

PINE RIVERS SHIRE COUNCIL

DESIGN MANUAL

CIVIL INFRASTRUCTURE DESIGN



SPECIFICATIONS

AusSpec Asset Owner Specifications
(Roadworks & Drainage)

AusSpec Development Construction Specifications
(Roadworks & Drainage)

PRSC 100 Roadworks Specifications

PRSC 400 Water Supply Specifications

PRSC 500 Sewerage Specifications

PINE RIVERS SHIRE COUNCIL

SPECIFICATIONS



PRSC 100

ROADWORKS SPECIFICATIONS

- 101 Manufacture of Asphaltic Concrete
- 102 Delivery and Laying of Asphaltic
Concrete**
- 103 Sprayed Bitumen Surfacing

PINE RIVERS SHIRE COUNCIL

PRSC 102 - DELIVERY AND LAYING OF ASPHALTIC CONCRETE



PRSC 102 DELIVERY AND LAYING OF ASPHALTIC CONCRETE

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1.0.0 PURPOSE

- 1.1.0** The purpose of this specification is to set down the requirements for the preparation of substrata for, and the delivery, laying, compaction and finishing of, asphaltic concrete road, car park and driveway (access) surfacing works.
- 1.2.0** The manufacture of asphaltic concrete is covered in a separate Pine Rivers Shire Council Specification.

2.0.0 SCOPE

- 2.1.0** This specification shall apply to works to be constructed by contract, subcontract or direct labour.
- 2.2.0** This specification shall apply to works being constructed directly by the Pine Rivers Shire Council or other authority or for a principal who will hand over the ownership of the constructed works to the Pine Rivers Shire Council or who will retain ownership.

3.0.0 REFERENCES

- 3.1.0** The following shall apply: -

AS 2124 - 1992	General Conditions of Contract
AS 3900	Quality Management and Quality Assurance Standards
ISO 9000	Quality Management and Quality Assurance Standards

- 3.2.0** The following shall apply when the respective materials have been specified or approved for use. Where the editions listed have been superseded or replaced, then any later copy of the standards shall apply in their place:-

AS 1199-2003	Sampling Procedures for Inspection by Attributes (Set)
AS 2157-1997	Cutback Bitumen
DMR TEST Q302	
DMR TEST Q306	
DMR TEST Q314	

4.0.0 DEFINITIONS

4.1.0 For the purpose of this specification the following definitions shall apply:-

- ❖ **Premises** - any parcel of land improved or unimproved, for which there is a property description
- ❖ **Director, Assets and Infrastructure Services Division** - the person occupying that position within the Pine Rivers Shire Council, or their nominated representative
- ❖ **Pine Rivers Shire Council engineer** - the engineer employed by the Pine Rivers Shire Council to approve, supervise or inspect the works, or their nominated representative
- ❖ **Consulting Engineer** - the registered professional engineering company or registered professional engineer engaged by the principal to carry out the investigation and design of the water supply works to be constructed by the principal. When engaged for the construction phase, the company or engineer shall act as superintendent for the purpose of works carried out by contract.
- ❖ **Contract, Contractor, Principal and Superintendent** - as defined in AS 2124

5.0.0 USE OF MIX TYPES

5.1.0 The various mix designs are called up as Types 1 through Type 4. These mix types shall be used on Pine Rivers Shire Council roads and streets as indicated in Table 5.0.

Table 5.0

Road Classification	Mix Type + (Bitumen Class)				
	Type 1 (170)	Type 2 (170)	Type 2 (320)	Type 3 (320)	Type 4 (320)
Urban Access Street / Place	✓	✓			
Urban Collector Street	✓	✓			
Urban Bus Collector		✓			
Urban Trunk Collector		✓	✓ (1)		
Industrial Access Road		✓	✓ (1)	✓	✓
Industrial Collector Road			✓ (1)	✓	✓
Urban Sub-Arterial Road			✓ (1)	✓	✓
Urban Arterial Road			✓ (1)	✓	✓

(1) Only with approval from a Pine Rivers Shire Council engineer

6.0.0 PREPARATION OF THE BASE COURSE SUBSTRATA

6.1.0 PREPARATION OF EXISTING SURFACES

- 6.1.1 The existing surface shall be thoroughly cleaned, by brooming or other approved means. All foreign matter adhering to the surface shall be removed before any prime, tack coating or asphalt spreading is carried out.
- 6.1.2 The prepared surface shall be inspected and approved by a Pine Rivers Shire Council engineer before the application of any prime, tack coating or asphalt spreading is carried out.

