APPENDIX 'A' GEOTECHNICAL REPORT

APPENDIX 'A' - GEOTECHNICAL REPORT

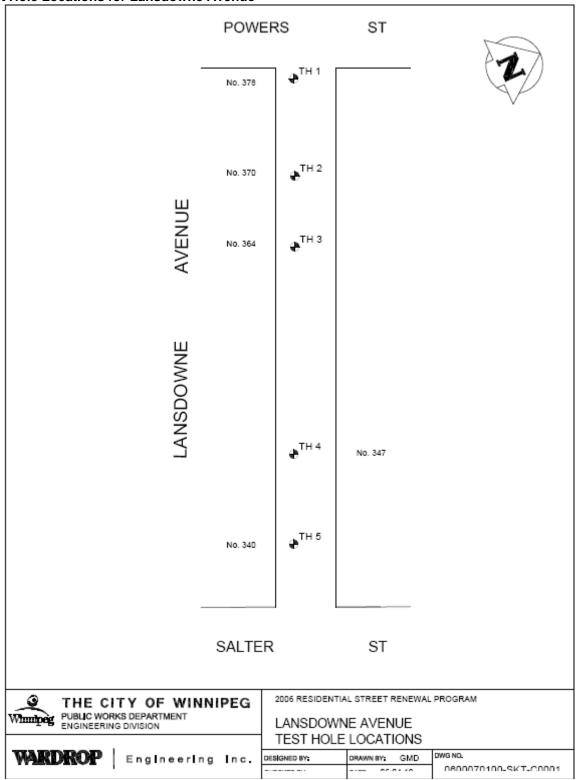
TABLE OF CONTENTS

GEOTECHNICAL REPORT FOR LANSDOWNE AVENUE	1
Test Hole Locations	1
Summary of Core Samples	2
Test Hole Log for Lansdowne Avenue T1	3
Test Hole Log for Lansdowne Avenue T2	4
Test Hole Log for Lansdowne Avenue T3	5
Test Hole Log for Lansdowne Avenue T4	6
Test Hole Log for Lansdowne Avenue T5	7
Particle Analysis for Lansdowne Avenue T2	8
Particle Analysis for Lansdowne Avenue T5	g
Pavement Core Photos for Lansdowne Avenue	10
GEOTECHNICAL REPORT FOR MACHRAY AVENUE	11
Test Hole Locations	11
Summary of Core Samples	12
Test Hole Log for Machray Avenue T1	13
Test Hole Log for Machray Avenue T2	14
Test Hole Log for Machray Avenue T3	15
Test Hole Log for Machray Avenue T4	16
Test Hole Log for Machray Avenue T5	17
Particle Analysis for Machray Avenue T2	18
Particle Analysis for Machray Avenue T4	19
Pavement Core Photos for Machray Avenue	20

The geotechnical report is provided to aid in the Contractor's evaluation of the existing pavement structure and/or soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling. However, variations in pavement structure and/or soil conditions may exist between test holes and fluctuations in groundwater levels can be expected seasonally and may occur as a result of construction activities. The nature and extent of variations may not become evident until construction commences.

Geotechnical Report for Landsdowne Avenue

Test Hole Locations for Lansdowne Avenue



Summary of Core Samples for Lansdowne Avenue

City of Winnipeg 2006 Street Renewal Program Geotechnical Investigation

		Pavement Su	ırlace	Pavement Str	ucture Material		Sample	Moisture		Particle Si	ze Analysta		A	terberg Lin	iits
Teathole	Testhole		Thickness		Thickness	Sample	Depth	Content	Gravel	Sand	Sit	Clay	Liquid	Plastic	Plasticity
No.	Location	Туре	(mm)	Type	(mm)	Description	(m)	(%)	(%)	(%)	(%)	(%)	Limit	Limit	Limit
1	Lansdowne Avenue	Asphal/Concrete	102/102	NA.	0										
2	Lansdowne Avenue	Concrete	200	NA.	0	Sit	1.2	26.2	0.0	0.0	71.5	25.5	30	14	16
3	Lansdowne Avenue	Asphal/Concrete	35/130	NA.	0										
4	Lansdowne Avenue	Asphall/Concrete	32/134	NA.	0										
5	Lansdowne Avenue	Asphalt/Concrete	64/158	NA NA	0	Clay	1.95	29.6	0	1.1	13.2	85.7	23	75	52

Test Hole Log T1 for Lansdowne

TESTHOLE TH1



Project Name: 2006 City of Winnipeg Streets Reconstruction

Client: Wardrop Engineering Inc.

