APPENDIX ‘A’

GEOTECHNICAL REPORT

APPENDIX 'A' - GEOTECHNICAL REPORT

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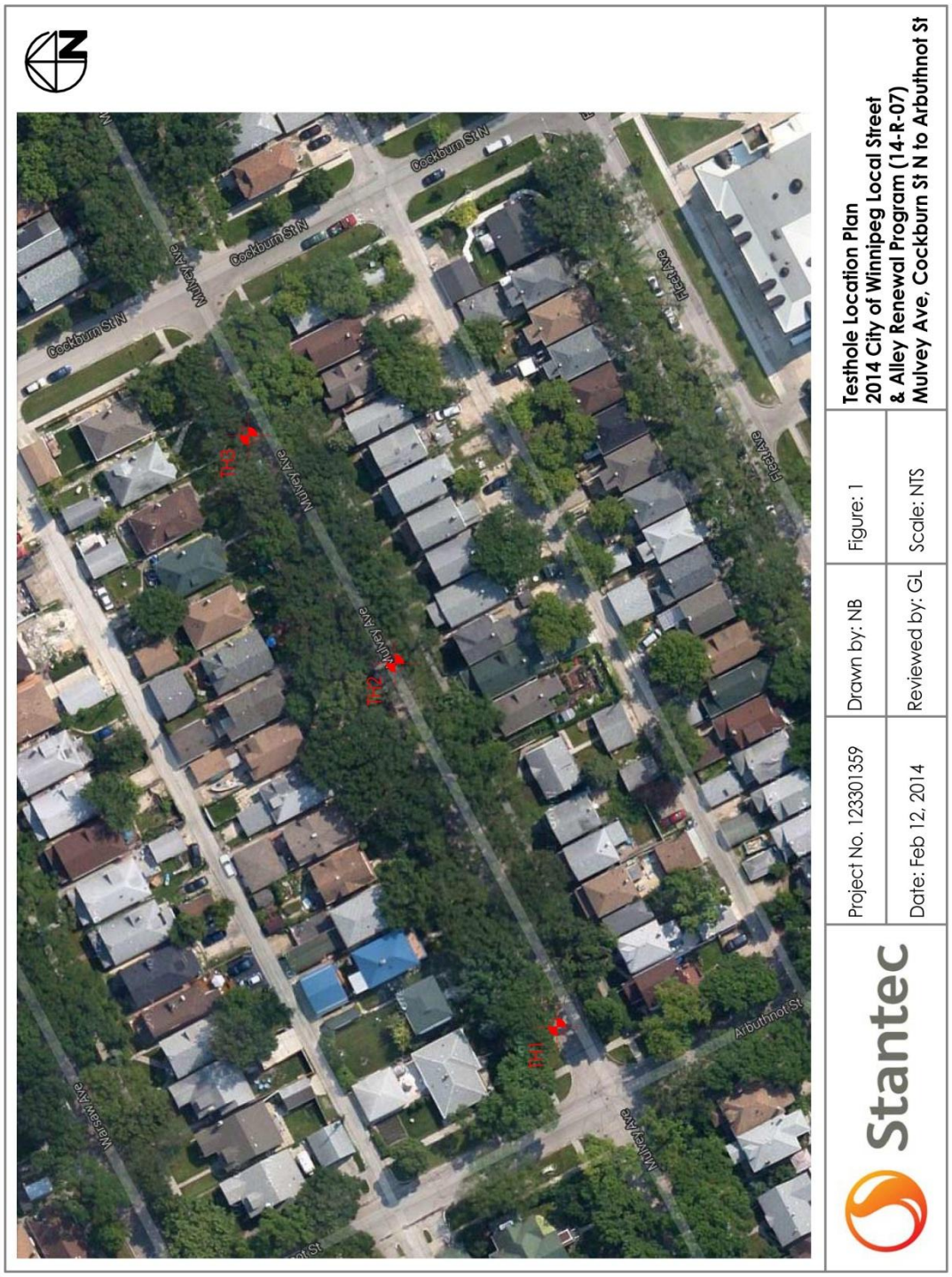
The geotechnical report is provided to aid in the Contractor's evaluation of the existing pavement structure and/or soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling. However, variations in pavement structure and/or soil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

Test Hole Locations



Summary of Core Samples

Stantec

TABLE 1
2014 CITY OF WINNIPEG LOCAL STREET & ALLEY RENEWAL PROGRAM (14-R-07)
MULVEY AVENUE FROM COCKBURN STREET N TO ARBUTHNOT STREET
GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Sample Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH01	Mulvey Avenue 10.0 m East from Northeast corner of Arbuthnot Street and Mulvey Avenue, 1.5 m South from North curb	Asphalt	55	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	155												
TH02	Mulvey Avenue 0.5 m West from property 702 & 706 Mulvey Avenue, 1.5 m North from South curb	Asphalt	80	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	130												
TH03	Mulvey Avenue 1.0 m West from property 687 & 689 Mulvey Avenue, 1.5 m South from North curb	Asphalt	60	-	-	Clay	0.6	33	0.0	1.5	14.8	83.7	84	26	58
		Concrete	140												

Test Hole Log for Mulvey Avenue

TESTHOLE TH1

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: Mulvey Avenue from Cockburn Street N to Arbuthnot Street
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 10.0 m east from northeast corner of Arbuthnot St & Mulvey Ave, 1.5 m south from north curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Description	Sample Type	Water Content (%)
	Asphalt		
	Concrete		
	Clay Fill - black, firm, moist, medium plasticity - some fine to coarse sand - trace fine gravel	BS	30
		BS	20
0.5	**Silt** - tan, soft, moist, low plasticity		
	Clay - brown, firm, moist, high plasticity - some silt - trace fine to sand - stiff below 1.1 m	BS	35
		BS	37
1.0			
		BS	37
1.5		BS	42
		BS	42
2.0		BS	47

Water Content (%) scale: 25 50 75 100

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

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TESTHOLE TH2

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: Mulvey Avenue from Cockburn Street N to Arbuthnot Street
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 0.5 m west from property 702 & 706 Mulvey Avenue, 1.5 m north from south curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Description	Sample Type	Water Content (%)
	Asphalt		
	Concrete		
	Clay Fill - black, firm, moist, medium plasticity - some fine to coarse sand - trace fine gravel	BS	34
		BS	39
0.5	**Clay** - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand	BS	37
		BS	43
1.0		BS	41
1.5		BS	48
		BS	41
2.0		BS	49

Water Content (%): 25 50 75 100

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

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TESTHOLE TH3

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: Mulvey Avenue from Cockburn Street N to Arbuthnot Street
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 1.0 m west from property 687 & 689 Mulvey Avenue, 1.5 m south from north curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Water Content (%) PL LL (25 50 75 100)
		Asphalt						
		Concrete						
		Clay Fill - black, firm, moist, medium plasticity - some fine to coarse sand - trace fine gravel	BS					●32
			BS					●36
0.5		**Clay** - brown, firm, moist, high plasticity - some silt - trace fine to sand	BS					●33
			BS	0.0	1.5	14.8	83.7	●36
1.0			BS					●41
1.5			BS					●45
			BS					●45
2.0			BS					●44

