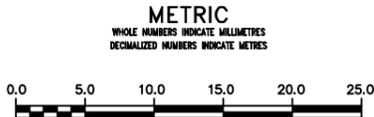
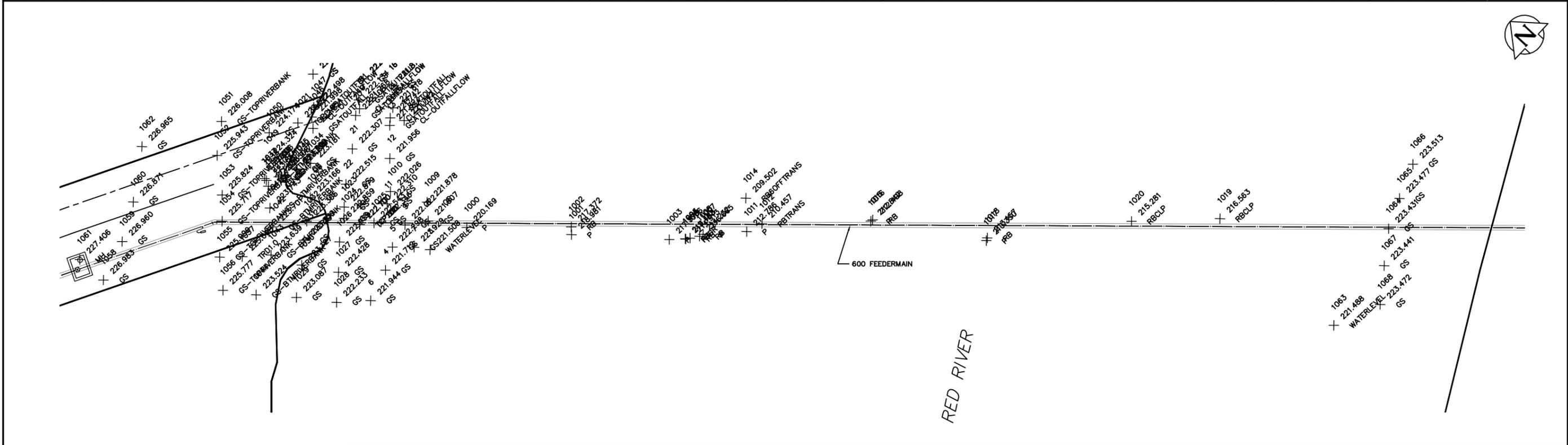
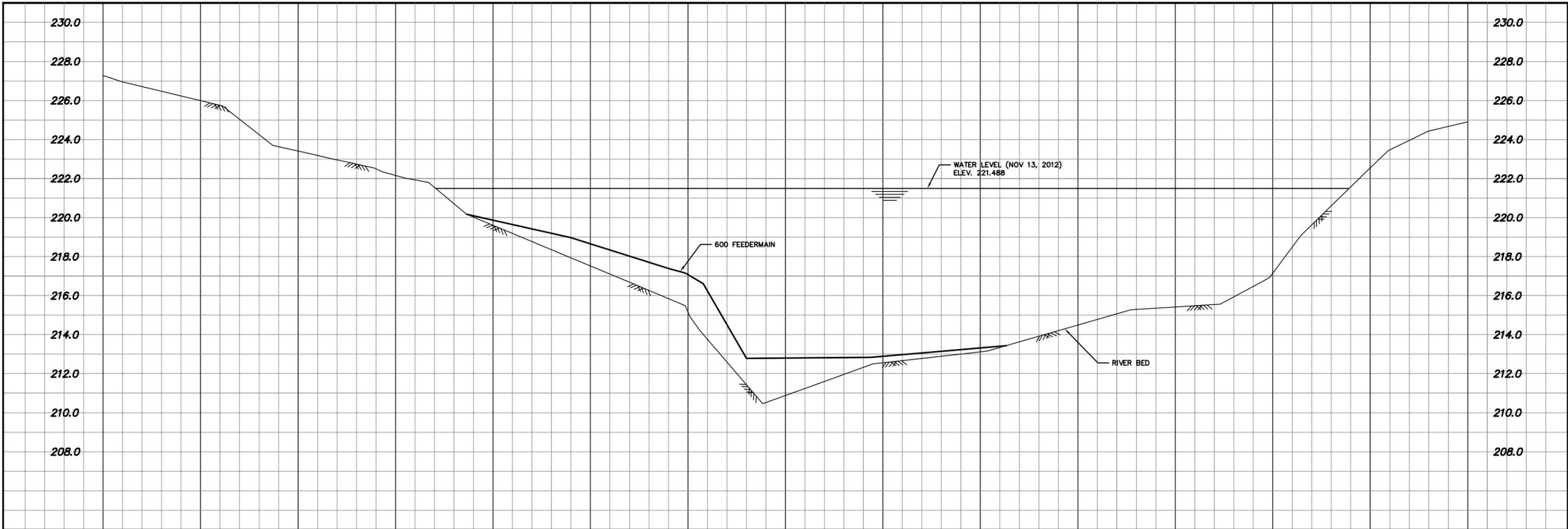


