BIKER-SHIELD™

Motorcycle Protection

Product & Installation Manual

Ref: PM 025/03

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Leading Safety

Complies with the recommendation for testing of Motorcyclist Protection Devices as documented in AS/NZS 3845.1:2015 Road safety barrier systems and devices

Crash tested in accordance with MASH Test Level 3 (3-10)

Crash tested in accordance with European Technical Specification EN1317-8

Crash tested to simulate sliding rider impacting at 60km/h

Face of BIKER-SHIELD™ aligns with the face of w-beam guardrail reducing the potential for rider pocketing and/or snagging

Flexible Design

The flexible mounting bracket absorbs rider impact energy providing a forgiving impact

Compatibility

Designed for attachment to RAMSHIELD® Guardrail

Can be attached to State Road Agency w-beam guardrail designs (subject to approval)

Fast Assembly

Mounting bracket connects directly to the w-beam guardrail

No connection at the post required

No dismantling of w-beam barrier required for retrofit

1.0 Introduction

BIKER-SHIELD™ is a motorcyclist safety barrier system designed to reduce the impact severity for riders when colliding with a roadside w-beam guardrail barrier.

BIKER-SHIELD™ is positioned below the w-beam guardrail panel and prevents a dismounted motorcyclist from contacting the supporting posts of the guardrail barrier.

2.0 Specifications

Panel section lengths:	4.0m (Australia)
	3.81m (NZ)
Mounting bracket spacing:	2.0m (Australia)
	1.9m (NZ)
System mass:	5.9 kg/m
Panel Material:	350Mpa yield steel
System Finish:	Hot dip galvanised

3.0 How BIKER-SHIELD™ Works

BIKER-SHIELD™ may be installed as part of a new RAMSHIELD® Guardrail barrier installation or retrofitted to an existing installation as determined by the road asset owner.

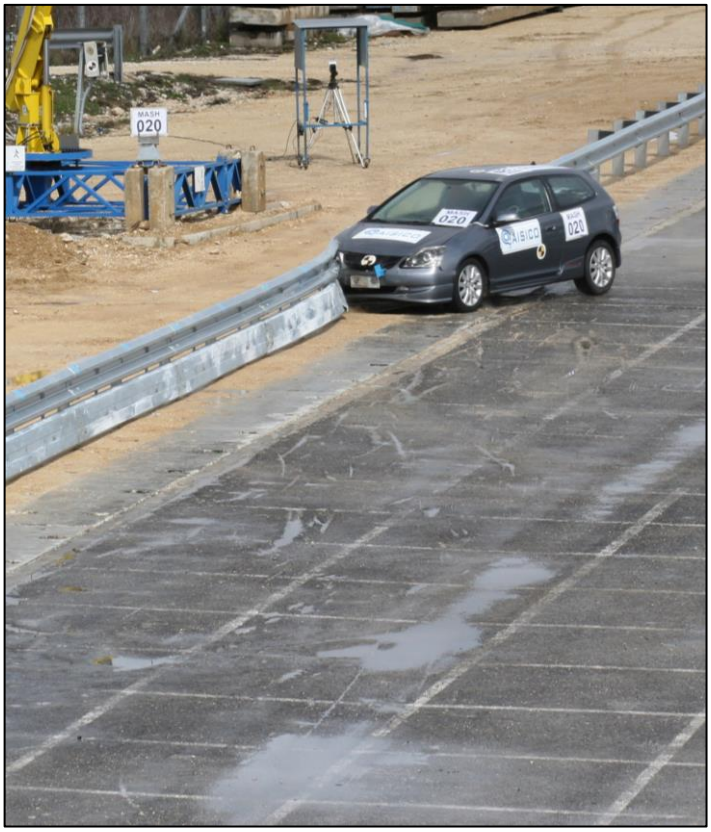
BIKER-SHIELD™ provides safe rider containment and redirection through the combination of spring mounting brackets and lightweight, corrugated beams. The spring brackets attach directly to the w-beam guardrail mid-span between posts and absorbs the impact energy of the sliding rider.

The position of BIKER-SHIELD™ beneath the w-beam guardrail prevents rider contact with the posts and provides forgiving containment and redirection.

The BIKER-SHIELD™ mounting bracket position is an important design consideration as vertical alignment with the face of the w-beam guardrail reduces the potential for rider snagging.

