



# FNQROC DEVELOPMENT MANUAL

## SPECIFICATION

S2

## ROAD PAVEMENTS

Version No. 11/19

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## TABLE OF CONTENTS

CLAUSE	CONTENTS	PAGE
<b>GENERAL</b>		<b>1</b>
S2.01	SCOPE	1
S2.02	REFERENCE DOCUMENTS	1
<b>MATERIALS</b>		<b>2</b>
S2.03	PAVEMENT MATERIAL	2
S2.04	ASPHALTIC CONCRETE SURFACING	2
S2.05	SPRAYED BITUMEN SURFACING	3
S2.06	CONCRETE INTERLOCKING PAVERS	3
S2.07	ROAD FURNITURE	3
S2.08	PAVEMENT MARKING	3
<b>CONSTRUCTION</b>		<b>4</b>
S2.09	INSPECTION, SAMPLING AND TESTING	4
S2.10	SETOUT	4
S2.11	CLEARING AND GRUBBING	4
S2.12	TOPSOIL OPERATIONS	4
S2.13	EARTHWORKS	4
S2.14	TRIM AND COMPACT SUBGRADE	4
S2.15	PAVEMENT COURSES	5
S2.16	FINAL TRIM	6
S2.17	ASPHALTIC CONCRETE SURFACING	6
S2.18	SPRAYED BITUMEN SURFACING	6
S2.19	CONCRETE SEGMENTAL PAVERS	6
S2.20	KERBING AND CHANNELLING	6
S2.21	SUBSOIL DRAINAGE	7
S2.22	TRIM VERGES AND BATTERS	7
S2.23	ROAD FURNITURE AND PAVEMENT MARKING	7



## GENERAL

### S2.01 SCOPE

1. This specification details all requirements pertaining to the construction of flexible road pavements, including kerbing, subsoil drainage and trimming of verges.
2. Where there is any conflict determined between the requirements specified herein and the requirements of any referenced Australian Standard, Statutory Authority Standards or otherwise, the requirements specified herein shall apply.

### S2.02 REFERENCE DOCUMENTS

**Note: Where Acts or reference documents are updated, reference should be made to the current version.**

#### Australian Standards

- AS 1289 Methods of Testing Soils for Engineering Purposes
- AS 2439.1 Perforated Drainage Pipe and Associated Fittings
- AS 3706.7 Determination of Pore-size Distribution - Dry Sieving Method

All Standards referenced in this specification shall be the current edition.

#### Queensland Department of Main Roads Standard Specifications

- MRTS03 Drainage, Retaining Structures and Protective Treatments
- MRTS04 General Earthworks
- MRTS05 Unbound Pavements
- MRTS11 Sprayed Bitumen Surfacing (Excluding Emulsions)
- MRTS14 Road Furniture
- MRTS17 Bitumen
- MRTS19 Bitumen Cutter and Flux Oils
- MRTS20 Cutback Bitumen
- MRTS22 Supply of Cover Aggregate
- MRTS30 Asphalt Pavements
- MRTS45 Road Surface Delineation
- MRTS35 Recycled Material Blends for Pavements

#### Australian Standard

- AS 1742 Manual of Uniform Traffic Control Devices

**MATERIALS**

**S2.03 PAVEMENT MATERIAL**

1. Pavement materials used for pavement construction shall comply with Table S2.1 unless otherwise approved by the relevant authority.

**Table S2.1 Pavement Materials**

<b>Pavement Material</b>	<b>Type of Material Permissible</b>	<b>Optional Use of Recycled Material</b>	<b>CBR (Minimum)</b>
Subgrade Replacement	Type 2.5	RM005	15
Access Places, Access Streets, Residential Streets and Minor Collector  Sub-base Base	Type 2.3 Type 2.2	RM003 RM002	45 60
For all roads of Major Collector or higher in the hierarchy  Sub-Base Base	Type 2.2 Type 2.1	RM002 RM001	60 80

<sup>1</sup>As defined in MRTS35 Recycled Material Blends for Pavements

2. All references to material type in the above table refer to the Main Roads Standard Specification MRTS05 "Unbound Pavements".
3. All materials shall be sourced from a Quality Assured material supplier and the results of the manufacturer's testing to assure the quality of the product shall be incorporated with the Contractor's Quality records.

