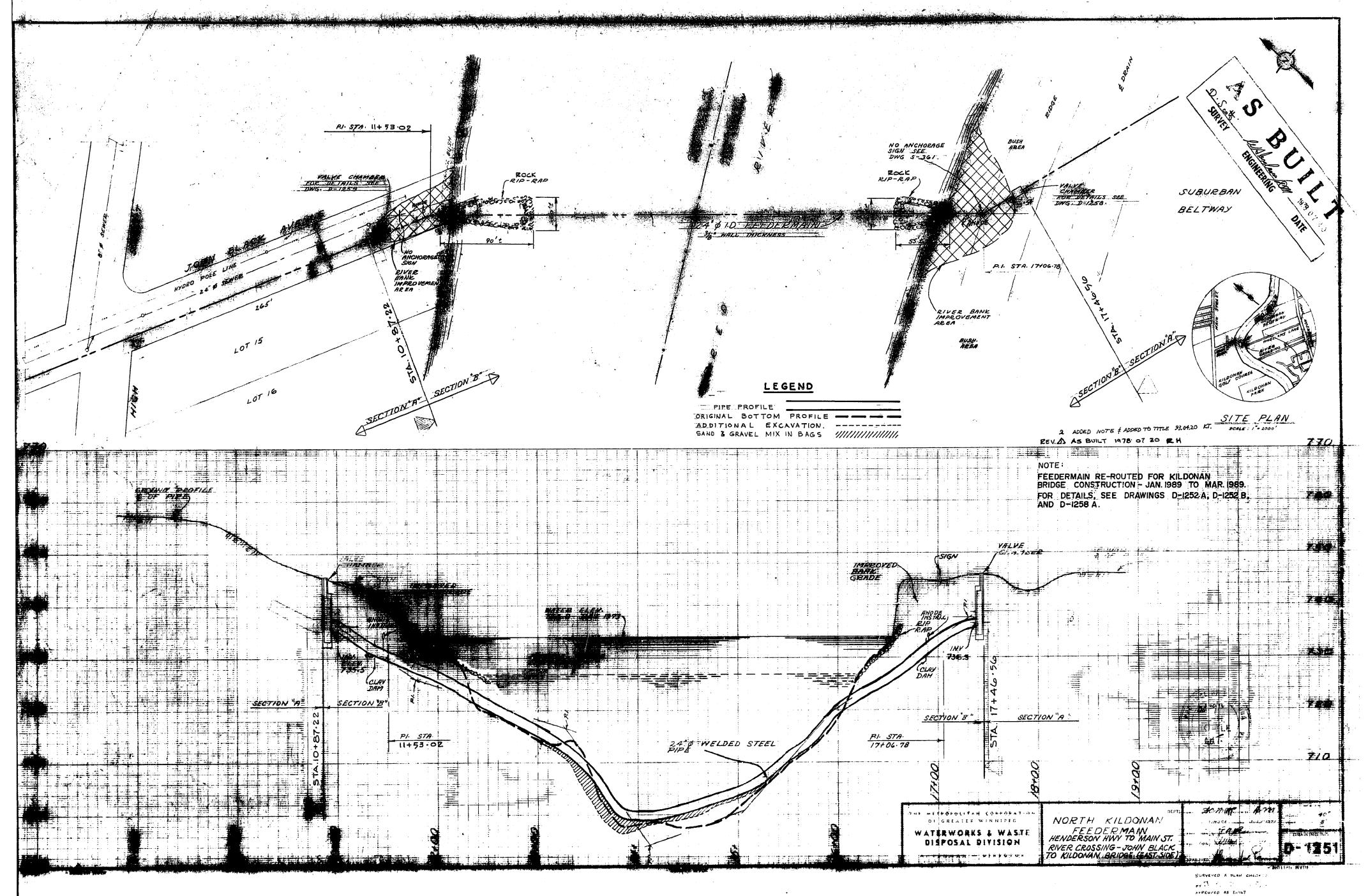
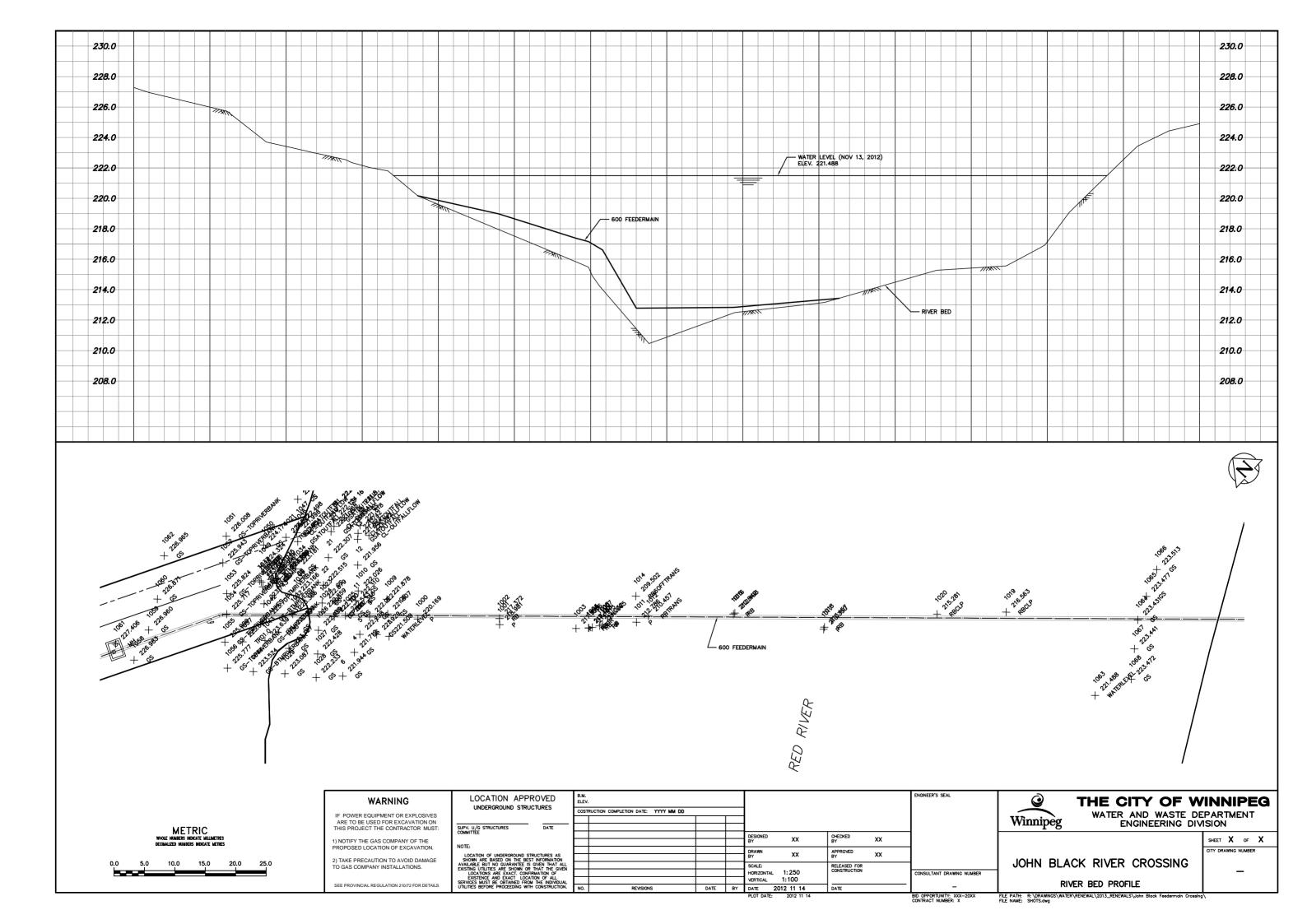
Template Version: SrC120120228- C RFP