4.0 Crash Test Performance

BIKER-SHIELD™ has been crash tested and evaluated in accordance with the European Technical Specification EN1317-8. This crash test procedure is nominated in AS/NZS 3845.1:2015 Road safety barrier systems and devices.



Crash testing simulates an 86kg dismounted rider sliding into the barrier as follows;

- Impact at the post at 60km/h and 30°, and
- Impact mid-span between the posts at 60km/h and 30°.

In addition, BIKER-SHIELD™ has been crash tested in accordance with MASH Test Level 3 when attached to RAMSHIELD® Guardrail as follows;

- 1100kg car travelling at 100km/h and 25°.

The vehicle impact demonstrates that the attachment of BIKER-SHIELD™ to RAMSHIELD® Guardrail does not affect safe vehicle containment and redirection.

5.0 Design Considerations

5.1 Site Grading

It is recommended that the area in advance of the barrier be limited to a grading of 10H:1V and free of undulations that may adversely affect the trajectory of a dismounted rider.

5.2 Kerbs

Placing kerbs in front of the barrier is not recommended. As an alternative subsurface grated drainage should be considered.

5.3 Retrofitting

Unlike systems which attach to the guardrail post, the BIKER-SHIELD™ mounting bracket connection to w-beam guardrail vertically aligns the barrier with the w-beam guardrail. This alignment reduces the potential for rider snagging.

Attachment of BIKER-SHIELD™ does not require any dismantling of the existing guardrail barrier. This reduces installation time and avoids problems where debris and/or vegetation can accumulate around the post.

5.4 Placement within Guardrail End Terminals

The end terminals of w-beam guardrail barriers are designed to reduce the severity of a vehicle impact near or at the end of the system.

These terminals may incorporate yielding posts, energy-absorbing impact heads or a combination of both.

It is recommended that BIKER-SHIELD™ not be installed within the guardrail end terminal section.

5.5 End Termination

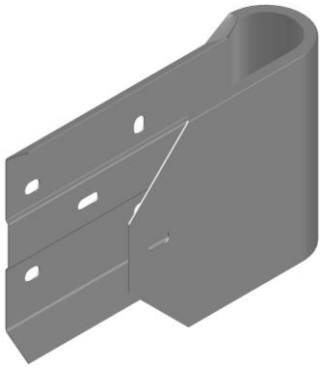
A specially designed bullnose is available for attachment to BIKER-SHIELD™.

It is a requirement that the BIKER-SHIELD™ bullnose be installed on the leading and trailing end of the system.

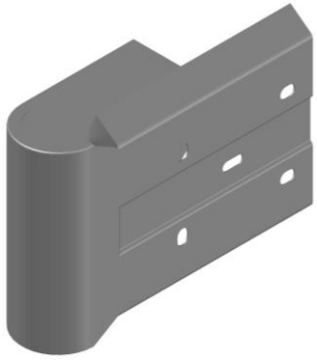
6.0 BIKER-SHIELD™ Component Identification

BIKER-SHIELD™ Beam

Mounting Bracket

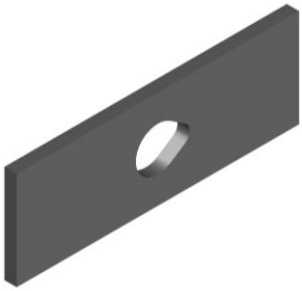


Bullnose (rear view)

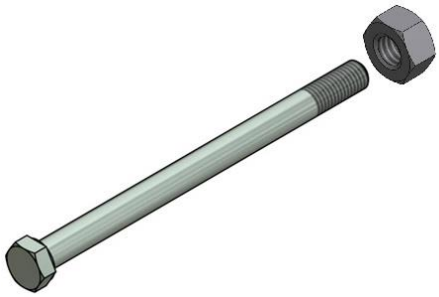


Bullnose (front view)

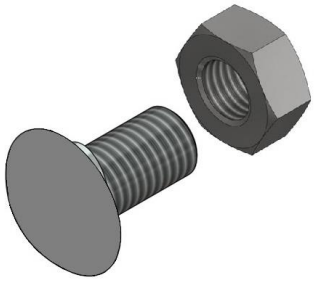
End Post Bracket



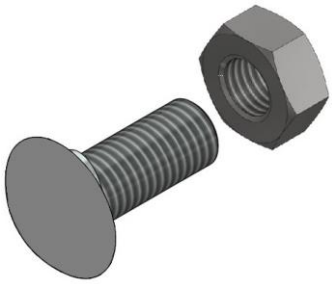
Rectangular Plate Washer



M16 x 200mm Bolt/Nut



M16 x 32mm Bolt/Nut



M16 x 50mm Bolt/Nut

7.0 Tools Required

Tools required for the installation of BIKER-SHIELD™ includes;

- Drill with 14mm and 18mm drill bit;
- Drill driver with 24mm attachment;
- Metal snips;
- Tape measure;
- Hammer; and
- 12mm diameter pinch bar.

