

RIGAGRIP

PRODUCT VALIDATION

Physical Properties, Laboratory and Site Validation Of Necessary Properties

Mixing Plant:	<i>Blackhills Quarry, Cove, Aberdeen</i>
Mix Designation:	<i>RIGAGRIP SMA 8 surf (Nytherm PMB 103, 0.3% fibres) Kishorn Quarry Aggregate</i>
Site:	<i>A956 King Street – Pelican Crossing (North of St Machar Roundabout)</i>

List of included information

AGGREGATE VALIDATION

Property	Test method / procedure	Comments
List of Mix Constituents		See attached
Coarse aggregate – particle Density	BS EN 1097 – 6: 2000	See CE certificate
Coarse aggregate – resistance to polishing	BS EN 1097 – 8: 2009	See CE certificate
Coarse aggregate – resistance to abrasion	BS EN 1097 – 8: 2009, Annex A	See CE certificate
Coarse aggregate – resistance to fragmentation	BS EN 1097 – 2: 2010	See CE certificate
Coarse aggregate – resistance to wear	BS EN 1397 – 1: 1996 Micro Deval method	See CE certificate

LABORATORY VALIDATION

Property	Test method / procedure	Comments
Declared Target Grading and Target Composition Limits	BS EN 13108 – 5	See attached report
Air voids content	BS EN 13108 – 20: 2006	See attached report
Water Sensitivity	BS EN 12697 – 12: 2008	See attached report
Binder Affinity	BS EN 12697 – 11: 2012: 6	See attached report
Binder Drainage	DD 232	See attached report
CE Declaration of Bituminous Mixture	BS EN 13108 - 21	See attached report
Resistance to permanent deformation	BS EN 12697 – 22: 2003	See attached report

SITE VALIDATION

Property	Test method / procedure	Comments
Binder content	BS EN 12697 – 1:2005	See attached report
Grading	BS EN 12697 – 2: 2002	See attached report
Air Voids in mat	BS 594987: 2010: Annex I	See attached report
Texture	BS 598 – 105	See attached report
Grip Test Number	BS 7941 – 2: 2000	See attached graph
Micro Grip Test Number		See attached graph

AGGREGATE VALIDATION

Constituents

Aggregates

SIZE	SOURCE	TYPE
6,3/8mm	Kishorn Quarry	Crushed Rock
4/6,3mm	Kishorn Quarry	Crushed Rock
0/4mm	Kishorn Quarry	Crushed Rock

Binder

TYPE	GRADE
Nytherm PMB 103	75/130 / 75 PMB

Filler

TYPE	SOURCE
Crushed limestone	Highland Lime, Torlundy, Highlands.

Fibre

TYPE	SOURCE
Viatop	J Rettenmaier



0086-CPD-515164

LEITHS

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EN 13043

Aggregates for Bituminous Mixtures

Aggregate Type	Declared	Crushed Rock
Particle shape	Category	Fl ₂₅
Particle size	Designation	6/8mm G _C 85/20
	Tolerance Category	G _{20/15}
Fines Content	Category	f ₄
Particle density	Declared Value	2.68 Mg/m ³
Resistance to Fragmentation /Crushing	Category	LA ₂₀
Resistance to Polishing/ Abrasion/Wear		
Polished stone value	Declared Value	PSV ₆₀
Aggregate abrasion value	Category	AAV ₁₀
Resistance to Wear of Coarse Aggregate	Category	M _{DE} 15
Durability against Freeze/Thaw	Category	MS ₁₈
	Category	WA ₂₄₂

LABORATORY VALIDATION

DECLARED TARGET GRADING AND TARGET COMPOSITION LIMITS

MIX	RIGAGRIP SMA 8 surf (Nytherm PMB 103) TS 2010 Kishorn Quarry Aggregate
SPECIFICATION	BS EN 13108 – 5 / PD 6691 / TS 2010
SUPPLIER	Leiths (Scotland) Ltd
SOURCE	Blackhills Coating Plant, Aberdeen.

