



LEMBAR PERHITUNGAN

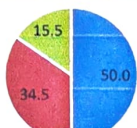
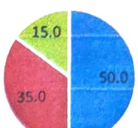
RAP	1000		ASPAL DI RAP		Kg	TOTAL RAP 488.3
	3.79%	17.81				
AGREGAT	94.10%		ADDITIVE RAP		Kg	
	94.10%	941	3.80%	0.68		
TOTAL	1000		0.54		Liter	
	1000		PLASTIK			
TOTAL	1000		6.00%	3.54	Kg	
	1000		ASPAL BARU			
TOTAL		1000		36.97	Kg	
TOTAL		1000	AGG. RAP		Kg	
TOTAL		1000	50%	470.5		
TOTAL		1000	AGG. BARU		Kg	
TOTAL		1000	50%	470.5		
TOTAL		1000	TOTAL		Kg	
TOTAL		1000	TOTAL			



REKAPITULASI HASIL PENGUJIAN

NAMA KEGIATAN : UJI COBA ASPAL LIMBAH (RECLAIMED ASPHALT PAVEMENT) DAN PLASTIK
NAMA SKPD : DINAS SUMBER DAYA AIR BINA MARGA DAN BINA KONSTRUKSI

1. KOMPOSISI CAMPURAN

NO.	AGREGAT (COLD BIN)				AGREGAT (HOT BIN)			
1	RAP			50.0 %	RAP			50.0 %
2	Screening			34.5 %	Hot Bin II			35.0 %
3	Spleet			15.5 %	Hot Bin III			15.0 %
Total				100.0 %	Total			100.0 %
					Kadar Aspal			5.9 %

2. GRADASI AGGREGAT

NO.	UKURAN SARINGAN (Inch)		3/4"	1/2"	3/8"	# 4	# 8	# 16	# 30	# 50	# 100	# 200
1	Cold Bin		100.00	97.80	83.44	56.05	40.03	29.74	23.11	17.26	12.34	6.38
2	Hot Bin		100.00	97.14	84.79	61.34	48.10	33.07	24.15	17.24	12.06	6.09
3	Spesifikasi	Min	100	90	77	53	33	21	14	9	6	4
		Maks	100	100	90	69	53	40	30	22	15	9

3. SIFAT CAMPURAN

NO.	PARAMETER PENGUJIAN	HASIL	SPESIFIKASI	SATUAN
1	Stabilitas Marshall	1152.55	Min.1000	Kg
2	Stabilitas Sisa (Retained Marshall Rendam 24 jam)	92.89	Min 90	%
3	Marshall Flow	3.63	2-4	mm
4	Marshall dibagi Flow (Marshal Quotient)	317.22	Min 250	Kg/mm
5	Rentang Kadar Aspal			%
6	Kadar Aspal	5.90		%
7	Tebal Film Aspal / Bitument Film Thicknees	8.79	min 8	µm
8	Rongga Dalam Campuran (VIM)	4.58	3-5	%
9	Rongga Dalam Campuran (VIM) PRD			%
10	Rongga Dalam Agregat (VMA)	17.31	Min 14	%
11	Rongga Terisi Aspal / Voids Filled Bitument	73.51	Min 65	%
12	Berat Jenis Bulk / Bulk Density	2.251		gr/cc
13	Rasio Abu Terhadap Aspal	1.031		