**S2.04 ASPHALTIC CONCRETE SURFACING**

1. For surfacing on pavements with depth 30mm, the material quality requirements, material quality compliance testing requirements and all other matters pertaining to Asphaltic Concrete road pavement surfacing shall conform to the requirements as specified in the "Asphalt Specification for Subdivision Pavements", published by the Australian Asphalt Pavement Association (Queensland Branch).
2. For surfacing on pavements with depths greater than 30mm, the material quality requirements, material quality compliance testing requirements and all other matters pertaining to Asphaltic Concrete road pavement surfacing shall conform to the appropriate Main Roads Standard Specification.
  - Main Roads Specification MRTS 30 " Asphalt Pavements".

**S2.05 SPRAYED BITUMEN SURFACING**

1. For surfacing of pavements with sprayed bitumen. the material quality requirements, material quality compliance testing requirements and all other matters pertaining to hot bitumen road pavement surfacing shall conform to the appropriate Queensland Department of Main Roads Specification.
  - Main Roads Specification MRTS 11 "Sprayed Bitumen Surfacing (Excluding Emulsions)"
  - Main Roads Specification MRTS 17 " Bitumen"
  - Main Roads Specification MRTS 19 " Bitumen Cutter and Flux Oils"
  - Main Roads Specification MRTS 20 " Cutback Bitumen"
  - Main Roads Specification MRTS 22 "Supply of Cover Aggregate" (Only Category A or B as specified, Table 7 – Particle Quality, will be accepted)

**S2.06 CONCRETE INTERLOCKING PAVERS**

1. Concrete interlocking pavers shall be manufactured and supplied in accordance with the requirements of Specification S3 SEGMENTAL PAVING

**S2.07 ROAD FURNITURE**

1. The manufacture, supply and material requirements appropriate to the specification for Road Signs and guidepost shall be as per the Main Roads Standard Specification "MRTS 14 Road Furniture".
2. All signs to be Class 1 reflectivity
3. Signs located in concrete islands or medians shall be supplied with the "V Loc" socket system and fitted with anti-theft bolts.

**S2.08 PAVEMENT MARKING**

1. The manufacture, supply and material requirements appropriate to the specification for Pavement Marking shall be as per the Main Roads Standard Specification "MRTS 45 Road Surface Delineation".

### CONSTRUCTION

#### S2.09 INSPECTION, SAMPLING AND TESTING

1. Inspection, sampling and testing of the pavement shall be in accordance with the requirements of this specification before, during and after the construction of the pavement.
2. All testing shall be carried out by a NATA registered laboratory with appropriate accreditation and suitably qualified personnel.

#### S2.10 SETOUT

1. The construction setout for roadworks construction shall be by reference to a datum line established by a Registered Surveyor (Consulting). The datum line may be either the road centreline, a pegged chainage offset line or any alternative datum suitable for the purposes of accurately setting out the roadworks in accordance with the drawings for the works.

#### S2.11 CLEARING AND GRUBBING

1. All clearing and grubbing works shall be in accordance with the Specification for S1 EARTHWORKS.

#### S2.12 TOPSOIL OPERATIONS

1. All topsoil operations associated with roadworks construction (topsoil stripping, stockpiling and re-spreading), shall be in accordance with the Specification for S1 EARTHWORKS.

#### S2.13 EARTHWORKS

1. All earthworks operations up to subgrade level shall comply with the requirements detailed in Main Roads Standard Specification MRTS 04 "General Earthworks".

#### S2.14 TRIM AND COMPACT SUBGRADE

1. The subgrade material is defined as the top 300mm of earthworks profiled and compacted upon which pavement materials are to be placed. The subgrade material shall be compacted in accordance with the requirements detailed in Main Roads Standard Specification MRTS 04 "General Earthworks", with the testing frequency and requirements are detailed herein:
2. The subgrade material shall be compacted to provide a relative compaction determined by AS1289 for a standard compactive effort as follows:
  - a. Minimum Dry Density Ratio (Cohesive soils) - 97%
  - b. Minimum Density Index (Cohesion less soils) - 80%
3. Testing frequency not less than one (1) test per 1000m<sup>2</sup> with a minimum number of three (3) tests per sample area being tested.
4. At least one (1) sample area shall be tested for type of subgrade material evident on site.
5. The subgrade material shall not include any "Unsuitable Material" as defined in Main Roads Standard Specification MRTS 04 "General Earthworks" and shall be trimmed to the profile required to conform with the Project Drawings and the tolerances specified herein.



