

Index of Provisionally Approved Mix Designs
Anderson Asphalt Limited

I. Reclaimed Asphalt Pavement (RAP) Mix

Bituminous Material	HyD Mix No.	Supplier's Mix No.	Date of Design	Approval Date	Expiry Date
10mm Wearing Course	10WC/AND/TS/RAP30/001	10WC/AND/TS/RAP30/001	20-Feb-2024	24-May-2024	23-May-2027
20mm Wearing Course	20WC/AND/TS/RAP30/001	20WC/AND/TS/RAP30/001	22-Jan-2024	24-May-2024	23-May-2027
28mm Base Course	28BC/AND/TS/RAP30/001	28BC/AND/TS/RAP30/001	29-Jan-2024	24-May-2024	23-May-2027
37.5mm Base Course	40BC/AND/TS/RAP30/001	40BC/AND/TS/RAP30/001	05-Feb-2024	24-May-2024	23-May-2027
37.5mm Roadbase (recipe mix)	40RB/AND/TS/RAP15/001	40RB/AND/TS/RAP15/001	31-May-2024	--	--

II. Reclaimed Asphalt Pavement (RAP) with Lime Mix

Bituminous Material	HyD Mix No.	Supplier's Mix No.	Date of Design	Approval Date	Expiry Date
10mm Wearing Course	10WC/AND/TS/RAP15/HL/001	10WC/AND/TS/RAP15/HL/001	28-Dec-2023	24-May-2024	23-May-2027
20mm Wearing Course	20WC/AND/TS/RAP15/HL/001	20WC/AND/TS/RAP15/HL/001	18-Dec-2023	24-May-2024	23-May-2027
28mm Base Course	28BC/AND/TS/RAP15/HL/001	28BC/AND/TS/RAP15/HL/001	13-Dec-2023	24-May-2024	23-May-2027
37.5mm Base Course	40BC/AND/TS/RAP15/HL/001	40BC/AND/TS/RAP15/HL/001	02-Jan-2024	24-May-2024	23-May-2027

Bituminous Material	HyD Mix No.	Supplier's Mix No.	Date of Design	Approval Date	Expiry Date
10mm Wearing Course	10WC/AND/TS/RAP30/HL/001	10WC/AND/TS/RAP30/HL/001	11-Oct-2023	24-May-2024	23-May-2027
20mm Wearing Course	20WC/AND/TS/RAP30/HL/001	20WC/AND/TS/RAP30/HL/001	04-Oct-2023	24-May-2024	23-May-2027
28mm Base Course	28BC/AND/TS/RAP30/HL/001	28BC/AND/TS/RAP30/HL/001	26-Sep-2023	24-May-2024	23-May-2027
37.5mm Base Course	40BC/AND/TS/RAP30/HL/001	40BC/AND/TS/RAP30/HL/001	18-Oct-2023	24-May-2024	23-May-2027
37.5mm Roadbase (recipe mix)	40RB/AND/TS/RAP15/HL/001	40RB/AND/TS/RAP15/HL/001	31-May-2024	--	--

III. Polymer Modified Mix

Bituminous Material	HyD Mix No.	Supplier's Mix No.	Date of Design	Approval Date	Expiry Date
10mm Polymer Modified Friction Course	10PMFC/AND/TS/PG/001	10PMFC/AND/TS/PG/001	26-Feb-2024	24-May-2024	23-May-2027
3.35mm Polymer Modified Cushion Course	CC/AND/TS/PG/001	CC/AND/TS/PG/001	18-Mar-2024	24-May-2024	23-May-2027
10mm Polymer Modified Stone Mastic Asphalt	10PMSMA/AND/TS/PG/VIA/001	10PMSMA/AND/TS/PG/VIA/001	09-Jan-2024	24-May-2024	23-May-2027
6mm Polymer Modified Stone Mastic Asphalt	6PMSMA/AND/TS/PG/VIA/001	6PMSMA/AND/TS/PG/VIA/001	04-Mar-2024	24-May-2024	23-May-2027

IV. Highly Modified Mix

Bituminous Material	HyD Mix No.	Supplier's Mix No.	Date of Design	Approval Date	Expiry Date
10mm Highly Modified Friction Course	10HMFC/AND/TS/PG/001	10HMFC/AND/TS/PG/001	27-Nov-2023	24-May-2024	23-May-2027
10mm Highly Modified Stone Mastic Asphalt	10HMSMA/AND/TS/PG/VIA/001	10HMSMA/AND/TS/PG/VIA/001	20-Nov-2023	24-May-2024	23-May-2027

Remark: Mix design details are tabled in the appropriate spreadsheets.

