TS 00028:10.0

Technical Information

Accepted Road Safety Barrier Systems and Devices

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2.0	12 October 2022	Second issue. Update in line with outcomes from the August 2022 ASBAP meeting.
3.0	20 February 2023	Third issue. Update in line with outcomes from the November 2022 ASBAP meeting.
4.0	12 April 2023	Fourth issue. Update in line with outcomes from the February 2023 ASBAP meeting.
5.0	14 July 2023	Fifth issue. Update in line with outcomes from the May 2023 ASBAP meeting.
6.0	06 October 2023	Sixth issue. Update in line with outcomes from the August 2023 ASBAP meeting.
7.0	15 December 2023	Seventh issue. Update in line with outcomes from the November 2023 ASBAP meeting.
8.0	22 March 2024	Eighth issue. Update in line with outcomes from the February 2024 ASBAP meeting.
9.0	17 June 2024	Ninth issue. Update in line with outcomes from the June 2024 ASBAP meeting.
10.0	19 September 2024	Tenth issue. Update in line with outcomes from the August 2024 ASBAP meeting.

Preface

This document provides a list of road safety barrier systems and devices that TfNSW has assessed as meeting the requirements of AS/NZS 3845 and considers acceptable for use on the classified road network, subject to appropriate design and installation. For roads not on the classified road network (for example, local roads), the responsible road authority (for example, councils) should be contacted to determine if this list is applicable.

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1 Scope

This document covers road safety barrier systems and devices. The systems and devices listed in this document are those that TfNSW has assessed as meeting the requirements of AS/NZS 3845 and considers acceptable for use on the classified road network, subject to appropriate design and installation. For roads not on the classified road network (for example, local roads), the responsible road authority (for example, councils) should be contacted to determine if this list is applicable.

2 Application

Safety barrier selection and design is an intricate process that requires the application of engineering judgement and risk assessment. Designers should use this list of accepted road safety barrier systems and devices in conjunction with:

- *Austroads Guide to Road Design Part 6: Roadside Design, Safety and Barriers* which describes the steps involved in designing a safety barrier installation
- TfNSW specification *R132 Safety Barrier Systems*
- the Austroads Technical Conditions for Use (TCU) documents and TfNSW specific conditions or variants listed in this document, which detail any product specific limitations identified through assessment
- the individual product installation and maintenance manuals, which are provided by the product owner or supplier to help achieve the desirable installation.

For further information regarding the product assessment and barrier performance, refer to the Austroads Barrier Assessment webpages https://austroads.com.au/safety-and-design/barrier-assessment

Where reference to TfNSW accepted products, this document should be deemed to satisfy that requirement.

For further clarification, please contact TechnologyStandards@Transport.nsw.gov.au.

3 Referenced documents

The following documents are cited in the text. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document applies.

International standards

AASHTO MASH 2:2016 *Manual for Assessing Safety Hardware*

Australian standards

AS/NZS 3845.1:2015 *Road safety barrier systems and devices – Part 1: Road safety barrier systems*

AS/NZS 3845.2:2017 *Road safety barrier systems and devices – Part 2: Road safety devices*

Transport for NSW standards

TS 02642.11 (11.097) *Supplement to Austroads Guide to Road Design Part 6: Roadside Design, Safety and Barriers* (2009), version 2.0

TS 03291 (all parts) (R132) *Safety Barrier Systems*

TS 05492 (20.346) *Traffic Control at Work Sites Technical Manual*

Other referenced documents

Austroads 2009, *Guide to Road Design – Part 6: Roadside Design, Safety and Barriers*

Note: TfNSW has not yet adopted the latest issue of Part 6 of the guide.

4 Terms, definitions and abbreviations

The following terms, definitions and abbreviations apply in this document.

accepted accepted for use on the classified road network

AGRD The Austroads Guide to Road Design – Part 6

ASBAP Austroads Safety Barrier Assessment Panel

CA crashworthiness assessment

conditionally accepted status allows products to remain in service with specific conditions

legacy status for permanent products allows retention of permanent products until the end of service life; for temporary products allows the product to be used on contracts signed on or before 1 January 2022

MASH Manual for Assessing Safety Hardware

phase out status allows products to remain in service to a fixed date after which time it will be withdrawn from acceptance

TCAWS Traffic Control at Work Sites Technical Manual

TCU technical conditions for use

TfNSW Transport for NSW

WRSB wire rope safety barrier

5 Assessment process

The assessment of road safety barrier systems, end treatments, and related road safety devices is undertaken at a national level by the Austroads Safety Barrier Assessment Panel (ASBAP).

