APPENDIX ‘B’

Test Hole Log

APPENDIX 'B' – TEST HOLE LOG

KEY TO SYMBOLS

LITHOLOGIC SYMBOLS

- Clay (CH, high plasticity)
- Clay (CL, low plasticity)
- Fill (made ground)
- Silt Till

SAMPLER SYMBOLS

- Auger Grab
- SPT Split Spoon

WELL CONSTRUCTION SYMBOLS

- Bentonite Grout
- Slope Inclinometer (bentonite)
- Slope Inclinometer (grout)
- Slough
- Standpipe (bentonite)
- Standpipe (cement/bentonite grout)
- Screen (slough)

ABBREVIATIONS

LL - Liquid Limit
PL - Plastic Limit
PI - Plastic Index
MC - Moisture Content
DD - Dry Density
NP - Non-Plastic
-200 - Percent Passing No. 200 Sieve
TV - Torvane (kPa)
PP - Pocket Penetrometer (kPa)
PSA - Particle Size Analysis
TOC - Top Of Casing

PN - Pneumatic Piezometer
VW - Vibrating Wire Piezometer
PID - Photoionization Detector
ppm - Parts Per Million
Water Level During Drilling
Water Level Upon Completion of Drilling
Water Level Remeasured/Static

KGS GROUP				
CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT		PROJECT NO.	22-0107-010
PROJECT NAME	St. Mary's Road Stability Improvement Works		LOCATION	Winnipeg, MB

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KGS GROUP — TEST HOLE LOG

HOLE NO. **TH22-01**

SHEET 1 of 2

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT	PROJECT NO.	22-0107-010
PROJECT	St. Mary's Road Stability Improvement Works	SURFACE ELEV.	223.66 m
LOCATION	Winnipeg, MB	TOC STICK-UP / ELEV.	0.00 m / 223.66 m (Inclinometer)
DESCRIPTION	Lower bank, ~2m south of existing concrete slab	START DATE	12/12/2022
DRILL RIG / HAMMER	Acker MP5 Track Mounted Drill Rig with Safety Drop Hammer	UTM (m)	N 5,525,627
METHOD(S)	0.0 m to 9.8 m: 125 mm ϕ SSA		E 635,700 Zone 14

ELEVATION (m)	DEPTH (m)	DESCRIPTION AND CLASSIFICATION	ELEV (m)	DRILLING/ DIGGING REMARKS	LOG OF INSTALLS: DEPTH (m)	SAMPLE TYPE	NUMBER
		CLAY (ALLUVIAL) - Dark grey, moist, firm, high plasticity, with fine to coarse grained sand, some fine to coarse grained gravel, trace silt, trace organics.	222.7				S1
		CLAY (LACUSTRINE) - Mottled grey/brown, moist, stiff, high plasticity, trace fine to coarse grained sand, trace fine to coarse grained gravel, trace silt, trace organics.			0.9		
		- Decreased granular content, no organics, trace silt nodules/inclusions (<10mm), trace gypsum nodules (<2mm) below 1.8 m.					S2
	10						
220							S3
					Pneumatic PN2040096 4.0		
		- Colour changing to mostly grey, no gypsum below 4.5 m. - Occasional coarse grained gravel (<50mm) below 4.7 m. - Mottled grey/brown from 5.0 m to 5.6 m.		- Squeezing near 4.5 m during drilling.			S4
	5	- Firm below 5.5 m.					
	20						
		- Grey below 6.6 m.					S5
		- Some silt till inclusions below 7.6 m.	215.7				

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WATER LEVEL: ▽ During Drilling/Digging 6.71 m on 12/12/2022

RECOVERY %	BLOWS/0.15 m	N-VALUE	PL MC LL; Cu TORVANE (kPa) ◆; qu POCKET PEN (kPa) ★; SPT (N) BLOWS/0.30 m ▲ (20 40 60 80)
			◆
			◆
			◆
			◆
			◆
			◆
			◆
			◆

WATER LEVELS: ▽ During Drilling/Digging 6.71 m on 12/12/2022

CONTRACTOR: Maple Leaf Drilling Ltd.
INSPECTOR: I. LI
APPROVED: C. ROBAK
DATE: 12/15/2022

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TEST HOLE LOG

HOLE NO. **TH22-01**

SHEET 2 of 2

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION (ELEV (m))	DRILLING/ DIGGING REMARKS	WATER LEVEL	LOG OF INSTALLS: DIAGRAM	LOG OF INSTALLS: DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	BLOWS/0.15 m	N-VALUE	PL MC LL; Cu TORVANE (kPa) ◆; qu POCKET PEN (kPa) ★; SPT (N) BLOWS/0.30 m ▲ (20 40 60 80)
215		30		**SILT TILL** - Light brown, moist, dense, some fine to coarse grained sand, some fine to coarse grained gravel, trace clay.				8.5		S6				★ ★
								9.1		S7	100	26 38 50/ 100mm	+100	>>▲
				213.9				9.8						
	10			Notes: 1. End of test hole at 9.8 m. 2. Refusal encountered in silt till at a depth of 9.8 m. 3. Test hole caved to 9.1 m upon completion of drilling/digging. 4. Slope inclinometer installed to a depth of 9.1 m. 5. Flush mount well cover installed at surface. 6. Test hole backfilled with grout. 7. Grout mix consisted of 1 part cement, 0.14 part bentonite, 2.84 part water. 8. Test hole UTM coordinates are based on handheld GPS (accuracy +/- 3 m).										
		40												
210														
	15	50												

