

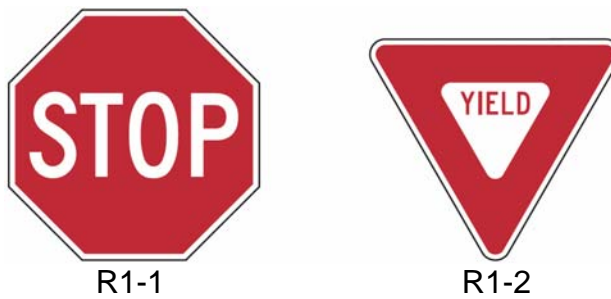
General-

See MUTCD Part 9, table 9B-1 for minimum sign size requirements for rail-trail facilities.

Placement of regulatory, warning, and guide signs for Rail-with-Trail facilities must coordinate with the placement of signals, signs, and markings of highway-rail crossings. See Figure F.7.1 and MUTCD Parts 8 and 10.

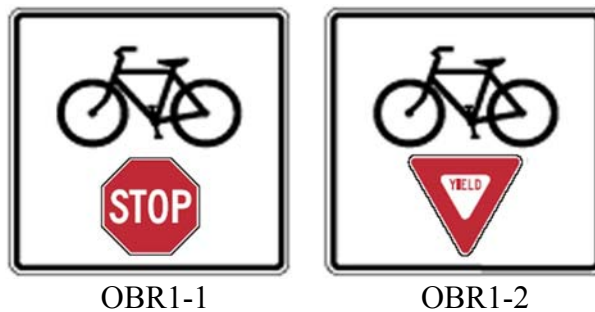
Other regulatory, warning, and guide signs not discussed in this Plan, but are described in MUTCD may be installed on rail-trail facilities as appropriate.

F.1 Regulatory Signs- give notice to users of traffic laws or regulations



R1-1 R1-2
Figure F.1.1 Stop and Yield Signs
 Source: MUTCD, Figure 9B-2

Stop signs (R1-1) shall be installed on rail-trail facilities at points where bicyclists are required to stop. Yield signs (R1-2) shall be installed on rail-trails at points where bicyclists have an adequate view of conflicting traffic as they approach the sign, and where bicyclists are required to yield the right-of-way to that conflicting traffic. Additionally, where conditions require path users, but not roadway users, to stop or yield, the stop sign or yield sign should be placed or shielded so that it is not readily visible to road users.



OBR1-1 OBR1-2
Figure F.1.2 Oregon’s Alternate Stop and Yield Signs
 Source: Oregon Bicycle Pedestrian Plan

Figure F.1.2 illustrates an example of Oregon’s adopted version of an alternate stop and yield sign that are used where the signs are visible to motor vehicle traffic. This situation typically occurs where a path is parallel and close to a roadway.



Figure F.1.3 Restricted Use Regulatory Signs
 Source: MUTCD, Figure 9B-2

The No Motor Vehicles sign (R5-3) may be installed at the entrance to the rail-trail facility. Where bicyclists and/or pedestrians are prohibited, the No Bicycles (R5-6) sign and No Pedestrians (R9-3a) sign should be installed at the entrance to the facility. This may occur at intersecting roadways or adjacent land uses and/or adjacent facilities where bicycle use is prohibited.



Figure F.1.4 Other Regulatory and Restriction Signs
 Source: MUTCD, Figure 9B-2

The Do Not Pass sign (R4-1) may potentially be used at pinch points along the rail-trail where the trail surface width must be reduced below the minimum width for a short distance. There may be a potential need for any of the remainder of the signs shown in Figure F.1.4 in areas where the facility user volumes are high and/or in more built-up areas. The need for these signs may not be anticipated during trail development or even after trail completion. Due to the dynamic ability for user volumes and conflicts to increase (including intersecting roadway traffic volumes and roadway improvements) it is recommended that the need for such signage be periodically reevaluated.

See Figure F.4.1 for an example of the regulatory signing for the beginning and end of a designated bicycle route on a rail-trail facility and Figure F.5.1 for an example of regulatory signing and markings for rail-trails that cross a roadway. See Figure F.6.1 for regulatory sign placement at railroad crossings.

F.2 Warning Signs- *give notice to users of a situation that might not be readily apparent*



Figure F.2.1 Turn or Curve Signs
Source: MUTCD, Figure 9B-3

Appropriate turn or curve warning signs (W1 series), shown in Figure F.2.1, shall be installed to warn bicyclists of unexpected changes in rail-trail direction. The W1-1 through W1-7 signs should be installed no less than 50 feet (50') in advance of the beginning of the change of alignment. Refer to MUTCD Table 2C-4 for guidelines for advance placement of warning signs. The need and placement of W1 and W2 series signs shall be determined on a case-by-case basis.