Where an assessment by ASBAP results in a recommendation for acceptance, the recommendation together with any conditions of acceptance is documented by Austroads. Following the recommendation, TfNSW will determine if the recommendation is suitable for the NSW classified road network.

6 Austroads Technical Conditions of Use (TCU) and TfNSW conditions

To improve national harmonisation, the Austroads Technical Conditions of Use (TCU) will be adopted by TfNSW when deemed suitable. Where Austroads has issued multiple revisions of a TCU, the revision specified and linked in this document shall be adopted.

Where TfNSW has specific conditions or variants, they will be detailed in the relevant column in the relevant table in this document. Where TfNSW does not have additional product conditions or variants, this column will contain 'Nil' and the Austroads TCU shall be adopted in its entirety.

In special circumstances, TfNSW may accept a road safety product that has not been assessed by ASBAP and therefore does not have an Austroads TCU. In this instance TfNSW acceptance conditions will be provided and referenced.

All products accepted for use by TfNSW are listed in this document. Using a product that is not accepted or using a product outside the parameters for which it has been accepted by TfNSW represents additional risk and requires a site-specific risk assessment to determine suitability.

TfNSW will periodically review all products accepted for use based on, but not limited to, ASBAP recommendations, in-service performance, industry use, and maintenance and durability requirements and reserves the right to withdraw or modify acceptances at any time.

7 System supplier and procurement

This listing nominates a system supplier for each proprietary product. It is a requirement of TfNSW that proprietary products are sourced from the nominated system supplier (or their agent).

8 Accepted test level

The minimum test level required for a site shall be determined using engineering judgement and information obtained during site-specific assessment. Further guidance is provided in *Guide to Road Design – Part 6: Roadside Design, Safety and Barriers*.

9 ASBAP technical advice notes

ASBAP provides technical advice notes to inform road agencies on issues related to safety barrier systems and devices. The webpage for technical advice notes is: https://austroads.com.au/safety-and-design/barrier-assessment/technical-service

10 Frequently asked questions

10.1 Installation on a kerb – permanent systems

Permanent safety barriers should not be installed on a kerb as, upon vehicle impact, roll and pitch are developed which can affect the interaction of the vehicle with the barrier. This is more likely to occur where vehicle speeds exceed 70 km/h.

Where installation on top of a kerb is required, the barrier should be offset either:

a. far enough behind the kerb to allow an errant vehicle to stabilise after crossing the kerb before striking the barrier (desirably 1.5 metres)

b. close enough to the kerb so an impacting vehicle has not had adequate time to develop significant pitch and/or roll; it is important that enough offset from the kerb is provided for the foundation of the barrier to be constructed (desirably 200 mm).

10.2 Installation on a kerb – temporary systems

Temporary barriers, including end treatments, should not be installed immediately in front of or behind kerbs on roads with a posted speed of 70 km/h or more, irrespective of profile. Special consideration may be given to placement of the temporary barrier system on top of a mountable or semi-mountable kerb where a site risk assessment has determined the site constraints preclude other options. The barrier shall not be placed where it could contact the kerb within its normal deflection range for the speed environment.

On roads with a posted speed of 60 km/h or less, temporary road safety barrier systems may be placed on top of the kerb. A site risk assessment should be completed to consider the impacts the kerb will have on the impact height and angle of an errant vehicle. The barrier shall not be placed where it could contact the kerb within its normal deflection range for the speed environment.

10.3 Foundation and pavement conditions

Safety barrier systems rely on adequate foundation strength to perform successfully. Therefore, it is important that site ground conditions are verified and confirmed to be at least as good as tested conditions.

Safety barrier systems are generally tested in ground conditions that meet or exceed AASHTO standard soil strength. This is undertaken as a requirement of AS/NZS 3845 and MASH to ensure systems are considered equally. AASHTO standard soil strength may or may not be required in some instances to ensure performance. As safety barrier systems are not tested in varying ground conditions, it is best practice and recommended to install safety barrier systems in ground conditions that meet or exceed AASHTO soil strength. Designers are often asked what this represents for typical Australian pavement and ground types as AAHSTO is not generally used as a definition in Australia. TfNSW requires safety barrier systems to be founded on minimum CBR 15% material with a plasticity index of 6 minimum and 15 maximum. Landscaping may not be appropriate in this area.