7.1 Recommended PPE

It is recommended that the following personal protective equipment (PPE) be provided for the safe installation of BIKER-SHIELD™;

- Safety footwear;
- Gloves;
- Hearing protection; and
- High visibility clothing.

8.0 Site Establishment

8.1 Traffic Control

Prior to the commencement of any work, the site should be evaluated for risks to workers, pedestrians and other road users. The establishment of traffic control should provide safe travel for passing vehicles and/or pedestrians and appropriately protect workers near the roadside.

8.2 Overhead Obstructions

The site should be evaluated for potential overhead obstructions that may present a risk during the installation process. These obstructions typically include power lines, signage or trees.

8.3 Unloading Exclusion Zone

Only appropriate load-rated slings or chains should be used for safe unloading. It is recommended that an exclusion zone be maintained around the unloading process. This provides distance between moving machinery and workers in the event that goods or the machinery move unexpectedly.

Unloading and the storing of the product on a level surface is recommended. Storing product adjacent to the installation area eliminates the requirement for workers to carry items over long distances.

9.0 Installation Sequence

When supplied as part of a new RAMSHIELD® guardrail barrier installation, it is recommended that the installation of the RAMSHIELD® be completed prior to commencing installation of the BIKER-SHIELD™ barrier.

The major steps in the installation of BIKER-SHIELD™ are as follows;

- Installing the mounting brackets;
- Attaching the BIKER-SHIELD™ beams;
- Splicing the BIKER-SHIELD™ beams; and
- Installing the approach and departure bullnose.

9.1 Attaching the Mounting Brackets

Potential Hazards: *Injury from movements and posture, hand injury from pinch points, strain to wrists from tightening bolts and excessive noise from use of impact driver.*

Recommended Control Measures: *Observe correct posture, wear gloves, use a pinch bar to align holes, use an impact drill to tighten bolts and wear appropriate hearing protection.*

The BIKER-SHIELD™ mounting bracket is secured to the w-beam guardrail mid-span between posts. For new installations the Safe Direction w-beam guardrail will be punched at this position to accommodate the attachment of the mounting bracket.

When retrofitting to an existing installation it will be necessary to drill an 18mm diameter hole through the w-beam guardrail.

Position the mounting bracket behind the w-beam guardrail. Secure using a M16 x 50mm mushroom head bolt and oversize nut. A rectangular plate washer is located under the bolt head on the traffic side.

There is no torque requirement for the tightening of the bolt. It should be tightened to a snug position.

Figure 1: Attachment of Mounting Bracket (front view)

Figure 2: Attachment of Mounting Bracket (rear view)

9.2 Attaching the BIKER-SHIELD™ Beams

Potential Hazards: *Injury from movements and posture, hand injury from pinch points, strain to wrists from tightening bolts and excessive noise from use of impact driver.*

Recommended Control Measures: *Observe correct techniques when lifting rails (bend at the knees), wear gloves, use a pinch bar to align holes, use an impact drill to tighten bolts and wear appropriate hearing protection.*

Position the BIKER-SHIELD™ beams below and parallel to the w-beam guardrail. Attach to the mounting bracket with a M16 x 50mm mushroom head bolt and oversize nut. A rectangular plate washer is located under the bolt head on the traffic side.

The BIKER-SHIELD™ beam lap is orientated so that the leading edge of the splice is shielded from the nearside approaching traffic. Beams are spliced together using four (4) standard M16 x 32mm mushroom head bolts and oversize nuts.

The use of a pinch bar will assist in aligning the splice holes as the bolts are inserted. The use of a driving pin to elongate the splice holes is NOT permitted.

There is no torque requirement for the tightening of these bolts. They should be tightened to a snug position.

The finished position of the BIKER-SHIELD™ beam should be parallel to the w-beam guardrail with a maximum 30mm gap between road level and the bottom of the BIKER-SHIELD™ beam.