Depth of Testhole: 2.0 m

Site: Lansdowne Avenue

Logged by: Robert Brown

Date Drilled: January 16, 2006

Testhole Location: 378 Lansdowne, 2.0 m W of E building line, 1.7 m N of curb

	[]	Subsurface Profile		Labor	ratory Te	sting
Depth	Symbol	Description	0	W at	ter Cont (%) 40 60	ent 80 100
0.0	041000 00 0041	Ground Surface			- T	
		ASPHALT - 102 mm thick, poor condition		!	1 1	
	的。	CONCRETE - 102 mm thick, rubble				
0.5		CLAY - black - moist, stiff, high plasticity below 0.9 m - and silt below 1.1 m				
1.0-		SILT - tan, moist, soft, low plasticity		/		
1.5-		- with most, out, for protectly				
2.0-	111211111111111111111111111111111111111	Francis a death of 0.0 m below as it				
		Frozen to a depth of 0.9 m below grade.				
	1	End of testhole at 2.0 m below grade.	1	i	1 1	

Test Hole Log T2 for Lansdowne Avenue

TESTHOLE TH2



Project Name: 2006 City of Winnipeg Streets Reconstruction

Client: Wardrop Engineering Inc. Site: Lansdowne Avenue Depth of Testhole: 2.0 m Logged by: Robert Brown

Date Drilled: January 13, 2006

Testhole Location: 370 Lansdowne Ave., 3.2 m E of west building line, 1.6 m N of curb

		Subsurface Profile	Laboratory T	esting	.		
Depth (m)	Symbol	Description	Moisture Content (%) PL LL 0 25 50 75 100 125	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
0.0		Ground Surface					
	0,0000 0,0000 0,0000 0,0000	CONCRETE - 200 mm thick, top 75 mm good condition, bottom 125 mm rubble					
		CLAY - black, with silt to 0.7 m - moist, stiff, high plasticity below 0.7 m					
0.5							
1.0		SILT - tan, moist, soft, low plasticity		0.0	0.0	71.5	28.
1.5							
2.0		CLAY - brown, moist, stiff, high plasticity					
		Frozen to a depth of 0.7 m below grade.					
		End of testhole at 2.0 m below grade.					

Test Hole Log T3 for Lansdowne Avenue

TESTHOLE TH3

THE SATIONAL DESIRED LABORATORIES LABORATORIES

Project Name: 2006 City of Winnipeg Streets Reconstruction

Client: Wardrop Engineering Inc. Site: Lansdowne Avenue Date Drilled: January 16, 2006 Depth of Testhole: 2.0 m Logged by: Robert Brown

Testhole Location: 364 Lansdowne Ave., 2.3 m E of west building line, 1.7 m N of curb

	1	Subsurface Profile	Labo	ratory To	sting
Depth	Symbol	Description	W a	ter Cont (%) 40 60	ent 80 100
0.0	BUT COLUMN	Ground Surface		. 11	,
		ASPHALT - 35 mm thick, good condition			1 00
		CONCRETE - 130 mm thick, rubble	 i		1 1
		CLAY - black, some slit - moist, stiff, intermediate plasticity below 0.7 m			
0.5				1 8	
	011011001	SILT			
1.0		 tan, moist, soft, low plasticity with clay, intermediate plasticity from 1.7 m to 2 m 			
			· Lorent many Committee		
1.5			•		
2.0					1
		Frozen to a depth of 0.7 m below grade.			9 5 2
		End of testhole at 2.0 m below grade.			

Test Hole Log T4 for Lansdowne Avenue

TESTHOLE TH4

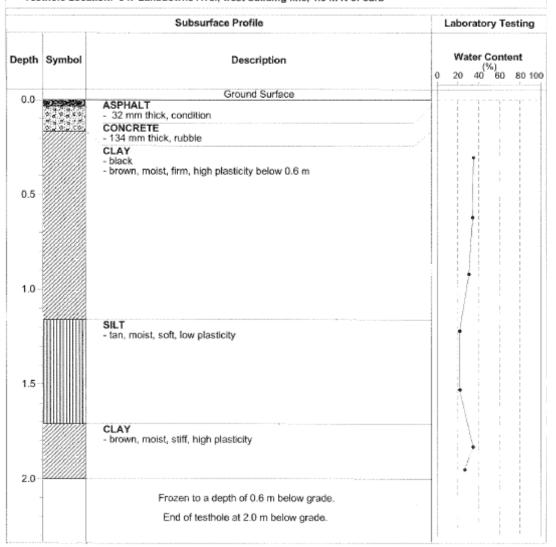


Project Name: 2006 City of Winnipeg Streets Reconstruction Client: Wardrop Engineering Inc.