Where the ground conditions vary, it may be necessary to either amend the foundation design in accordance with the design/installation guidance provided by the system supplier or consider an alternative system.

10.4 Minimum installation length

While barrier lengths shorter than the tested article length shown in the Austroads TCUs are possible, the designer shall consider how this will affect other performance values (such as deflection). Additional commentary can be found in *Guide to Road Design – Part 6: Roadside Design, Safety and Barriers*.

10.5 Attachments and screens

In accordance with the requirements of Australian/New Zealand standard AS/NZS 3845 there shall be no attachment to a road safety barrier system unless it can be shown by crash testing or risk assessment to be suitable.

At present there are no road furniture items such as headlight screens, signs, lighting posts, fences, visual screens, debris screens, pedestrian/cyclist rails, and so on, permitted to be attached to road safety barrier systems.

10.6 Offset to hazards

Appropriate clearance shall be allowed between the safety barrier and the hazard that it is protecting to allow for either the accepted deflection or the working width of the barrier when impacted, dependent upon whether the hazard is above or below the road surface level.

Where the hazard will not be impacted by any part of the vehicle that extends beyond the barrier, generally where the hazard is below road surface level (for example, fill batter), the ‘accepted deflection’ is sufficient.

Where the hazard may be impacted by any part of the vehicle that extends beyond the barrier, generally where the hazard is above road surface level, ‘working width’ shall be used.

10.7 Proximity to the batter hinge

Safety barriers should be installed with sufficient distance to the hinge point to accommodate the barrier's accepted dynamic deflection and to provide adequate lateral support for the system. This ensures that there is no damage to the batter following an impact and that the lateral support for the system is adequate to achieve the tested conditions.

Where the site is constrained, it may be possible to place the barrier closer to the hinge point. Issues such as constructability, performance of the product, impact on posts/anchorage and space behind batter for workers need to be addressed. This may involve the use of longer posts or other treatments to ensure that there is sufficient lateral support for the barrier system.

Maintenance of the barrier and the area behind the barrier may be difficult and appropriate maintenance procedures should be considered and documented as part of the installation requirements.

10.8 Distance to an excavation

The minimum distance between the back of the system and the edge of an excavation should provide sufficient distance to accommodate the barrier's design deflection and provide adequate lateral support for the system, whichever is the greater.

11 Accepted products

11.1 Accepted permanent products

MASH TL3 and TL4 permanent products are accepted for use in 110 km/h speed zones.

11.1.1 Steel rail safety barriers

Due to the performance of steel rail safety barriers during impact, that is, flattening of the rail, the dynamic deflection and working width values at TL3 are generally the same. At TL4 the working width value includes any heavy vehicle roll observed during testing.

Steel rail safety barriers are listed in Table 1.

Table 1 – Steel rail safety barriers

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
CrocGuard Safety Barrier	Safe Direction	*7 Mar 24*	MASH TL4 MASH TL3		Nil

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
EZY-GUARD High Containment Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL4 MASH TL3		Nil
EZY-GUARD High Containment Median Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL4 MASH TL3		Nil
EZY-GUARD LDS Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL4 MASH TL3		Nil
RAMSHIELD High Containment Safety Barrier	Safe Direction	*7 Mar 24*	MASH TL4 MASH TL3		Nil
Sentry Thrie-Beam Safety Barrier	Safe Direction	*7 Mar 24*	MASH TL4 MASH TL3		Nil
Sentry Thrie-Beam Median Safety Barrier	Safe Direction	*7 Mar 24*	MASH TL4 MASH TL3		Nil
EZY-GUARD 4 Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL3		Nil
EZY-GUARD 4 Median Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL3		Nil
EZY-GUARD Smart Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL3		Nil
EZY-GUARD Smart Median Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL3		Nil

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
EZY-GUARD HD Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL3		Nil
HammerBeam Safety Barrier	Safe Direction	*13 Jun 24*	MASH TL3		Nil
Ingal RBT (Rigid Barrier Transition)	Ingal Civil Products	*7 Mar 24*	MASH TL3		Anchor block design in accordance with Austroads SBTA 21-005
RAMSHIELD Low Deflection Safety Barrier	Safe Direction	*12 Jun 24*	MASH TL3		Nil
RAMSHIELD Safety Barrier	Safe Direction	*7 Mar 24*	MASH TL3		Nil
RAMSHIELD Transition	Safe Direction	*7 Mar 24*	MASH TL3		Anchor block design in accordance with Austroads SBTA 21-005
SENTRY W BEAM Safety Barrier	Safe Direction	*7 Mar 24*	MASH TL3		Nil
SENTRY W BEAM Median Safety Barrier	Safe Direction	*7 Mar 24*	MASH TL3		Nil