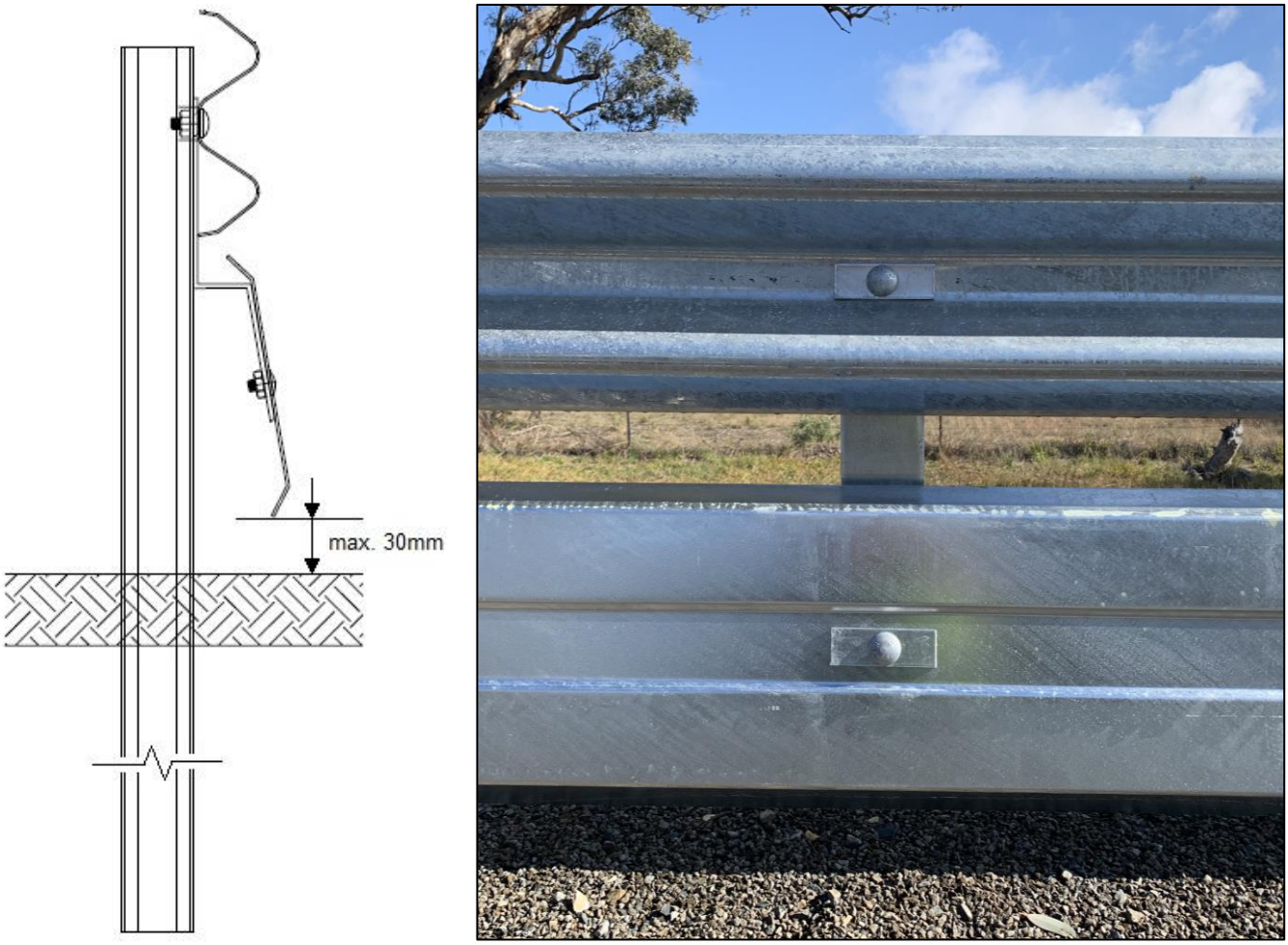


Figure 3: Attachment of the BIKER-SHIELD™ Beams

9.3 Attaching the End Bullnoses

Potential Hazards: *Injury from movements and posture, hand injury from pinch points, strain to wrists from tightening bolts and excessive noise from use of impact driver.*

Recommended Control Measures: *Observe correct techniques (bend at the knees), wear gloves, use a pinch bar to align holes, use an impact drill to tighten bolts and wear appropriate hearing protection.*

Place the end post bracket behind the BIKER-SHIELD™ beam and position against the last/first guardrail post. Align the 18mm hole pre-punched in the end post bracket with the 18mm x 42mm centre slot of the BIKER-SHIELD™ beam.