6. Where unsuitable material is encountered in the subgrade, a suitable "Subgrade Replacement Material" in accordance with the requirements of this specification shall be incorporated in the works.
7. In this instance, the unsuitable material shall be excavated to a level sufficient to obtain a sound foundation for the pavement. The compaction requirements and testing frequency noted previously shall apply to all operations involving any subgrade replacement material required for the works.
8. The tolerances appropriate to the construction of subgrade and to subgrade replacement material shall comply with the following:
  - a. Design Level Tolerance +15mm, - 30mm
  - b. Shape Tolerance of 25mm maximum deviation from a 3m straight edge laid in any direction.
  - c. Horizontal Tolerances as per MRTS 04,
9. Following completion of subgrade compaction, trimming, and satisfactory density testing, the whole of the subgrade area shall be inspected by proof rolling with a fully loaded single rear axle truck with a minimum axle loading of 8 tonne (or acceptable equivalent). Acceptable proof rolling shall be taken to be no visible signs of deformation or instability in the subgrade.

## **S2.15 PAVEMENT COURSES**

1. The pavement course materials (Base Course and Sub-base Course) shall be transported from the material supplier to the spreading area without segregation and shall be placed at the correct moisture content.
2. The pavement course materials shall be spread in uniform loose layers on the prepared subgrade, subgrade replacement, or sub-base course and compacted to conform with the grades, profiles and cross sections as indicated on the Project Drawings and to the tolerances and compaction standards specified herein.
3. The thickness of any loose layers shall be such that after compaction it shall not be less than 100mm nor more than 200mm thick. Appropriate compaction equipment shall immediately follow the spreading and shaping of the loose materials and under no circumstances shall the materials be allowed to dry out before compaction.
4. After compaction of each pavement course, the whole of the surface shall be watered and rolled with a steel drum roller to give a hard, dense, tightly packed surface free of lenses, compaction planes and caking, in accordance with the tolerances specified herein.
5. No placement of base course material on the sub-base shall commence until the compaction standards and tolerances for construction of the lower layer have been inspected and confirmed satisfactory.
6. The pavement course material shall be compacted to provide a relative compaction determined by AS1289 for a standard compactive effort as follows:
 

a. Base Course	-	100%
b. Sub-base Courses	-	100%
7. Testing frequency not less than one test per 500m<sup>2</sup> with a minimum of four (4) tests per sample area being tested for sand replacement method and two tests per 500 m<sup>2</sup> with a minimum of eight (8) tests per sample for nuclear test.
8. The vertical tolerances for the construction of the pavement courses shall comply with Table S2.2.
9. Horizontal tolerances are to comply with MRTS 05

**Table S2.2 Construction Tolerances**

<b>Course</b>	<b>Design Level Tolerance</b>	<b>Layer Thickness Tolerance</b>	<b>Shape Tolerance</b>
Sub-base	+ 20mm - 20mm	+ 40mm - 20mm	25mm in 3m Maximum
Base	+ 10mm - 10mm	+ 15mm - 15mm	15mm in 3m Maximum
Overall	+20mm -10mm	+20mm -10mm	

**S2.16 FINAL TRIM**

1. Following placement and compaction of the base course material, the whole of the surface of the base course shall be final graded and trimmed to the specified tolerances so as to leave a hard, dense, tightly packed surface free of lenses, compaction planes and caking.
2. Sprayed bituminous or asphaltic concrete surfacing works shall not be commenced until the profile, surface, compaction, quality and finish of the base course has been inspected and confirmed satisfactory.