11.1.2 Wire rope safety barriers

The following apply to all wire rope safety barriers (WRSB):

a. The maximum length of WRSB between anchors is 1000 m where this is in accordance with the system owner's and system supplier's guidance. Longer installations require intermediate anchorage. It is necessary to overlap the intermediate anchors to provide a continuous length of redirective barrier system. A minimum of accepted deflection distance should be provided between the intermediate anchors. This minimises any risk associated

with errant vehicles impacting two systems simultaneously which is not well understood at this time.

b. WRSB consist of tensioned ropes held between posts and, as such, there is a limit to their use on horizontal and vertical alignments. It is generally accepted that the minimum allowable horizontal curve radius for WRSB installations is 200 m, however if the system supplier specifies a minimum that is different than this, the manufacturer's requirements shall be used. The minimum allowable sag curve K value is 30. The use of intermediate anchors at the base of sag curves may be considered to reduce ropes from rising. There is no K value limit for crest curves.

c. It has been demonstrated that the deflection of WRSB will continually increase as the length of installation increases. It is therefore necessary to multiple the accepted deflection distances by correction factors to determine the appropriate design deflection for an installation. The correction factors are published in the product manuals for individual proprietary WRSB.

Wire rope safety barriers are listed in Table 2.

Table 2 – Wire rope safety barriers

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
MashFlex Wire Rope Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL4 MASH TL3		Nil
Sentryline-M Wire Rope Safety Barrier	Safe Direction	*7 Mar 24*	MASH TL4 MASH TL3		Nil
Brifen Wire Rope Safety Barrier	Safe Direction	*7 Mar 24*	MASH TL3		Nil

11.1.3 Steel safety barriers

Steel safety barriers are listed in Table 3.

Table 3 – Steel safety barriers

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
HighwayGuard Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL4 MASH TL3		Nil
HighwayGuard LDS Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL3 MASH TL4		Nil
SafeZone LDS Safety Barrier	Jaybro Group	*7 Mar 24*	MASH TL4 MASH TL3		Nil
SafeZone Safety Barrier	Jaybro Group	*7 Mar 24*	MASH TL4 MASH TL3		Nil
BG800 Safety Barrier	Highway Care	*22 Mar 24*	MASH TL4 MASH TL3		Nil
BG800 MDS Safety Barrier	Highway Care	*22 Mar 24*	MASH TL3		Nil
HighwayGuard MDS Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL3		Nil
Safezone MDS Safety Barrier	Jaybro Group	*7 Mar 24*	MASH TL3		Nil
BG800 LDS Safety Barrier	Highway Care	*22 Mar 24*	MASH TL2 (Modified) 80 km/h		Nil

11.1.4 Concrete safety barriers

TfNSW does not accept the use of precast concrete barriers for permanent use. Concrete safety barriers are listed in Table 4.

Table 4 – Concrete safety barriers

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
TYPE F Concrete Safety Barrier	Public Domain	Not applicable	MASH TL5 MASH TL4 MASH TL3		*4 Apr 23*

11.1.5 Other safety barriers

Other safety barriers are listed in Table 5.

Table 5 – Other safety barriers

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
QUICKCHANGE Concrete Reactive Tension Barrier System	Lindsay Transportation Services	*4 Sep 24*	MASH TL3		Nil
SAFETY ROLLER Safety Barrier	Ambient Technologies	*7 Mar 24*	MASH TL4 MASH TL3		Nil
ROBOS Safety Barrier	Hiway Stabilisers Australia	*7 Mar 24*	MASH TL4 MASH TL3		Nil
ROBOS Median Safety Barrier	Hiway Stabilisers Australia	*12 Jun 24*	MASH TL4 MASH TL3		Nil

11.1.6 Terminals

A gating terminal is designed to permit controlled penetration of errant vehicles behind the system. A run out area should be provided to allow adequate space for the vehicle to safely come to rest. Unless otherwise specified in the TCU documents, the run out area should be 18.5 m in length x 6 m in width (from the point of redirection). Run out areas should have a crossfall of 10:1 or flatter and be free of roadside hazards.

