

APPENDIX 'A'

GEOTECHNICAL REPORT

APPENDIX 'A' - GEOTECHNICAL REPORT

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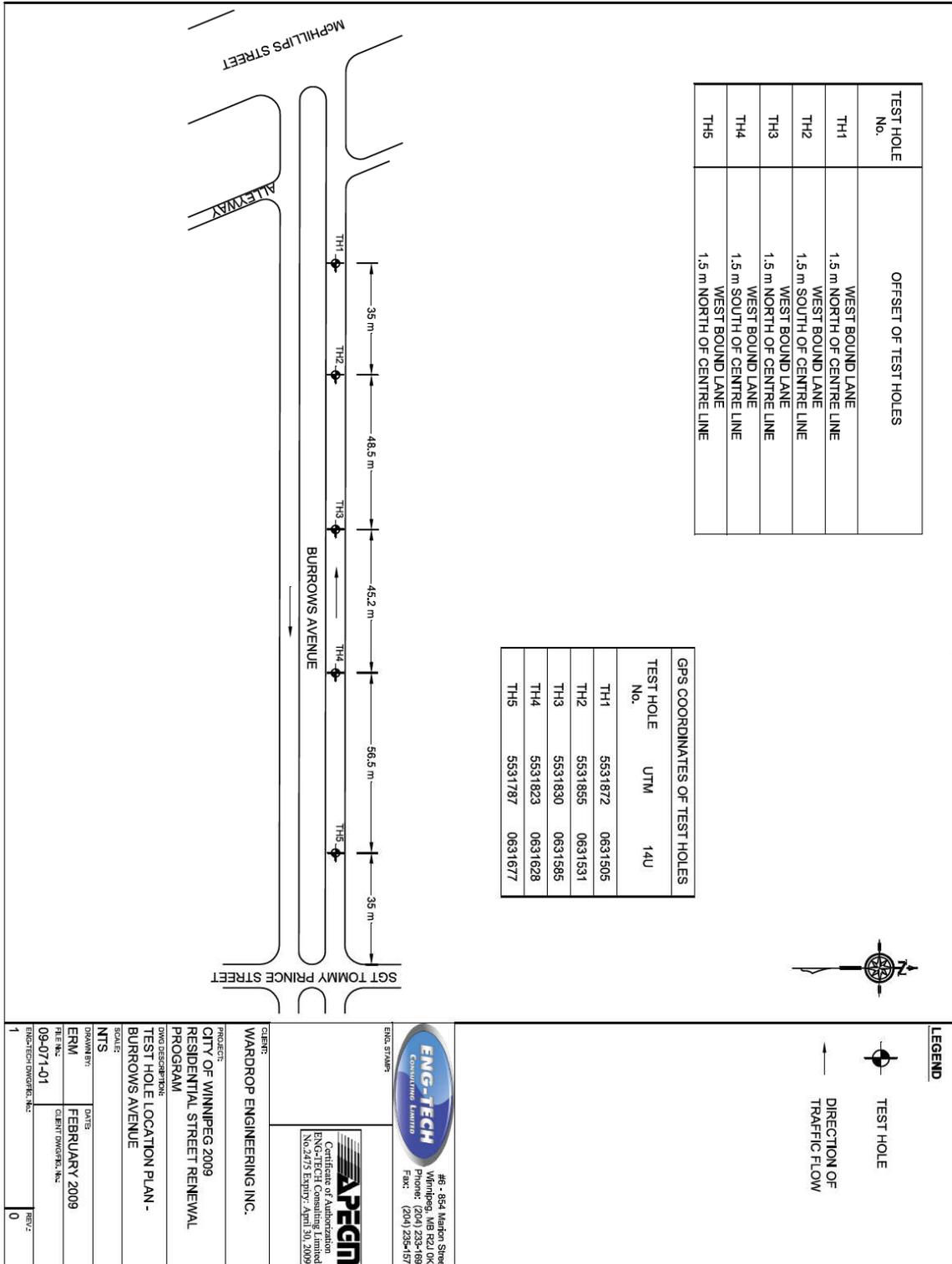
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The geotechnical report is provided to aid in the Contractor's evaluation of the existing pavement structure and/or soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling. 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.

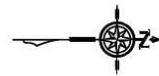
Geotechnical Report for Burrows Avenue

Test Hole Locations



TEST HOLE No.	OFFSET OF TEST HOLES
TH1	WEST BOUND LANE 1.5 m NORTH OF CENTRE LINE
TH2	WEST BOUND LANE 1.5 m SOUTH OF CENTRE LINE
TH3	WEST BOUND LANE 1.5 m NORTH OF CENTRE LINE
TH4	WEST BOUND LANE 1.5 m SOUTH OF CENTRE LINE
TH5	WEST BOUND LANE 1.5 m NORTH OF CENTRE LINE

GPS COORDINATES OF TEST HOLES		
TEST HOLE No.	UTM	14U
TH1	5531872	0631505
TH2	5531885	0631531
TH3	5531830	0631585
TH4	5531823	0631628
TH5	5531787	0631677



LEGEND

TEST HOLE
 DIRECTION OF TRAFFIC FLOW

ENG-TECH
 CONSULTING LIMITED

46, 854, Madson Street
 Winnipeg, MB R2J 0K4
 Phone: (204) 233-1894
 Fax: (204) 235-1579

APEGM
 Certificate of Authorization
 ENG-TECH Consulting Limited
 No. 2475 Expiry: April 30, 2009

CLIENT: WARDROP ENGINEERING INC.