Appropriate intersection warning signs (W2 series) shall be used in conjunction with a rail-trail facility in advance of an intersection to indicate the presence of an intersection. Placement of intersection warning signs is determined when engineering judgment identifies that the visibility of the intersection is limited on the rail-trail approach. Intersection warning signs should not be used where a stop sign, yield sign, or a traffic control signal controls the rail-trail approach to the intersection.



Figure F.2.3 Advance Traffic Control Signs
Source: MUTCD, Figure 9B-3

The advance traffic control symbol signs, shown in Figure F.2.3, include the stop ahead (W3-1), yield ahead (W3-2), and signal ahead (W3-3) signs. These signs may potentially be required on the roadway and/or the rail-trail facility at their intersections. These signs shall be installed on an approach to a primary traffic control device that is not visible for a sufficient distance to permit the road or trail user to respond to the device (see MUTCD, Part 2, Table 2C-4). The visibility criteria for a traffic control signal shall be based on having a continuous view of at least two signal faces for the distance specified in MUTCD, Part 4, Table 4D-1.

Permanent obstructions causing the limited visibility might include roadway alignment, trail alignment, structures and other intermittent obstructions such as foliage or parked vehicles. Where intermittent obstructions occur, engineering judgment should determine the treatment to be implemented. An advance traffic control sign may be used for additional emphasis of the primary

traffic control device, even when the visibility distance to the device is satisfactory. A warning beacon may also be used with an advance traffic control sign.

Word message warning signs (W3-1a, W3-2a, W3-3a) may be used as alternates to the advance traffic control symbol signs. An optional word message sign is shown in the SHS book. Additionally, word message warning signs other than those discussed in this Plan or MUTCD may be developed and installed. Supplemental street name or trail facility name plaques may be installed above or below an advance traffic control sign.



Figure F.2.4 Other Warning Signs
 Source: MUTCD, Figures 9B-3 & 2C-4

The Bikeway Narrows sign (W5-4a) and Hill sign (W7-5) shall be installed on rail-trail facilities to warn bicyclists of conditions not readily apparent such as where the rail-trail width is reduced from its typical design width or slopes drastically change. This situation may be more likely to occur at the transition to/from access, connector, and spur trails. Signs warning of permanent or reoccurring conditions that might be of concern to bicyclists, such as the Bump sign (W8-1), Dip sign (W8-2), Pavement Ends sign (W8-3), and any other word message that describes conditions that are of concern to bicyclists, may also be used.

The Bicycle Surface Condition Warning sign (W8-10) may be installed where the rail-trail conditions could cause a bicyclist to lose control of the bicycle. A supplemental plaque (W8-10p) may be used to clarify the specific type of surface condition.



W10-1

Figure F.2.5 Railroad Crossing Sign
 Source: MUTCD, Figure 8B-2

The Railroad Crossing sign (W10-1) is to be used in advance of every trail and railroad facility intersection. It is anticipated that this sign will be more common to Rail-with-Trail facilities. These warning signs shall be installed no less than fifty feet (50') in advance of the intersection. See Figure F.6.1 for warning sign placement on a rail-trail at railroad crossings.



Figure F.2.6 Bicycle and Pedestrian Warning Signs
 Source: MUTCD, Figure 9B-3

The bicycle warning sign (W11-1) and pedestrian warning sign (W11-2) alert the road user to unexpected entries into the roadway by bicyclists, pedestrians, and other crossing activities that might cause conflicts. A supplemental plaque with the legend AHEAD or XXX FEET may be used with these warning signs. Refer to MUTCD for placement prior to and at the intersection.

An optional fluorescent yellow-green background color with a black legend and border may be used for bicycle and pedestrian warning signs and supplemental plaques. When the fluorescent yellow-green background color is used, a systematic approach featuring one background color within a zone or area should be used. The mixing of standard yellow and fluorescent yellow-green backgrounds within a zone or area should be avoided.

