
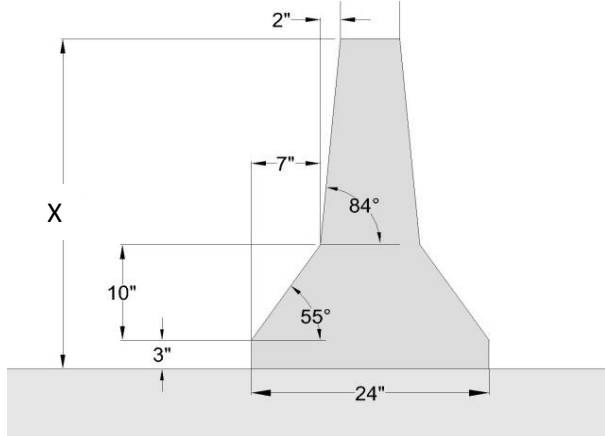

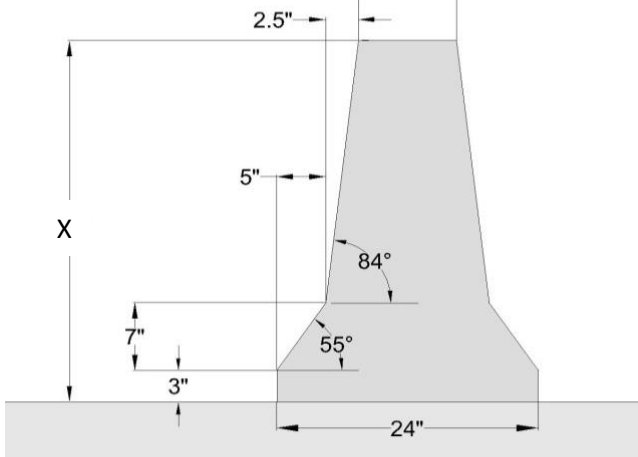

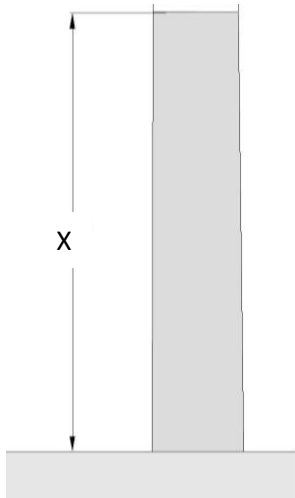


# AASHTO MASH Cast-In-Place Concrete Barriers

NOTE: Reinforcing steel in each of these barrier may vary and have been omitted from the drawings for clarity, only the Ontario Tall Wall was successfully crash tested as a unreinforced section.