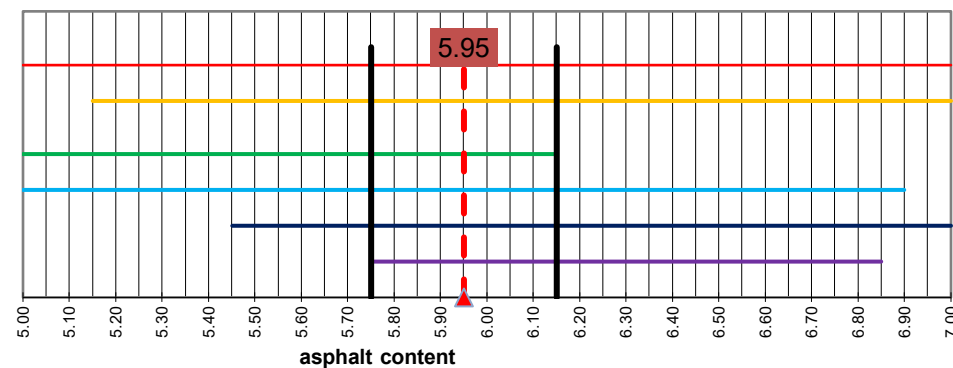
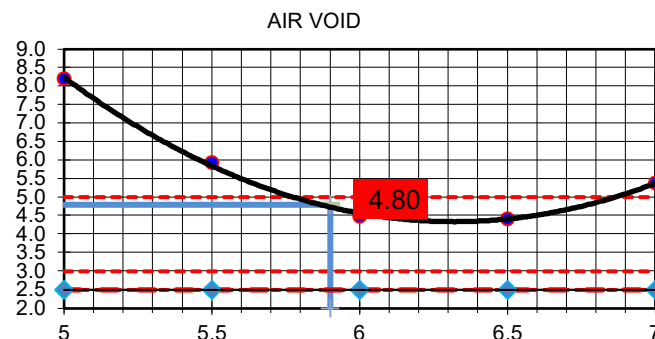
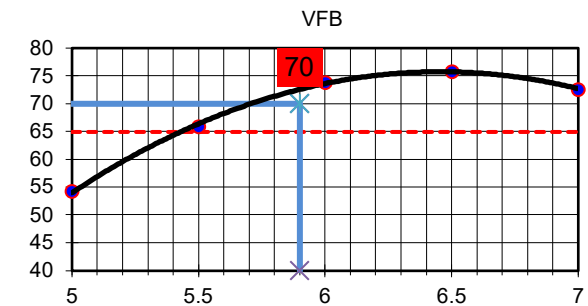
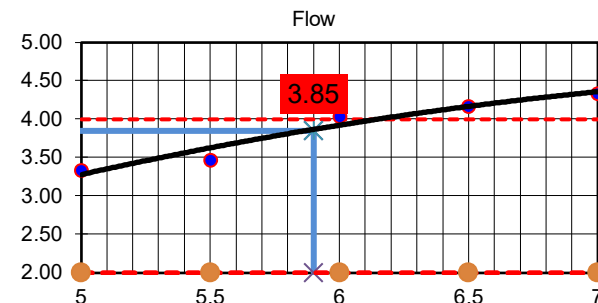
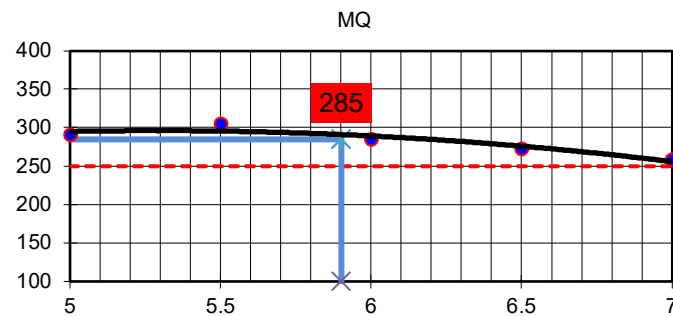
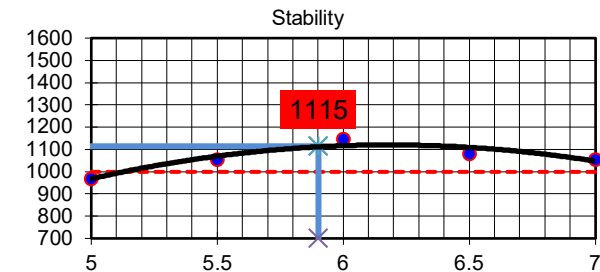
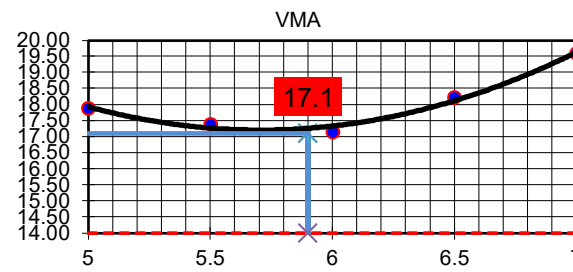
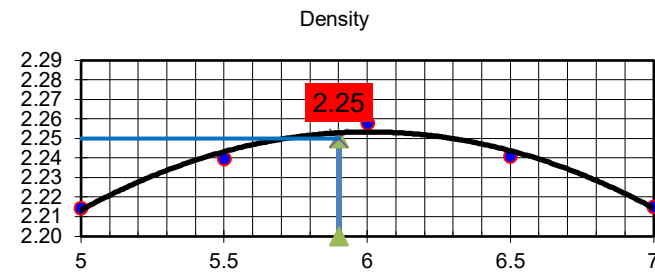
Catatan :