APPENDIX A – ADDITIONAL INFORMATION

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



WARNING

IF POWER EQUIPMENT OR EXPLOSIVES ARE TO BE USED FOR EXCAVATION ON THIS PROJECT THE CONTRACTOR MUST:

- 1) NOTIFY THE GAS COMPANY OF THE PROPOSED LOCATION OF EXCAVATION.
- 2) TAKE PRECAUTION TO AVOID DAMAGE TO GAS COMPANY INSTALLATIONS.

SEE PROVINCIAL REGULATION 210/72 FOR DETAILS

LOCATION APPROVED UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES COMMITTEE	DATE

NOTE:
LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

B.M. ELEV.	

CONSTRUCTION COMPLETION DATE: YYYY MM DD	

NO.	REVISIONS	DATE	BY

DESIGNED BY	XX	CHECKED BY	XX
DRAWN BY	XX	APPROVED BY	XX
SCALE:		RELEASED FOR CONSTRUCTION	
HORIZONTAL	1:250		
VERTICAL	1:100		
DATE	2012 11 14	DATE	
PLOT DATE:	2012 11 14		

ENGINEER'S SEAL

CONSULTANT DRAWING NUMBER

THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT
ENGINEERING DIVISION

JOHN BLACK RIVER CROSSING
RIVER BED PROFILE

SHEET X OF X
CITY DRAWING NUMBER

BID OPPORTUNITY: XXX-20XX
CONTRACT NUMBER: X

FILE PATH: R:\DRAWINGS\WATER\RENEWAL\2013_RENEWALS\John Black Feedermain Crossing\
FILE NAME: SHOTS.dwg

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 24/09/87

JOB NO. 87422

HOLE NO. 15

WATER CONTENT

$w_p - \square$ $w - \circ$ $w_L - \triangle$
 PERCENT %
 10 20 30 40 50 60

DEPTH
m

SOIL SYMBOL

SOIL DESCRIPTION

SOIL SAMPLE

DRILL TYPE

DATUM

CONDITION

TYPE

PENETRATION
RESISTANCE

SURFACE ELEVATION

OTHER TESTS

14

BROKEN ROCK

SOUND ROCK

REC - 99%
RQD - 60%

15

NO RECOVERY

SOUND ROCK

REC - 99%
RQD - 60%

16

NO RECOVERY

SOUND ROCK

REC - 99%
RQD - 79%

17

SOUND ROCK

REC - 100%
RQD - 70%

18

NO RECOVERY

19

BROKEN ROCK

SOUND ROCK

REC - 84%
RQD - 17%

20

SOUND ROCK

REC - 100%
RQD - 45%

22

End hole at 21.7 m.
Rock surface estimated at elev.
210.53
Top 0.9 m unsound rock.

