

SCOPE OF MOTOR GRID STANDARD DRAWINGS

The scope of Motor Grid Standard Drawings is to provide indicative standard details for various Grid Construction Scenarios. It is the responsibility of the project design engineer to provide project specific drawings to suit grid span, widths, road crossfall and other site specific conditions.

GENERAL NOTES:

- The applicable Standard Drawings shall be chosen from TABLE : GRID CONSTRUCTION SCENARIOS.
- STANDARD SIZES OF GRIDS for normal installation are shown in table below. For other widths where specifically approved, the standard width may be varied as required, provided the bearer spacing does not exceed 700, and the rail overhang does not exceed 250.

STANDARD GRID WIDTHS			
Formation width, m	Pavement width, m	Grid width, m	Grid segments to use
7.5, 8.0	3.5, 4.0	8.0	Refer SD 1565
8.5, 9.0	6.0, 6.5, 7.0	9.0	
greater than 9.0	6.0, 6.5, 7.0	10.0	
STANDARD GRID SPANS for 1.9m or 2.7m only (Refer Drawing 2, Note 3)			

- NO WIDTH MARKERS are required for the standard grid widths as in Note 2. Otherwise width markers are required when the grid width is less than the formation width.
- 10m min BITUMEN SEAL as specified, for full formation width on unsealed roads to comply with MRTS11 and MRTS22.
- MOTOR GRID DESIGN LIFE shall be 50 years.
- DESIGN TRAFFIC LOADS : W80, A160, SM1600 and HLP400 to AS 5100.
- DESIGN CRITERIA : Technical Note 18 of Design Criteria for Motor Grids.
- CONCRETE to be in accordance with MRTS70 (cast in situ concrete) and MRTS72 (precast concrete).
- EXPOSURE CLASSIFICATION AND COVER to reinforcement shall be to AS 3600. Minimum Exposure classification B1. Minimum concrete strength and cover to reinforcement shall be as shown in table below. Minimum concrete strength for higher exposure classifications than specified in the table shall be in accordance with MRTS72 and Design Criteria for Bridges and Other Structures, as appropriate. Un-reinforced concrete N25/20. Blinding concrete N20/20. All exposed edges to have 19 x 19 chamfers unless shown otherwise. Maximum aggregate size to be 20mm.

	Minimum concrete strength	COVER (mm)	
		Precast *	Cast Insitu
B1	S32/20	30	40
B2	S40/20	35	45

* Using rigid formwork and intense compaction

- REINFORCING STEEL to be read in conjunction with Standard Drawings 1043 and 1044. Reinforcing steel to be in accordance with MRTS71 and AS/NZS 4671. Deformed bars Grade D500N. Round bars Grade R250N. All carbon reinforcing steel to be Australian Certification Authority for Reinforcing Steel (ACRS) certified.
- STRUCTURAL STEEL to be fabricated to the requirements of MRTS78. Refer Standard Drawing 1565 for Structural Steelwork Notes and Welding Notes for Motor Grid Steelworks. CHS to be Grade C250L0 to AS/NZS 1163. All Structural steel hollow section material manufactured to AS/NZS 1163. All Steel flat material manufactured to AS/NZS 1594. All Steel plate material manufactured to AS/NZS 3678. Bolts Class 4.6 to AS 1111.1, nuts Class 5 to AS 1112.1 and thin nuts Class 5 to AS 1112.4. All bolts and nuts to be hot dip galvanised to AS 1214. All other steelwork to be hot dip galvanised to AS/NZS 4680 unless shown otherwise. Prior to galvanising all weld splatter and welding slag is to be removed.
- PRECAST CONCRETE ITEMS shall be manufactured in accordance with MRTS72. Minimum concrete strength for formwork removal and lifting of precast items shall be as shown in drawings. Lifting design and devices shall be in accordance with MRTS72.
- DIMENSIONS are in millimetres unless shown otherwise.