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

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Particle Size Analysis for Mulvey Avenue

Stantec

PARTICLE SIZE ANALYSIS
ASTM D422

Dillon Consulting Ltd.
1558 Wilson Place
Winnipeg, Manitoba
R3T 0Y4

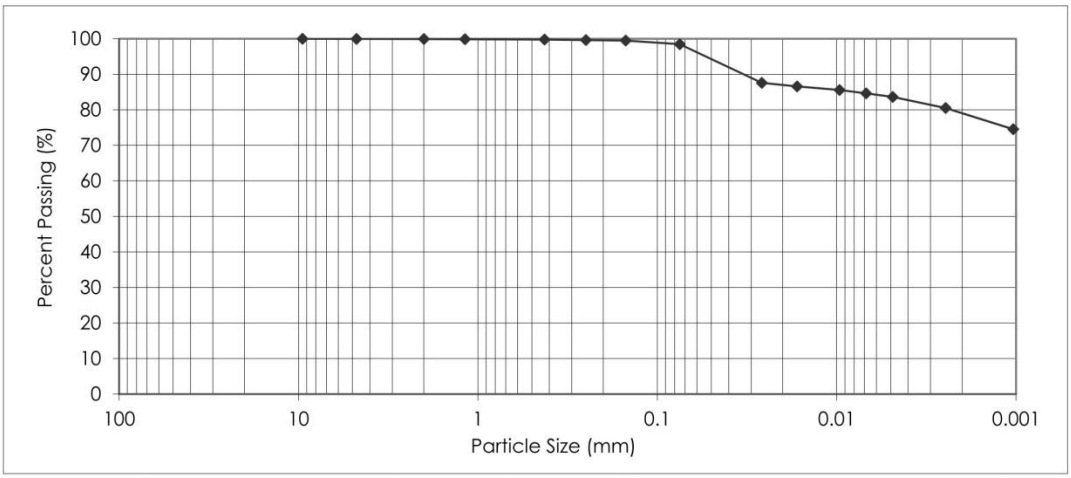
PROJECT: 2014 City of Winnipeg Local Street & Alley Renewal Program (14-R-07)
Mulvey Ave from Cockburn St N to Arbuthnot St

Attention: Taran Peters

PROJECT NO.: 123301359

SAMPLED BY: Sothea Bun
SAMPLE ID: TH3 @ 0.6 m

DATE RECEIVED: February 3, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	100.0
2.00 mm	99.9

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.9
0.425 mm	99.8
0.250 mm	99.6
0.150 mm	99.5
0.075 mm	98.5
0.005 mm	83.7
0.002 mm	78.6
0.001 mm	NT*

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.1	0.1	1.3	14.8	83.7	NT*

NT* Sample not tested for colloids

February 19, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

199 Henlow Bay, Winnipeg, Manitoba R3Y 1G4 Phone (204) 488-6999 Fax (204) 488-6947

Pavement Core Photos

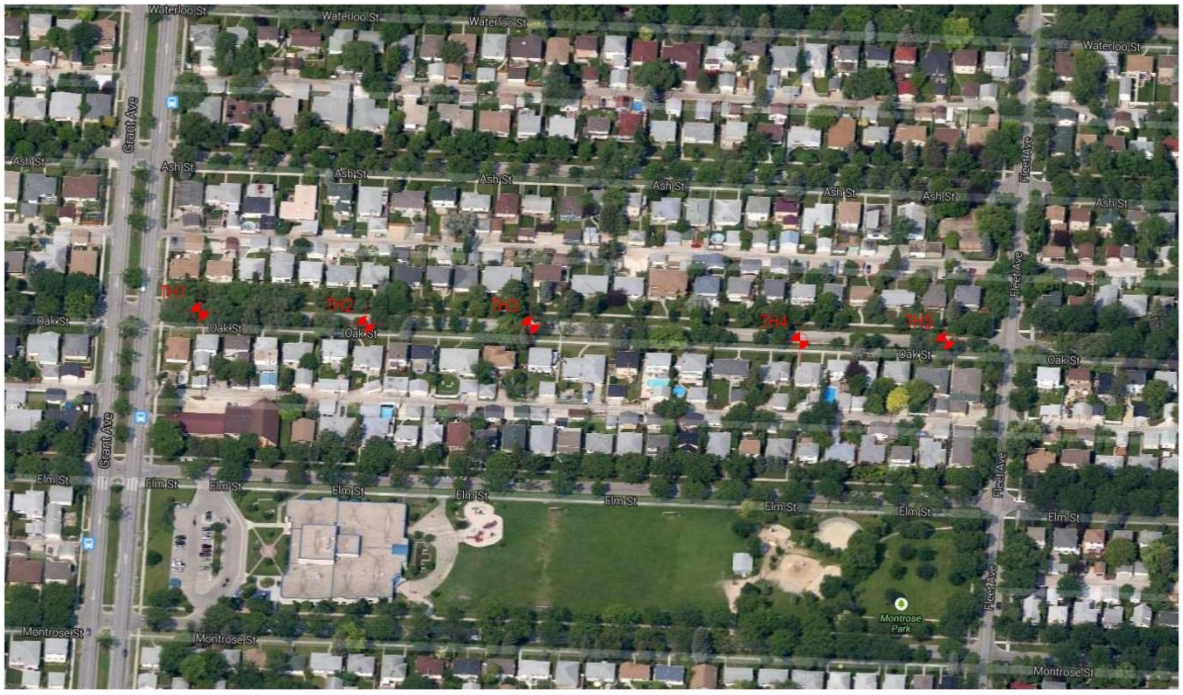
Core sample from Testhole TH1

Core sample from Testhole TH2

Core sample from Testhole TH3

Geotechnical Report for Oak Street

Test Hole Locations



Stantec	Project No. 123301359	Drawn by: NB	Figure: 1	**Testhole Location Plan** **2014 City of Winnipeg Local Street & Alley Renewal Program (14-R-07)** **Oak St from Grant Ave to Fleet Ave**
	Date: Feb 12, 2014	Reviewed by: GL	Scale: NTS	

Summary of Core Samples

Stantec

TABLE 1
2014 CITY OF WINNIPEG LOCAL STREET & ALLEY RENEWAL PROGRAM (14-R-07)
OAK STREET FROM GRANT AVENUE TO FLEET AVENUE
GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Sample Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH01	Oak Street 2.0 m South from property 741 & 745 Oak Street, 1.0 m East from West curb	Concrete	245	-	-	Clay	0.6	38	0.1	1.8	13.4	84.7	84	25	59
TH02	Oak Street 2.0 m North from property 720 & 724 Oak Street, 1.5 m West from East curb	Concrete	200	-	-	-	-	-	-	-	-	-	-	-	-
TH03	Oak Street 3.0 m North from property 701 & 705 Oak Street, 1.5 m East from West curb	Concrete	180	-	-	-	-	-	-	-	-	-	-	-	-
TH04	Oak Street 3.0 m North from property 668 & 672 Oak Street, 1.5 m West from East curb	Concrete	240	-	-	-	-	-	-	-	-	-	-	-	-
TH05	Oak Street 1.0 m South from property 649 & 653 Oak Street, 1.5 m East from West curb	Concrete	215	-	-	Silty Clay	0.6	35	0.0	1.5	35.5	63.0	48	18	30