SIEVE SIZE (mm)	DECLARED TARGET GRADING (% PASSING)	LIMITS FOR COMPOSITION (TS 2010: Table 2.1A)
11,2	100	100
8	100	93 – 100
5,6	52	35 – 55
2	24	20 – 32
0,71	18	14 - 22
0,125	12	
0,063	9.0	8 - 12

Binder Content (%)	6,9	6,7 – 7,1
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Issued By: 

Client: Leiths (Scotland) Ltd.
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Attn: Neil Anderson

Authorised Signatories
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Technical Manager
A. Trickett – Bell
Laboratory Manager

DETERMINATION OF AIR VOIDS CONTENT

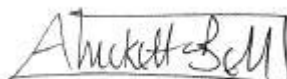
Report No.: P.44.BLACKHILLS.P17374		Sample Ref.: P17374	
Scheme / Site:	King Street, Aberdeen – Laboratory Design		
Client:	Leiths (Scotland) Ltd.		
Material:	RIGAGRIP [SMA 8 surf PMB (Nytherm PMB 103) TS 2010]		
Specification:	PD 6691 / BS EN 13108 – 5 / TS 2010		
Source:	Leiths – Blackhills Coating Plant (KISHORN AGGREGATE)		
Location:	N/A		
Test Method:	BS EN 12697 – 8		
Date Sampled From:	08.05.2015	Date Received:	08.05.2015
Date Sampled To:	12.05.2015	Date Tested From:	08.05.2015
Sampled By:	Lab Staff	Date Tested To:	12.05.2015
Sample Type:	Bulk	Certificate Received:	Yes

TEST RESULTS

Sample No.	Bulk Density (kg/m ³)	Air Voids Content (%)	Mean Air Voids Content (%)	Specification
P17374/1	2327	3.9	3.7	V _{min3.5} ; V _{max4} .
P17374/2	2326	3.9		
P17374/3	2339	3.3		

REMARKS: 6.9% Binder + 0.3% Viatop Fibres
Maximum Density = 2420 kg/m³

Sample complies with the requirements.

Issued By: 
Date of Issue: 12.05.2015

Client: Leiths
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Authorised Signatories
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A. Trickett – Bell
Laboratory Manager

DETERMINATION OF WATER SENSITIVITY OF BITUMINOUS SPECIMENS

Test Method: BS EN 12697 – 12: 2008

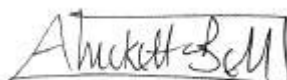
Report No.: P.13.LTS.P14938	Sample Ref.: P14938		
Scheme / Site: Client:	Blackhills SMA – KISHORN AGGREGATES Leiths Technical Services		
Material:	SMA 6/8 Nytherm PMB 103 (Binder Content = 6.5%)		
Source:	Kishorn Aggregate		
No. of Test Specimens:	6 (3 Dry, 3 Wet)	Date Tested From:	15.02.2013
		Date Tested To:	22.02.2013
Specimen Type:	Laboratory made with Impact Compactor 2 x 35 blows		
Storage Time Between Mixing and Testing:	Conditioned after 16 hours; Wet subset placed in water bath for 72 hours prior to Testing.		

TEST RESULTS

SUBSET	1 (DRY)	2 (WET)
Average Diameter of each Subset (mm):	102	102
Average Bulk Density of each Subset (Mg/m ³):	2.296	2.296
Test Temperature (°C):	25	25
Average Indirect Tensile Strength of each Subset (kPa)	493	464
Indirect Tensile Strength Ratio (%):	94.1	

Remarks and Observations:

Type of Failure:	Clear indirect tensile break lines.
Observations of Binder Coating on Surface of Exposed Aggregates:	All surfaces of exposed aggregates were fully coated.
Observations of Fractured or Crushed Aggregates:	No fractured or crushed aggregates observed.

Issued By: 
Date of Issue: 25.02.2013

Client: Leiths (Scotland) Ltd.
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Attn: Neil Anderson

Authorised Signatories

N. Anderson
(Technical Manager)
A. Trickett – Bell
(Laboratory Manager)

DETERMINATION OF BINDER AFFINITY

Test Method: BS EN 12697 – 11: 2012: Static Method

Report No.: RIG.10.KISHORN.P17374		Sample Ref.: P17374	
Scheme / Site:	Kishorn Quarry – QA		
Client:	Leiths Technical Services		
Material:	6,3/10mm Aggregate		
Specification:	-		
Source:	Leiths, Kishorn Quarry.		
Location:	Stockpile at Quarry		
Date Sampled From:	08.05.2015	Date Received:	08.05.2015
Date Sampled To:	08.05.2015	Date Tested From:	12.05.2015
Sampled By:	ATB	Date Tested To:	14.05.2015
Sample Type:	Bulk	Certificate Received:	Yes

