

Registration of Bituminous Mix Designs

1. Scope

This Code of Practice describes the process to be undertaken when registering bituminous mix designs to comply with the following VicRoads / Department of Transport (DoT) Standard Specification Sections for Roadworks and Bridgeworks:

- a) [Section 404 Stone Mastic Asphalt](#)
- b) [Section 405 Regulation Gap Graded Asphalt](#)
- c) [Section 407 Dense Graded Asphalt](#)
- d) [Section 417 Open Graded Asphalt](#)
- e) [Section 418 High Modulus Asphalt \(EME2\)](#)
- f) [Section 421 High Binder Crumb Rubber Asphalt](#)
- g) [Section 422 Light Traffic Crumb Rubber Asphalt](#)
- h) [Section 427 Bituminous Slurry Surfacing](#)

All mixes shall be designed in accordance with the appropriate test methods listed in VicRoads Code of Practice RC500.16 and any referenced Standard Specification Sections and Test Methods, and Australian Standard test methods. The order of precedence of VicRoads / DoT documents for mix designs are:

- Standard Specification Sections
- Codes of Practice
- Test Methods

Registration under this Code of Practice does not attest to the production, delivery, placement or compaction of the mix and does not guarantee the handling properties or performance of the mix.

All mixes shall be produced in compliance with Standard Specification Section 407. Failure to demonstrate production in accordance with the specification requirements may result in registrations being withdrawn.

The various types of bituminous mix are listed in Table 1.

2. Definitions

Stone Mastic Asphalt (SMA)

SMA is a gap graded wearing course mix with a high proportion of coarse aggregate which provides a textured surface and resistance to deformation. This asphalt incorporates a Polymer Modified Binder (PMB) which combines with the fines and filler to form a mastic that resists cracking.

Regulation Gap Graded Asphalt (RGGA)

RGGA is used as a thin regulating course under sprayed seals and asphalt overlays.

Dense Graded Asphalt (DGA)

DGA Types L, N, V, VP and H series mixes are primarily used for wearing and regulation courses, and Type S series mixes and EME2 are primarily used as structural mixes for intermediate and base courses. DGA's can be produced using either a hot mix or warm mix process.

Warm Mix Asphalt (WMA)

Asphalts incorporating warm mix technologies that allows the mix to be produced and placed at lower temperatures than conventional asphalts.

Open Graded Asphalt (OGA)

OGA is a wearing course principally used on freeways for its noise reduction properties and water spray reduction.

High Binder Crumb Rubber Asphalt (HBCRA)

An asphalt mix which has a high binder content and crumb rubber incorporated into the mix, which has a higher resistance to cracking.

Light Traffic Crumb Rubber Asphalt (LTCRA)

An asphalt mix which has crumb rubber incorporated into the mix, for use on light trafficked roads.

Bituminous Microsurfacing

A mixture of graded aggregate, PMB emulsion and water of sufficient fluidity to be capable of being screeded over a road surface in a very thin layer without the need for heating or use of mechanical compaction equipment.

