

## **ENGINEERING DIRECTIVE**

Patricia Leavenworth (signature on original)

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CHIEF ENGINEER

### **Milled Longitudinal Rumble Strips**

#### **General Guidance**

This Engineering Directive identifies conditions where milled longitudinal rumble strips should be considered on MassDOT projects. The implementation of rumble strips can significantly reduce the risk of head-on, opposite-direction sideswipe, and run-off-the-road crashes. Longitudinal rumble strips are an FHWA Proven Safety Countermeasure.

This Engineering Directive supersedes MassDOT Engineering Directive E-14-004, *Measures to Enhance Highway Safety*, dated July 21, 2014. This Engineering Directive applies to all projects advertised after January 1, 2021.

#### **Rumble Strips on Freeways and Expressways**

Longitudinal rumble strips in the inside (median) and outside shoulders shall be installed within shoulders on all resurfaced, reconstructed, or new constructed freeway and expressway facilities, and the on- and off-ramps accessing said facilities, in accordance with the Construction Standards and the Standard Specifications for Highways and Bridges. The minimum paved shoulder width for rumble strips shall be 2 feet.

In areas where travel is legally permitted in the outside shoulder during certain hours, rumble strips shall not be installed in the outside shoulder, unless an alternate design has been approved.

In areas where acceleration and/or deceleration lanes have no paved outside shoulders, any rumble strips that are in outside shoulders shall be terminated at the beginning of the deceleration lane and initiated at the end of the acceleration lane.

#### **Centerline Rumble Strips on Secondary Roads**

On undivided roads with a posted or statutory speed limit of 40 miles per hour or greater, rumble strips shall be installed on the centerline with yellow centerline pavement markings applied over the strips (commonly referred to as a rumble stripe). A sinusoidal rumble stripe (Type C) installation shall be used for all centerline installations.

## **Shoulder Rumble Strips on Secondary Roads**

On non-freeways and -expressways with a posted speed limit or statutory speed limit of 40 miles per hour or greater, longitudinal rumble strips shall be installed as follows:

- Where bicycle travel is prohibited, rumble strips shall be installed on outside shoulders that are 2 feet or wider and, if median separated, inside shoulders that are 2 feet or wider.
- Where bicycle travel is permitted, rumble strips shall be installed on all paved outside shoulders that are 8 feet or wider and, if median separated, inside shoulders that are 2 feet or wider.

## **Design Considerations**

This Engineering Directive does not prohibit the installation of rumble strips on lower speed roads or on narrower shoulders. However, the Design Engineer shall weigh the costs versus the benefit of such applications.

Longitudinal rumble strips shall not be installed adjacent to lanes that are less than 11 feet wide. However, this does not require the removal of existing rumble strips if lanes are temporarily narrowed due to construction or maintenance activities.

On secondary roads, consideration should be given to breaking runs of longitudinal rumble strips at major driveways where frequent crossings may cause a nuisance.

Centerline rumble strips shall be continuous through any one-way or two-way passing zones.

Rumble strips shall not be installed on bridge or tunnel decks and shall be terminated within 20 feet of bridge joints.

Refer to the Construction Standards for additional design details and layouts for the installation of rumble strips within the vicinity of castings, railroad crossings, intersections, and interchanges.

## **Exceptions**

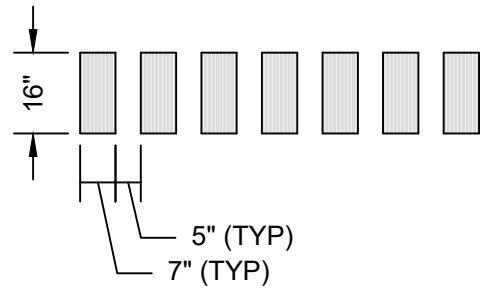
Longitudinal rumble strips in paved shoulders or on the centerline that meet the aforementioned criteria shall be installed unless otherwise approved by the Chief Engineer. Requests for exceptions shall be in the form of a memorandum to the Chief and include the following information:

- Project name, number, and location;
- Project funding source;
- ADT, number of lanes, divided/undivided;
- Posted, statutory, and/or measured 85<sup>th</sup> percentile speeds;
- Portion(s) of the project where the exception is requested;
- Reason for request;

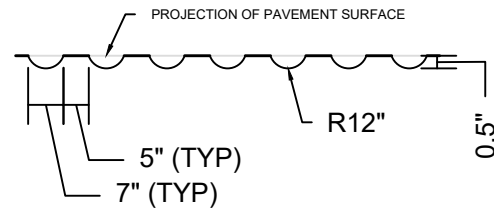
- A review of the most recent 5 years of crash data within the project area that will look at the total of lane- and road-departure crashes where rumble strips may be an effective countermeasure. The Traffic and Safety Section can provide a template for how to query such a search upon request; and
- Alternate countermeasures considered and/or designed to reduce the likelihood of lane departure crashes.

