THE UNIVERSITY OF THE WEST INDIES

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Mr. Danny Gokool 17-10-11
Managing Director
Danny's Enterprises Ltd.
Claxton Bay
Trinidad and Tobago, W.I.

Dear Mr. Gokool,

PANAMA COLD ASPHALT MIX ANALYSIS: REPORT
SAMPLE: OCTOBER 2011 PRODUCTION

Please find attached (Attachment #1) the results of the Cold Asphalt Mix analysis requested by your company on one bulk sample of cold asphalt mix produced at your Claxton Bay Plant and delivered to our laboratory on the same day on the 04-10-2011.
The evaluation of the mix was done in accordance with ASTM standard methods of test, and the specification ASTM D4215 Cold Mix Cold Laid Paving Mixtures was used as a guide. The properties analysed are summarised in Table 1 below with specification values shown in brackets.

Table 1: Summary of Cold Asphalt Mix Test Results

Property	Result
Gradation (ASTM C136/D422)	Conforms to ASTM D3515, 12.5 mm nominal mix, and to TTCB HMA2 Schedule 20, Govt. Of Trinidad and Tobago (See Attachment #1)
Coated Particles (ASTM D24890), %	100 (100)
Asphalt Content (ASTM D2172), %	6.3
Maximum Theoretical Specific Gravity (ASTM D2041)	2.469
Marshall Properties (ASTM D1559)	
Air Void Content (ASTM D3203), %	3.1 (3 to 5)
Percent Compaction, %	96.9 (95 % Min)
Stability, kg	8,640 (8000 min)
Flow, mm	2.62 (2 to 4)

Please contact us for any clarification you may require.
Sincerely,

Raymond Charles

Raymond Charles, F.I.C.E., R.Eng.

ATTACHMENT# 1

Project : ***Panama Export Cold Mix Analysis***

Client : ***Super Pave Ltd, Claxton Bay, Trinidad and Tobago, W.I.***

Source: ***Production Plant, October 2011***

Tested By : ***EO*** Checked By : ***RC***

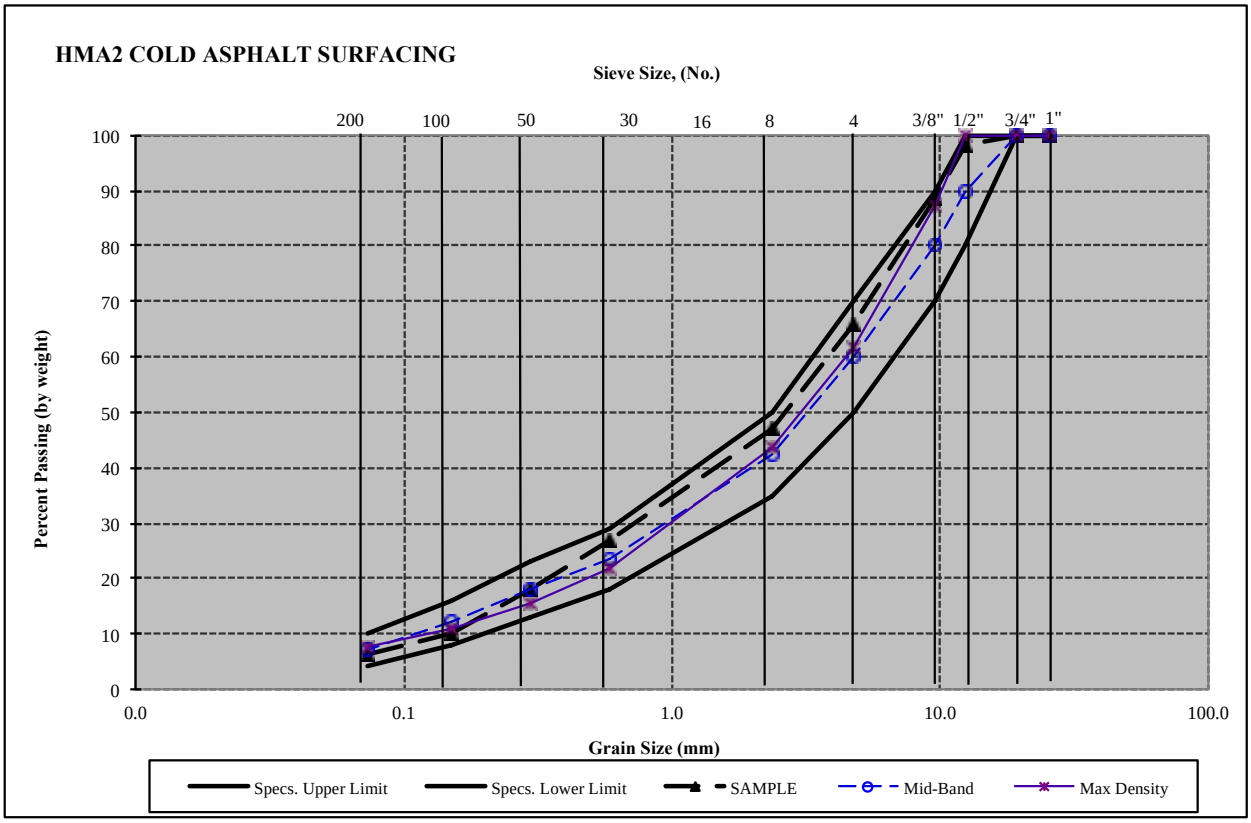
Date: ***12/10/2011***

Remarks : **HMA 2 Cold Asphalt Mix Surfacing Blend**

GRADATION ANALYSIS (ASTM C136/D422)