Summary of Provisionally Approved Mix Designs
Anderson Asphalt Limited
(RAP Mix)

1. Source and Type of Constituent Materials :

Constituent Material	Source	Type
Bitumen	DongGuan TaiHe Asphalt Co., Ltd.	Grade 60/70 pen
Coarse Aggregate (retained on 5mm BS sieve)	Tai Sheng Quarry, China	Crushed rock (Granite)
Fine Aggregate (passing 5mm BS sieve)	Tai Sheng Quarry, China	Crushed rock (Granite)
Filler (passing 75 μ m BS sieve)	Tai Sheng Quarry, China	Crushed rock filler

2. Mix Designs :

Bituminous Material	10mm Wearing Course		20mm Wearing Course		28mm Base Course		37.5mm Base Course		37.5mm Roadbase (recipe mix)	
HyD Mix No.	10WC/AND/TS/RAP30/001		20WC/AND/TS/RAP30/001		28BC/AND/TS/RAP30/001		40BC/AND/TS/RAP30/001		40RB/AND/TS/RAP15/001	
Supplier's Mix No.	10WC/AND/TS/RAP30/001		20WC/AND/TS/RAP30/001		28BC/AND/TS/RAP30/001		40BC/AND/TS/RAP30/001		40RB/AND/TS/RAP15/001	
Date of Design	20-Feb-2024		22-Jan-2024		29-Jan-2024		05-Feb-2024		31-May-2024	
Approval Date	24-May-2024		24-May-2024		24-May-2024		24-May-2024		--	
Expiry Date	23-May-2027		23-May-2027		23-May-2027		23-May-2027		--	
	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Data	GS Requirement*
Binder content (%)	6.0	5.5 - 6.5	5.0	4.5 - 5.5	4.5	4.0 - 5.0	4.0	3.5 - 4.5	3.5	3.0 - 4.0
B.S. Sieve (mm)	% Passing		% Passing		% Passing		% Passing		% Passing	
50							100	100	100	100
37.5					100	100	99	95 - 100	99	90 - 100
28			100	100	96	92 - 100	91	84 - 98	93	70 - 94
20			99	95 - 100	87	80 - 94	76	69 - 83	81	62 - 84
14	100	100	89	82 - 96	77	70 - 84	66	59 - 73	--	--
10	99	95 - 100	80	73 - 87	68	61 - 75	57	50 - 64	65	49 - 67
5	69	62 - 76	61	54 - 68	42	35 - 49	40	33 - 47	47	37 - 55
2.36	51	44 - 58	46	39 - 53	31	24 - 38	30	23 - 37	35	27 - 43
1.18	38	31 - 45	34	27 - 41	23	16 - 30	23	16 - 30	--	--
0.60	26	21 - 31	25	20 - 30	17	12 - 22	18	13 - 23	18	13 - 28
0.30	18	13 - 23	17	12 - 22	12	7 - 17	13	8 - 18	12	7 - 21
0.15	13	10 - 16	13	10 - 16	9	6 - 12	10	7 - 13	--	--
0.075	7.1	5.1 - 9.1 10.1 [#]	7.6	5.6 - 9.6 10.6 [#]	5.9	3.9 - 7.9 8.9 [#]	7.0	5.0 - 9.0 10.0 [#]	4.8	2.0 - 8.0 8.0 [@]
	(including 30% RAP)		(including 30% RAP)		(including 30% RAP)		(including 30% RAP)		(including 15% RAP)	
	Marshall Properties		Marshall Properties		Marshall Properties		Marshall Properties		Marshall Properties	
Air voids in mix, VIM (%)	3.8	3.0 - 5.0	4.1	3.0 - 5.0	4.2	3.0 - 5.0	4.2	3.0 - 5.0	--	--
Voids in mineral aggregate, VMA (%)	16.6	≥ 16	14.8	≥ 14	14.0	≥ 13	13.2	≥ 12.5	--	--
Marshall stability (kN)	14.4	≥ 10	14.4	≥ 10	13.3	≥ 10	15.0	≥ 10	--	--
Flow (mm)	3.3	≤ 4.0	3.0	≤ 4.0	3.6	≤ 4.0	3.5	≤ 4.0	--	--

