

Maine Department of Transportation

Highway Program

Design Guidance

Title: Sideslopes and Backslopes

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Discipline: General Engineering

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Background:

MaineDOT defines sideslope as the slope from the edge of roadway to the toe of ditch or toe of fill slope. The backslope is defined as the slope from the toe of ditch to the top of slope on the backside of the ditch. The AASHTO Roadside Design Guide uses the terms foreslope and backslope for these slopes.

Slopes are further defined as recoverable or non-recoverable. A recoverable sideslope is considered to be 4:1 or flatter, and motorists generally will be able to stop or slow their vehicles enough to be able to return to the roadway safely. A non-recoverable sideslope is one that is traversable, but one on which most vehicles will be unable to return to the roadway safely. Vehicles on these slopes are expected to reach the bottom of the slope. These slopes are typically between 4:1 and 3:1. A critical sideslope is one that is steeper than 3:1 and is considered non-recoverable and non-traversable. Vehicles on these slopes have a higher chance of overturning and should be protected with a roadside barrier.

Roadside slopes should be designed considering such factors as safety, clear zone, environmental impacts, and Right of Way impacts. The following guidance pertains to all projects. For further information beyond this guidance, refer to the current version of the Roadside Design Guide and Engineering Instruction C2.1 Clear Zone.

Guidance:

Sideslopes

<u>Roadway</u>	<u>Sideslope</u>	<u>Notes</u>
Interstate Mainline	6:1	Sideslope may be hinged to 4:1 at Clear Zone
Interstate Ramps	4:1	
Highway Corridor Priority 1	4:1	Flatter slopes should be considered in urban residential areas
Highway Corridor Priority 2-5	4:1 or 3:1	For corridor priority 2 roads with AADT>6000 and posted speed >45 mph, 4:1 sideslope shall be used

Guardrail Requirements

Slopes steeper than 3:1 generally require guardrail.

Slopes equal to and greater than 20' in height generally require guardrail.

The AASHTO Roadside Design Guide Figure entitled Comparative Barrier Consideration for Embankments provides additional guidance.

Hinging

Hinging 4:1 to 3:1 – may be used to minimize impacts. This provides a traversable slope to the toe, but may require a clear run out area at the toe to meet clear zone.

Hinging 4:1 to 2:1 – may be used if the clear zone is established with a traversable, recoverable slope, and the height of the 2:1 section does not exceed 5'. A clear run out area must be provided at the toe. This approach is not to be used in ditch cut situations.

Sideslope Transition Lengths

Sideslope transition lengths should follow the table below:

From	To	Transition Length
6:1	4:1	100 ft
4:1	3:1	50 ft
3:1	2:1	50 ft

Backslopes

<u>Location</u>	<u>Backslope</u>
Bedrock cuts, other backslope areas	Steeper than 2:1 with Geotech involvement
Typical backslope in earth cuts	2:1
Interstate, lawn areas, maintained areas	3:1
Urban areas	3:1 or flatter