ASSOCIATED DOCUMENTS:

Main Roads Standard Drawings Roads Manual
Main Roads Specifications and Technical Standards Manual
Manual of Uniform Traffic Control Devices (MUTCD)
Design Criteria for Motor Grids – Technical Note 18
Design Criteria for Bridges and Other Structures

REFERENCED DOCUMENTS:

Standard Drawings:
1043 Reinforcing Steel – Standard Bar Shapes
1044 Reinforcing Steel – Lap Lengths and Reinforcing Steel Information
1353 Road Furniture – Vermin and Dog Fencing at Motor Grid
1562 Road Furniture – Motor Grid – Cast Insitu Abutment
1563 Road Furniture – Motor Grid – Cast Insitu Slab
1564 Road Furniture – Motor Grid – Precast Slab
1565 Road Furniture – Motor Grid – Steelworks

Standard Specifications:

MRTS03 Drainage, Retaining Structures and Protective Treatment
MRTS11 Sprayed Bituminous Surfacing (Excluding Emulsion)
MRTS14 Road Furniture
MRTS22 Supply of Cover Aggregate
MRTS70 Concrete
MRTS71 Reinforcing Steel
MRTS72 Manufacture of Precast Elements
MRTS78 Fabrication of Structural Steelwork




Australian Standards:

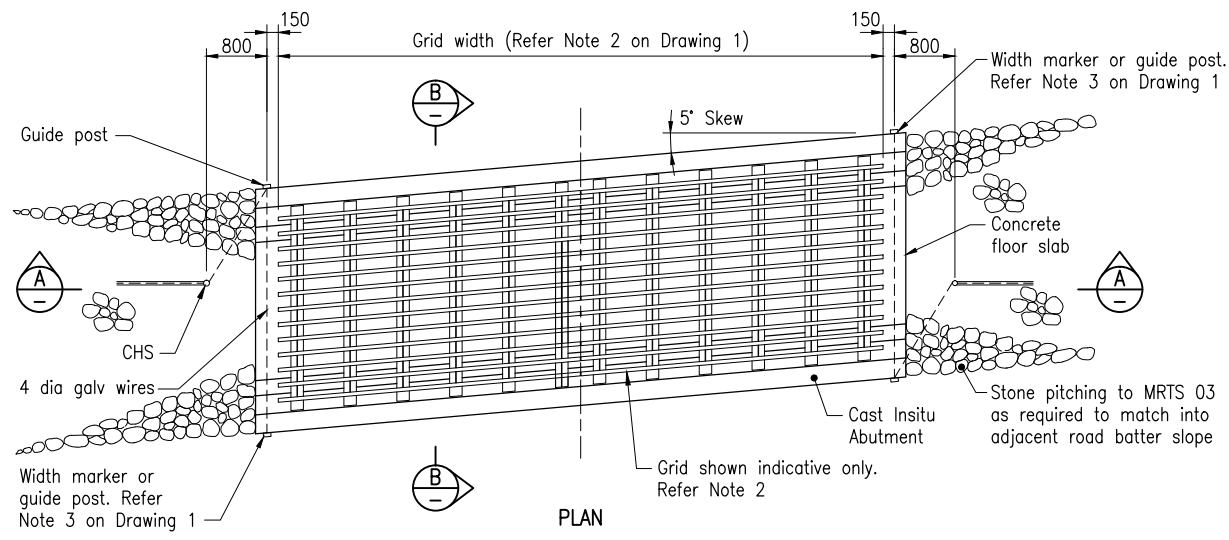
AS 1111.1 ISO Metric Hexagon Bolts and Screws – Product Grade C – Bolts
AS 1112.1 ISO Metric Hexagon Nuts – Style 1 – Product Grades A and B
AS 1112.4 ISO Metric Hexagon Nuts – Chamfered thin nuts – Product Grades A and B
AS/NZS 1163 Cold-Formed Structural Steel Hollow Sections
AS 1214 Hot-dip Galvanized Coatings on Threaded Fasteners (ISO Metric Coarse Thread Series)
AS/NZS 1594 Hot rolled steel flat products
AS/NZS 3600 Concrete Structures
AS/NZS 3678 Structural Steel – Hot-rolled Plates, Floor Plates and Slabs
AS/NZS 3679.1 Structural Steel – Hot-rolled Bars and Sections
AS/NZS 4671 Steel Reinforcing Materials
AS/NZS 4680 Hot-dip Galvanized (Zinc) Coatings on Fabricated Ferrous Articles
AS 5100 (Set) Bridge Design

