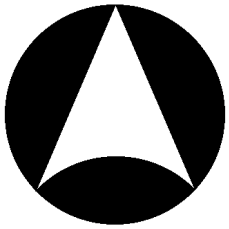

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA (WA BRANCH)

AUSTRALIAN ASPHALT PAVEMENT ASSOCIATION (WA BRANCH)

TECHNICAL SPECIFICATION, TENDER FORM AND SCHEDULE
FOR SUPPLY AND LAYING OF ASPHALT ROAD SURFACING

Revision No 4
Date: April 2016

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TECHNICAL SPECIFICATION, TENDER FORM AND SCHEDULE
FOR SUPPLY AND LAYING OF ASPHALT ROAD SURFACING

FOREWORD

This specification has been produced jointly by the Institute of Public Works Engineering Australia WA Division (IPWEA) and the Australian Asphalt Pavement Association WA Branch (AAPA) to complement Australian Standards AS 2150 – Hot Mix Asphalt – A Guide to Good Practice and, AAPA Stone Mastic Asphalt Design & Application Guide – 2000

This document is the third revision of the original IPWEA Asphalt Specification produced in December 1995 and based on the very original AAPA specification which had been in use by both Local Government and private for some 20 years previous. This revision has been undertaken jointly by IPWEA and AAPA.

This Specification is a stand-alone document and no part should be altered . Any user wishing to make variations must nominate all variances in the Table of **Variations to Specification** in Appendix 1.

The issue of penalty deductions for pavements not meeting the required conformance criteria is an important issue. Most Contractors involved in the industry are highly professional organisations committed to providing a high standard of service to their Customers. Penalty deductions should be given careful consideration before application, and it is recommended that Superintendents apply penalties prudently, specifically in cases where Contractors are continuously failing to meet the specification requirements and are not making any effort to overcome the problem. It would not be recommended that penalty deductions be made for isolated occurrences of conditional conformance or when there is obvious effort by the Contractor to determine the cause of a problem and work towards a solution.

RECORD OF REVISIONS

REVISION No.	DATE	DETAILS
0	December 1995	Original Version.
1	May 1998	Testing requirements modified; several minor amendments.
2	April 2002	Amended clauses and tables throughout.
3	March 2012	Major re write
4	September 2015	Major rewrite and inclusion of warm mix asphalt
5	May 2019	Table 10.2 amended to show AC and RAC in 50 blow Marshal mixes

TECHNICAL SPECIFICATION, TENDER FORM AND SCHEDULE FOR SUPPLY AND LAYING OF HOT ASPHALT ROAD SURFACING

1. SCOPE OF SPECIFICATION

1.1 Specification Documents

This Specification is to be read in conjunction with Australian Standards AS 2150 - Hot Mix Asphalt – A guide to Good Practice, AS 2008 - Residual Bitumen for Pavements, AAPA Stone Mastic Asphalt Design & Application Guide – 2000.

Where conflict exists, the requirements of this specification will be met.

1.2 Interpretation of Terms

"Australian Standard (AS)" refers to, the quoted Australian Standard document, current at March 2008.

"All tonnages" - Where all tonnages is included in the schedule of rates, the Contractor will charge these rates when the Council presents the contractor with a programme of works, not including hand work, that totals more than 650 tonne. The contractor shall have the sole discretion to submit a tender in such form.

"Contract" - shall mean and include the Tender, Contract, General Conditions, Schedule of Quantities, Schedule of Rates, Specifications and all plans, drawings and other schedules.

"Contractor" - shall mean the person or persons, corporation or corporations whose tender is accepted by the Council, and shall include the executors or administrators, successors and assigns of such person or persons, corporation or corporations.

"Council" - shall mean Council specified in the General Conditions of Tender and/or Contract.

"Job Mix" - The job mix is the mix design produced within the broad targets of the specification, and subject to tolerance given in Table 11 of AS 2150 except in the case of laterite mixes where AS2150 does not apply

"Job Size" – shall mean the number of asphalt tonnes laid at one location. If it is possible to lay asphalt at a number of locations in one day and mobilization of machinery is not required, the day's production shall be considered in total. If however, plant and machinery must be mobilized, the sites shall be considered individually.

"MRWA Test Methods" are the Main Roads WA test method, current at time of tender.

"Mobilization" shall be defined as the requirement for machinery to be transported by truck.

"Pay factor" means the calculated proportion of the whole payment to be paid to the Contractor subject to conformance with this document.

"Payment penalty" means the actual reduction in payment resulting from the pay factor.
"Superintending Officer" - shall mean any person who from time to time shall be entrusted to superintend the works on behalf of the Council.

"Test Lot" – refers to any area subjected to conformance testing and the extent of the test lot shall be defined by the Superintending Officer. The test lot may be a days work on a large job, a single street, or two or more small jobs or streets providing that the mix used is homogeneous within the lot. It may also consist of a subsection of a section of pavement surfacing as determined by the Superintending Officer.

"Works" or "Work" - shall mean the work to be done by the Contractor under the Contract.

1.3 Extent Of Works

As specified in Appendix 2- Table of special requirements

1.4 Tender Prices, Mix Designs and Rise and Fall

Tender prices shall be submitted as being fixed for the initial twelve month period, except for the rise and fall in the cost of bitumen which will constitute an adjustment at any time in the contract period.

At the end of each 12 month period of the contract, an increase in the tender price based on CPI (Perth) shall be applied based on the initial tender price**.** All increases must be submitted for approval within 60 days of occurrence and contract anniversary date in the case of CPI.

