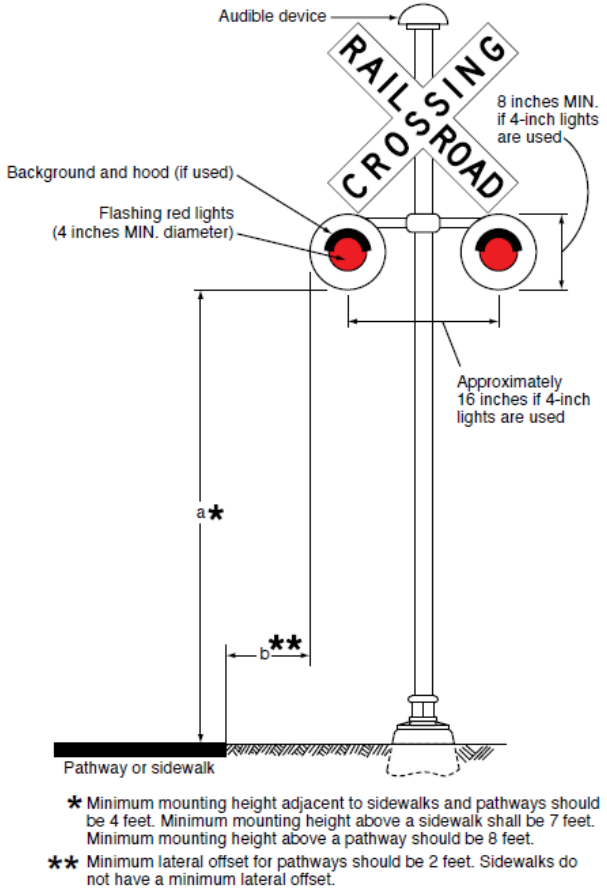


Image: MUTCD 11th Edition

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).



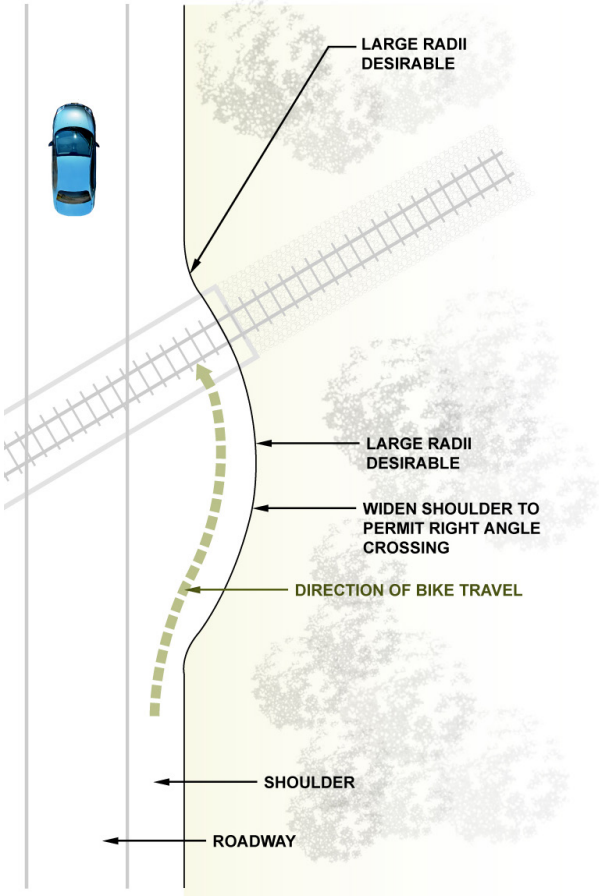
Students waiting behind a pedestrian gate to cross the tracks in Garfield, NJ.



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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