GRAFIK PENGUJIAN MARSHALL

Type : *ACWC RAP50 + Plastik*

NAMA KEGIATAN : UJI COBA ASPAL LIMBAH (RECLAIMED ASPHALT PAVEMENT) DAN PLASTIK
NAMA SKPD : DINAS SUMBER DAYA AIR BINA MARGA DAN BINA KONSTRUKSI



Dari Tarikan Grafik : 5,95%
Aspal Dipakai 5,90%

	LEMBAR PERHITUNGAN (ANALYSYS OF COMPACTED PAVING MIXTURE)																																																
NAMA KEGIATAN : UJI COBA ASPAL LIMBAH (RECLAIMED ASPHALT PAVEMENT) DAN PLASTIK																																																	
PENGGUNA JASA : DINAS SUMBER DAYA AIR BINA MARGA DAN BINA KONSTRUKSI																																																	
Sample : JMF						Date :																																											
Identification : Material Hot Bin						Done by : M. Utsman																																											
Type of Mix. : ACWC RAP50 + Plastik						Checked by : Heri Erwanto, S.T																																											
Item		Aggregate Proportion %	Bulk Specific Gravity	Apparent Specific Gravity		Mixture or Trial Number																																											
						Variasi Kadar Aspal				Kadar Aspal Optimum																																							
1		-	-	-	P ₁				-																																								
2	Hot Bin IV				P ₂				-																																								
3	Hot Bin III	35.0	2.574	2.628	P ₃	33.25	33.08	32.90	32.73	32.55	32.94																																						
4	Hot Bin II	15.0	2.597	2.663	P ₄	14.25	14.18	14.10	14.03	13.95	14.12																																						
5	Hot Bin I	50.0	2.544	5.147	P ₅	47.50	47.25	47.00	46.75	46.50	47.05																																						
6	Total Aggregate	G _s	2.562	3.489	P _s	95.00	94.50	94.00	93.50	93.00	94.10																																						
7	Asphalt Cement	G _b	1.034		P _b	5.00	5.5	6.0	6.5	7.0	5.9																																						
8	Bulk Specific Gravity (Gsb), total aggregate					2.562					2.562																																						
9	Apparent Specific Gravity (Gsa), total aggregate					3.489					3.489																																						
10	Max. Specific Gravity (Gmm), paving mix.					2.412	2.381	2.364	2.349	2.342	2.360																																						
11	Bulk Specific Gravity (Gmb), compacted mix.					2.214	2.240	2.258	2.241	2.215	2.252																																						
12	Effective Specific Gravity (Gse), total aggregate					2.594	2.576	2.576	2.576	2.588	2.566																																						
13	Effective Specific Gravity (Gse), Rata- Rata					2.582																																											
14	Absorbed Asphalt (Pba), % by wt. Total aggregate %					0.496	0.224	0.212	0.223	0.411	0.061																																						
15	Surface Area of aggregate (S.A.) kg/m ²					6.826																																											
		<table><tr><th>Sieve Size</th><th>Percent Passing</th><th>S.A. Factor</th><th>Surface Area</th></tr><tr><td>3/4"</td><td>100.00</td><td>0.41</td><td>0.410</td></tr><tr><td># 4</td><td>61.34</td><td>0.41</td><td>0.251</td></tr><tr><td># 8</td><td>48.10</td><td>0.82</td><td>0.394</td></tr><tr><td># 16</td><td>33.07</td><td>1.64</td><td>0.542</td></tr><tr><td># 30</td><td>24.15</td><td>2.87</td><td>0.693</td></tr><tr><td># 50</td><td>17.24</td><td>6.14</td><td>1.058</td></tr><tr><td># 100</td><td>12.06</td><td>12.29</td><td>1.482</td></tr><tr><td># 200</td><td>6.09</td><td>32.77</td><td>1.994</td></tr><tr><td colspan="2">TOTAL</td><td></td><td>6.826</td></tr></table>	Sieve Size	Percent Passing	S.A. Factor	Surface Area	3/4"	100.00	0.41	0.410	# 4	61.34	0.41	0.251	# 8	48.10	0.82	0.394	# 16	33.07	1.64	0.542	# 30	24.15	2.87	0.693	# 50	17.24	6.14	1.058	# 100	12.06	12.29	1.482	# 200	6.09	32.77	1.994	TOTAL			6.826							
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15	Effective Asphalt Content (Pbe) = $P_b - \frac{P_{ba} \times P_s}{100}$ %					4.53	5.29	5.80	6.29	6.62	5.84																																						
16	Voids in Mineral Aggregate (VMA) = $100 - \frac{G_{mb} \times P_s}{G_{sb}}$ %					17.89	17.39	17.15	18.22	19.60	17.29																																						
17	Air Voids (Va) = $100 \times \frac{G_{mm} - G_{mb}}{G_{mm}}$ %					8.19	5.93	4.48	4.59	5.42	4.57																																						
18	Voids Filled with Asphalt (VFA) = $100 \times \frac{VMA - Va}{VMA}$ %					54.22	65.90	73.88	74.81	72.35	73.57																																						
19	Bitument Film Thickness = $\frac{P_{be}}{P_s \times SA \times G_b}$ mm					6.76	7.93	8.74	9.53	10.09	8.79																																						

