Crash Cushions (MASH)

NAME	MANUFACTURER		PERFORMANCE CHARACTERISTIC		MASH 2016	DIMENSIONS			LOCATIONS		SYSTEM INFORMATION	LOCATIONS CAN BE USED
			Non-Redirective, Gating	Redirective, Non-gating	Test Level	WIDTH (without transitions)	LENGTH	HEIGHT	PERMENANT	TEMPORARY		
Big Sandy®MASH http://www.traffixdevices.com/cgi-local/SoftCart.exe/bigsandy.htm?E+scstore Eligibility Letter: CC-139, Mar 8, 2018 (TL-3)	 **Big Sandy®**	Traffix Devices	X		TL-3	Varies to fit site	Varies (25 to 70 mph)	40.3" to 52.5"	X	X	Sand-filled plastic barrels dissipate the kinetic energy of an impacting vehicle by transferring the vehicle's momentum to the variable masses of sand in the barrels that are impacted. At minimum, use three (3) barrels to form the arrays with the least amount of sand in the first barrel and the maximum of sand in the last barrel closest to the area of concern. Additional barrels are used for varying speed and site width. For cold weather application pea gravel can be used in place of sand or rock salt can be added to the sand - see highway agency specifications. Can be placed on concrete, asphalt, gravel, compacted dirt, and inertial pallets. After an impact all damaged components should be replaced.	Temporary Construction Worksites i.e. Ends of Concrete Barriers; Gore Two-sided Protection; Wide Medians; Bridge Piers
CrashGard® https://www.pss-innovations.com/safety-products/crash-cushions-channelizers-drums/crashgard-sand-barrel-system Eligibility Letter: CC-145, Sep 17, 2018 (TL-3)	 **CrashGard®**	Plastic Safety Systems, Inc.	X		TL-3	Varies to fit site	Varies (25 to 75 mph)	48"	X	X	Sand-filled plastic barrels dissipate the kinetic energy of an impacting vehicle by transferring the vehicle's momentum to the variable masses of sand in the barrels that are impacted. At minimum, use four (4) barrels to form the arrays with the least amount of sand in the first barrel and the maximum of sand in the last barrel closest to the area of concern. Additional barrels are used for varying speed and site width. For cold weather application add 5 percent (by weight) rock salt to sand. Can be placed on concrete, asphalt, or smooth compacted soil. After an impact all damaged components should be replaced.	Temporary Construction Worksites i.e. Ends of Concrete Barriers; Gore Two-sided Protection; Wide Medians; Bridge Piers
Energite® III https://www.valtir.com/product/energite-iii/ Eligibility Letter: CC-164, Nov 19, 2020 (TL-3)	 **Energite® III**	Valtir, LLC	X		TL-3	Varies to fit site	Varies (25 to 70 mph)	42.9" to 52.1"	X	X	Sand-filled plastic barrels dissipate the kinetic energy of an impacting vehicle by transferring the vehicle's momentum to the variable masses of sand in the barrels that are impacted. At minimum, use four (4) barrels to form the arrays with the least amount of sand in the first barrel and the maximum of sand in the last barrel closest to the area of concern. Additional barrels are used for varying speed and site width. For cold weather application add 5 percent (by weight) rock salt to sand. Can be placed on concrete, asphalt, or smooth compacted soil. After an impact all damaged components should be replaced.	Temporary Construction Worksites i.e. Ends of Concrete Barriers; Gore Two-sided Protection; Wide Medians; Bridge Piers
Sentry Longitudinal Energy Dissipater® https://www.traffixdevices.com/products/attenuators/sled-us Eligibility Letter: CC-131, Sept. 21, 2016 (TL-3)	 **SLED®**	Traffix Devices	X		TL-1 TL-2 TL-3	22 ½"	12'-7" 18'-11" 25'-3"	42"		X	The SLED utilizes water, thermoplastic modules (modules), Containment Impact Sled (CIS), steel t-pins, and a transition to absorb kinetic energy and contain or control the trajectory of an impacting vehicle. System Configuration: For TL-3, the system comprises the CIS with four (4) modules. For TL-2, the system comprises the CIS with three (3) modules. For TL-1, the system comprises the CIS with two (2) modules. The module in the CIS is always empty . Each of the modules contains four (4) corrosion resistant cables permanently molded, a fill lid and a pop up float water level indicator. No ground anchoring needed and can be placed on concrete, asphalt, or smooth compacted soil. In cold weather, additives should be added to the water to prevent freezing, see the SLED manual for more information. Exisitng inventory is interchangeable as the design, manufacturering process, and installation are identical to the NHCRP 350 system. After an impact all damaged components should be replaced.	Temporary Construction worksite. Roadsides, exits and medians. Any locations where it is safe for the post impact trajectories to be on the back side of the system.