Terminals are listed in Table 6.

Table 6 – Terminals

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
ET-SS Terminal	Ingal Civil Products	*7 Mar 24*	MASH TL3 MASH TL2		Nil
MAX-TENSION Terminal	Safe Direction	*7 Mar 24*	MASH TL3 MASH TL2		Nil

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
MSKT (MASH Sequential Kinking Terminal)	Safe Direction	*7 Mar 24*	MASH TL3 MASH TL2		Nil
Trend Median Terminal	Ingal Civil Products	*4 Sep 24*	MASH TL3		Nil
TRAILING Terminal	Public Domain	Not applicable	MASH TL3		*31 Jan 20*
SLOPED END Concrete Terminal – Permanent	Public Domain	Not applicable	70 km/h		*6 Jul 21*

11.1.7 Redirective crash cushions

Redirective crash cushions are not to be deployed as single point protectors for traffic signal posts without approval from the relevant Transport for NSW representative.

Redirective crash cushions are listed in Table 7.

Table 7 – Redirective crash cushions

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
HERCULES Crash Cushion	Safe Direction	*7 Mar 24*	MASH TL3		Nil
QUADGUARD Elite M10 Crash Cushion	Ingal Civil Products	*7 Mar 24*	MASH TL3		Nil
QUADGUARD M10 Crash Cushion	Ingal Civil Products	*7 Mar 24*	MASH TL3 MASH TL2		Nil
SMART Crash Cushion	HS Roads	*7 Mar 24*	MASH TL3 MASH TL2		Nil

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
Tau-XR Crash Cushion	Safe Direction	*4 Sep 24*	MASH TL3		Nil
UNIVERSAL TAU-M Crash Cushion	Safe Direction	*7 Mar 24*	MASH TL3 MASH TL2		Nil

11.1.8 Median gates

In line with the changes to AS/NZS 3845 and the recommendation of the ASBAP, TfNSW has transitioned the current suite of accepted safety barrier systems and devices to the MASH test protocol. MASH tested products provide an increased level of safety to road users. As of 1 January 2022, the products in Table 8 will be 'conditionally accepted' until such time as a MASH tested horizontal longitudinal safety barrier gate is recommended for use.

Table 8 – Median gates

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
ARMOR GUARD Gate	Safe Direction	*20 Nov 20*	NCHRP 350 TL3		Conditionally accepted
BG800 Gate	Ingal Civil Products	*20 Nov 20*	NCHRP 350 TL3		Conditionally accepted
VEVA3 Median Gate	Traffic Tech	*20 Nov 20*	EN1317 HC2		Conditionally accepted
Cado Emergency Gate	Traffic Tech	*2 Sep 22*	MASH TL3		Nil

11.1.9 Bollards and point protectors

Bollards and point protectors are listed in Table 9.

Table 9 – Bollards and point protectors

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
ENERGY Absorbing Bollard	Roadside Services & Solutions Impact Absorbing Systems	Not applicable	50 km/h		*Oct 18*

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
OMNI STOP Ultra Security Bollard	SafeRoads	Not applicable	50 km/h		*25 May 18*
RAPTOR Plastic Single Point Protector	Valmont Highway	*1 Dec 21*	50 km/h		Not permitted for use with traffic signal post

11.2 Accepted temporary products

A temporary safety barrier is defined as a road safety barrier that is installed in association with adjacent ongoing and continuous works, short term emergencies, or similar situations. This type of safety barrier shall be removed upon completion of the works or emergency. Temporary safety barriers perform in the same way as other road safety barriers; however, the consequence of a failure of the barrier may involve injury to road workers.

When choosing a temporary safety barrier it is necessary to consider the speed environment during works and periods of in-activity. If it is likely higher speeds will be realised (or permitted) during periods of in-activity, a safety barrier approved for the higher speed zone shall be chosen.

11.2.1 Concrete safety barriers

Concrete safety barriers are listed in Table 10.