WATER LEVELS ▽ During Drilling/Digging 6.71 m on 12/12/2022

CONTRACTOR: Maple Leaf Drilling Ltd.
INSPECTOR: I. LI
APPROVED: C. ROBAK
DATE: 12/15/2022

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TEST HOLE LOG

HOLE NO. **TH22-02**

SHEET 1 of 2

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT	PROJECT NO.	22-0107-010
PROJECT	St. Mary's Road Stability Improvement Works	SURFACE ELEV.	225.92 m
LOCATION	Winnipeg, MB	TOC STICK-UP / ELEV.	0.00 m / 225.92 m (Standpipe)
DESCRIPTION	Mid bank, ~10m from toe of upper bank	START DATE	12/13/2022
DRILL RIG / HAMMER	Acker MP5 Track Mounted Drill Rig with Safety Drop Hammer	UTM (m)	N 5,525,638
METHOD(S)	0.0 m to 12.1 m: 125 mm ø SSA		E 635,716 Zone 14

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	DRILLING/ DIGGING REMARKS	LOG OF INSTALLS DIAGRAM	LOG OF INSTALLS DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	BLOWS/0.15 m	N-VALUE
				CLAY FILL - Dark grey, damp, very stiff, high plasticity, some silt, trace fine to medium grained sand, trace rootlets/roots, trace organics.	225.4								
225				**CLAY (ALLUVIAL)** - Dark brown, moist, very stiff, high plasticity, some fine to coarse grained sand, some fine to coarse grained gravel, some silt, trace organics, trace rootlets. - Decreased granular content below 0.9 m. - Mottled black/brown, increased organic content, decreased silt content from 1.4 m to 2.0 m. - Mottled brown from 2.0 m to 2.2 m. - Light brown, soft to firm, decreased plasticity, increased silt, trace fine grained sand below 2.2 m.	222.9	- Seepage below 2.3 m during drilling. - Squeezing near 3.0 m upon completion of drilling.		0.9					
	10			**CLAY (LACUSTRINE)** - Mottled grey/brown, moist, stiff, high plasticity, trace fine to coarse grained sand, trace silt nodules (<10mm), trace gypsum nodules (<5mm). - Silt partings/seams at 3.8 m. - Wet below 3.8 m.			Pneumatic PN2040093	4.6					
	5			- Increased gypsum (<20mm) below 4.9 m.									
220		20		- Grey, no gypsum below 6.4 m. - Firm below 6.7 m.									

Sample types: S1, S2, S3, S4, S5, S6, S7

N-VALUE: PL — MC — LL; Cu TORVANE (kPa) ◆; qu POCKET PEN (kPa) ★; SPT (N) BLOWS/0.30 m ▲ (20, 40, 60, 80)

WATER LEVELS

CONTRACTOR Maple Leaf Drilling Ltd.	INSPECTOR I. LI
APPROVED C. ROBAK	DATE 12/15/2022

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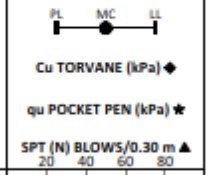
TEST HOLE LOG

HOLE NO. **TH22-02**

SHEET 2 of 2

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION (ELEV (m))	DRILLING/ DIGGING REMARKS	LOG OF INSTALLS: DIAGRAM	LOG OF INSTALLS: DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	BLOWS/0.15 m	N-VALUE
				- Trace silt till inclusions below 9.1 m.			9.1		S8			
									S9			
				215.4			10.5					
215				**SILT TILL** - Light brown, moist to wet, dense, some fine to coarse grained sand, some fine to coarse grained gravel, trace silt. - Poor recovery below 10.7 m.					S10	100	44 30 32	62
							11.7					
				213.8			12.0			100	50/ 80mm	+100

Notes:
1. End of test hole at 12.1 m.
2. Refusal encountered in silt till at a depth of 12.1 m.
3. Test hole caved to 12.0 m upon completion of drilling/digging.
4. Flush mount well cover installed at surface.
5. Test hole backfilled with grout. An approximate 0.9 m of bentonite seal at surface.
6. Grout mix consisted of 1 part cement, 0.28 part bentonite, 3.3 part water.
7. Unable to install sandpack due to test hole squeezing around standpipe and grout tremie line.
8. Test hole UTM coordinates are based on handheld GPS (accuracy +/- 3 m).



WATER LEVELS

CONTRACTOR: Maple Leaf Drilling Ltd.