Table 1 – Types of Bituminous Mixes	
Mix Designation	Description
Stone Mastic Asphalt	
SMAN	A Size 7 or 10mm asphalt wearing course with PMB for use in heavily trafficked pavements
SMAH	A Size 7 or 10mm asphalt wearing course with a heavily modified PMB for use in heavily trafficked intersections and pavements
Regulation Gap Graded Asphalt	
RGG	A Size 7mm or smaller asphalt regulating course
Dense Graded Asphalt	
L	A light duty Size 7 or 10mm wearing course with low air voids and higher binder content for use in very lightly trafficked pavements
N	A light to medium duty Size 7, 10 or 14mm wearing course or regulating course for use in light to moderately trafficked pavements
H	A heavy duty Size 7, 10 or 14mm asphalt wearing course or regulating course typically used in mid-block applications on moderate to heavily trafficked pavements
V	A heavy duty Size 10 or 14mm asphalt wearing course for moderate to heavily trafficked intersections
HP	A high performance Size 10 or 14mm heavy to very heavy duty wearing course asphalt incorporating a PMB typically used for use in mid-block applications where a high resistance to deformation and flexural cracking is required
VP	A high performance Size 14mm heavy to very heavy duty wearing course asphalt incorporating a PMB for use in heavily trafficked intersections where a high resistance to deformation and flexural cracking is required
SI	A multipurpose Size 14 or 20mm structural asphalt for intermediate course in heavy duty pavements or base course in medium duty pavements
SF	A fatigue resistant Size 20mm structural base course asphalt for heavy duty asphalt pavements with a total asphalt thickness of at least 175mm
SP	A high performance heavy to very heavy duty Size 20mm structural intermediate course asphalt incorporating a PMB for high resistance to deformation and flexural cracking
SS	A very stiff Size 20mm structural intermediate course asphalt sometimes used to increase pavement stiffness for very large scale heavy duty asphalt pavements
EME2	A high modulus structural intermediate or base course asphalt with a high resistance to deformation
Open Graded Asphalt	
OGA	A heavy duty Size 10mm non-structural asphalt wearing course with high air voids and PMB binder for use in high speed environments such as freeways/highways
Crumb Rubber Asphalt	
HBCRA	A specialised Size 10mm or 14mm asphalt wearing course or Size 20mm structural base course with a high binder content and crumb rubber incorporated into the mix for use in heavily trafficked pavements
LTCRA	A Size 7mm, 10mm or 14mm asphalt wearing course with crumb rubber incorporated into the mix for use in light trafficked pavements
Bituminous Microsurfacing	
	A Size 4,5,7 or 10mm mix for use as a regulating course or wearing course

3. Mix Design

Stone Mastic Asphalt (SMA)

SMA mix designs shall comply with the requirements of Standard Specification Section 404.05 Mix Design and 404.06 Mix Design Requirements.

Regulation Gap Graded Asphalt (RGGA)

RGGA mix designs shall comply with the requirements of Standard Specification Section 405.04 Mix Design and 405.05 Mix Design Requirements.

Dense Graded Asphalt (DGA)

For any given suite of dense graded mixes for any asphalt plant, excluding EME2, one of the following mix design methods shall be used:

- The Austroads Mix Design Method as described in RC201.12 Design of Asphalt Mixes (Gyratory Compaction Method) and RC201.13 Performance Properties of Asphalt Mixes; or
- The Marshall Mix Design Method as described in RC201.01 Design of Asphalt Mixes (Marshall Method)

DGA mix designs shall comply with the requirements of Standard Specification Section 407.

EME2 mix designs shall comply with the requirements of Standard Specification Section 418.

Open Graded Asphalt (OGA)

OGA mix designs shall comply with the requirements of Standard Specification Section 417.

High Binder Crumb Rubber Asphalt (HBCRA)

HBCRA mix designs shall be in accordance with Standard Specification Section 421.

Light Traffic Crumb Rubber Asphalt (LTCRA)

LTCRA mix designs shall be in accordance with Standard Specification Section 422.

Bituminous Microsurfacing

Mix designs shall be in accordance with Standard Specification Section 427.

4. Mix Registration

Applications to register a bituminous mix shall be submitted by the supplier to the DoT Asphalt Mix Mail Inbox (VicRoadsAsphaltMix@roads.vic.gov.au) at least two months prior to the proposed date for the commencement of supply of the mix and shall be accompanied by the information listed in Clause 5.

Mixes shall be current at the time of the commencement of the supply of the mix to a project.

The registration of a mix design shall remain current for a period of three (3) years subject to there being no changes to the source or grading of aggregate components, source of filler components, or the type of binder. All mix designs registered with DoT are issued a status according to compliance as:

- **General**
Complies with the requirements of this Code of Practice.
- **Conditional**
Mixes which do not comply with one or more aspects of the requirements of this Code of Practice but which are considered appropriate for use subject to conditions attached to the registration.
- **Expired**
Registered mixes that have passed their registration date, but details are retained for record purposes.