Table 10 – Concrete safety barriers

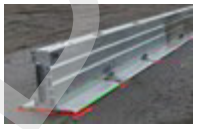
Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
Rebloc 120FA_6_SF Safety Barrier	Hill & Smith	*7 Mar 24*	MASH TL5 MASH TL3		Nil
DB80 T150 Safety Barrier	Jaybro Group	*12 Jun 24*	MASH TL4 MASH TL3		Nil
Rebloc 80SAH_12	Hill & Smith	*7 Mar 24*	MASH TL4 MASH TL3		Nil

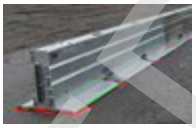
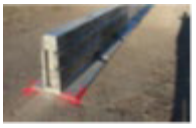
Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
3.6M JJ Hooks Safety Barrier – Freestanding	Australian Road Barriers	*7 Mar 24*	MASH TL3		Nil
6M JJ HOOKS Safety Barrier	Australian Road Barriers	*7 Mar 24*	MASH TL3		Nil
DB80 K150 Safety Barrier	Jaybro Group	*7 Mar 24*	MASH TL3		Nil
DB80A T150S Safety Barrier	Jaybro Group	*7 Mar 24*	MASH TL3		Nil
PIN and LOOP LDS Safety Barrier	Pin and Loop	*7 Mar 24*	MASH TL3		Nil
PIN and LOOP Safety Barrier	Pin and Loop	*7 Mar 24*	MASH TL3		Nil
Rebloc 80SAH_12_8B	Hill & Smith	*7 Mar 24*	MASH TL3		Nil
Rebloc 80SAH_4	Hill & Smith	*7 Mar 24*	MASH TL3		Nil
T-LOK F-TYPE Safety Barrier	Saferoads	*7 Mar 24*	MASH TL3		Nil
T-LOK Rubber Safety Barrier	Saferoads	*7 Mar 24*	MASH TL3		Nil

11.2.2 Steel safety barriers

Steel safety barriers are listed in Table 11.

Table 11 – Steel safety barriers

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
BG800 Safety Barrier	Highway Care	*22 Mar 24*	MASH TL4 MASH TL3		Nil
DEFENDER 100 HC Safety Barrier	Safe Barriers	*7 Mar 24*	MASH TL4 MASH TL3		Nil
HighwayGuard LDS Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL4 MASH TL3		Nil
HighwayGuard Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL4 MASH TL3		Nil
SafeZone LDS Safety Barrier	Jaybro Group	*7 Mar 24*	MASH TL4 MASH TL3		Nil
SafeZone Safety Barrier	Jaybro Group	*7 Mar 24*	MASH TL4 MASH TL3		Nil
ZONEGUARD Safety Barrier	Hill & Smith	*7 Mar 24*	MASH TL4 MASH TL3		Nil
HV2 Hybrid Safety Barrier	Saferoads	*7 Mar 24*	MASH TL4 MASH TL3		Nil
BG800 MDS Safety Barrier	Highway Care	*22 Mar 24*	MASH TL3		Nil
DEFENDER 100 FS Safety Barrier	Safe Barriers	*7 Mar 24*	MASH TL3		Nil

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
DEFENDER 100 LDS Safety Barrier	Safe Barriers	*7 Mar 24*	MASH TL3		Nil
HighwayGuard MDS Safety Barrier	Ingal Civil Products	*7 Mar 24*	MASH TL3		Nil
Safezone MDS Safety Barrier	Jaybro Group	*7 Mar 24*	MASH TL3		Nil
ZONEGUARD MDS Safety Barrier	Hill & Smith	*7 Mar 24*	MASH TL3		Nil
BG800 LDS Safety Barrier	Highway Care	*22 Mar 24*	MASH TL2 (Modified) 80 km/h		Nil
DEFENDER 70 Safety Barrier	Safe Barriers	*7 Mar 24*	MASH TL2		Nil
IRONMAN HYBRID Safety Barrier	Saferoads	*7 Mar 24*	MASH TL2		Nil

11.2.3 Plastic water filled safety barriers

Plastic water filled safety barriers are listed in Table 12.

Table 12 – Plastic water filled safety barriers

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
ARMORZONE MASH Plastic Water Filled System	Ingal Civil Products	*7 Mar 24*	MASH TL2 MASH TL1		Nil
Lo-Ro Water Cable Barrier	Jaybro Group	*7 Mar 24*	MASH TL2 MASH TL1		Nil

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
RICOCHET Plastic Water Filled System	TFH Hire Services	*7 Mar 24*	MASH TL1		Nil
SHIELD I Plastic Water Filled System	National Plastics	*7 Mar 24*	MASH TL1		Nil

11.2.4 Other safety barriers

Other safety barriers are listed in Table 13.

