

EZY-GUARD Smart Steel Rail Safety Barrier - Permanent

Product summary

Status	Accepted
Category	Permanent – Flexible Longitudinal Barriers
Test Level	MASH TL3: 100km/h
Supplier	Ingal Civil Products
Description	Ezy-Guard Smart Steel Rail Safety Barrier is a permanent longitudinal barrier.



Introduction and purpose

This detail sheet is intended to supplement *VicRoads Road Design Note 06-04 - Accepted Safety Barrier Products*. Please refer to RDN 06-04 for the current VicRoads acceptance status, information on the product assessment process and general acceptance conditions.

The technical details within this document have been extracted from information submitted to VicRoads by the Supplier and the recommended 'Conditions for Use' from the Austroads Safety Barrier Assessment Panel (ASBAP).

VicRoads requirements take precedence over the product manual and Austroads conditions. Where a departure from these requirements is required, users should understand the risks and document their engineering decisions.

For more detailed product information, refer to the individual product manual or contact the System Supplier.

Technical information

The Ezy-Guard Smart Steel Rail Safety Barrier should be designed, installed and maintained in accordance with the following VicRoads conditions for use.

These conditions for use have been based on an Austroads assessment of technical performance against AS/NZS 3845 and contain VicRoads specific requirements when necessary.



Summary Conditions for Use

Accepted configuration	Ezy-Guard Smart Steel Rail Safety Barrier – Permanent
Variants	Standard Installation Back to Back Installation Ezy Lift – only to be installed where the road surface has been overlaid Surface Mount – Refer to system conditions Socketed – Refer to system conditions
Deflection	1.65 metres
Product manual reviewed	Ingal Civil Product Ezy-Guard Smart, Product & Manual, August 2015 Release
ASBAP issue	5 September 2017 for Ezy Guard Smart Steel Rail Safety Barrier

Refer VicRoads conditions for use (below).

Detail Sheet	Page 1 of 4	5th edition	Sept 2019
--------------	-------------	-------------	-----------

VicRoads Conditions for Use

Tested design requirements

Containment level	Speed (km/h)	Vehicle mass (kg)	Point of Redirection (m)		Tested article length (m)	Post/Pin Spacing (m)	Dynamic deflection (m)	Working width (m)	Notes
			Leading	Trailing					
MASH TL-3	100	2270	Refer to appropriate approved terminal conditions		60	2.0	1.65	1.65	Article length between end treatments. Refer other considerations.

Approved Terminals and Connections

<i>Crash Cushions or Terminals must be fitted to both ends of a barrier</i>	
Public Domain Products	
W-Beam Guardrail	Permitted
Thrie-Beam Guardrail	Permitted
Proprietary Products	
ET 2000 Plus Terminal	Refer to ET 2000 Plus Terminal Detail Sheet conditions of approved use
Trend 350 Steel Rail Terminal	Refer to Trend 350 Terminal Detail Sheet conditions of approved use

Design Guidance

System width (m)	0.2 for Standard 0.31 for Back to Back Variant
Installation	This product must be installed and maintained in accordance with the Product Manual and Road Agency specifications. Road Agency specifications and standards shall have precedence.
Minimum distance to excavation	<ol style="list-style-type: none"> 0.5 metres minimum distance between the edge of the barrier and the edge of an excavation, is accepted without further approval. Distance less than 0.5m, Seek advice from VicRoads Safe System Engineering or the Supplier for further guidance.
Slope limit	Side slope limit: 10 Horizontal to 1 Vertical (10.0%).
Systems conditions	<ol style="list-style-type: none"> Flaring across the clear zone without a terminal listed above is not permitted. Installation on top of a kerb is not recommended, however if installed on top of a kerb, all system components must be free to operate. Ezy-Guard Surface Mount Variant should be limited to constrained locations, where a driven post cannot be installed, such as across culverts, shallow rock and shallow underground services. The total length of surface mount posts should be minimised where possible. Seek advice from the Safe System Engineering team where necessary.
Minimum installation distance from batter hinge point of the slope (m)	0.5 - The proposed distance supersedes the one stated within the product & installation manual.
Gore area use	Refer to appropriate approved terminal conditions
Pedestrian area use	Permitted – consider potential for snagging and deflection.
Cycleway use	Permitted – consider potential for snagging and deflection.
Frequent impact likely	Permitted
Remote location	Permitted
Median use	Permitted

Foundation pavement conditions

Submitted Foundation Pavement Conditions					
Pavement	Use	Accepted Speed (max)	Post/Pin spacing (m)	Pavement construction	Post/pin type
Concrete	Permitted	100 km/h	2.0	Refer to Manual	Only for Surface Mount Variant
Deep lift asphaltic	Permitted	100 km/h	2.0	Foundation pavement conditions must be smooth and free of snag points, kerbs or obstructions that may interfere with the operation of the product	Refer to the Product Manual Socket variant to be designed – refer notes.
Asphalt over granular pavement	Permitted	100 km/h			
Flush seal over granular pavement	Permitted	100 km/h			
Unsealed compacted formation	Permitted	100 km/h			
Natural surface	Permitted	100 km/h			

Other considerations and comments

Transition to Rigid Barriers and End Posts

Ezy-Guard Smart shall be transitioned to Guard Fence where a connection to a rigid concrete barrier or bridge end post is scheduled. This transition shall be in accordance with Ingal drawing **EZT-SM-020**.