Adjustments for the cost of bitumen will only be allowed for each $20/t increment in the price of bitumen, and will not be considered until the price has moved by more than $20/t from the tender price and subsequent already varied prices thereafter.

At each request for a price increase due to the rise and fall in the price of bitumen, the contractor shall supply supporting documentation for the nominated bitumen supplier.

Should it be discovered that the Contractor has not passed on to the Council any price reduction due to a fall in the price of bitumen, then the Council may immediately terminate the contract, and the contractor shall, whether the contract is terminated or not, pay to the Council the sum determined as being overpaid to the Contractor.

The calculation for the new contract prices for bitumen variation shall be as follows: -

$$P = A + (B_c \times B_v)$$

The annual calculation for the new contract prices for CPI shall be as follows: -

$$P = A + (I \times CPI)$$

Where:

P = adjusted or new price.
I = initial tender price or adjusted tender price for CPI only from previous years adjustment/s at end of each year.
A = tender price or existing price from previous adjustment.
B_c = the percentage bitumen content by mass of mix as ascertained in Clause 3.2 Job Mixes.
B_v = the variance in the cost of bitumen from tender price or previous varied price.
CPI = variation in Consumer Price Index for Perth as published by Australian Bureau of Statistics for the previous 12 month period.

As there may not be a correspondence between tender anniversary date and CPI publications the previous known 12 month figures shall be used for the calculation.

Tender prices for each mix design shall be submitted on the Form of Tender in Appendix 4. Tenderers should give prices for each of the mixes designed to this specification. The tenderer shall provide prices for any additional mix types specified in the Table of Special Requirements in Appendix 2 and shall include any additional costs that may be applicable resulting from Variations to Specification in Appendix 1. Any additional information required by the Table of Special Requirements should be appended to the Tender Form.

Contracts may be awarded for a period of up to 5 years.

Where the contractor elects, a uniform price for all tonnages may be submitted, and the Council may elect to accept the tender on the basis of “All Tonnages” OR “Job Size” but once the tender is accepted, the method shall remain binding. The contractor must submit prices based on the Job Size listed in the schedule of rates, but is not required to submit a price for all tonnages.

1.5 General Conditions of Tender / Contract

Where applicable this specification should be read in conjunction with the Council’s General Conditions of Tender and/or Contract.

2. MATERIALS

2.1 Aggregate

All aggregates used with the exception of laterite will meet the requirements of AS 2758.5 – Asphalt Aggregates. The aggregate shall be produced from a source rock designated in the table of special requirements (Appendix 2).

2.2 Reclaimed Asphalt Pavement

Processed Reclaimed Asphalt Pavement (RAP) may be added to the mix in proportions of up to 10% by mass with no changes to the job mix. Where RAP at greater than 10% is used, a specific job mix shall be registered with the Council.

RAP shall not be used in SMA asphalt.

2.3 Bitumen

Bitumen will be Class 170 or 320 (as specified for the mix types in Appendix 3) unless otherwise directed by the Superintending Officer and will meet the requirements of AS 2008 – Residual Bitumen for Pavements. Where Class 170 is specified, Class 320 may be substituted in lieu of Class 170, but Class 170 may not be substituted for Class 320.

Polymer modified binders (plastomers or elastomers) shall meet the requirements of Austroads AGPT – T190 unless specified otherwise by the Superintending Officer.

3. MIX DESIGNS

3.1 General

All mix supplied for this contract will generally be as detailed in Appendix 3, though other mix types may be used at the direction of the Superintending Officer.

Other than the requirements in Clauses 1.2, 2.1 and 3.2, Laterite mixes, in general, shall conform to the same requirements as the dense graded mix in Appendix 3. Where the mix is being designed to conform with heavy duty applications in accordance with 3.1, up to 30% by mass of combined course and fine granite may be incorporated in the mix design.

3.2 Job Mixes

Prior to the commencement of the Contract, the Contractor will submit ‘Job Mixes’ for each mix type which conform to the properties listed in Appendix 4.‘Job Mixes’ shall be resubmitted prior to any subsequent changes due to mix re-designs.

The grading curve of the aggregate shall not vary from the low limit on one size of sieve to the high limit on adjacent sieves, or vice versa. The particle size distribution of the aggregates when plotted, shall give a smooth curve throughout the whole range of sieve sizes.

On written acceptance of a ‘Job Mix’, the permissible variation of aggregate grading and bitumen content shall not exceed Table 11 of AS 2150. The minimum calculated bitumen film thickness shall be 7.5 micron using the Austroads test method AGPT/T237.

In the case of laterite mixes, the bitumen tolerance of the job mix shall be ±1% of the target.

The calculated bitumen film thickness is a required design property of the job mix, but is not be used as a conformance requirement of the mix. However it may be used to accept a mix where other properties such as particle size distribution or bitumen content fall out of the specified range.

3.3 Alternative Mixes

Should Tenderers wish to submit alternative mix designs which are outside of the specifications, details of the mix designs and tender prices shall be included. Mixes with properties other than those listed in Appendix 3 may be specified and these shall be listed in the Table of Special Requirements (Appendix 2)

All tenders will be evaluated based on conforming prices as listed in Appendix 4. However Council may consider alternatives during the course of the contract after full evaluation of an alternative and accordingly alternative submissions are encouraged.

