

# **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.

**2015 CITY OF WINNIPEG  
ALLEY PACKAGE CONTRACT 1  
(15-RL-01)**

**VALOUR ROAD AND ASHBURN  
STREET ALLEY BETWEEN  
SARGENT AVENUE AND ELLICE  
AVENUE**

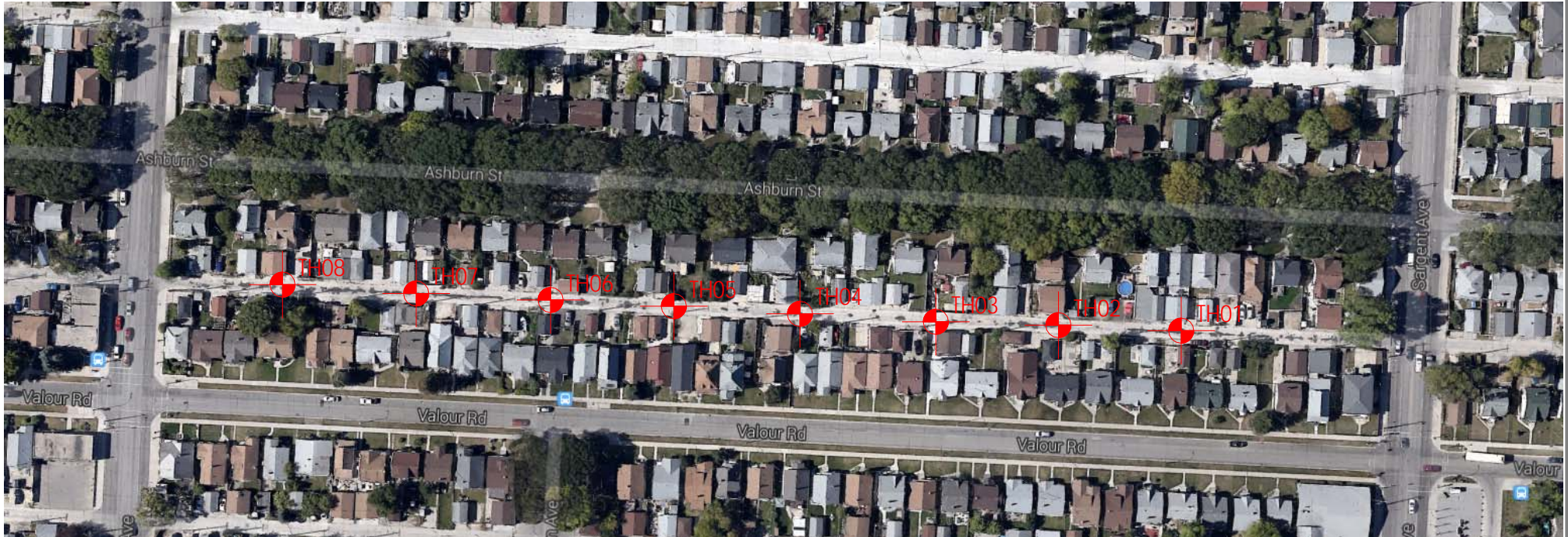
**GEOTECHNICAL INVESTIGATION**



Prepared for:  
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199 Henlow Bay  
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January 22, 2015  
Project No. 123311678



Project No. 123311678

Drawn by: SB

Figure: 1

Date: January 8, 2014

Reviewed by: GL

Scale: NTS

**Testhole Location Plan  
2015 City of Winnipeg Alley  
Package Contract (15-RL-01)  
Valour Rd and Ashburn St Alley  
between Sargent Ave and Ellice Ave**

**TABLE 1**  
**2015 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT (15-RL-01)**  
**VALOUR ROAD AND ASHBURN STREET ALLEY BETWEEN SARGENT AVENUE AND ELLICE 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
TH1	325.0 m North of Ellice Avenue on Centreline	Asphalt	15	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	200												
TH2	281.0 m North of Ellice Avenue on Centreline	Asphalt	40	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	230												
TH3	240.0 m North of Ellice Avenue on Centreline	Concrete	185	-	-	-	-	-	-	-	-	-	-	-	-
TH4	200.0 m North of Ellice Avenue on Centreline	Asphalt	35	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	190												
TH5	158.0 m North of Ellice Avenue on Centreline	Asphalt	50	-	-	Clay	0.9	29	0.0	2.9	29.3	67.8	76	21	55
		Concrete	210												
TH6	121.0 m North of Ellice Avenue on Centreline	Concrete	200	-	-	-	-	-	-	-	-	-	-	-	-
TH7	79.0 m North of Ellice Avenue on Centreline	Concrete	265	-	-	-	-	-	-	-	-	-	-	-	-
TH8	40.0 m North of Ellice Avenue on Centreline	Concrete	230	-	-	-	-	-	-	-	-	-	-	-	-

# TESTHOLE RECORD TH01

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Valour Rd and Ashburn St Alley between Sargent Ave and Ellice Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 15, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Grab Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/>				DEPTH (ft)	
					TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa		
0		AS	Asphalt		CORE							0	
		CO	Concrete										
			Clay Fill - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand		AS	25							
					AS	28							2
1		CH			AS	26							4
					AS	27							4
					AS	28							
2		CH	Clay - brown, stiff, moist, high plasticity - silty - trace fine to coarse sand		AS	30							6
					AS	29							
3			TESTHOLE LOCATION: 325.0 m North of Ellice Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.										10
													12

Sample Type: GS - Grab Sample    SPT - Standard Penetration Test  
 ST - Shelby Tube    PT - Piston Tube    VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite     Drill Cuttings     Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH02

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Valour Rd and Ashburn St Alley between Sargent Ave and Ellice Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 15, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)		
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕			
0	AS		Asphalt	CORE								0	
	CO		Concrete										
	CH		Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand		AS	32							2
					AS	33							
1					AS	30							
	ML		Silt - tan, soft, moist, low plasticity		AS	21							4
					AS	22							
2				AS	27							6	
				AS	23								
3			TESTHOLE LOCATION: 281.0 m North of Ellice Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									8	
												10	
												12	

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH03

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Valour Rd and Ashburn St Alley between Sargent Ave and Ellice Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 15, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0			Concrete	CORE							0	
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	44							
		CH	Clay - brown, stiff, moist, high plasticity - silty - trace fine to coarse sand	AS	31							2
		CH		AS	29							
		CH		AS	26							4
		CH		AS	26							
		ML	Silt - tan, soft, moist, low plasticity	AS	26							6
				AS	23							
2			TESTHOLE LOCATION: 240.0 m North of Ellice Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									8
3												10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal





# TESTHOLE RECORD TH04

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Valour Rd and Ashburn St Alley between Sargent Ave and Ellice Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 15, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Grab Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input type="checkbox"/>				DEPTH (ft)	
					TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa		
0	AS		Asphalt		CORE							0	
	CO		Concrete										
	CH		Clay Fill - black, firm, moist, high plasticity - trace organic materials - trace fine to coarse sand		AS	27							2
	CH		Clay - brown, stiff, moist, high plasticity - silty - trace fine to coarse sand		AS	27							2
1	CH		Clay - brown, stiff, moist, high plasticity - silty - trace fine to coarse sand		AS	29							4
	CH		Clay - brown, stiff, moist, high plasticity - silty - trace fine to coarse sand		AS	31							4
	CH		Clay - brown, stiff, moist, high plasticity - silty - trace fine to coarse sand		AS	33							6
2	ML		Silt - tan, soft, moist, low plasticity		AS	22							6
	AS		TESTHOLE LOCATION: 200.0 m North of Ellice Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.		AS	21							8
3												10	
												12	

Sample Type: GS - Grab Sample    SPT - Standard Penetration Test  
 ST - Shelby Tube    PT - Piston Tube    VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite     Drill Cuttings     Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH05

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Valour Rd and Ashburn St Alley between Sargent Ave and Ellice Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 15, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)				
				TYPE	NUMBER	MOISTURE CONTENT (%)	□	□	△	×					
0	AS		Asphalt	CORE								0			
	CO		Concrete												
	CH		Clay - brown, firm, moist, high plasticity - silty - trace fine to coarse sand - stiff below 1.2 m  Particle Size Analysis at 0.9 m: 0.0% Gravel, 2.9% Sand, 29.3% Silt, 67.8% Clay		AS	34									
					AS	28									2
1					AS	29									4
					AS	31									
	ML		Silt - tan, soft, moist, low plasticity		AS	28									
2				AS	23								6		
				AS	25										
3	TESTHOLE LOCATION: 158.0 m North of Ellice Avenue on Centreline.  <ul style="list-style-type: none"> <li>The soil was frozen to a depth of 0.9 m.</li> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.1 m.</li> </ul>											8			
												10			
												12			

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH06

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Valour Rd and Ashburn St Alley between Sargent Ave and Ellice Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 15, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0		CO	Concrete	CORE							0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	26						
		CH	Clay - brown, firm, moist, high plasticity - silty - trace fine to coarse sand	AS	28						2
1		CH		AS	26						
		ML	Silt - tan, soft, moist, low plasticity - trace clay below 1.8 m	AS	24						4
		ML		AS	26						
2		CH	Clay - brown, stiff, moist, high plasticity	AS	31						6
		CH		AS	29						
3			TESTHOLE LOCATION: 121.0 m North of Ellice Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								8
											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH07

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Valour Rd and Ashburn St Alley between Sargent Ave and Ellice Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 15, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0			Concrete	CORE							0
		CO									
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	25						
		CH		AS	28						2
1		CH	Clay - brown, stiff, moist, high plasticity - silty - trace fine to coarse sand	AS	30						4
		CH		AS	30						
		CH		AS	29						
2		ML	Silt - tan, soft, moist, low plasticity	AS	23						6
				AS	25						
			TESTHOLE LOCATION: 79.0 m North of Ellice Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								8
3											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH08

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Valour Rd and Ashburn St Alley between Sargent Ave and Ellice Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 15, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0			Concrete	CORE							0	
			Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	33							
				AS	23							2
1				AS	49							4
			Silt - tan, soft, moist, low plasticity	AS	28							6
				AS	29							8
2				AS	26							10
				AS	21							12
3			TESTHOLE LOCATION: 40.0 m North of Ellice Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal





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



Core sample from Testhole TH6





Core sample from Testhole TH7



Core sample from Testhole TH8



**LABORATORY**  
 199 Henlow Bay  
 Winnipeg MB R3Y 1G4  
 Tel: (204) 488-6999

**PARTICLE SIZE ANALYSIS  
 ASTM D422**

KGS Group Inc.  
 3rd Floor - 865 Waverley St.  
 Winnipeg, Manitoba  
 R3T 5P4

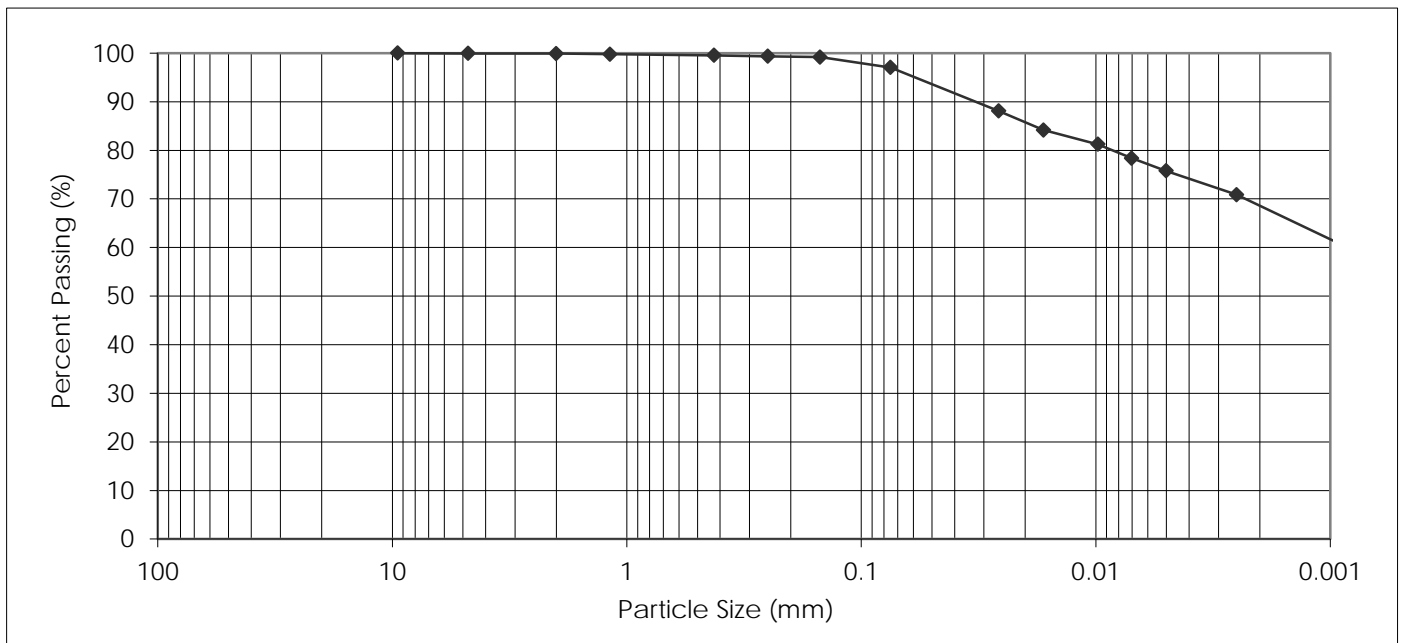
PROJECT: 2015 City of Winnipeg Alley Package  
 Contract (15-RL-01)  
 Valour Rd and Ashburn St Alley between  
 Sargent Ave and Ellice Ave

Attention: Michael Turko

PROJECT NO.: 123311678

SAMPLED BY: Nestor Abarca  
 SAMPLE ID: TH5 @ 0.91 m

DATE RECEIVED: January 13, 2015  
 TESTED BY: Sothea Bun, C.E.T.



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	99.5
0.250 mm	99.3
0.150 mm	99.2
0.075 mm	97.1
0.005 mm	75.7
0.002 mm	
0.001 mm	61.7

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 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	0.4	2.4	29.3	67.8	61.7

January 19, 2015



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

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

**2015 CITY OF WINNIPEG  
ALLEY PACKAGE CONTRACT 1  
(15-RL-01)**

**SPRUCE STREET AND VALOUR  
ROAD BETWEEN ST. MATTHEWS  
AVENUE AND FELIX AVENUE**

**GEOTECHNICAL INVESTIGATION**



Prepared for:  
KGS Group Inc.  
3rd Floor - 865 Waverley Street  
Winnipeg, Manitoba  
R3T 5P4

Prepared by:  
Stantec Consulting Ltd.  
199 Henlow Bay  
Winnipeg, Manitoba  
R3Y 1G4

January 22, 2015  
Project No. 123311678



Project No. 123311678

Drawn by: SB

Figure: 1

Date: January 9, 2015

Reviewed by: GL

Scale: NTS

Testhole Location Plan  
2015 City of Winnipeg Alley Package  
Contract (15-RL-01)  
Spruce St and Valour Rd Alley  
between St Matthews Ave and Felix Ave

**TABLE 1**  
**2015 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT (15-RL-01)**  
**SPRUCE STREET AND VALOUR ROAD ALLEY BETWEEN ST. MATTHEWS AVE AND FELIX AVE**  
**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	28.0 m South of St. Matthews Avenue, approximately 0.5 m West of Centreline	Asphalt	15	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	255	-	-	-	-	-	-	-	-	-	-	-	-
TH2	62.0 m South of St. Matthews Avenue on Centreline	Concrete	260	-	-	Silt	0.9	23	0.0	2.7	71.8	25.5	32	14	18
TH3	102.0 m South of St. Matthews Avenue on Centreline	Concrete	250	-	-	-	-	-	-	-	-	-	-	-	-
TH4	25.0 m North of Felix Avenue on Centreline	Concrete	235	-	-	-	-	-	-	-	-	-	-	-	-

# TESTHOLE RECORD TH01

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Spruce St and Valour Rd Alley between St. Matthews Ave and Felix Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0	AS		Asphalt	CORE							0	
	CO		Concrete									
	FL		Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand - some silt below 0.6 m	AS	26							2
				AS	27							2
1			Clay - brown, stiff, moist, high plasticity	AS	27							4
	CH			AS	27							4
				AS	29							6
				AS	34							6
2				AS	39							8
3			TESTHOLE LOCATION: 28.0 m South of St. Matthews Avenue, approximately 0.5 m West of Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH02

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Spruce St and Valour Rd Alley between St. Matthews Ave and Felix Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES		<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Grab Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input type="checkbox"/>					DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa				
0			Concrete	CORE										0
	CO													
	FL		Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	38									2
	ML		Silt - tan, soft, moist, medium plasticity - clayey - trace fine to medium sand  Particle Size Analysis at 0.9 m: 0.0% Gravel, 2.7% Sand, 71.8% Silt, 25.5% Clay	AS	26									4
				AS	23									
				AS	20									
				AS	21									
	CH		Clay - brown, stiff, moist, high plasticity	AS	30									6
				AS	31									8
3			TESTHOLE LOCATION: 62.0 m South of St. Matthews Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.											10
														12

Sample Type: GS - Grab Sample    SPT - Standard Penetration Test  
 ST - Shelby Tube    PT - Piston Tube    VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite     Drill Cuttings     Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH03

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Spruce St and Valour Rd Alley between St. Matthews Ave and Felix Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0			Concrete	CORE							0
	CO										
			Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	36						
	FL			AS	26						2
1			Clay - brown, stiff, moist, high plasticity	AS	29						4
				AS	30						
	CH			AS	29						6
				AS	40						
2				AS	41						8
			TESTHOLE LOCATION: 102.0 m South of St. Matthews Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								10
3											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal





# TESTHOLE RECORD TH04

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Spruce St and Valour Rd Alley between St. Matthews Ave and Felix Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0			Concrete	CORE							0
	CO										
	FL		Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	30						
			Silt - tan, soft, moist, medium plasticity - clayey - trace fine to medium sand	AS	24						2
1				AS	23						
	ML			AS	24						4
				AS	20						
2				AS	23						6
				AS	23						
3			TESTHOLE LOCATION: 25.0 m North of Felix Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								8
											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal





Core sample from Testhole TH1



Core sample from Testhole TH2



Core sample from Testhole TH3



Core sample from Testhole TH4



**LABORATORY**  
 199 Henlow Bay  
 Winnipeg MB R3Y 1G4  
 Tel: (204) 488-6999

**PARTICLE SIZE ANALYSIS  
 ASTM D422**

KGS Group Inc.  
 3rd Floor - 865 Waverley St.  
 Winnipeg, Manitoba  
 R3T 5P4

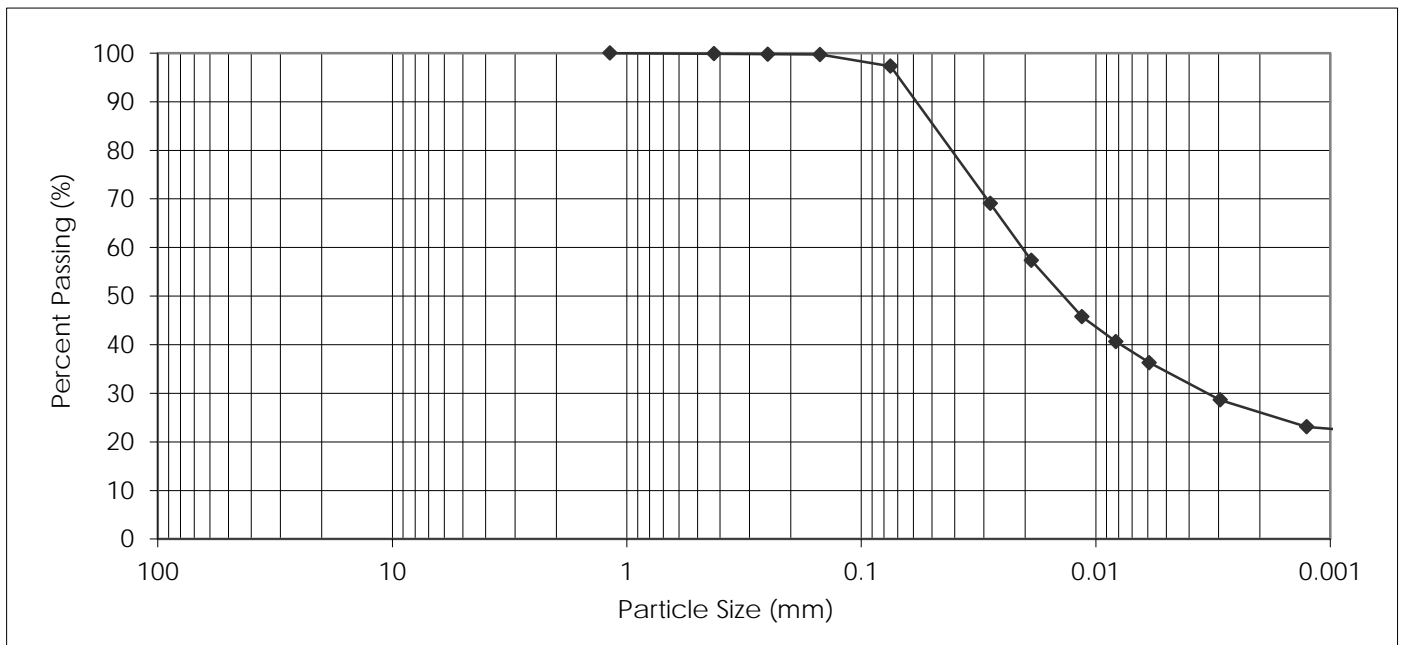
PROJECT: 2015 City of Winnipeg Alley Package  
 Contract (15-RL-01)  
 Spruce St and Valour Rd Alley between  
 St. Matthews Ave and Felix Ave

Attention: Michael Turko

PROJECT NO.: 123311678

SAMPLED BY: Nestor Abarca  
 SAMPLE ID: TH2 @ 0.91 m

DATE RECEIVED: January 13, 2015  
 TESTED BY: Sothea Bun, C.E.T.