INSPECTOR: I. LI

APPROVED: C. ROBAK

DATE: 12/15/2022

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TEST HOLE LOG

HOLE NO.
TH22-02A

SHEET 1 of 2

CLIENT	**CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT**	**PROJECT NO.**	22-0107-010
PROJECT	**St. Mary's Road Stability Improvement Works**	**SURFACE ELEV.**	225.92 m
LOCATION	Winnipeg, MB	**TOC STICK-UP / ELEV.**	0.00 m / 225.92 m (Inclinometer)
DESCRIPTION	Mid bank, ~10m from toe of upper bank near TH22-02	**START DATE**	12/14/2022
DRILL RIG / HAMMER	Acker MP5 Track Mounted Drill Rig with Safety Drop Hammer	**UTM (m)**	N 5,525,639
METHOD(S)	0.0 m to 12.8 m: 125 mm ø SSA		E 635,719 Zone 14

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	LOG OF INSTALLS: DIAGRAM	LOG OF INSTALLS: DEPTH (m)	SAMPLE TYPE	NUMBER	PL MC LL; Cu TORVANE (kPa) ◆; qu POCKET PEN (kPa) ★; SPT (N) BLOWS/0.30 m ▲ (20 40 60 80)
				CLAY FILL - Borehole was not logged. Stratigraphy projected from TH22-02.	225.4					
225				**CLAY (ALLUVIAL)** - Borehole was not logged. Stratigraphy projected from TH22-02.	222.9		0.9			
		10		**CLAY (LACUSTRINE)** - Borehole was not logged. Stratigraphy projected from TH22-02.						
	5									
220		20								

WATER LEVELS

CONTRACTOR: **Maple Leaf Drilling Ltd.**	INSPECTOR: **I. Li**
APPROVED: C. ROBAK	DATE: 12/15/2022

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TEST HOLE LOG

HOLE NO.
TH22-02A

SHEET 2 of 2

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	LOG OF INSTALLS: DIAGRAM	LOG OF INSTALLS: DEPTH (m)	SAMPLE TYPE	NUMBER	PL MC LL; Cu TORVANE (kPa) ◆; qu POCKET PEN (kPa) ★; SPT (N) BLOWS/0.30 m ▲ (20 40 60 80)
		30								
	10									
					215.4					
215				**SILT TILL** - Borehole was not logged. Stratigraphy projected from TH22-02.						
		40					12.2			
					213.1		12.8			
210	15	50								

Notes:
1. End of test hole at 12.8 m.
2. Test hole caved to 12.2 m upon completion of drilling/digging.
3. Slope inclinometer installed to a depth of 12.2 m.
4. Flush mount well cover installed at surface.
5. Test hole backfilled with grout. An approximate 0.9 m of bentonite seal at surface.
6. Grout mix consisted of 1 part cement, 0.28 part bentonite, 3.3 part water.
7. Stratigraphy assumed from TH22-02.
8. Test hole UTM coordinates are based on handheld GPS (accuracy +/- 3 m).

WATER LEVELS	CONTRACTOR	INSPECTOR
	Maple Leaf Drilling Ltd.	I. LI
	APPROVED	DATE
	C. ROBAK	12/15/2022

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TEST HOLE LOG

HOLE NO.
TH22-03

SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT	PROJECT NO.	22-0107-010
PROJECT	St. Mary's Road Stability Improvement Works	SURFACE ELEV.	226.22 m
LOCATION	Winnipeg, MB	START DATE	12/13/2022
DESCRIPTION	Mid bank, ~5.5m from toe of upper bank	UTM (m)	N 5,525,625
DRILL RIG / HAMMER	Acker MP5 Track Mounted Drill Rig with Safety Drop Hammer		E 635,727 Zone 14
METHOD(S)	0.0 m to 6.1 m: 125 mm ø SSA		

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	DRILLING/ DIGGING REMARKS	SAMPLE TYPE	NUMBER	PL MC LL; Cu TORVANE (kPa) ◆; qu POCKET PEN (kPa) ★; SPT (N) BLOWS/0.30 m ▲ (20 40 60 80)
				CLAY FILL - Dark brown, damp to moist, stiff, high plasticity, some organics, trace roots/rootlets, occasional fine grained gravel.					
225				- Increased organics (black) below 1.1 m.	224.8				
				CLAY (ALLUVIAL) - Light brown, moist, firm, low plasticity, with silt.	224.7				
				CLAY (LACUSTRINE) - Mottled grey/brown, moist, very stiff, high plasticity, trace silt nodules (<3mm), trace gypsum nodules (<10mm), trace organics.		- Squeezing near 1.5 m during drilling.			
				- Stiff below 1.8 m.					
				- Increased silt inclusions (<10mm) below 2.6 m.					
		10							
	5			- Trace fine to coarse grained gravel below 4.9 m.					
				- Grey below 5.3 m.					
		20			220.1				
220				Notes: 1. End of test hole at 6.1 m. 2. Test hole backfilled with auger cuttings and bentonite chips. 3. Test hole UTM coordinates are based on handheld GPS (accuracy +/- 3 m).					

WATER LEVELS

CONTRACTOR Maple Leaf Drilling Ltd.	INSPECTOR I. LI
APPROVED C. ROBAK	DATE 12/15/2022

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