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 25/09/87

JOB NO. 87422

HOLE NO. 16

WATER CONTENT

W_p - □ W - ○ W_L - △.
PERCENT %
10 20 30 40 50 60

DEPTH
m

SOIL SYMBOL

SOIL DESCRIPTION

SOIL SAMPLE

DRILL TYPE

DATUM

CONDITION

TYPE

PENETRATION
RESISTANCE

SURFACE ELEVATION

OTHER TESTS

14

BROKEN ROCK TO 13.7 m

3 - 6mm clay seams at 14.0 m

REC - 75%

15

SOUND ROCK

REC - 95%

RQD - 68%

16

225 mm seam or soft rock

REC - 98%

17

18

SOUND ROCK

REC - 93%

19

NO RECOVERY

20

Abandon hole at 20.1 m
Drill rods jamming

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 06/10/87

JOB NO. 87422

HOLE NO. 16A

WATER CONTENT						DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △	CONDITION	TYPE	PENETRATION RESISTANCE				OTHER TESTS			
PERCENT %												
10	20	30	40	50	60			DATUM				
								SURFACE ELEVATION				
						14	█	GLACIAL TILL				
							█	LIMESTONE BEDROCK				REC - 100% ROD - 67%
						15		UNSOUND ROCK				
								NO CORE RECOVERY				
						16						
						17						
						18						
						19						
						20		UNSOUND ROCK				
								NO CORE RECOVERY				
						21						
						22						
						23	█	UNSOUND ROCK				REC - 30%
						24		End hole at 23.6 m.				

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 07/10/87

JOB NO. 87422

HOLE NO. 16B

WATER CONTENT			DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE	
W _p - □	W - ○	W _L - △				CONDITION	TYPE	PENETRATION RESISTANCE		
PERCENT %					DATUM				OTHER TESTS	
10	20	30	40	50	60	SURFACE ELEVATION 223.69 m				
			1		WATER					
			2							
			3							
			4							
			5							
			6							
			7							
			8							
			9							
			10		ALLUVIUM					
			11		GLACIAL TILL (depth to till extrapolated from DMT 7)					
			12							
			13							

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 07/10/87

JOB NO. 87422

HOLE NO. 16B

WATER CONTENT

W_p - □ W - ○ W_L - △.
PERCENT %
10 20 30 40 50 60

DEPTH
m

SOIL SYMBOL

SOIL DESCRIPTION

SOIL SAMPLE

DRILL TYPE

DATUM

CONDITION

TYPE

PENETRATION
RESISTANCE

SURFACE ELEVATION 223.69 m

OTHER TESTS

14

LIMESTONE BEDROCK
SOUND ROCK

REC - 100%
ROD - 56%

15

SOUND ROCK

REC - 98%
ROD - 83%

16

SOUND ROCK

REC - 96%
ROD - 90%

17

18

SOUND ROCK

REC - 94%
ROD - 73%

19

20

NO RECOVERY

End hole at 20.0 m
Drill rods jamming in broken
rock and clay.

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 14/10/87

JOB NO. 87422

HOLE NO. 16C

WATER CONTENT

$W_p - \square$ $W - \circ$ $W_L - \triangle$
 PERCENT %
 10 20 30 40 50 60

DEPTH
m

SOIL SYMBOL

SOIL DESCRIPTION

SOIL SAMPLE

DRILL TYPE

DATUM

CONDITION

TYPE

PENETRATION
RESISTANCE

SURFACE ELEVATION

OTHER TESTS

WATER

1

2

3

4

5

6

7

8

9

ALLUVIUM

10

GLACIAL TILL
(depth to till extrapolated
from DMT 7)

11

12

13

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 14/10/87

JOB NO. 87422

HOLE NO. 16C

WATER CONTENT			DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △				CONDITION	TYPE	PENETRATION RESISTANCE	
PERCENT %									
10	20	30	40	50	60				
			14	[Rock Symbol]	LIMESTONE BEDROCK SOUND ROCK				REC - 100% RQD - 85%
			15		SOUND ROCK				REC - 92% RQD - 91%
			16						
			17		SOUND ROCK				REC - 98% RQD - 96%
			18		SOUND ROCK				REC - 100% RQD - 100%
			19		NO RECOVERY				
			20		BROKEN ROCK, NO RECOVERY NO RECOVERY				
			21	[Rock Symbol]	SOUND ROCK				REC - 93% RQD - 73%
			22						
			23		End hole at 22.3 m.				