Penetrasi Aspal	60/70	Keterangan Kalibrasi proving Ring : 15.07 KG	VIM	VMA	VFB
Berat Jenis Aspal	1.030		$\frac{100 \cdot (E-K)}{E}$	$100 - \frac{(100-A)}{B} \times K$	$\frac{100 \cdot (M-L)}{M}$
BB Bulk Agregat	1.030		Rongga Campuran	Rongga Agregat	Rongga terisi Aspal
BD Effektive Agregat	2.562				

No	Kadar Aspal	Berat Jenis Total Agregat		GMM BD Maks Campuran	Berat Sample (gr)			Volume	BD Campuran	VIM	VMA	Rongga Terisi Aspal	Stability				Flow	Quotient Marshall	Absorbsi Aspal	Agregat Surface	Tebal Film Aspal
		Bulk	Eff.		Udara	Air	SSD						Bacaan dial	Adjust	Koreksi	Kg					
	%									%	%	%					mm		%		µm
	A	B	C	E	F	G	H	J=H-G	K=F/J	L	M	N	O			P	Q	R	S	T	U

PENAMBAHAN ADDITIVE 3,8 % (Perendaman selama 30 Menit)

1	5.9	2.562	2.566	2.360	1195.5	667.3	1198.4	531.1	2.251	4.60	17.32	73.43	80	1205.6	0.96	1157.4	3.8				
2	5.9	2.562	2.566	2.360	1198.3	669.3	1201.4	532.1	2.252	4.56	17.29	73.62	79	1190.5	0.96	1142.9	3.6				
3	5.9	2.562	2.566	2.360	1197.9	668.4	1200.5	532.1	2.251	4.59	17.31	73.48	80	1205.6	0.96	1157.4	3.5				
RATA-RATA				2.360					2.251	4.58	17.31	73.51				1152.55	3.63	317.2			

PENAMBAHAN ADDITIVE 3,8 % (Perendaman selama 24 Jam)

1	5.9	2.562	2.566	2.360	1198.3	669.2	1201.6	532.4	2.251	4.61	17.33	73.38	73	1100.1	0.96	1056.1	3.9				
2	5.9	2.562	2.566	2.360	1197.7	668.4	1200.6	532.2	2.250	4.63	17.34	73.33	73	1100.1	0.96	1056.1	3.9				
3	5.9	2.562	2.566	2.360	1199.2	670.4	1202.6	532.2	2.253	4.51	17.24	73.86	76	1145.3	0.96	1099.5	4.1				
RATA-RATA				2.360					2.252	4.58	17.30	73.53				1070.57	3.97	269.9			

KETERANGAN:

STABILITAS MARSHALL SISA RENDAMAN SELAMA 24 JAM DENGAN SUHU 60 °C ADALAH

= $\frac{1070.57}{1152.55}$: 92.89 %



PENGUJIAN BERAT JENIS AGREGATE (*Specific Gravity*)
SNI 03-1969-1990

NAMA KEGIATAN : UJI COBA ASPAL LIMBAH (RECLAIMED ASPHALT PAVEMENT) DAN PLASTIK
NAMA SKPD : DINAS SUMBER DAYA AIR BINA MARGA DAN BINA KONSTRUKSI

TYPE HOTMIX : ACWC RAP 50

AGREGAT RAP (HASIL EKSTRAKSI)