Test Hole Log for Oak Street

TESTHOLE TH1

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: Oak Street from Grant Avenue to Fleet Avenue
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 2.0 m south from property 741 & 745 Oak Street, 1.0 m east from west curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Water Content (%) PL LL
		Concrete						
		Clay Fill - black, firm, moist, medium plasticity - some fine to medium sand - trace silt	BS					26
			BS					23
0.5		**Clay** - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel	BS	0.1	1.8	13.4	84.7	38
			BS					39
1.0			BS					41
1.5			BS					43
			BS					47
2.0			BS					51

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

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Template Version: C420131129 - RW

TESTHOLE TH2

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: Oak Street from Grant Avenue to Fleet Avenue
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 2.0 m north from property 720 & 724 Oak Street, 1.5 m west from east curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%) 25 50 75 100
		Concrete		
		Clay Fill - black, firm, moist, medium plasticity - some fine to medium sand - trace silt	BS BS	●23 ●21
0.5		**Clay** - brown, firm, moist, high plasticity - some silt - trace fine sand	BS	●37
1.0		**Silty Clay** - brown, firm, moist, medium plasticity - trace fine to medium sand	BS	●36
			BS	●38
1.5		**Clay** - brown, firm, moist, high plasticity - trace silt	BS	●44
			BS	●42
2.0			BS	●46

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

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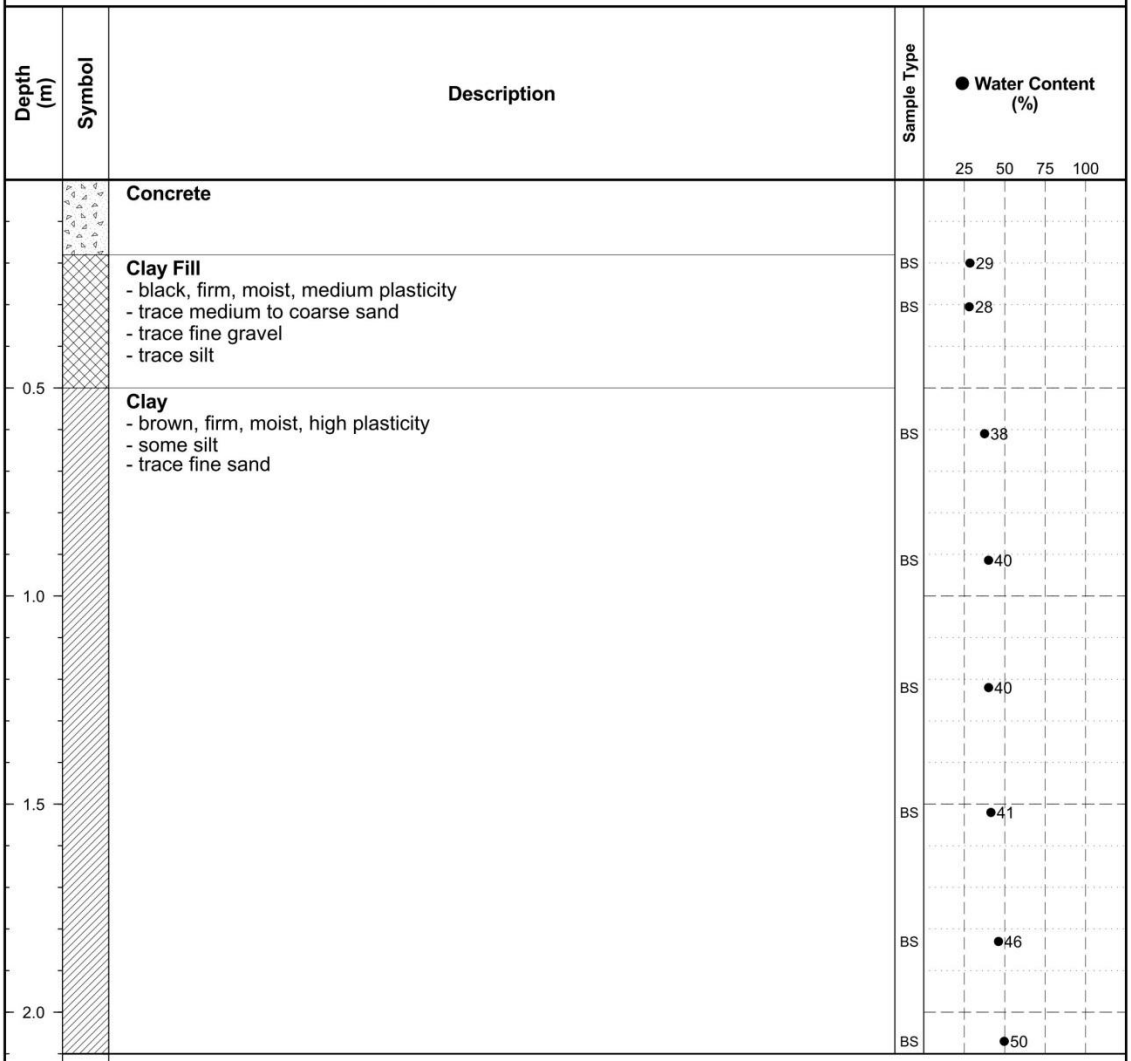
TESTHOLE TH3

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: Oak Street from Grant Avenue to Fleet Avenue
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 3.0 m north from property 701 & 705 Oak Street, 1.5 m east from west curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal



- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

Template Version: C420131129 - RW

TESTHOLE TH4

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: Oak Street from Grant Avenue to Fleet Avenue
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 3.0 m north from property 668 & 672 Oak Street, 1.5 m west from east curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%) 25 50 75 100
		Concrete		
		Clay Fill - black, firm, moist, medium plasticity - some fine to medium sand - trace silt	BS BS	●36 ●34
0.5		**Silty Clay** - brown, firm, moist, medium plasticity - trace fine to medium sand	BS	●22
			BS	●26
1.0		**Clay** - brown, firm, moist, high plasticity - some silt - trace fine sand	BS	●42
1.5			BS	●43
			BS	●47
2.0			BS	●41

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

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Template Version: C420131129 - RW

TESTHOLE TH5

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: Oak Street from Grant Avenue to Fleet Avenue
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 1.0 m south from property 649 & 653 Oak Street, 1.5 m east from west curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Water Content (%) PL LL (25 50 75 100)
		Concrete						
		Clay Fill - black, firm, moist, medium plasticity - some fine to medium sand - trace silt	BS					32
			BS					25
0.5		**Silty Clay** - brown, firm, moist, medium plasticity - trace fine to medium sand	BS	0.0	1.5	35.5	63.0	35
			BS					33
1.0		**Clay** - brown, firm, moist, high plasticity - some silt - trace fine sand	BS					41
1.5			BS					42
			BS					44
2.0			BS					48