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 15/10/87

JOB NO. 87422

HOLE NO. 16D

WATER CONTENT

$w_p - \square$ $w - \circ$ $w_L - \triangle$
 PERCENT %
 10 20 30 40 50 60

DEPTH
m

SOIL SYMBOL

SOIL DESCRIPTION

SOIL SAMPLE

DRILL TYPE

DATUM

SURFACE ELEVATION

CONDITION

TYPE

PENETRATION
RESISTANCE

OTHER TESTS

WATER

1

2

3

4

5

6

7

8

9

10

ALLUVIUM

11

GLACIAL TILL
(depth to glacial till
extrapolated from DMT 7)

12

13

LIMESTONE BEDROCK

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 15/10/87

JOB NO. 87422

HOLE NO. 16D

WATER CONTENT						DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △	CONDITION	TYPE	PENETRATION RESISTANCE				OTHER TESTS			
PERCENT %												
10	20	30	40	50	60			DATUM				
								SURFACE ELEVATION				
						14		150 mm clay or soft rock				REC - 69% RQD - 67%
								----- 150 mm clay or soft rock				
						15		NO RECOVERY				
						16		SOUND ROCK				REC - 88%
						17		SOUND ROCK				REC - 100% RQD - 93%
						18		SOUND ROCK				
								NO RECOVERY				
						19		SOUND ROCK				
						20		UN SOUND ROCK				REC - 30% RQD - 10%
						21		SOUND ROCK				REC - 80%
						22		BROKEN ROCK				RQD - 63%
								End hole at 22.5 m.				

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 06/10/87

JOB NO. 87422

HOLE NO. 17

WATER CONTENT			DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE	
W _p - □	W - ○	W _L - △				CONDITION	TYPE	PENETRATION RESISTANCE		
PERCENT %					DATUM				OTHER TESTS	
10	20	30	40	50	60	SURFACE ELEVATION	223.65 m			
			1		WATER					
			2							
			3							
			4							
			5							
			6							
			7							
			8							
			9		ALLUVIAL SOILS					For tests in alluvium see DMT 7
			10							
			11	▲	GLACIAL TILL					
			12	▲	VERY DENSE, HARD BELOW 11.2 m					
			13	▲						

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 21/09/87

JOB NO. 87422

HOLE NO. 18

WATER CONTENT			DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △				CONDITION	TYPE	PENETRATION RESISTANCE	
PERCENT %					DATUM				
10	20	30	40	50	60	SURFACE ELEVATION 223.68			
			1		WATER				
			2						
			3						
			4						
			5						
			6						
			7						
			8						
			9						
			10						
			11		GLACIAL TILL				
			12						
			13		LIMESTONE BEDROCK, BROKEN TO 13.1m				
					SOUND ROCK, 13.1 - 13.8 m				

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 21/09/87

JOB NO. 87422

HOLE NO. 18

WATER CONTENT			DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △				CONDITION	TYPE	PENETRATION RESISTANCE	
PERCENT %									
10	20	30	40	50	60				
			14		NO RECOVERY 13.8 - 13.9 m SOUND ROCK 25 mm clay seam at 14.6 m				REC - 87% RQD - 82%
			15		SOUND ROCK				REC - 95% RQD - 87%
			16						
			17		SOUND ROCK				REC - 95% RQD - 65%
			18		SOUND ROCK				REC - 95% RQD - 87%
			19						
			20		SOUND ROCK				REC - 95%
			21		SOUND ROCK				REC - 93%
			22						
			23		End hole at 22.3 m.				

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 19/09/87

JOB NO. 87422

HOLE NO. 19

WATER CONTENT			DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △				CONDITION	TYPE	PENETRATION RESISTANCE	
PERCENT %					DATUM				
10	20	30	40	50	60	SURFACE ELEVATION 223.62			OTHER TESTS
			1		WATER				
			2						
			3						
			4						
			5						
			6						
			7						
			8						
			9						
			10	▲	GLACIAL TILL (depth to glacial till extrapolated from DMT 5)				
			11	▲					
			12	▲					
			13	▲					

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 19/09/87

JOB NO. 87422

HOLE NO. 19

WATER CONTENT						DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △	CONDITION	TYPE	PENETRATION RESISTANCE				OTHER TESTS			
PERCENT %												
10	20	30	40	50	60		DATUM					
							SURFACE ELEVATION					
								GLACIAL TILL				
							14	LIMESTONE BEDROCK BROKEN ROCK TO 14.6 m				REC - 30%
							15	SOUND ROCK				REC - 100%
							16					
							17	SOUND ROCK				REC - 96% RQD - 94%
							18	SOUND ROCK				REC - 96% RQD - 74%
							19					
							20	SOUND ROCK				REC - 97%
							21	End hole at 20.7 m.				