The supplier will be advised in writing of the result of the application to register a mix. The supplier shall nominate a mix identification number for each mix and this number shall be used to identify the mix for all future communications and for job records.

The mix identification number for mixes designed by the Austroads method shall include the suffix "(A)" and mixes designed by the Marshall method shall include the suffix "(M)".

In addition to the above, the mix identification number for Warm Mix Asphalt (WMA) shall include the suffix "(W)".

If a registered mix has unsatisfactory handling or field performance, the supplier may request DoT to deregister the mix. Alternatively, DoT may de-register the mix pending a review and immediately advise the supplier of action taken.

5. Information Required for Mix Registration

5.1 Dense Graded Asphalt

(a) Information Required

The following information shall be submitted for each new mix design:

- (i) Grading test results for each component
- (ii) Proportion of each component in the mix
- (iii) Grading of the mix
- (iv) Graphs of mix properties vs Bitumen Content for: Bulk Density, Max Density, Voids in Mineral Aggregate, Air Voids, and Binder Film Index
- (v) Unsound and marginal rock content of the coarse aggregate
- (vi) Flakiness Index of each separate coarse aggregate fraction of 10mm and above
- (vii) Degradation Factor and Plasticity Index for the crusher fines and manufactured sand components

- (viii) Sand Equivalent Value of washed sand and Plasticity Index of unwashed sand as applicable
- (ix) Class of binder and certificate of compliance
- (x) Source of added filler and certificate of compliance for added filler
- (xi) The Dry Compacted Voids of total combined filler
- (xii) Test information as shown in Table 2. For EME2 refer to Standard Specification Section 418
- (xiii) Recycled Asphalt Pavement (RAP) – refer to 5.1(d)
- (xiv) Name, source, nominated proportions and material properties of any additives

All test results shall be current at the time of submission of the mix design and shall not be greater than 12 months old.

All components of the asphalt mix shall comply with Standard Specification Section 407 or 418 clauses as appropriate.

Table 2 – Test Information to be Submitted for each Mix for Registration

Volumetric Tests	Bituminous Mix Size and Types	
	Austrroads Mixes	Marshall Mixes
Air Voids at Design Binder Content	All mixes Clause 6.1 (b) (i)	All mixes Clause 6.1 (b) (ii)
Air Voids at 250 Gyratory Cycles Clause 6.1 (b) Table 8	All mixes <u>except</u> Type L and SF mixes (to be reported)	All mixes <u>except</u> Type L and SF mixes (to be reported)
Voids in the Mineral Aggregate Clause 6.1 (b) Table 9	All mixes	All mixes
Bulk Density	All mixes	All mixes
Maximum Density (voids free density)	All mixes	All mixes
Minimum Binder Content Clause 6.1 (a) (v) Table 5	All mixes	All mixes
Binder Film Index Clause 6.1 (a) (vi) Table 7	All mixes	All mixes
Performance Tests	Austrroads Mixes	Marshall Mixes
Indirect Tensile Modulus Clause 6.1 (c) (i)	All mixes <u>except</u> Type L and N and 7 mm mixes	All mixes <u>except</u> Type L and N and 7mm mixes
Moisture Sensitivity Clause 6.1 (c) (ii)	All mixes <u>except</u> size 7mm mixes and Type L mixes	All mixes <u>except</u> size 7mm mixes, type SF mixes and Type L mixes
Wheel Tracking Depth Clause 6.1 (c) (iii)	All mixes <u>except</u> size 7mm mixes, Type L, N (incorporating C320 binder or RAP greater than 10%) and SF mixes	All mixes <u>except</u> size 7mm mixes, Type L, N (incorporating C320 binder or RAP greater than 10%) and SF mixes
Resistance to Fatigue Clause 6.1 (c) (iv)	Not applicable at this time pending further investigation	Not applicable at this time pending further investigation

(b) Binder used in Production

For asphalt types with no RAP or those containing RAP in accordance with RAP Level 1, the class of binder for each asphalt type shall be as shown in Table 3.