TEST RESULTS

No. of Aggregate Pieces on which Binder has Stripped	1	Specification: No more than 6 per 150 pieces
Binder Content at Test:	4.0 %	

Remarks:
Sample complies with the specification

Issued By: 
Date of Issue: 15.05.2015

Client: Leiths Technical Services
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Laboratory Manager

DETERMINATION OF BINDER DRAINAGE

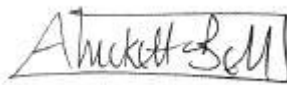
Report No.: P.11.BLACKHILLS.P14938		Sample Ref.: P14938	
Scheme / Site:	SMA 8 surf TS 2010 Specification		
Client:	Leiths (Scotland) Ltd.		
Material:	RIGAGRIP [SMA 8 surf (Nytherm PMB 103) TS 2010]		
Specification:	BS EN 13108 – 5 / PD 6691 / TS 2010		
Source:	Leiths – Blackhills Coating Plant (Kishorn Aggregate)		
Location:	Laboratory Trial		
Test Method:	BS DD 232: 1996		
Date Sampled From:	01.08.2013	Date Received:	01.08.2013
Date Sampled To:	01.08.2013	Date Tested From:	01.08.2013
Sampled By:	Lab Staff	Date Tested To:	02.08.2013
Sample Type:	Bulk	Certificate Received:	Yes

TEST RESULTS

BINDER DRAINAGE @ 6.9% Bitumen	0.0%
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REMARKS

0.3% Viatop Fibre Addition

Issued By: 
Date of Issue: 05.08.2013



0086-CPR-595350



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Certificate No. BLKQ-B833

TS 2010

Stone Mastic Asphalt

**B833 RIGAGRIP [SMA 8 surf (Nytherm PMB 103) TS2010] - Blackhills Asphalt Plant
(Kishorn Aggregates)**

General requirements

Temperature of the mixture		150 °C to 200 °C
Grading (passing)	16 mm test sieve	100 %
	11,2 mm test sieve	100 %
	8 mm test sieve	100 %
	5,6 mm test sieve	52 %
	2 mm test sieve	24 %
	0,063 mm test sieve	9,0%
Binder content		$B_{min 6,8}$ (6,9 %)
Water Sensitivity	BS EN 12697 – 12: 2008	$ITSR_{90}$
Binder Drainage	BS EN 12697 – 18: 2004	$D_{0,3}$
Resistance to permanent deformation		
- small size device: wheel tracking slope	BS EN 12697 – 22: B in Air	$WTS_{AIR 0,05}$ (0,04mm)
- small size device: proportional rut depths	BS EN 12697 – 22: B in Air	$PRD_{AIR 1,5}$ (1,3%)

Leiths (Scotland) Ltd confirms that the asphalt concrete referred to in this certificate complies with the requirements of TS 2010

Authorised by:

N. Anderson. Group Technical Director

Date Valid from	01/03/2013
Date Valid to	Currently Valid
Date of Certificate Issue	31 August 2015

SITE VALIDATION

Client: Leiths (Scotland) Ltd.
Rigifa
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Attn: R Bremner

Authorised Signatories
N. Anderson
Technical Manager
A. Trickett – Bell
Laboratory Manager

BITUMINOUS ANALYSIS TEST REPORT

Test Method: BS EN 12697 – 1: 2000 (Soluble binder content – by difference)
Test Method: BS EN 12697 – 2: 2002 (Particle size distribution)

Report No.: P.02.KING STREET.R0267		Sample Ref.: R0267 / R0268 / R0280 / R0281	
Scheme / Site: Client:	King Street, Aberdeen Leiths (Scotland) Ltd.		
Material: Specification:	RIGAGRIP [SMA 8 surf (Nytherm PMB 103) TS 2010] BS EN 13108 – 5 / PD 6691 / BS 594987		
Source: Location:	Leiths – Blackhills Coating Plant (Kishorn Aggregate) Northbound and Southbound.		
Date Sampled From: Date Sampled To: Sampled By: Sample Type:	25.05.2015 26.05.2015 Lab Staff Bulk	Date Received: Date Tested From: Date Tested To: Certificate Received:	25.05.2015 to 26.05.2015 25.05.2015 27.05.2015 Yes

TEST RESULTS

Results are in Tabulated Form

REMARKS

Tolerances applied to the declared target grading in accordance with BS EN 13108 – 21: Table A.1 Individual Samples.