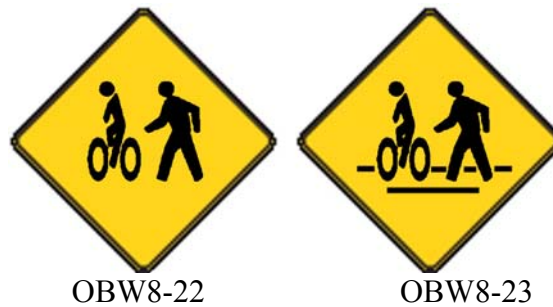


Figure F.2.7 Oregon's Alternate Path Crossing Roadway Signs
 Source: Oregon Bicycle Pedestrian Plan

Figure F.2.7 illustrates an example of Oregon's adopted versions of an alternate combined bicycle and pedestrian warning sign. These signs are intended to be used only where a rail-trail facility crosses a roadway in an unexpected location. It is recommended that an optional fluorescent yellow-green background color version be adopted as well. DelDOT and DNREC have begun fabrication and installation of a similar sign, which is currently installed at locations in Lewes, DE and in the Cape Henlopen State Park area.

See Figure F.4.1 for an example of the warning signing for the beginning and end of a designated bicycle route on a rail-trail facility and Figure F.5.1 for an example of warning signing and markings for rail-trails that cross a roadway.

F.3 Guide Signs- show users route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information



Figure F.3.1 Guide and Route Signs

Source: MUTCD, Figure 9B-4

Guide signs like those shown in Figure F.3.1 may be installed at roadway and bicycle route intersections with the RTT/RWT facilities to inform and identify the rail-trail facility to motorists and bicyclists. Additionally, these signs may be placed on the RTT/RWT facility to inform the trail users of on-road bicycle facilities and destinations.

The bicycle route guide sign (D11-1) should be provided at decision points along designated bicycle routes, including signs to inform bicyclists of bicycle route direction changes and confirmation signs for route direction, distance, and destination.

To establish a unique identification (route designation) for a State or local bicycle route, the bicycle route sign (M1-8) may be used. The bicycle route sign shall contain a route designation and shall have a green background with a retroreflectorized white legend and border. See MUTCD and the Delaware Bicycle Facility Master Plan for on-road bicycle facility signage use and placement.



Figure F.3.2 Supplemental Guide Signs

Source: MUTCD, Figure 9B-4

Figure F.3.2 illustrates some of the typical supplemental guide signs used on rail-trails.

See Figure F.4.1 for an example of the guide signing for the beginning and end of a designated bicycle route on a rail-trail facility and Figure F.5.1 for an example of guide signing and markings for rail-trails that cross a roadway.

F.4 RTT/RWT Facility Begin and/or End at Roadway- sign selection, use, and placement to be considered on a case-by-case basis and typically installed at major rail-trail/roadway intersections