PROJECT: CITY OF WINNIPEG 2009 RESIDENTIAL STREET RENEWAL PROGRAM

DRAWN BY: NTS

DATE: FEBRUARY 2009

FILE NO: 09-071-01

REVISION: 0

Summary of Pavment Structure for Burrows Avenue

Table 1
Summary of Pavement Structure

File No.: 09-071-01

Wardrop Engineering Inc.
 City of Winnipeg 2009 Residential Street Renewal Program

Page 1 of 3

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits						
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index				
1	Burrows Avenue	Asphalt Concrete	95 175				Clay (Fill)	0.3	25.6										
								0.76	31.9										
								Silt	1.00	26.0									
									1.52	23.9									
								Clay	1.83	43.0									
									2.13	45.1									
2	Burrows Avenue	Asphalt Concrete	85 175				Clay (Fill)	0.5	29.5										
								0.76	26.4										
								1.00	27.7										
								Clay	1.52	29.9									
									1.83	50.5									
									2.13	50.5									

P:\2009\Projects\071(Wardrop)\01\2009 Residential Streets\summary tables\Table 1 - Pavement Summary_Burrows_Ave(final).rtf

Table 1
Summary of Pavement Structure

File No.: 09-071-01

Wardrop Engineering Inc.
 City of Winnipeg 2009 Residential Street Renewal Program

Page 2 of 3

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits						
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index				
3	Burrows Avenue	Asphalt Concrete	125 165				Clay (Fill)	0.3	37.9										
								0.61	28.9	0.0	0.0	23.5	76.5	71.6	28.9	42.7			
								0.76	28.2										
								Silt	1.00	24.5									
									1.52	23.7									
								Clay	1.83	30.0									
2.13	41.5																		
4	Burrows Avenue	Asphalt Concrete	95 150				Clayey Silt (Fill)	0.3	27.5										
								0.61	32.7										
								0.76	28.9	0.0	5.2	67.4	27.4	31.4	18.3	13.1			
								Clay	1.00	40.0									
									1.52	39.7									
								Clay	1.83	24.2									
2.13	43.9																		

P:\2009\Projects\071(Wardrop)\01\2009 Residential Streets\summary tables\Table 1 - Pavement Summary_Burrows_Ave(final).rtf

Particle Size Analysis of TH3 for Burrows Avenue



#6 - 854 Marion Street
 Winnipeg, Manitoba
 R2J 0K4
 eng_tech@mts.net
 www.eng-tech.ca

PARTICLE SIZE ANALYSIS REPORT

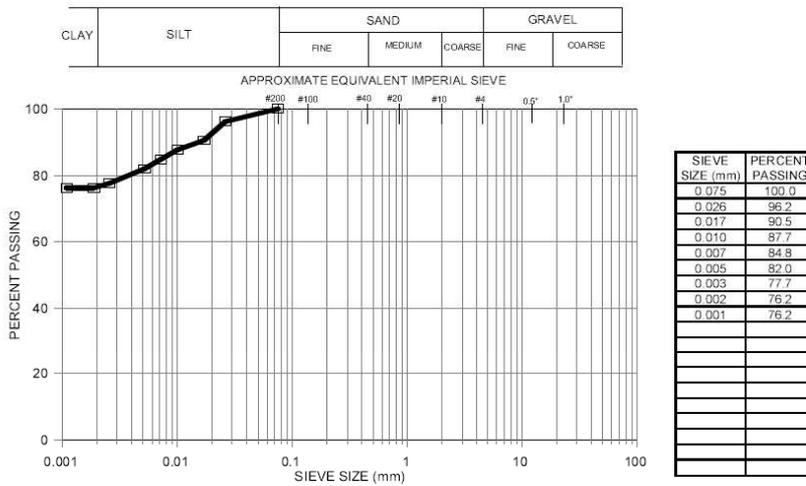
Wardrop Engineering Inc.
 400-386 Broadway
 Winnipeg, Manitoba
 R3C 4M8

File No.: 09-071-01
 Ref. No.: 9-71-1-3

ATTENTION: Naveed Haider, B.S.C.E.

PROJECT: CITY OF WINNIPEG 2009 RESIDENTIAL STREETS RENEWAL PROGRAM

Test Hole No. TH3 Sample No. S2 Depth: 0.61m
 Sampled By: ENG-TECH Type of Sample: Grab Source: Burrows Avenue
 Date Sampled: Jan 28/09 Date Received: Jan 29/09 Date Tested: Feb 2/09



Percent of: GRAVEL (0.0%), SAND (0.0%), SILT (23.5%) and CLAY (76.5%)
 Sample Description:

COMMENTS:

ENG-TECH Consulting Limited

Clark Hryhoruk

per Clark Hryhoruk, M. Sc., P. Eng., President
 Ph: (204) 233-1694 Fax: (204) 235-1579