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NAME	MANUFACTURER		PERFORMANCE CHARACTERISTIC		MASH 2016	DIMENSIONS			LOCATIONS		SYSTEM INFORMATION	LOCATIONS CAN BE USED
			Non-Redirective, Gating	Redirective, Non-gating	Test Level	WIDTH (without transitions)	LENGTH	HEIGHT	PERMENANT	TEMPORARY		
Sentry Longitudinal Energy Dissipater® - Mini https://www.traffixdevices.com/products/attenuators/sled-mini Eligibility Letter: CC-142, June 1, 2018 (TL-1, 2) CC-144, Sept. 17, 2018 to Conc Barrier	 **SLED® Mini**	Traffix Devices	X		TL-2	23"	7'-1"	32 ½"		X	The SLED mini utilizes water-filled thermoplastic modules (modules), Containment Impact Sled (CIS), steel t-pins, and a transition to absorb kinetic energy and contain or control the trajectory of an impacting vehicle. System Configuration: For TL-2, the system comprises the CIS with two (2) water-filled modules when connected to a concrete median barrier. For TL-1 and TL-2, the system comprises the CIS with one (1) water-filled module when connected to TrafFix Water-Cable Barrier. Each of the modules contains three (3) corrosion resistant cables permanently molded, a fill lid and a pop up float water level indicator. No ground anchoring needed and can be placed on concrete, asphalt, or smooth compacted soil. In cold weather, additives should be added to the water to prevent freezing, see the SLED Mini manual for more information. After an impact all damaged components should be replaced.	Temporary Construction worksite. Roadsides, exits and medians. Any locations where it is safe for the post impact trajectories to be on the back side of the system.
Absorb-M https://www.lindsay.com/usca/en/infrastructure/brands/barrier-systems/solutions/crash-cushions/absorb/ Eligibility Letter: CC-153, June 25, 2019 (TL-3) CC-154, Nov. 21, 2019 (TL-2)	 **Absorb-M**	Lindsay Transportation Solutions	X		TL-2 TL-3	24"	14'-7 ½" 21'	42"		X	The ABSORB-M system utilizes water, thermoplastic elements (elements), tension straps, a midnose, and a transition to absorb kinetic energy and contain or control the trajectory of an impacting vehicle. System configuration: For TL-3, the nose plate is attached to an empty element with two (2) additional elements filled with water. For TL-2, the nose plate is attached to an empty element with one (1) element filled with water. Each element is pre-assembled using four tension straps secured with eight bolts and thread locking compound. No ground anchoring needed and can be placed on concrete, asphalt, or smooth compacted soil. In cold weather, additives should be added to the water to prevent freezing, see manual for more information. After an impact all damaged components should be replaced.	Temporary Construction worksite. Roadsides, exits and wide medians. Any locations where it is safe for the post impact trajectories to be on the back side of the system.
ArmorBuffa™ https://www.valmonthighway.com/products-solutions/temporary-barriers/armorbuffa Eligibility Letter: CC-171, Aug. 17, 2022 (TL-3)	 **ArmorBuffa™**	Valmont Highway International Pty, Ltd	X		TL-2 TL-3	20.7"	17'-5" 30'-7"	43.7"		X	The AmorBuffa system utilizes a nose piece, water-filled thermoplastic elements (elements), pins, and a transition to absorb kinetic energy and contain or control the trajectory of an impacting vehicle. System Configuration: For TL-3, the system comprised of a nose piece and four (4) elements. For TL-2, the system comprised of a nose piece with two (2) elements. All elements are always filled with water. No ground anchoring needed and can be placed on concrete, asphalt, or smooth compacted soil. In cold weather, additives should be added to the water to prevent freezing, see manual for more information. After an impact all damaged components should be replaced.	Temporary Construction worksite. Roadsides, exits and wide medians. Any locations where it is safe for the post impact trajectories to be on the back side of the system.