Date Drilled: January 16, 2006 Depth of Testhole: 2.0 m Logged by: Robert Brown

Site: Lansdowne Avenue

Testhole Location: 347 Lansdowne Ave., west building line, 1.9 m N of curb



2.0

0.0

1.1

13.2 85.7

Test Hole Log T5 for Lansdowne Avenue

TESTHOLE TH5 Project Name: 2006 City of Winnipeg Streets Reconstruction Date Drilled: January 16, 2006 Client: Wardrop Engineering Inc. Depth of Testhole: 2.0 m Site: Lansdowne Avenue Logged by: Robert Brown Testhole Location: 340 Lansdowne Ave., east lot line, 1.5 m N of curb Subsurface Profile Laboratory Testing Gravel (%) Depth (m) Clay (%) Sand (%) Symbol Description Moisture Content (%) Silt (%) 75 100 125 50 Ground Surface 0.0 ASPHALT - 64 mm thick, fractured CONCRETE 158 mm thick, rubble CLAY - black - moist, firm, high plasticity below 0.8 m 0.5 1.0 1.5

Frozen to a depth of 0.8 m below grade. End of testhole at 2.0 m below grade.

Particle Size Anaylsis T2 for Lansdowne Avenue



PARTICLE SIZE ANALYSIS ASTM D422

TC

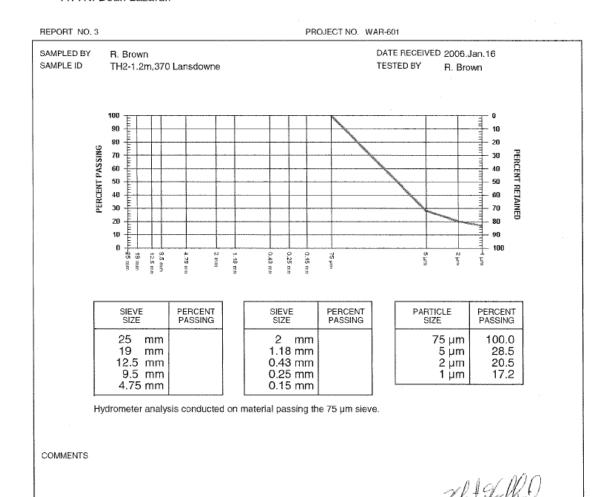
Page 1 of 1

2006.Mar.15

Wardrop Engineering Inc. 400-386 Broadway Winnipeg, Manitoba R3C 4M8 CLIENT Wardrop Engineering Inc.

ATTN: Dean Lazaruk

PROJECT 2006 Winnipeg Streets Reconstruction



REVIEWED BY

Particle Size Anaylsis T5 for Lansdowne Avenue



PARTICLE SIZE ANALYSIS ASTM D422

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Wardrop Engineering Inc. 400-386 Broadway Winnipeg, Manitoba R3C 4M8

CLIENT Wardrop Engineering Inc. C.C.