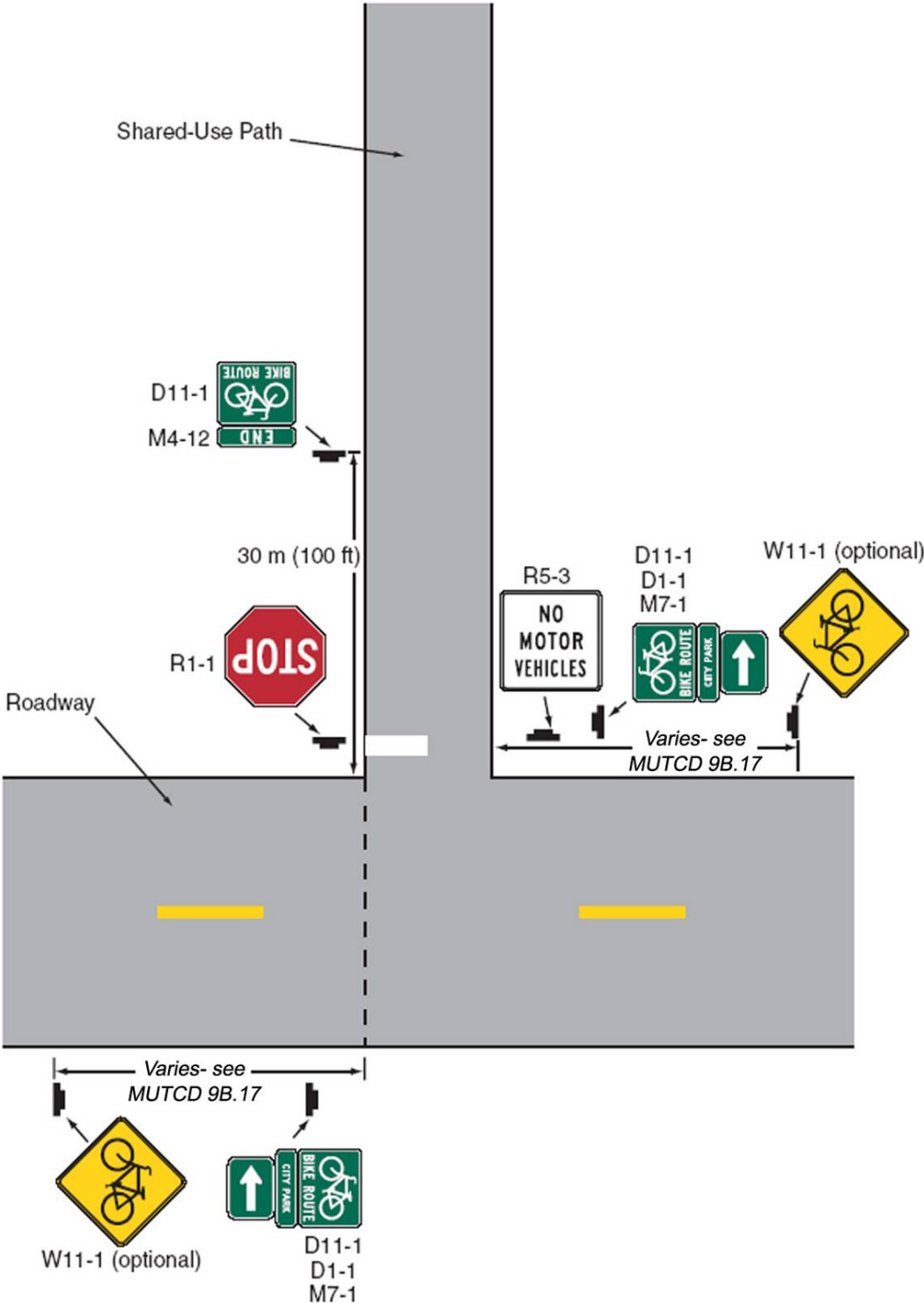


Figure F.4.1 Example of Signing for the Beginning and End of a Designated Bicycle Route on a RTT/RWT Facility
Source: MUTCD, Figure 9B-5

F.5 RTT/RWT Facility - Roadway Intersection- sign selection, use, and placement to be considered on a case-by-case basis and typically installed at major rail-trail/roadway intersections

