Much Asphalt (Pty), Ltd.
Central Laboratory

a SANAS Accredited Testing Laboratory, T0283

PO Box 49, Eersterivier, 7103
Ryneveld Street, Eersterivier, 7100

Tel: (021) 900-4400
Fax: (021) 900-4468
E-Mail: alec.rippenaar@murrob.com

Test Report Cover Page

Client's Name	*Much Asphalt Site Laboratory*
Address	*P.O Box 15287* *Bellair* *4006*
Attention	*Timothy Gradwell*

Our Ref:	*CL\09\M008*
Your Ref:	
Date	*30/03/2009*

Particulars of Sample

Description of Samples	*Various aggregate samples and Bitumen for mix design*
Condition of Samples	*Good*
Date Received	*January - March 2009*
Sampling Procedure	*Sampled by Coedmore Staff*

SANAS Accredited Test Methods	*TMH1 : B3;TMH1 : B4; TMH1 : B14 & B15; TMH1 : C1; TMH1 : C2; TMH1 : C3; TMH1 : C4; TMH1 : C5; TMH1 : C7 (b); TMH1 : C12 T ASTM-D5; IP 49;ASTM-D36; ASTM 4402' SANS 838*

NON- Accredited Test Methods **	*GYRATORY TEST; ASTM: C1252-93; AASHTO: TP33* [1]

Deviations, Exclusions or Additions or Irregularities Observed:
None

1. All measuring equipment used are traceable to National Standards where applicable .
2. This report is a true record of all measurements made and may not be reproduced other than in full except with the written approval of the Laboratory Manager.
3. Results reported in this Report, relate only to the samples tested.

Remarks
*Please note that the the Gyratory Test(marked with **) are not SANAS Accredited.*

Authorised Signatory	*HJ Appollis*	**Date:**	*30/03/2009*
Designation	*Reg Technical Manager*		

SANAS Disclaimer:
Tests marked “Not SANAS Accredited” in this Report are not included in the SANAS Schedule of Accreditation for this laboratory.
Opinions and interpretations expressed herein are outside the scope of SANAS accreditation.

Much Asphalt (Pty) Ltd., Coedmore

Asphalt Mix Design

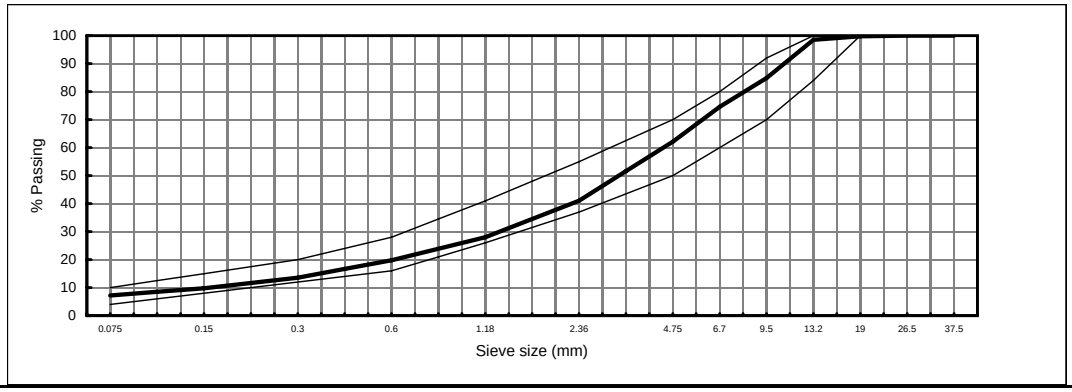
Mix Type Type D + 10% Rap

Ref Number CL/09/M008

Date 14/03/2009 **Report Ref Number:** CL/09/M008

Aggregates		
Number	**Nominal size**	**Description and Source**
1 (CL/0029)	13.2mm Stone	Crushed stone ex Afrisam Quarry
2 (CL/0030)	6.7mm Stone	Crushed stone ex Afrisam Quarry
3 (CL/0033)	Crusher dust	Crusher Dust ex Lafarge Quarry- Ridgeview
4 (CL/0073)	C/dust hotbin	Crusher Dust hotbin ex Plant
5 (CL/0034)	Sand	Sand ex Multi Sand
6 (CL/0327)	Rap	Rap ex Durban Corporation
Fillers		
Number	**Type**	**Description and Source**
7 (CL/0036)	Lime	Hydrated Lime

	Sieve Analysis and % Passing											
	Aggregates							Fillers			Combined Grading	Specification
Sample Number	**1**	**2**	**3**	**4**	**5**	**6**		**7**				
% In Mix	**24%**	**17%**	**29%**	**14%**	**5%**	**10%**		**1%**			**100.0%**	
37.5												
26.5						100						
19.0	100					98					**100**	**100 - 100**
13.2	95					97					**99**	**84 - 100**
9.5	42	100	100			88					**85**	**70 - 92**
6.7	13	88	99	100	100	78					**75**	
4.75	9	34	95	97	99	71					**62**	**50 - 70**
2.36	6	2	69	60	91	53					**41**	**37 - 55**
1.18	5	1	48	32	67	39					**28**	**26 - 41**
0.600	5	1	36	17	32	30					**20**	**16 - 28**
0.300	4	1	26	9	8	22		100			**14**	**12 - 20**
0.150	3	1	20	4	1	15		98			**10**	**8 - 15**
0.075	2.5	0.7	14.7	2.2	0.4	10.5		86.5			**7.2**	**4 - 10**
BRD of Aggregate	2.670	2.569	2.656	2.667	2.619	2.643		2.312			**2.640**	
Flakiness Index %	24.5	39.5										
LUW	1435	1326	1672	1646	1541							
RUW	1586	1468	1862	1812	1686							
Sand Equivalent %			25	79	91							
Water Absorption %	0.7	1.2	1.0	0.8	0.3							