TABLE : GRID CONSTRUCTION SCENARIOS

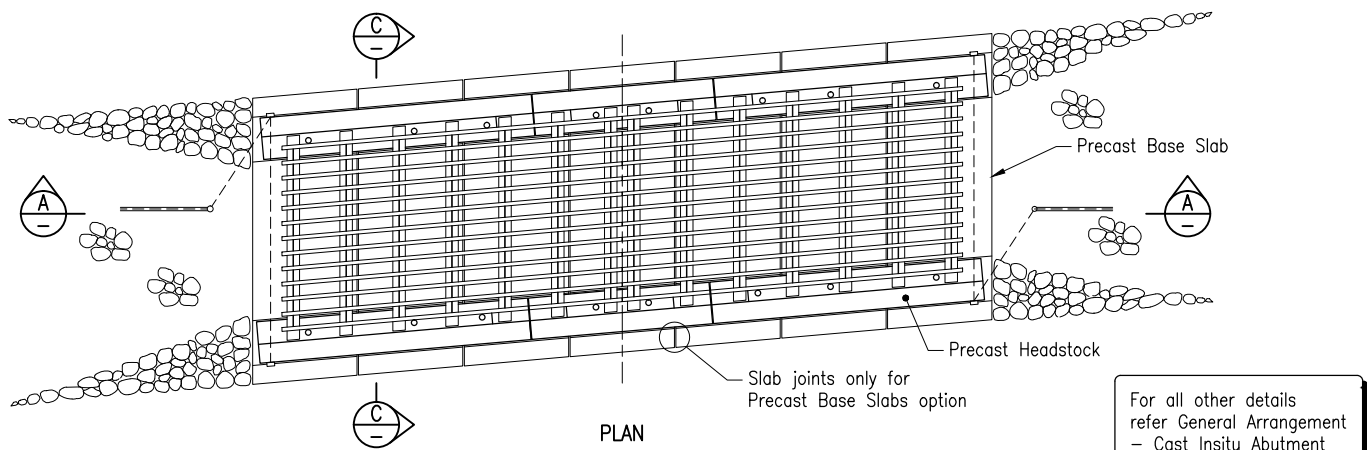
RAIL TYPE	ABUTMENT	BASE SLAB	DRAWING REFERENCE
RHS Rails	Cast Insitu	Not applicable	SD 1561 Motor Grid – General Arrangement
			SD 1562 Motor Grid – Cast Insitu Abutment
			SD 1565 Motor Grid – Steelworks
	Precast	Cast Insitu	SD 1561 Motor Grid – General Arrangement
			SD 1563 Motor Grid – Cast Insitu Base Slab
			SD 1565 Motor Grid – Steelworks
Precast	Precast	SD 1561 Motor Grid – General Arrangement	
		SD 1564 Motor Grid – Precast Base Slab	
		SD 1565 Motor Grid – Steelworks	

GENERAL NOTES FOR STANDARD MOTOR GRIDS

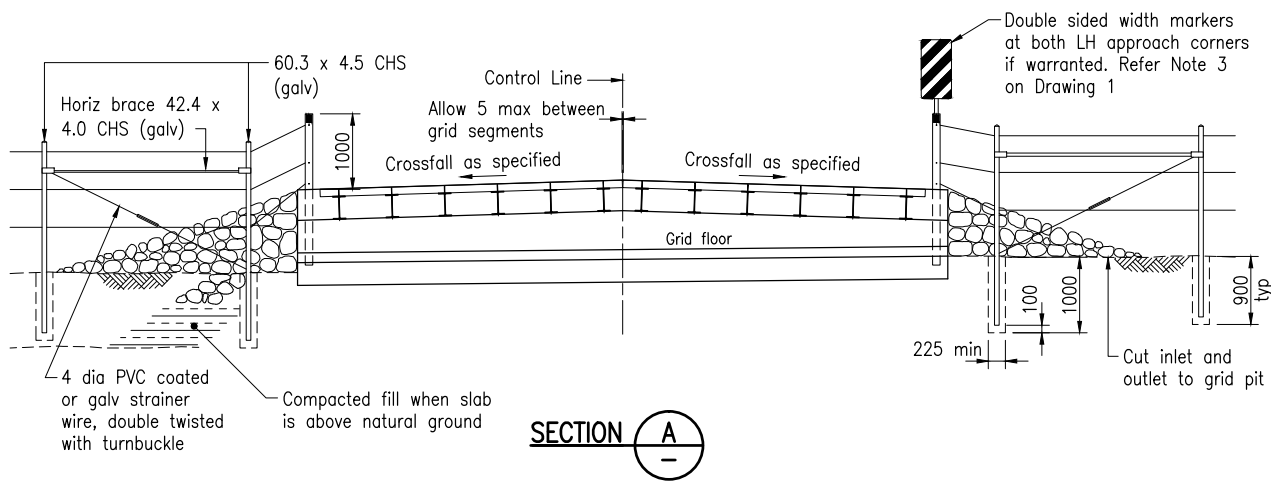
Department of Transport and Main Roads			
ROAD FURNITURE			© The State of Queensland (Department of Transport and Main Roads) 2014 http://creativecommons.org/licenses/by/3.0/au
MOTOR GRID – GENERAL ARRANGEMENT DRAWING 1 of 2		A3 Not to Scale	Standard Drawing No 1561 Date 3/14
A			