PARTICLE SIZE		PERCENT PASSING		PARTICLE SIZE		PERCENT PASSING	
37.50 mm	100.0	1.18 mm	100.0	0.425 mm	99.9		
25.00 mm	100.0	0.250 mm	99.8	0.250 mm	99.8		
19.00 mm	100.0	0.150 mm	99.7	0.150 mm	99.7		
16.00 mm	100.0	0.075 mm	97.3	0.075 mm	97.3		
12.50 mm	100.0	0.005 mm	33.9	0.005 mm	33.9		
9.50 mm	100.0	0.002 mm	25.5	0.002 mm	25.5		
4.75 mm	100.0	0.001 mm	22.7	0.001 mm	22.7		
2.00 mm	100.0						

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 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	0.1	2.6	71.8	25.5	22.7

January 19, 2015



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

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

**2015 CITY OF WINNIPEG  
ALLEY PACKAGE CONTRACT 1  
(15-RL-01)**

**DOWNING STREET AND MINTO  
STREET ALLEY BETWEEN ELLICE  
AVENUE AND ARMOURY  
AVENUE**

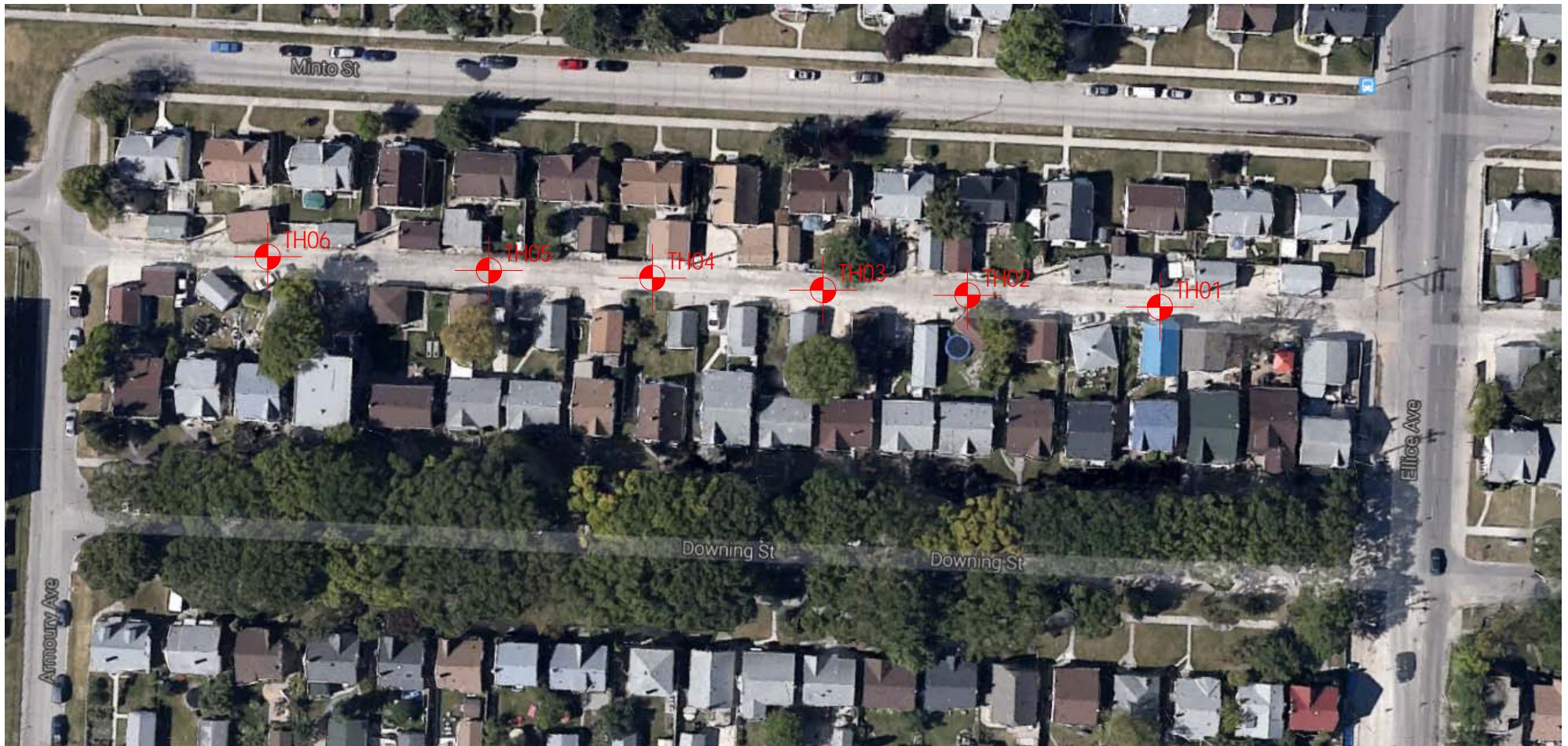
**GEOTECHNICAL INVESTIGATION**



Prepared for:  
KGS Group Inc.  
3rd Floor - 865 Waverley Street  
Winnipeg, Manitoba  
R3T 5P4

Prepared by:  
Stantec Consulting Ltd.  
199 Henlow Bay  
Winnipeg, Manitoba  
R3Y 1G4

January 21, 2015  
Project No. 123311678



Project No. 123311678

Drawn by: SB

Figure: 1

Date: January 9, 2015

Reviewed by: GL

Scale: NTS

**Testhole Location Plan**  
**2015 City of Winnipeg Alley Package**  
**Contract (15-RL-01)**  
**Downing St and Minto St Alley**  
**between Ellice Ave and Armoury Ave**

**TABLE 1**  
**2015 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT (15-RL-01)**  
**DOWNING STREET AND MINTO STREET ALLEY BETWEEN ELLICE AVENUE AND ARMOURY 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
TH1	36.0 m South of Ellice Avenue, approximately 1.0 m East of Centreline	Concrete	180	-	-	-	-	-	-	-	-	-	-	-	-
TH2	65.0 m South of Ellice Avenue on Centreline	Asphalt	15	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	215												
TH3	87.0 m South of Ellice Avenue on Centreline	Concrete	190	-	-	-	-	-	-	-	-	-	-	-	-
TH4	104.0 m South of Ellice Avenue on Centreline	Concrete	195	-	-	-	-	-	-	-	-	-	-	-	-
TH5	144.0 m South of Ellice Avenue on Centreline	Asphalt	20	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	250												
TH6	177.0 m South of Ellice Avenue on Centreline	Concrete	250	-	-	Clayey Silt	0.9	23	0.0	7.9	67.7	24.4	32	15	17





# TESTHOLE RECORD TH02

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Downing St and Minto St Alley between Ellice Ave and Armoury Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Grab Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input type="checkbox"/>				DEPTH (ft)	
					TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa		
0		AS	Asphalt									0	
		CO	Concrete		CORE								
			Clay Fill - black, firm, moist, high plasticity - trace organic materials - trace fine to coarse sand		AS	38							
					AS	37							2
1		CH			AS	31							4
					AS	31							4
					AS	30							
		CH	Clay - brown, stiff, moist, high plasticity		AS	42							6
2					AS	44							6
			TESTHOLE LOCATION: 65.0 m South of Ellice Avenue on Centreline.  <ul style="list-style-type: none"> <li>The soil was frozen to a depth of 0.9 m.</li> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.1 m.</li> </ul>										8
3													10
													12

Sample Type: GS - Grab Sample    SPT - Standard Penetration Test  
 ST - Shelby Tube    PT - Piston Tube    VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite     Drill Cuttings     Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH03

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Downing St and Minto St Alley between Ellice Ave and Armoury Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0		CO	Concrete	CORE							0	
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	41							
		CH		AS	34							2
1		CH		AS	26							4
		CH	Clay - brown, stiff, moist, high plasticity	AS	26							4
		CH		AS	27							6
2		CH		AS	41							6
				AS	45							8
3			TESTHOLE LOCATION: 87.0 m South of Ellice Avenue on Centreline.  • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH04

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Downing St and Minto St Alley between Ellice Ave and Armoury Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0		CO	Concrete	CORE							0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	40						
		CH		AS	31						2
1		CH		AS	28						
		CH		AS	27						4
		CL ML	Clayey Silt - tan, soft, moist, medium plasticity - clayey - trace fine to medium sand	AS	24						
2		CH	Clay - brown, stiff, moist, high plasticity	AS	34						6
			TESTHOLE LOCATION: 104.0 m South of Ellice Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.	AS	36						
3											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH05