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

Particle Size Analysis for Oak Street

Stantec

PARTICLE SIZE ANALYSIS
ASTM D422

Dillon Consulting Ltd.
1558 Wilson Place
Winnipeg, Manitoba
R3T 0Y4

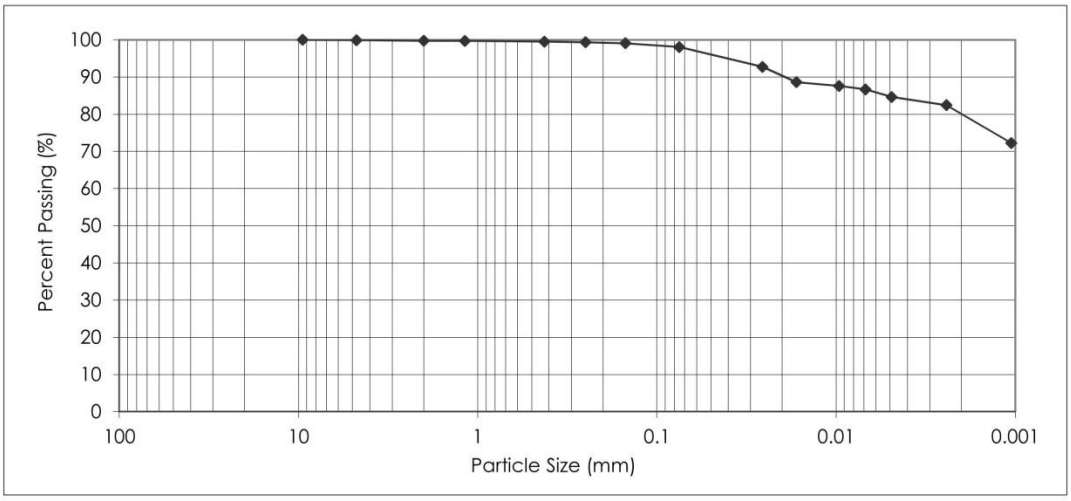
PROJECT: 2014 City of Winnipeg Local Street & Alley Renewal Program (14-R-07)
Oak Street from Grant Avenue to Fleet Avenue

Attention: Taran Peters

PROJECT NO.: 123301359

SAMPLED BY: Sothea Bun
SAMPLE ID: TH1 @ 0.6 m

DATE RECEIVED: February 3, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	99.9
2.00 mm	99.7

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.7
0.425 mm	99.5
0.250 mm	99.3
0.150 mm	99.1
0.075 mm	98.1
0.005 mm	84.7
0.002 mm	79.3
0.001 mm	NT*

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.1	0.2	0.2	1.4	13.4	84.7	NT*

NT* Sample not tested for colloids

February 18, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

199 Henlow Bay, Winnipeg, Manitoba R3Y 1G4 Phone (204) 488-6999 Fax (204) 488-6947

PARTICLE SIZE ANALYSIS
ASTM D422

Dillon Consulting Ltd.
1558 Wilson Place
Winnipeg, Manitoba
R3T 0Y4

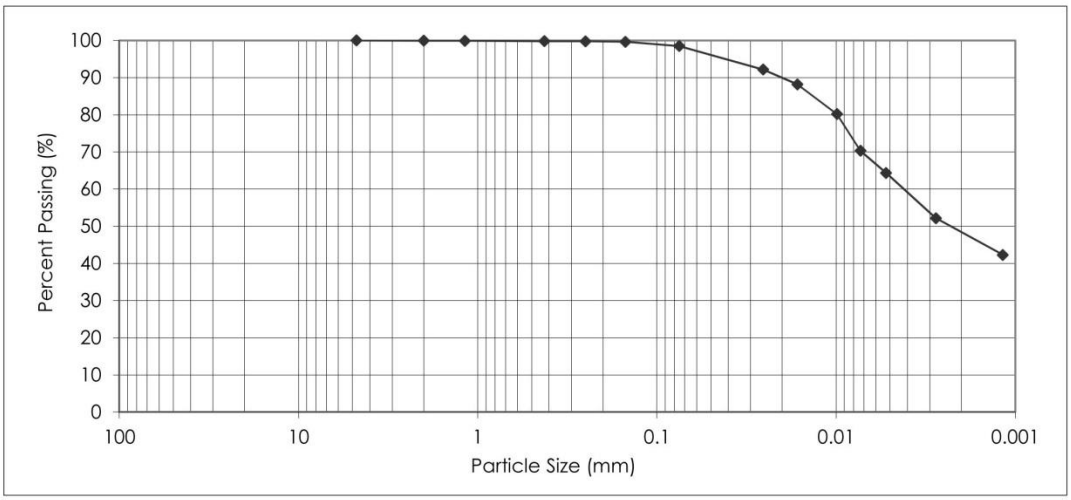
PROJECT: 2014 City of Winnipeg Local Street & Alley Renewal Program (14-R-07)
Oak Street from Grant Avenue to Fleet Avenue

Attention: Taran Peters

PROJECT NO.: 123301359

SAMPLED BY: Sothea Bun
SAMPLE ID: TH5 @ 0.6 m

DATE RECEIVED: February 3, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	100.0
2.00 mm	100.0

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.9
0.425 mm	99.8
0.250 mm	99.8
0.150 mm	99.7
0.075 mm	98.5
0.005 mm	63.0
0.002 mm	47.4
0.001 mm	NT*

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.0	0.2	1.3	35.5	63.0	NT*

NT* Sample not tested for colloids

February 18, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

199 Henlow Bay, Winnipeg, Manitoba R3Y 1G4 Phone (204) 488-6999 Fax (204) 488-6947

Pavement Core Photos

Core sample from Testhole TH1

Core sample from Testhole TH2

Core sample from Testhole TH3

Core sample from Testhole TH4

Core sample from Testhole TH5

Geotechnical Report for South Drive

Test Hole Locations

Summary of Core Samples

Stantec

TABLE 1
2014 CITY OF WINNIPEG LOCAL STREET & ALLEY RENEWAL PROGRAM (14-R-07)
SOUTH DRIVE FROM HOLLY AVENUE TO CRESCENT DRIVE
GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Sample Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH1	South Drive 20.0 m North from Northwest corner of Crescent Drive and South Drive, 1.5 m East from West curb	Asphalt	110	Granular Fill	140	-	-	-	-	-	-	-	-	-	-
TH2	South Drive 64.0 m North from Northwest corner of Dove Bay and South Drive, 1.5 m West from East curb	Asphalt	90	Granular Fill	160	Clayey Silt	0.6	19	0.0	4.9	68.3	26.8	26	17	9
TH3	South Drive 51.0 m North from Northwest corner of Kebir Place and South Drive, 2.0 m West from West curb	-	-	-	-	Clayey Silt	0.6	20	0.5	6.2	62.1	31.2	34	16	18
TH4	South Drive 112.0 m North from Northwest corner of Kebir Place and South Drive, 1.5 m West from East curb	Asphalt	80	Granular Fill	180	Clay	0.9	30	0.0	2.4	19.0	78.6	76	24	52
TH5	South Drive 18.0 m South from Southwest corner of Holly Avenue and South Drive, 1.5 m East from West curb	Asphalt	110	Granular Fill	140	-	-	-	-	-	-	-	-	-	-

Template Version: C420131129 - RW

Test Hole Log for South Drive

TESTHOLE TH1

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: South Drive from Holly Avenue to Crescent Drive
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 20.0 m north from northwest corner of Crescent Drive and South Drive, 1.5 m east from west curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%) 25 50 75 100
		Asphalt		
		Granular Fill - 20 mm maximum aggregate size		
		Clay Fill - black, firm, moist, high plasticity - some fine to medium sand - trace silt	BS BS	●35 ●31
0.5		**Clayey Silt** - tan, firm, moist, low plasticity - trace fine to medium sand	BS	●26
		Clay - brown, firm, moist, high plasticity - some silt - trace fine to medium sand	BS	●31
1.0			BS	●31
1.5			BS	●29
			BS	●38
2.0			BS	●40
		• The soil was frozen to a depth of 1.2 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.		