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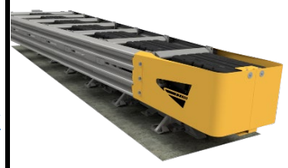
			Non-Redirective, Gating	Redirective, Non-gating	Test Level	WIDTH (without transitions)	LENGTH	HEIGHT	PERMENANT	TEMPORARY		
QUASH™ https://moovop.com/products/crash-cushion/ Elligibilty letter pending	 **QUASH™**	MOOVOP	X		TL-1 TL-2 TL-3	24"	5.7' 16.7' 24'	42"	X	X	The Quash system utilizes a nose piece, water-filled thermoplastic elements (elements), pins, and a transition to absorb kinetic energy and contain or control the trajectory of an impacting vehicle. System Configuration: For TL-3, the nose plate is attached to an empty element and five (5) water-filled elements. For TL-2, the nose plate is attached to an element filled to 15", followed by three (3) water-filled elements. For TL-1 configuration consists of one element filled with water and the nose piece. Each element is pre-assembled using four secured tension straps. For portable temporary barrier applications, the elements are connected together by three (3) pins on the flange assembly. For movable barrier applications, the elements are connected together by two (2) pins on each self-centering J-slot hinge. No ground anchoring needed and can be placed on concrete, asphalt, or smooth compacted soil. In cold weather, additives should be added to the water to prevent freezing, see manual for more information. After an impact all damaged components should be replaced.	Temporary Construction worksite. Roadsides, exits and wide medians. Any locations where it is safe for the post impact trajectories to be on the back side of the system.
QuadGuard® M10 https://www.valtir.com/product/quadguard-m10/ Eligibility Letter: CC-112,Feb 9, 2011 (TL-3) CC-112B, Mar 8, 2012 w/Asphalt CC-121, July 30, 2012; 3 bays CC-112C, Sept 21, 2016; Modified CC-163, Dec 20, 2020; Wide System	 **QuadGuard® M10**	Valtir, LLC		X	TL-2 TL-3 TL-3 (WIDE)	24" 24" 69"	13' 22' 22'	32 ⅛"	X	X	QuadGuard® M10 utilizes a steel nose and crushable, energy absorbing cartridges surrounded by a framework of steel Quad-Beam™ panels that slides back on a single track to absorb the kinetic energy of an impacting vehicle, when struck head-on. The system uses two types of cartridges in a staged configuration; Type I in nose and front bays and Type II in rear bays. System Configuration - TL-3 - 7 cartridges in 6 bays; 4 Type I (in nose and front bays) and 3 Type II (in rear bays) TL-2 - 4 cartridges in 3 bays; 3 Type I (in nose and front bays) and 1 Type II (in rear bay). Permanent applications - Requires a concrete pad. Temporary applications - Requires a Tension-strut Backup to be installed on asphalt. After an impact, the system is pulled forward and reset to its original length. Replace all crushed cartridges, support brackets, nose assembly, and panels.	Median, shoulder or gore areas.
QuadGuard®Elite M10 https://www.valtir.com/product/quadguard-elite-m10/ Eligibility Letter: CC-112A,May 7, 2012 (TL-2,3)	 **QuadGuard®Elite M10**	Valtir, LLC		X	TL-3	24" or 69"	27'-2"	32"	X	X	QuadGuard®Elite M10 utilizes a flex-belt nose, and High Density Polyethylene (HDPE) cylinders surrounded by a framework of steel Quad-Beam™ panels that slides back on a single track to absorb the kinetic energy of an impacting vehicle, when struck head-on. The system consists of eight bays, each with a HDPE cylinder that protrudes above the top of the side rails of the system. The nose section includes a self-restoring HDPE cylinder, place horizontally. Consist of some of the same components as the QuadGuard®. Permanent applications - Requires a concrete pad. Temporary applications - Requires a Tension-strut Backup to be installed on asphalt. After an impact, the hit indicator will be in the UP position. The system is pulled forward and rest to its original length. Replace all damage cylinders and other components. Cylinders are potenitally reusable after an impact - determined by DOT.	Median, shoulder or gore areas.