* For reference only

[#] The percentage passing the 0.075mm BS sieve shall not deviate from the approved design value by more than 3%.

[@] The percentage passing the 0.075mm BS test sieve shall not exceed 8.0%.

Summary of Provisionally Approved Mix Designs
Anderson Asphalt Limited
(RAP with Lime Mix)

1. Source and Type of Constituent Materials :

Constituent Material	Source	Type
Bitumen	DongGuan TaiHe Asphalt Co., Ltd.	Grade 60/70 pen
Coarse Aggregate (retained on 5mm BS sieve)	Tai Sheng Quarry, China	Crushed rock (Granite)
Fine Aggregate (passing 5mm BS sieve)	Tai Sheng Quarry, China	Crushed rock (Granite)
Filler (passing 75 μ m BS sieve)	Tai Sheng Quarry, China Hydrated lime - Sun Man Lee	Mixture of crushed rock filler and hydrated lime

2. Mix Designs :

Bituminous Material	10mm Wearing Course		20mm Wearing Course		28mm Base Course		37.5mm Base Course	
HyD Mix No.	10WC/AND/TS/RAP15/HL/001		20WC/AND/TS/RAP15/HL/001		28BC/AND/TS/RAP15/HL/001		40BC/AND/TS/RAP15/HL/001	
Supplier's Mix No.	10WC/AND/TS/RAP15/HL/001		20WC/AND/TS/RAP15/HL/001		28BC/AND/TS/RAP15/HL/001		40BC/AND/TS/RAP15/HL/001	
Date of Design	28-Dec-2023		18-Dec-2023		13-Dec-2023		02-Jan-2024	
Approval Date	24-May-2024		24-May-2024		24-May-2024		24-May-2024	
Expiry Date	23-May-2027		23-May-2027		23-May-2027		23-May-2027	
	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*
Binder content (%)	6.0	5.5 - 6.5	5.0	4.5 - 5.5	4.5	4.0 - 5.0	4.0	3.5 - 4.5
B.S. Sieve (mm)	% Passing		% Passing		% Passing		% Passing	
50							100	100
37.5					100	100	99	95 - 100
28			100	100	96	92 - 100	91	84 - 98
20			99	95 - 100	87	80 - 94	75	68 - 82
14	100	100	89	82 - 96	77	70 - 84	66	59 - 73
10	99	95 - 100	80	73 - 87	68	61 - 75	57	50 - 64
5	69	62 - 76	61	54 - 68	41	34 - 48	40	33 - 47
2.36	52	45 - 59	46	39 - 53	31	24 - 38	31	24 - 38
1.18	38	31 - 45	34	27 - 41	23	16 - 30	24	17 - 31
0.60	26	21 - 31	24	19 - 29	17	12 - 22	18	13 - 23
0.30	19	14 - 24	18	13 - 23	12	7 - 17	13	8 - 18
0.15	14	11 - 17	14	11 - 17	10	7 - 13	11	8 - 14
0.075	7.2	5.2 - 9.2 10.2 [#]	7.7	5.7 - 9.7 10.7 [#]	5.9	3.9 - 7.9 8.9 [#]	7.1	5.1 - 9.1 10.1 [#]
	(including 15% RAP & 1.5% hydrated lime)		(including 15% RAP & 1.5% hydrated lime)		(including 15% RAP & 1.5% hydrated lime)		(including 15% RAP & 1.5% hydrated lime)	
	Marshall Properties		Marshall Properties		Marshall Properties		Marshall Properties	
Air voids in mix, VIM (%)	3.8	3.0 - 5.0	3.8	3.0 - 5.0	4.0	3.0 - 5.0	4.1	3.0 - 5.0
Voids in mineral aggregate, VMA (%)	16.5	≥ 16	14.6	≥ 14	13.6	≥ 13	13.0	≥ 12.5
Marshall stability (kN)	11.8	≥ 10	13.8	≥ 10	13.0	≥ 10	14.4	≥ 10
Flow (mm)	3.0	≤ 4.0	3.1	≤ 4.0	3.2	≤ 4.0	3.2	≤ 4.0
Hydrated Lime (%)	1.5	≥ 1.5	1.5	≥ 1.5	1.5	≥ 1.5	1.5	≥ 1.5