Hot Bin	No	Berat Material (Gr)					Berat Jenis Agregat Halus			
		SSD	Picno.	Di Udara	Picno. + Air	Picno. + Air + Sample	Bulk	App.	SSD	Absorpsi
		A	B	C	D	E	F	G	H	I
RAP	1	500.0		495.5	792.9	1098.1	2.544	2.604	2.567	2.669
	Rata-rata						2.544	2.604	2.567	2.669

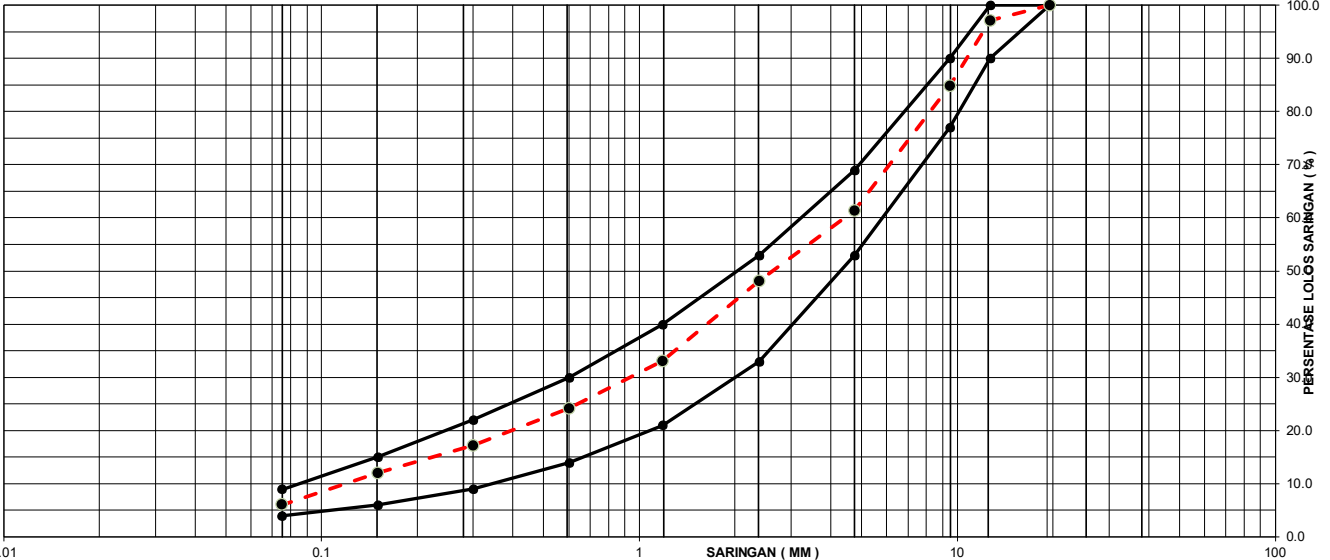
Aggregat Kasar

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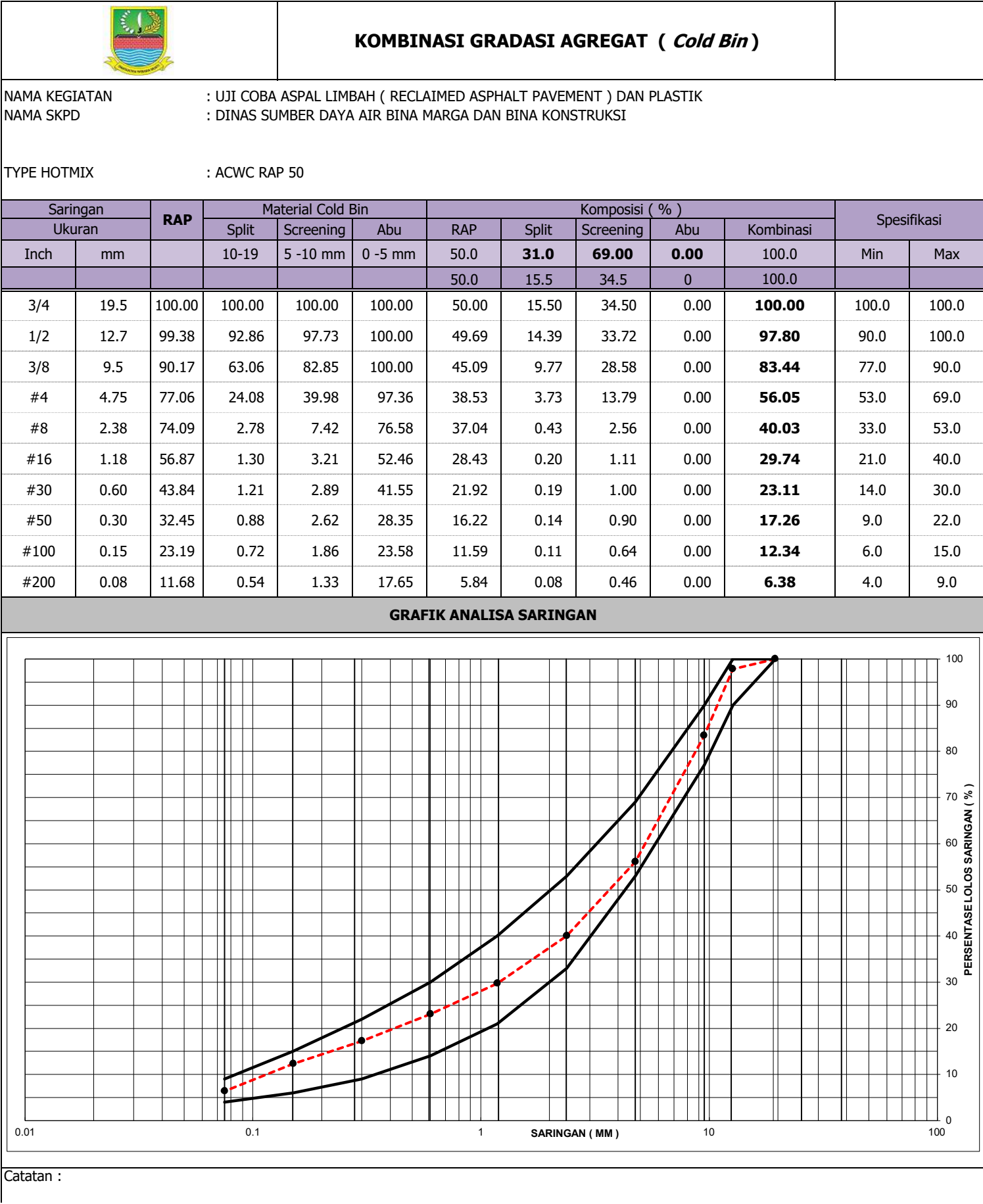
2. CALCULATION SPECIFIC GRAVITY

Aggregat		Berat Jenis Rata - Rata			Perhitungan Berat Jenis Dan ApSORBSI						
Hot Bin	%	Bulk	App.	Absorpsi	P/Q	Bulk	P/R	App.	Eff.	P / S	Absorpsi
						100/ΣR		100/ΣV	(U + W)/2		100/ΣY
	P	Q	R	S	T	U	V	W	X	Y	Z
I	50.0	2.544	2.604	2.669	19.657		19.203			18.731	
II	35.0	2.597	2.663	0.949	13.476		13.143			36.882	
III	15.0	2.574	2.628	0.805	5.828		5.708			18.636	
Total	100.0				39.0	2.567	38.1	2.628	2.597	74.2	1.347

Berat Jenis						
Bulk	Apparent	Effective				
2.567	2.628	2.597				

	KOMBINASI GRADASI AGREGAT (Hot Bin)															
NAMA KEGIATAN : UJI COBA ASPAL LIMBAH (RECLAIMED ASPHALT PAVEMENT) DAN PLASTIK																
NAMA SKPD : DINAS SUMBER DAYA AIR BINA MARGA DAN BINA KONSTRUKSI																
TYPE HOTMIX : ACWC RAP 50																
Ukuran		RAP	Hot Bin			RAP	1	2	3		Komb.	Spesifikasi		Ideal	Faktor	