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Downing St and Minto St Alley between Ellice Ave and Armoury Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Grab Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input type="checkbox"/>				DEPTH (ft)	
					TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa		
0	AS		Asphalt									0	
	CO		Concrete	CORE									
	CH		Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	33								
	CH		Clay - brown, stiff, moist, high plasticity	AS	37								2
1	CH		Clay - brown, stiff, moist, high plasticity	AS	29								
	CH		Clay - brown, stiff, moist, high plasticity	AS	28								4
	CH		Clay - brown, stiff, moist, high plasticity	AS	29								
2	CL		Clayey Silt - tan, soft, moist, medium plasticity - clayey	AS	21								6
	ML		Clayey Silt - tan, soft, moist, medium plasticity - clayey - trace fine to medium sand	AS	22								
			<p>TESTHOLE LOCATION: 144.0 m South of Ellice Avenue on Centreline.</p> <ul style="list-style-type: none"> <li>The soil was frozen to a depth of 1.1 m.</li> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.1 m.</li> </ul>										8
3													10
													12

Sample Type: GS - Grab Sample    SPT - Standard Penetration Test  
 ST - Shelby Tube    PT - Piston Tube    VT - Shear Vane Test  
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH06

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Downing St and Minto St Alley between Ellice Ave and Armoury Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0			Concrete	CORE							0	
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	39							
				AS	30							2
1			Clayey Silt - tan, soft, moist, medium plasticity - clayey - trace fine to medium sand	AS	23							
		CL ML	Particle Size Analysis at 0.9 m: 0.0% Gravel, 7.9% Sand, 67.7% Silt, 24.4% Clay	AS	22							4
				AS	22							
2		CH	Clay - brown, stiff, moist, high plasticity	AS	38							6
			TESTHOLE LOCATION: 177.0 m South of Ellice Avenue on Centreline.	AS	41							
			<ul style="list-style-type: none"> <li>• The soil was frozen to a depth of 0.9 m.</li> <li>• No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>• Testhole terminated at a depth of 2.1 m.</li> </ul>									8
3												10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type: ■ Bentonite ⊠ Drill Cuttings □ Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal





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



Core sample from Testhole TH6





**LABORATORY**  
 199 Henlow Bay  
 Winnipeg MB R3Y 1G4  
 Tel: (204) 488-6999

**PARTICLE SIZE ANALYSIS  
 ASTM D422**

KGS Group Inc.  
 3rd Floor - 865 Waverley St.  
 Winnipeg, Manitoba  
 R3T 5P4

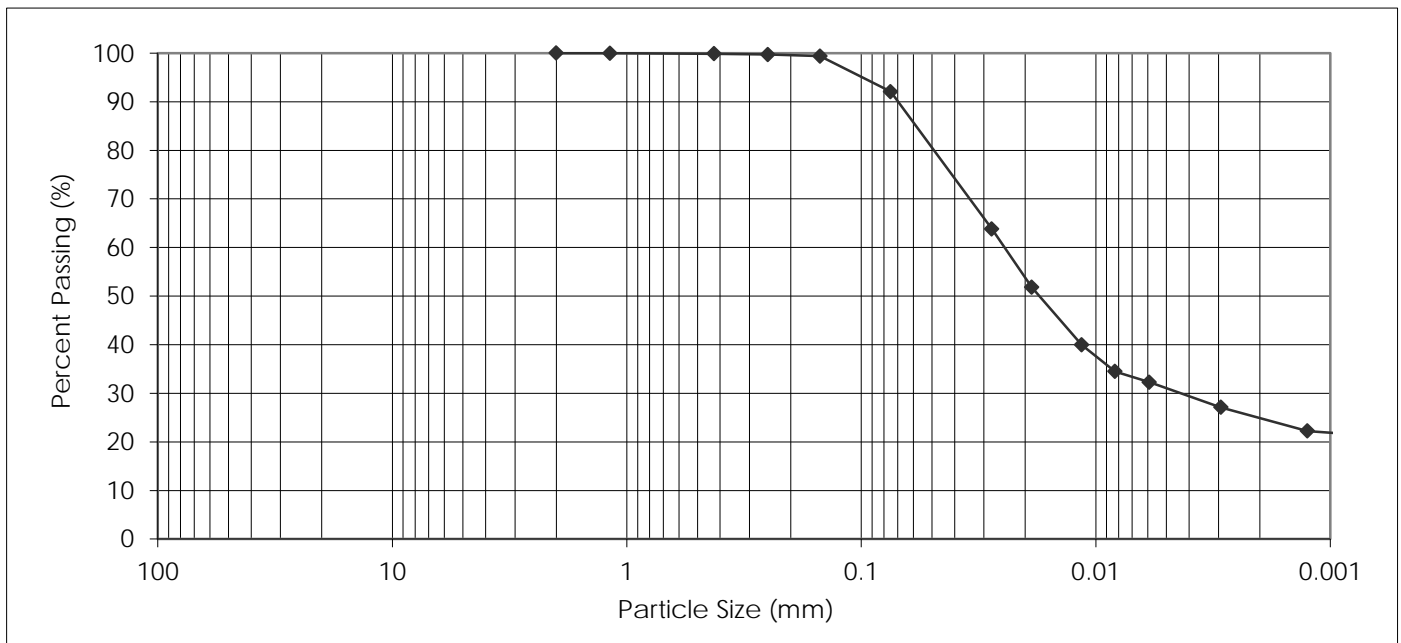
PROJECT: 2015 City of Winnipeg Alley Package  
 Contract (15-RL-01)  
 Downing St and Minto St Alley  
 between Ellice Ave and Armoury Ave

Attention: Michael Turko

PROJECT NO.: 123311678

SAMPLED BY: Nestor Abarca  
 SAMPLE ID: TH6 @ 0.91 m

DATE RECEIVED: January 13, 2015  
 TESTED BY: Sothea Bun, C.E.T.



PARTICLE SIZE		PERCENT PASSING		PARTICLE SIZE		PERCENT PASSING	
37.50 mm	100.0	1.18 mm	100.0	0.425 mm	99.9		
25.00 mm	100.0	0.250 mm	99.7	0.150 mm	99.4		
19.00 mm	100.0	0.075 mm	92.1	0.005 mm	30.7		
16.00 mm	100.0	0.002 mm	24.4	0.001 mm	21.9		
12.50 mm	100.0						
9.50 mm	100.0						
4.75 mm	100.0						
2.00 mm	100.0						

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 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	0.1	7.8	67.7	24.4	21.9

January 19, 2015



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

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

**2015 CITY OF WINNIPEG  
ALLEY PACKAGE CONTRACT 1  
(15-RL-01)**

**SHERBURN STREET AND  
INGERSOLL STREET BETWEEN  
ELLICE AVENUE AND  
ST. MATTHEWS AVENUE**

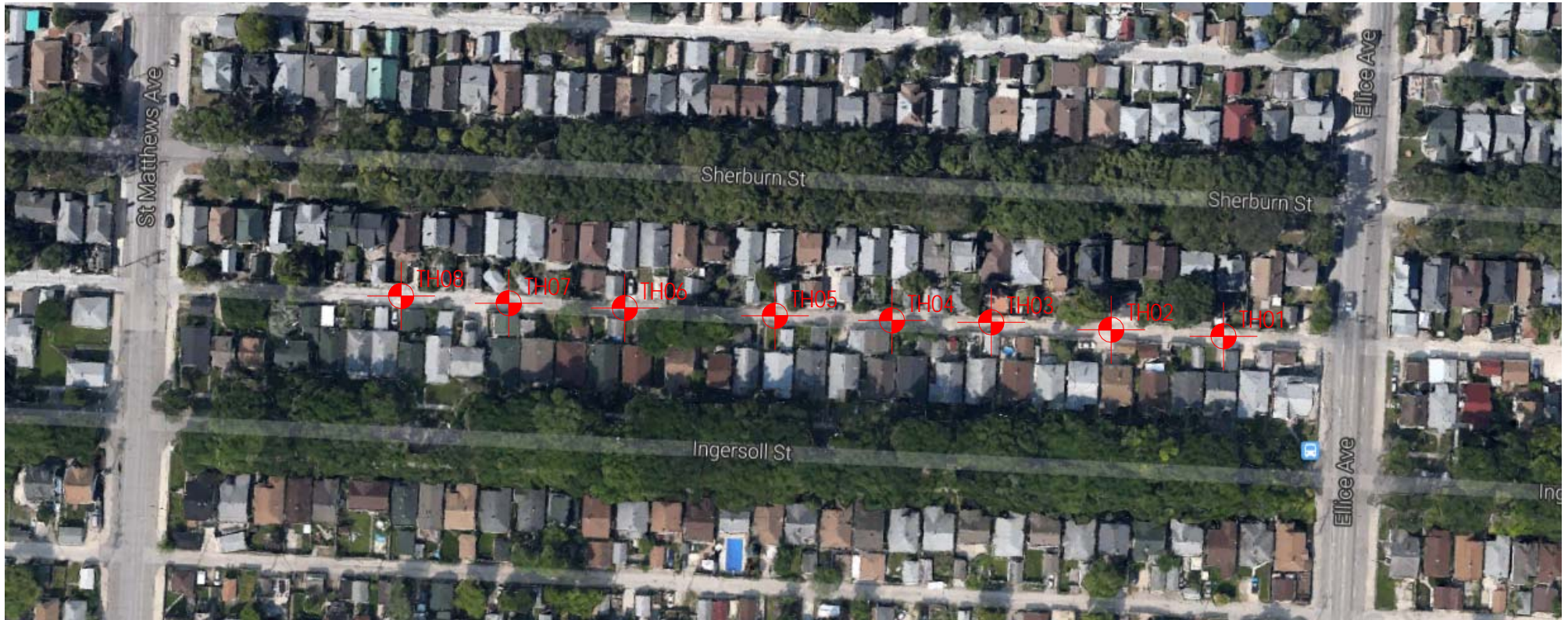
**GEOTECHNICAL INVESTIGATION**



Prepared for:  
KGS Group Inc.  
3rd Floor - 865 Waverley Street  
Winnipeg, MB  
R3T 5P4