Pavement Core Photos for Burrows Avenue



Burrows Avenue
McPhillips Street to Sgt Tommy Prince Street

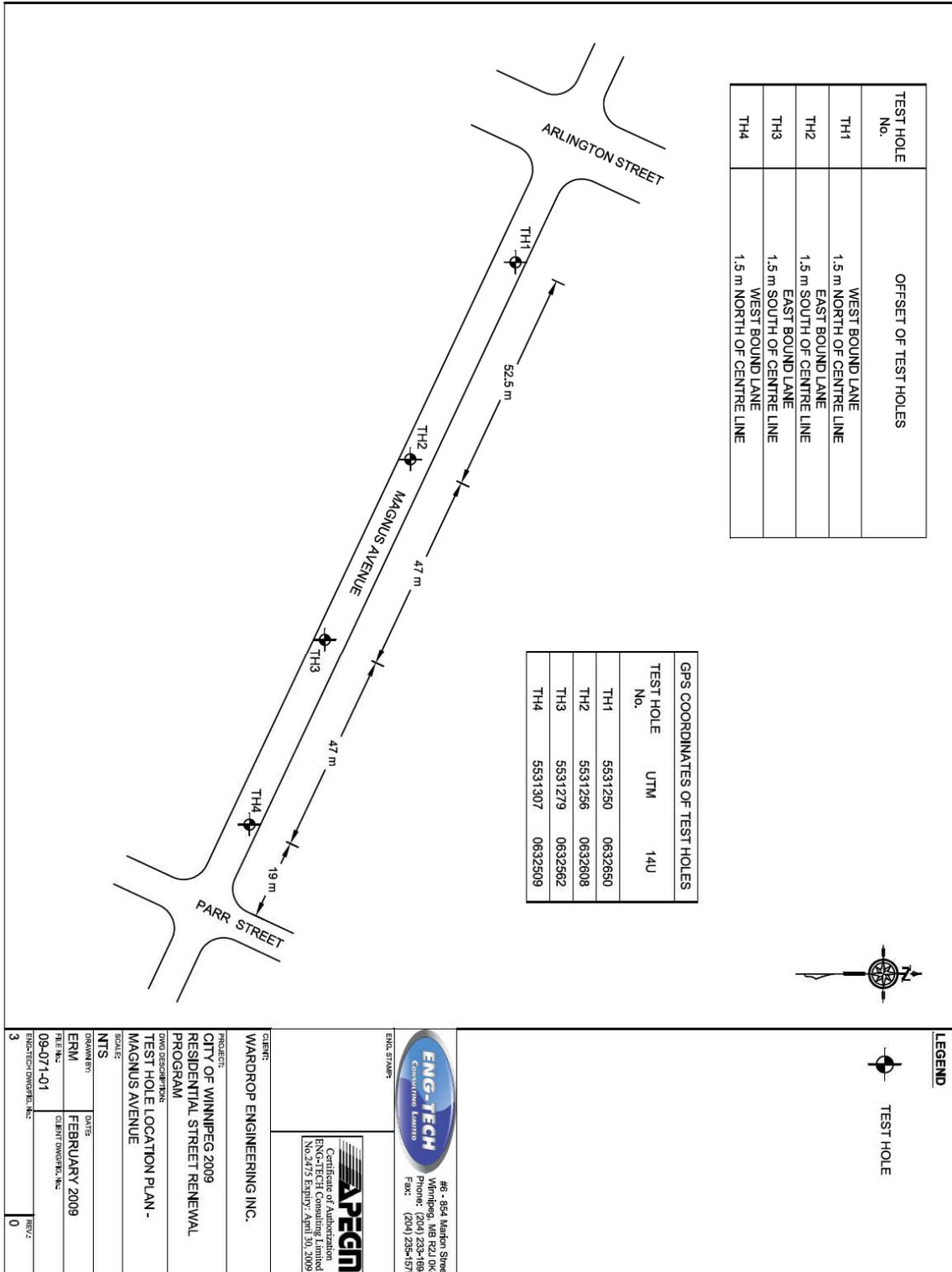


Burrows Avenue
McPhillips Street to Sgt Tommy Prince Street



Geotechnical Report for Magnus Avenue

Test Hole Locations



CLIENT: WARDROP ENGINEERING INC.

PROJECT: CITY OF WINNIPEG 2009 RESIDENTIAL STREET RENEWAL PROGRAM

DATE: FEBRUARY 2009

TEST HOLE LOCATION PLAN - MAGNUS AVENUE

SCALE: NTS

DRAWN BY: ERM

DATE: FEBRUARY 2009

FILE NO.: 09-071-01

REVISIONS:

NO.	DESCRIPTION	DATE
3		
0		

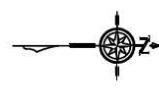


ENG-TECH
Consultative Limited

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Certificate of Authorization
 ENG-TECH Consulting Limited
 No. 2475 Expiry: April 30, 2009



Summary of Pavement Structure for Magnus Avenue

Table 3
Summary of Pavement Structure

File No.: 09-071-01

Wardrop Engineering Inc.
 City of Winnipeg 2009 Residential Street Renewal Program

Page 1 of 2

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits					
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index			
1	Magnus Avenue	Asphalt Concrete	35 130			Silty Clay (Fill)	0.3	27.5										
							0.61	26.9										
							0.76	21.5										
							0.91	22.7	0.0	4.4	49.0	46.6	39.7	18.5	21.2			
							Clay (Fill)	1.52	35.4									
								1.83	37.5									
								2.13	47.1									
2	Magnus Avenue	Asphalt Concrete	40 145			Silty Clay (Fill)	0.3	36.5										
							0.61	25.5										
							0.76	28.1										
							0.91	26.8										
							1.00	27.6										
							Clay (Fill)	1.52	34.7									
								1.83	45.3									
2.13	44.2																	