Inch	mm		I	II	III	50.0	0.0	70.0	30.0		100.00	Min	Max	Spek.	Luas	
						50.0	0.0	35	15		100.00					
3/4	19.5	100.00	100.00	100.00	100.00	50.0	0.00	35.00	15.00		100.00	100.0	100.0	100.0		
1/2	12.7	99.38	100.00	100.00	83.01	49.7	0.00	35.00	12.45		97.14	90.0	100.0	95.0		
3/8	9.5	90.17	100.00	100.00	31.36	45.1	0.00	35.00	4.70		84.79	77.0	90.0	83.5	0.41	0.41
#4	4.75	77.06	94.02	64.91	0.60	38.5	0.00	22.72	0.09		61.34	53.0	69.0	61.0	0.41	0.25
#8	2.38	74.09	76.58	31.45	0.34	37.0	0.00	11.01	0.05		48.10	33.0	53.0	43.0	0.82	0.39
#16	1.18	56.87	52.46	13.26		28.4	0.00	4.64			33.07	21.0	40.0	30.5	1.64	0.54
#30	0.600	43.84	41.55	6.38		21.9	0.00	2.23			24.15	14.0	30.0	22.0	2.87	0.69
#50	0.300	32.45	28.35	2.90		16.2	0.00	1.01			17.24	9.0	22.0	15.5	6.14	1.06
#100	0.150	23.19	23.58	1.32		11.6	0.00	0.46			12.06	6.0	15.0	10.5	12.29	1.48
#200	0.075	11.68	14.57	0.71		5.8	0.00	0.25			6.09	4.0	9.0	6.5	32.77	1.99
																6.83
Tebal Film Aspal = $\frac{1000 \times (\text{Kadar Aspal} - \text{Absorp Aspal})}{\text{BD Aspal} \times \text{Faktor Luas} \times (100 - \text{Kadar Aspal})}$: 8.63 μm																
Kadar Aspal : 5.8 %																
Absorpsi : 0.06 %																
BD Aspal : 1.034 %																
																