Prepared by:  
Stantec Consulting Ltd.  
199 Henlow Bay  
Winnipeg, MB  
R3Y 1G4

February 4, 2015  
Project No. 123311678



Manitoba Hydro high voltage services south of testhole TH8



Project No. 123311678

Drawn by: SB

Figure: 1

Date: January 9, 2015

Reviewed by: GL

Scale: NTS

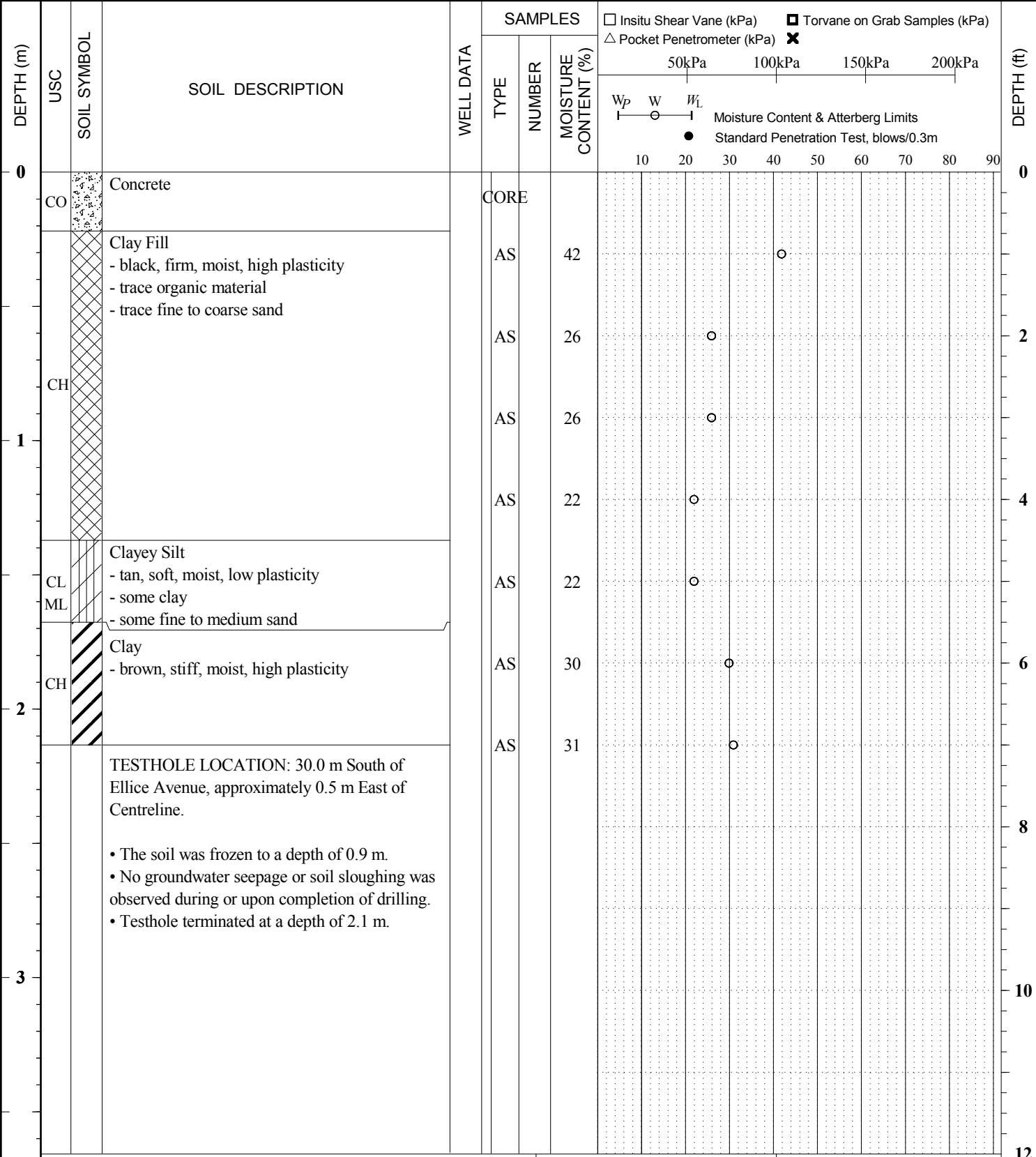
Testhole Location Plan  
2015 City of Winnipeg Alley Package  
Contract (15-RL-01)  
Sherburn St and Ingersoll St Alley  
between Ellice Ave and St Matthews Ave

**TABLE 1**  
**2015 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT (15-RL-01)**  
**SHERBURN STREET AND INGERSOLL STREET ALLEY BETWEEN ELLICE AVENUE AND ST. MATTHEWS 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
TH1	30.0 m South of Ellice Avenue, approximately 0.5 m East of Centreline	Concrete	220	-	-	-	-	-	-	-	-	-	-	-	-
TH2	65.0 m South of Ellice Avenue, approximately 0.5 m East of Centreline	Concrete	200	-	-	-	-	-	-	-	-	-	-	-	-
TH3	102.0 m South of Ellice Avenue, approximately 1.0 m East of Centreline	Concrete	230	-	-	-	-	-	-	-	-	-	-	-	-
TH4	130.0 m South of Ellice Avenue on Centreline	Asphalt	15	-	-	Clayey Silt	0.9	24	0.0	13.3	64.3	22.4	29	15	14
		Concrete	235												
TH5	165.0 m South of Ellice Avenue on Centreline	Concrete	230	-	-	-	-	-	-	-	-	-	-	-	-
TH6	133.0 m North of St. Matthews Avenue on Centreline	Asphalt	20	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	270												
TH7	102.0 m North of St. Matthews Avenue on Centreline	Concrete	200	-	-	-	-	-	-	-	-	-	-	-	-
TH8	70.0 m North of St. Matthews Avenue on Centreline	Concrete	230	-	-	-	-	-	-	-	-	-	-	-	-

# TESTHOLE RECORD TH01

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Sherburn St and Ingersoll St Alley between Ellice Ave and St. Matthews Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA



Sample Type: GS - Grab Sample    SPT - Standard Penetration Test  
 ST - Shelby Tube    PT - Piston Tube    VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite     Drill Cuttings     Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH02

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Sherburn St and Ingersoll St Alley between Ellice Ave and St. Matthews Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0			Concrete	CORE							0	
			Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	29							
				AS	35							2
				AS	30							1
				AS	22							4
			Clayey Silt - tan, soft, moist, low plasticity - some clay - some fine to medium sand	AS	22							
			Clay - brown, stiff, moist, high plasticity	AS	24							6
				AS	25							
			TESTHOLE LOCATION: 65.0 m South of Ellice Avenue, approximately 0.5 m East of Centreline.  • The soil was frozen to a depth of 0.6 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									8
3												10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH03

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Sherburn St and Ingersoll St Alley between Ellice Ave and St. Matthews Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0		CO	Concrete	CORE							0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	35						2
		CH		AS	36						2
1		CL	Clayey Silt - tan, soft, moist, low plasticity - some clay - some fine to medium sand	AS	24						4
		ML		AS	22						4
		ML		AS	23						6
2		ML		AS	24						6
				AS	24						8
3			<p>TESTHOLE LOCATION: 102.0 m South of Ellice Avenue, approximately 1.0 m East of Centreline.</p> <ul style="list-style-type: none"> <li>The soil was frozen to a depth of 0.9 m.</li> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.1 m.</li> </ul>								10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH04

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Sherburn St and Ingersoll St Alley between Ellice Ave and St. Matthews Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)		
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	△ Pocket Penetrometer (kPa)	■ Torvane on Grab Samples (kPa)	✕			
0	AS		Asphalt	CORE								0	
	CO		Concrete										
	CH		Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand		AS	35							
			Clayey Silt - tan, soft, moist, low plasticity - some clay - some fine to medium sand		AS	26							2
1			Particle Size Analysis at 0.9 m: 0.0% Gravel, 13.3% Sand, 64.3% Silt, 22.4% Clay		AS	24							
	CL				AS	21							4
	ML				AS	22							
2				AS	25							6	
				AS	25								
3			TESTHOLE LOCATION: 130.0 m South of Ellice Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									8	
												10	
												12	

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal





# TESTHOLE RECORD TH05

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Sherburn St and Ingersoll St Alley between Ellice Ave and St. Matthews Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0			Concrete	CORE							0	
		CO										
			Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	28							2
		CH		AS	28							
1			Clay - brown, stiff, moist, high plasticity - silty	AS	25							4
		CH		AS	24							
				AS	14							6
2				AS	32							8
				AS	30							10
3			TESTHOLE LOCATION: 165.0 m South of Ellice Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH06

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Sherburn St and Ingersoll St Alley between Ellice Ave and St. Matthews Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Grab Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input type="checkbox"/> X				DEPTH (ft)	
					TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa		
0	AS		Asphalt									0	
	CO		Concrete	CORE									
	CH		Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	27								2
	CH		Clay - brown, stiff, moist, high plasticity - trace silt	AS	26								4
	CH			AS	27								6
	CL		Clayey Silt - tan, soft, moist, low plasticity - some clay	AS	24								6
	ML		- some fine to medium sand	AS	22								8
3			TESTHOLE LOCATION: 133.0 m North of St. Matthews Avenue on Centreline.  • The soil was frozen to a depth of 0.8 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.										10
													12

Sample Type: GS - Grab Sample    SPT - Standard Penetration Test  
 ST - Shelby Tube    PT - Piston Tube    VT - Shear Vane Test  
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH07

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Sherburn St and Ingersoll St Alley between Ellice Ave and St. Matthews Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0		CO	Concrete	CORE							0	
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	36							2
		CH	Clay - brown, stiff, moist, high plasticity	AS	30							4
		CH		AS	29							6
		CH		AS	28							8
		CH		AS	30							10
		CH		AS	36							12
		CH		AS	38							14
			TESTHOLE LOCATION: 102.0 m North of St. Matthews Avenue on Centreline.									