Table 13 – Other safety barriers

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
MOBILE BARRIERS MBT-1 Safety Barrier	Dynamic Road Maintenance Services	*7 Mar 24*	MASH TL3 Speed restricted 80 km/h		Nil
QUICKCHANGE Concrete Reactive Tension Barrier System	Lindsay Transportation Services	*4 Sep 24*	MASH TL3		Nil

11.2.5 Water-filled crash cushions

Water-filled crash cushions are non-redirective devices that gate during impact. A gating end treatment is designed to permit controlled penetration of errant vehicles behind the system. A run out area should be provided to allow adequate space for the vehicle to safely come to rest. Unless otherwise specified in the TCU, the run out area should be 18.5 m in length x 6 m in width (from the point of redirection). Run out areas should have a crossfall of 10 to 1 or flatter and be free of roadside hazards.

Water-filled crash cushions are listed in Table 14.

Table 14 – Water-filled crash cushions

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
ABSORB-M Crash Cushion	Jaybro Group	*7 Mar 24*	MASH TL3 – Speed Restricted 80km/h MASH TL2		Nil
SLED Plastic Water Filled Terminal	Saferoads Pty Ltd	*7 Mar 24*	MASH TL3 – Speed Restricted 80km/h MASH TL2 MASH TL1		Nil
ArmorBuffa Crash Cushion	Ingal Civil Products	*7 Mar 24*	MASH TL3 – Speed Restricted 80km/h		Nil

11.2.6 Redirective crash cushions

Redirective crash cushions are listed in Table 15.

Table 15 – Redirective crash cushions

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
HERCULES Crash Cushion	Safe Direction	*7 Mar 24*	MASH TL3		Nil
QUADGUARD M10 CZ Crash Cushion	Ingal Civil Products	*7 Mar 24*	MASH TL3 MASH TL2		Nil
SMART Crash Cushion	HS Roads	*7 Mar 24*	MASH TL3 MASH TL2		Nil
Tau-XR Crash Cushion	Safe Direction	*4 Sep 24*	MASH TL3		Nil

Product name	Supplier	Austroads TCU	Test level	Product photo	TfNSW conditions & variants
UNIVERSAL TAU-M Crash Cushion	Safe Direction	*7 Mar 24*	MASH TL3 MASH TL2		Nil

11.3 Other crashworthy devices

The products in this list have been assessed and recommended by ASBAP in accordance with AS/NZS 3845.2:2017. Products listed here have only been assessed in accordance with AS/NZS 3845.2:2017, and there are other approvals that are required elsewhere in the organisation prior to use. In other words, a product listed here has been deemed to be crashworthy but this is not the only consideration. Users should select devices which are fit for purpose to their total requirements, noting that crashworthiness is just one aspect to consider.

11.3.1 Sign support structures and poles

Sign support structures and poles are listed in Table 16.

Table 16 – Sign support structures and poles

Product name	Supplier	Austroads CA	Test level	Product photo	TfNSW conditions & variants
OPTIMAST Sign Support	Delnorth Group	*20 Dec 21*	MASH TL3		Nil
SIGNFIX Sign Support	Delnorth Group	*20 Dec 21*	MASH TL3		Nil

11.3.2 Truck and trailer mounted attenuators

All activities utilising truck or trailer mounted attenuators shall be undertaken in accordance with TCAWS and supported by a risk assessment that is specific to the tasks being undertaken.

Truck and trailer mounted attenuators are listed in Table 17.

Table 17 – Truck and trailer mounted attenuators

Product name	Supplier	Austroads CA	Test level	Product photo	TfNSW conditions & variants
MASH Scorpion II TL3 Trailer Attenuator	A1 Roadlines	*20 Nov 20*	MASH TL3		Nil
SCORPION II MASH Truck Mounted Attenuator	A1 Roadlines	*20 Nov 20*	MASH TL3		Nil
Silke MASH Truck Mounted Attenuator	J1-Led Intelligent Solutions	*22 Mar 22*	MASH TL3		Nil
SS180M TMA	Ingal Civil Products	*20 Nov 20*	MASH TL3		Nil
TTMA-200 Trailer Mounted Attenuator	Ambient Technologies	*4 Mar 21*	MASH TL3		Nil
VERDEGRO BLADE Truck Mounted Attenuator	Innov8 Equipment	*5 Dec 20*	MASH TL3		Nil
Scorpion II Metro Slim TMA	A1 Roadlines	*12 Jun 24*	MASH TL2 (Modified) 80 km/h		Nil
MASH Scorpion II TL2 TMA	A1 Roadlines	*20 Nov 20*	MASH TL2		Nil

11.4 Permanent products – legacy status

There shall be no installations of permanent products with legacy status.