Catatan :																







PENGUJIAN GRADASI AGREGAT (*COLD BIN*)

NAMA KEGIATAN : UJI COBA ASPAL LIMBAH (RECLAIMED ASPHALT PAVEMENT) DAN PLASTIK
NAMA SKPD : DINAS SUMBER DAYA AIR BINA MARGA DAN BINA KONSTRUKSI

TYPE HOTMIX : ACWC RAP 50

Cold Bin 1									Cold Bin 2								
Ukuran		Tanggal :			Tanggal :			Rata-rata	Ukuran		Tanggal :			Tanggal :			Rata-rata
		No : 1			No : 2						No :			No :			
		Berat : 1000.0 gram			Berat : 1000.0 gram						Berat : 1188.4 Gram			Berat : 1205.4 Gram			
		Tertahan		Lolos	Tertahan		Lolos				Tertahan		Lolos	Tertahan		Lolos	
Inc	mm	(Gram)	(%)	(%)	(Gram)	(%)	(%)	(%)	Inc	mm	(Gram)	(%)	(%)	(Gram)	(%)	(%)	(%)
1"	25							100.00	1"	25							
3/4"	19.1							100.00	3/4"	19.1			100.00			100.00	100.00
1/2"	12.7							100.00	1/2"	12.7	28.0	2.36	97.64	26.3	2.18	97.82	97.73
3/8"	9.53			100.00			100.00	100.00	3/8"	9.53	208.3	17.53	82.47	202.3	16.78	83.22	82.85
# 4	4.75	26.4	2.64	97.36	26.4	2.64	97.36	97.36	# 4	4.75	717.2	60.35	39.65	719.5	59.69	40.31	39.98
# 8	2.36	234.2	23.42	76.58	234.2	23.42	76.58	76.58	# 8	2.36	1095.2	92.16	7.84	1121.1	93.01	6.99	7.42
# 16	1.18	475.4	47.54	52.46	475.4	47.54	52.46	52.46	# 16	1.18	1149.7	96.74	3.26	1167.3	96.84	3.16	3.21
# 30	0.6	584.5	58.45	41.55	584.5	58.45	41.55	41.55	# 30	0.6	1153.0	97.02	2.98	1171.6	97.20	2.80	2.89
# 50	0.3	716.5	71.65	28.35	716.5	71.65	28.35	28.35	# 50	0.3	1156.8	97.34	2.66	1174.4	97.43	2.57	2.62
# 100	0.15	764.2	76.42	23.58	764.2	76.42	23.58	23.58	# 100	0.15	1165.2	98.05	1.95	1184.2	98.24	1.76	1.86
# 200	0.075	823.5	82.35	17.65	823.5	82.35	17.65	17.65	# 200	0.075	1172.7	98.68	1.32	1189.2	98.66	1.34	1.33
Cold Bin 3																	
Ukuran		Tanggal :			Tanggal :			Rata-rata	Ukuran		Tanggal :			Tanggal :			Rata-rata
		No :			No :						No :			No :			
		Berat : 2192.2 Gram			Berat : 1968.4 Gram						Berat :			Berat :			
		Tertahan		Lolos	Tertahan		Lolos				Tertahan		Lolos	Tertahan		Lolos	
Inc	mm	(Gram)	(%)	(%)	(Gram)	(%)	(%)	(%)	Inc	mm	(Gram)	(%)	(%)	(Gram)	(%)	(%)	(%)
1"	25								1"	25							
3/4"	19.1			100.00			100.00	100.00	3/4"	19.1							
1/2"	12.7	163.5	7.46	92.54	134.4	6.80	93.17	92.86	1/2"	12.7							
3/8"	9.53	805.8	36.76	63.24	730.9	37.10	62.87	63.06	3/8"	9.53							
# 4	4.75	1677.7	76.53	23.47	1482.6	75.30	24.68	24.08	# 4	4.75							
# 8	2.36	2131.7	97.24	2.76	1913.1	97.20	2.81	2.78	# 8	2.36							
# 16	1.18	2163.0	98.67	1.33	1943.6	98.70	1.26	1.30	# 16	1.18							
# 30	0.6	2165.9	98.80	1.20	1944.2	98.80	1.23	1.21	# 30	0.6							
# 50	0.3	2173.1	99.13	0.87	1950.9	99.10	0.89	0.88	# 50	0.3							
# 100	0.15	2175.5	99.24	0.76	1955.2	99.30	0.67	0.72	# 100	0.15							
# 200	0.075	2179.7	99.43	0.57	1958.4	99.50	0.51	0.54	# 200	0.075							
Ukuran		Tanggal :			Tanggal :			Rata-rata	Ukuran		Tanggal :			Tanggal :			Rata-rata
		No :			No :						No :			No :			
		Berat : Gram			Berat : Berat						Berat : gram			Berat : gram			
		Tertahan		Lolos	Tertahan		Lolos				Tertahan		Lolos	Tertahan		Lolos	
Inc	mm	(Gram)	(%)	(%)	(Gram)	(%)	(%)	(%)	Inc	mm	(Gram)	(%)	(%)	(Gram)	(%)	(%)	(%)
1"	25								1"	25							
3/4"	19.1								3/4"	19.1							
1/2"	12.7								1/2"	12.7							
3/8"	9.53								3/8"	9.53							
# 4	4.75								# 4	4.75							
# 8	2.36								# 8	2.36							
# 16	1.18								# 16	1.18							
# 30	0.6								# 30	0.6							
# 50	0.3								# 50	0.3							
# 100	0.15								# 100	0.15							
# 200	0.075								# 200	0.075							

