



AASHTO MASH Roadside and Median Terminals

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NAME	MANUFACTURER	PERFORMANCE CHARACTERISTICS		AASHTO MASH 2016		FLARED	TANGENT	DEVICE INFORMATION	LOCATIONS CAN BE USED
		Energy-Absorbing	Non-Energy-Absorbing	Test Level (System Length)	System Height				
ROADSIDE SYSTEMS									
Buried-in-Backslope Terminal  <p style="text-align: center;">BIB</p>	Generic		X	TL-3	Single Rail System. Top rail at 31" Stacked Rail System - Top rail remains parallel to the road elevation (to a maximum of 46" height)			No impact head. For slopes steeper than 10:1, keep the height of the w-beam rail constant relative to the roadway grade until the barrier crosses the ditch flow line (but a max height of 46") Use a flare rate, either 13:1 or appropriate for the design speed. Add a w-beam rubrail when the distance between the bottom of the w-beam rail and the ground exceeds ~19" and increasing. Use an anchor of steel posts capable of developing the full tensile strength of the w-beam rail and buried 1' below ground. The effective barrier (to BLON; point where the face of rail crosses the toe of the backslope) must be brought to a sufficient distance in advance of the beginning of the area of concern such that a vehicle which passed behind the non-effective part of the rail (or upstream of the anchor) should have enough distance to be captured behind the rail upstream of the area of concern.	When the road transitions from a cut to a fill. Cut sections of a roadway.
SoftStop http://www.highwayguardrail.com/products/SoftStop.html Eligibility Letter: CC-115; Nov. 12, 2015 CC-115A 8"/12" blocks & TL-3 CC-115B 8"/12" blocks & TL-2 CC-115C 8"/12" blocks & TL-1 CC-115D 8"/12" Blocks, offset & TL-3 CC-115E 8"/12" Blocks, offset & TL-2 CC-115F 8"/12" Blocks, offset & TL-1 CC-115G modified head CC-115H Use of 25' rail panels CC-115I modified anchor plate	 <p style="text-align: center;">SoftStop</p>	Trinity Highway Products, LLC	X	TL-1 (25'-9 1/2") TL-2 (38'-3 1/2") TL-3 (50'-9 1/2") ALL system length dimensions are provided from the front anchor post (Post 0)	31"	X	7" wide Rectangular Impact Face Absorbs energy by vertically compressing the rail elements as the impact head is pushed down the rails, typically containing the compressed rail on the ground just below. Anchorage is provided through the first rail element (no cables) that has three specially fabricated slots approximately 6' long which allow the resulting four strips to be flattened, passed through the impact head, and connected via a paddle assembly to post "0". Incorporates an innovative resistive tensile coupling that typically maintains tension in the terminal portion of the guardrail during forward-direction vehicle impacts and releases during a reverse-direction impact. All steel post system. Post 0 - proprietary anchor; Post 1 - shortened Steel Yielding Terminal Post (SYTP) - impact head sits on post. Post 2: 6' Steel Yielding Terminal Post (SYTP); Post 3 through 8: W6x8.5 x 6' standard steel post. No blockouts at posts 0 and 1. Post 2 and beyond uses a composite blockout All w-beam guardrail is spliced mid-span, between posts. SoftStop components are allowed to be coated with Natina Steel Solution, after Hot Dip Galvanizing, to obtain a mottled brown finish - if specified by the appropriate roadway authority.	BLON: at post 3 (16-6" from anchor post "0") 0 - 2 ft offset allowed over entire length of TL-3 system 0 - 1 ft offset allowed over the entire length of TL-2 system. 0 - 6 in offset allowed over the entire length of TL-1 system.	

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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=cushions