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH08

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Sherburn St and Ingersoll St Alley between Ellice Ave and St. Matthews Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 12, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0			Concrete	CORE							0	
			Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand - some silt below 1.2 m	AS	35							
				AS	32							2
1		CH		AS	25							4
				AS	25							6
2		CH	Clay - brown, stiff, moist, high plasticity - trace silt - trace fine to coarse sand	AS	35							6
			TESTHOLE LOCATION: 70.0 m North of St. Matthews Avenue on Centreline.  • The soil was frozen to a depth of 0.8 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.	AS	38							8
3												10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal





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



Core sample from Testhole TH6



Core sample from Testhole TH7



Core sample from Testhole TH8





**LABORATORY**  
 199 Henlow Bay  
 Winnipeg MB R3Y 1G4  
 Tel: (204) 488-6999

**PARTICLE SIZE ANALYSIS  
 ASTM D422**

KGS Group Inc.  
 3rd Floor - 865 Waverley St.  
 Winnipeg, Manitoba  
 R3T 5P4

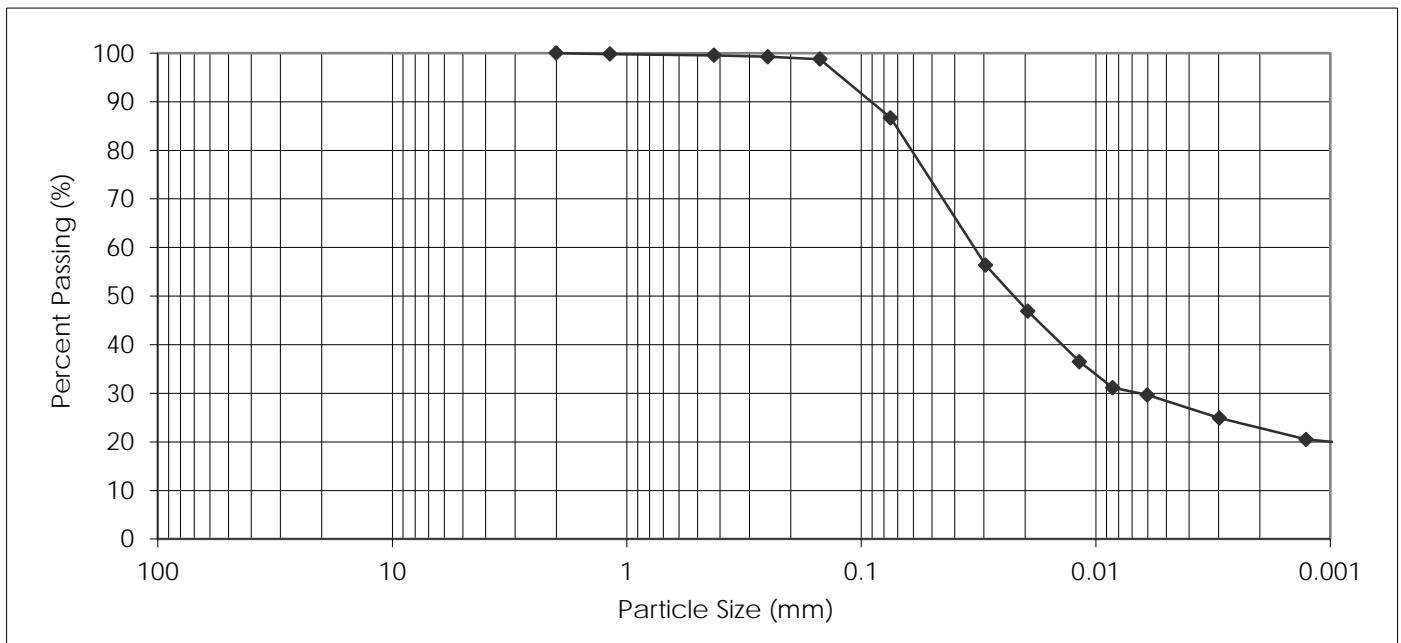
PROJECT: 2015 City of Winnipeg Alley Package  
 Contract (15-RL-01)  
 Sherburn St and Ingersoll St Alley  
 between Ellice Ave and St. Matthews Ave

Attention: Michael Turko

PROJECT NO.: 123311678

SAMPLED BY: Nestor Abarca  
 SAMPLE ID: TH4 @ 0.91 m

DATE RECEIVED: January 13, 2015  
 TESTED BY: Sothea Bun, C.E.T.



PARTICLE SIZE	PERCENT PASSING	PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0	1.18 mm	99.8
25.00 mm	100.0	0.425 mm	99.6
19.00 mm	100.0	0.250 mm	99.3
16.00 mm	100.0	0.150 mm	98.8
12.50 mm	100.0	0.075 mm	86.7
mm	100.0	0.005 mm	28.0
4.75 mm	100.0	0.002 mm	22.4
2.00 mm	100.0	0.001 mm	20.0

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 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	0.4	12.9	64.3	22.4	20.0

January 19, 2015



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

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

**2015 CITY OF WINNIPEG  
ALLEY PACKAGE CONTRACT 1  
(15-RL-01)**

**YOUNG STREET AND SPENCE  
STREET ALLEY BETWEEN NOTRE  
DAME AVENUE AND  
CUMBERLAND AVENUE**

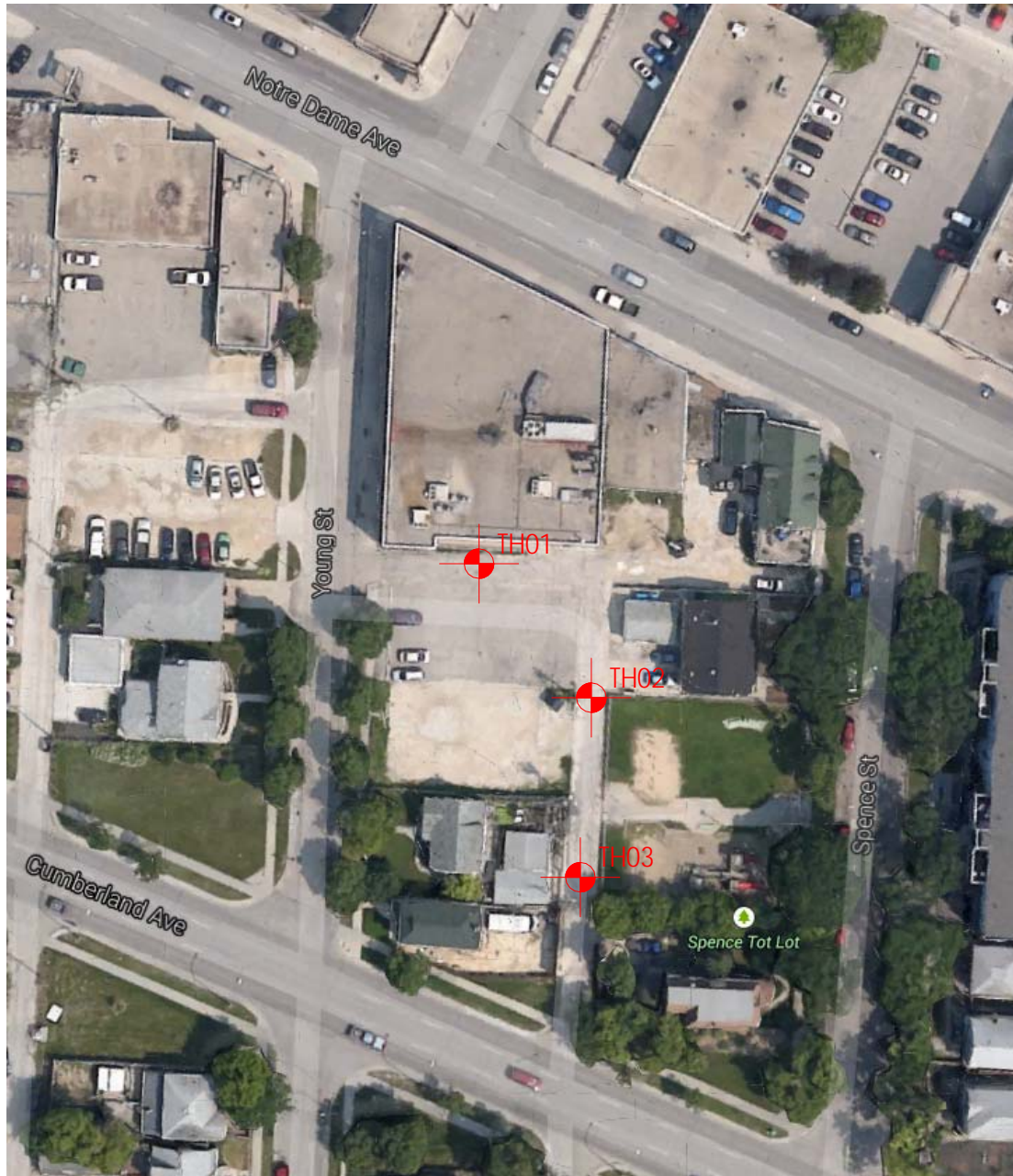
**GEOTECHNICAL INVESTIGATION**



Prepared for:  
KGS Group  
3rd Floor - 865 Waverley Street  
Winnipeg, Manitoba  
R3T 5P4

Prepared by:  
Stantec Consulting Ltd.  
199 Henlow Bay  
Winnipeg, Manitoba  
R3Y 1G4

January 21, 2015  
Project No. 123311678



Project No. 123311678

Drawn by: SB

Figure: 1

Date: January 9, 2015

Reviewed by: GL

Scale: NTS

**Testhole Location Plan  
2015 City of Winnipeg Alley Package  
Contract (15-RL-01)  
Young St and Spence St Alley between  
Notre Dame Ave and Cumberland Ave**

**TABLE 1**  
**2015 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT (15-RL-01)**  
**YOUNG STREET AND SPENCE STREET ALLEY BETWEEN NOTRE DAME AVENUE AND CUMBERLAND 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
TH1	15.0 m East of Young Street, approximately 0.5 m North of Centreline	Asphalt	20	-	-	Silt	0.9	21	0.0	6.9	70.2	22.9	31	16	15
		Concrete	260												
TH2	44.0 m North of Cumberland Avenue on Centreline	Concrete	280	-	-	-	-	-	-	-	-	-	-	-	-
TH3	23.0 m North of Cumberland Avenue on Centreline	Concrete	250	-	-	-	-	-	-	-	-	-	-	-	-

# TESTHOLE RECORD TH01

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Young St and Spence St Alley between Notre Dame Ave and Cumberland Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 16, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0	AS		Asphalt	CORE							0	
	CO		Concrete									
	CH		Clay Fill - black, firm, moist, high plasticity - some silt below 0.5 m	AS	35							2
	AS			AS	24							
1	ML		Silt - tan, soft, moist, medium plasticity - some clay - trace fine to medium sand	AS	21							4
	ML		Particle Size Analysis at 0.9 m: 0.0% Gravel, 6.9% Sand, 70.2% Silt, 22.9% Clay	AS	21							
	AS			AS	22							
2	CH		Clay - brown, stiff, moist, high plasticity	AS	38							6
	AS			AS	41							
3			TESTHOLE LOCATION: 15.0 m East of Young Street, approximately 0.5 m North of Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									8
												10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH02