AS/NZS 3845.1:2015 and AS/NZS 3845.2:2017 specify MASH as the current basis for crash testing, thereby superseding NCHRP 350. The changes are in response to the ongoing industry progress, market trends, and changes in the average vehicle size, plus an increased availability of MASH tested products becoming available to the Australian market.

Safety barrier systems with a legacy status continue to provide the level of service at which they were originally tested. Legacy status products may be maintained and/or repaired until the end of their service life, or when parts are no longer available.

When long lengths of legacy items are damaged or within the limit of works, an assessment should be made on whether an approved system may be installed instead as part of reinstatement works.

Legacy products shall not be relocated.

Permanent products with legacy status are listed in Table 18.

Table 18 – Permanent products – legacy status

Product name	Supplier	Acceptance conditions date	Product photo
ET 2000 PLUS Terminal	Ingal Civil Products	*1 Jan 20*	
FLEAT 350 Terminal	Safe Direction	*Aug 14*	
FLEAT-SP Terminal	Safe Direction	*1 Jan 20*	
FLEXFENCE TL3 3 Wire Rope Barrier System	Ingal Civil Products	*Aug 14*	
FLEXFENCE TL3 4 Wire Rope Barrier System	Ingal Civil Products	*1 Jan 20*	
FLEXFENCE TL4 4 Wire Rope Barrier System	Ingal Civil Products	*1 Oct 20*	
IRONMAN MEDIAN Gate	Saferoads	*Jan 15*	
MELT (MODIFIED ECCENTRIC LOADER TERMINAL) Steel Rail Terminal	Public Domain	*7 Jun 19*	

Product name	Supplier	Acceptance conditions date	Product photo
NSW Transition to Rigid Concrete	Public Domain	*22 Mar 24*	
QUADGUARD Crash Cushion – Permanent	Ingal Civil Products	*1 Jan 20*	
Rubber Crash Cushion	Saferoads	*Aug 14*	
SENTRYLINE II 4 Wire Rope Barrier System	Australian Construction Products	*1 Oct 20*	
SKT 350 Terminal	Safe Direction	*Jun 14*	
SKT-SP Terminal	Safe Direction	*1 Jan 20*	
THRIE-BEAM Safety Barrier	Public Domain	*1 Jan 20*	
TRACC Crash Cushion	Ingal Civil Products	*1 Jan 20*	
TREND 350 Terminal	Ingal Civil Products	*1 Jan 20*	
UNIVERSAL TAU-II Crash Cushion – Permanent	Australian Construction Products	*1 Jan 20*	
W-BEAM G4 Safety Barrier	Public Domain	*4 Sep 24*	
X-TENSION 350 Terminal	Australian Construction Products	*1 Jan 20*	

11.5 Temporary products – legacy status

There shall be no temporary products with legacy status used on contracts signed post 1 January 2022.

AS/NZS 3845.1:2015 and AS/NZS 3845.2:2017 specify MASH as the current basis for crash testing, thereby superseding NCHRP 350. The changes are in response to the ongoing industry progress, market trends, and changes in the average vehicle size, plus an increased availability of MASH tested products becoming available to the Australian market.

For temporary barriers, all contracts signed post 1 January 2022 shall use MASH temporary safety devices. While all contracts signed before 1 January 2022 may continue to use NCHRP 350 temporary safety barrier products until practical/physical completion.

Safety barrier systems with a legacy status continue to provide the level of service at which they were originally tested.

Temporary products with legacy status are listed in Table 19.

Table 19 – Temporary products – legacy status

Product name	Supplier	Acceptance conditions date	Product photo
ABSORB 350 Terminal	Australian Construction Products	*16 Dec 21*	
ARMORZONE Plastic Water Filled Barrier System	Ingal Civil Products	*16 Dec 21*	
JL-D-0850 Stuer-Egghe ‘Julietta’ TMA	J1-LED Intelligent Transport Solutions	*16 Dec 21*	
QUADGUARD CZ Crash Cushion	Ingal Civil Products	*16 Dec 21*	
SLOPED END Concrete Terminal – Temporary	Public Domain	*16 Dec 21*	
UNIVERSAL TAU-II Crash Cushion – Temporary	Australian Construction Products	*16 Dec 21*