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Table 3
Summary of Pavement Structure

File No.: 09-071-01

Wardrop Engineering Inc.
 City of Winnipeg 2009 Residential Street Renewal Program

Page 2 of 2

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits					
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index			
3	Magnus Avenue	Asphalt Concrete	30 165			Silty Clay (Fill)	0.3	27.8										
							0.91	31.0										
							1.00	39.3										
							1.22	38.5										
							1.52	35.8										
							Clay	1.83	33.6									
								2.13	37.7									
4	Magnus Avenue	Asphalt Concrete	40 180			Silty Clay (Fill)	0.3	28.1										
							0.61	30.2	0.0	8.3	38.8	52.9	53.0	23.7	29.3			
							0.91	30.8										
							Silty Clay	1.22	31.4									
								1.52	29.1									
								1.83	24.6									
							Clay	2.13	40.1									

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Particle Size Analysis of TH4 for Magnus Avenue



#6 - 854 Marion Street
 Winnipeg, Manitoba
 R2J 0K4
 eng_tech@mts.net
 www.eng-tech.ca

PARTICLE SIZE ANALYSIS REPORT

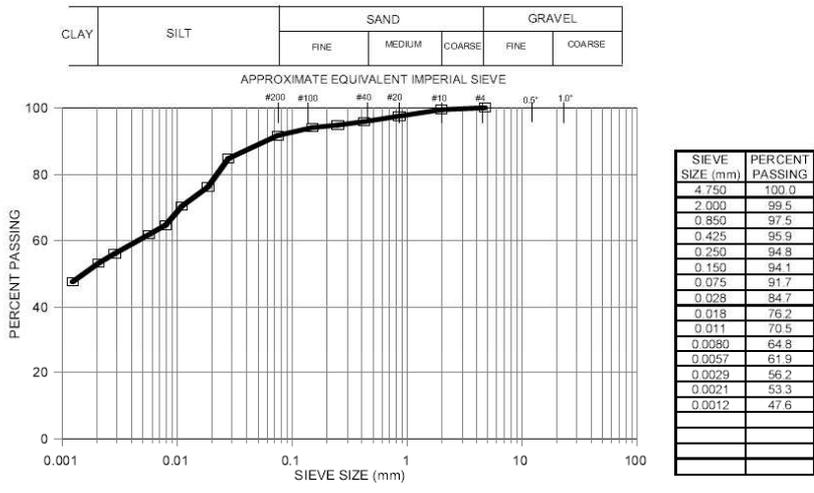
Wardrop Engineering Inc.
 400-386 Broadway
 Winnipeg, Manitoba
 R3C 4M8

File No.: 09-071-01
 Ref. No.: 9-71-1-1

ATTENTION: Naveed Haider, B.S.C.E.

PROJECT: CITY OF WINNIPEG 2009 RESIDENTIAL STREETS RENEWAL PROGRAM

Test Hole No. TH4 Sample No. S2 Depth: 0.61m
 Sampled By: ENG-TECH Type of Sample: Grab Source: Magnus Avenue
 Date Sampled: Jan 28/09 Date Received: Jan 29/09 Date Tested: Feb 2/09



Percent of: GRAVEL (0.0%), SAND (8.3%), SILT (38.8%) and CLAY (52.9%)
 Sample Description:

COMMENTS:

ENG-TECH Consulting Limited

 per Clark Hryhoruk, M. Sc., P. Eng., President
 Ph: (204) 233-1694 Fax: (204) 235-1579