APPENDIX A – ADDITIONAL INFORMATION

- 1. NK FM DRAWING D1251
- 2. NK FEEDERMAIN RIVER BED PROFILE NOVEMBER 2012
- 3. HISTORIOCAL TEST HOLE LOCATIONS
- 4. HISTORICAL TEST LOGS





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BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR CKD. DATE OF INVEST. 25/09/87 JOB NO. HOLE NO. 16 87422 LOGGED/DWN. DRILL TYPE WATER CONTENT SOIL DESCRIPTION SOIL SAMPLE PENETRATION RESISTANCE DEPTH DATUM w-0 WL - A. Wp -PERCENT % SURFACE ELEVATION 223.61 m m OTHER TESTS 20 50 10 WATER - 1 - 2 - 4 - 5 - 6 7 - 8 - 9 FOR TESTS IN ALLUVIAL SOILS ALLUVIUM SEEH - 10 DMT 7 GLACIAL TILL -SOFT/LOOSE 11 -PUSHED DRILL RODS TO BEDROCK SURFACE - 12 LIMESTONE BEDROCK PLATE A-25

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BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR DATE OF INVEST. 06/10/87 HOLE NO. 16A LOGGED/DWN. CKD. JOB NO. 87422 DRILL TYPE CONTENT SOIL DESCRIPTION SOIL SAMPLE WATER PENETRATION RESISTANCE DEPTH DATUM Wp w-0 WL-A. PERCENT % m SURFACE ELEVATION OTHER TESTS 50 20 30 40 10 WATER 1 3 4 5 6 8 9 ALLUVIAL SOILS 10 GLACIAL TILL 11 (depth extrapolated from DMT 1) PLATE A-27

			vest-eranii 755				BOREH	OLE		LOG		
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BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR DATE OF INVEST. 07/10/87 CKD. JOB NO. LOGGED/DWN. 87422 HOLE NO. 16B DRILL TYPE CONTENT SAMBOL SYMBOL SOIL DESCRIPTION SOIL SAMPLE WATER PENETRATION RESISTANCE DATUM Wp w-0 WL-A. PERCENT % SURFACE ELEVATION 223.69 m m OTHER TESTS 50 20 30 40 10 WATER -1 . 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 ALLUVIUM - 10 GLACIAL TILL - 11 (depth to till extrapolated from DMT 7) -12 - 13 PLATE A-29

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	LOGG	ED/DW	V.			СК	D.			DATE OF INVEST. 07/10/87 JOB NO. 87422	HOLE NO. 16B
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BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR DATE OF INVEST. 14/10/87 JOB NO. 87422 LOGGED/DWN. HOLE NO. 160 CKD. DRILL TYPE CONTENT WATER SOIL DESCRIPTION SOIL SAMPLE PENETRATION PESISTANCE DEPTH DATUM CONDITION Wp w-0 WL-A. PERCENT % m SURFACE ELEVATION OTHER 50 TESTS 20 30 40 10 MATER - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 ALLUVIUM - 10 GLACIAL TILL - 11 (depth to till extranolated
 from DMT 7) - 12 - 13 PLATE A-31

BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR DATE OF INVEST. 14/10/87 HOLE NO. 160 CKD. JOB NO. 87422 LOGGED/DWN. DRILL TYPE SOIL DESCRIPTION WATER CONTENT SOIL SAMPLE PENETRATION RESISTANCE DEPTH DATUM Wp -W-O WL-A. PERCENT % m SURFACE ELEVATION OTHER TESTS 30 40 50 20 LIMESTONE BEDROCK 14 REC - 100% SOUND ROCK RQD - 85% REC - 92% -15SOUND ROCK RQD - 91% -16 REC - 98% SOUND ROCK 17 RQD - 96% -18 REC - 100% SOUND ROCK RQD - 100% 19 NO RECOVERY -20 BROKEN ROCK, NO RECOVERY NO RECOVERY REC - 93% -21 SOUND ROCK RQD - 73% -22 End hole at 22.3 m. 23 PLATE A-32

BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR DATE OF INVEST. JOB NO. LOGGED/DWN. CKD. HOLE NO. 15/10/87 87422 16D DRILL TYPE CONTENT SOIL DESCRIPTION SOIL SAMPLE WATER PENETRATION RESISTANCE DEPTH DATUM CONDITION Wp w-0 WL-A. PERCENT % m SURFACE ELEVATION OTHER TESTS 50 20 30 40 10 WATER -1 -2 - 3 -4 -5 - 6 -7 - 8 9 ALLUVIUM _10 GLACIAL TILL 11 (depth to glacial till extrapolated from DMT 7) - 12 13 LIMESTONE BEDROCK PLATE A-33

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BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR **DATE OF INVEST.** 06/10/87 JOB NO. 87422 CKD. HOLE NO. 17 LOGGED/DWN. DRILL TYPE WATER CONTENT SOIL DESCRIPTION SOIL SAMPLE DATUM w-0 WL-A. DEPTH Wp -PERCENT % m SURFACE ELEVATION OTHER TESTS 50 20 30 40 GLACIAL TILL - 14 LIMESTONE BEDROCK - 15 NO RECOVERY 14.3 to 15.5 m REC - 99% SOUND ROCK - 16 RQD - 99% REC - 97% -17 SOUND ROCK RQD - 75% -18 REC - 97% SOUND ROCK RQD - 79% -19 SOUND ROCK REC 100% - 20 REC 0% BROKEN ROCK REC - 100% SOUND ROCK RQD - 70% - 21 REC - 93% SOUND ROCK RQD - 30% - 22 - 23 End hole at 22.6 m. PLATE A-36

	DYREGROV &														BO	REHOI	E	L	.OG		
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BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR CKD. DATE OF INVEST. 21/09/87 LOGGED/DWN. JOB NO. 87422 HOLE NO. 18 DRILL TYPE WATER CONTENT SOIL DESCRIPTION SOIL SAMPLE PENETRATION RESISTANCE DEPTH DATUM Wp w-0 WL-A. PERCENT % m SURFACE ELEVATION 223.68 m OTHER TESTS 20 NO RECOVERY 13.8 - 13.9 m - 14 REC - 87% SOUND ROCK 25 mm clay seam at 14.6 m RQD - 82% REC - 95% 15 SOUND ROCK RQD - 87% - 16 REC - 95% SOUND ROCK - 17 RQD - 65% **-** 18 REC - 95% SOUND ROCK RQD - 87% - 19 REC - 95% SOUND ROCK - 20 - 21 SOUND ROCK REC - 93% - 22 End hole at 22.3 m. - 23 PLATE A-38

BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR DATE OF INVEST. 19/09/87 JOB NO. 87422 HOLE NO. 19 CKD. LOGGED/DWN. DRILL TYPE DESCRIPTION SOIL SOIL SAMPLE WATER CONTENT PENETRATION RESISTANCE DATUM DEPTH w-0 WL-A. Wp -PERCENT % SURFACE ELEVATION 223.62 m OTHER TESTS 50 30 40 10 20 WATER - 1 - 4 6 7 8 9 GLACIAL TILL (depth to glacial till extrapolated from DMT 5) 10 11 12 13 PLATE A-39