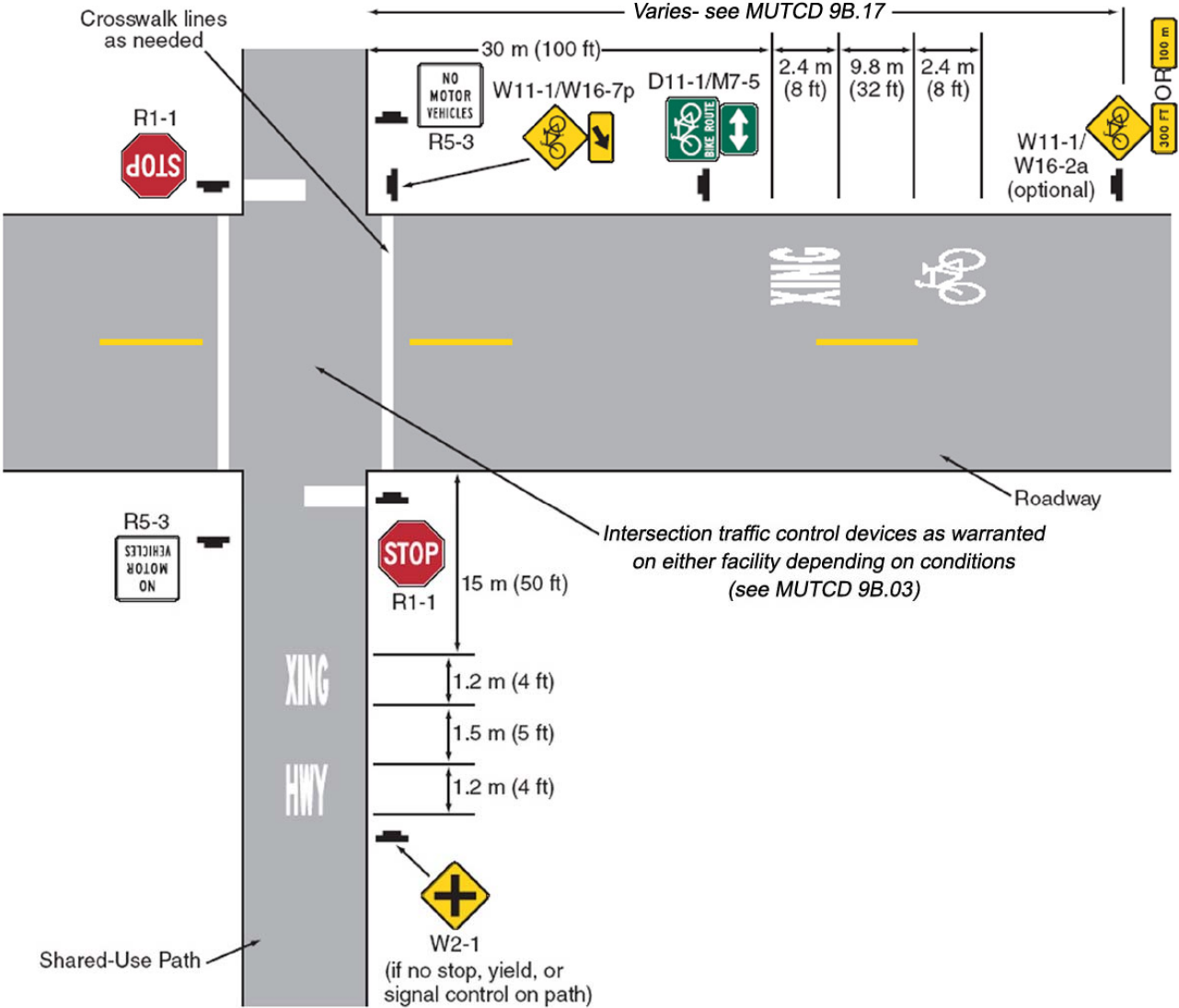


Figure F.5.1 Examples of Signage and Markings for RTT/RWT Facility at Roadway Intersections
Source: MUTCD, Figure 9B-7

F.6 RTT/RWT Facility - Railroad Intersection-

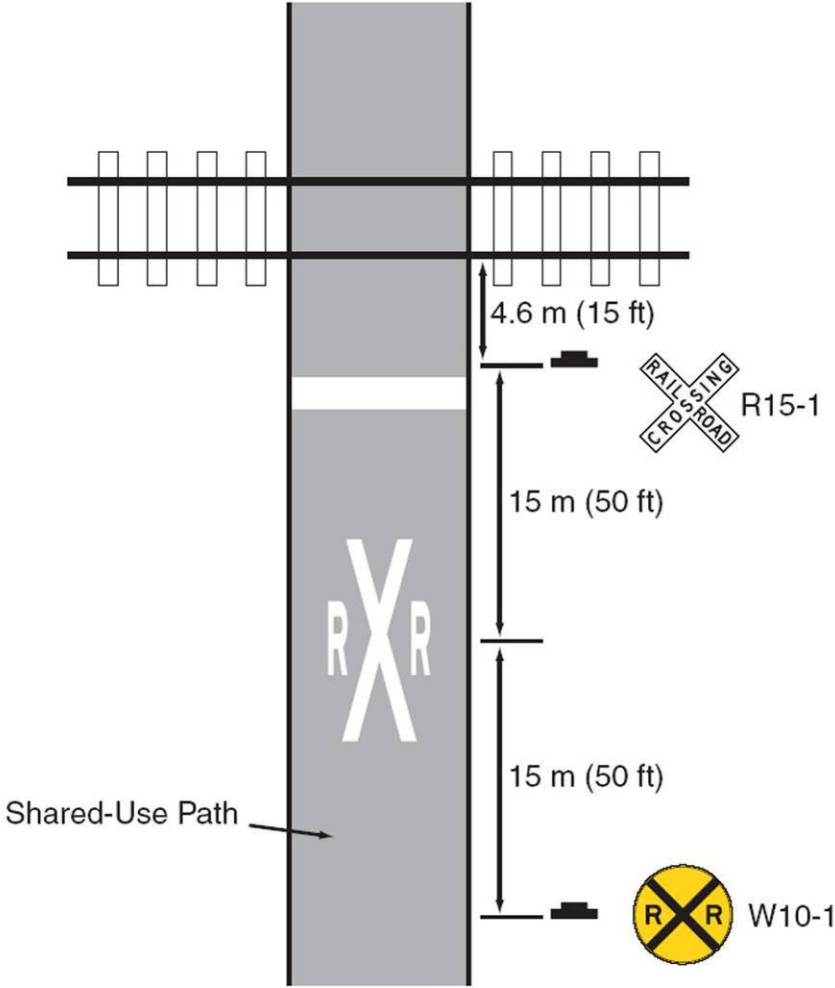


Figure F.6.1 Examples of Signage and Markings for RTT/RWT Facility at Railroad Crossings
Source: MUTCD, Figure 9B-7

See Figure F.8.8 for railroad crossing stencil-marking dimensions.