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TESTHOLE TH2

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: South Drive from Holly Avenue to Crescent Drive
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 64.0 m north from northwest corner of Dove Bay and South Drive, 1.5 m west from east curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Water Content (%) PL LL (25 50 75 100)
0.0		**Asphalt**						
		Granular Fill - 20 mm maximum aggregate size						
		Clay Fill - black, firm, moist, high plasticity - some fine to medium sand - trace silt	BS					39
			BS					33
0.5		**Clayey Silt** - tan, firm, moist, low plasticity - trace fine to medium sand	BS	0.0	4.9	68.3	26.8	19
			BS					24
1.0		**Clay** - brown, firm, moist, high plasticity - some silt - trace fine to medium sand	BS					32
1.5			BS					38
			BS					39
2.0			BS					44

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

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Template Version: C420131129 - RW

TESTHOLE TH3

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: South Drive from Holly Avenue to Crescent Drive
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 51.0 m north from northwest corner of Kebir Place and South Drive, 2.0 m west from west curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Water Content (%) PL LL (25 50 75 100)
		Topsoil						
		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace silt - trace fine gravel	BS					24
			BS					25
0.5		**Clayey Silt** - brown, firm, moist, medium plasticity - trace fine to coarse sand - trace fine gravel	BS	0.5	6.2	62.1	31.2	20
			BS					25
1.0		**Clay** - brown, stiff, moist, high plasticity - some silt - trace fine to medium sand	BS					34
1.5			BS					35
			BS					35
2.0			BS					44

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

Page 1 of 1

TESTHOLE TH4

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: South Drive from Holly Avenue to Crescent Drive
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 112.0 m north from northwest corner of Kebir Place and South Drive, 1.5 m west from east curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Water Content (%) PL LL (25 50 75 100)
		Asphalt						
		Granular Fill - 20 mm maximum aggregate size						
		Clay Fill - black, firm, moist, high plasticity - some fine to medium sand - trace silt	BS BS					●34 ●28
0.5		**Clay** - black, firm, moist, high plasticity - some silt - trace fine to coarse sand - some organic material below 1.4 m - grey below 1.7 m	BS					●32
			BS	0.0	2.4	19.0	78.6	●30
1.0			BS					●32
1.5			BS					●35
			BS					●24
2.0			BS					●33

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

Page 1 of 1

Template Version: C420131129 - RW

TESTHOLE TH5

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: South Drive from Holly Avenue to Crescent Drive
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 18.0 m south from southwest corner of Holly Avenue and South Drive, 1.5 m east from west curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%) 25 50 75 100
		Asphalt		
		Granular Fill - 20 mm maximum aggregate size		
		Clay Fill - brown, firm, moist, high plasticity - some fine to medium sand - trace silt	BS BS	●49 ●44
0.5		**Clay** - brown, firm, moist, high plasticity - some silt - trace fine to medium sand - stiff below 1.7 m	BS	●29
			BS	●29
1.0			BS	●29
1.5			BS	●30
			BS	●36
2.0			BS	●32

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

Page 1 of 1

Particle Size Analysis for South Drive

Stantec

PARTICLE SIZE ANALYSIS
ASTM D422

Dillon Consulting Ltd.
1558 Wilson Place
Winnipeg, Manitoba
R3T 0Y4

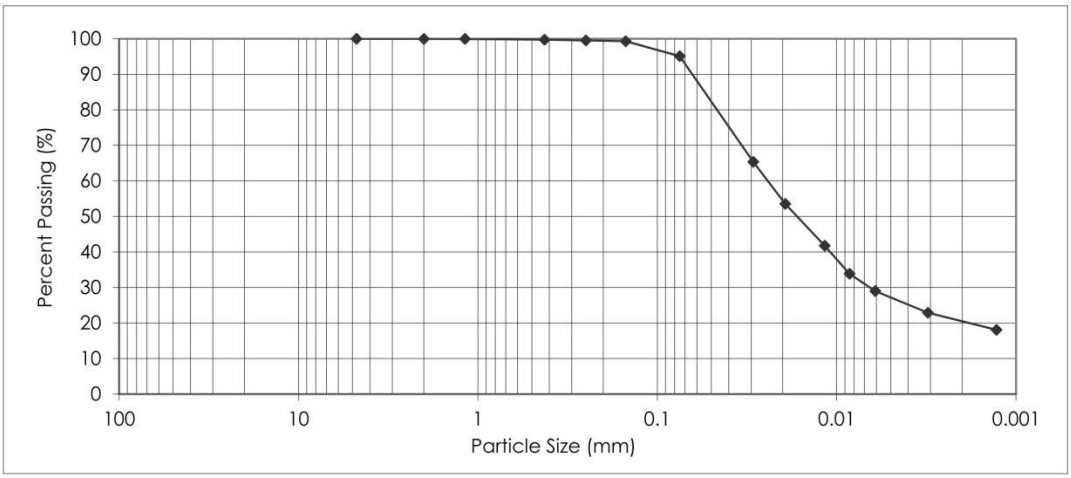
PROJECT: 2014 City of Winnipeg Local Street & Alley Renewal Program (14-R-07)
South Drive from Holly Avenue to Crescent Drive

Attention: Taran Peters

PROJECT NO.: 123301359

SAMPLED BY: Sothea Bun
SAMPLE ID: TH2 @ 0.6 m

DATE RECEIVED: February 3, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	100.0
2.00 mm	100.0

PARTICLE SIZE	PERCENT PASSING
1.18 mm	100.0
0.425 mm	99.7
0.250 mm	99.5
0.150 mm	99.3
0.075 mm	95.1
0.005 mm	26.8
0.002 mm	20.0
0.001 mm	NT*

