

Product Manual



Release 06/17

1.0 Introduction

The Ingal Motorcyclist Protection Rail (Ingal MPR) is a protective enhancement installed on existing four-wheel vehicle restraint systems to reduce the chances of serious injury to motorcyclists and pillion passengers in run-off-road accidents.

Traditional highway safety barriers installed on the road carriageways to restrain vehicles from impacting roadside hazards, these typically take the form of the W-Beam rail supported by a series of posts. These posts introduce a significant hazard to an errant motorcyclist in a run-off-road accident. The Ingal MPR consists of an under-riding rail which is mounted on a spring bracket. Upon impacting this rail, the spring bracket deflects back absorbing some of the impact energy from the motorcyclist, whilst the rail contains and re-directs the motorcyclist away from the rigid posts and hazards.

The installer should ensure any variants of this product are approved by the final asset owner.

2.0 Specification

| | |
|-----------------------------------|------------------|
| Ingal MPR Rail Length: | 3.81m NLL |
| 4m MPR Rail Mass: | 12.3kg |
| Ingal MPR System Mass: | 4.65kg per metre |
| Rail Height Above Ground: | 60mm |
| Post Spacing: | 2m or 3.81m |
| Ingal MPR Crash Test Performance: | Level 1 |

The Ingal MPR rails and brackets are manufactured from hot-rolled steel flat products in accordance with AS/NZS1594. These items are hot dip galvanised in accordance with AS/NZS 4680 after fabrication leaving no surface untreated.

3.0 Crash Test Analysis

Crash test guidelines provide a minimum set of requirements that a roadside barrier has to meet in order to demonstrate its satisfactory impact performance. Whilst crash test guidelines cannot include all possible impact conditions that may be experienced in the real world, the crash test matrix is selected to represent a "worst practical condition" for a roadside barrier impact. The Ingal MPR system has been fully crash tested and evaluated according to Standards UNE 135900-1 and 2 and UNE EN-1317-1 and 2, and has produced satisfactory results in the following full scale crash tests. **The dummy tests recorded an impact severity of Level 1 which is the lowest severity for this testing standard.**

- TM1.6.0: Dummy to post, 60 km/h 30° angle of impact.
- TM.3.60: Dummy to point on barrier midway between posts, 60 km/h 30° angle of impact
- TB11: 900 kg car at 100 km/h and 20° angle of impact.
- TB32: 1,500 kg car at 110 km/h and 20° angle of impact



4.0 Features and Benefits

- The specially designed anchoring system fully facilitates the positioning of the guard rail at the correct height, ensuring a uniform distance from the ground throughout the run and compensating for uneven terrain and height differences in the existing barriers. The mounting bracket also allows the motorcyclists rail to be raised to match alterations in the level of the road surface.
- The motorcyclist rail can be assembled and raised without the need to modify the traditional vehicle barrier system
- More space between the system and the ground (60mm), allowing water drainage, snow clearance, cleaning of hard shoulders, etc.
- The mounting bracket is symmetric, and is therefore the same for both the right and left side of the carriageway.
- Small number of components and ease of installation make the system very cost-effective.

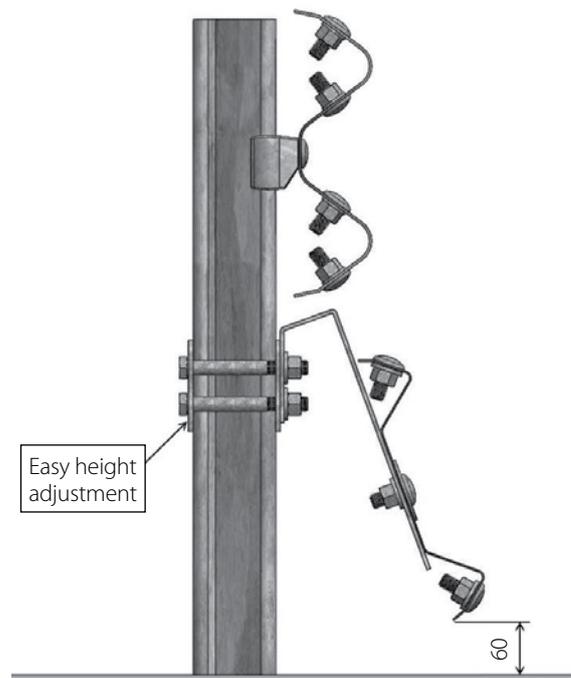
5.0 Installation

The specially designed anchoring system facilitates the positioning of the guard rail at the correct height, allowing deflection of the system when impacted.