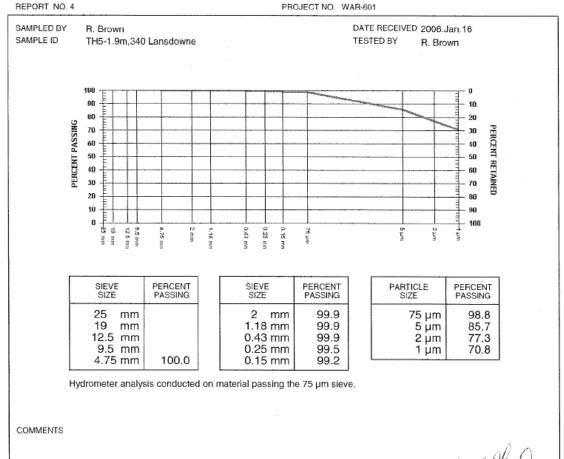
ATTN: Dean Lazaruk

PROJECT 2006 Winnipeg Streets Reconstruction

REPORT NO. 4

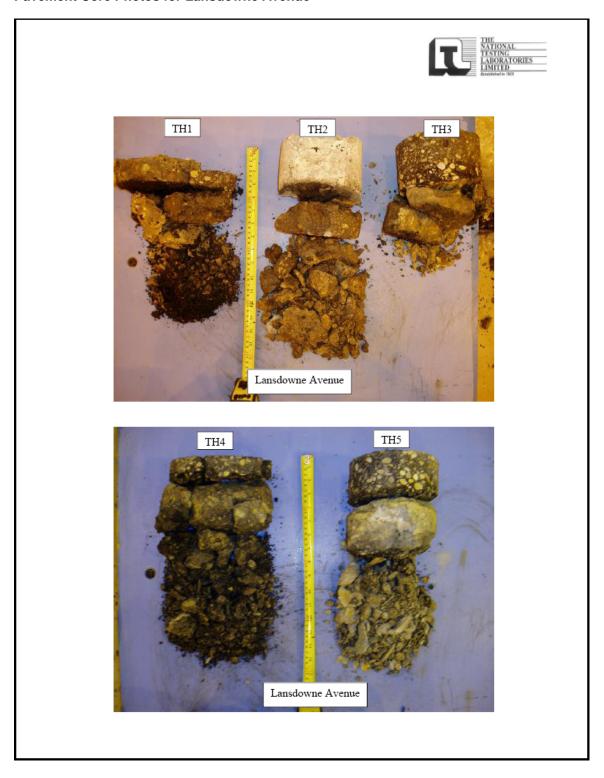
Page 1 of 1

2006.Mar.15



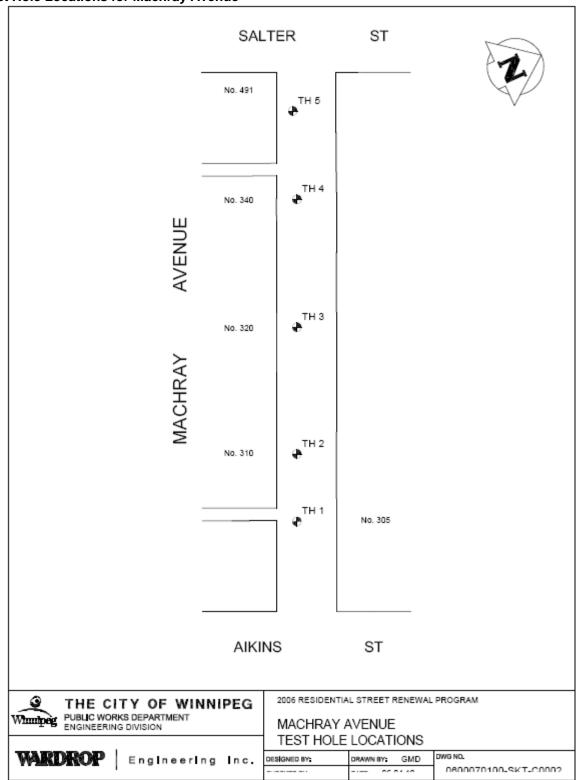
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Pavement Core Photos for Lansdowne Avenue



Geotechnical Report for Machray Avenue

Test Hole Locations for Machray Avenue



Summary of Core Samples for Machray Avenue

City of Winnipeg 2006 Street Renewal Program Geotechnical Investigation

Γ			Pavement St	urface	Pavement Str	ucture Material		Sample	Moisture		Particle St	ze Analysis		A	terberg Lin	nits
١	Testhole	Testhole		Thickness		Thickness	Sample	Depth	Content	Gravel	Sand	Sit	Clay	Liquid	Plastic	Plasticity
L	No.	Location	Type	(mm)	Type	(mm)	Description	(m)	(%)	(%)	(%)	(%)	(%)	Limit	Limit	Limit
	1	Machray Avenue	Asphalt/Concrete	90/130	NA.	0										
	2	Machray Avenue	Asphalt/Concrete	70/140	NA.	0	Clay	0.9	28.2	0.2	3.6	19.6	76.6	25	83	58
	3	Machray Avenue	Asphalt/Concrete	90/140	NA.	0										
	4	Machray Avenue	Asphalt/Concrete	80/150	NA.	0	Sit	1.8	24.8	0.0	5.4	79.9	14.7	12	21	9
	5	Machray Avenue	Asphalt/Concrete	80/140	NA.	0										