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ROADSIDE SYSTEMS									
MSKT - MASH Sequential Kinking Terminal http://www.roadsystems.com/mash-mskt/ Eligibility Letters: 126; June 10, 2016 CC-126A 12" blocks CC-126C CRT posts CC-126D TL-2 CC-126E 2 ft. Offset CC-126F Powder Coated CC-126G MASH 2016	 <p style="text-align: center;">MSKT</p>	Road Systems, Inc.	X		TL-2 (25' - measured to Post #5) TL-3 (50' - measured to Post #9)	30" to 32"	X	20" wide Square Impact Head, with front side of feeder chute closed and backside open. The MSKT absorbs energy by kinking rail elements as they feed through impact head. Strut and cable anchorage, between post 1 and 2, act together to transfer tension from a downstream impact (for redirection). Cable anchor bracket is seated on shoulder bolts; bolts secured w/nuts on the face of rail. Longitudinal slots in w-beam rail element between posts 1 & 2 - there are three slots in the valley of the rail and five slots on both the top and bottom corrugations. W-beam rails are spliced mid-span between posts beyond post 4. All steel post system with posts 1 and 2 being hinged posts. The remaining posts (post 3 thru 8) are W6x8.5x 6' standard steel posts. Options: Post 3 through 8: Control Release Post (CRT) (Wood); MSKT can be powder coated or Natina stain may be applied over the galvanized surface; Some parts are interchangeable with flared MASH MFLEAT terminal; No blockouts at posts 1 and 2. Post 3 and beyond, 8" or 12" wood or composite blockouts.	BLON: at post 3 (12'-6" from post 1) Offset Post 1 at 25:1 max flare rate) over length of system.
MFLEAT - MASH FLared Energy Absorbing Terminal http://www.roadsystems.com/mash-mfleat/ Eligibility Letters: 143; April 10, 2019	 <p style="text-align: center;">MFLEAT</p>	Road Systems, Inc.	X		TL-3 (39'-7" - measured to Post #9)	30" to 32"	X	20" wide Square Impact Head, with front side of feeder chute open and backside closed. The MFLEAT absorbs energy by kinking rail elements that exit on the traffic side as they are fed through the impact head. Strut and cable anchorage, between post 1 and 2, act together to transfer tension from a downstream impact (for redirection). Cable anchor bracket is seated on shoulder bolts; bolts secured w/nuts on the face of rail. Longitudinal slots in w-beam rail element between posts 1 & 2 - there are three slots in the valley of the rail and five slots on both the top and bottom corrugations. W-beam rails are spliced mid-span between posts beyond post 5. All steel post system with posts 1 thru 3 being hinged posts. Installed as a straight flared length of 39 ft. – 7 inches with a 3 ft. offset. End rail is 12'-6", 10'-5" second rail and 13'-6.5" third rail. Some parts are interchangeable with tangent MASH MSKT and box beam MBEAT terminal. No blockouts at posts 1, 2 and 3. Post 4 and beyond, 8" or 12" wood or composite blockouts. MFLEAT can be powder coated or Natina stain may be applied over the galvanized surface.	BLON: at post 4 (16'-8" from post 1) Offset Post 1 at 3 ft.

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ROADSIDE SYSTEMS									
<p>MAX-Tension™</p> <p>https://www.lindsay.com/usca/en/infrastructure/brands/barrier-systems/solutions/end-treatments/max-tension/#section-1077</p> <p>Eligibility Letter: CC-133, June 15, 2017 (TL-3) CC-133A MASH 16 CC-134, Jan. 10, 2018 (TL-2) CC-134A MASH 16</p>	 <p>MAX-Tension</p>	Lindsay Transportation Solutions	X		<p>TL-2 (29'-11") (NON-GATING)</p> <p>TL-3 (55')</p>	31"		<p>14" wide Rectangular Impact Face</p> <p>Utilizes tensioned cables, telescoping panels and a cutting tooth to absorb the energy of an impacting vehicle by friction on the cables passing through the deflector plates in the non-extruding impact head and by the coupler/cutting tooth.</p> <p>Anchorage is provided by connecting the cable assemblies to the anchor system in front of post 1 consisting of a soil anchor and ground strut.</p> <p>All steel post system. Proprietary releasable Post 1; W6x8.5 x 6' standard line posts beyond post 1.</p> <p>W-beam guardrail is spliced mid-span, between posts.</p> <p>No blackout at post 1. Post 2 and beyond, 8" or 12" wood or composite blackout.</p> <p>The non-energy absorbing parts of the system can be powder coated.</p>	<p>BLON: TL-2 at post 1. TL-3 at post 3 (9'-4" from post 1)</p> <p>0 - 2 ft offset allowed over straight length of system</p>
<p>MBEAT Box Beam Terminal</p> <p>https://roadsystems.com/mash-mbeat/</p> <p>Eligibility Letter: CC-157, Mar 13, 2020 (TL-3)</p>	 <p>MBEAT</p>	Road Systems, Inc.	X		<p>TL-3 (15' from the front face of the impact head to post #3)</p>	28"		<p>20" wide Square Impact Head with tapered mandrel section.</p> <p>During end-on impacts, the vehicle forces the mandrel portion of the MBEAT impact head into the end of the box beam section causing the tube to burst. The four walls of the tube are then peeled back.</p> <p>The MBEAT is a cable-anchored system connected at the base of post #1. A ground strut is also used.</p> <p>Posts #1 and #2 are bolted steel breakaway end posts connected by a strut. Posts #3 and beyond are standard 3" x 5.7# 1 beam weak posts used in standard 6" x 6" Box Beam.</p> <p>The end tube rail is 9'-10 3/4" long x 1/8" thick. A second 18'-0" long (minimum) section of standard 6"x 6" x 3/16" box beam rail is required.</p> <p>Blockouts are not used with the MBEAT.</p> <p>Some parts are interchangeable with flared MASH MFLEAT W-beam terminal.</p>	<p>BLON: TL-3 at post 3 (12'-3" from post 1)</p> <p>The system can taper parallel with the State allowed box beam taper up to a 25:1 flare rate</p>