Pavement Core Photos for Magnus Avenue

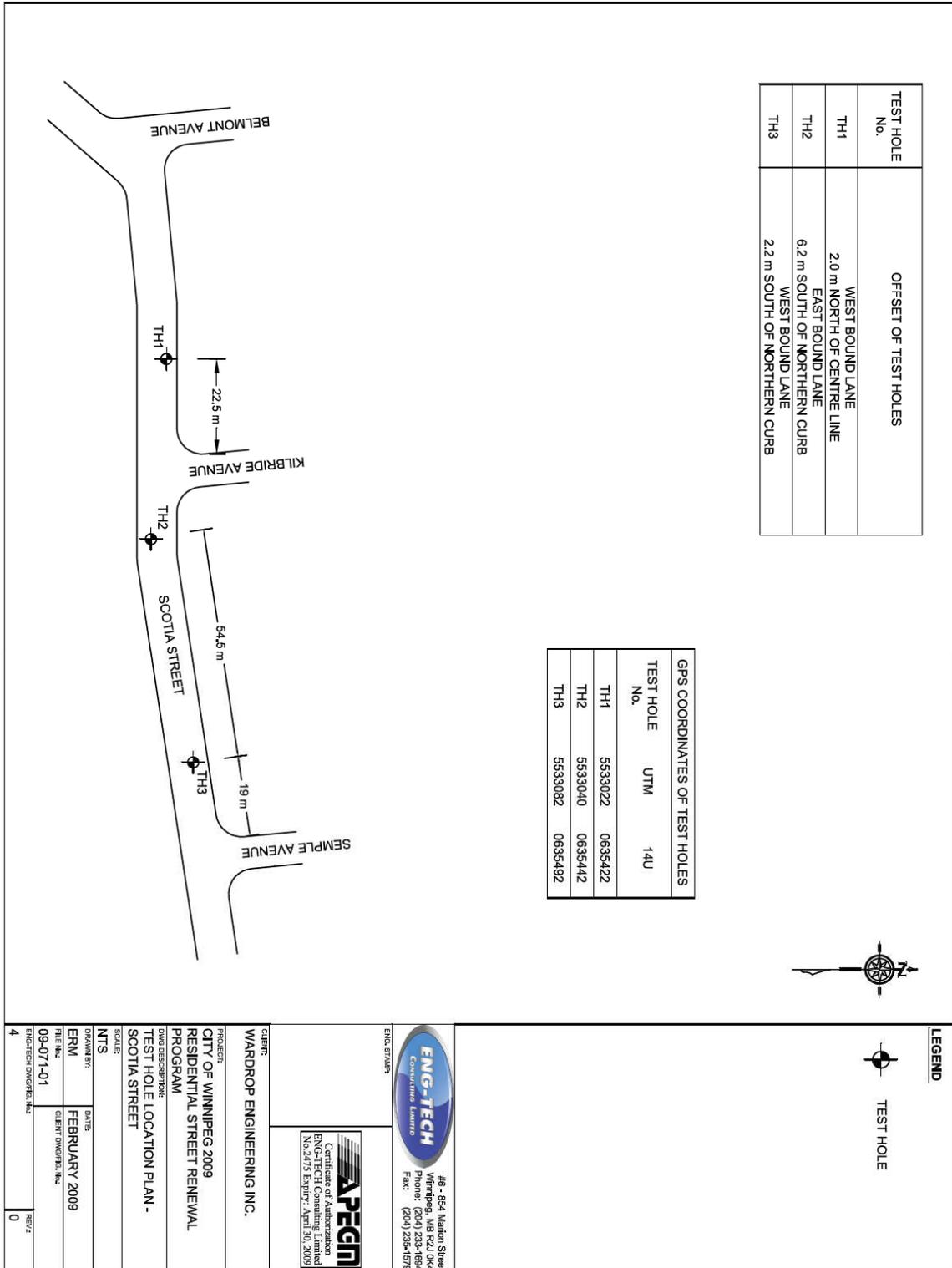


Magnus Avenue
Arlington Street to Parr Street



Geotechnical Report for Scotia Street

Test Hole Locations



Summary of Pavement Structure for Scotia Street

Table 4
Summary of Pavement Structure

File No.: 09-071-01

Wardrop Engineering Inc.
 City of Winnipeg 2009 Residential Street Renewal Program

Page 1 of 2

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits					
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index			
1	Scotia Street	Asphalt Concrete	95 --				Silty Clay (Fill)	0.3	19.3									
								0.61	32.0									
								Clay	0.76	32.2								
									1.00	32.1								
									1.52	31.4								
								Silt	1.83	25.1								
2.13	23.5																	
2	Scotia Street	Asphalt Concrete	70 --	Granular Fill (20 mm)	380		Silty Clay (Fill)	0.61	17.4	3.4	25.2	33.4	38.0	42.0	20.0	22.0		
								Clay	0.76	30.1								
									1.00	30.2								
									1.52	30.9								
								Silt	1.83	23.0								
									2.13	22.5								

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Table 4
Summary of Pavement Structure

File No.: 09-071-01

Wardrop Engineering Inc.
 City of Winnipeg 2009 Residential Street Renewal Program

Page 2 of 2

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits				
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index		
3	Scotia Street	Asphalt Concrete	75 --	Granular Fill (20 mm)	380		Silty Clay (Fill)	0.76	28.9								
								Clay	1.00	30.4	0.1	0.1	25.6	74.2	72.9	32.6	40.3
									1.52	27.6							
								Silt	1.83	23.3							
									2.13	24.4							

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Particle Size Analysis of TH2 for Scotia Street



#6 - 854 Marion Street
 Winnipeg, Manitoba
 R2J 0K4
 eng_tech@mts.net
 www.eng-tech.ca

PARTICLE SIZE ANALYSIS REPORT

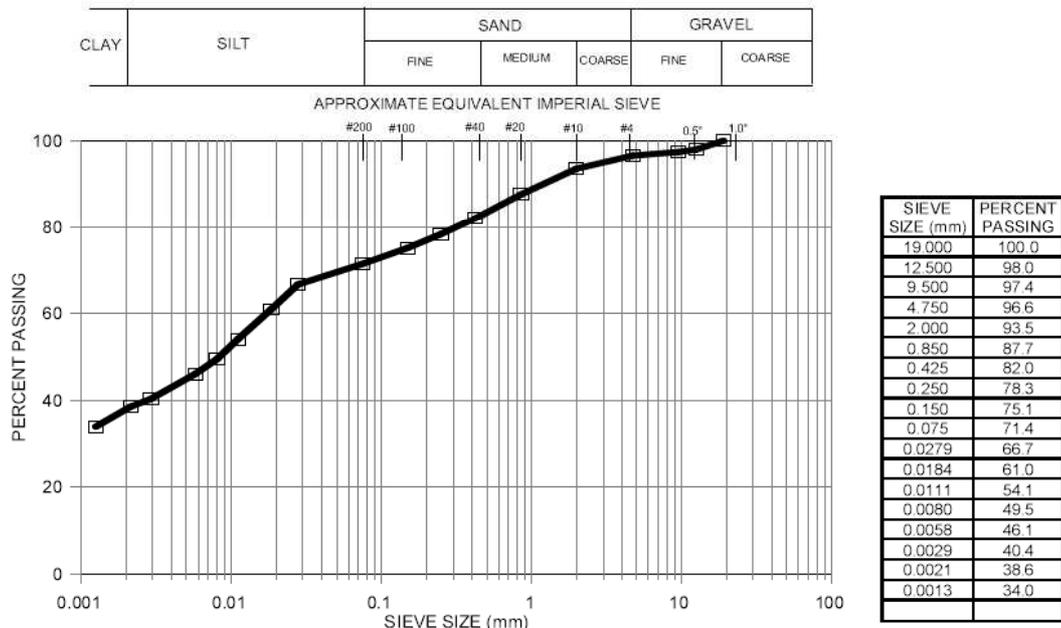
Wardrop Engineering Inc.
 400-386 Broadway
 Winnipeg, Manitoba
 R3C 4M8