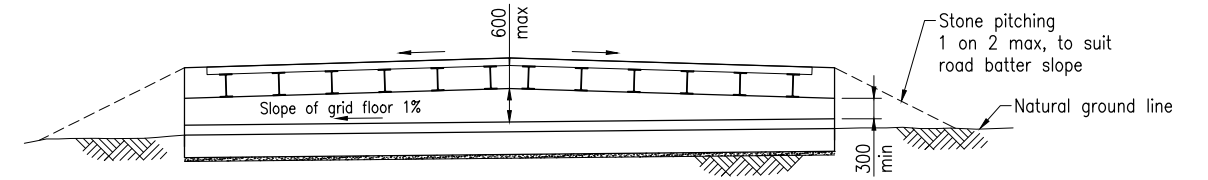
GENERAL ARRANGEMENT – CAST INSITU ABUTMENT



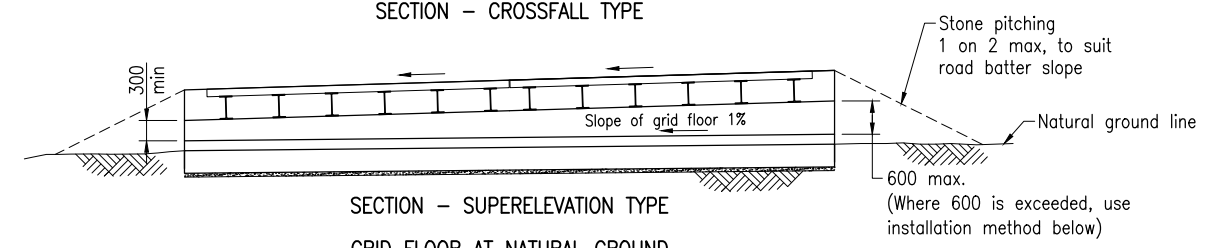
GENERAL ARRANGEMENT – PRECAST HEADSTOCKS ON PRECAST BASE SLABS
(PRECAST HEADSTOCKS ON CAST INSITU BASE SLAB SIMILAR)



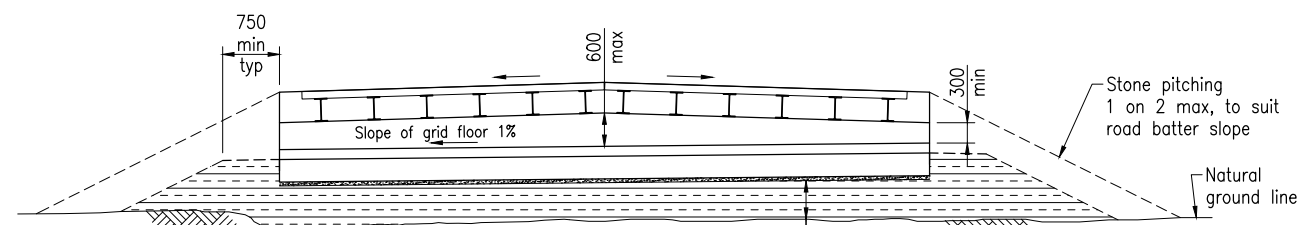
SECTION A
CROSSFALL TYPE AS SHOWN
(SUPERELEVATION SIMILAR)