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.0	0.3	4.6	68.3	26.8	NT*

NT* Sample not tested for colloids

February 18, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

199 Henlow Bay, Winnipeg, Manitoba R3Y 1G4 Phone (204) 488-6999 Fax (204) 488-6947

PARTICLE SIZE ANALYSIS
ASTM D422

Dillon Consulting Ltd.
1558 Wilson Place
Winnipeg, Manitoba
R3T 0Y4

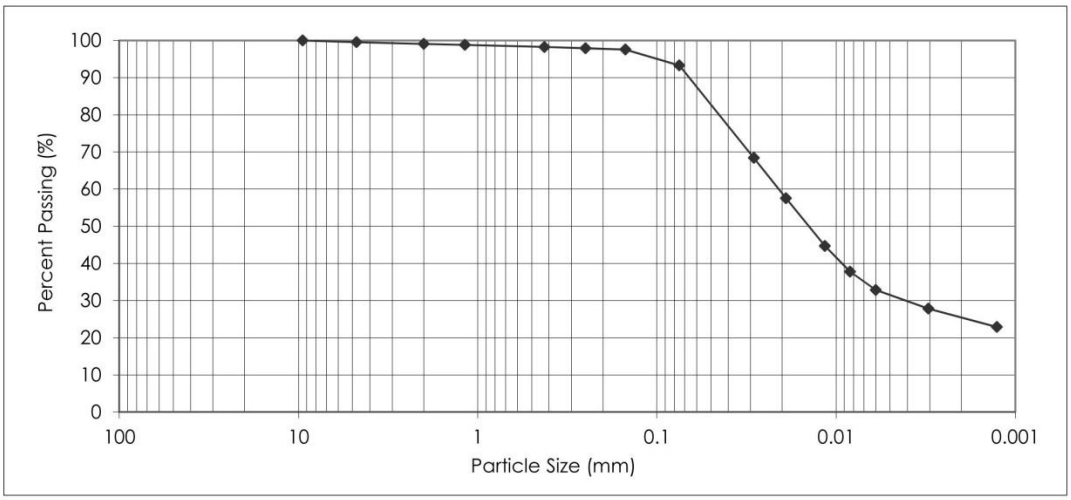
PROJECT: 2014 City of Winnipeg Local Street & Alley Renewal Program (14-R-07) South Drive from Holly Avenue to Crescent Drive

Attention: Taran Peters

PROJECT NO.: 123301359

SAMPLED BY: Sothea Bun
SAMPLE ID: TH3 @ 0.6 m

DATE RECEIVED: February 3, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	99.5
2.00 mm	99.1

PARTICLE SIZE	PERCENT PASSING
1.18 mm	98.8
0.425 mm	98.3
0.250 mm	97.9
0.150 mm	97.6
0.075 mm	93.3
0.005 mm	31.2
0.002 mm	24.9
0.001 mm	NT*

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.5	0.4	0.8	5.0	62.1	31.2	NT*

NT* Sample not tested for colloids

February 18, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

199 Henlow Bay, Winnipeg, Manitoba R3Y 1G4 Phone (204) 488-6999 Fax (204) 488-6947

PARTICLE SIZE ANALYSIS
ASTM D422

Dillon Consulting Ltd.
1558 Wilson Place
Winnipeg, Manitoba
R3T 0Y4

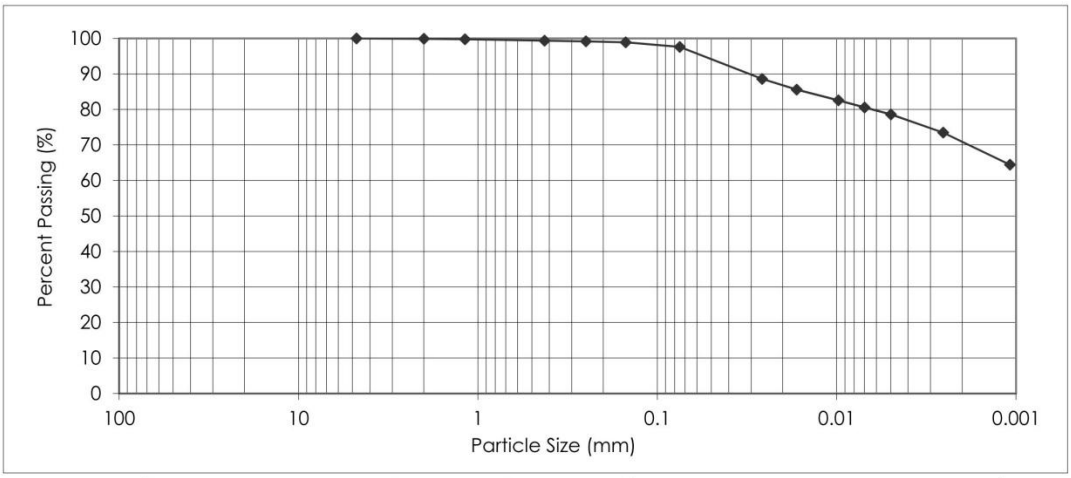
PROJECT: 2014 City of Winnipeg Local Street & Alley Renewal Program (14-R-07) South Drive from Holly Avenue to Crescent Drive

Attention: Taran Peters

PROJECT NO.: 123301359

SAMPLED BY: Sothea Bun
SAMPLE ID: TH4 @ 0.9 m

DATE RECEIVED: February 3, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	100.0
2.00 mm	99.9

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.8
0.425 mm	99.4
0.250 mm	99.2
0.150 mm	98.9
0.075 mm	97.6
0.005 mm	78.6
0.002 mm	70.1
0.001 mm	NT*

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.1	0.5	1.8	19.0	78.6	NT*

NT* Sample not tested for colloids

February 18, 2014

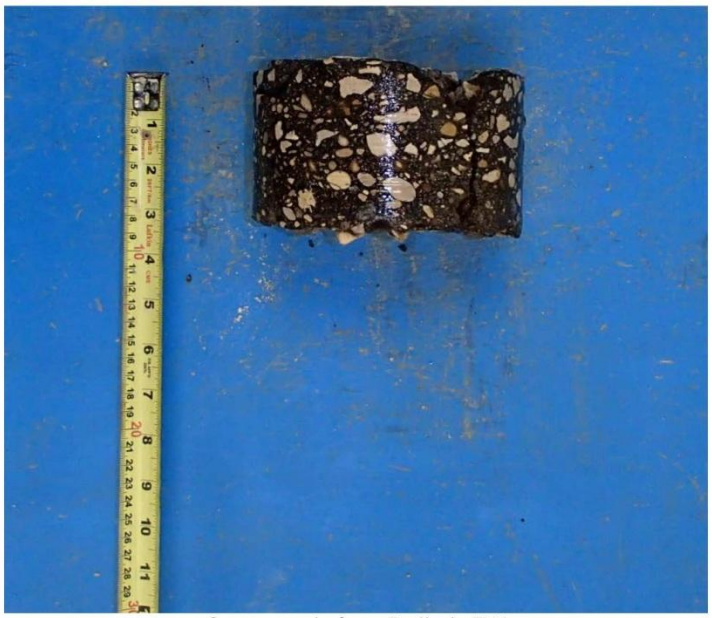
REVIEWED BY: German E. Leal, B.Sc., P. Eng.