Only items provided by Ingal are to be used for the installation of the Ingal MPR. The following written instructions are to be read in conjunction with Ingal's drawings. A generic Safe Work Method Statement is available upon request for installation operations.

5.1 Site Preparation

This site should be prepared free of obstructing vegetation and other hazards that may interfere with the installation or operational performance of the system. Some sites may require minor grading if installed beyond the edge of the pavement shoulder.



5.2 Assembly

- Step 1 Assembly should be initiated with placing the post bracket around the guardrail posts, particular care should be taken to ensure the bracket is oriented in the correct direction with the open side facing the oncoming traffic for verge installations.
- Step 2 Attach the rail bracket to the post bracket with the M16 x 190 Hex Bolts. Typically the rail bracket will need to be abutting the underside of the block in the G4 guardrail system for convenient assembly. Tighten all fasteners to snug tight.
- Step 3 Mount the rail on the rail brackets with the appropriate fastener configuration. Before tightening, ensure a 60mm clearance between finished ground level and MPR rail.
- Step 4 Terminate beginning and end of run with MPR terminal piece.



5.3 Curved Installations

The MPR rails can be field curved down to a radius of 26m. Rails can be machine curved down to a radius of 5m. Contact your local Ingal office for details.





Ingal MPR Installation Checklist

Customer:

Project:

Barrier ID:

Barrier Length:

Checked By:

Signed:

Date

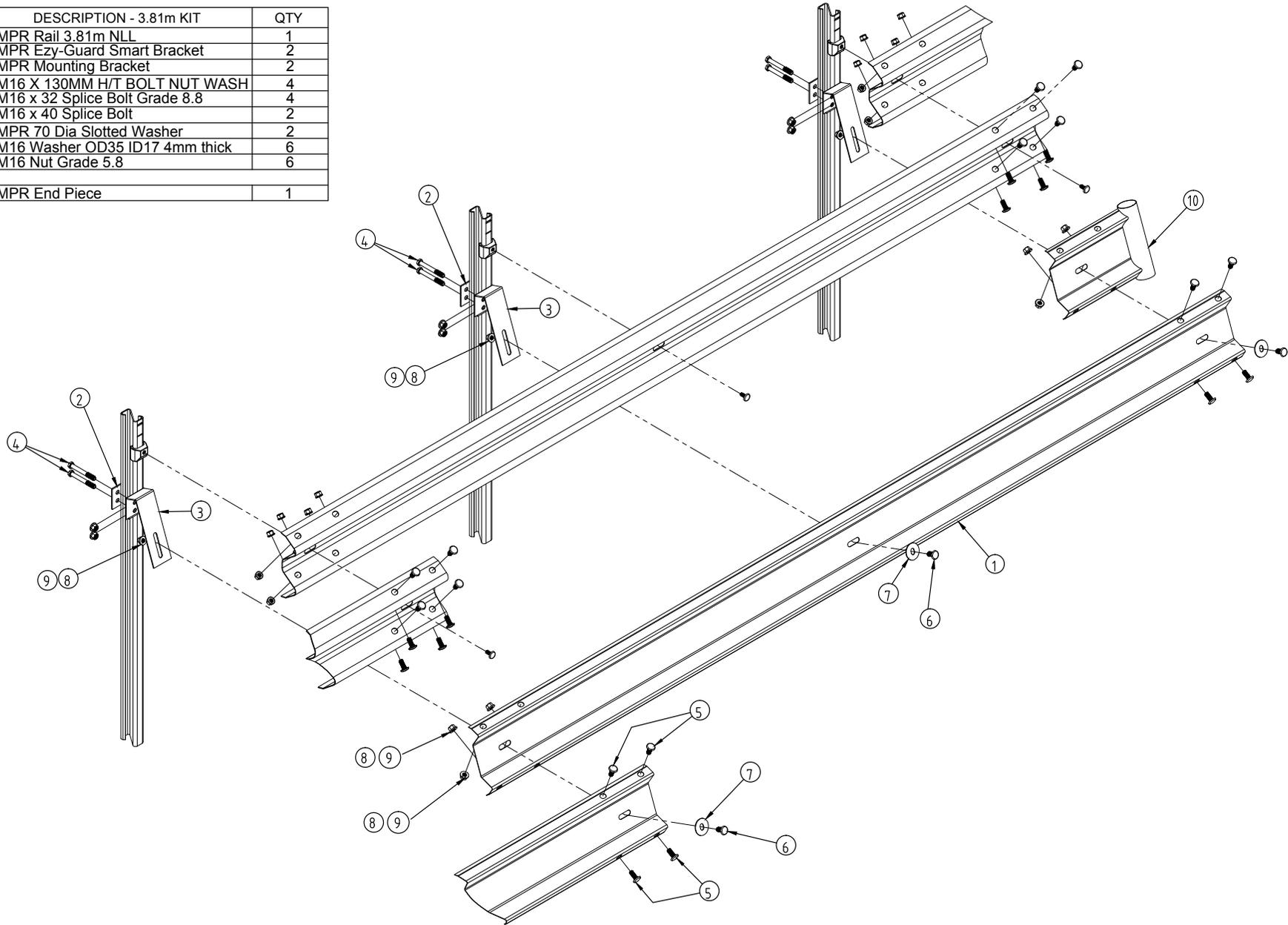
| | | |
|---|------------------------------|-----------------------------|
| Is the MPR rail ground clearance within tolerance of 60mm \pm 20mm | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Has each end of the run been terminated with an MPR Terminal End | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Have all fasteners been tightened to snug tight | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Has a \varnothing 70 x 2mm slot washer been used on the traffic side of the rail mounting | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Has a \varnothing 35 x 17 x 4mm washer been used on the verge side of the rail mounting | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Has any minor damage been repaired using two coats of an organic zinc rich paint | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Is the barrier system free from humps, sags or other irregularities | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Are the barrier components free from splits, burrs or sharp edges after installation | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Does the barrier form a smooth line vertically and horizontally when viewed along the run | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

Notes

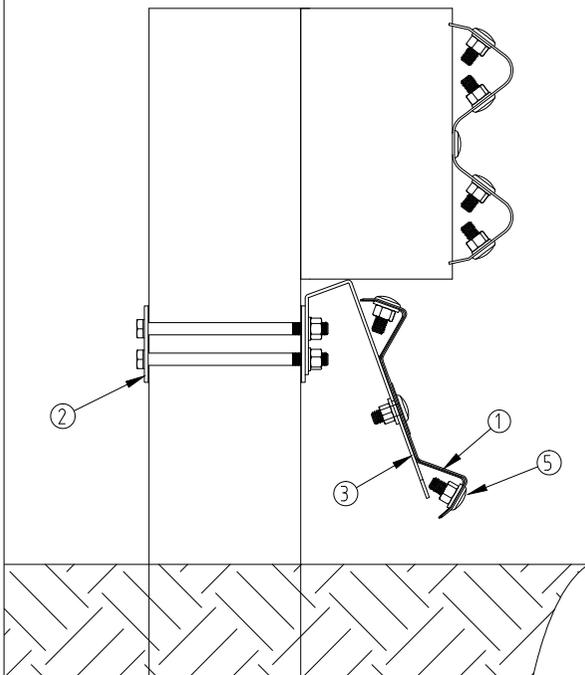
Disclaimer:

Important Note: The conformity of the installation is the responsibility of the installation contractor, and Ingal Civil Products accepts no liability for or in connection with any installation that is outside of the specifications of this manual or the NZTA. For more information, please refer to our Standard Terms and Conditions of Sale available on our website: www.ingalcivil.co.nz.