F.7 Highway - Railroad Intersection-

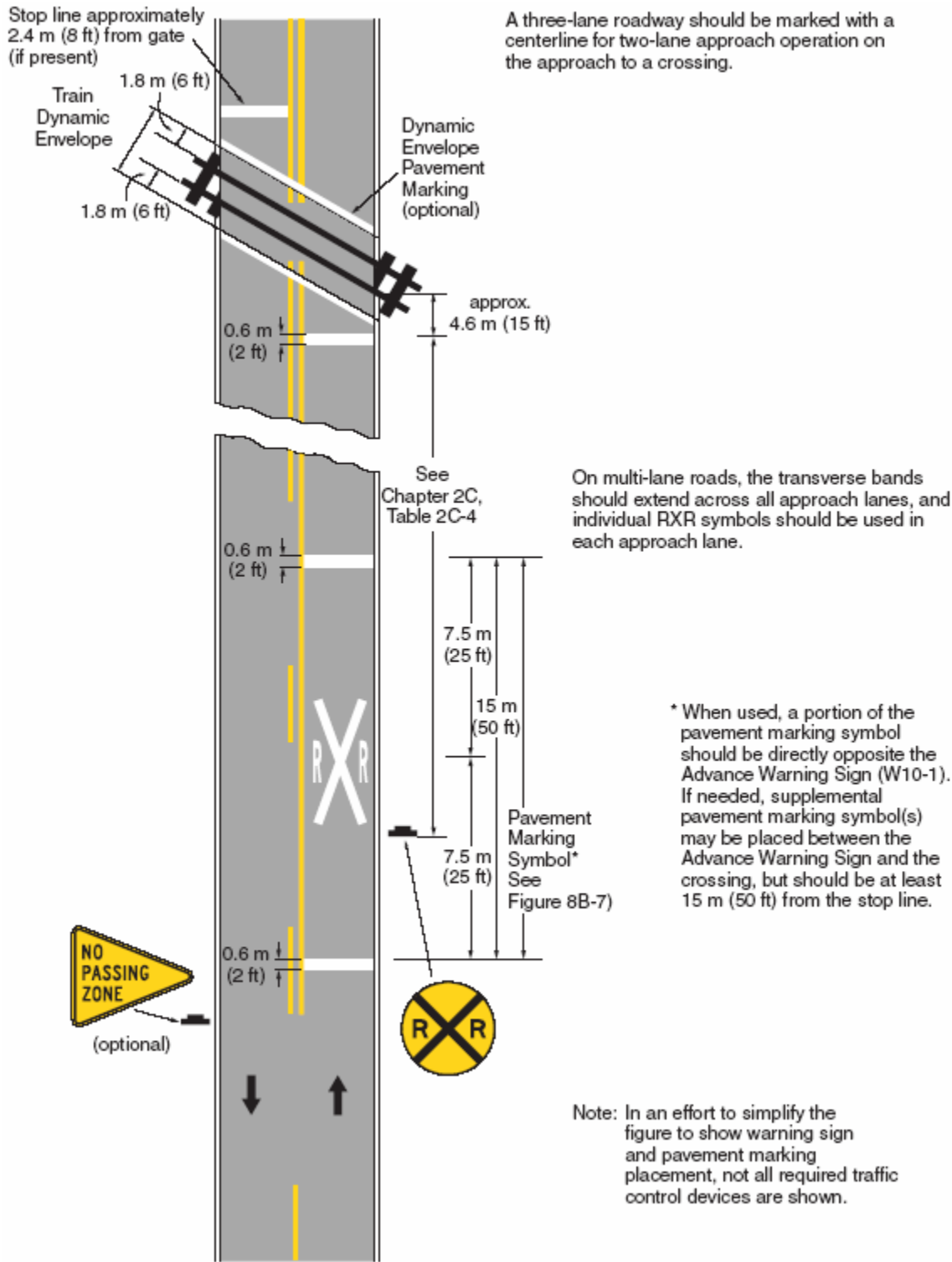


Figure F.7.1 Example of Placement of Warning Signs and Pavement Markings at Highway-Rail Grade Crossings Source: MUTCD, Figure 9B-7

F.8 Markings-

Markings indicate the separation of the lanes for path users, assist the bicyclist by indicating assigned travel paths, and provide advance information for turning and crossing maneuvers. Markings used on bikeways shall be retroreflectorized. Additionally, pavement marking symbols and/or word messages should be used on rail-trails only where appropriate. Consideration should be given to selecting pavement-marking materials that will minimize loss of traction for bicycles and other users under wet conditions.