Table 3 - Class of Binder	
Asphalt Type	Binder Class
L	C170
N	C170 ⁽¹⁾ or C320 ⁽²⁾
H, V, SI and SF	C320
HP, VP and SP	A10E
SS	C600
EME2	15/25 penetration grade 10/20 penetration grade

Notes on Table 3

1. For mixes containing C170, up to 25% RAP may be used
2. For mixes containing C320, up to 10% RAP may be used

(c) Additional Information Required for Mixes Manufactured Using WMA Technology, Compaction aids or other additives

The following information is required for mixes manufactured using WMA technology, compaction aides or other additives.

- (i) WMA technology describing the process of manufacture.
- (ii) Name, source, nominated proportions and material properties of any additives.
- (iii) Where foaming technology is used, specify the target rate for water and the acceptable variation for production.
- (iv) Documentation that demonstrates proven field performance of the WMA technology for at least two (2) years including the details of the field validation site, mixture volumetrics and field density ratio. Trials undertaken through Austroads, DoT and other State Road Authorities will be accepted. International data will be considered.

Where the Supplier meets the requirements of this clause and those described in Clause 6.1, Warm Mix Dense Graded Asphalt mixes shall be registered as 'GENERAL'. The same WMA technology can also be extended to other asphalt mixes except for mixes incorporating PMB.

Where the Supplier cannot meet the requirements described in Clause 5.1 (c)(iv), DoT may permit the use of WMA. Additional testing, trials or validation of the mixes may be required. DoT may register the mix as 'GENERAL', once the proposed WMA technology has been successfully trialled in accordance with Clause 5 (c).

DoT may permit the use of any other new or untried WMA technologies including mixes incorporating PMB, subject to additional testing, trials or validation of the trial mixes and meeting the requirements as described in Clauses 5 (c), 6.1 and 6.2. These mixes shall be registered as "CONDITIONAL".

(d) Additional Information Required for Mixes Containing RAP

The following information is required for all asphalt mixes incorporating RAP:

- RAP nominal size and percentage of RAP used
- sieve analysis after extraction of binder;
- binder content of RAP; and
- RAP Management Plan and Inspection and Test Plan that meets the requirements of Standard Specification Clause 407.13.

In addition, for RAP Level 2 mixes, the following information is required:

- Virgin binder, RAP binder and binder blend viscosities

For RAP Level 2 mixes the blend of virgin and RAP binder shall be designed to have a viscosity at 60 °C that falls within the viscosity range in Table 407.132 for the binder specified in the nominated mix type. The components of the binder blend shall be determined according to AGPT/T193.

To achieve the targeted binder blend viscosity in the asphalt mix, a virgin binder class one grade lower than that specified in Table 3 may be used.

The viscosity of the virgin binder class used in the binder blend calculation may be determined using either AGPT/T192 or AS 2341.2. RAP binder characterisation and binder blend viscosity adjustments must be designed in accordance with Standard Specification Clause 407.13(e).

5.2 Information Required for Other Bituminous Mix Registrations

Stone Mastic Asphalt

Refer to Standard Specification Section 404.

Regulation Gap Graded Asphalt

Refer to Standard Specification Section 405.

Open Graded Asphalt

Refer to Standard Specification Section 417.

High Modulus Asphalt (EME2)

Refer to Standard Specification Section 418.

Bitumen Crumb Rubber Asphalt

Refer to Standard Specification Section 421.

Light Traffic Crumb Rubber Asphalt

Refer to Standard Specification Section 422.

Bituminous Microsurfacing

Refer to Standard Specification Section 427.

6. Test Properties Required for Bituminous Mixes

6.1 Dense Graded Asphalt

(a) Material Test Properties

(i) Grading of Aggregates

The proportions of aggregate and binder in the mix and the grading of aggregates including any added filler after mixing but before compaction, shall lie within the limits specified in Table 5 for each size of asphalt unless otherwise approved by DoT.