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 03/10/87

JOB NO. 87422

HOLE NO. 20

WATER CONTENT

W_p - □ W - ○ W_L - △
 PERCENT %
 10 20 30 40 50 60

DEPTH
 m

SOIL SYMBOL

SOIL DESCRIPTION

SOIL SAMPLE

DRILL TYPE

DATUM

CONDITION

TYPE

PENETRATION
 RESISTANCE

SURFACE ELEVATION 223.61 m

OTHER TESTS

WATER

ALLUVIAL SOILS
 (for test results see DMT 4)

GLACIAL TILL
 (depth to till extrapolated
 from DMT 4)

1.5-2.0%
 2.0-2.5%
 2.5-3.0%
 3.0-3.5%
 3.5-4.0%
 4.0-4.5%
 4.5-5.0%
 5.0-5.5%
 5.5-6.0%
 6.0-6.5%
 6.5-7.0%
 7.0-7.5%
 7.5-8.0%
 8.0-8.5%
 8.5-9.0%
 9.0-9.5%
 9.5-10.0%
 10.0-10.5%
 10.5-11.0%
 11.0-11.5%
 11.5-12.0%
 12.0-12.5%
 12.5-13.0%
 13.0-13.5%
 13.5-14.0%
 14.0-14.5%
 14.5-15.0%
 15.0-15.5%
 15.5-16.0%
 16.0-16.5%
 16.5-17.0%
 17.0-17.5%
 17.5-18.0%
 18.0-18.5%
 18.5-19.0%
 19.0-19.5%
 19.5-20.0%
 20.0-20.5%
 20.5-21.0%
 21.0-21.5%
 21.5-22.0%
 22.0-22.5%
 22.5-23.0%
 23.0-23.5%
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 24.0-24.5%
 24.5-25.0%
 25.0-25.5%
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 26.5-27.0%
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 32.5-33.0%
 33.0-33.5%
 33.5-34.0%
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 37.0-37.5%
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 38.5-39.0%
 39.0-39.5%
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 40.5-41.0%
 41.0-41.5%
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 42.5-43.0%
 43.0-43.5%
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 45.0-45.5%
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 46.5-47.0%
 47.0-47.5%
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 61.5-62.0%
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 72.0-72.5%
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 74.0-74.5%
 74.5-75.0%
 75.0-75.5%
 75.5-76.0%
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 84.0-84.5%
 84.5-85.0%
 85.0-85.5%
 85.5-86.0%
 86.0-86.5%
 86.5-87.0%
 87.0-87.5%
 87.5-88.0%
 88.0-88.5%
 88.5-89.0%
 89.0-89.5%
 89.5-90.0%
 90.0-90.5%
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 95.5-96.0%
 96.0-96.5%
 96.5-97.0%
 97.0-97.5%
 97.5-98.0%
 98.0-98.5%
 98.5-99.0%
 99.0-99.5%
 99.5-100.0%

LIMESTONE BEDROCK

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 03/10/87

JOB NO. 87422

HOLE NO. 20

WATER CONTENT						DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION		SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △		DATUM				CONDITION	TYPE	PENETRATION RESISTANCE	OTHER TESTS		
PERCENT %												SURFACE ELEVATION	
10	20	30	40	50	60			223.61 m					
						14	[Rock symbol]	BROKEN ROCK 13.4 - 14.0 m					REC - 64%
								SOUND ROCK BELOW 14.0 m					
						15	[Rock symbol]	SOUND ROCK					REC - 97%
													RQD - 81%
						16	[Rock symbol]	SOUND ROCK					REC - 95%
													RQD - 93%
						17	[Rock symbol]	SOUND ROCK					REC - 92%
													RQD - 69%
						18	[Rock symbol]	SOUND ROCK					REC - 97%
								100 mm clay seam					RQD - 73%
						19	[Rock symbol]	SOUND ROCK					REC - 92%
													RQD - 79%
						20	[Rock symbol]	SOUND ROCK					REC - 92%
													RQD - 79%
						21	[Rock symbol]	SOUND ROCK					REC - 92%
													RQD - 79%
						22	[Rock symbol]	SOUND ROCK					REC - 92%
													RQD - 79%
						23		End hole at 22.6 m.					