File No.: 09-071-01
 Ref. No.: 9-71-1-7

ATTENTION: Naveed Haider, B.S.C.E.

PROJECT: CITY OF WINNIPEG 2009 RESIDENTIAL STREETS RENEWAL PROGRAM

Test Hole No. TH2 **Sample No.** S3 **Depth:** 0.61m
Sampled By: ENG-TECH **Type of Sample:** Grab **Source:** Scotia Street
Date Sampled: Jan 29/09 **Date Received:** Jan 30/09 **Date Tested:** Feb 3/09



Percent of: GRAVEL (3.4%), SAND (25.2%), SILT (33.4%) and CLAY (38.0%)
Sample Description:

COMMENTS:

ENG-TECH Consulting Limited
 per
 Clark Hryhoruk, M. Sc., P. Eng., President
 Ph: (204) 233-1694 Fax: (204) 235-1579

Particle Size Analysis of TH3 for Scotia Street



#6 - 854 Marion Street
 Winnipeg, Manitoba
 R2J 0K4
 eng_tech@mts.net
 www.eng-tech.ca

PARTICLE SIZE ANALYSIS REPORT

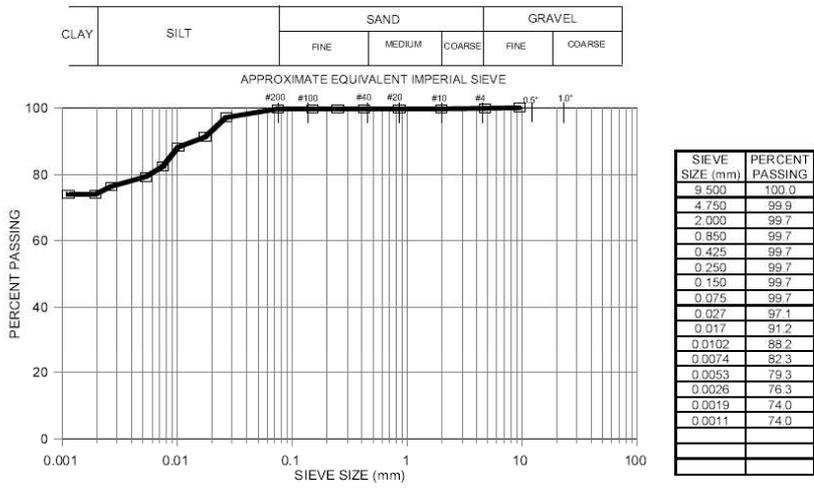
Wardrop Engineering Inc.
 400-386 Broadway
 Winnipeg, Manitoba
 R3C 4M8

File No.: 09-071-01
 Ref. No.: 9-71-1-8

ATTENTION: Naveed Haider, B.S.C.E.

PROJECT: CITY OF WINNIPEG 2009 RESIDENTIAL STREETS RENEWAL PROGRAM

Test Hole No. TH3 Sample No. S3 Depth: 1.0m
 Sampled By: ENG-TECH Type of Sample: Grab Source: Scotia Street
 Date Sampled: Jan 29/09 Date Received: Jan 30/09 Date Tested: Feb 3/09



Percent of: GRAVEL (0.1%), SAND (0.1%), SILT (25.6%) and CLAY (74.2%)
 Sample Description:

COMMENTS:

ENG-TECH Consulting Limited

 per Clark Hryhoruk, M. Sc., P. Eng., President
 Ph: (204) 233-1694 Fax: (204) 235-1579