4. SAMPLING AND TESTING

The contractor shall be responsible for sampling and testing of the asphalt supplied to the council. The contractor shall organise testing by a laboratory accredited by the National Association of Testing Authorities of Australia (NATA). The laboratory must have included in its Scope of accreditation the current test methods requested by this specification.

For the purpose of testing the production mix, the contractor shall sample production lots at the minimum frequencies set out in the Quality Plan and Inspection Test Plan supplied by the Contractor. If during the duration of the Contract, the Contractor makes changes to the quality plan, these changes shall be referred to the Superintending Officer, who shall have the right to reject the changes if it is considered the changes will result in greater risk to the client.

The testing frequency requirement shall apply to each asphalt mix type. The test results shall be related to production intervals with samples representing the full lot of production of the specific mix.

The costs associated with the lot sampling and testing of the production mix shall be borne by the contractor.

Where the Contractor is directed to undertake compliance testing, and this testing is not part of the Contractor's Quality Assurance System, the cost of the compliance testing shall be paid by the Council.

When the Council requires audit testing, the cost of testing shall be paid by the Council.

5. DISPUTE RESOLUTION

This specification covers the basic requirements of the technical aspect of the manufacture and laying of asphalt. The acceptance criteria place significant reliance on the contractors quality plans. Under the Contractors quality plan, not every project will necessarily be tested. In the event that within a period of nine months after completion of any project unacceptable performance by way of shoving, flushing, stripping or ravelling of aggregate, Council reserves the right to treat this in accordance with the following procedure.

If a payment penalty or rejection of work or requirement for warrantee is in dispute, the Contractor may apply to have a retest carried out at the Contractor's cost. The retest shall consist of removal of a random sample of the compacted asphaltic mat (1m x 1m). This shall be divided into two samples, one sample to be tested by a laboratory of the Contractor's choice, and the other sample tested by a laboratory of Council's choice. These tests are to be carried out in accordance with the current Australian and/or Main Roads WA standard. The mean result of the two tests shall be the definitive result.

The Superintending Officer and or the Contractor may witness any testing that is part of dispute procedures.

The costs of retesting shall remain the responsibility of the Contractor should the rejection of work be confirmed, otherwise they shall be borne by Council.

Where the Contractor considers that failure to achieve the specified quality of the asphaltic mat is due to deficiencies in the base preparation, the Contractor shall arrange independent testing of the base compaction by a NATA registered laboratory. In the event that the base work is found to be deficient, the cost of the additional testing and any remedial measures shall be borne by the Council.

Alternatively, either party may request the pavement and test results be referred to an independent specialist Consultant who shall be agreed by both parties to examine and report on the suitability of the asphalt surface or underlying pavement if that is in dispute.

The findings of the specialist Consultant shall be binding.

6. MANAGEMENT SYSTEMS

At the tender submission the Contractor shall supply all the documentation listed below in relation to its managements systems for quality, safety and environment.

Any new Company who wishes to submit a tender may do so by submitting documentary evidence of its management systems currently in place and an undertaking that it will complete its third party accreditation within the first year of contract.

6.1 Quality management

The Contractor shall supply to the Superintending Officer a copy of the Contactors third party certification to AS/NZS ISO 9001 (current version) and Quality Management Plan.

The Contractor's Quality Assurance System shall include a Process Control System conforming to the requirements of ISO 9001 - Quality Systems for Production and Installation and the AAPA publication Asphalt Plant Process Control Guide.

The Contractor's process control records may be made available to the Council and in all cases the control intervention levels should be within the limits of the specification.

The Contractor's Quality Assurance System shall be used to identify areas/lots of suspect mix where audit testing shows that the mix does not meet the specification.

6.2 Safety Management

The Contractor shall supply to the Superintending Officer a copy of the Contractors third party certification to AS/NZS 4801 (current version) including:

- Health and Safety Management Plan.
- Cyclone Contingency Plan in the case where the Council is in a designated cyclone region.

6.3 Environmental Management

The Contractor shall supply to the Superintending Officer a copy of the Contractors third party certification to AS/NZS ISO 14001 (current version) including the Environmental Management Plan

7. MANUFACTURE

7.1 Applicable Standards

7.1.1 Hot mix asphalt

All mixes shall be manufactured according to the requirements of AS 2150, except in the case of Stone Mastic Asphalt, which shall be manufactured in accordance with the table 3.3 shown in Appendix 3 of this specification.

7.1.2 Warm Mix Asphalt

Warm Mix Asphalt (WMA) is asphalt which contains an additive, or uses a manufacturing process, that allows the asphalt mix to be produced and placed at lower temperatures than Hot Mix Asphalt (HMA). The maximum moisture content of the mix shall not exceed 0.5% by mass.

Where warm mix asphalt used, all the requirements for hot mix asphalt shall apply, with the exception of the temperature requirements.

7.1.3 Polymer Modified Bitumen Asphalts

Polymer modified bitumen asphalts generally fall into one of two categories:

- Plastomeric types (such as EVA) which increase modulus, improve rut resistance and resistance to shear forces from turning traffic

- Elastomeric types (such as SBS) which decrease modulus, but improve fatigue life, rut resistance and resistance to shear forces from turning traffic

Care must be taken to ensure that the modified bitumen is well blended, and it shall be the responsibility of the Contractor to ensure the correct grade of polymer and blending is achieved.

Where there is evidence of separation of the polymer from the bitumen such that the desired properties are not achieved, the mix shall be removed and replaced at the contractor at no cost to the Principal.