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BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR DATE OF INVEST. 03/10/87 CKD. JOB NO. 87422 LOGGED/DWN. HOLE NO. 20 DRILL TYPE SOIL SAMPLE WATER CONTENT SOIL DESCRIPTION PENETRATION PESISTANCE DEPTH DATUM Wp w-O WL-A. PERCENT % m SURFACE ELEVATION 223.61 m OTHER TESTS 40 50 60 20 30 WATER -1 ALLUVIAL SOILS - 2 (for test results see DMT 4) - 3 - 4 - 5 - 6 - 7 GLACIAL TILL . 8 (depth to till extrapolated from DMT 4) - 9 - 10 - 11 - 12 - 13 LIMESTONE BEDROCK PLATE A-41

BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR DATE OF INVEST. 03/10/87 HOLE NO. 20 JOB NO. 87422 LOGGED/DWN. CKD. DRILL TYPE SOIL DESCRIPTION SOIL SAMPLE WATER CONTENT SYMBOL HLABO DATUM Wp w-0 WL-A. PERCENT % SURFACE ELEVATION OTHER TESTS m 223.61 m 20 30 50 10 - 14 BROKEN ROCK 13.4 - 14.0 m REC - 64% SOUND ROCK BELOW 14.0 m RQD - 53% - 15 REC - 97% SOUND ROCK RQD - 81% - 16 REC - 95% - 17 SOUND ROCK RQD - 93% - 18 SOUND ROCK REC - 92% - 19 RQD - 69% 100 mm clay seam SOUND ROCK REC - 97% 20 RQD - 73% - 21 SOUND ROCK REC - 92% - 22 RQD - 79% End hole at 22.6 m. - 23 PLATE A-42

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BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR HOLE NO. 21 DATE OF INVEST. 28/09/87 JOB NO. 87422 CKD. LOGGED/DWN. DRILL TYPE SOIL DESCRIPTION SOIL SAMPLE WATER CONTENT DEPTH DATUM Wp-□ W-O WL-△. PERCENT % SURFACE ELEVATION OTHER TESTS 50 60 NO RECOVERY TO 14.2 m - 14 SOUND ROCK, 14.2 - 14.8 m - 15 REC - 99% — — 25 mm clay seam RQD - 44% SOUND ROCK - 16 SOUND ROCK REC - 97% - 17 RQD - 81% - 18 - - 6 mm clay seams (2) REC - 95% -- 12 mm clay seam RQD - 45% SOUND ROCK - 19 REC - 98% SOUND ROCK - 20 RQD - 67% 21 SOUND ROCK REC - 100% - 22 RQD - 36% End hole at 22.4 m. - 23 PLATE A-44

BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR HOLE NO. 22 DATE OF INVEST. JOB NO. 87422 CKD. LOGGED/DWN. 23/09/87 DRILL TYPE SOIL DESCRIPTION SOIL SAMPLE WATER CONTENT PENETRATION RESISTANCE DEPTH DATUM Wp w-0 WL-A. PERCENT % 223.68 m m SURFACE ELEVATION OTHER TESTS 50 30 10 20 WATER - 1 - 2 ALLUVIAL SOILS (for testing see DMT 3) - 3 - 4 - 5 6 - 7 - 8 GLACIAL TILL (depth to glacial till extrapolated from DMT 3) 9 - 10 - 11 - 12 13 LIMESTONE BEDROCK PLATE A-45

BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR DATE OF INVEST. 23/09/87 JOB NO. HOLE NO. CKD. LOGGED/DWN. 87422 22 DRILL TYPE SOIL DESCRIPTION SOIL SAMPLE WATER CONTENT SAMBOL HT430 PENETRATION PESISTANCE DATUM w-0 WL-A. Wp -PERCENT % m SURFACE ELEVATION 223.68 m OTHER TESTS 50 10 20 30 no REC BROKEN ROCK, 13.0-13.8 m REC - 99% - 14 SOUND ROCK RQD - 45% SOUND ROCK REC - 99% RQD - 83% 15 -16 SOUND ROCK REC - 96% RQD - 73% -17 SOUND ROCK -18 REC - 93% RQD - 66% - 19 End hole at 19.0 m. PLATE A-46

BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR DATE OF INVEST. 22/09/87 HOLE NO. 23 JOB NO. 87422 CKD. LOGGED/DWN. DRILL TYPE SOIL SAMPLE SYMBOL HLABO SOIL DESCRIPTION WATER CONTENT PENETRATION RESISTANCE DATUM w-0 $W_L - \Delta$. Wp -PERCENT % M SURFACE ELEVATION 223.70 m OTHER TESTS 50 20 WATER - 1 ALLUVIAL SOILS - 2 (For testing see DMT 3) - 3 - 4 - 5 - 6 - 7 - 8 GLACIAL TILL (Depth to till extrapolated 9 from DMT 3) - 10 11 12 13 LIMESTONE BEDROCK PLATE A-47

BOREHOLE LOG

PLATE A-48

DYREGROV & E	URGE	SS PROJECT KILDONAN CORRIE	DOR	
LOGGED/DWN. CKD.		DATE OF INVEST. 22/09/87 JOB NO. 8	37422	HOLE NO. 23
WATER CONTENT		SOIL DESCRIPTION	SOIL SAMPLE	
Wp-□ W-O W _L -△. PERCENT %	DEPTH HT930	DATUM	CONDITION TYPE FENETRATION RESISTANCE	
10 20 30 40 50 60	SOIL	URFACE ELEVATION 223.70 m	S	OTHER TESTS
	14	SOUND ROCK		REC 87% RQD 83%
	— 15 [[SOUND ROCK	+++ -	REC 97%
		JOHN NOOK		RQD - 70%
	16	SOUND ROCK		REC 100%
	— 17 			RQD - 88%
	— 18 T	SOUND ROCK		REC 95%
	19			RQD - 47%
	20	SOUND ROCK		REC 97%
	21			
		End hole at 20.9 m.		
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BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

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	w	/p - C		W-O		/L - Z	۵.		DEPTH	100	DATUM	CONDITION	TYPE	PENETRATION RESISTANCE	
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BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR DATE OF INVEST. 30/09/87 JOB NO. HOLE NO. DMT 4 CKD. 87422 LOGGED/DWN. DRILL TYPE SOIL SAMPLE SOIL DESCRIPTION WATER CONTENT PENETRATION DEPTH DATUM Wp w-O WL-A. PERCENT % SURFACE ELEVATION OTHER TESTS 223.61 50 60 m UNDRAINED WATER SHEAR - 1 STRENGTH (kPa) - 2 CLAYEY SILT 28 27 27 - 3 36 STRATIFIED SILT, SAND, AND CLAY 4 45 39 5 SILTY SAND ø=34⁰ ø=36⁰ 6 51 7 SILTY CLAY 59 58 End dilatometer test at 7.5 m. 8 Refusal on boulder or glacial till. PLATE A-50