* For reference only

[#] The percentage passing the 0.075mm BS sieve shall not deviate from the approved design value by more than 3%.

Summary of Provisionally Approved Mix Designs

Anderson Asphalt Limited

(RAP with Lime Mix)

1. Source and Type of Constituent Materials :

Constituent Material	Source	Type
Bitumen	DongGuan TaiHe Asphalt Co., Ltd.	Grade 60/70 pen
Coarse Aggregate (retained on 5mm BS sieve)	Tai Sheng Quarry, China	Crushed rock (Granite)
Fine Aggregate (passing 5mm BS sieve)	Tai Sheng Quarry, China	Crushed rock (Granite)
Filler (passing 75 μ m BS sieve)	Tai Sheng Quarry, China Hydrated lime - Sun Man Lee	Mixture of crushed rock filler and hydrated lime

2. Mix Designs :

Bituminous Material	10mm Wearing Course		20mm Wearing Course		28mm Base Course		37.5mm Base Course		37.5mm Roadbase (recipe mix)	
HyD Mix No.	10WC/AND/TS/RAP30/HL/001		20WC/AND/TS/RAP30/HL/001		28BC/AND/TS/RAP30/HL/001		40BC/AND/TS/RAP30/HL/001		40RB/AND/TS/RAP15/HL/001	
Supplier's Mix No.	10WC/AND/TS/RAP30/HL/001		20WC/AND/TS/RAP30/HL/001		28BC/AND/TS/RAP30/HL/001		40BC/AND/TS/RAP30/HL/001		40RB/AND/TS/RAP15/HL/001	
Date of Design	11-Oct-2023		04-Oct-2023		26-Sep-2023		18-Oct-2023		31-May-2024	
Approval Date	24-May-2024		24-May-2024		24-May-2024		24-May-2024		--	
Expiry Date	23-May-2027		23-May-2027		23-May-2027		23-May-2027		--	
	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Grading	GS Requirement*	Design Data	GS Requirement*
Binder content (%)	6.0	5.5 - 6.5	5.0	4.5 - 5.5	4.5	4.0 - 5.0	4.0	3.5 - 4.5	3.5	3.0 - 4.0
B.S. Sieve (mm)	% Passing		% Passing		% Passing		% Passing		% Passing	
50							100	100	100	100
37.5					100	100	99	95 - 100	99	90 - 100
28			100	100	96	92 - 100	91	84 - 98	93	70 - 94
20			99	95 - 100	87	80 - 94	76	69 - 83	81	62 - 84
14	100	100	89	82 - 96	77	70 - 84	66	59 - 73	--	--
10	99	95 - 100	80	73 - 87	68	61 - 75	57	50 - 64	65	49 - 67
5	69	62 - 76	61	54 - 68	42	35 - 49	40	33 - 47	47	37 - 55
2.36	51	44 - 58	46	39 - 53	31	24 - 38	30	23 - 37	35	27 - 43
1.18	38	31 - 45	34	27 - 41	23	16 - 30	23	16 - 30	--	--
0.60	26	21 - 31	25	20 - 30	17	12 - 22	18	13 - 23	18	13 - 28
0.30	18	13 - 23	17	12 - 22	12	7 - 17	13	8 - 18	12	7 - 21
0.15	13	10 - 16	13	10 - 16	9	6 - 12	10	7 - 13	--	--
0.075	7.3	5.3 - 9.3	7.8	5.8 - 9.8	6.0	4.0 - 8.0	7.2	5.2 - 9.2	5.0	2.0 - 8.0
		10.3 [#]		10.8 [#]		9.0 [#]		10.2 [#]		8.0 [@]
	(including 30% RAP & 1.5% hydrated lime)		(including 30% RAP & 1.5% hydrated lime)		(including 30% RAP & 1.5% hydrated lime)		(including 30% RAP & 1.5% hydrated lime)		(including 15% RAP & 1.5% hydrated lime)	
	Marshall Properties		Marshall Properties		Marshall Properties		Marshall Properties		Marshall Properties	
Air voids in mix, VIM (%)	3.4	3.0 - 5.0	4.1	3.0 - 5.0	3.9	3.0 - 5.0	4.1	3.0 - 5.0	--	--
Voids in mineral aggregate, VMA (%)	16.4	≥ 16	15.1	≥ 14	13.8	≥ 13	13.1	≥ 12.5	--	--
Marshall stability (kN)	11.6	≥ 10	14.5	≥ 10	13.4	≥ 10	12.5	≥ 10	--	--
Flow (mm)	3.5	≤ 4.0	3.0	≤ 4.0	3.6	≤ 4.0	3.5	≤ 4.0	--	--
Hydrated Lime (%)	1.5	≥ 1.5	1.5	≥ 1.5	1.5	≥ 1.5	1.5	≥ 1.5	1.5	≥ 1.5