Test Hole Log T1 for Machray Avenue

TESTHOLE TH1

THE NATIONAL TISTING LABORATORIES LABORATORIES

Project Name: 2006 City of Winnipeg Streets Reconstruction Client: Wardrop Engineering Inc. Date Drilled: January 13, 2006 Depth of Testhole: 2.0 m Logged by: Robert Brown

Site: Machray Avenue

Logged by: Robert Brown

Testhole Location: 305 Machray Ave., 0.3 m E of east building line of garage, 1.5 m N of curb Subsurface Profile Laboratory Testing Water Content Depth Symbol Description (%) 40 60 80 100 Ground Surface 0.0 ASPHALT - 90 mm thick, condition fair CONCRETE - 130 mm thick, rubble CLAY FILL - brown 0.5 brown
 moist, firm, high plasticity, some silt below 0.6 m - tan, moist, soft, low plasticity CLAY - brown, moist, stiff, high plasticity 2.0 Frozen to a depth of 0.6 m below grade. End of testhole at 2.0 m below grade.

Test Hole Log T2 for Machray Avenue

TESTHOLE TH2

Project Name: 2006 City of Winnipeg Streets Reconstruction

Client: Wardrop Engineering Inc.

Date Drilled: January 13, 2006 Depth of Testhole: 2.0 m

		Subsurface Profile	Laboratory Testing							
Depth (m)	Symbol	Description	Moisture Content (%) PL 0 25 50 75 100 125	Gravel (%)	Sand (%)	Silt (%)	Clay (%)			
0.0		Ground Surface ASPHALT - 70 mm thick, fractured CONCRETE - 140 mm thick, rubble CLAY FILL - brown								
0.5		CLAY - brown - moist, firm, high plasticity below 0.5 m - some silt from 1.2 m to 1.5 m								
1.0-				0.2	3.6	19.6	76			
1.5		SILT - tan, moist, soft, low plasticity								
2.0		Frozen to a depth of 0.5 m below grade. End of testhole at 2.0 m below grade.	# 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5							

Test Hole Log T3 for Machray Avenue

TESTHOLE TH3

Project Name: 2006 City of Winnipeg Streets Reconstruction

Client: Wardrop Engineering Inc.

Depth of Testhole: 2.0 m

Date Drilled: January 13, 2006

Site: Machray Avenue

Logged by: Robert Brown

Testhole Location: 320 Machray Ave., 2 m W of east building line, 1.1 m N of curb

		Laboratory Testing	
Depth	Symbol	Description	Water Content (%) 0 20 40 60 80 100
		Ground Surface	
0.0-		ASPHALT - 90 mm thick, fractured	1 I I I I I I I
-	2007	CONCRETE - 140 mm thick, rubble	
		CLAY FILL - brown	
0.5-		CLAY - brown, moist, firm, high plasticity, some silt - with silt from 0.8 m to 0.9 m	
1.0-		SILT - tan, moist, soft, low plasticity	
1.5-			
2.0-		Frozen to a depth of 0.5 m below grade. End of testhole at 2.0 m below grade.	

0.0

5.4

79.9 14.7

Test Hole Log T4 for Machray Avenue

TESTHOLE TH4 Project Name: 2006 City of Winnipeg Streets Reconstruction Date Drilled: January 13, 2006 Client: Wardrop Engineering Inc. Depth of Testhole: 2.0 m Site: Machray Avenue Logged by: Robert Brown Testhole Location: 340 Machray Ave., 2.7 m E of west lot line, 1.6 m N of curb Subsurface Profile Laboratory Testing Gravel (%) Depth (m) Symbol Description Moisture Content (%) Clay (%) Silt (%) 100 125 Ground Surface 0.0 ASPHALT - 80 mm thick, condition fair CONCRETE - 150 mm thick, rubble CLAY FILL 0.5 - brown, moist, firm, high plasticity - and silt from 1.1 m to 1.2 m 1.0-- tan, moist, soft, low plasticity

Frozen to a depth of 0.5 m below grade. End of testhole at 2.0 m below grade.