6.2.0 PREPARATION OF NEW BASE COURSE

- 6.2.1 A primer or primer seal coat will be required by a Pine Rivers Shire Council engineer before any asphaltic concrete surfacing is carried out unless specified otherwise.
- 6.2.2 The type, rate and temperature of application of the primer shall be determined by the superintendent after consideration of the permeability and absorptive characteristics of the paving material based on the results of tests taken during the paving construction, and the type of proposed asphalt surfacing.
- 6.2.3 The primer used shall satisfy the requirements of the Australian Standard AS 2157.
- 6.2.4 Primer shall be applied by a sprayer which complies with the requirements of NAASRA "Specification for Performance Requirements for Mechanical Sprayers of Bituminous Materials".
- 6.2.5 Asphaltic concrete surfacing shall not commence until the primer has cured and the superintendent's approval is obtained for the commencement of surfacing. Primer shall be left for a minimum of 48 hours before applying asphalt surfacing unless approved otherwise by the superintendent and a Pine Rivers Shire Council engineer.
- 6.2.6 During this period, traffic shall not be permitted over the surface unless a cover coat of course sand or fine screenings has been applied concurrently with the application of the primer and incorporated into the surface by rolling in a manner approved by the superintendent.
- 6.2.7 If the placing of asphaltic concrete is delayed or the primed surface contaminated in any way, the superintendent may direct the application of a tack coat to all or part of the area.

6.3.0 INSPECTION OF SUBSTRATA

- 6.3.1 Asphaltic concrete surfacing shall not be commenced until the superintendent and a Pine Rivers Shire Council engineer have inspected the substrata either as a base course or existing surface and certified that it is suitable for the laying of asphaltic concrete surfacing.
- 6.3.2 The superintendent and a Pine Rivers Shire Council engineer will consider the quality of the finished levels, compaction and texture finish before such certification.

7.0.0 TACK COAT

7.1.0 A tack coat is required in addition to a primer or primer seal coat unless specified otherwise by a Pine Rivers Shire Council engineer. A tack coat shall be sprayed on the existing surface for resurfacing work.

7.2.0 The whole of the area to be sheeted with asphaltic concrete shall be lightly and evenly tack-coated with a fine spray of approved bitumen emulsion. The application shall be equivalent to 0.18 - 0.30 litres of bitumen per square metre. Dilution with water may be required to facilitate spraying and permit uniform application. The tack coat shall be allowed to "break" (water separating from the bitumen) before the mix is spread. Care must be taken to ensure that the longitudinal edges are adequately tack coated to secure satisfactory bonding along the edges.

7.3.0 All care shall be taken to prevent overspray onto kerb and channel or median kerbs. Any such overspray must be removed prior to final acceptance.

8.0.0 CORRECTOR COURSE

8.1.0 If final pavement levels lead to a variation in depth of asphalt exceeding - 0 mm / + 10 mm, a corrector course of asphalt shall be laid to bring the base course within this tolerance range before application of the final asphalt surface course.