At the location where these holes intersect, drill a 18mm diameter hole through the guardrail post.

Attach the BIKER-SHIELD™ bullnose to the beam using four (4) standard M16 x 32mm mushroom head bolts and oversize nuts.

Attach the BIKER-SHIELD™ beam with the attached bullnose to the last/first post with a M16 x 200mm bolt and standard nut.

The bullnose will wrap around the last/first post and is secured to the back of the post. A rectangular plate washer is located under the bolt head on the traffic side and under the nut on the backside of the post.

There is no torque requirement for the tightening of these bolts. They should be tightened to a snug position.

Figure 4: Termination of BIKER-SHIELD™ in advance of Guardrail End Terminal Posts

Figure 5: Attachment of Bullnose (rear views)

BIKER-SHIELD™ Inspection Form

Inspection Date	
Client	
Project Reference	
Name of Inspector	
Company	

❑ Yes ❑ No	The w-beam guardrail system has been installed in accordance with proprietor or state road agency specifications.
❑ Yes ❑ No	The BIKER-SHIELD™ mounting brackets are positioned on the rear side of the w-beam guardrail, mid-span between the guardrail posts.
❑ Yes ❑ No	The BIKER-SHIELD™ mounting brackets have been connected to the w-beam guardrails with one (1) M16 x 50mm mushroom head bolt and oversize nut.
❑ Yes ❑ No	Each BIKER-SHIELD™ mounting bracket is fitted with a rectangular plate washer under the bolt head on the traffic side of the bracket.
❑ Yes ❑ No	The BIKER-SHIELD™ beams are secured to each mounting bracket with a M16 x 50mm mushroom head bolt & oversize nut.
❑ Yes ❑ No	Each BIKER-SHIELD™ beam to mounting bracket connection is fitted with a rectangular plate washer under the bolt head on the traffic side of the bracket.
❑ Yes ❑ No	The BIKER-SHIELD™ beams are spliced with four (4) M16 x 32mm mushroom head bolts and oversize nuts.
❑ Yes ❑ No	The BIKER-SHIELD™ beams are lapped so that the leading edge of the splice is shielded from approaching traffic.
❑ Yes ❑ No	The gap between ground level and the BIKER-SHIELD™ beams is maximum 30mm.
❑ Yes ❑ No	A BIKER-SHIELD™ bullnose is secured to the approach and trailing end of the system.
❑ Yes ❑ No	The BIKER-SHIELD™ system does not extend into the w-beam guardrail terminal section.
❑ Yes ❑ No	The front and rear face of the BIKER-SHIELD™ bullnose is secured to the first/last post with a M16 x 200mm bolt and standard nut.
❑ Yes ❑ No	A rectangular plate washer is located under the M16 x 200mm bolt head on the traffic side and under the nut on the backside of the post.
❑ Yes ❑ No	All bolts are tightened.
❑ Yes ❑ No	The BIKER-SHIELD™ system follows a smooth alignment of the upper w-beam guardrail.

Comments/Notes

10.0 Maintenance

BIKER-SHIELD™ is a low maintenance barrier. Except for repairs due to impacts, it is recommended that an annual inspection be undertaken to assess the following;

- Debris has not accumulated around the barrier which may impede the function of the barrier;
- Vegetation around the barrier is appropriately maintained;
- Nuisance impacts have not gone undetected; and
- Bullnoses are fitted to the leading and trailing end of the BIKER-SHIELD™ system.