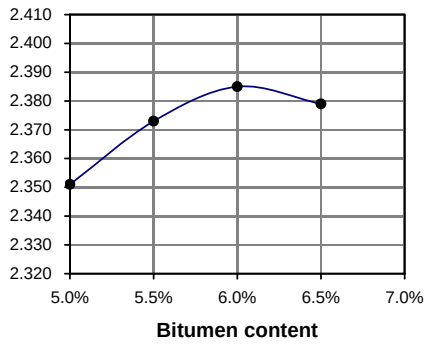


MIX TYPE Type D + 10% Rap

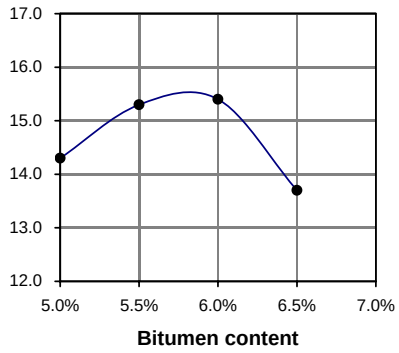
REF NUMBER CL/09/M008

Binder		
Grade: 40/50 Pen	Bulk Relative Density	**1.025**
Source : Sapref	Mixing Temperature :	**165 °c**
Penetration: 44	Compaction Temperature:	**145 ° c**
Sample No. CL/0037	**Brookfield Viscosity @ 60º C = 326.5 Pa.s**	
Softening Point: 51.1 ºc	**Brookfield Viscosity @ 135º C = 0.462 Pa.s**	

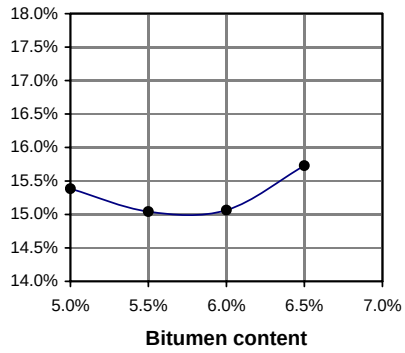
Bulk Relative Density



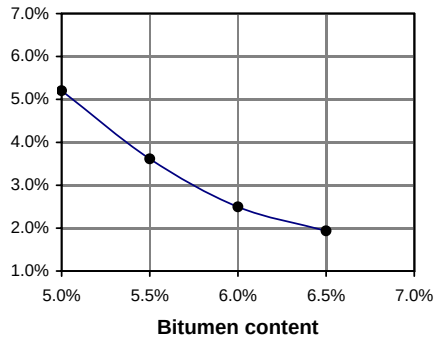
Stability



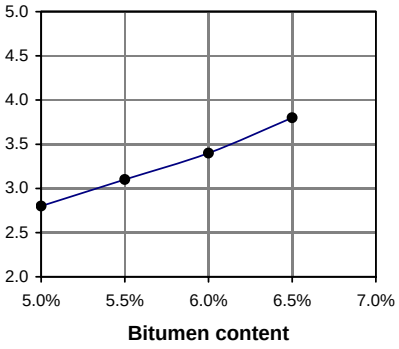
VMA



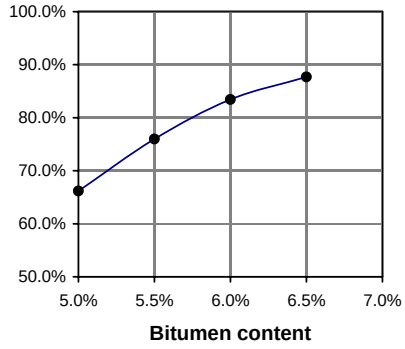
Voids in Mix



Flow



V.F.B



Binder Content	**%**	**5.0%**	**5.5%**	**6.0%**	**6.5%**			**5.0%**
Bulk Relative Density		2.351	2.373	2.385	2.379			
Max. Theor. Density		2.480	2.462	2.446	2.426			
Voids in Mix	**%**	5.2%	3.6%	2.5%	1.9%			**5.2%**
VMA	**%**	15.4%	15.0%	15.1%	15.7%			
V.F.B	**%**	66.2%	76.0%	83.4%	87.7%			
Stability	**kN**	14.3	15.3	15.4	13.7			
Flow	**mm**	2.8	3.1	3.4	3.8			
Stability/Flow Ratio		5.1	4.9	4.5	3.6			
Film Thickness	**µ**	7.1	7.9	8.7	9.6			
Binder Absorption	**%**	0.6%	0.6%	0.6%	0.6%			
Air Permeability @ 7% Voids	**CM²**							
Dynamic Creep @ 40ºc	**mPa**							
Indirect Tensile Strength @ 25ºc	**kPa**							
Filler/Bitumen Ratio		1.4	1.3	1.2	1.1			
Voids @ 300 Gyrations	**%**							
Modified Lotman*TSR								