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	LOG	GED	/DWN				C	KD.				DATE OF IN	vest. 3	0/09/87	Ţ.	јов но . 87 <i>а</i>	122			HOLE NO.	
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BOREHOLE LOG PROJECT DYREGROV & BURGESS KILDONAN CORRIDOR DATE OF INVEST. 30/09/87 HOLE NO. DMT 7 CKD. JOB NO. 87422 LOGGED/DWN. DRILL TYPE DESCRIPTION SOIL SOIL SAMPLE WATER CONTENT PENETRATION RESISTANCE DEPTH DATUM Wp w-0 WL-A. PERCENT % m SURFACE ELEVATION OTHER TESTS 60 50 20 30 10 MATER 1 2 - 3 4 5 6 7 8 - 9 10 GLACIAL TILL - soft/loose 11 - Drill rods pushed with no rotation from 10.4 to 13.1 m. Refusal on probable bedrock at 13.1 m. 12 13 PLATE A-53

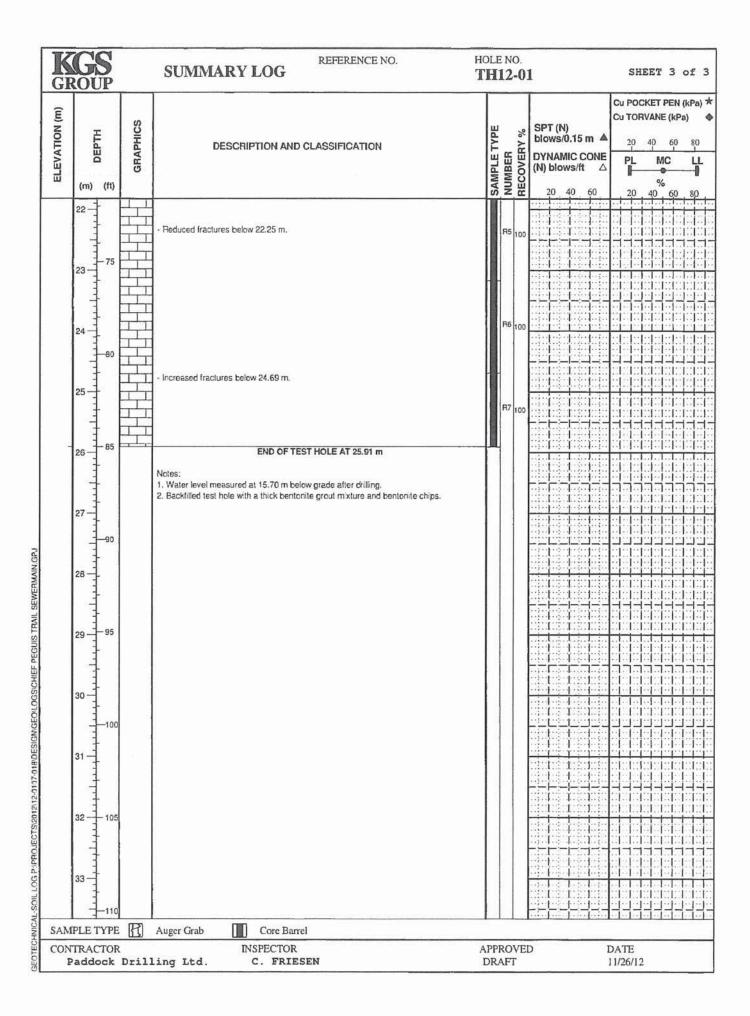
	K	GS ROUP		SUMMARY LOG REFERENCE NO.			E NO. [12-0 2	2	SHEET 1 of 3
		JECT (Chief F	F WINNIPEG - WATER AND WASTE DEPARTMEN Peguis Bridge Sewer Replacement	T			JOB NO. GROUND ELEV. TOP OF PVC ELE	12-0107-018 228-37
	SITI			Red River and South of Chief Peguis Trail f Existing Sewermain on the Upper Bank				WATER ELEV. DATE DRILLED	11/8/2012
1	DRII			rack Drill Rig, 125 mm ø Solid Stem and HQ Core Barrel	i			UTM (m)	N 5,534,757 E 636,604
	ELEVATION (m)	(a) DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	NUMBER RECOVERY %	SPT (N) blows/0.15 m DYNAMIC CONE (N) blows/ft 20 40 60	Cu POCKET PEN (kPa) * Cu TORVANE (kPa) 20 40 60 80 PL MC LL 60 40 60 80
		1		SILTY CLAY FILL - Brown, moist, stiff, intermediate to high plasticity, some medium to coarse grained sand, some fine grained gravel, trace coarse grained gravel, trace rootlets.			Sı		
	100	1-5		SILTY CLAY - Brown, moist, stiff, high plasticity, trace fine to medium grained sand.		2			
1		2-		- Increased sand content below 1.83 m.					
		ومواليوه		SAND - Brown, moist, compact, fine to medium grained, trace coarse grained sand, trace silt, trace clay.		Į.	S2		
		3 10		SILTY SAND - Brown, moist, loose, fine to medium grained, with silt, trace clay.		Ł	S 3		
GEOTECHNICAL SOIL LOG P:PROJECTS/2012/12-0107-018/DESIGN/GEO/LOGS/CHIEF PEGUIS TRAIL SEWERMAIN, GPJ		5-15		SAND - Brown, moist, compact, fine to medium grained, trace silt.			Σ		
F PEGUIS T	-	1		- Water noticed on sample at ~ 5.49 m. SANDY SILT - Brown, moist, firm, intermediate to high plasticity, trace oxidation.		1	S4		
GEOYLOGSICHIE	- 5	20		SILTY SAND - Brown, moist, soft, fine to medium grained, trace oxidation. 1- Grey, no oxidation below 6.71 m.		Ę	S5		
07-018/DESIGN		7-25		SAND - Grey, moist, compact, medium grained, some fine and coarse grained sand. SILTY CLAY - Grey, moist, firm, high plasticity. - Medium grained sand layer between 7.39 and 7.47 m.					
JTS/2012/12-01		8		SILTY SAND - Grey, moist, soft, fine to medium grained sand, with silt. - Organic layer between 8.53 and 8.64 m.	The second	ŧ	S6		•
LOG P: PROJEC	-	9-30		SILTY CLAY - Grey, moist, firm, high plasticity, trace fine grained sand.					
L-SOIL I		1		- Increased sand between 9.75 and 9.96 m.		F	S7		
HINICA	SAM	PLE TYPE	团	Auger Grab Split Spoon Core Barrel					
GEOTEC		TRACTOR Paddock		INSPECTOR Ling Ltd. C. FRIESEN			PROVE RAFT		DATE 1/26/12