11.0 Repair

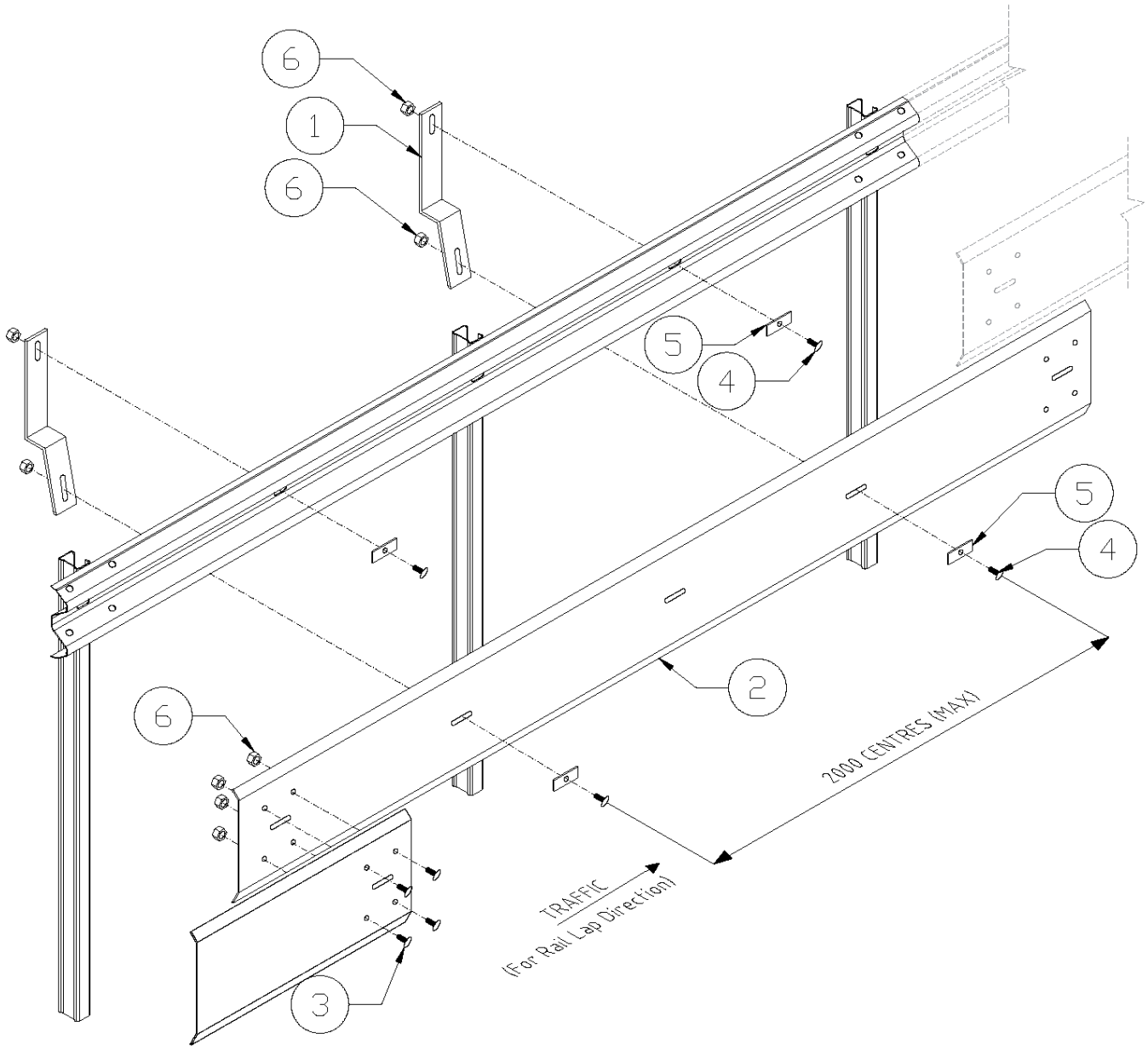
In the event of an impact, damage to the BIKER-SHIELD™ system is to be assessed in accordance with Table 1. Typically, impacts with BIKER-SHIELD™ will require replacement of damaged sections of mounting brackets and beams. It is also recommended that new bolts be used where mounting brackets and beams rails have been replaced.

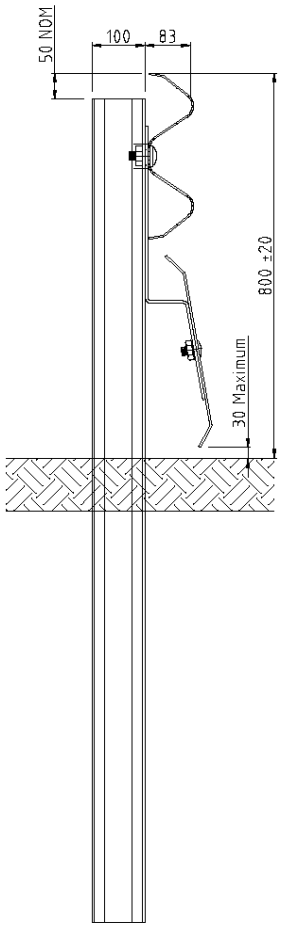
Similar to the installation sequence, it is recommended that the guidelines contained in Section 8.0 be observed in the establishment of traffic control and an unloading exclusion zone in addition to investigation for underground services and overhead obstructions.