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			Non-Redirective, Gating	Redirective, Non-gating	Test Level	WIDTH (without transitions)	LENGTH	HEIGHT	PERMENANT	TEMPORARY		
Smart Cushion® https://hillandsmith.com/product/smart-cushion-crash-attenuator/ Eligibility Letter: CC-128, Aug. 16, 2016 (TL-3)	 **Smart Cushion®**	Hill & Smith		X	TL-2	24"	13'-8"	34"	X	X	The Smart Cushion® utilizes a cable, hydraulic cylinder system and steel frames that telescope rearwards, absorbing the energy of an impacting vehicle bring it to a stop within the system. The system is slightly tapered from front to rear, to allow for the side panels to nest over each other. It consist of a base, supporting frames, a sled, side panels, a wire rope cable, sheaves, and a shock-arresting hydraulic cylinder. System comes fully assembled. Can be bolted on asphalt and a concrete pad. No change between NCHRP 350 and MASH system. After an impact the system is pulled forward and reset to its original position and replace two ¼" grade 8 shear bolts. Replace any damage components. The system width is measured from the inside of the last sliding panels.	Median, shoulder or gore areas.
					TL-3		21'-8"					
Universal TAU-M™ https://www.lindsay.com/uploads/files/resources/441-LINFRA%2024015%20PI%20Sheet%20TAU-M.pdf Eligibility Letter: CC-147, Sept. 17, 2018; TL-3 CC-146, Oct 15, 2018; TL-2	 **Universal TAU-M™**	Lindsay Transportation Solutions		X	TL-2	34.5"	15'-5"	32⅝"	X	X	The Universal TAU-M™ utilizes elliptical cylindrical cartridges that are crushed as the system is telescope backwards, absorbing the energy of an impacting vehicle bring it to a stop within the system. It consist of a flat steel nose, thrie-beam slider panels, elliptical cylindrical cartridges (without holes) in each bay and two cable tension assemblies. The system is bolted to a concrete or asphalt pad, only at the leading and tail end. System Configuration - TL-3 - 7 cartridges in 7 bays; TL-2 - 4 cartridges in 4 bays A retrofit kit is avaliable to upgrade TAU-II NCHRP 350 systems to MASH TAU-M. After an impact, the system is pulled forward and reset to its original length. Replace all crushed cartridges, support brackets, nose assembly, and panels.	Median, shoulder or gore areas.
					TL-3		23'-11"					
Hercules https://www.smaroadsafety.com/en/p/crash-cushion/hercules/ Eligibility Letter: CC-156, Nov. 19, 2019; TL-3 CC-170; Dec 13, 2021; TL-2 CC-174; Mar 14, 2023; TL-3 Wide	 **Hercules**	SMA Road Safety		X	TL-2	24"	14'-5"	35"	X	X	The Hercules utilizes a front trolley unit that allows for a controlled deformation of the collapsable beam to absorb the energy of the impacting vehicle bring it to a stop within the system. It consist of an all steel construction with a 4-corrugated beam sides, a mounting rail and a collapsible beam split into modular bays. System comes fully assembled. System Configuration - TL-3 - 10 modular bays; TL-2 - 7 modular bays The system is bolted to a concrete or asphalt pad. After an impact, the system is pulled forward and reset to its original length. Replace all crushed modular bays and any damaged slding side panels.	Median, shoulder or gore areas.