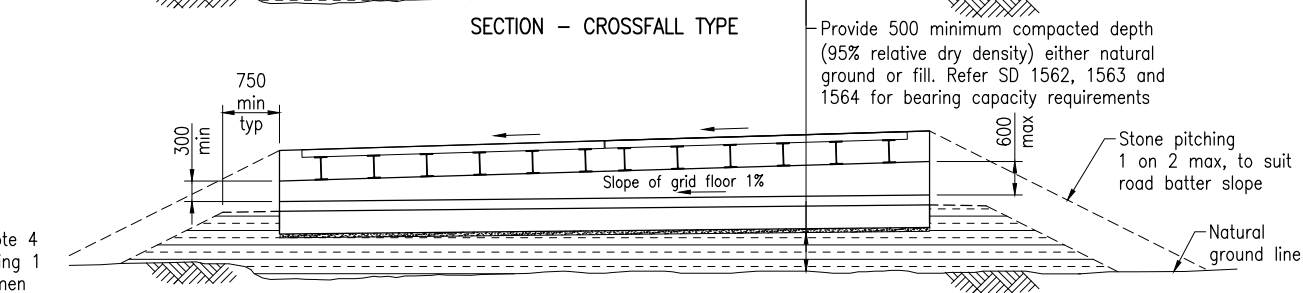
SECTION – CROSSFALL TYPE



SECTION – SUPERELEVATION TYPE
GRID FLOOR AT NATURAL GROUND



SECTION – CROSSFALL TYPE

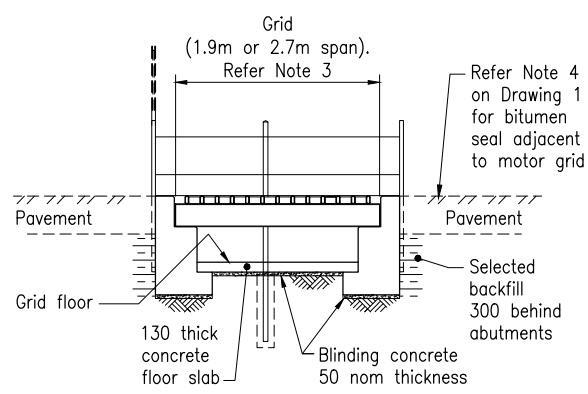


SECTION – SUPERELEVATION TYPE
GRID FLOOR ABOVE NATURAL GROUND

INSTALLATION METHODS FOR STANDARD MOTOR GRIDS

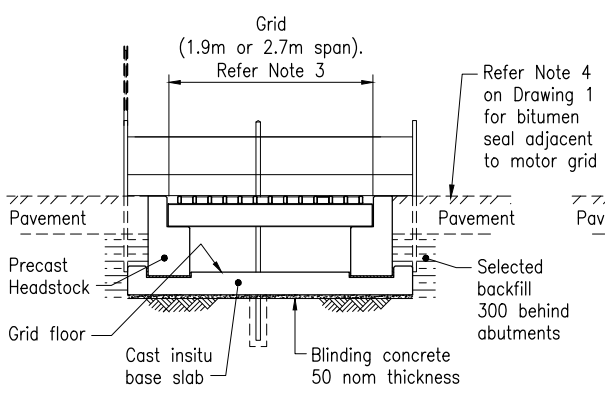
NOTES:

- Refer Drawing 1 for all General Notes
- Refer SD 1565 for Motor Grid steelwork details
- GRID SPANS:
 - 1.9m Spans – Typically used for small animals like sheep.
 - 2.7m Spans – Typically used for large animals like cattle.
 - 2.7m Spans – Shall be used for vermin and dog. Refer SD 1353 for vermin and dog fencing details and works adjacent to motor grids. All other details shall be in accordance with this drawing



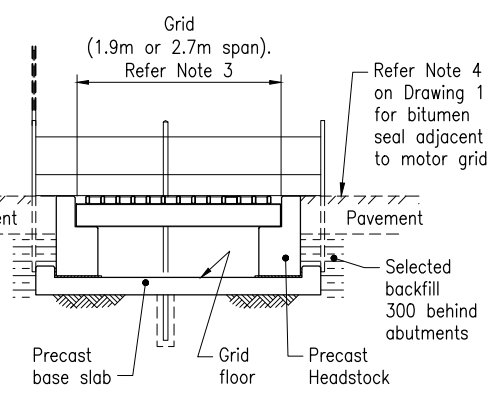
SECTION B

FOR CAST INSITU ABUTMENT
(Refer SD 1562 for details)



SECTION C

FOR CAST INSITU BASE SLAB
(Refer SD 1563 for details)



SECTION C

FOR PRECAST BASE SLAB
(Refer SD 1564 for details)

**GENERAL ARRANGEMENT
STANDARD MOTOR GRIDS**

Department of Transport and Main Roads			
ROAD FURNITURE			
A3	Not to Scale	Standard Drawing No	1561
A		Date	3/14

MOTOR GRID –
GENERAL ARRANGEMENT
DRAWING 2 of 2