K	GS ROUP		SUMMARY LOG REFERENCE NO.			DLE NO. H12-02	2	SHEET 2 o	f 3
ELEVATION (m)	∃ DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER RECOVERY %	SPT (N) blows/0.15 m DYNAMIC CONE (N) blows/ft 20 40 60		
	35 11 -		- Increased sand between 10.36 and 10.52 m. SILTY SAND - Grey, moist, compact, medium grained, trace fine grained sand, trace clay. - Test hole squeezing at 10.67 m.			\$\$ \$8			
	12 40		25 mm thick organic layer at 12.50 m. Decreased sand between 12.95 and 13.26 m.			SS SS			
	14 15 50 50		SILTY CLAY - Grey, moist, firm, high plasticity, trace coarse grained sand, trace fine grained gravel, trace silt nodules. - Grain Size Distribution: Gravel (1.0%), Sand (8.8%), Silt (21.9%), Clay (57.0%) at 14.63 m.			KT 510			
LIIS TRAIL SEWERMAIN GPJ	16 - 55		SILT TILL - Tan, moist, compact, with medium to coarse grained sand, some fine grained gravel, trace coarse grained gravel Loose, decreased gravel below 16.46 m.			S12 ₁₀₀	\$\frac{1}{2}\$ \$		
ROESIGNIGEOLOGSSCHIEF PEG	18 - 60		- Auger refusal at 18.34 m on bedrock. Switched over to core below 18.34 m. LIMESTONE BEDROCK - White, competent, vertical and horizontal fractures.			S13			
GEOTECHNICAL-SOIL LOG P-PROJECT SPRITATE-0107-018/0ESIGN/GEOLOGS/GHIEF PEGUIS TRAIL SEWERMAIN GRU WWW. Commonwealth of the common services of the common servic	65					R2 98			
SAM CON CON	IPLE TYPE VTRACTOR Paddock		Auger Grab Split Spoon Core Barrel INSPECTOR Ling Ltd. C. FRIESEN	- 作版知識		PPROVEI DRAFT		DATE	

K	GS OUP		SUMMARY LOG REFERENCE NO.	Side I Special Con-		H12		2					SHE	EET	3 0	of 3
ELEVATION (m)		IICS		90.	(m)	PE	%	SP	T (N) 0.15 m		Cu	TOR	VANE	(kPa)	
VATIO	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	ERY	DY	NAM	iic cc		_	20 PL	40 MC	60	80 LL
ELE		2	v v	<u>=</u>	ä	MPL	COV	(N)	blov	vs/ft	Δ		-	%		Ī
	(m) (ft)	<u> </u>			_	S	2 2		20	40 6	0		20		60	80
	22	臣			22.2	R	3 98	:	1							
	4	口口					11396/0		-			4	11		1.1	
	23 - 75		- Increased fractures below 22.94 m.							1:::1			11			
	23 =	片	- Vertical fracture between 23.01 and 23.67 m.			SERVICE STATES				1:2:1			1.1		1 1	
	1 1				1		4 100		-	冒		1	11	11	11	-
	24-						100			1:::1		4		11	11	
	80	田				101										
	7	井井							1							11.
	25-	莊				the state of the s			100	1						#
	3	丗				R	5 100									
	1	中			25.8											
-	26 - 85		END OF TEST HOLE AT 26.06 m		26.1				1	11	·• [1	1.1.	1	1.1.
	=		Notes:											44:		44:
	}		1. Installed casagrande standpipe at a depth of 26.06 m with a stick-up of 0.84 m.							1:3:1						
	27—		Backfilled test hole with silica sand between 26.06 and 22.17 m and bentonite chips from 22.17 m to grade.					::::			;		1:1	1:1:		11:
	90		- Manufacturing and an anti-state of the Anti-state of English of English of Society 											44		
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	110				1	Ш			H			4	11	1:1:	11	
SAM	PLE TYPE		Auger Grab Split Spoon Core Barrel			D.	21.1									
CON	TRACTOR addock		INSPECTOR Ling Ltd. C. FRIESEN			APPRO DRAI		U				DA7	E 6/12			

	K	GS ROUP		SUMMARY LOG	HOLE TH1		1	SHEET 1 of 3
	CLII			OF WINNIPEG - WATER AND WASTE DEPARTMENT Peguis Bridge Sewer Replacement			JOB NO. GROUND ELEV. TOP OF PVC ELE	12-0107-018 226. 37
	LOC			Red River and South of Chief Peguls Trall f Existing Sewermain on the Lower Bank			WATER ELEV. DATE DRILLED	11/7/2012
	DRI	LLING	Acker T	rack Drill Rig, 125 mm ø Solid Stem and HQ Core Barrel			UTM (m)	N 5,534,788 E 636,543
	ELEVATION (π)	(#) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE	NUMBER RECOVERY %	SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △ 20 40 60	Cu POCKET PEN (kPa) * Cu TORVANE (kPa) 20 40 60 80 PL MC LL % 20 40 60 80
		1 1 5		SILTY CLAY - Brown, damp, firm, intermed ate plasticity, trace rootlets, trace fine grained sand, trace fine grained gravel.	#			
	1	2 - 10		SAND & GRAVEL - Light grey, moist, dense, medium to coarse grained sand, fine to coarse grained gravel, some clay. - Hole squeezing at 1.63 m.	#	S2		
SEWERMAIN.GP.J		4 15		SAND - Brown, moist to wet, loose, fine to medium grained, trace oxidation. - Water noticed on sample below 4.57 m.	<u></u>	S3		6
SSICHIEF PEGUIS TRAIL		6-20		- Grey, no exidation below 5.33 m.	丑	S4		
OULO		1	XX	SILTY CLAY - Grey, moist, firm, high plasticity.	日	S5		
GEOTECHNICAL-SOIL LOG PAPROJECTS/2012/12-0107-018/DESIGNIGEO/LOGSICHIEF PEGUIS TRAIL SEWERMAIN.GPJ		7 - 25		SAND - Grey, moist, loose, medium grained, trace coarse grained sand. - Some to with silt, reduced sand below 7.92 m.	12	S6		
CAL-SOIL LOG P.1PI		1-30 1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-		SILTY CLAY - Grey, moist, firm, high plasticity, trace silt nodules, trace medium grained sand, trace fine grained gravel.				
ECHNIC		PLE TYP		Auger Grab Core Barrel INSPECTOR	A DDF	OVE	,	ATE
GEOT				ling Ltd. C. FRIESEN	DRA	ROVEI AFT		DATE 1/26/12

ELEVATION (m)	Ŧ	HICS		'PE	%	SP	T (N))).15 r	n 🛦	Cu	TOR\	KET P	(kPa))
EVAT	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE	NUMBER	DY	NAM blow	IC C		\vdash	20 PL	MC	60	80 LL
Ш (г	n) (ft)				_				Ģ0 <u>.</u>		20	%	60	80
	1		- Stiff below 10.06 m.	H	S7									T
	35		- Reduced fine grained gravel below 10.67 m.				 						177	1:
11	1						1	L	1		 -	1.1.	1.1.	1.
	1		- Grain Size Distribution: Gravel (1.2%), Sand (11.7%), Silt (30.5%), Clay (56.6%) at 11.58 m.	Ħ.	S8					- -	9			4
12	40		11.56 m.	51		::::::		i	i de la la la la la la la la la la la la la					·j∢
	1		- Reduced silt nodules below 12.50 m.				-						11.	1
13	-		 Firm below 12.95 m. Grain Size Distribution: Gravel (0.8%), Sand (10.2%), Silt (23.7%), Clay (65.3%) at 				1:3::	1				1:1:	#	+
	+		- Grant Size Distribution, Graver (0.6%), Sano (10.2%), Six (23.7%), Clay (65.3%) at 13.11 m.	H.	59		i 	ļ		-i-				1
- 14	-45		SILTY TILL - Tan, moist, compact, with medium to coarse grained sand, some fine	1										1
	1		grained gravel, trace coarse grained gravel.							1	1			į
15]		- Loose, reduced coarse grained sand, reduced fine to coarse grained gravel below 14.60 m.	II's	10		i			b				1
	50			П				leie Leie						11:
								 						1
16	1			Hs.	11									111
-	55	ЩЩ	- Auger refusal at 16.76 m on bedrock. Switched over to core below 16.76 m.					 				11:		1
17	1	干	LIMESTONE BEDROCK - White, fractured with vertical and horizontal fractures.	T P	85						1 - 1			+
	1	廿				<u> </u> 								1
18	-	坩		R	98							11	 	1
	- 60	拑								4-				1
19	#	픾		STATE STATE OF										+
	1	中		R	100					4	14	442		1
20 -	65	田	- Clay seam at 19.69 m.	arpsitestes.								1		1:
] [井	- Clay between 20.12 and 20.19 m.											i
0.1	}			А	4 100									1.
21 -	70	甘								 		 : .		T
	}	R	Yellow fractured limestone between 21.41 and 22.25 m.											1