(ii) RAP - General Requirements

RAP must comply with the requirements of Standard Specification 407.

The incorporation of RAP in the design of asphalt mix VP, HP, SP, HBCRA and EME2 is not permitted.

Table 4 – Permitted RAP Content (% by mass)

Asphalt Type	RAP Level 1	RAP Level 2
L	Up to 25	-
N	Up to 10 ¹ Up to 25 ²	-
H	Up to 15	16 to 20
SI, SS	Up to 15	16 to 30
V	Up to 15	-
SF	Up to 15	16 to 40

Notes on Table 4

- For Type N mixes using C320 binder
- For Type N mixes using C170 binder

Table 5 – Grading Limits for Aggregates (including any filler)

Sieve Size AS (mm)	Percentage Passing (by mass)					
	Type N, V, VP, H Series and S Series				Type L	
	Size 7 Mix	Size 10 Mix	Size 14 Mix	Size 20 Mix	Size 7 Mix	Size 10 Mix
37.5						
26.5				100		
19.0			100	90 – 100		
13.2		100	85 - 100	75 - 88		100
9.5	100	90 – 100	70 - 84	61 - 75	100	90 – 100
6.70	80 - 100	70 – 86	59 - 73	49 - 64	80 – 100	70 – 90
4.75	70 - 88	58 – 73	48 - 65	41 - 55	70 – 90	58 – 76
2.36	46 - 65	38 – 55	32 - 48	27 - 41	45 – 65	40 – 58
1.18	31 - 51	25 – 44	22 - 37	18 - 33	34 – 55	27 – 48
0.600	20 – 40	16 – 34	14 - 28	12 - 25	22 – 45	17 – 38
0.300	13 – 29	10 – 24	10 - 22	8 - 19	14 – 33	11 – 26
0.150	8 - 17	6 – 16	6 - 14	5 - 13	8 – 18	7 – 18
0.075	5 - 8	4 – 7	4 - 7	3 - 6	5 – 8	4 – 7

(iii) Minimum Design Binder Content

The binder content shall comply with the requirements of Table 6.

	Size 7mm	Size 10mm	Size 14mm	Size 20mm
Binder	5.0	4.5	4.5	4.0

(iv) Binder Film Index

The binder film index shall comply with the requirements of Table 7.

Asphalt Type	Minimum Binder Film Index (micron)
N, H, , VP, SI, SS	8.0
V	7.5
L, HP & SP	8.5
SF	9.5

(v) **Added Filler**

Wearing Course

Wearing course asphalt shall contain a minimum of 1% added filler. Added filler shall comply with the requirements of Standard Specification Section 407. It may consist of hydrated lime, cement kiln dust, ground limestone, ground granulated blast furnace slag, Portland Cement or fly ash produced from the combustion of black coal but excludes crusher dust and plant recycled fines.

Acid Igneous Rocks

Any asphalt containing aggregates of coarse or medium grained acid igneous rocks (e.g. granite, adamellite, granodiorite, quartz porphyry) shall contain not less than 1% hydrated lime filler.

(b) Volumetric Test Properties

(i) **Austrroads Mix Design Method**

The laboratory compaction level and design air voids for all mixes shall comply with those specified in Table 8, using the same binder type used in production as the base binder.

The minimum Voids in the Mineral Aggregate (VMA) shall not be less than the limits specified in Table 9 and the Binder Film Index shall not be less than the limits specified in Table 7. The binder content for Type HP shall be derived from the air voids versus binder content plot for the three trial binder contents used to design the Type H mix at 120 gyratory compaction cycles.

Type SS shall be produced by direct substitution of the same mass of C600 binder for the C320 binder in the Type SI mix.

(ii) **Marshall Mix Design Method**

The test properties for Types L, N, V, VP, H and S Series mixes shall comply with Tables 7 and 9.