Reduced Post Spacing (1 metre)

The use of reduced 1m post spacing's, to achieve desired deflection, shall only be used at isolated hazard points (i.e. an isolated tree), with the transition to 1m spacing starting 10m before hazard and 10m after hazard. Long lengths are not desirable.

Dynamic Deflection based on theoretical engineering analysis to NCHRP 350 TL-3 is 1.041m. MASH details have not been provided.

Socketed Variant

Socketed variant may be used in locations where there are likely maintenance benefits (e.g. narrow flush medians).

Concrete socket foundations must be designed to limit the amount of movement during an impact. The tested foundation (300mm Dia x 1000mm Deep) was installed in 100mm deep lift asphalt on 500mm weak soil (32 ϕ / 75kPa) on 400+mm weak soil (25 ϕ / 50kPa).

Minimum length of barrier

Refer VRS to AGRD Part 6; While shorter lengths than the tested article length are possible, the designer must consider how this will affect other performance values (e.g. deflection). Designers should consult with the product supplier or mitigate the risk through additional controls such as reducing the posted speed.

In general, an alternate barrier type should be considered when shorter than the following: 30m.

Installation

Must conform to the requirement listed in references below, including full compliance of Specification 708.

Damaged Components

Damaged components must be replaced. Repaired components must not be used. References

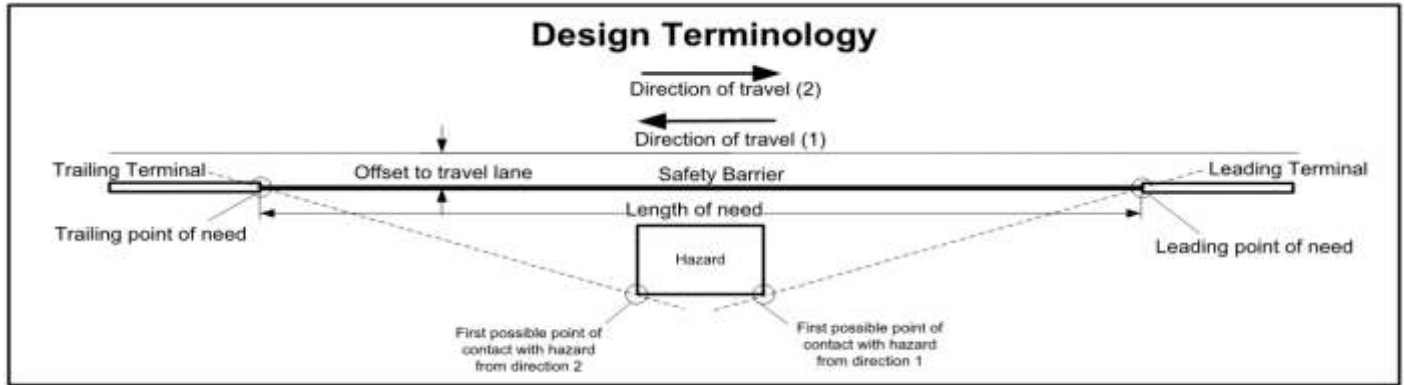
References

- Austroads Guide to Road Design – Part 6.
- Product Installation Manual and Product Operational Manual refer licensed product supplier website.
- VicRoads Road Design Note 06-04 Accepted Safety Barrier Products.
- VicRoads Road Design Note 06-08 The Use of Guard Fence.
- VicRoads Standard Drawing SD2001 – Kerb types
- VicRoads Standard Drawing SD3573 – Guidance on the verge and permissible slopes
- VicRoads Standard Section 204 – Earthworks
- VicRoads Standard Section 708 – Steel Beam Guard Fence
- VicRoads Supplement to Austroads Guide to Road Design – Part 6.