8. PREPARATION

8.1 Programming

Prior to commencement of any works in this Contract a “pre start” meeting will be held to determine procedure and protocol for programming and allocating work together with the regularity, if any of ongoing programming meetings.

Prior to the commencement of each project throughout the Contact period, a pre start meeting shall be held with the Superintending Officer to determine specific requirements.

The works within the contract need not be continuous but the Contractor shall have the approval of the Superintending Officer prior to stopping work. The point of cessation shall be approved and in no circumstances shall it be in a location considered to be detrimental to the completed job.

8.2 Site Inspection and base condition

The quality of the base, either new or old will have an effect on the level of compaction and ride quality of the finished asphalt mat.

The Superintending Officer accepts full responsibility for the quality of the surface to be overlaid. Where the Superintending Officer is aware of any deficiencies in the surface, these will be brought to the attention of the Contractor and confirmed in writing or by email.

The Contractor will inspect every paving job with the Superintending Officer prior to paving commencing. Should the Contractor be concerned with any aspect of the surface preparation, base construction or irregularities in the base prior to or during paving operations, such concerns shall be brought to the attention of the Superintending Officer. This shall be confirmed in writing or by email

Where the Superintending Officer directs that the works be halted to allow for the remediation of the base, the Contractor shall be compensated for any costs of establishment and loss of time.

8.3 Keying In

The Council will be responsible for keying in work at each end of the job and at any intersections where overlay of the intersecting street is not to be included in the work. This may be done by burning and 'chasing' or milling, and removing the existing asphalt. The method used will be that agreed with the Superintending Officer. Alternative methods may also be negotiated between the Contractor and the Superintending Officer.

The responsibility for keying in may also be passed on to the Contractor and the cost will be paid by the Council at pre determined rates.

8.4 Sweeping

The Council shall be responsible for the sweeping of pavements within 24 hours of asphalt laying. Where some areas may have incurred unsuspected entry of debris and they can easily be swept by hand, this work shall be undertaken by the contractor without further charge to Council.

8.5 Tack Coat

Tack Coat shall be sprayed in accordance with AS 2150 - Hot-mix Asphalt – A Guide to Good Practice, Section 11.

Material shall be a bitumen emulsion and shall be in accordance with AS 1160 – Bituminous Emulsions for the Construction and Maintenance of Pavements.

The application rate shall generally be sufficient to fully coat the surface with a residual binder content of 0.10 litres per square metre, except between structural layers where the rate shall be 0.15 litres per square metre. However, the application rate may be varied or even omitted to suit particular conditions when approved or instructed by the Superintending Officer.

Contractors are encouraged to adopt this technology during the period of the Contact, if not already adopted.

8.6 Corrector Course

When directed by the Superintending Officer, preparatory to resurfacing, a separate regulating course shall be placed for correction of both longitudinal and transverse pavement shape. Unless directed otherwise, the maximum compacted thickness of any one layer of corrector course shall not exceed five times the size of the largest aggregate in the asphalt used.

In the case that the Council instructs the contractor to supply and lay a corrector course due to ride quality inconsistency in the original surface, then the ride quality of the surface shall become the responsibility of the Contractor

The "pre start" meeting can also include as part of the agenda discussions and agreement on corrector course asphalt and ride quality improvement in general. On reaching agreement on methods of ride quality improvement the contractor will apply those methods to applicable roads.

9. LAYING OF MIX

9.1 Undue Delays

Should the Contractor be unable to carry out the required works within 14 days of request in situations where a road is under construction, or within 28 days for routine maintenance overlays, Council reserves the right to obtain the services of another Contractor after consultation with the Contractor. Alternatively the Contractor may supply the service by using any other Contractor approved by the Superintending Officer and additional costs incurred shall be the responsibility of the Contractor.

In an emergency situation, where un-scheduled works arise that are beyond the control of the superintending officer to foresee, the Council may obtain the services of another contractor, at its own expense, should the Contractor be unable to supply in any period that is determined by the Superintending Officer.

9.2 Delivery

All mix shall be delivered according to the requirements of AS 2150 - Hot Mix Asphalt, Guide to Good Practice, Section 8, unless otherwise directed by the Superintending Officer.

Delivery shall be made during the hours approved by the Superintending Officer.

9.3 Weather Conditions

The surface on which asphalt is to be laid shall be free from ponding water. The Superintending Officer reserves the right to stop paving operations under adverse weather conditions. Mix that has been produced prior to the Superintending Officers directive to cease work may still be laid, but the risk shall remain with the contractor.

9.4 Protection of Drains & Removal of Debris

During the progress of the work the Contractor shall cover all drainage gullies and at the completion of the days work, remove all sweepings, spoil and excess or rejected material from the site to the satisfaction of the Superintending Officer. The disposal of such materials shall be in accordance with any requirements of Council and at the Contractors expense.

9.5 Traffic Management/Control

Traffic management can be a significant cost on any project but can vary in extremes depending on road layout and importance, and cannot be included in the tender price.

The Superintending Officer shall be responsible to provide traffic management to the requirements of the current version of the MRWA Traffic Management for Works on Roads Code of Practice. The Contractor and the Council have a duty of care to ensure safety of workers and public, and therefore the Contractor must bring any concerns regarding traffic management to the attention of the Superintending Officer. Works should not proceed until both parties have agreed on traffic management and site safety.