CATATAN :



PENGUJIAN EKSTRAKSI

SNI 03-3640-1994

NAMA KEGIATAN : UJI COBA ASPAL LIMBAH (RECLAIMED ASPHALT PAVEMENT) DAN PLASTIK
NAMA SKPD : DINAS SUMBER DAYA AIR BINA MARGA DAN BINA KONSTRUKSI

MATERIAL : HASIL SCRAP

Deskripsi		Hasil Pengujian			
		1	2		
Berat sample mula-mula	A	808.2	750.5		
Berat filter mula-mula	B	8.8	8.8		
Berat sample setelah di ekstrak	C	775.4	719.7		
Berat filter setelah ekstrak	D	11	10.9		
Berat filler	E = (D-B)	2.2	2.1		
Berat Total Agregate	F = (E+C)	777.6	721.8		
Berat Aspal	G = A-F	30.6	28.7		
Kadar Aspal	KA=(A-F)/Fx100	3.79	3.82		

GRADASI EKSTRAKSI

Ukuran Saringan		No : _____			No : _____			Rata-rata
		Berat : 777.6 Kg			Berat : 721.8 Kg			
		Tertahan		Lolos	Tertahan		Lolos	
Inc	mm	(Gram)	(%)	(%)	(Gram)	(%)	(%)	
3/4"	19.1			100.00			100.00	100.00
1/2"	12.7	4.8	0.62	99.38	10.4	1.44	98.56	98.97
3/8"	9.53	76.4	9.83	90.17	76.7	10.62	89.38	89.78
# 4	4.75	178.4	22.94	77.06	178.1	24.67	75.33	76.19
# 8	2.36	201.5	25.91	74.09	195.0	27.02	72.98	73.53
# 16	1.18	335.4	43.13	56.87	318.7	44.15	55.85	56.36
# 30	0.6	436.7	56.16	43.84	401.5	55.63	44.37	44.11
# 50	0.3	525.3	67.55	32.45	492.7	68.26	31.74	32.09
# 100	0.15	597.3	76.81	23.19	556.2	77.06	22.94	23.06
# 200	0.075	686.8	88.32	11.68	628.8	87.11	12.89	12.28

GRAFIK GRADASI AGREGAT HASIL EKTRAKSI