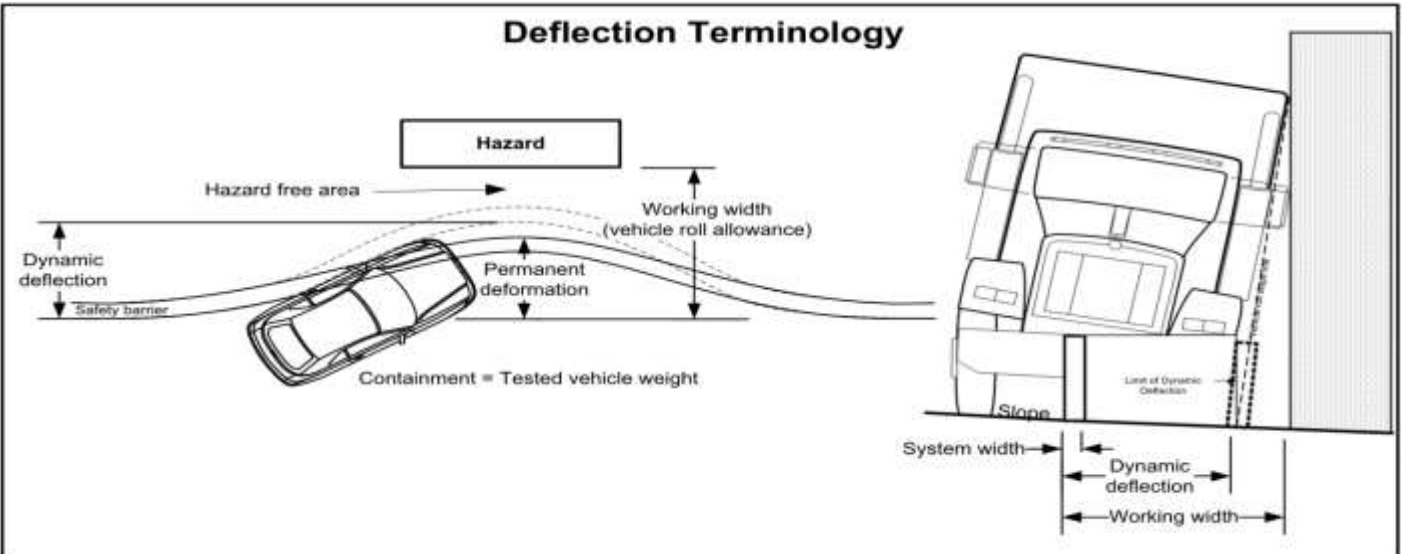
Detail Sheet – Update Summary

Issue	Approved	Amendment
Jun 2017	NDS-SSD	Minor Amendment – Name Change
Oct 2017	NDS-SSD	Updated ASBAP Conditions
June 2018	M-SSD	Product variant inclusion
Jan 2019	M-SSE	Product variant inclusion MASH update
Sept 2019	M-SSE	Tested article length and minimum length

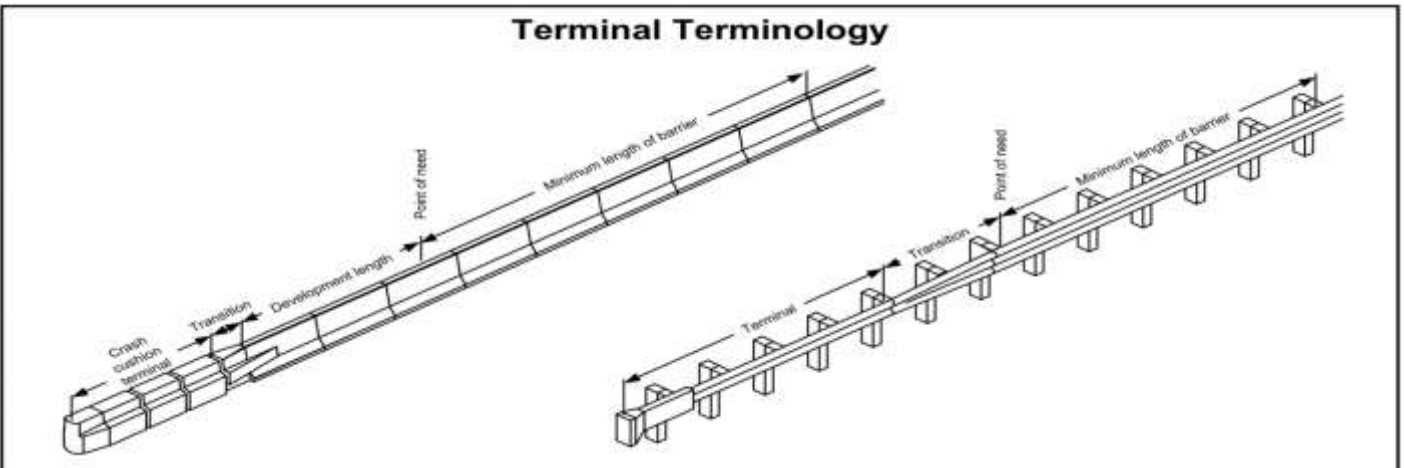
Design Terminology



Deflection Terminology



Terminal Terminology



Flare Terminology