9.6 Joints

Unless otherwise directed by the Superintending Officer, longitudinal joints shall be:

- continuous and parallel;
- within 150mm of line of change in crossfall;
- offset by at least 150mm from joints in underlying layers;
- located away from traffic wheel paths; and
- located beneath proposed traffic line markings where feasible, in the case of a wearing course.

Where practical, adjacent paving runs will be completed to within 5 metres of each other daily. However where the paving thickness is equal to or less than 40mm longitudinal joints which are greater than 5 metres in length may be ramped down and milled out prior to continuing. This can also be done when the Contractor has been caught in the rain and is unable to square off the paving runs.

The Council will be responsible for the preparation of longitudinal joints where new work abuts old work such as that encountered in road widenings.

9.7 Survey Control

Where the Council has provided survey control, it shall be the Contractor's responsibility to ensure that the levels are maintained to within $\pm$ 10mm of the survey control points provided also that two consecutive survey points do not go from positive to negative or vice versa. Inability to maintain the required level may result in rejection of this section. The requirement of achieving level control may constitute a variation in rates.

9.8 Spreading and Compaction

Spreading and compaction of the asphalt shall be carried out in a manner such that the finished pavement meets this specification.

9.9 Precautions with Stone Mastic Asphalt (SMA)

SMA has high binder contents requiring manufacture to very high tolerances and non-standard compaction methods. In warmer weather SMA requires time to allow the mix to cool before opening to traffic. If the mix is not allowed to cool, traffic can cause excess bitumen to migrate to the surface of the matt and flushing can occur.

The Contractor shall ensure that sufficient time is left to allow the mix to cool to less than 60^{o}C prior to opening to traffic. The contractor together with Council should also consider: -

- Avoiding laying during very hot weather or consider laying at night.
- Heavy gritting if the pavement needs to be trafficked prior to cooling.

- Consider the use of PMB in extreme conditions such as roundabouts, heavily trafficked intersections and intersection approaches.

9.10 Delivery Dockets

A delivery docket showing the empty and loaded masses of the vehicle shall be handed to the Superintending Officer at the point of delivery by the Contractor's representative. In addition, the following written information shall be supplied:

- the date and time of loading;
- the name of the supplier;
- the identification number of the vehicle;
- the size and Marshall blows of the asphalt and the location reference of the plant at which the asphalt was manufactured
- the temperature of the asphalt.

10. ACCEPTANCE OF ASPHALT PAVEMENT

10.1 Grading And Bitumen Content

When the results of an individual test undertaken by the Council or the Contractor show that the mix does not meet the specification and where the Contractor has in place a Process Control System as part of an accredited Quality Assurance System, the Superintending Officer shall take into consideration the Process Control Records before deciding on a course of action.

If minor non-conformances are detected by either the Council's or the Contractor's testing, the Council may request that the Contractor produce evidence that corrective and/or preventative action, in accordance with their management systems have been taken in order to achieve specified requirements.

Table 9.1 provides a guideline for the treatment of more significant non-conformances of mix properties.

TABLE 9.1 – SUGGESTED ACTIONS FOR DEVIATIONS IN MIX PROPERTIES

Property	Deviation from Specified Limits in job mix	Action
Bitumen Content	>0.3% below minimum	A penalty equal to 4.8 x (%age below) x bitumen price per tonne is to be applied.
	> 0.5% below minimum	Negotiated settlement using dispute resolution or specialist technical advice at contractors cost. A penalty equal to 4.8 x (%age below) x bitumen price per tonne is to be applied should the mix be accepted.
	>0.3% above maximum	If air voids not are conforming, 5 yr written guarantee against flushing or shoving for all mixes.
Particle Size Distribution	Single Sieve: >5% on 2.36mm or greater >3% on 1.18mm or under	Seek 5yr written guarantee if air voids are conforming and bitumen film thickness < 7.5µm min.
	>10% Cumulative	
	Single Sieve: >8% on 2.36mm or greater	Negotiated settlement using dispute resolution or specialist technical advice at contactors cost

	>5% on 1.18mm or under >15% Cumulative	
Filler Content (75 micron)	>1.0% below minimum	Seek 5yr written guarantee if air voids are non-conforming.
	> 1.0% above maximum	Seek 5yr written guarantee if air voids are non-conforming and bitumen film thickness < 6.5µm min.

For conformance conditions that are not covered in the above table, a negotiated agreement may be reached which may necessitate the obtaining of expert advice from a mutually agreed source. The cost of providing expert advice shall be the responsibility of the Contractor.

Where a 5 year guarantee is applied, the terms of the guarantee shall be to the satisfaction of the Superintending Officer.

10.2 Marshall Characteristics

The Marshall characteristics of voids, stability, flow and quotient of a test lot when tested in accordance with the current Australian and/or Main Roads WA Standard, shall form part of the determination for quality level of the asphalt.

The Marshall quotient is the calculated ratio of stability to flow which represents an approximation of the ratio of load to deformation and may be used as a measure of the asphalt's resistance to permanent deformation under load.

10.3 Asphaltic Mat Voids

There are two considerations with voids in an asphalt mix, Marshall Voids and insitu voids. Marshall Voids are the voids in laboratory compacted asphalt samples, and the mix is designed to have specified air voids after 35,50 or 75 blows of a Marshall hammer on each face of a cylindrical sample. **Marshall voids are a property of the mix**. Insitu voids are the air voids determined by determining the difference between the maximum and filed density of the mix generally based on cores or non-destructive density testing. **Insitu voids are a property of the finished asphalt layer**. The results of air voids determined from cores taken from the field cannot be related to Marshall voids.
It should also be noted that excessively low insitu voids result in a risk of early deformation and/or flushing, however high insitu voids in an overlay, as distinct from structural layers, may have little bearing on the life of the surface.