199 Henlow Bay, Winnipeg, Manitoba R3Y 1G4 Phone (204) 488-6999 Fax (204) 488-6947

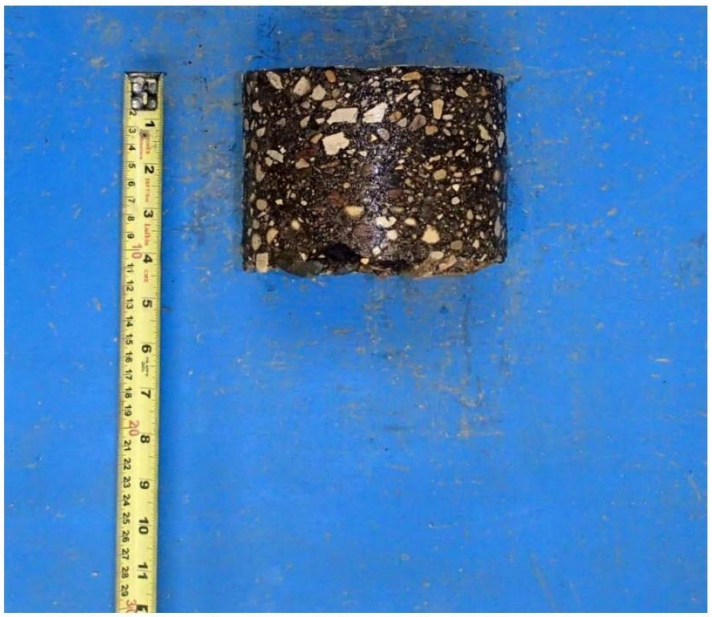
Pavement Core Photos

Core sample from Testhole TH1

Core sample from Testhole TH2



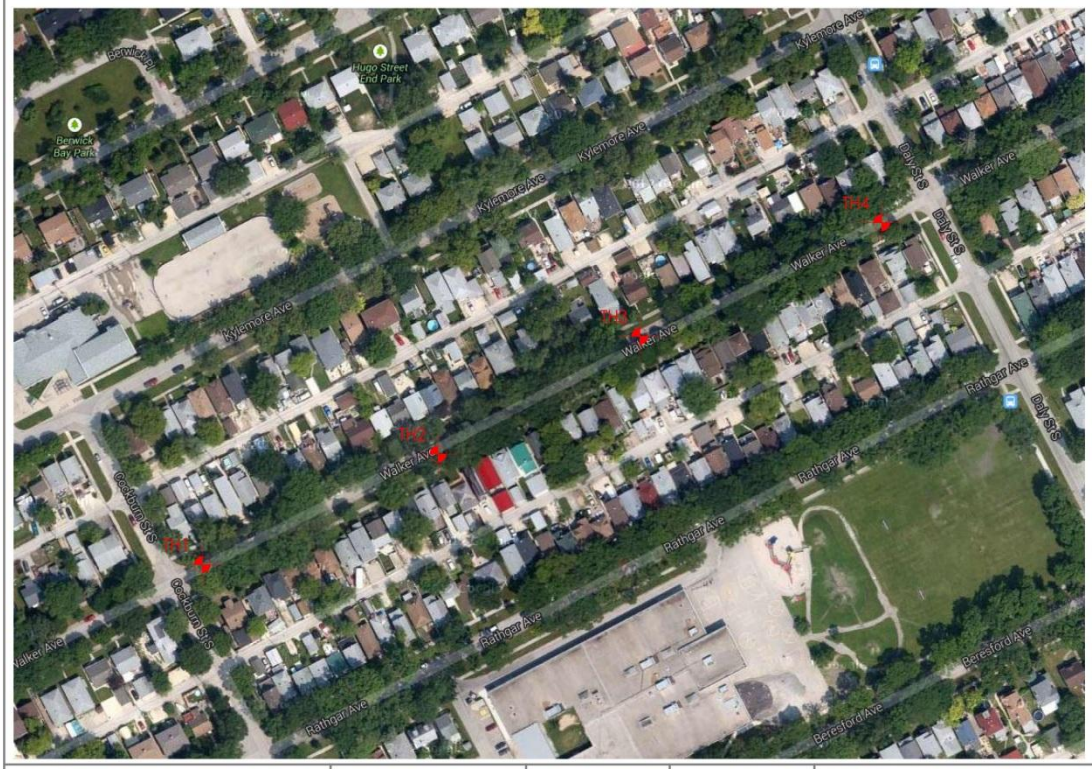
Core sample from Testhole TH4



Core sample from Testhole TH5

Geotechnical Report for Walker Avenue

Test Hole Locations



Stantec	Project No. 123301359	Drawn by: NB	Figure: 1	**Testhole Location Plan** **2014 City of Winnipeg Local Street & Alley Renewal Program (14-R-07)** **Walker Ave from Daly St to Cockburn St S**
	Date: Feb 12, 2014	Reviewed by: GL	Scale: NTS	

Summary of Core Samples

Stantec

TABLE 1
2014 CITY OF WINNIPEG LOCAL STREET & ALLEY RENEWAL PROGRAM (14-R-07)
WALKER AVENUE FROM DALY STREET TO COCKBURN STREET S
GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Sample Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH01	Walker Avenue 7.0 m East from Northwest corner of Cockburn Street S and Walker Avenue, 1.0 m South from North curb	Asphalt	210	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	170												
TH02	Walker Avenue 4.0 m West from property 672 & 678 Walker Avenue, 1.0 m North from South curb	Asphalt	90	-	-	Clayey Silt	0.9	17	0.0	4.0	62.0	34.0	31	17	14
		Concrete	150												
TH03	Walker Avenue 2.0 m West from property 646 & 648 Walker Avenue, 1.0 m South from North curb	Asphalt	125	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	135												
TH04	Walker Avenue 3.5 m West from property 610 & 614 Walker Avenue, 1.0 m North from South curb	Asphalt	130	-	-	Clay	0.9	37	0.5	2.2	13.9	83.4	74	23	51
		Concrete	110												

Test Hole Log for Walker Avenue

TESTHOLE TH1

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: Walker Avenue from Daly Street to Cockburn Street S
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 7.0 m east from northwest corner of Cockburn St S and Walker Ave, 1.0 m south from north curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Description	Sample Type	Water Content (%)
	Asphalt		
	Concrete		
	Clay Fill - black, firm, moist, high plasticity - some fine to medium sand	BS BS	33 30
0.5	**Clayey Silt** - tan, firm, moist, medium plasticity - trace fine to medium sand	BS	24
		BS	18
1.0	**Clay** - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel	BS	31
1.5		BS	38
		BS	44
2.0		BS	46

Water Content (%): 25 50 75 100

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

Page 1 of 1

TESTHOLE TH2

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: Walker Avenue from Daly Street to Cockburn Street S
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 4.0 m west from property 672 & 678 Walker Avenue, 1.0 m north from south curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Water Content (%) PL LL (25 50 75 100)
		Asphalt						
		Concrete						
		Clay Fill - black, firm, moist, high plasticity - some fine to medium sand	BS					27
			BS					38
0.5		**Clayey Silt** - tan, firm, moist, medium plasticity - trace fine to medium sand	BS					27
			BS	0.0	4.0	62.0	34.0	17
1.0			BS					22
1.5		**Clay** - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel - stiff below 1.7 m	BS					30
			BS					39
2.0			BS					44