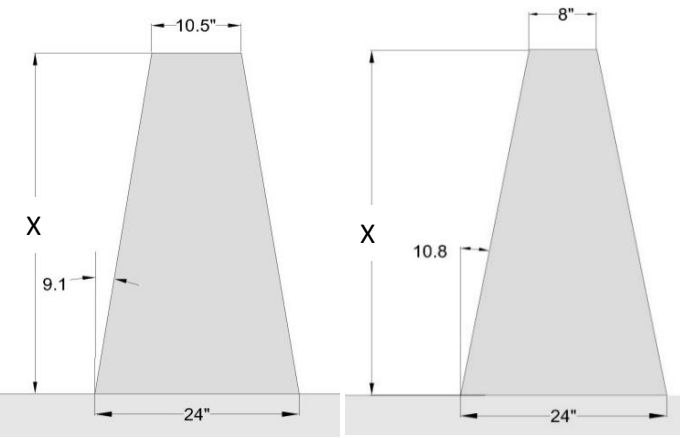

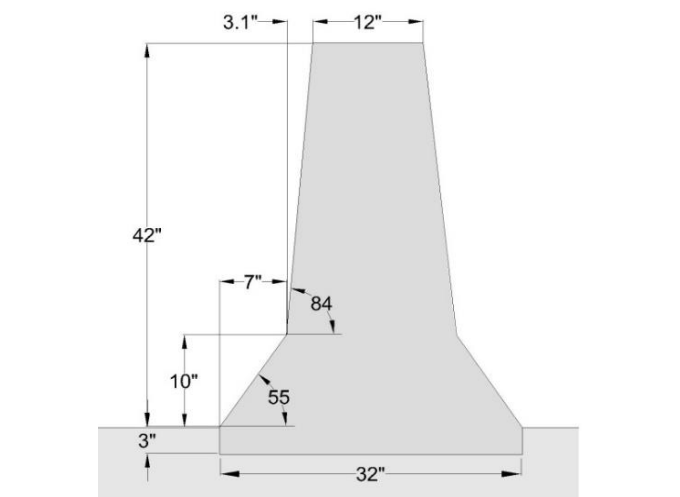

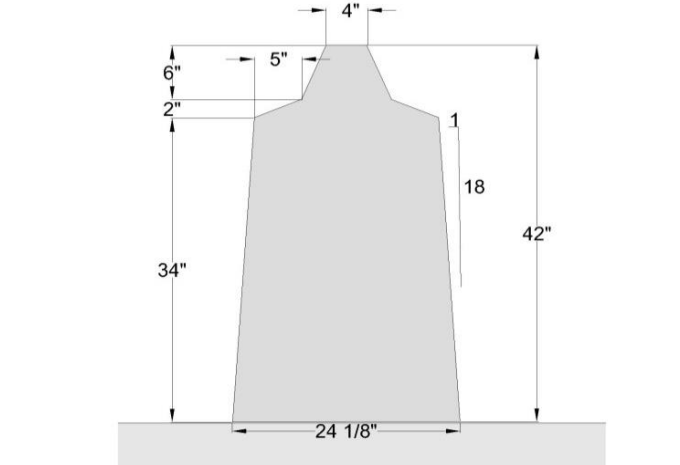
NAME/MANUFACTURER	ILLUSTRATION	AASHTO MASH	PROFILE GEOMETRIC DIMENSIONS	CHARACTERISTICS
<p><b>New Jersey Safety-Shape Barrier</b></p> <p><a href="http://tf13.org/Guides/hardwareGuide/index.php?action=view&amp;hardware=111">http://tf13.org/Guides/hardwareGuide/index.php?action=view&amp;hardware=111</a></p> <p>Eligibility Letter NCHRP Project 22-14(03)(MASH TL3) NCHRP 20-07(395) (MASH TL4 &amp; TL5)</p>		<p>TL-3 32" Tall</p> <p>TL-4 36" Tall</p> <p>TL-5 42" Tall</p>		<p>The New Jersey Barrier was the most widely used safety shape concrete barrier prior to the introduction of the F-shape. As shown, the "break-point" between the 55 deg and 84 deg slope is 13 inches above the pavement, including the 3 inch vertical reveal. The flatter lower slope is intended to lift the vehicle which absorbs some energy, and allows vehicles impacting at shallow angles to be redirected with little sheet metal damage; however, it can cause significant instability to vehicles impacting at high speeds and angles.</p>
<p><b>F-shape Barrier</b></p> <p><a href="http://tf13.org/Guides/hardwareGuide/index.php?action=view&amp;hardware=109">http://tf13.org/Guides/hardwareGuide/index.php?action=view&amp;hardware=109</a></p> <p>Eligibility Letter NCHRP Project 22-14(03)(MASH TL3) NCHRP 20-07(395) (MASH TL4 &amp; TL5)</p>		<p>TL-3 32" Tall</p> <p>TL-4 36" Tall</p> <p>TL-5 42" Tall</p>		<p>The F-shape has the same basic geometry as the New Jersey barrier, but the "break-point" between the lower and upper slopes is 10 inches above the pavement. This modification results in less vehicle climb in severe impacts and improved post-crash trajectories. The 7.5 inch horizontal distance from the toe of the F-shape to its top corner also reduces the roll angle of impacting trucks and other vehicles with high centers-of-gravity.</p> <p>NOTE: 8" minimum top width.</p>
<p><b>Vertical Concrete Barrier</b></p> <p>Eligibility Letter NCHRP Project 22-14(03)(MASH TL3) NCHRP 20-07(395) (MASH TL4 &amp; TL5)</p>		<p>TL-3 32" Tall</p> <p>TL-4 36" Tall</p> <p>TL-5 42" Tall</p>		<p>A vertical concrete barrier may be a good choice where either vehicle lift or roll must be minimized, such as when shielding a bridge pier. This shape offers the best post-crash trajectories with no lift and only slight roll, pitch, and yaw angles. Lateral deceleration forces may be somewhat higher than with a safety shape design.</p>

**GENERAL NOTES:**

1. It is user responsibility to appropriately utilize all available information on crash testing including review of the device crash test report. The crash test report contains all reportable information on crash testing that is not necessarily considered a pass/fail criterion.
2. For a complete copy of the eligibility letter, visit FHWA website at [https://safety.fhwa.dot.gov/roadway\\_dept/countermeasures/reduce\\_crash\\_severity/listing.cfm?code=long](https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/listing.cfm?code=long)