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TABULATED TEST RESULTS – RIGIFA LABORATORY

SCHEME / SITE: WESTBURN ROAD, ABERDEEN

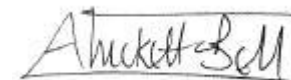
MATERIAL: RIGAGRIP [SMA 8 surf (Nytherm PMB 103) TS 2010] SPECIFICATION: BS EN 13108 – 5 / PD 6691

SOURCE: BLACKHILLS COATING PLANT, COVE. (KISHORN AGGREGATES)

Sieve Size (mm)	11,2	8	5,6	2	1	0,710	0,250	0,125	0,063	Binder	Remarks	
Target Grading	100	100	52	24		18		12	9.0	6,9		
Tolerance	98 – 100	92 – 100	45 – 59	19 - 29		14 – 22		8 - 16	7.0 – 11.0	6.7 – 7.1		
Sample No.	Date Made											
R0267	25/05/2015	100	96	55	26	19	17	13	10	8,0	6,9	Southbound
R0268	25/05/2015	100	95	45	29	24	22	16	12	8,0	6,7	Southbound
R0280	26/05/2015	100	96	49	26	20	18	14	11	8,2	6,8	Northbound
R0281	26/05/2015	100	96	53	29	23	21	17	14	9,5	7,0	
Average		100	96	51	28	22	20	15	12	8,4	6,9	
SD		0.0	0.5	4.4	2.1	2.4	2.4	1.8	1.7	0.7	0.1	

= Denotes non-compliance (if present)

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Date of Issue: 27.05.2015

Client: Leiths (Scotland) Ltd.
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Laboratory Manager

Determination of Bulk Density & Voids

Test Method: BS 594987 / SHW Series 900

Report No.: R.08.KING STREET.R0267A		Sample Ref.: R0267	
Scheme / Site:	King Street, Aberdeen		
Client:	Leiths Scotland Ltd.		
Material:	RIGAGRIP [SMA 8 surf (Nytherm PMB 103) TS 2010]		
Specification:	BS EN 13108 – 5 / PD 6691 / BS 594987		
Source:	Leiths – Blackhills Coating Plant (Kishorn Aggregate)		
Location:	Northbound and Southbound Carriageways		
Date Sampled From:	25.05.2015	Date Received:	25.05.2015 to 26.05.2015
Date Sampled To:	26.05.2015	Date Tested From:	25.05.2015
Sampled By:	Lab Staff	Date Tested To:	27.05.2015
Sample Type:	Indirect Density Gauge	Certificate Received:	No

TEST RESULTS

Location	DG Bulk Density (kg/m ³)	% Voids	Location	DG Bulk Density (kg/m ³)	% Voids
Southbound S/L	2264	5.5	Southbound Joint	2203	8.1
Southbound S/L	2314	3.5	Southbound Joint	2250	6.1
Southbound S/L	2264	5.5	Northbound Joint	2237	6.7
Southbound S/L	2279	4.9	Northbound Joint	2207	7.9
Southbound F/L	2306	3.8	Northbound Joint	2217	7.5
Northbound S/L	2344	2.2			
Northbound S/L	2282	4.8			
Northbound F/L	2306	3.8			
Northbound F/L	2301	4.0			
AVERAGE:	2296	4.2	AVERAGE:	2223	7.3

Remarks: Maximum Density = 2397 kg/m³

Issued By: 
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DETERMINATION OF TEXTURE DEPTH – VOLUMATRIC METHOD

Report No.: R.04.KING STREET.R0267B		Sample Ref.: R0267	
Scheme / Site:	King Street, Aberdeen		
Client:	Leiths		
Material:	RIGAGRIP [SMA 8 surf (Nytherm PMB 103) TS 2010]		
Specification:	Proprietary Mix		
Source:	Blackhills Coating Plant (Kishorn Quarry)		
Location:	See below		
Test Method:	BS EN 13036		
Date Sampled From:	N/A	Date Received:	25.05.2015
Date Sampled To:	N/A	Date Tested From:	25.05.2015
Sampled By:	Lab Staff	Date Tested To:	27.05.2015
Sample Type:	N/A	Certificate Received:	N/A