* For reference only

[#] The percentage passing the 0.075mm BS sieve shall not deviate from the approved design value by more than 3%.

Summary of Provisionally Approved Mix Designs
Anderson Asphalt Limited
(Polymer Modified Mix)

1. Source and Type of Constituent Materials :

Constituent Material	Source	Type			
		10PMFC/AND/TS/PG/001	CC/AND/TS/PG/001	10PMSMA/AND/TS/PG/VIA/001	6PMSMA/AND/TS/PG/VIA/001
Bitumen	DongGuan TaiHe Asphalt Co., Ltd.	Grade PG76			
Coarse Aggregate (retained on 5mm BS sieve)	Tai Sheng Quarry, China	Crushed rock (Granite)	Not applicable	Crushed rock (Granite)	
Fine Aggregate (passing 5mm BS sieve)	Tai Sheng Quarry, China	Crushed rock (Granite)			
Filler (passing 75 μ m BS sieve)	Tai Sheng Quarry, China Hydrated lime - Sun Man Lee	Mixture of crushed rock filler and hydrated lime			
Fibre	JRS - VIATOP premium	Not applicable		Cellulose Fibre	

2. Mix Designs :

Bituminous Material	10mm Polymer Modified Friction Course		3.35mm Polymer Modified Cushion Course		10mm Polymer Modified Stone Mastic Asphalt		6mm Polymer Modified Stone Mastic Asphalt	
HyD Mix No.	10PMFC/AND/TS/PG/001		CC/AND/TS/PG/001		10PMSMA/AND/TS/PG/VIA/001		6PMSMA/AND/TS/PG/VIA/001	
Supplier's Mix No.	10PMFC/AND/TS/PG/001		CC/AND/TS/PG/001		10PMSMA/AND/TS/PG/VIA/001		6PMSMA/AND/TS/PG/VIA/001	
Date of Design	26-Feb-2024		18-Mar-2024		09-Jan-2024		04-Mar-2024	
Approval Date	24-May-2024		24-May-2024		24-May-2024		24-May-2024	
Expiry Date	23-May-2027		23-May-2027		23-May-2027		23-May-2027	
	Design Grading	PS Requirement*	Design Grading	PS Requirement*	Design grading	PS Requirement*	Design grading	PS Requirement*
Polymer modified binder content (%)	5.5	5.0 - 6.0	9.6	9.1 - 10.1	6.0	5.3 - 6.3	6.0	5.3 - 6.3
B.S. Sieve (mm)	% passing		% passing		% Passing		% Passing	
14	100	100			100	100	100	100
10	97	93 - 100			97	93 - 100	99	95 - 100
6.3	--	--	100	100	--	--	--	--
5	21	14 - 28	--	--	33	26 - 40	76	69 - 83
3.35	--	--	96	92 - 100	--	--	--	--
2.36	13	6 - 20	--	--	25	18 - 32	25	18 - 32
1.18	--	--	58	51 - 65	--	--	19	12 - 26
0.30	--	--	26	21 - 31	--	--	--	--
0.075	2.4	0.4 - 4.4 5.4 [#]	15.2	13.2 - 17.2 18.2 [#]	12.3	10.3 - 14.3 15.3 [#]	9.6	7.6 - 11.6 12.6 [#]
	(including 1.5% hydrated lime)		(including 2.0% hydrated lime)		(including 2.0% hydrated lime)		(including 2.0% hydrated lime)	
	Marshall Properties		Marshall Properties		Marshall Properties		Marshall Properties	
Air voids in mix, VIM (%)	22.2	≥ 20	--	--	4.3	3.5 - 4.5	8.3	7.0 - 10.0
Voids in mineral aggregate, VMA (%)	--	--	--	--	17.0	≥ 17	20.7	≥ 17
Marshall stability (kN)	--	--	--	--	10.9	≥ 6	7.7	≥ 6
Binder draindown (%)	--	--	--	--	0.0	≤ 0.3	0.0	≤ 0.3
Marshall quotient (kN/mm)	--	--	0.7	0.7 - 1.2	--	--	--	--
Binder drainage test	Pass	Tmax > Binder content	--	--	--	--	--	--