Percent (by weight) Passing Through Sieve (%)

Item	Sieve Size mm	1"	3/4"	1/2"	3/8"	No. 4	No. 8	No. 30	No. 50	No. 100	No. 200
		25.40	19.05	12.50	9.53	4.75	2.38	0.59	0.30	0.150	0.074
Specs. Upper Limit		100.0	100.0	100.0	90.0	70.0	50.0	29.0	23.0	16.0	10.0
Specs. Lower Limit		100.0	100.0	80.0	70.0	50.0	35.0	18.0	13.0	8.0	4.0
SAMPLE		**100.0**	**100.0**	**98.3**	**88.7**	**65.7**	**47.2**	**26.8**	**18.1**	**10.2**	**6.1**
Specs Mid Band		100.0	100.0	90.0	80.0	60.0	42.5	23.5	18.0	12.0	7.0
Maximum Density		100.0	100.0	100.0	87.3	61.6	43.6	21.7	15.4	10.9	7.7



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BITUMEN EXTRACTION (ASTM D2172)			
SPECIMEN	**No.1**	**No.2**	**Average**
WEIGHT OF MIX (gms)	1500.0	1500.0	1500.0
WEIGHT OF AGGREGATE (gms)	1405.8	1406.2	1406.1
WEIGHT OF BITUMEN (gms)	94.2	93.8	94.0
% BITUMEN BY WEIGHT OF MIX:	6.28	6.25	6.3

Note: Sample prepared according to Note.5, ASTM D4215

MAXIMUM THEORETICAL SPECIFIC GRAVITY	
(MTSG - ASTM D2041)	
WT. BOTTLE + WATER + SAMPLE (gms)	2131.1
TEMPERATURE OF SUSPENSION (T, in deg.C)	25.00
WT. BOTTLE + WATER AT Temp. T	1833.60
DRY WT. MIX (gms)	500.000
MTSG	2.469

Note: Tested on Marshall sample 19-02-10

PERCENTAGE OF COATED PARTICLES			
(ASTM D2489)			
Sample 1, %:	100		
Sample 2, %:	100		

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MARSHALL VOIDS AND STABILITY (ASTM D1559)

7	Dry Specific Gravity of Coarse Aggregate	gr/cc.	2.651	2.651	2.651	
8	Apparent Specific Gravity of Coarse Aggregate	gr/cc.	2.719	2.719	2.719	2.685
9	Specific Gravity of Sand	gr/cc.	2.621	2.621	2.621	
10	Apparent Specific Gravity of Sand	gr/cc.	2.645	2.645	2.645	2.633
11	Apparent Specific Gravity of Filler	gr/cc.				
12	Height of Sample	cm.				
13	Weight of Sample in Air	gr.	1190.70	1195.20	1195.60	
14	SSD Weight of Sample	gr.	1191.00	1195.60	1196.00	
15	Weight of Sample in Water	gr.	693.60	695.70	696.40	
16	Volume of Sample	c.c	497.40	499.90	499.60	
17	Sample Specific Gravity	gr/cc.	2.394	2.391	2.393	2.393
18	Maximum Theoretical Specific Gravity (MTSG)	gr/cc.	2.469	2.469	2.469	2.469
19	Maximum Theoretical Density	gr/cc.	2.274	2.274	2.274	
20	Percent Air Voids	%	3.044	3.164	3.074	**3.094**
21	Specific Gravity of Total Aggregate	gr/cc.	2.631	2.631	2.631	
22	Apparent Specific Gravity of Total Aggregate	gr/cc.	2.670	2.670	2.670	
23	Effective Specific Gravity of Total Aggregate	gr/cc.	2.650	2.650	2.650	
24	Percent Absorbed Asphalt Binder	%	0.28	0.28	0.28	
25	Total Volume of Aggregate	%	90.98	90.87	90.95	
26	Effective Asphalt Binder Content (volume)	%	5.97	5.97	5.97	
27	% Voids in the Mineral Aggregate (VMA)	%	9.02	9.13	9.05	9.06
28	Effective Asphalt Binder Content (weight)	%	6.02	6.02	6.02	
29	Voids Filled With Asphalt (VFA)	%	66.25	65.35	66.02	**65.87**
30	Stability	kg.	8457	8851	8612	
31	Correction Factor		1.00	1.00	1.00	
32	Corrected Stability	kg.	8457	8851	8612	**8640**
33	Flowmeter Reading	pulg.	10.00	10.00	11.00	10.33
34	Flow	mm.	2.54	2.54	2.79	2.62
35	Stability/Flow Ratio	kg/cm.	33295	34846	30823	32988.3
36.000	Compaction (%MTSG)	%	96.96	96.84	96.93	96.9

Note: 1. Sample prepared in accordance with paragraph 4.4.2, ASTM D1559