9.0.0 TRANSPORT

- 9.1.0** The mixed material shall be discharged into motor trucks, the bodies of which have been lightly coated with lime water or soap solution, or other approved coating agent to permit easy discharge. The complete load shall be covered with heavy canvas (or equivalent) to minimise loss of heat during transit and prevent wetting by rain.
- 9.2.0** Each truck shall be fitted with an approved type of tailgate to allow proper control of the mix during discharge into the spreading device. All trucks shall carry not less than 6 tonnes of mixed material and delivery shall be so arranged that there is minimal delay in the discharge of the load into the spreader. Smaller capacity trucks may be used where surfacing work has to be carried out using small pavers i.e. footpaths or small constrained areas.
- 9.3.0** When backing trucks against the spreader, care shall be taken not to jar the spreader out of its proper alignment. Delivery of mix shall be at a uniform rate within the capacity of the spreading and compacting equipment. Transport shall be as expeditious as possible to minimise cooling of the mixture.
- 9.4.0** Unless approval is given to other means of measurement, all truck loads of mix shall be weighed upon a certified weighbridge.
- 9.5.0** Laying shall only be carried out in daylight hours (unless specific approval is given by the superintendent to the contrary) and delivery of asphalt to the job site shall be arranged accordingly. The last truck load on the job must arrive not later than one hour before sunset

10.0.0 SPREADING

10.1.0 PLACEMENT

10.1.1 Spreading, except as agreed otherwise, shall be by an approved self-propelled machine, having an effective spreading capacity of not less than 400 tonnes of mix per eight hour day for work on roads, or suitable capacity for work on footpaths or in lightly constructed areas. It should include the following features: -

- ❖ means of pushing each motor truck during spreading
- ❖ a receiving hopper into which motor trucks can discharge the mixed material
- ❖ distributing screws to place the material evenly in front of the screed plate, without segregation
- ❖ automatic tamping or vibrating devices
- ❖ an adjustable screed capable of providing a smooth even surface free from tears or other blemishes, to a width of not less than 3.5 metres for work on roadways. Provision shall be made for easy adjustment to permit lesser widths of spread.
- ❖ an approved screed heating device
- ❖ effective steering, such that the mix can be laid to a true line
- ❖ means of adjusting depth of spread between 6 mm and 100 mm

10.1.2 On straight runs, the width of the mat laid by the spreader shall be such that the width to be hand placed shall not exceed 500 mm on any one side of the spreader. At intersections and other irregular areas, the hand placing and raking shall be kept to a minimum

10.1.3 The machine shall be so operated that material does not accumulate along the sides of the receiving hopper. Any mix, in or under the machine, which has become unworkable for any reason, shall be removed. Where the end of the spread material has cooled due to delay in laying or when resuming work after a planned stoppage, a transverse joint shall be formed by cutting the spread material to a vertical face before any fresh mix is spread.

10.1.4 In the event of faulty operation of the mechanical spreader causing irregularities in the spread material, work shall be suspended until the fault is rectified. If the irregularities are of a minor nature, and the surface has not cooled appreciably, it will be permissible to spread a thin layer of fresh mix by hand, level it with board rakes and roll it quickly. Should the treatment fail to produce a surface of acceptable texture and regularity, or if the faults left by the spreader are of appreciable depth, then the defective surface shall be removed and fresh material shall be laid as previously described.

10.1.5 The temperature of the mix when it is tipped into a spreader shall not be less than 130⁰C, nor greater than 160⁰C. Spreading shall proceed without undue delay, and initial rolling of the mix shall commence at a temperature of not less than 95⁰C nor greater than 130⁰C. It may be necessary to complete compaction at higher temperatures than 95⁰C for thin layers (less than 50 mm) in cold and windy conditions.

- 10.1.6 In the event of a breakdown of the spreader or of any item of compaction equipment, all operations shall be suspended until replacement units are available. Any material not laid and compacted in accordance with this specification shall be removed and replaced by the contractor at the contractor's cost.
- 10.1.7 Where the pavement temperature is less than 25⁰C and is exceeded by the wind speed in km/h i.e. 20⁰C and wind speed greater than 20 km/h. the asphalt laying contractor shall supply an additional roller and/or increase the asphalt discharge temperature not exceeding the maximum discharge temperature in Clause 10.1.5 of this Specification.
- 10.2.0 CONDITIONS WHEN ASPHALT SHALL NOT BE PLACED**
- 10.2.1 Mixing and placing of asphalt will not be permitted when the surface of the road is wet.
- 10.2.2 Asphalt shall not be placed during periods of heavy or continuous rain, or when rain is likely to fall during placement and compaction operations
- 10.2.3 Asphalt shall not be placed if the pavement surface temperature is less than 10⁰C.
- 10.2.4 Where compaction is not achieved in the conditions referred to in Clause 10.1.8 of this specification, no further asphalt shall be placed.