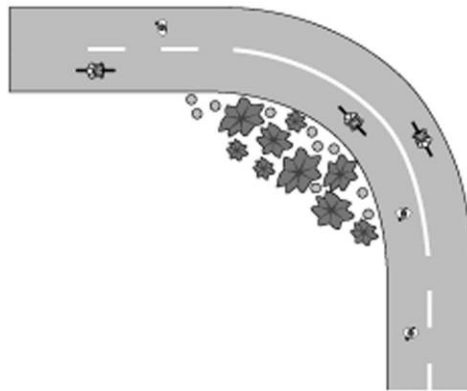


Figure F.8.1 Example of RTT/RWT Striping
 Source: Oregon Bicycle Pedestrian Plan

Where rail-trails are of sufficient width to designate two minimum width lanes, a solid 4 inch (4") wide yellow line may be used to separate the two directions of travel where passing is not permitted, and a broken yellow line may be used where passing is permitted as shown above and in Figure F.8.2. Recommended spacing may be either 3 foot (3') segments and 9 foot (9') gaps or 10 foot (10') segments and 30 foot (30') gaps.

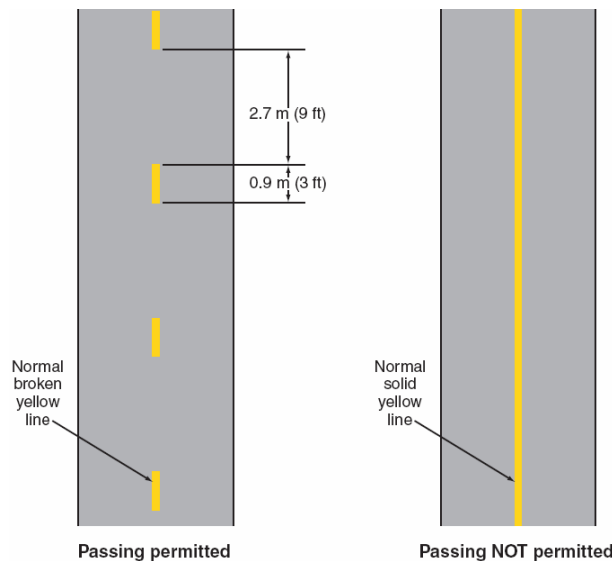


Figure F.8.2 Centerline Markings for RTT/RWT Facilities
 Source: MUTCD, Figure 9C-2

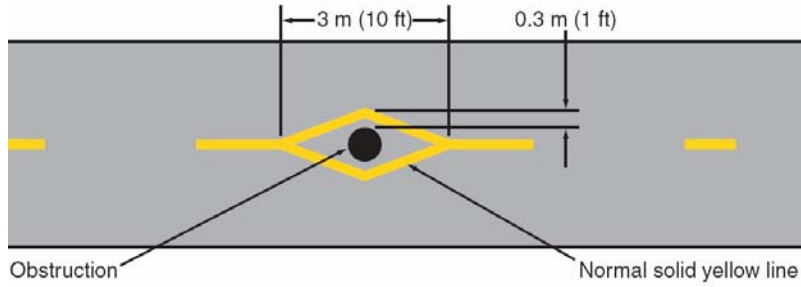
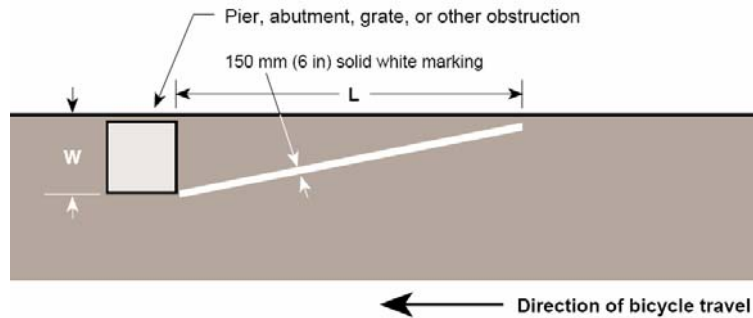