For Type H and SI mixes, the same binder type used in production shall be used in the base mixes for compliance with Table 9. The binder content of all other mixes may be derived from these mixes if they are the same in every respect other than binder class and content. All derived mixes must pass all other relevant volumetric test requirements for the mix using the production binder.

Type SF shall be derived from a Type SI asphalt mix with a design binder content of 1% by mass of total mix higher than the Type SI mix. Volumetric properties for the Type SF mix shall be derived for the specified increase in binder content.

Types HP and SP shall have a design binder content of 0.3% by mass of total mix higher than the Type H and Type SI mixes respectively. Volumetric properties for Types HP and SP shall be derived from the complying volumetrics Type H and SI mixes respectively, for the specified increase in binder content. Film index of Type HP and SP mixes shall comply with Table 7.

Type SS shall be produced by direct substitution of the same mass C600 binder for C320 binder in Type SI.

Table 8 - Compaction Cycles and Air Voids for the Mixes Designed by the Austrroads Method			
Asphalt Type	Gyratory Cycles to Achieve Design Aim for Air Voids (No.)	Design Air Voids⁽¹⁾ (%)	Minimum Air Voids at 250 Gyratory Cycles⁽²⁾ (%)
L	50	4.0	Not Applicable
N	80	4.0	To be reported
H	120	4.0	To be reported
V	120	5.0	To be reported
HP	120	3.0	To be reported
VP	120	4.0	To be reported
SI, SS	120	4.0	To be reported
SP	120	3.0	To be reported
SF	80	2.0	Not Applicable

Notes on Table 8

1. The design air voids values may be adjusted to account for rounding of the binder content to the nearest 0.1%
2. Also applies to mixes types designed by the Marshall Method

Table 9 – Air Voids and Voids in Mineral Aggregate for Mix Types Designed by the Marshall Method

Mix Size (mm)	Air Voids Range (%)						Minimum Voids in Mineral Aggregate (%) ⁽¹⁾						
	L	N & H	V	VP	SI	SS	L	N	H	V	VP	SI	SS
7	3.8 – 4.2	4.9 – 5.3	-	-	-	-	15	15	16	-	-	-	-
10	3.8 – 4.2	4.9 – 5.3	5.9 – 6.3	-	-	-	15	15	16	16	-	-	-
14	-	4.9 – 5.3	5.9 – 6.3	4.9 – 5.3	4.9 – 5.3	-	-	15	15	15	15	15	-
20	-	-	-	-	4.9 – 5.3	4.9 – 5.3	-	-	-	-	-	14	14

Notes on Table 9

- Also applies to mix types designed by the Austroads Mix Design Method

(c) Performance Test Properties

(i) Indirect Tensile Modulus Test Properties

The mean indirect tensile modulus of test specimens for each asphalt type listed in Table 10 shall be within the corresponding specified range.

Table 10 - Mean Indirect Tensile Modulus Limits ⁽¹⁾ (Gyratory Compaction)			
Asphalt Type	Nominal Size (mm)	Mean Indirect Tensile Modulus at 25°C (MPa)	
		Min	Max
H	10	2500	5500
H & SI	14	3000	6000
V	10 & 14	2500	5500
VP	14	1000	- ⁽²⁾
HP	10 & 14	1000	2500
SP	20	1000	2500
SI, SS	20	3500	7000
SF	20	3000	7000

Notes on Table 10

- Modulus test limits apply to gyratory compacted specimens compacted to 5% air voids within a tolerance of $\pm 0.5\%$ air voids.
- Value to be added in future revision

(ii) Moisture Sensitivity

The Wet Tensile Strength and the Tensile Strength Ratio shall comply with the requirements of Table 11.

Table 11 - Wet Tensile Strength and Tensile Strength Ratio ⁽¹⁾		
Asphalt Size & Type	Minimum Wet Tensile Strength (kPa)	Minimum Wet to Dry Tensile Strength Ratio
10N, 10H, 10V, 14N, 14H, 14V	850	80%
14SI, 20SI, 20SS	650	80%
10HP, 14HP, 14VP, 20SP	To be reported	80%

Notes on Table 11

- Test specimens shall be prepared using gyratory compaction to 8% air voids $\pm 1\%$ air voids.