11.0.0 **COMPACTION**

11.1.0 Compaction of the mix shall be carried out using such equipment and techniques as are necessary to comply with the field density requirements of the specification. A minimum requirement for compaction equipment shall be a twin drum vibrating roller having the following characteristics:

- a) minimum dead weigh 6 tonnes
- b) minimum drum width 1.4 m
- c) vibrating frequency on both drums 2001-3000 hertz
- d) vibrating amplitude 0.4 mm-0.8 mm

11.2.0 If the street is not trafficked during the asphalt laying operation or because of the apparent open texture of the rolled asphalt surfacing, the superintendent may order that a multi-tyre roller, with a minimum tyre pressure of 550 kPa and a minimum load of 1 tonne for each tyre, be used as a finishing roller

11.3.0 The transverse and longitudinal joints and edges shall be compacted first and rolling shall then proceed longitudinally at the sides and gradually progress towards the centre of the pavement, except on super elevated curves, where the rolling should begin on the low side and progress to the high side. Each traverse pass shall substantially overlap the previous traverse roller pass.

12.0.0 QUALITY ASSURANCE

12.1.0 GENERAL

12.1.1 The surface of all asphaltic concrete shall be finished true to grade and profile with smooth joints and a neat finish around manholes and other road surface fittings, all to the satisfaction of the superintendent and a Pine Rivers Shire Council engineer.

12.2.0 TOLERANCES AND FINISHED LEVELS

12.2.1 Where finished levels are shown on drawings, the final asphalt surfacing shall not deviate from these levels by more than the tolerances shown in the Table 12.0. Due allowance may be made for the effect of geometric acceptance in the design where relevant.

Table 12.0

Criteria	Test	Tolerance above prescribed amount (+)	Tolerance below prescribed amount (-)
Match to lip level of concrete channel		6 mm	0 mm
Asphalt thickness	Each individual test	10 mm	0 mm
	Average	8 mm	0 mm
Crossfall	Any location	0.50 %	0.20 %
	Average	0.20 %	0.20 %
Local imperfections	Deviation from level over a 3 m long straight edge parallel to profile	5 mm	5 mm
Horizontal alignment		50 mm	50 mm
Width	Un-kerbed	150 mm	0 mm
	Kerbed	No gap at lip of channel	

12.3.0 TESTING FREQUENCY

12.3.1 The contractor shall undertake process control testing to ensure the compacted thicknesses are achieved. Thicknesses shall be checked by measuring the core cut for density determination and by recorded depths at five random locations along the roadway of 80 metres spacing using a depth gauge at the time of laying and compaction. Of the five test sites, four shall be taken 1.0 m from the crown, and one approximately 1.0 m from the face of kerb or edge of road.

12.3.2 Compaction density shall be tested at the rate of 1 test per 100 tonnes of asphalt placed. The minimum number of tests required shall be the number required to satisfy the requirements of Clause 12.4.0 of this specification.

12.3.3 Testing for geometry shall be conducted at the rate of 1 per 20 metres.

12.4.0 **COMPACTION**

12.4.1 DEFINITION OF LOTS

12.4.1.1 Acceptance of compaction shall be based on a statistical analysis of density testing of the work in lots. Provided the mix is homogeneous and placed in one layer under essentially uniform conditions, a lot shall be considered as 2500 m² or part thereof, which is completed in one days operation.