Table 1: Damage Assessment Guidelines

Type of Damage	Description of the Damage	Remedial Action
Damage to the galvanised coating on the beams.	The sum total of the damaged area does not exceed 180cm^2 (0.5% of the total surface area) and no individual damaged area exceeds 40cm^2.	An organic zinc rich paint is to be applied to the repair area in two coats.
	The sum total of the damaged exceeds 180cm^2 (0.5% of the total surface area) and no individual damaged area exceeds 40cm^2.	The beam is to be replaced.
Damage to the beams.	The beam is dented, twisted or flattened.	The beam is to be replaced.
	There are nicks in any part of the beam.	
	The slots in the beam are distorted.	
Damage to the mounting brackets.	The bracket is bent, twisted or flattened.	The mounting bracket is to be replaced.
Damage to bolts.	The body of the bolt is distorted.	The bolt is to be replaced.
	The thread of the bolt is damaged.	

BILL OF MATERIALS	
ITEM	DESCRIPTION
1	MOUNTING BRACKET
2	BIKER–SHIELD BEAM
3	M16x32 MUSHROOM HEAD BOLT
4	M16x50 MUSHROOM HEAD BOLT
5	PLATE WASHER
6	M16 OVERSIZE NUT





POST ELEVATION

NOTES:

1. **Ramshield assembly in accordance with GR-WB-060**
2. **Ramshield Guardrail has been crash tested in accordance with MASH Test level 3 at rail heights of between 730mm & 820mm**
3. **An installed rail height of 800mm ± 20mm provides compatibility with MASH guardrail end terminals.**

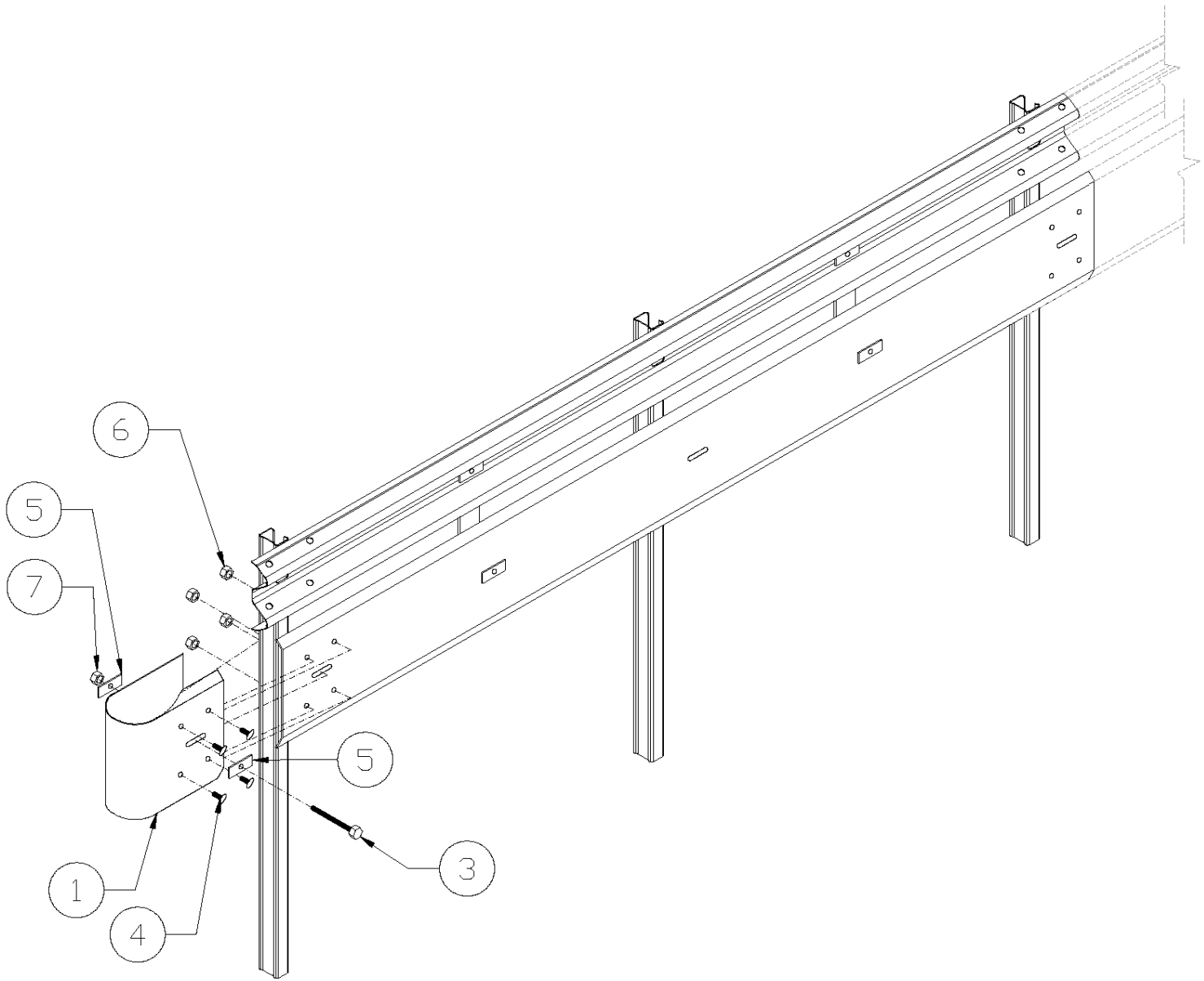
REVISIONS					
REV	DATE	DESCRIPTION	DRAWN	APPRD.	
D	30.06.20	BRACKET AMENDED	MS	TC	
c	12.08.19	ROUND WASHER REMOVED	MS	TC	
B	02.04.19	RAIL HEIGHT AMENDED	MS	TC	
A	11.07.18	INITIAL ISSUE	MS	TC	