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Young St and Spence St Alley between Notre Dame Ave and Cumberland Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 16, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES		<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Grab Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input type="checkbox"/>				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa			
0			Concrete	CORE									0
		CO	Concrete										
			Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	51								
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	39								2
1			Silt - tan, soft, moist, medium plasticity - some clay - trace fine to coarse sand	AS	25								
		ML	Silt - tan, soft, moist, medium plasticity - some clay - trace fine to coarse sand	AS	23								4
			Clay - brown, stiff, moist, high plasticity	AS	23								
		CH	Clay - brown, stiff, moist, high plasticity	AS	35								6
2			TESTHOLE LOCATION: 44.0 m North of Cumberland Avenue on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.	AS	39								8
3													10
													12

Sample Type: GS - Grab Sample    SPT - Standard Penetration Test  
 ST - Shelby Tube    PT - Piston Tube    VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite     Drill Cuttings     Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH03

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Young St and Spence St Alley between Notre Dame Ave and Cumberland Ave ELEVATION \_\_\_\_\_  
 DRILLING DATE December 16, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	△ Pocket Penetrometer (kPa)	■ Torvane on Grab Samples (kPa)	✕	
0		CO	Concrete	CORE							0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material - some silt below 0.5 m	AS	62						
		ML	Silt - tan, soft, moist, medium plasticity - some clay - trace fine to coarse sand	AS	24						2
1				AS	22						4
				AS	23						6
2				AS	24						8
				AS	24						10
3											12

**TESTHOLE LOCATION:** 23.0 m North of Cumberland Avenue on Centreline.  

- The soil was frozen to a depth of 0.9 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

**Sample Type:** GS - Grab Sample   SPT - Standard Penetration Test  
 ST - Shelby Tube   PT - Piston Tube   VT - Shear Vane Test  
**Piezometer Backfill Type:** ■ Bentonite   ⊠ Drill Cuttings   □ Sand

Logged by: Nestor Abarca

Reviewed by: German Leal



Core sample from Testhole TH1



Core sample from Testhole TH2





Core sample from Testhole TH3



**LABORATORY**  
 199 Henlow Bay  
 Winnipeg MB R3Y 1G4  
 Tel: (204) 488-6999

**PARTICLE SIZE ANALYSIS  
 ASTM D422**

KGS Group Inc.  
 3rd Floor - 865 Waverley St.  
 Winnipeg, Manitoba  
 R3T 5P4

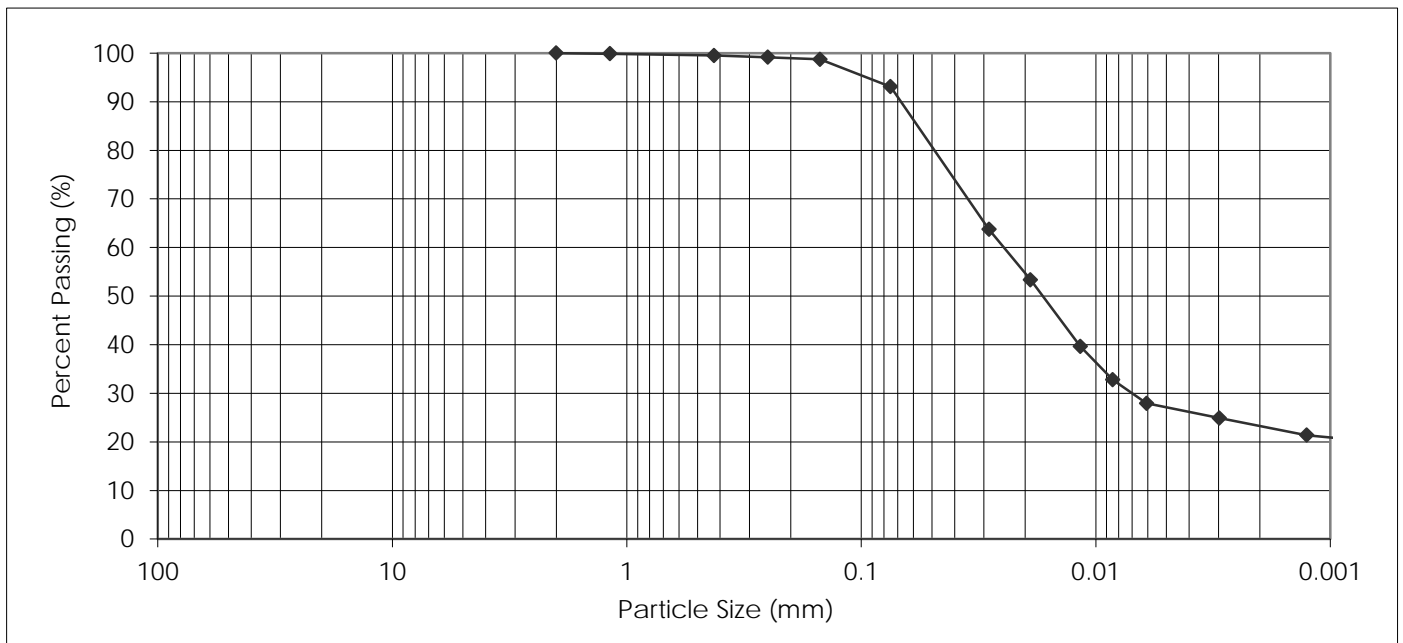
PROJECT: 2015 City of Winnipeg Alley Package  
 Contract (15-RL-01)  
 Young St and Spence St Alley between  
 Notre Dame Ave and Cumberland Ave

Attention: Michael Turko

PROJECT NO.: 123311678

SAMPLED BY: Nestor Abarca  
 SAMPLE ID: TH1 @ 0.91 m

DATE RECEIVED: January 13, 2015  
 TESTED BY: Sothea Bun, C.E.T.



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	99.5
0.250 mm	99.2
0.150 mm	98.7
0.075 mm	93.1
0.005 mm	26.9
0.002 mm	22.9
0.001 mm	20.9

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 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	0.5	6.4	70.2	22.9	20.9

January 19, 2015



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

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

**2015 CITY OF WINNIPEG  
ALLEY PACKAGE CONTRACT 1  
(15-RL-01)**

**DONALD STREET AND SMITH  
STREET ALLEY BETWEEN  
BROADWAY AVENUE AND  
HARGRAVE PLACE**

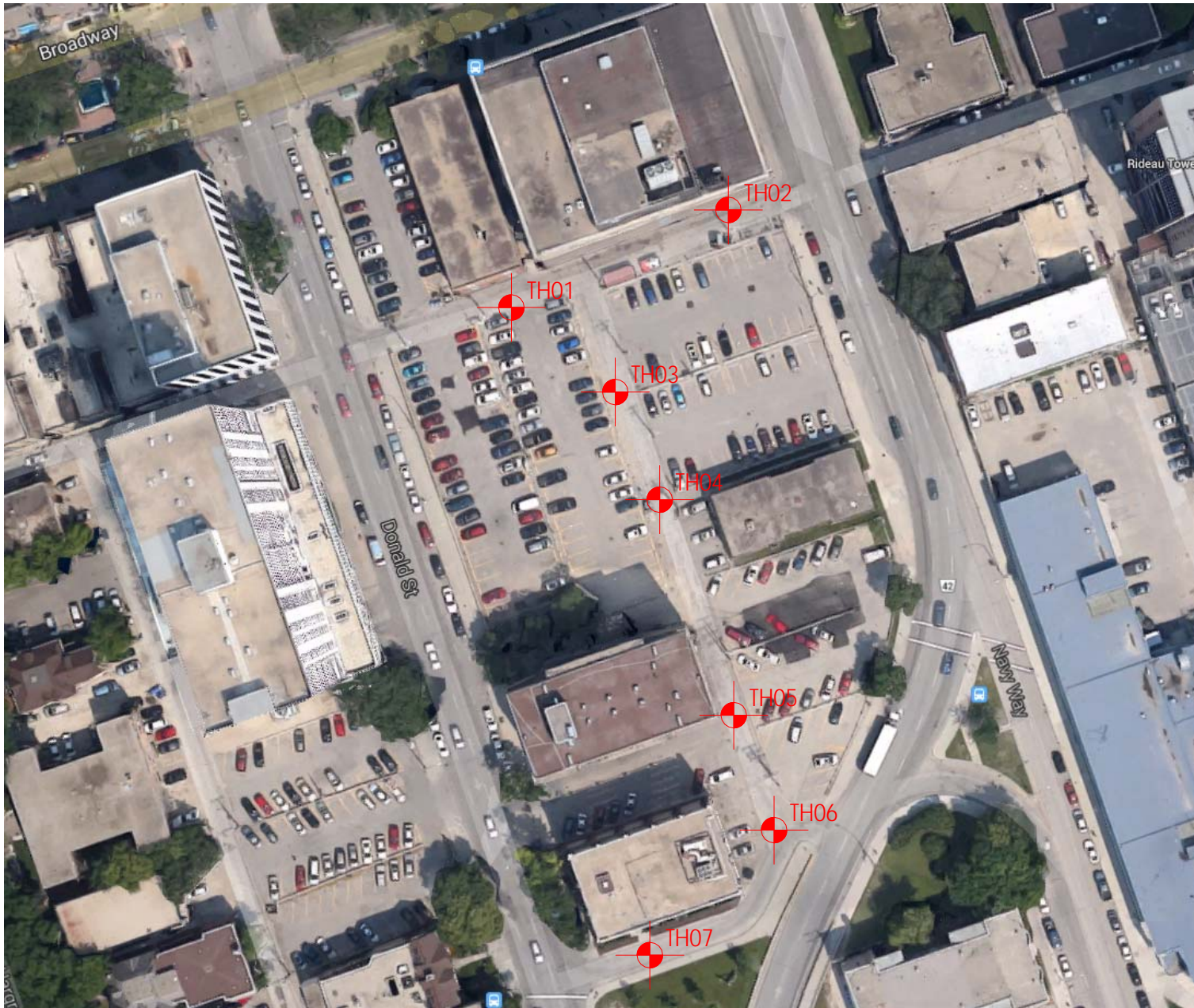
**GEOTECHNICAL INVESTIGATION**



Prepared for:  
KGS Group Inc.  
3rd Floor - 865 Waverley Street  
Winnipeg, Manitoba  
R3T 5P4

Prepared by:  
Stantec Consulting Ltd.  
199 Henlow Bay  
Winnipeg, Manitoba  
R3Y 1G4

January 26, 2015  
Project No. 123311678



Project No. 123311678

Drawn by: SB

Figure: 1

Date: January 9, 2015

Reviewed by: GL

Scale: NTS

**Testhole Location Plan**  
**2015 City of Winnipeg Alley Package**  
**Contract (15-RL-01)**  
**Donald St and Smith St Alley between**  
**Broadway St and Hargrave Pl**