Pavement Core Photos for Scotia Street

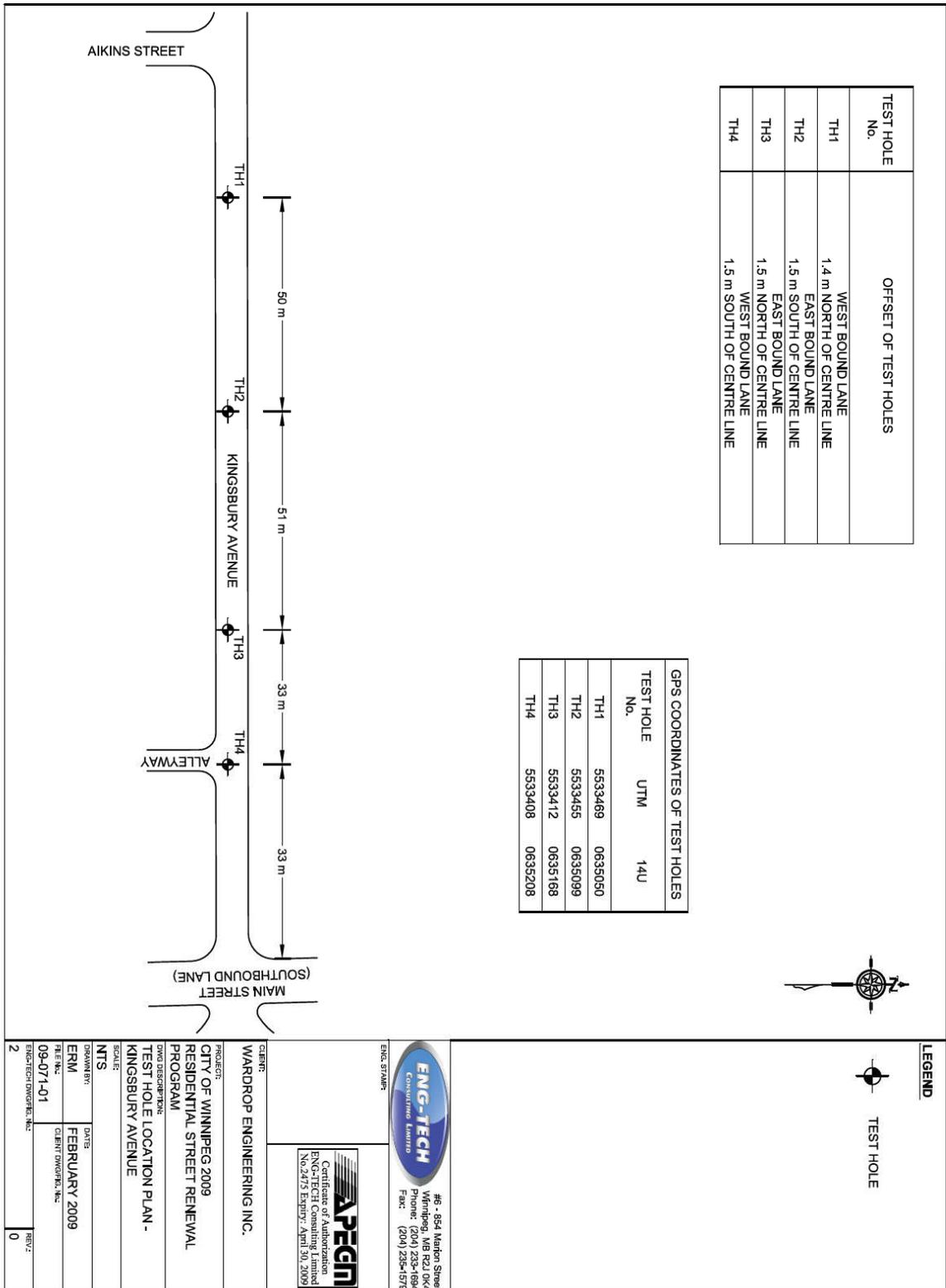


Scotia Street
Belmont Avenue to Semple Avenue



Geotechnical Report for Kingsbury Avenue

Test Hole Locations



Summary of Pavement Structure for Kingsbury Avenue

Table 2
Summary of Pavement Structure

File No.: 09-071-01

Wardrop Engineering Inc.
 City of Winnipeg 2009 Residential Street Renewal Program

Page 1 of 2

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits				
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index		
1	Kingsbury Avenue	Asphalt Concrete	60 --	Granular Fill (20 mm)	375	Silty Clay (Fill)	0.50	19.5	2.6	37.4	34.7	25.3	37.1	18.4	18.7		
							Clay	0.76	30.3								
								1.00	32.7								
								1.52	32.2								
							Silt	1.83	24.4								
								2.13	22.8								
2	Kingsbury Avenue	Asphalt Concrete	93 --	Granular Fill (20 mm)	407	Clay	0.76	34.8									
							1.00	28.8									
							1.52	31.3									
							Silt	1.83	24.4								
								2.13	24.1								

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Table 2
Summary of Pavement Structure

File No.: 09-071-01

Wardrop Engineering Inc.
 City of Winnipeg 2009 Residential Street Renewal Program

Page 2 of 2

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits			
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
3	Kingsbury Avenue	Asphalt Concrete	75 --	Granular Fill (20 mm)	225	Silty Clay (Fill)	0.5	30.3								
							Clay	0.76	36.4							
								1.00	40.6	1.5	0.0	28.2	70.3	81.0	37.1	43.9
								1.52	34.2							
							Silt	1.83	22.7							
								2.13	23.5							
4	Kingsbury Avenue	Asphalt Concrete	70 --	Granular Fill (20 mm)	380	Silty Clay (Fill)	0.5	26.2								
							Clay	0.76	27.2							
								1.00	35.7							
								1.52	38.7							
							Silt	1.83	24.3							
								2.13	24.4							

P:\2009\Projects\071(Wardrop)\01\2009 Residential Streets\summary tables\Table 2 - Pavement Summary_Kingsbury_Ave(final).rtf