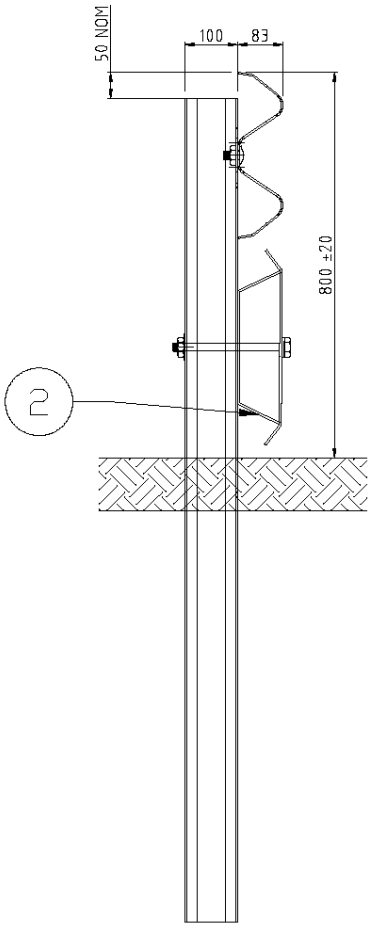
REVISIONS					
REV	DATE	DESCRIPTION	DRAWN	APPRD.	

SAFE DIRECTION

DRAWING DESCRIPTION	RAMSHIELD WITH BIKER-SHIELD ASSEMBLY			
DRAWING REFERENCE	GR-WB-121	DRAWN BY	M. SEAL	DIMENSIONS mm
		CHECKED	H. WALLACE	SCALE NTS
		APPROVED	T. COLQUHOUN	

BILL OF MATERIALS	
ITEM	DESCRIPTION
1	BIKER–SHIELD BULLNOSE
2	POST BRACKET
3	M16x200 BOLT
4	M16x32 MUSHROOM HEAD BOLT
5	PLATE WASHER
6	M16 OVERSIZE NUT
7	M16 STANDARD NUT





POST ELEVATION

NOTES:

1. **Ramshield assembly in accordance with GR-WB-060**
2. **Ramshield Guardrail has been crash tested in accordance with MASH Test level 3 at rail heights of between 730mm & 820mm**
3. **An installed rail height of 800mm ± 20mm provides compatibility with MASH guardrail end terminals.**

REVISIONS

REV	DATE	DESCRIPTION	DRAWN	APPRD.
C	12.08.19	ROUND WASHER REMOVED	MS	TC
B	02.04.19	RAIL HEIGHT AMENDED	MS	TC
A	11.07.18	INITIAL ISSUE	MS	TC

REVISIONS

REV	DATE	DESCRIPTION	DRAWN	APPRD.

SAFE DIRECTION

DRAWING DESCRIPTION: BIKER-SHIELD BULLNOSE ATTACHMENT

DRAWING REFERENCE: GR-WB-122

DRAWN BY	M. SEAL	DIMENSIONS	mm
CHECKED	H. WALLACE	SCALE	NTS
APPROVED	T. COLQUHOUN		

SafeDirection

CRASH BARRIER SOLUTIONS

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