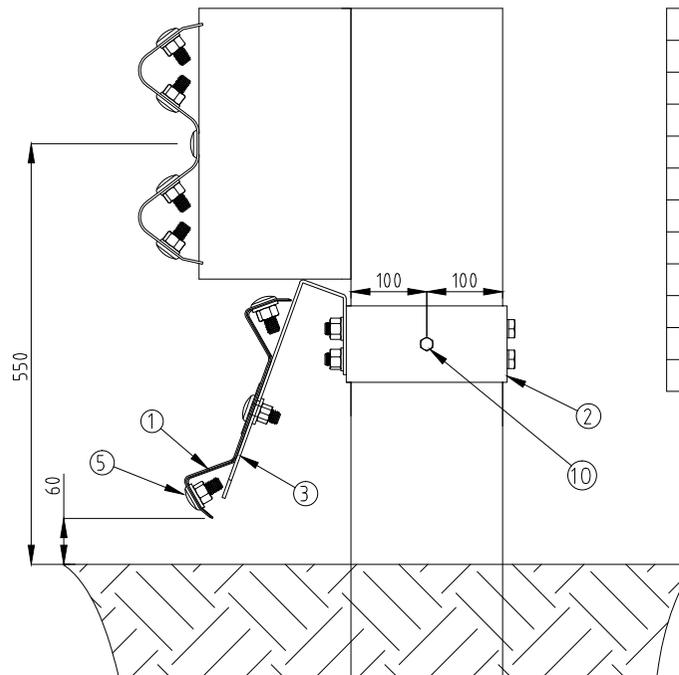
| ITEM | PART No | DESCRIPTION - 3.81m KIT | QTY |
|------|----------|--------------------------------|-----|
| 1 | 10007769 | MPR Rail 3.81m NLL | 1 |
| 2 | 10007332 | MPR Ezy-Guard Smart Bracket | 2 |
| 3 | 10006772 | MPR Mounting Bracket | 2 |
| 4 | 10003618 | M16 X 130MM H/T BOLT NUT WASH | 4 |
| 5 | 10001248 | M16 x 32 Splice Bolt Grade 8.8 | 4 |
| 6 | 10006769 | M16 x 40 Splice Bolt | 2 |
| 7 | 10006771 | MPR 70 Dia Slotted Washer | 2 |
| 8 | 10006770 | M16 Washer OD35 ID17 4mm thick | 6 |
| 9 | 10007834 | M16 Nut Grade 5.8 | 6 |
| 10 | 10006767 | MPR End Piece | 1 |



| REV | DATE | DESCRIPTION | DRAWN | CHECKED | APPROVED | DRAWING NUMBER | REFERENCE DRAWINGS | NAME | DATE | PROJECT | TITLE | INGAL CIVIL PRODUCTS PART No. | DRAWING No. |
|---|----------|--------------------|-------|---------|----------|----------------|--------------------|------------|------------|--|---|-------------------------------|-------------|
| 2 | 22-11-16 | WASHER QTY REDUCED | MC | LG | MC | | | AR | 29-10-2015 |  DRAWING AND CONTENTS ARE COPYRIGHT TO INGAL CIVIL PRODUCTS AND CAN ONLY BE USED WITH PRIOR WRITTEN CONSENT FROM INGAL CIVIL PRODUCTS | INGAL MPR - 3.81m NLL EZY-GUARD CONFIGURATION EXPLODED VIEW | ICP-MPR-006 | |
| 1 | 31-01-16 | BOM UPDATED | MC | LG | MC | | LG | 29-10-2015 | | | | | |
| | | | | | | | N.T.S. @ | A3 | | | | | |
| REFERENCES | | | | | | | | SCALE | | ISSUE FOR INFORMATION ONLY 57-65 AIRDS ROAD MINTO, N.S.W 2566 PH. +61 2 9827 3333 www.ingalcivil.com.au | | | |
| PROJECT TITLE: INGAL MPR - 3.81m NLL EZY-GUARD CONFIGURATION EXPLODED VIEW DRAWING No. ICP-MPR-006 Rev. 2 | | | | | | | | | | | | | |