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

Page 1 of 1

Template Version: C420131129 - RW

TESTHOLE TH3

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: Walker Avenue from Daly Street to Cockburn Street S
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 2.0 m west from property 646 & 648 Walker Avenue, 1.0 m south from north curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%) 25 50 75 100
		Asphalt		
		Concrete		
		Clay Fill - black, firm, moist, high plasticity - some fine to medium sand	BS BS	●34 ●29
0.5		**Clayey Silt** - tan, firm, moist, medium plasticity - trace fine to medium sand	BS	●24
		Clay - brown, stiff, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel	BS	●30
1.0			BS	●35
1.5			BS	●44
			BS	●45
2.0			BS	●46

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

Page 1 of 1

Template Version: C420131129 - RW

TESTHOLE TH4

Stantec

Project Name: 2014 City of Winnipeg Local Street & Alley Renewals (14-R-07)
Project Location: Walker Avenue from Daly Street to Cockburn Street S
Client: Dillon Consulting
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
Testhole Location: 3.5 m west from property 610 & 614 Walker Avenue, 1.0 m north from south curb

Date Drilled: February 3, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution: Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Water Content (%) PL LL (25 50 75 100)
		Asphalt						
		Concrete						
		Clay Fill - black, firm, moist, high plasticity - some fine to medium sand	BS					35
			BS					36
0.5		**Clay** - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel - stiff below 1.2 m	BS					27
			BS	0.5	2.2	13.9	83.4	37
1.0			BS					39
1.5			BS					41
			BS					40
2.0			BS					48

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

Page 1 of 1

Particle Size Analysis for Walker Avenue

Stantec

PARTICLE SIZE ANALYSIS
ASTM D422

Dillon Consulting Ltd.
1558 Wilson Place
Winnipeg, Manitoba
R3T 0Y4

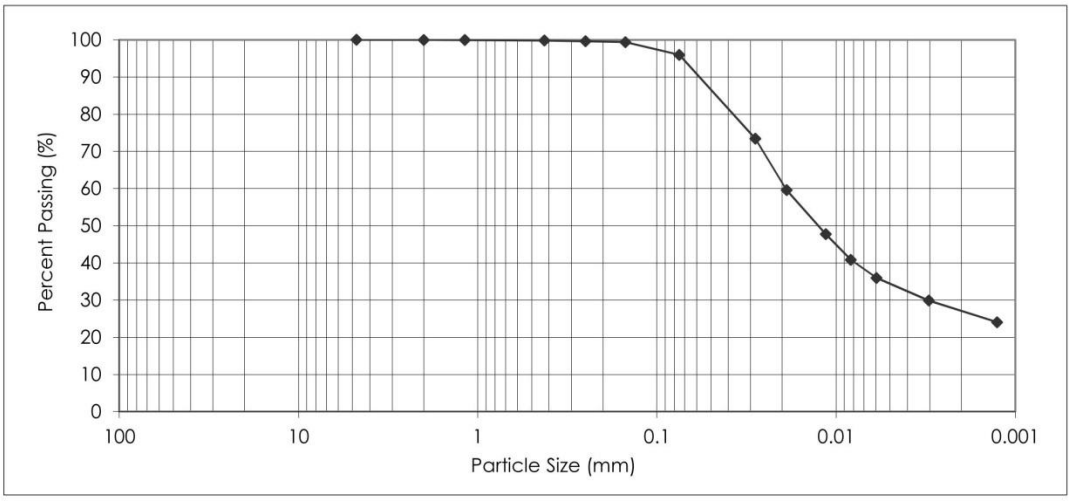
PROJECT: 2014 City of Winnipeg Local Street & Alley Renewal Program (14-R-07)
Walker Ave from Daly St to Cockburn St S

Attention: Taran Peters

PROJECT NO.: 123301359

SAMPLED BY: Sothea Bun
SAMPLE ID: TH2 @ 0.9 m

DATE RECEIVED: February 3, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	100.0
2.00 mm	100.0

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.9
0.425 mm	99.8
0.250 mm	99.6
0.150 mm	99.4
0.075 mm	96.0
0.005 mm	34.0
0.002 mm	26.5
0.001 mm	NT*

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.0	0.2	3.8	62.0	34.0	NT*

NT* Sample not tested for colloids

February 18, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

199 Henlow Bay, Winnipeg, Manitoba R3Y 1G4 Phone (204) 488-6999 Fax (204) 488-6947

PARTICLE SIZE ANALYSIS
ASTM D422

Dillon Consulting Ltd.
1558 Wilson Place
Winnipeg, Manitoba
R3T 0Y4

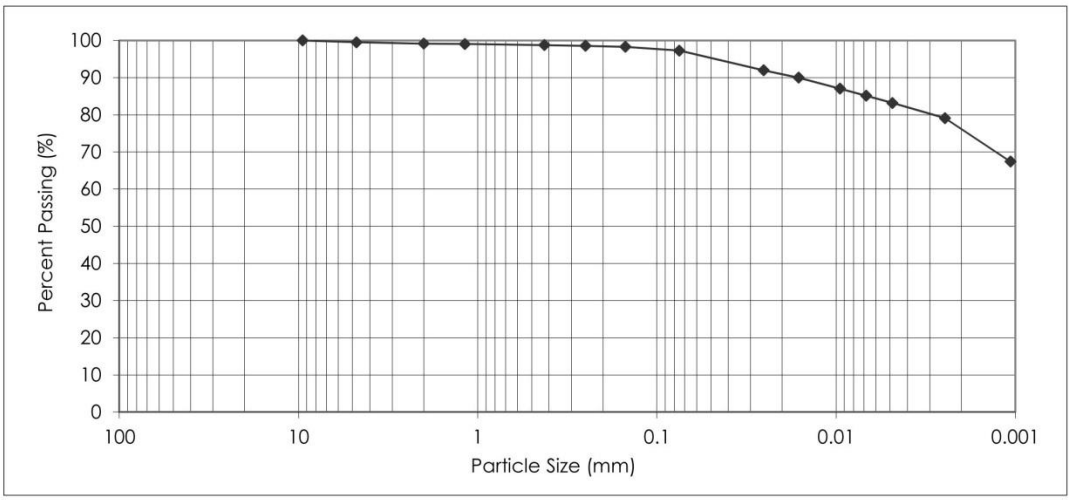
PROJECT: 2014 City of Winnipeg Local Street & Alley Renewal Program (14-R-07)
Walker Ave from Daly St to Cockburn St S

Attention: Taran Peters

PROJECT NO.: 123301359

SAMPLED BY: Sothea Bun
SAMPLE ID: TH4 @ 0.9 m

DATE RECEIVED: February 3, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	99.5
2.00 mm	99.2

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.1
0.425 mm	98.8
0.250 mm	98.5
0.150 mm	98.3
0.075 mm	97.3
0.005 mm	83.4
0.002 mm	75.2
0.001 mm	NT*

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.5	0.3	0.4	1.5	13.9	83.4	NT*

NT* Sample not tested for colloids

February 18, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

199 Henlow Bay, Winnipeg, Manitoba R3Y 1G4 Phone (204) 488-6999 Fax (204) 488-6947

Pavement Core Photos

Core sample from Testhole TH1

Core sample from Testhole TH2

Core sample from Testhole TH3

Core sample from Testhole TH4