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 28/09/87

JOB NO. 87422

HOLE NO. 21

WATER CONTENT			DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △				CONDITION	TYPE	PENETRATION RESISTANCE	
PERCENT %					DATUM				
10	20	30	40	50	60	SURFACE ELEVATION 223.63 m			
			1		WATER				
			2		ALLUVIAL SOILS (for test results see DMT 4)				
			3						
			4						
			5						
			6						
			7						
			8	▲	GLACIAL TILL (depth to till extrapolated from DMT 4)				
			9	▲					
			10	▲					
			11	▲					
			12	▲					
			13	▲	LIMESTONE BEDROCK				

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 23/09/87

JOB NO. 87422

HOLE NO. 22

WATER CONTENT			DEPTH m	SOIL SYMBOL SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △				CONDITION	TYPE	PENETRATION RESISTANCE	
PERCENT %					DATUM				
10	20	30	40	50	60	SURFACE ELEVATION 223.68 m			
			1		WATER				
			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				

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 23/09/87

JOB NO. 87422

HOLE NO. 22

WATER CONTENT						DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE	
W _p - □	W - ○	W _L - △	PERCENT %						DATUM	CONDITION	TYPE	PENETRATION RESISTANCE	OTHER TESTS
10	20	30	40	50	60			SURFACE ELEVATION 223.68 m					
						14	[Rock Symbol]	BROKEN ROCK, 13.0-13.8 m				no REC	
								SOUND ROCK				REC - 99%	RQD - 45%
						15	[Rock Symbol]	SOUND ROCK				REC - 99%	RQD - 83%
						16		SOUND ROCK				REC - 96%	RQD - 73%
						17	[Rock Symbol]	SOUND ROCK				REC - 93%	RQD - 66%
						18		SOUND ROCK					
						19	[Rock Symbol]	End hole at 19.0 m.					

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 22/09/87

JOB NO. 87422

HOLE NO. 23

WATER CONTENT		DEPTH M	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○				W _L - △	CONDITION	TYPE	
PERCENT %			DATUM	SURFACE ELEVATION 223.70 m				OTHER TESTS
10	20	30 40 50 60						
				WATER				
		1						
		2		ALLUVIAL SOILS (For testing see DMT 3)				
		3						
		4						
		5						
		6						
		7						
		8						
		9	▲	GLACIAL TILL (Depth to till extrapolated from DMT 3)				
		10	▲					
		11	▲					
		12	▲					
		13	▲	LIMESTONE BEDROCK				

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 22/09/87

JOB NO. 87422

HOLE NO. 23

WATER CONTENT			DEPTH	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △				CONDITION	TYPE	PENETRATION RESISTANCE	
PERCENT %									
10	20	30	40	50	60	SURFACE ELEVATION 223.70 m			
			14		SOUND ROCK				REC. - 87% RQD. - 83%
			15		SOUND ROCK				REC. - 91% RQD - 70%
			16						
			17		SOUND ROCK				REC. - 100% RQD - 88%
			18		SOUND ROCK				REC. - 95% RQD - 47%
			19						
			20		SOUND ROCK				REC. - 97% RQD - 61%
			21		End hole at 20.9 m.				

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST.

22/09/87

JOB NO. 87422

HOLE NO. DMT 3

WATER CONTENT			DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △				CONDITION	TYPE	PENETRATION RESISTANCE	
PERCENT %					DATUM				
10	20	30	40	50	60	SURFACE ELEVATION	223.70 m		
			1		WATER				
			2		SILT - clayey				
			3		CLAY - silty				
			4						
			5						
			6						
			7		STRATIFIED SILTY CLAY AND CLAYEY SILT				
			8		End Dilatometer testing at 7.9 m. Refusal on glacial till or boulder at 7.9 m.				

UNDRAINED SHEAR STRENGTH (kPa)

10.3
11.3
12.1
13.1
13.9
14.8
15.8
16.6
15.8
26.9
20.7
19.8
31.2
27.9
34.5
38.6

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 30/09/87

JOB NO. 87422

HOLE NO. DMT 4

WATER CONTENT			DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION	SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △				CONDITION	TYPE	PENETRATION RESISTANCE	
PERCENT %					DATUM				
10	20	30	40	50	60	SURFACE ELEVATION 223.61			
			1		WATER				UNDRAINED SHEAR STRENGTH (kPa)
			2	▨	CLAYEY SILT				28
			3	▨	STRATIFIED SILT, SAND, AND CLAY				27
			4	▨					27
			5	▨	SILTY SAND				36
			6	▨					45
			7	▨	SILTY CLAY				39
			8		End dilatometer test at 7.5 m. Refusal on boulder or glacial till.				∅=34 ⁰
									∅=36 ⁰
									51
									59
									58