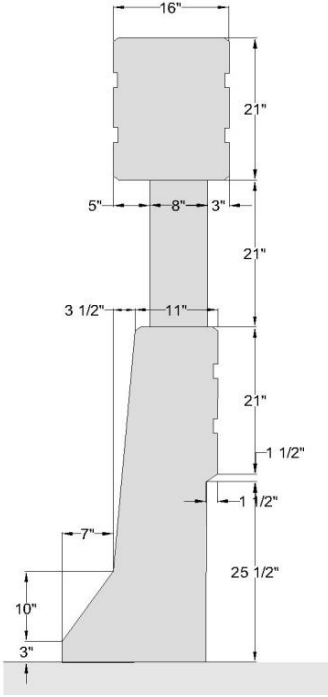
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NAME/MANUFACTURER	ILLUSTRATION	AASHTO MASH	PROFILE GEOMETRIC DIMENSIONS	CHARACTERISTICS
<p><b>Single (Constant) Slope Barrier</b></p> <p>CalTrans design – 9.1 degree slope Texas design - 10.8 degree slope</p> <p>Eligibility Letter B-225, dated Nov 17, 2011 (MASH TL-3) NCHRP 20-07(395) (MASH TL5) TTI Report 9-1002 (MASH TL4)</p>		<p>TL-3 32" Tall</p> <p>TL-4 36" Tall</p> <p>TL-5 42" Tall</p>		<p>The 9.1 degree single-slope barrier with the 10.5" top width was developed by California. The 10.8 degree single-slope barrier with a 8" top width was developed by Texas. This barrier performs comparably to the F-shape barrier under the (severe) test conditions, with good post-impact vehicle trajectories.</p>
<p><b>Ontario Tall Wall Median Barrier</b></p> <p><a href="http://tf13.org/Guides/hardwareGuide/index.php?action=view&amp;hardware=113">http://tf13.org/Guides/hardwareGuide/index.php?action=view&amp;hardware=113</a></p> <p>Eligibility Letter NCHRP 20-07(395) (MASH TL5)</p>				<p>The lower portion of the barrier is very similar to the F shape barrier with its slope "break-point" 10 inches above the pavement. However this barrier is taller and has a larger footprint (32" vs. 24") than the standard F-shape and has no reinforcing steel.</p>
<p><b>Concrete Median Barrier Incorporating Head Ejection Criteria</b></p> <p>Eligibility Letter NCHRP 20-07(395) (MASH TL5)</p>				<p>This concrete median barrier was developed to redirect vehicles ranging from small cars to fully-loaded tractor trailers, while safely doing the following:</p> <ul style="list-style-type: none"> <li>Maximizing stability in passenger vehicles by limiting wheel climb and roll.</li> <li>Addressing occupant safety by limiting peak impact forces</li> <li>Preventing "head slap"</li> <li>Providing an economical alternative to existing concrete barrier design.</li> </ul>

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NAME/MANUFACTURER	ILLUSTRATION	AASHTO MASH	PROFILE GEOMETRIC DIMENSIONS	CHARACTERISTICS
<p>Texas T5 Modified Bridge Rail (i.e., 'Roman Wall')</p> <p>NCHRP 20-07(395) (MASH TL5)</p>			 <p>Technical drawing showing profile geometric dimensions for the Texas T5 Modified Bridge Rail. The drawing includes the following dimensions:</p> <ul style="list-style-type: none"> <li>Top width: 16"</li> <li>Top height: 21"</li> <li>Top flange width: 5" (left), 8" (center), 3" (right)</li> <li>Second section height: 21"</li> <li>Third section height: 21"</li> <li>Fourth section height: 21"</li> <li>Bottom section height: 25 1/2"</li> <li>Bottom section width: 11"</li> <li>Bottom section offset: 3 1/2"</li> <li>Bottom section slope: 7"</li> <li>Bottom section base offset: 1 1/2"</li> <li>Bottom section base offset: 1 1/2"</li> <li>Bottom section base offset: 1 1/2"</li> <li>Bottom section base offset: 10"</li> <li>Bottom section base offset: 3"</li> </ul>	<p>This barrier was developed as a TL-6 design to contain and redirect vehicles up to an 80,000 lb. tractor tanker. The base is essentially a New Jersey barrier slope, followed by an open "window" design, and topped by a continuous reinforced concrete beam 21 inches high and 16 inches deep. It has been used in the US as a bridge railing, a median barrier and as a roadside barrier.</p>