GI	CS		SUMMARY LOG			DLE NO. H12-0	2B	SHEET 1 of 2
PRO	JECT	Chief I	OF WINNIPEG - WATER AND WASTE DEPARTMEN Peguis Bridge Sewer Replacement	NT			JOB NO. GROUND ELEV. TOP OF PVC ELI	C
SIT			Red River and South of Chief Peguis Trail				WATER ELEV.	
Loc	ATION	~3 m W	est of TH12-02				DATE DRILLED	11/9/2012
	LLING	Acker T	rack Drill Rig, 125 mm ø Solid Stem			,	UTM (m)	N E
ELEVATION (m)	рертн	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER RECOVERY %	SPT (N) blows/0.15 m DYNAMIC CONE	Cu POCKET PEN (kPa) * Cu TORVANE (kPa) 20 40 60 80
EFE	(m) (ft)	9		III	DE	NUMBE	(N) blows/ft △	PL MC LL
	1		SILTY CLAY FILL - Brown, moist, stiff, intermediate to high plasticity, some medium to coarse grained sand, some fine grained gravel, trace coarse grained gravel, trace rootlets.			0,2 11	20 40 60	20 40 60 80
	1-		SILTY CLAY - Brown, moist, stiff, high plasticity, trace fine to medium grained sand.					
	-5 -5							
	2 -	XX	- Increased sand content below 1.83 m.					
	1 1	_i/. i i/	SAND - Brown, moist, compact, fine to medium grained, trace coarse					
	1		grained sand, trace siti, trace clay.					
-	3 10		SILTY SAND - Brown, moist, loose, fine to medium grained, with silt, trace clay.					
N.GPJ	4		SAND - Brown, moist, compact, fine to medium grained, trace silt.					
GUIS TRAIL SEWERMAIN.GPJ	5-15							
GUIS	1		- Water noticed on sample at ~ 5.49 m.					
CHIEF PE	6-1-20		<u>SANDY SILT</u> - Brown, moist, firm, intermediate to high plasticity, trace oxidation.					
OLOGS	1		<u>SILTY SAND</u> - Brown, moist, soft, fine to medium grained, trace oxidation.					
SNIGE	7-		Grey, no oxidation below 6.71 m. SAND - Grey, moist, compact, medium grained, some fine and coarse					
DESIG	1	//	grained sand. SILTY CLAY - Grey, moist, firm, high plasticity.					
7-018	- 25	$\mathbb{Z}_{\mathbb{Z}}$	- Medium grained sand layer between 7.39 and 7.47 m.					
012/12-010	8-1		SILTY SAND - Grey, moist, soft, fine to medium grained sand, with silt.					
GEOTECHNICAL-SOIL LOS PAPROJECTS/2012/12-0107-018/DESIGNIGEDILOGS/CHIEF PE D S S A Z B S S S S S S S S S S S S S S S S S S	1		- Organic layer between 8.53 and 8.64 m.					
10G PNPR	9 - 30		SILTY CLAY - Grey, moist, firm, high plasticity, trace fine grained sand.					
L-SOIL L	1		- Increased sand between 9.75 and 9.96 m.					
SAM	PLE TYPE			Control of the Contro	1			
CON.	TRACTOR addock		INSPECTOR ing Ltd. C. FRIESEN			PPROVEI		DATE 1/26/12

ELEVATION (m)	_	క్ర		96	m)	Ē,	SI	PT (N)		Cu.	POCI TOR\			
VATIO	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	E TYP	bl D	NAN	IIC C	ONE	\vdash	20 PL	40 M	60	80 L
ELE	(m) (ft)	ą.		□	DE	SAMPLE TYPE NUMBER	(N) blov 20		Δ 60		1	% 40		80
	1		- Increased sand between 10.36 and 10.52 m.												
-	11 - 35		SILTY SAND - Grey, moist, compact, medium grained, trace fine grained sand, trace clay. - Test hole squeezing at 10.67 m.						1						
	1 1		- resultible squeezing at 10.67 fb.	PN	11.4 11.6			1		j 	 - -				
	12-40							1	1:3: 1:3:	ii Ii		1:1:			
	1 1		- 25 mm thick organic layer at 12.50 m.								1			- -	
	13-		Decreased sand between 12.95 and 13.26 m.						#:#:: 	leie leie			11		
	45							1	<u> </u>	 					
	14-7	//	SILTY CLAY - Grey, moist, firm, high plasticity, trace coarse grained sand, trace fine grained gravel, trace sift nodules.					1.3	1.3.						
	15 —								i			i -i -			
	50														
	16-						::::			!:::: -::::					
			SILT TILL - Tan, moist, compact, with medium to coarse grained sand, some fine grained gravel, trace coarse grained gravel. - Loose, decreased gravel below 16.46 m.		400				1 1 1] 		111		44	
	17-				16.8				 	 					
	1			30000	17.4 17.7										
94	18		AUGER REFUSAL AT 18.34 m	那	18.3				† 	 		- - - - - -	- - - - - - - - -		i
	1		Notes: 1. Stratigraphy assumed from TH12-02 drilled ~3 m away.] 			 - -		1
	19-1		2. Installed casagrande standpipe at a depth of 17.68 m with a stick-up of 0.91 m. 3. Installed PN 034983 at a depth of 11.58 m. below grade.					1:::	1:5:	1::::					
	65		Backfilled test hole with silica sand between 17.68 and 16.76 m and bentonite chips from 16.76 m to grade.					1							1
	1									(:::: 					
	21-3-														
	70							ļ.,	i		H				
SAM	PLE TYPE						1	1	1::::	1	::1::	LH	EE	11.1	:.]:

	K	GS ROUP		SUMMARY LOG REFERENCE NO.			LE NO. H12-0 :	3	SHEET 1 of 3
	CLIE PRO SITE	JECT	Chief F	OF WINNIPEG - WATER AND WASTE DEPARTMEN Peguis Bridge Sewer Replacement Fred River and South of Chief Peguis Trail	ΙT			TOP OF PVC ELE	12-0107-018 230-84 EV.
	2000			f Existing Sewermain on the Upper Bank				WATER ELEV. DATE DRILLED	11/13/2012
		LLING	CME Tr	ack Drill Rig, 125 mm ø Solid Stem and HQ Core Barrel				UTM (m)	N 5,534,926 E 636,265
	ELEVATION (m)	(E) DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER RECOVERY %	SPT (N) blows/0.15 m DYNAMIC CONE (N) blows/ft 20 40 60	Cu POCKET PEN (kPa) * Cu TORVANE (kPa) 20 40 60 80 PL MC LL 66 80 20 40 60 80
ı		=		SILTY CLAY FILL - Black, moist, stiff, high plasticity, trace rootlets.	製調		0,	:::1:::1:::1::::1::::	:: : : : : : : : : : : : : : : : : : : :
	-	1	****	Trace medium to coarse grained sand, trace fine to coarse grained gravel below 0.23 m.					
- 1		1, 1	\mathbb{Z}	SILTY CLAY - Brown, moist, stiff, high plasticity, trace coarse grained sand.			13		
- 1		']	K/	- No sand below 1.22 m.			₹ s1		
		-5		1.000.000.000.000					
		2				I			
ĺ		1		SILTY SAND TO SANDY SILT - Light brown, moist, soft/loose, fine grained sand.			₹ 52		:
ĺ		1				İ			
		3-10							
١	-	1		SILTY CLAY - Brown, moist, stiff, high plasticity, trace silt nodules (~1-3					
Í		3		mm diameter) 10 mm diameter gravel piece at 3.73 m.					
GP.J		4-		- 10 mili diameter graver piece at 3.73 m.			F] S3		
MAIN		3				ı	4		
EWER	-	15							
HAIL S		5-							
UIST		1		- Grey below 5.49 m.			P] 54		
F PEG		}		- City beam 3.43 III.			H 54		
SICHIE	- 1	6-20	//	- Firm below 6.10 m.					
MLOG		1	//		麗 麗				
NGEC		<u>, †</u>	//						
DESIG		1	//				S5 S		i i i i i i i i i i i i i i i i i i i
7-018/		-25	///						44444444
2-010		8-	//						
2012\1		1							
ECTS	- 1	1			麗 麗	1	S ₅		
PROJ		9-]	Y/J			ľ			
0G P		3-30		- Slightly increased silt nodules (up to 5 mm diameter) below 9.14 m.	關權				
SOILL		1							
JICAL-	SAM	PLE TYPI		Auger Grab Split Spoon Core Barrel	嚴。		D		
GEOTECHNICAL-SOIL LOG PAPROJECTSI2012/12-0107-018/DESIGNIGEOLOGSICHIEF PEGUIS TRAIL SEWERMAIN GPJ	CON	TRACTO	R	INSPECTOR		Al	PPROVE) [DATE
GFO	P	addock	Drill	ing Ltd. C. FRIESEN			RAFT		1/26/12

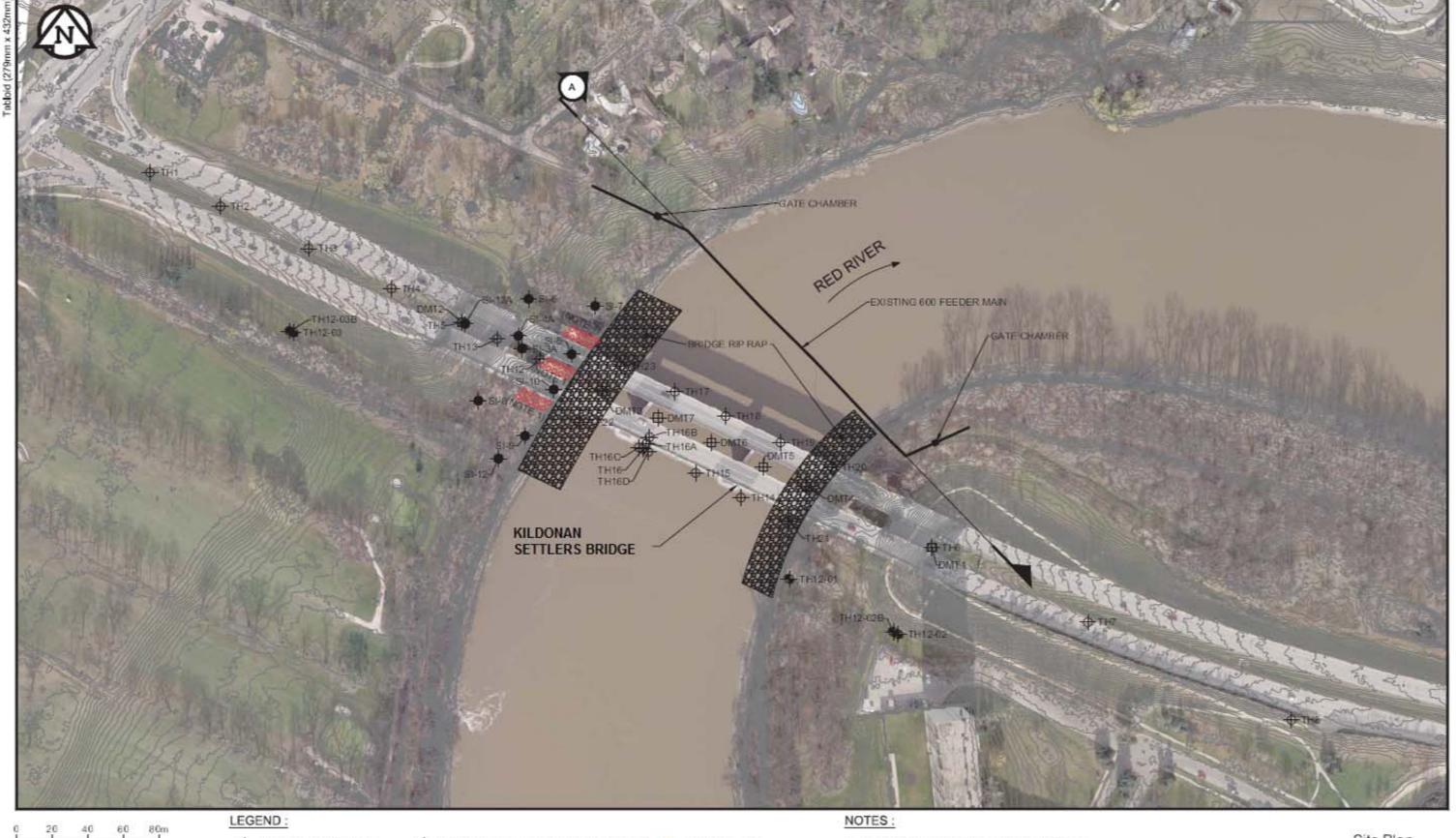
K	GS ROUP		SUMMARY LOG REFERENCE NO.			DLE NO. H12- (S	HEE	T 2	of 3	3
ELEVATION (m)	(E) DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER PECOVEDY %	S D (1	PT (N lows/0 YNAM N) blow).15 m IIC CO	NE A		ORVA 0 4(MC %	80 LL	* *
	12 40		- Trace silt pockets below 12.19 m Trace fine grained gravel below 12.50 m.			\$8							0 60	9 80	
WERMAIN.GPJ	15 50		- Reduced silt, trace coarse grained sand, no fine grained gravel below 15.24 m.			\$10 \$10						•	9		
OGSICHIEF PEGUIS TRAIL SE	17 55		Occasional silt pockets/nodules below 16.92 m. Grain Size Distribution: Gravel (0.7%), Sand (7.5%), Silt (19.4%), Clay (72.4%) at 17.68 m. Trace fine grained gravel below 18.29 m.			F)512									
GEOTECHNICAL-SOIL LOG PAPROJECTS/2012/107-018/0ES/GWGEO/LOGS/CHIEF PEGUIS TRAIL SEWERMAIN GRU SO S S S S S S S S S S S S S S S S S S	19 - 1 - 65		SILT TILL - Tan with grey, moist, compact, fine to coarse grained sand, fine grained gravel, trace clay.			\$13 \$14 61		\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				•			
ACAL-SOIL LOG PAPROJEC	21 —	R			21.0	S15									
CON	TRACTOR		Auger Grab Split Spoon Core Barrel INSPECTOR ing Ltd. C. FRIESEN	187		PPROVE PRAFT	D				ATE 1/26/				