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MEDIAN SYSTEMS									
MAX-Tension™ Median https://www.lindsay.com/usca/en/infrastucture/brands/barrier-systems/solutions/end-treatments/max-tension/#section-1085 Eligibility Letter: CC-141, Jan. 10, 2018 (TL-3) CC-141A MASH 16	 <p style="text-align: center;">MAX-Tension™ Median</p>	Lindsay Transportation Solutions	X		TL-3 (55'-5½")	31"	X	30" wide Rectangular Impact Face The MAX system utilizes tensioned cables, telescoping panels and a cutting tooth to absorb the energy of an impacting vehicle by friction on the cables passing through the deflector plates in the non-extruding impact head and by the couplers/cutting tooth located between posts 5 and 6. Anchorage is provided by connecting the cable assemblies to the anchor system in front of post 1 consisting of a soil anchor and ground strut. All steel post system. Proprietary releasable posts 1 and 2; W6x8.5 x 6' standard line posts beyond post 2. W-beam guardrail is spliced mid-span, between posts. No blackout at post 1. Post 2 and beyond, 8" wood or composite blockouts The non-energy absorbing parts of the system can be powder coated.	BLON: at post 3 (9'-4" from post 1) 0 - 2 ft offset allowed over straight length of system



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updated May 3, 2021

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TRAILING END ANCHOR									
Wood-Post, Trailing-End Anchorage System Report Link https://mwrsf.unl.edu/reportResult.php?reportId=279&search-textbox=TRP-03-279-13	 <p>Wood-Post, Trailing-End Anchorage System</p>	Generic	X	TL-3 (31'-3")	31"		X	No impact head. The trailing-end anchorage system provides tensile capacity for the barrier impacts within the length of need. During a vehicle impact at post six and beyond, the anchor posts would breakaway and allow for the anchor cable to release. The vehicle can gate behind the system without snagging on the anchor post. The anchorage system consisted of two BCT timber posts set into a 6-in. wide x 8-in. deep x 72-in. long, steel foundation tube. The two 6-ft steel foundation tubes were connected at the ground line with a strut and yoke assembly. One end of a 3/4-in diameter 6x19 wire rope was attached on the back side of the W-beam, and the other end passed through the hole at the bottom of end post and was secured through a 8-in. x 8-in. x 3/8-in steel bearing plate. Breakaway anchor posts (post nos. 1 and 2) consist of two 5 1/2-in. wide x 7 1/2-in. deep x 46-in. long, BCT timber posts set into steel foundation tube. W-beam guardrail is spliced mid-span, between posts. No blackout at post 1 and 2. Post 3 and beyond, 12" wood or composite blockouts	BLON: NA
TxDOT 31-in. W-Beam Downstream Anchor Terminal Report Link https://static.tti.tamu.edu/tti.tamu.edu/documents/9-1002-6.pdf	 <p>Downstream Anchor Terminal (DAT)</p>	Generic	X	TL-3 (9'-4")	31"		X	No impact head. The trailing-end anchorage system would release the anchor cable, the anchor posts would breakaway and the vehicle will gate through without snagging on the anchor post in an impact downstream of the length of need of the barrier system. The anchorage system consist of two BCT timber post into a 6-in. x 8-in. x 72-in. foundation tubes. These foundations were spaced 72 in. from center to center. The two foundation tubes were then linked together at ground level using two C3x5 channel sections. A W-beam end section was used to finish the end of the rail, and a standard breakaway anchor cable was used in conjunction with a guardrail anchor bracket. Breakaway anchor posts (post nos. 1 and 2) consist of two 5 1/2-in. wide x 7 1/2-in. deep x 46-in. long, BCT timber posts set into steel foundation tube. W-beam guardrail is spliced mid-span, between posts. No blackout at post 1 and 2. Post 3 and beyond, 8" wood or composite blockouts	BLON: NA


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TRAILING END ANCHOR										
Steel-Post, Trailing-End Anchorage System Report Link https://mwrsf.unl.edu/reportResult.php?reportId=423&search-textbox=trailing		Generic		X	TL-3 (31'-3")	31"		X	No impact head. The trailing-end anchorage system provides tensile capacity for the barrier impacts within the length of need. During a vehicle impact at post six and beyond, the anchor posts would breakaway and allow for the anchor cable to release. The vehicle can gate behind the system without snagging on the anchor post. The steel-post, trailing-end anchorage system utilizes breakaway anchor posts consisting of a W6x8.5 top portion and a 6-in. x 8-in. x 3/16-in. steel foundation tube. The top portion of the post incorporated a slot through the base plate and the web so that the anchor cable could pass through the post and be supported by the downstream face of the post and foundation tube. The anchor cable assembly consisted of anchor bearing plate, anchor bracket mounted on rail, end plate, and steel cable. Breakaway anchor posts (post nos. 1 and 2) consist of a W6x8.5 top portion and a 6-in. x 8-in. x 3/16-in. steel foundation tube. W-beam guardrail is spliced mid-span, between posts. No blockout at post 1 and 2. Post 3 and beyond, 12" wood or composite blockouts	BLON: NA

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