APPROACH-SIDE
ELEVATION VIEW

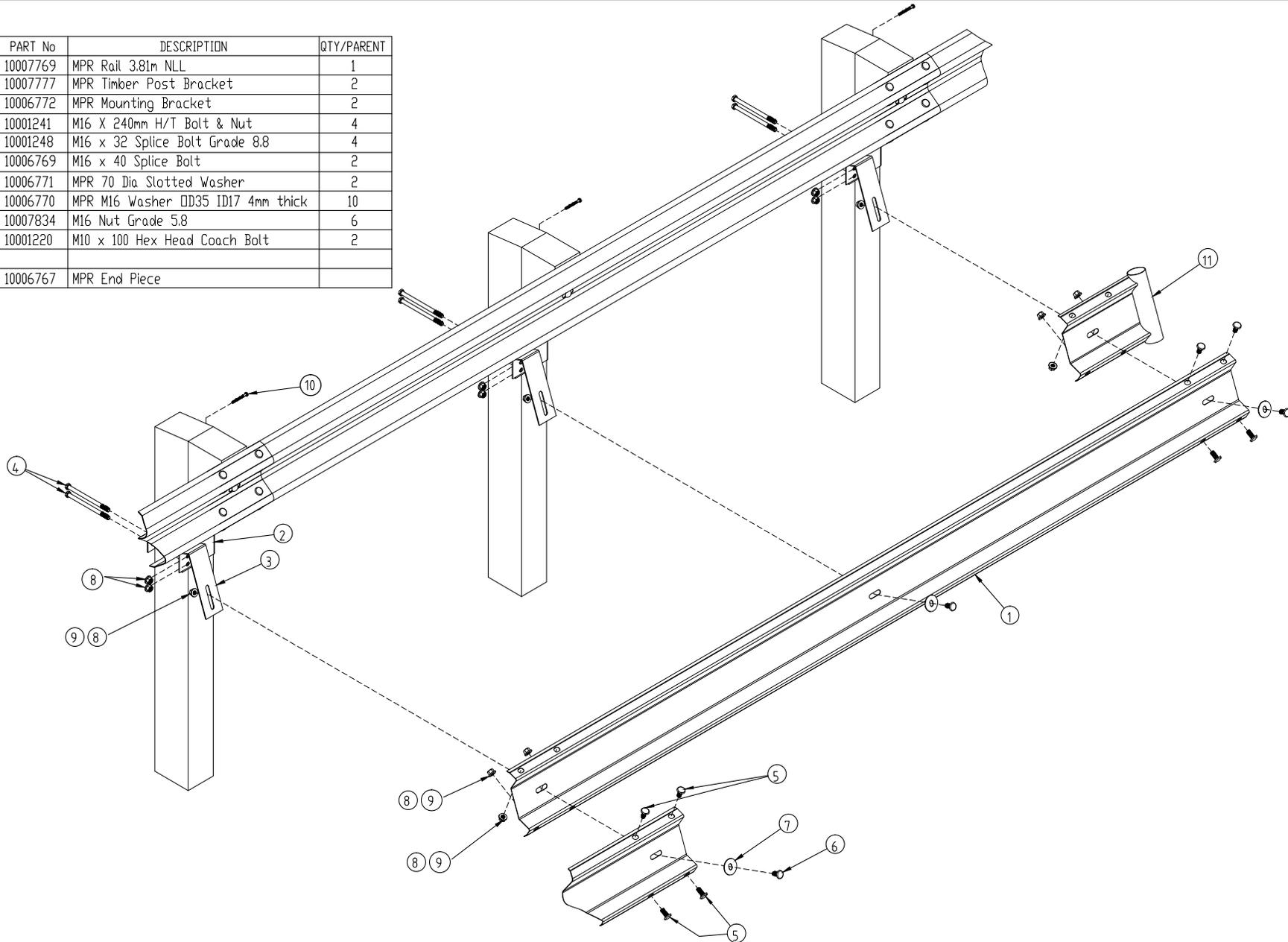


DEPARTURE-SIDE
ELEVATION VIEW

| G4 CONFIG - MPR BILL OF MATERIALS | | | |
|-----------------------------------|-----|----------|------------------------------|
| ITEM | QTY | PART No | DESCRIPTION |
| 1 | 1 | 10007769 | Motorcyclist protection beam |
| 2 | 2 | 10007777 | MPR Timber Post bracket |
| 3 | 2 | 10006772 | Rail mounting bracket |
| 4 | 4 | 10001224 | M16x240 Hex Bolt & Nut |
| 5 | 4 | 10001248 | Round head bolt M16x32 |
| 6 | 2 | 10006769 | Round head bolt M16x40 |
| 7 | 2 | 10006771 | Slot washer ϕ 70x2 |
| 8 | 10 | 10006770 | Washer ϕ 35x17x4 |
| 9 | 6 | 10007834 | M16 nut |
| 10 | 2 | 10001220 | M10x100 hex head coach bolt |

| REV | DATE | DESCRIPTION | DRAWN | CHECKED | APPROVED | DRAWING NUMBER | REFERENCE DRAWINGS | NAME | DATE | PROJECT | INGAL CIVIL PRODUCTS PART No. |
|-----|----------|-------------|-------|---------|----------|----------------|--------------------|-----------|------------------|--|---|
| 1 | 31-08-16 | BOM UPDATED | MC | LG | MC | | | MC | 07-10-2015 | <p>DRAWING AND CONTENTS ARE COPYRIGHT TO INGAL CIVIL PRODUCTS AND CAN ONLY BE USED WITH PRIOR WRITTEN CONSENT FROM INGAL CIVIL PRODUCTS 57-65 AIRDS ROAD MINTO, N.S.W 2566 PH. +61 2 9827 3333 www.ingalcivil.com.au</p> | |
| | | | | | | | | LG | 07-10-2015 | | |
| | | | | | | | | MC | 07-10-2015 | | |
| | | | | | | | | | | | |
| | | | | | | | | SCALE | N.T.S. @ A3 | TITLE | INGAL MPR MOTORCYCLIST PROTECTION NZ TIMBER POST GUARDRAIL CONFIGURATION ASSEMBLY DETAILS |