GROUP (m) DEPTH DEPTH	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	YPE	è	1 %	SPT (N) blows/0.15 n	n 🛦	Cu 1	ORV	ANE (k	(Pa)
ELEVA (#) DEI	DESCRIPTION AND GEASSIFICATION	PIEZ.	DEPT	SAMPLE TYPE	NUMBER	RECOVER	DYNAMIC CO (N) blows/ft	ONE △ 60	P	L	MC %	L
22	- Flubble zone between 28.46 and 26.52 m Flubble zone between 28.46 and 26.52 m Vertical fracture between 28.52 and 28.70 m. - Vertical fracture between 28.52 and 28.70 m. END OF TEST HOLE AT 30.02 m Notes: 1. Installed casagrande standpipe at a depth of 30.02 m with a stick-up of 0.91 m. 2. Backfilled test hole with silica sand between 30.02 and 27.58 m, bentonite chips from 27.55 to 23.93 m, slough from 23.93 to 21.03 m and bentonite chips from 21.03 m to grade.		23.9 27.6 29.7		R3 97 100 100 100 100 100 100 100 100 100 10	7						
SAMPLE TYPE	Auger Grab Split Spoon Core Barrel											

GR CLIE	ENT (CITYO	F WINNIPEG - WATER AND WASTE DEPARTME	NT			JOB NO.	12	2-0107-0)18
			eguis Bridge Sewer Replacement				GROUND ELEV. TOP OF PVC ELI			
SITE	١ ١	West of	Red River and South of Chief Peguis Trail				WATER ELEV.	. v.		
LOC	ATION -	-2 m W	est of TH12-03				DATE DRILLED		/14/201	2
DRIE	LING (OME Tra	ack Drill Rig, 125 mm ø Solid Stem				UTM (m)	N E		
Ê									CKET PEN	
NO	Ε	IICS		8	E	님 %	SPT (N) blows/0.15 m A		EVAINE (KI	
/ATI	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	E TY ERY	DYNAMIC CONE	-20	40 60	
ELEVATION (m)	(m) (ft)	GF		1 2	H	SAMPLE TYPE NUMBER RECOVERY %	(N) blows/ft △	PL I	MC %	
-		XXXX	SILTY CLAY FILL - Black, moist, stiff, high plasticity, trace rootlets.		\vdash	SZE	20 40 60	20	40 60	80
	3	₩	Trace medium to coarse grained sand, trace fine to coarse grained gravel below 0.23 m.							
	1	//	SILTY CLAY - Brown, moist, stiff, high plasticity, trace coarse grained							11
	1-	V/	sand.							#
- 1	-5	V/I	- No sand below 1.22 m.							
	1	KX								
+	2-		SILTY SAND TO SANDY SILT - Light brown, moist, soft/loose, fine						[][]. [][].	
- 1	-}		grained sand.					44-		44
	1									
	3 10							:: :: ::		
	1		SILTY CLAY - Brown, moist, stiff, high plasticity, trace silt nodules (~1-3 mm diameter).					44-	إدادا	11
-	, <u>f</u>		- 10 mm d'ameter gravel piece at 3.73 m.							
1	1									
-	15	//						444	1444	44
1	5-									1:1:
	1									
-	1	$\mathbb{Z}_{\mathbb{Z}}$	- Grey below 5.49 m.					-1-1-		-1-1
-	6-1	//								1.1
-	120		- Firm below 6.10 m.	图 隐						
1	7							11:		
1	7									11
1	1									1:1
1	- 25							111		11
1	8-			層 腰						++
1	1									1.1
	1									77 11
	9-30		Control of the Contro					·] - [- i -] -]		1-1
]		 Slightly increased silt nodules (up to 5 mm diameter) below 9.14 m. 		4117					1.1
	1									
	_11	11:1/1		暖暖	\sqcup			1-1-1	ereieje	11

ELEVATION (m) DEPTH	3	90 (8)	<u> </u>	SPT (N)	Cu POCKET PEN (kPa) Cu TORVANE (kPa)
DEPTH	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	E TYF	blows/0.15 m ▲ DYNAMIC CONE	20 40 00 0
(m) (ft)	5		SAMPLE TYPE NUMBER RECOVERY %	(N) blows/ft \triangle	%
13 - 45 14 - 55 16 - 55 17 - 45	- Trace silt pockets below 12.19 m Trace fine grained gravel below 12.50 m. - Reduced silt, trace coarse grained sand, no fine grained gravel below 15.24 m. - Ocassional silt pockets/nodules below 16.92 m.		6	20 40 60	
18 - 60	- Trace fine grained gravel below 18.29 m.				
20 - 65 - 70	SILT TILL - Tan with grey, moist, compact, fine to coarse grained sand, fine grained gravel, trace clay. AUGER REFUSAL AT 20.98 m Notes: 1. Stratigraphy assumed from TH12-03 drilled ~2 m away.	20. 20. E 21.	7		

ELEVATION (m)	ОЕРТН	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER RECOVERY %	SI		N) 5/0.1			Cu	_	VANE	€ (kP	Pa)	80
ELEV	(m) (ft)	GR		HI.	DE	AMPLE	(N) blo	ows/	/ft	Δ		PL I	%	,		L
	22-		2. Installed casagrande standpipe at a depth of 20.98 m with a stick-up of 0.66 m.		\vdash	0, 2 12		20	40	j			20	40	60	1	3
	1 1		3. Installed PN 034985 at a depth of 11.64 m. below grade. 4. Backfilled test hole with silica sand between 20.98 and 20.12 m and bentonite chips from 20.12 m to grade.				-	-	- -	4	- -				 -	1	
	23 - 75		5. Test hole squeezing at 8.53 m shortly after drilling.						+							1::	The state of
								+	+	4					4	1::	
	24-							1	1	() ()			1:1			1	1
	80							1	+	4		17					1
	25 -							1	+				1:1				1
	1							+	+				11			1::1	1
	26 - 85							1	+			:4: 	1.1	1.1	-1-	1	1
	1 1							ł		4					4		1
	27—							1	1	1							1
	- 							- -	1								111
	28-	à						1	1				111				4-
	3 65							-	- - -				11	11	1		1
	29 95							1	1								1
	- T							F									1
	30-100							1	1	1			1.1.	-[] -[] -[]			1
	31 -							1	1:						1		1
								1:3	1	4			111	1:1:	1		1
	32 - 105							1	ir:	1.			: [: [: -[::]:				111
	1 1							-	Î.	4					-i		1
	33-								1	1					1		1
	110							į.	<u>.</u>	j.		- -			4-		



TEST HOLE (KGS, 2012) ➡ DILATOMETER TESTING (DYREGROV, 2988) ○ ROCK COLUMNS TEST HOLE (DYREGROV, 1988) SLOPE INDICATOR (1989)

ROCK COLUMNS SHOWN ARE NOT TO SCALE
 AERIAL IMAGE IN 2008
 GROUND SURFACE TOPOGRAPHY BASED ON LIDAR

Site Plan