Test Hole Log T5 for Machray Avenue

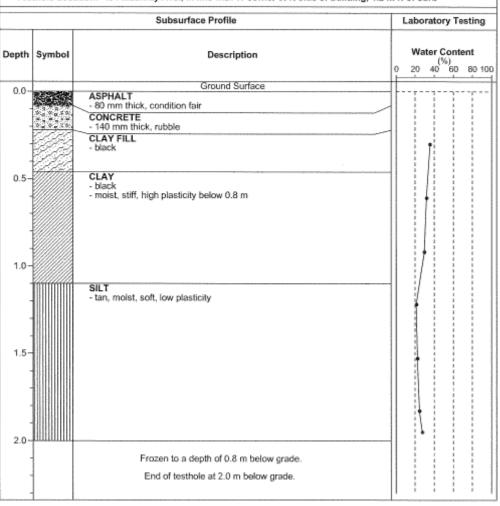
TESTHOLE TH5

SATIONAL TESTING LABORATORIES LIMITED

Project Name: 2006 City of Winnipeg Streets Reconstruction Client: Wardrop Engineering Inc. Site: Machray Avenue

Date Drilled: January 13, 2006 Depth of Testhole: 2.0 m Logged by: Robert Brown

Testhole Location: 491 Machray Ave., in line with W corner of N side of building, 1.2 m N of curb



Particle Size Analysis T2 for Machray Avenue



PARTICLE SIZE ANALYSIS ASTM D422

TC

Wardrop Engineering Inc. 400-386 Broadway Winnipeg, Manitoba R3C 4M8 CLIENT Wardrop Engineering Inc.

ATTN: Dean Lazaruk

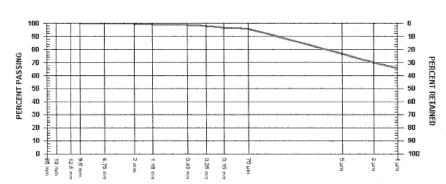
PROJECT 2006 Winnipeg Streets Reconstruction

REPORT NO. 1

PROJECT NO. WAR-601

SAMPLED BY R. Brown
SAMPLE ID TH2 - 0.9m, 310 Machray

DATE RECEIVED 2006.Jan.16
TESTED BY R. Brown
R. Brown



SIEVE SIZE	PERCENT PASSING
25 mm 19 mm 12.5 mm 9.5 mm 4.75 mm	100.0 99.8

SIEVE	PERCENT
SIZE	PASSING
2 mm	99.6
1.18 mm	99.4
0.43 mm	98.9
0.25 mm	98.1
0.15 mm	96.8

PARTICLE	PERCENT
SIZE	PASSING
75 μm	96.1
5 μm	76.6
2 μm	70.2
1 μm	65.7

Hydrometer analysis conducted on material passing the 75 µm sieve.

COMMENTS

Page 1 of 1 2006.Mar.15

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Particle Size Analysis T4 for Machray Avenue



PARTICLE SIZE ANALYSIS ASTM D422

TO

Wardrop Engineering Inc. 400-386 Broadway Winnipeg, Manitoba R3C 4M8 CLIENT Wardrop Engineering Inc.

ATTN: Dean Lazaruk

PROJECT 2006 Winnipeg Streets Reconstruction

REPORT NO. 2

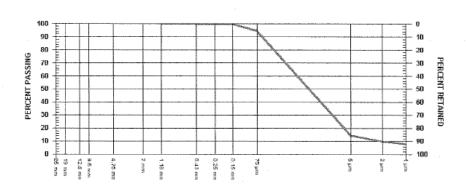
PROJECT NO. WAR-601

SAMPLED BY SAMPLE ID R. Brown

TH4-1.8 m, 340 Machray

DATE RECEIVED 2006.Jan.16

TESTED BY R. Brown



SIEVE SIZE	PERCENT PASSING
25 mm 19 mm 12.5 mm 9.5 mm 4.75 mm	

SIEVE	PERCENT
SIZE	PASSING
2 mm 1.18 mm 0.43 mm 0.25 mm 0.15 mm	100.0 99.9 99.8 99.8

PARTICLE	PERCENT
SIZE	PASSING
75 μm	94.6
5 μm	14.7
2 μm	9.8
1 μm	7.7

Hydrometer analysis conducted on material passing the 75 µm sieve.

COMMENTS

Page 1 of 1 2006.Mar.15

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Pavement Core Photos For Machray Avenue