| | | | | | | | | ISSUE FOR | INFORMATION ONLY | | DRAWING No. ICP-MPR-008 |

| ITEM | PART No | DESCRIPTION | QTY/PARENT |
|------|----------|------------------------------------|------------|
| 1 | 10007769 | MPR Rail 3.81m NLL | 1 |
| 2 | 10007777 | MPR Timber Post Bracket | 2 |
| 3 | 10006772 | MPR Mounting Bracket | 2 |
| 4 | 10001241 | M16 X 240mm H/T Bolt & Nut | 4 |
| 5 | 10001248 | M16 x 32 Splice Bolt Grade 8.8 | 4 |
| 6 | 10006769 | M16 x 40 Splice Bolt | 2 |
| 7 | 10006771 | MPR 70 Dia Slotted Washer | 2 |
| 8 | 10006770 | MPR M16 Washer DD35 ID17 4mm thick | 10 |
| 9 | 10007834 | M16 Nut Grade 5.8 | 6 |
| 10 | 10001220 | M10 x 100 Hex Head Coach Bolt | 2 |
| 11 | 10006767 | MPR End Piece | |



| REV | DATE | DESCRIPTION | DRAWN | CHECKED | APPROVED | DRAWING NUMBER | REFERENCE DRAWINGS | NAME | DATE | PROJECT | INGAL CIVIL PRODUCTS PART No. |
|-----|----------|-------------|-------|---------|----------|----------------|--------------------|-----------|------------------|--|-------------------------------|
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| | | | | | | | | LG | 06/11/15 | TITLE | ICP-MPR-009 |
| | | | | | | | | SCALE | N.T.S. @ A3 | INGAL MPR NZTA GUARDRAIL - TIMBER POST CONFIG EXPLODED ISOMETRIC ASSEMBLY | |
| | | | | | | | | ISSUE FOR | INFORMATION ONLY | 57-65 AIRDS ROAD MINTO, N.S.W 2566 | |
| | | | | | | | | | | PH. +61 2 9827 3333 www.ingalcivil.com.au | Rev. 1 |





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