TEST RESULTS

LOCATION	TEXTURE DEPTH (mm)
Southbound Slow Lane	1.4
Southbound Fast Lane	1.3
Northbound Slow Lane	1.3
Northbound Fast Lane	1.3
AVERAGE	1.3

REMARKS

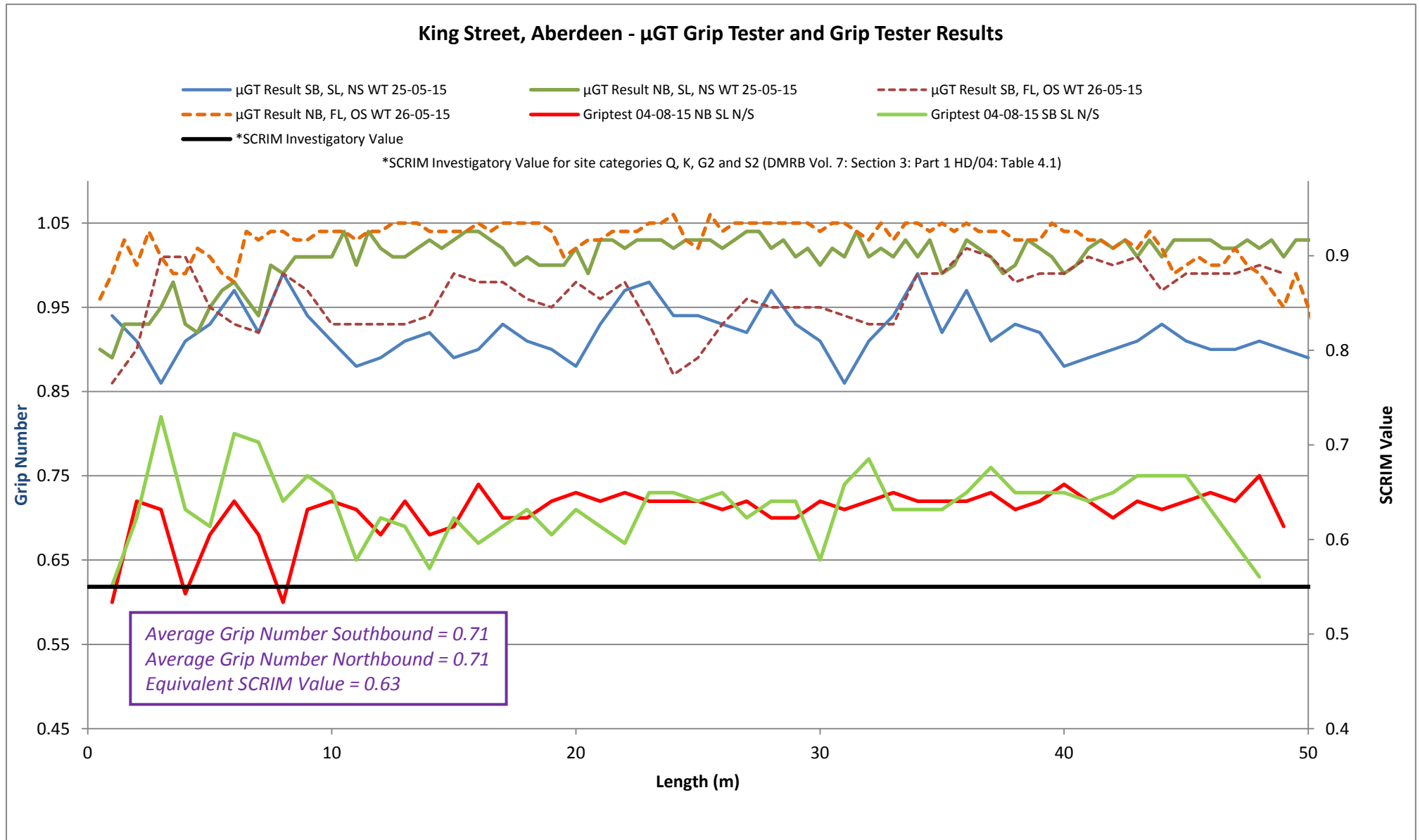
Surface Condition: Dry

Issued By: 

Date of Issue: 27.05.2015

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NOTE: μ GT carried out on both lanes of northbound and southbound carriageways. Griptest carried out on slow lane only of northbound and southbound carriageways.