Figure F.8.3 Markings for Obstructions/ Bollards

Source: MUTCD, Figure 9C-2

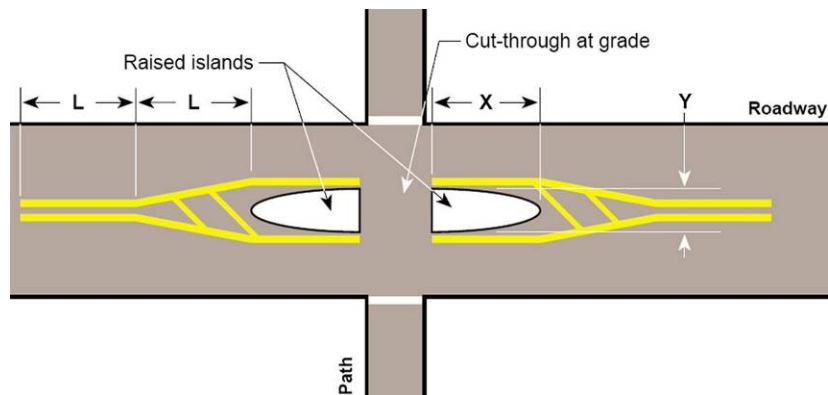
Markings as shown in Figure F.8.3 should be used at the location of obstructions in the center of the path, including vertical elements, such as bollards, intended to physically prevent unauthorized motor vehicles from entering the path. See Figure F.8.4 for markings to be used for obstructions at the edge of a path.



$L = WV$, where V is bicycle approach speed (mph)

Figure F.8.4 Obstruction Marking at Path Edge (drainage grates)

Source: AASHTO Guide for the Development of Bicycle Facilities, Figure 30



W (offset) = $Y/2$
 $L = WV^2/60$, where $V < 45$ mph
 $L = WV$, where $V \geq 45$ mph

X = Length of island should be 2 m (6 ft) or greater
 Y = Width of refuge:
 6' = poor, 8' = satisfactory, 10' = good

Figure F.8.5 Center Island Refuge Area at High Volume Roadway Crossings

Source: AASHTO Guide for the Development of Bicycle Facilities, Figure 23

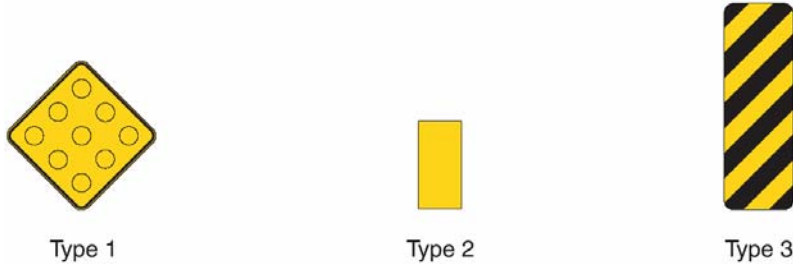


Figure F.8.6 Fixed Object Markers
Source: MUTCD, Section 9C.03

Fixed objects within or adjacent to rail-trails may be marked with object markers such as Type 1, 2, or 3 shown in Figure F.8.6. Marker mounting heights shall meet the standard sign mounting heights for rail-trails however, when object markers are applied to an object that requires a lower or higher mounting, the vertical mounting height may vary according to need. All object markers shall be retroreflective.

Additional marker types and guidance are described in MUTCD, Section 3C.01 and shall also be used on rail-trails, as appropriate. On Type 3 markers, the alternating black and retroreflective yellow stripes shall be sloped down at an angle of 45 degrees (45°) toward the side on which traffic is to pass the obstruction.

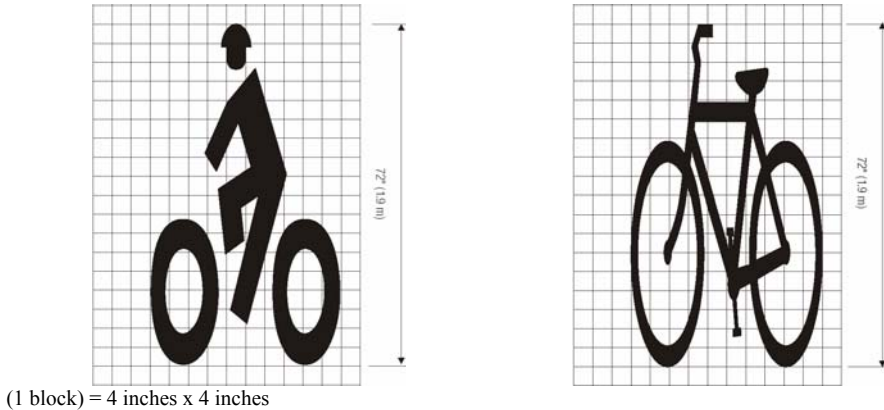


Figure F.8.7 Bicycle Facility Markings
Source: MUTCD, Figure 9C-6

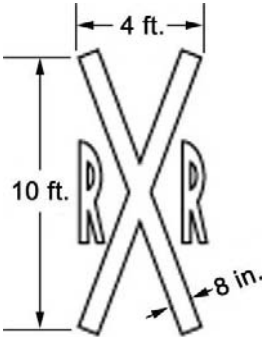


Figure F.8.8 Railroad Crossing Warning Marking
Source: Oregon Bicycle Pedestrian Plan