**TABLE 1**  
**2015 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT (15-RL-01)**  
**DONALD STREET AND SMITH STREET ALLEY BETWEEN BROADWAY AVENUE AND HARGRAVE PLACE**  
**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	30.0 m East of Donald Street, approximately 1.5 m South of Centreline	Concrete	155	-	-	-	-	-	-	-	-	-	-	-	-
TH2	9.0 m West of Smith Street, approximately 1.5 m North of Centreline	Concrete	180	-	-	-	-	-	-	-	-	-	-	-	-
TH3	78.5 m North from property line 55 and 59 Donald Street on Centreline	Asphalt	35	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	150												
TH4	40.5 m North from property line 55 and 59 Donald Street on Centreline	Asphalt	25	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	140												
TH5	5.0 m North from property line 55 and 59 Donald Street on Centreline	Asphalt	20	-	-	Clayey Silt	1.2	25	0.0	7.5	67.2	25.3	48	17	31
		Concrete	165												
TH6	22.0 m South from property line 55 and 59 Donald Street on Centreline	Asphalt	20	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	240												
TH7	14.5 m East of Donald Street, approximately 0.6 m South of Centreline	Asphalt	125	Granular Fill	165	-	-	-	-	-	-	-	-	-	-
		Concrete	165												

# TESTHOLE RECORD TH01

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Donald St and Smith St Alley between Broadway Ave and Hargrave Pl ELEVATION \_\_\_\_\_  
 DRILLING DATE December 19, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0		CO	Concrete	CORE							0	
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	38							
		CH		AS	41							2
1		CH		AS	36							4
		CH		AS	35							4
		CH		AS	33							6
2		CH	Clay - brown, stiff, moist, high plasticity	AS	32							6
				AS	31							8
3			TESTHOLE LOCATION: 30.0 m East of Donald Street, approximately 1.5 m South of Centreline.  • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH02

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Donald St and Smith St Alley between Broadway Ave and Hargrave Pl ELEVATION \_\_\_\_\_  
 DRILLING DATE December 19, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□	□	△	×	
0			Concrete	CORE							0
			Clay Fill - brown, firm, moist, high plasticity - trace fine to coarse sand - some granular fill below 1.4 m	AS	4	○					
				AS	19		○				2
1		CH		AS	17		○				4
				AS	14		○				4
				AS	16		○				6
2		CH	Clay - brown, stiff, moist, high plasticity	AS	26		○				6
				AS	27		○				8
3			TESTHOLE LOCATION: 9.0 m West of Smith Street, approximately 1.5 m North of Centreline.  • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal







# TESTHOLE RECORD TH04

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Donald St and Smith St Alley between Broadway Ave and Hargrave Pl ELEVATION \_\_\_\_\_  
 DRILLING DATE December 19, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)				
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕					
0	AS		Asphalt	CORE								0			
	CO		Concrete												
	CH	X	Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand		AS	36									
					AS	36									2
					AS	36									
1	CL ML	/	Clayey Silt - tan, soft, moist, medium plasticity		AS	31								4	
				AS	26										
				AS	25										6
2				AS	22								8		
3													10		
													12		

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH05

PROJECT KGS Group Inc. PROJECT No. 123311678  
 LOCATION Donald St and Smith St Alley between Broadway Ave and Hargrave Pl DATUM \_\_\_\_\_  
December 19, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES										DEPTH (ft)						
				TYPE	NUMBER	MOISTURE CONTENT (%)	<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Grab Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input type="checkbox"/> X	50kPa    100kPa    150kPa    200kPa	Wp    W    W <sub>L</sub> Moisture Content & Atterberg Limits ● Standard Penetration Test, blows/0.3m														
0	AS	Asphalt		CORE																			0
	CO	Concrete																					
	CH	Clay Fill - black, firm, moist, high plasticity - trace organic material - some silt below 0.6 m		AS	31																		
	CH			AS	28																		
1	CH			AS	38																		
	CL	Clayey Silt - tan, soft, moist, medium plasticity - trace fine to medium sand		AS	25																		
	ML	Particle Size Analysis at 0.9 m: 0.0% Gravel, 7.5% Sand, 67.2% Silt, 25.3% Clay		AS	24																		
2	CH	Clay - brown, stiff, moist, high plasticity		AS	28																		
	CH			AS	38																		
3		TESTHOLE LOCATION: 5.0 m North from property line 55 and 59 Donald Street on Centreline.  • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.																					

Sample Type: GS - Grab Sample    SPT - Standard Penetration Test  
 ST - Shelby Tube    PT - Piston Tube    VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite     Drill Cuttings     Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH06

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Donald St and Smith St Alley between Broadway Ave and Hargrave Pl ELEVATION \_\_\_\_\_  
 DRILLING DATE December 19, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)			
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕				
0	AS		Asphalt	CORE								0		
	CO		Concrete											
			Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand		AS	26								
					AS	29								2
1					AS	25								
	CH				AS	32								4
					AS	31								
2			AS	27								6		
			AS	32										
3			TESTHOLE LOCATION: 22.0 m South from property line 55 and 59 Donald Street on Centreline.  • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									8		
												10		
												12		

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type:  Bentonite  Drill Cuttings  Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal



# TESTHOLE RECORD TH07

CLIENT KGS Group Inc. PROJECT No. 123311678  
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM \_\_\_\_\_  
 LOCATION Donald St and Smith St Alley between Broadway Ave and Hargrave Pl ELEVATION \_\_\_\_\_  
 DRILLING DATE December 19, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)				
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕					
0	AS		Asphalt	CORE								0			
	CO		Concrete												
	GW		Granular Fill - 20 mm maximum size aggregate		AS	8	○								
	CH		Clay Fill - brown, firm, moist, high plasticity - trace organic material - trace fine to coarse sand - black below 1.2 m - brown below 1.8 m - trace fine gravel		AS	30	○						2		
1					AS	31	○								
					AS	25	○								4
					AS	32	○								
2				AS	26	○									6
	AS	28	○												
3			<p>TESTHOLE LOCATION: 14.5 m East of Donald Street, approximately 0.6 m South of Centreline.</p> <ul style="list-style-type: none"> <li>The soil was frozen to a depth of 1.1 m.</li> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.1 m.</li> </ul>									8			
												10			
												12			

Sample Type: GS - Grab Sample SPT - Standard Penetration Test  
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test  
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca  
 Reviewed by: German Leal





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



Core sample from Testhole TH6



Core sample from Testhole TH7





**LABORATORY**  
 199 Henlow Bay  
 Winnipeg MB R3Y 1G4  
 Tel: (204) 488-6999

**PARTICLE SIZE ANALYSIS  
 ASTM D422**

KGS Group Inc.  
 3rd Floor - 865 Waverley St.  
 Winnipeg, Manitoba  
 R3T 5P4

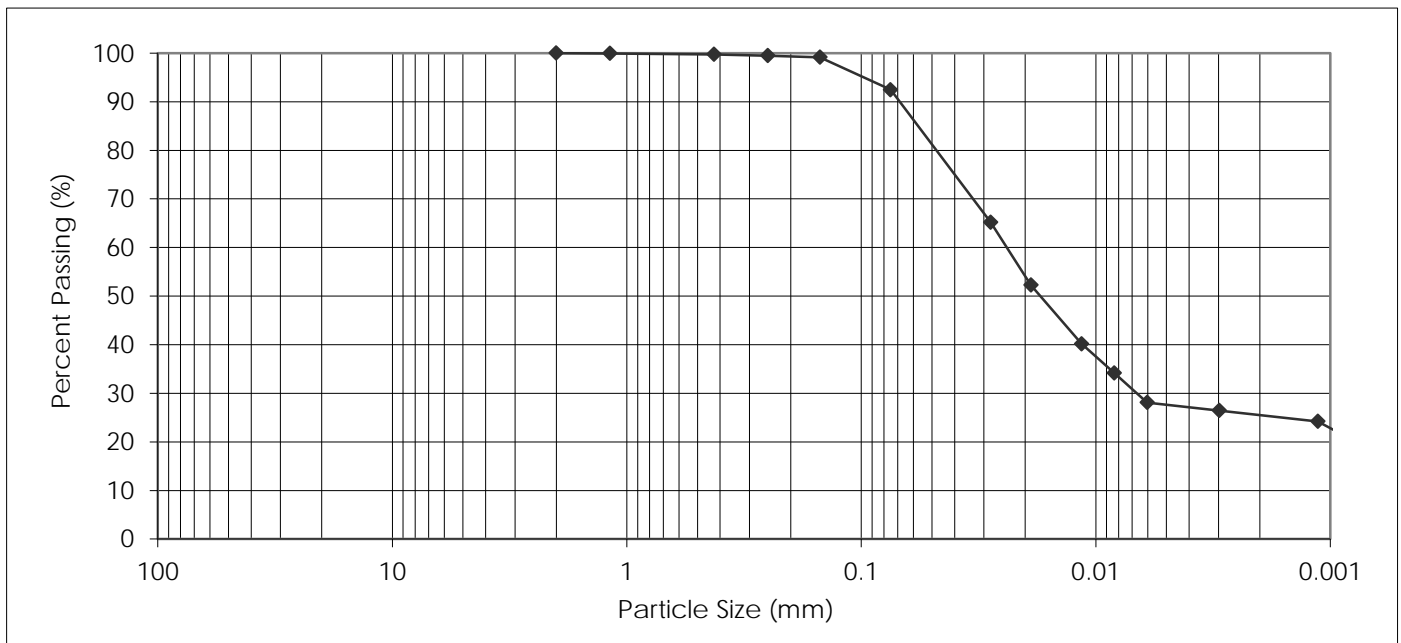
PROJECT: 2015 City of Winnipeg Alley Package  
 Contract (15-RL-01)  
 Donald St and Smith St Alley between  
 Broadway Ave and Hargrave Pl

Attention: Michael Turko

PROJECT NO.: 123311678

SAMPLED BY: Nestor Abarca  
 SAMPLE ID: TH5 @ 1.2 m

DATE RECEIVED: January 13, 2015  
 TESTED BY: Sothea Bun, C.E.T.



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	99.5
0.150 mm	99.1
0.075 mm	92.5
0.005 mm	27.5
0.002 mm	25.3
0.001 mm	22.8

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 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	7.3	67.2	25.3	22.8

January 19, 2015



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

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.