(iii) Resistance to Deformation

The maximum Tracking Depth tested under the Austroads Wheel Tracking test method shall not exceed the values for asphalt mixes specified in Table 12.

Table 12 – Wheel Tracking Depth⁽¹⁾	
Asphalt Size and Type	Maximum Tracking Depth at 60°C (mm)
14V, 14HP, 14VP, 20SP	4.0
10HP, 20SI, 20SS	5.0
10V, 14N ⁽²⁾ , 14H, 14SI	7.0
10H & 10N ⁽²⁾	8.0

Notes on Table 12

1. Wheel track test specimens shall be compacted to 5% air voids ± 1% air voids.
2. For Type N mixes that contain C170 binder with less than 10% RAP

(iv) Resistance to Fatigue under Flexural Bending

Fatigue testing requirements will be included in a future revision based on the outcomes of further investigations.

6.2 Test Properties required for other Bituminous Mixes

Stone Mastic Asphalt

Refer to Standard Specification Section 404.

Regulation Gap Graded Asphalt

Refer to Standard Specification Section 405.

Open Graded Asphalt

Refer to Standard Specification Section 417.

High Modulus Asphalt (EME2)

Refer to Standard Specification Section 418.

High Binder Crumb Rubber Asphalt

Refer to Standard Specification Section 421.

Light Traffic Crumb Rubber Asphalt

Refer to Standard Specification Section 422.

Bituminous Microsurfacing

Refer to Standard Specification Section 427.

To receive this publication in an accessible format, please request using VicRoads online message feedback form.

VicRoads Code of Practice - Revision Summary
RC 500.01 - Registration of Bituminous Mix Designs

Date	Clause	Description of Revision	Authorised by
July 2021	Various	Update to Level 1 RAP content for Type N asphalt. Minor editorial changes and updates to Type H, V and VP asphalt definitions.	Principal Engineer – Pavements, Geotech. & Materials
April 2021	Various	Update to reflect change to RAP requirements for asphalt mixes, as specified in Section 407 (April 2021). Removal of multigrade binder, update to various definitions.	Principal Engineer – Pavements, Geotech. & Materials
November 2019	Various Table 4 Table 12	Inclusion of reference to Standard Specification Section 422 – Light Traffic Crumb Rubber Asphalt Various editorial changes, including table numbers and associated notes and order of precedence documents Removed fatigue testing requirement for conditional RAP Type N & H mixes Maximum tracking depth values revised to one decimal place.	Principal Advisor – Pavements Geotech. & Materials
December 2018	various	Various format and structural changes. Registration of other bituminous mixes included (UTA and Lean mix removed) Added 14VP and Size 7 mm SMA Table 1: Expanded definitions to bituminous mixes. VP and Size 7 mm SMA added. EME2 reclassified as DGA. Table 2: Removed 10 gyratory cycles, stability and flow. Revised testing requirements for various mixes. Table 3: Multigrade M500 replaces M1000. Added 15/25 penetration grade for EME2. Table 4: Particle loss required for SI. Particle loss removed for SF. Table 5: Removed aggregate proportion. Removed upper limit of bitumen content. Volumetric testing of the base mix will use production binder. VMA tolerance removed. Table 8: Removed 10 gyratory cycles. Added V & VP. Table 9: Removal of stability and flow. VMA reduced by 1% to account for the removal of the tolerance in 6.1 (b). Table 11: Moisture sensitivity testing extended to additional mixes Table 12: Revised wheel tracking limits for mixes. Removal of fatigue testing requirements pending further investigation. Table of acceptable warm mix technologies removed.	Principal Advisor – Pavements Geotech. & Materials
April 2016	various	Incorporation of EME2 references	Principal Advisor – Pavements Geotech. & Materials