10.3.1 Determination of characteristic insitu voids

The characteristic asphaltic mat voids is taken as the average insitu voids of a sample test lot. A test lot shall be a minimum of a 6 core sample set or a minimum of 6 determinations of density and voids determined by non destructive test methods. Where non destructive test methods are used, the method shall be approved by the Superintending Officer

Contractors, in collaboration with Councils are encouraged to work towards non-destructive density and in situ air void testing.

10.3.2 Outlying Core

Where the insitu voids of one (1) individual core only exceeds the average by more than a factor of 1.3 times the mean, it is likely that the core has been damaged and may not be representative of the voids at that location and may be deemed a suspect core.

At the discretion of the Superintending Officer the suspect core may be disregarded, and the average of the 5 core test lot used to determine the characteristic insitu voids.

Alternatively, the Superintending Officer may direct that two additional cores be cut 1m either side of the suspect core, and the mean density of these two cores be used in place of the suspect core density.

Where the additional cores confirm that the core is representative, it shall be included in the determination of mean density.

10.3.3 Conformance

The determination of Conformance, Conditional Conformance and Non-Conformance will be in accordance with Table 10.2.

TABLE 10.2 PAYMENT FACTORS FOR NON-CONFORMANCE IN ASPHALT MAT VOIDS

Mix specification	Conformance	Conditional conformance		
DGA 35 blow Marshall wearing course	2.5% - 8.0%	>8.0% - 10.0%	>10.0%	<2.5%
DGA AC 50 blow Marshall wearing course	3.5% - 11.0%	>11.0% - 12.0%	>12.0%	<3.5%
DGA RAC 50 blow Marshall wearing course	3.0% - 10.0%	>10.0% - 11.0%	>11.0%	<3.0%
DGA 75 blow Marshall wearing course	3.5% - 11.0%	>11.0% - 12.0%	>12.0%	<3.5%
SMA 50 blow Marshall wearing course	3.5% - 11.0%	>11.0% - 12.0%	>12.0%	<3.5%
DGA 75 blow Marshall intermediate course	3.0% - 7.0%	>7.0% - 8.0%	>8.0%	<3.0%
DGA 35 blow Marshall fatigue layer	1.5% - 7.0%	>7.0% - 8.0%	>8.0%	<1.5%
Pay factor	1.0	0.95	0.9	1.0 with 5 year warranty

No penalties shall be applied to Lateritic mixes for conditional conformance, and for non conformance the penalty shall be 0.95

10.4 Thickness

10.4.1 Recommended layer thickness

The recommended layer thickness for dense graded asphalt is a minimum of 3 to a maximum of 5 times the maximum nominal aggregate size.

The recommended layer thickness for open graded asphalt or stone mastic asphalt is a minimum of 4 to a maximum of 6 times the maximum nominal aggregate size.

In order to account for rapid temperature drop when thin layers are proposed, the minimum recommended layer thickness is 30mm. Where the Superintending Officer specifies a layer thickness of less than 30mm, the ability to achieve compaction is compromised and the accuracy of any core testing is suspect. For layers less than 30mm, conformance and conditional conformance shall be increased by 1%.

10.4.2 Determination of layer thickness

The nominal thickness (NT) of asphalt to be laid shall be specified by the Superintending Officer. It should be noted that the nominal thickness will be greater than the minimum desired thickness, and the Superintending Officer should specify a nominal thickness greater than the required minimum thickness taking into account the roughness of the surface to be overlaid.

On any specific occasion the Superintending officer may request the Contractor to try and achieve a required spread rate. After consultation and agreement between the Superintending Officer and Contractor's representative, the contractor shall make its best endeavour to achieve the required spread rate. Where the Superintending Officer has requested a specific spread rate, the Council shall take responsibility for the performance of such works.
Where the average thickness exceeds the nominal thickness by more than 15% excluding corrector, and the Contractor has not raised concerns regarding the existing pavement levels, the Council shall only be required to pay for that portion of the mix as determined by the following equation:

Area x 1.15Nt/1000 x 2.4 x tender rate for mix .

Where the average thickness is less than the nominal thickness by more than 10%, or an individual core is less than 20% of the nominal thickness, the Superintending Officer shall direct the Contractor to undertake one of the following actions:

1. Additional cores shall be taken to identify the extent of any thin lots, and the thin lot shall be overlaid or milled and replaced to the specified thickness
2. An overlay of the same mix type shall be laid, and the Contractor paid for the portion of the asphalt that raises the mean asphalt thickness to the nominal thickness plus 10%.
3. The Superintending Officer may agree a negotiated penalty withy the Contractor

In the case of non destructive testing, there is no method of determining the asphalt thickness at any specific location. Where non destructive testing is undertaken, the mean matt thickness shall be determined from the calculated volume and the measured area of the lot.

The mean density (tonnes/m^3) shall be determined from the non destructive test data. The nominal thickness (NT) shall be determined by the following formula:

$$NT = \frac{Tonnes\ laid\ /mean\ density}{Area\ of\ lot} \times 1000$$

10.5 Shape

Provided that the base pavement conforms with the requirements for the intermediate course as defined in Table 15 of AS 2150, the shape of the asphalt wearing course shall conform to the values as detailed in Table 15 of AS 2150.