					TL-3	24" to 7'-9"	19'-4"					
Delta® https://www.traffixdevices.com/products/attenuators/delta Eligibility Letter: CC-167, June 17, 2021; TL-3 Letter pending; TL-2	 **Delta®**	Traffix Devices		X	TL-2	30"	13'	32"	X	X	The Delta® utilizes high strength tear bolts that rip the various size cut-outs with in the valley of the thrie-beam panels to absorb the energy of the impacting vehicle, bring it to a stop within the system. It consists of a series of nose module, and steel thrie-beam fender panels supported by diaphragms. Systems comes fully assembled. System Configuration: TL-3 - 10 modular bays, TL-2 - 6 modular bays The system is bolted to a concrete or asphalt pad. After an impact, replace all damaged components.	Median, shoulder or gore areas.
					TL-3		21'					

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		Non-Redirective, Gating	Redirective, Non-gating	Test Level	WIDTH (without transitions)	LENGTH	HEIGHT	PERMENANT	TEMPORARY		
REACT® M https://www.valtir.com/product/react-m/ Eligibility Letter: CC-169, June 23, 2021; TL-3	 **REACT® M**	Valtir, LLC		X	TL-3	38¾"	22'-2¾"	52¾"	X	X	The REACT®M utilizes the crushing of a high molecular weight, high density polyethylene (HDPE) hollow cylinders to absorb the energy of the impacting vehicle. It consists of six (6) HDPE cylinders of varying thickness, four (4) redirective cables on each side of the system, a steel diaphragm bolted to a concrete pad, and a self-contained steel backup structure designed to resist movement during impacts. System comes fully assembled. The system is bolted to a concrete or asphalt pad. After an impact, the system is pulled forward and rest to its original length. Replace all damage cylinders and other components. Cylinders are potenitally reusable after an impact - determined by DOT.	Median, shoulder or gore areas.
SmartPod® https://hillandsmith.com/product/smartpod/ Eligibility Letter: CC-177, Jan. 12, 2024; TL-3	 **SmartPod®**	Hill & Smith		X	TL-3	37½"	22'-6"	33½"	X	X	The SmartPod® utilizes energy absorbing pods that are crushed as the system is telescope rearwards, absorbing the energy of an impacting vehicle bring it to a stop within the system. The system is slightly tapered from front to rear, to allow for the side panels to nest over each other. It consists of a baseframe, intermediate bulkheads, a backstop, side panels and energy absorbing pods. Four (4) Type 1 pod, placed in the front of the system and three (3) Type 2 pods place in the back of the system. System comes fully assembled. The system can be bolted to asphalt ans a concrete pad. After an impact, the system is pulled forward and reset to its original length. Replace all crushed pods, panels, bulkhead and backstop.	Median, shoulder or gore areas.
NOVUS™ 100 https://www.valtir.com/product/novus-100/ Eligibility Letter: Pending		Valtir, LLC		X	TL-3	26"	21'	34¾"	X	X	The NOVUS™ 100 utilizes high strength energy absorbing side panels to absorb the energy of the impacting vehicle, bring it to a stop within the system. It consist of a base track, impact head, energy absorbing side panel, diaphragm and backup. System comes fully assembled. The system is bolted to a concrete or asphalt pad. After an impact, the system is pulled forward and reset to its original length. Replace all damaged side panels.	Median, shoulder or gore areas.
Universal TAU-XR™ https://www.lindsay.com/uploads/files/resources/40901-LINFRA%2024015%20PI%20Sheet%20TAU-XR_WEB.pdf Eligibility Letter: Pending	 **Universal TAU-XR™**	Lindsay Transportation Solutions		X	TL-3	36"	23'-6"	32¼"	X	X	The Universal TAU-XR™ utilizes aluminum tubes that are crushed as the system is telescope backwards, absorbing the energy of an impacting vehicle bring it to a stop within the system. It consist of a rigid rail anchoring system, a backstop, a front support, 6 mid supports, and 14 telescoping thrie-beam side panels to form 7 collapsible bays. Each of the bays consists of energy-absorbing aluminim tubes. The system is bolted to a concrete or asphalt pad, only at the leading and tail end. The TAU-XR utilizes standard corrugated thrie-beam panels which enable the application of standard transition methods to various roadside hardware and barrier systems. After an impact, the system is pulled forward and reset to its original length. Replace all crushed aluminium tubes and panels.	Median, shoulder or gore areas.