* For reference only

[#] The percentage passing the 0.075mm BS sieve shall not deviate from the approved design value by more than 3%.

Summary of Provisionally Approved Mix Designs
Anderson Asphalt Limited
(Highly Modified Mix)

1. Source and Type of Constituent Materials :

Constituent Material	Source	Type	
		10HMFC/AND/TS/PG/001	10HMSMA/AND/TS/PG/VIA/001
Bitumen	DongGuan TaiHe Asphalt Co., Ltd.	Polymer modified Super PG82	
Coarse Aggregate (retained on 5mm BS sieve)	Tai Sheng Quarry, China	Crushed rock (Granite)	
Fine Aggregate (passing 5mm BS sieve)	Tai Sheng Quarry, China	Crushed rock (Granite)	
Filler (passing 75 μ m BS sieve)	Tai Sheng Quarry, China Hydrated lime - Sun Man Lee	Mixture of crushed rock filler and hydrated lime	
Fibre	JRS - VIATOP premium	Not applicable	Cellulose Fibre

2. Mix Designs :

Bituminous Material	10mm Highly Modified Friction Course		10mm Highly Modified Stone Mastic Asphalt	
HyD Mix No.	10HMFC/AND/TS/PG/001		10HMSMA/AND/TS/PG/VIA/001	
Supplier's Mix No.	10HMFC/AND/TS/PG/001		10HMSMA/AND/TS/PG/VIA/001	
Date of Design	27-Nov-2023		20-Nov-2023	
Approval Date	24-May-2024		24-May-2024	
Expiry Date	23-May-2027		23-May-2027	
	Design Grading	PS Requirement*	Design grading	PS Requirement*
Highly modified binder content (%)	5.5	5.0 - 6.0	6.1	5.4 - 6.4
B.S. Sieve (mm)	% passing		% Passing	
14	100	100	100	100
10	97	93 - 100	97	93 - 100
5	21	14 - 28	33	26 - 40
2.36	13	6 - 20	25	18 - 32
0.075	2.4	0.4 - 4.4 5.4 [#]	12.3	10.3 - 14.3 15.3 [#]
	(including 1.5% hydrated lime)		(including 2.0% hydrated lime)	
	Marshall Properties		Marshall Properties	
Air voids in mix, VIM (%)	21.7	≥ 20	4.4	3.5 - 4.5
Voids in mineral aggregate, VMA (%)	--	--	17.2	≥ 17
Marshall stability (kN)	--	--	9.9	≥ 6
Binder draindown (%)	--	--	0.0	≤ 0.3
Binder drainage test	Pass	Tmax > Binder content	--	--

* For reference only

[#] The percentage passing the 0.075mm BS sieve shall not deviate from the approved design value by more than 3%.