11. PAYMENT

Payment shall be made on the basis of the actual mass of asphalt used unless the pavement is considered a conditional conformance or non-conformance pavement where a proportional factor shall apply. The final payment factor shall be the worst individual or lowest of all payment factors.

Payment shall be paid at the rate applicable for the job size as tendered in the Form of Tender plus price variations applicable at the time of laying the asphalt.

Where a job requires different asphalt mixes across the road surface, such as the case with red laterite cycle lanes and or medians, with granite running lanes, or bus bays, etc., each type of asphalt shall be considered as a separate job and payment shall be made at the rate applicable for tonnes of that mix laid. (eg if 270T of granite asphalt is laid, and 55T of laterite asphalt is laid, then the payment for the granite asphalt will be paid at the 200T-300T rate and the laterite asphalt at the 50T-100T rate)

12. GUIDE TO TENDER EVALUATION

Tenders will be evaluated such that the Council is most likely to receive best value for money from its Contractor. It is considered that the best value for money is derived from more than just the lowest price. Accordingly in the tender evaluation process Council will take the following into consideration: -

- Price
- Company experience
- Experience of key personnel
- Financial Stability
- Innovation
- Commitment to research and development
- Management Systems including
  - Quality
  - Safety
  - Environment

Appendix 1 – Variation to specification

Any changes to clauses, mix designs or any other special requirements are to be listed here

Appendix 2 – Table of Special Requirements

Clause	Description	Requirement
1.3	Extent of Work	
2.1	Aggregate Type – Granite, Diorite, or Basalt	
3.3	Alternative Mixes	

Appendix 3 – Asphalt mixes

3.1. DENSE GRADED: Highways, Arterial, Industrial and Distributor Roads

Property	Mix Designation		
	AC10	AC14	AC20
Grading Limits % passing AS Sieve			
26.5mm			100
19.0mm		100	90-100
13.2mm	100	85-100	75-90
9.5mm	90-100	70-85	60-80
6.7mm	70-90	62-75	50-70
4.75mm	58-76	53-70	40-60
2.36mm	40-58	35-52	25-43
1.18mm	27-44	24-40	18-35
600μm	17-35	15-30	14-27
300μm	11-24	10-24	9-21
150μm	7-16	7-16	6-15
75μm	4-7	4-7	3-7
Bitumen Content	5.0-7.0	4.5-6.5	4.0-6.0
Marshall Voids (%)	4.0-6.0	4.0-6.0	4.0-6.0
Voids in Mineral Aggregates (Min)	15	14	14
Refusal voids (350 cycles gyropac) 75 blow Marshal mixes only	2.5	2.5	2.5
Minimum Marshall 50 blow Stability 75 blow	6.5kN 8.0kN	6.5kN 8.0kN	6.5kN 8.0kN
Marshall Flow (mm)	2.0-4.0	2.0-4.0	2.0-4.0
Marshall Quotient (min) 50 blow (kN/mm) 75 blow	1.7 2.0	1.7 2.0	1.7 2.0

Recommendations for 20 year design traffic

Range/Type	Mix	Bitumen Type
Heavy truck traffic	75 blow	Class 320
Less than 2,000,000 ESA	50 blow	Class 170
Greater than 2,000,000 ESA	75 blow	Class 320
Maintenance	50 blow	Class 170
Intersections	75 blow	Class 320

3.2. DENSE GRADED: Residential Streets/Cul-de-sacs/Recreational areas

Property		Mix Designation			
		AC5	AC7	RAC10	RAC14
Grading Limits % passing AS Sieve					
19.0mm					100
13.2mm				100	90-100
9.5mm			100	95-100	70-90
6.7mm		100	80-100	80-95	62-75
4.75mm		85-100	70-90	65-80	47-67
2.36mm		55-75	45-60	45-60	34-52
1.18mm		38-57	35-50	35-50	25-41
600μm		26-43	22-35	25-40	16-32
300μm		15-28	14-25	15-25	9-21
150μm		8-18	8-16	7-15	5-13
75μm		4-11	5-8	4-7	4-7
Bitumen Content		5.0-7.0	5.0-7.0	5.0-7.0	4.5-6.5
Marshall Voids (%)	35 blow 50 blow	2.5-4.5 3.0-5.0	2.5-4.5 3.0-5.0	2.5-4.5 3.0-5.0	2.5-4.5 3.0-5.0
Voids in Mineral Aggregate (VMA) (%)	35 blow 50 blow	-	17	16	15
Minimum Marshall Stability	35 blow 50 blow	4.0kN 5.0kN	4.0kN 5.5kN	4.0kN 6.5kN	5.5kN 6.5kN
Marshall Flow (mm)	35 blow 50 blow	2.0-5.0 2.0-4.0	2.0-5.0 2.0-4.0	2.0-5.0 2.0-4.0	2.0-5.0 2.0-4.0
Marshall Quotient(min) (kN/mm)	35 blow 50 blow	1.0 1.7	1.0 1.7	1.0 1.7	1.0 1.7

Recommendations for 20 year design traffic

Range/Type	Mix	Bitumen Type
Greater than 500,000 ESA	Use distributor road mix	
Greater than 50,000 ESA	50 blow	Class 170
Less than 50,000 ESA	35 blow	Class 170
Maintenance	50 blow	Class 170