Particle Size Analysis of TH1 for Kingsbury Avenue



#6 - 854 Marion Street
 Winnipeg, Manitoba
 R2J 0K4
 eng_tech@mts.net
 www.eng-tech.ca

PARTICLE SIZE ANALYSIS REPORT

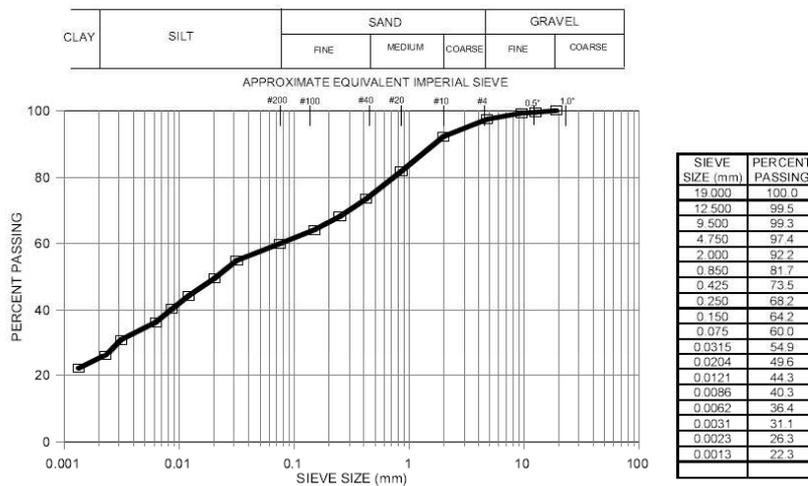
Wardrop Engineering Inc.
 400-386 Broadway
 Winnipeg, Manitoba
 R3C 4M8

File No.: 09-071-01
 Ref. No.: 9-71-1-5

ATTENTION: Naveed Haider, B.S.C.E.

PROJECT: CITY OF WINNIPEG 2009 RESIDENTIAL STREETS RENEWAL PROGRAM

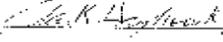
Test Hole No. TH1 Sample No. S2 Depth: 0.5m
 Sampled By: ENG-TECH Type of Sample: Grab Source: Kingsbury Avenue
 Date Sampled: Jan 29/09 Date Received: Jan 30/09 Date Tested: Feb 3/09



Percent of: GRAVEL (2.6%), SAND (37.4%), SILT (34.7%) and CLAY (25.3%)
 Sample Description:

COMMENTS:

ENG-TECH Consulting Limited

per 
 Clark Hryhoruk, M. Sc., P. Eng., President
 Ph: (204) 233-1694 Fax: (204) 235-1579

Particle Size Analysis of TH3 for Kingsbury Avenue



#6 - 854 Marion Street
 Winnipeg, Manitoba
 R2J 0K4
 eng_tech@mts.net
 www.eng-tech.ca

PARTICLE SIZE ANALYSIS REPORT

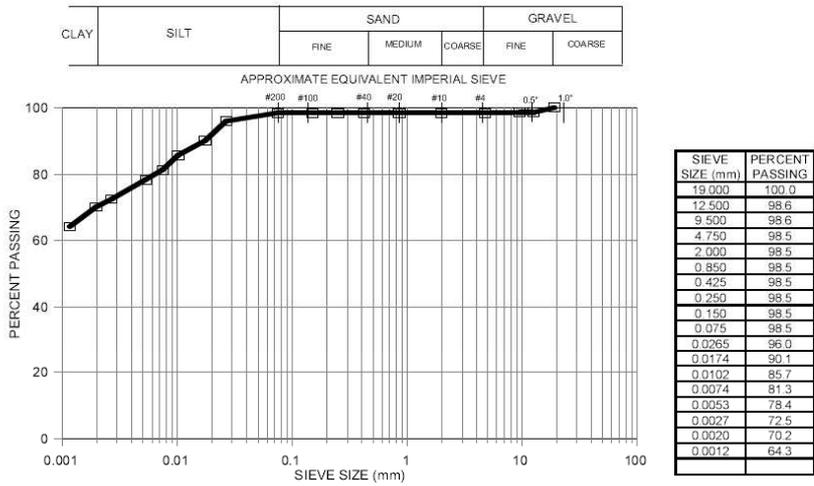
Wardrop Engineering Inc.
 400-386 Broadway
 Winnipeg, Manitoba
 R3C 4M8

File No.: 09-071-01
 Ref. No.: 9-71-1-6

ATTENTION: Naveed Haider, B.S.C.E.

PROJECT: CITY OF WINNIPEG 2009 RESIDENTIAL STREETS RENEWAL PROGRAM

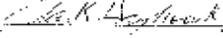
Test Hole No. TH3 Sample No. S3 Depth: 1.0m
 Sampled By: ENG-TECH Type of Sample: Grab Source: Kingsbury Avenue
 Date Sampled: Jan 29/09 Date Received: Jan 30/09 Date Tested: Feb 3/09



Percent of: GRAVEL (1.5%), SAND (0.0%), SILT (28.2%) and CLAY (70.3%)
 Sample Description:

ENG-TECH Consulting Limited

COMMENTS:

per 
 Clark Hryhoruk, M. Sc., P. Eng., President
 Ph: (204) 233-1694 Fax: (204) 235-1579

Pavement Core Photos for Kingsbury Avenue



Kingsbury Avenue
Main Street to Aikins Street