12.4.2 ACCEPTANCE (PROCESS CONTROL) TESTING

12.4.2.1 Density testing will be carried out as soon as possible after final rolling and, where possible, prior to trafficking. Sites for density testing will be selected on an essentially random basis provided no site is selected within 150 mm of a joint or free edge. Should it be necessary to conduct density testing later than two days after the trafficking, the sites for testing shall be outside the trafficked wheel paths.

12.4.2.2 For each lot, the density of the compacted mix will be determined by nuclear gauge in accordance with DMR Q314. Where the specified compacted layer thickness is less than 50 mm, the core sampling as per Q302A or Q302B, to determine the density of the compacted mix in accordance with Q306A or Q306C should be considered as the preferred method.

12.4.3 ACCEPTANCE/REJECTION CRITERIA - COMPACTION

12.4.3.1 Relative compaction (xi) is the percentage ratio of the density of the compacted mix to the maximum density of the particular lot. The maximum density of the lot is the mean value of the maximum densities of production samples taken from the lot. The maximum theoretical density of each production sample is determined in accordance with the Pine Rivers Shire Council specification for "Manufacture of Asphaltic Concrete".

12.4.3.2 The compaction of the asphalt surfacing shall be assumed from the following tested characteristics:-

- ❖ for compliance testing a designated lot of eight positions are to be selected at random by using random numbers of procedures the Guide to AS1199 "Sampling Procedures and Tables for Testing and Inspection by Attributes" Clause 2.18
- ❖ the average daily M.T.D. as a percentage of the mean theoretical density is to be determined either by the nuclear density method or by cutting cores and meaning the density
- ❖ for Type 1 and Type 2 (170) mixes at 25 mm minimum thickness used on roads up to and including industrial access classification, the lot will be accepted if of the eight results, two or less falls below 90%. i.e. 10% total air voids
- ❖ for work on sub-arterial, arterial, and industrial collector road classifications of 40 mm thickness or greater where a Type 2 (320) and all Type 3 and 4 mixes are used, the lot will be accepted if of the eight results two or less fall below 91% (9% of total air voids).

12.4.3.3 The designated lot may be rejected if:-

- ❖ for Type 1 and Type 2 (Class 170) mixes at 25 mm minimum thickness, three or more tests fall below 90% (10% total air voids)
- ❖ For Type 2 (Class 320), Type 3 and Type 4 mixes of 40 mm minimum thickness or greater, three or more tests fall below 91% (9% total air voids)

OR

- ❖ the contractor may elect to carry out an additional five tests and combine those results with the initial eight tests

12.4.3.4 The designated lot will be rejected if:-

- ❖ for Type 1 and Type 2 (Class 170) mixes at 25 mm minimum thickness, four or more of the combined thirteen tests fall below 90% (10% air voids)
- ❖ for Type 2 (Class 320) Type 3 and Type 4 mixes of 40 mm minimum thickness or greater, four or more of the combined thirteen tests fall below 91% (9% total air voids)

12.4.3.5 The following clause shall not apply to works carried out as operational works that are to be transferred to the Pine Rivers Shire Council for ownership or maintenance.

Where Pine Rivers Shire Council is the principal, a Pine Rivers Shire Council engineer may elect to accept the lot at a reduced cost by adopting the following formula:-

- ❖ For each additional test that does not meet the acceptance requirements, a reduction of 22% of the contract price will be deducted for each test up to but not exceeding four tests falling below the specified compaction requirements.

13.0.0 PROVISION FOR TRAFFIC

- 13.1.0** All necessary signs, barriers etc., required for the control and protection of traffic shall be provided and erected to the satisfaction of the superintendent. Special care shall be taken to ensure that vehicles and pedestrians are not sprayed with primer or tack coat material and entry to areas treated with uncovered primer tack coat or hot paving mixture is prevented. Areas that have been tack coated are not to be opened to traffic unless approval is given by the superintendent.

14.0.0 STOPPAGE OF WORK

- 14.1.0** The superintendent shall suspend all work if he considers the performance of the work is not in accordance with the specification.