3.3. STONE MASTIC : Special applications

Property	Mix Designation			
	SMA 5	**SMA 7**	**SMA 10**	**SMA 14**
Grading Limits % passing AS Sieve				
26.5mm				
19.0mm				100
13.2mm			100	90-100
9.5mm		100	90-100	30-40
6.7mm	100	90-100	25-40	20-30
4.75mm	90-100	25-45	18-30	18-30
2.36mm	25-40	15-28	15-28	15-28
1.18mm	13-24	13-24	13-24	13-24
600μm	12-21	12-21	12-21	12-21
300μm	10-18	10-18	10-18	10-18
150μm	9-14	9-14	9-14	9-14
75μm	8-12	8-12	8-12	8-12
Bitumen Content	6.0-8.0	6.0-8.0	6.0-8.0	5.5-7.5
Marshall Voids (%) 50 blow	3.0-5.5	3.0-5.5	3.0-5.5	3.0-5.5
Voids at 80 Cycles of the Gyratory Compactor (%) (Mix Design Process only)	3.0-5.5	3.0-5.5	3.0-5.5	3.0-5.5
VMA (min) (%)	19	19	18	17
Binder Draindown (max) (%)	0.3	0.3	0.3	0.3
Cantabro Abrasion Unconditioned Loss (Max) (%) Conditioned	25 35	25 35	25 35	25 35

Recommendations:

Range/Type	Mix	Bitumen Type
Special applications requiring good, rut resistance and fatigue performance	50 blow	Class 320

3.4. DEEP LIFT: Special applications involving structural layers

Property	Mix Designation			
	AC14 Base Course	**AC20 Base Course**	**AC20 Intermediate Course**	**AC28 Base Course**
Grading Limits % passing AS Sieve				
37.5mm				100
26.5mm		100	100	90-100
19.0mm	100	90-100	90-100	73-88
13.2mm	85-100	71-86	71-86	58-76
9.5mm	70-85	58-75	58-75	47-67
6.7mm	62-75	46-64	46-64	37-58
4.75mm	53-70	37-55	37-55	30-50
2.36mm	35-52	24-42	24-42	20-37
1.18mm	24-40	15-32	15-32	13-28
600μm	15-30	10-24	10-24	9-22
300μm	10-24	7-17	7-17	6-16
150μm	7-16	4-12	4-12	4-10
75μm	4-7	3-6	3-6	3-6
Bitumen Content (%)	4-6	4.8-5.4	3.8-5.8	3-5
Marshall Voids (%) 75 blow	2.5-4.5	2.5-4.5	2.5-4.5	2.5-4.5
Voids at 350 Cycles of the Gyratory Compactor (%) (Mix Design Process only)	2.5	2.5	2.5	2.5
VMA (min) (%)	14	13	13	12
Minimum Marshall 75 blow Stability	8kN	8.0kN	8.0kN	8kN
Marshall Flow (mm) 75 blow	2.0-4.0	2.0-4.0	2.0-4.0 .0	2.0-4.0
Marshall Quotient(min) 75 blow (kN/mm)	2	2	2	2

Appendix 4 – Form of Tender

INSERT COUNCIL NAME AND LOGO

TENDER FORM FOR TENDER NO

for the SUPPLY and LAYING of HOT ASPHALT ROAD SURFACING

COUNCIL NAME
ADDRESS

I/We _____, the undersigned, offer, undertake and agree, to supply and deliver in accordance and conformity in all respects with the Technical Specification all such quantities as may be ordered by the Council, of those items for which a price has been tendered on the attached Schedule of Rates.

This offer shall be deemed a separate offer in respect to each price endorsed by me/us on the aforesaid Schedule and may be accepted in respect to any or all of the items for which a price has been tendered.

I/We acknowledge that no tender may be deemed to be accepted until the tenderer is so advised in writing. However, in the event of acceptance of any tender offered on attached Schedule, I/We, the undersigned, agree to attend at a time mutually agreed, but within 1 month of the Council's acceptance of tender, at the Council offices, for the purpose of signature to a Memorandum of Agreement to incorporate such tender as a binding contract.

SIGNATURE OF TENDERER: _____ DATE: _____

PRINT NAME: _____

ADDRESS: _____

_____ POST CODE _____

TELEPHONE: _____

Schedule of Rates

		JOB SIZE (TONNES)							
Mix Type	**Marshall Blow**	**0-10**	**10-20**	**20-50**	**50-100**	**100-200**	**200-300**	**300-400**	**400+**
AC20	50								
AC20	75								
AC14	50								
AC14	75								
RAC14	35								
RAC14	50								
AC10	50								
AC10	75								
RAC10	35								
RAC10	50								
AC7	35								
AC7	50								
AC5	35 (Handwork)								
AC5	50 (Handwork)								
SMA14	50								
SMA10	50								
SMA7	50								

Schedule of rates

WEEKEND OPENING FEE

Where the Superintending Officer has specifically programmed the works, the weekend and public holiday surcharge shall be a lump sum of:

$ _____

Where the Superintending Officer has specifically programmed the works, the night works surcharge shall be a lump sum of:

$ _____

SUPPLY ON COUNCIL TRUCKS EX-PLANT

Mix Type	Marshall Blow	Tender Price ($ / tonne)
AC14mm	35	
AC14mm	50	
AC14mm	75	
RAC14mm	35	
RAC14mm	50	
AC10mm	35	
AC10mm	50	
AC10mm	75	
RAC10mm	35	
RAC10mm	50	
AC7mm	35	
AC7mm	50	
AC5mm	50	
AC5mm	35	

SIGNATURE OF TENDERER _____

FOR _____