**S2.17 ASPHALTIC CONCRETE SURFACING**

1. For all Asphalt surfacing the construction requirements, method of construction works, and compliance testing requirements for Asphalt surfacing, shall be in accordance with Main Roads Specification MRTS 30 "Asphalt Pavements".
2. All roads greater than 10% gradient shall have a 10mm primer seal applied to the base course prior to the placement of the Asphaltic Concrete. Alternate methods where approved by Council shall be as noted on the approved Project Drawings.

**S2.18 SPRAYED BITUMEN SURFACING**

1. The construction requirements, method of construction works, and compliance testing requirements for Hot Sprayed Bitumen surfacing, shall be in accordance with the following Queensland Department of Main Roads Specifications.
  - Main Roads Specification MRTS 11 "Sprayed Bitumen Surfacing (Excluding Emulsions)"
  - Main Roads Specification MRTS 17 "Bitumen"
  - Main Roads Specification MRTS 19 "Bitumen Cutter and Flux Oils"
  - Main Roads Specification MRTS 20 "Cutback Bitumen"
  - Main Roads Specification MRTS 22 "Supply of Cover Aggregate"

**S2.19 CONCRETE SEGMENTAL PAVERS**

1. Concrete interlocking pavers shall be constructed in accordance with the requirements of Specification S3 SEGMENTAL PAVING

**S2.20 KERBING AND CHANNELLING**

1. Concrete kerb, kerb and channel shall be constructed by a continuous slip form extrusion machine true to line and grade and to the profile for each kerb type in accordance with the Standard Drawing S1000.

2. Kerbing shall be constructed on sub base material compacted to 100% standard compaction as determined in accordance with the relevant Test Methods contained in AS 1289.
3. The finished kerbing shall be well compacted and shall have exposed surfaces free from voids and honeycombing.
4. Contraction joints shall be made at regular intervals not exceeding 3m. The joints shall be made by forming grooves 40mm deep and not more than 6mm wide in all exposed surfaces of the kerb and kerb and channel. All grooves shall be normal to the top surfaces and square to the alignments of the kerb and kerb and channel.
5. The horizontal and vertical alignments of the kerb and kerb and channel shall not vary from the design level by more than  $\pm 10$ mm, provided that:
  - a. The difference between the deviations from correct levels at any two points 30m apart shall not exceed 30mm
  - b. The deviation from a straight edge laid parallel to the centreline shall not exceed 10mm in 3m.
6. The invert of all channels shall be finished true to grade and alignment and no channelling in which water is found to pond will be accepted.
7. Any kerb or kerb and channel not true to line or with noticeable kinks, bends or other faults, or not of the required dimensions (considering the tolerances specified herein), may be condemned and shall be broken out and removed from site.

#### **S2.21 SUBSOIL DRAINAGE**

1. Unless otherwise detailed on the Project Drawings subsoil drainage shall be constructed beneath the kerbing on an alignment as shown on Standard Drawing S1095.
2. Subsoil drainage trenches, drainage pipe, backfill material, geotextile shall be constructed in accordance with the requirements of Main Roads Standard Specification MRTS 03 "Drainage, Retaining Structures and Protective Treatments".
3. Subsoil drainage cleanouts shall be constructed in accordance with the requirements of Standard Drawing S1095 and shall preferably; be located with the upstream flushing point internally within a stormwater gully pit or manhole.

#### **S2.22 TRIM VERGES AND BATTERS**

1. Following completion of all earthworks operations associated with roadworks construction, all verges and fill batters shall be graded and trimmed to the line and level indicated on the Project Drawings. Allowance shall be made in the final trimming operations for topsoiling and grassing activities.
2. Cut batters shall be lightly tined to a depth of 25 - 50mm prior to respreading of topsoil material

#### **S2.23 ROAD FURNITURE AND PAVEMENT MARKING**

1. The construction of all Road Signs and associated Road Furniture shall comply with the requirements of the following:
  - a. Main Roads Standard Specification MRTS 14 "Road Furniture"
  - b. Australian Standards "Manual of Uniform Traffic Control Devices"
  - c. Standard Drawing S1040 for Street Name Signs.
  - d. Standard Drawing S1041 for Traffic Control Devices.

## ROAD PAVEMENTS

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2. All Pavement Marking shall comply with the requirements of Main Roads Standard Specification MRTS 45 "Road Surface Delineation"