**TYPE A**  
CYLINDER RUMBLE STRIP  
(BICYCLE TRAVEL PROHIBITED)

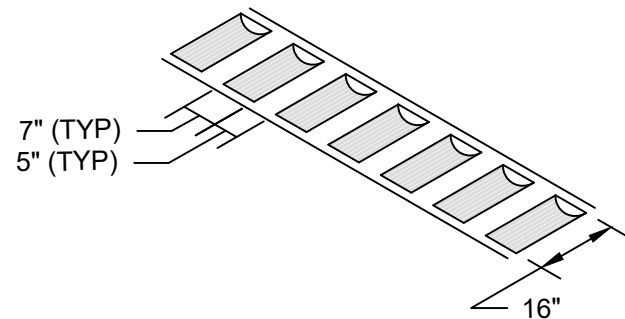
PLAN



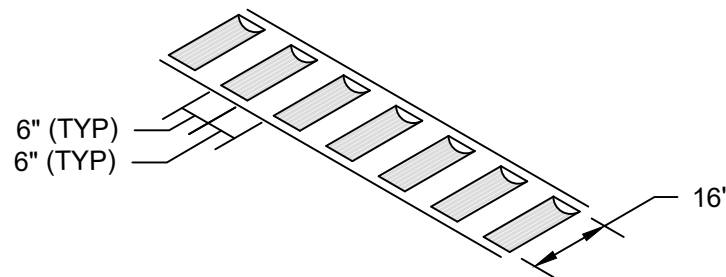
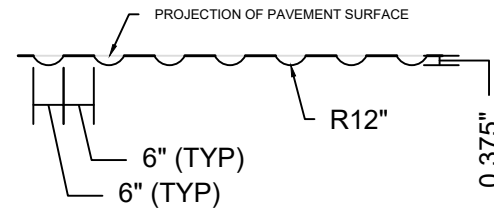
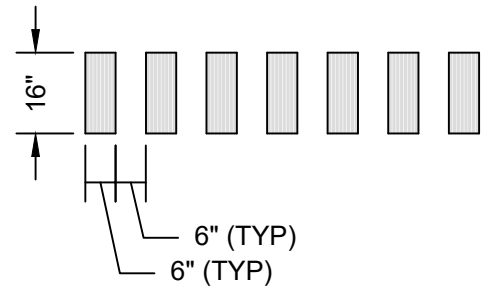
ELEVATION



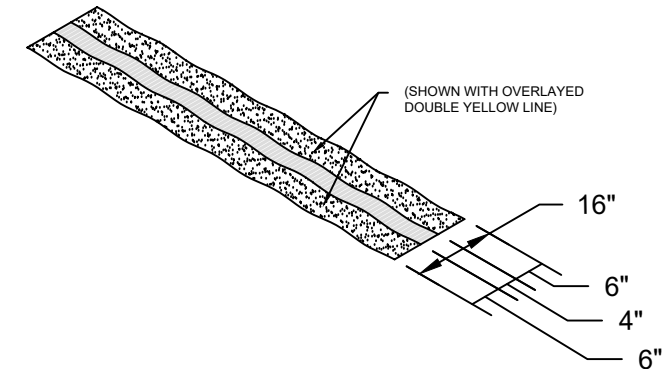
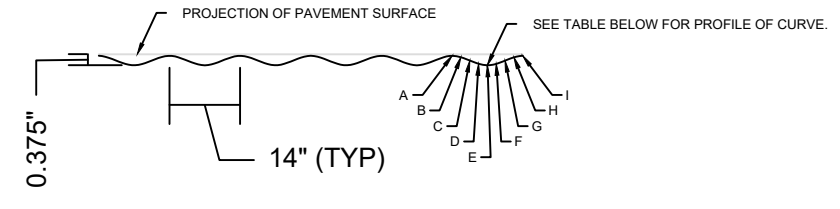
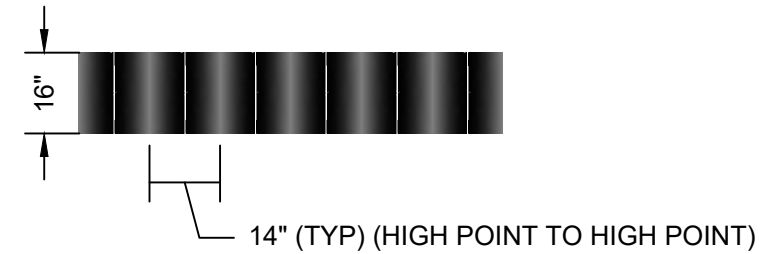
ISOMETRIC



**TYPE B**  
CYLINDER RUMBLE STRIP  
(BICYCLE TRAVEL PERMITTED)



**TYPE C**  
CONTINUOUS SINUSOIDAL  
RUMBLE STRIP



**NOTES:**

1. NOT TO SCALE. SOME LINE WORK EXAGGERATED FOR CLARITY.
2. SEE PLANS FOR LOCATION(S) AND START AND END STATIONS FOR ALL RUMBLE STRIP INSTALLATIONS.
3. HIGH POINT OF SINUSOIDAL RUMBLE STRIP LOCATED  $\frac{1}{16}$ " BELOW PAVEMENT SURFACE.

DESIGN OF CURVE PROFILE FOR SINUSOIDAL RUMBLE STRIP

POINT	A	B	C	D	E	F	G	H	I
DEPTH FROM PAVEMENT SURFACE (IN.)	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{11}{32}$	$\frac{3}{8}$	$\frac{11}{32}$	$\frac{7}{32}$	$\frac{1}{8}$	$\frac{1}{16}$
DISTANCE FROM HIGH POINT "A" (IN.)	0	1.75	3.5	5.25	7	8.75	10.5	12.25	14