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 30/09/87

JOB NO. 87422

HOLE NO. DMT 6

WATER CONTENT						DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION		SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △	PERCENT %					DATUM	CONDITION	TYPE	PENETRATION RESISTANCE	OTHER TESTS	
10	20	30	40	50	60			SURFACE ELEVATION 223.61					
						1		WATER					
						2							
						3							
						4							
						5							
						6							
						7							
						8							
						9							
						10		ALLUVIAL SOILS					
						11		Drill rod pushed from 10.0 to 10.6 m. Refusal on glacial till or boulder at 10.6 m.					
						12							

DYREGROV & BURGESS

BOREHOLE LOG

PROJECT

KILDONAN CORRIDOR

LOGGED/DWN.

CKD.

DATE OF INVEST. 30/09/87

JOB NO. 87422

HOLE NO. DMT 7

WATER CONTENT						DEPTH m	SOIL SYMBOL	SOIL DESCRIPTION		SOIL SAMPLE			DRILL TYPE
W _p - □	W - ○	W _L - △		DATUM				CONDITION	TYPE	PENETRATION RESISTANCE	OTHER TESTS		
PERCENT %												SURFACE ELEVATION	
10	20	30	40	50	60								
						1		WATER					
						2							
						3							
						4							
						5							
						6							
						7							
						8							
						9							
						10							
						11	D.R. 10.4	GLACIAL TILL - soft/loose					
						12		- Drill rods pushed with no rotation from 10.4 to 13.1 m. Refusal on probable bedrock at 13.1 m.					
						13							

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT Chief Peguis Bridge Sewer Replacement
SITE East of Red River and South of Chief Peguis Trail
LOCATION South of Existing Sewermain on the Upper Bank
DRILLING METHOD Acker Track Drill Rig, 125 mm ø Solid Stem and HQ Core Barrel

JOB NO. 12-0107-018
GROUND ELEV. 228.37
TOP OF PVC ELEV.
WATER ELEV.
DATE DRILLED 11/8/2012
UTM (m) N 5,534,757
 E 636,604

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★		Cu TORVANE (kPa) ◆	
									20	40	60	80
			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.			S1						
	1		SILTY CLAY - Brown, moist, stiff, high plasticity, trace fine to medium grained sand.									
	5		- Increased sand content below 1.83 m.									
	2		SAND - Brown, moist, compact, fine to medium grained, trace coarse grained sand, trace silt, trace clay.			S2						
	3		SILTY SAND - Brown, moist, loose, fine to medium grained, with silt, trace clay.			S3						
	4		SAND - Brown, moist, compact, fine to medium grained, trace silt.									
	15		- Water noticed on sample at ~ 5.49 m.			S4						
	5		SANDY SILT - Brown, moist, firm, intermediate to high plasticity, trace oxidation.									
	6		SILTY SAND - Brown, moist, soft, fine to medium grained, trace oxidation.			S5						
	7		- Grey, no oxidation below 6.71 m.									
	25		SAND - Grey, moist, compact, medium grained, some fine and coarse grained sand.									
	8		SILTY CLAY - Grey, moist, firm, high plasticity. - Medium grained sand layer between 7.39 and 7.47 m.			S6						
	8		SILTY SAND - Grey, moist, soft, fine to medium grained sand, with silt. - Organic layer between 8.53 and 8.64 m.									
	9		SILTY CLAY - Grey, moist, firm, high plasticity, trace fine grained sand. - Increased sand between 9.75 and 9.96 m.			S7						

GEOTECHNICAL SOIL LOG P:\PROJECTS\2012\12-0107-018\DESIGN\GEOLOGS\CHIEF PEGUIS TRAIL SEWERMAIN.GPJ

SAMPLE TYPE Auger Grab Split Spoon Core Barrel

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
C. FRIESEN

APPROVED
DRAFT

DATE
11/26/12

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲	Cu POCKET PEN (kPa) ★		
									DYNAMIC CONE (N) blows/ft △	PL	MC	LL
			- 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.									
12	40		- 25 mm thick organic layer at 12.50 m.									
13			- Decreased sand between 12.95 and 13.26 m.									
14	45		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.									
15	50											
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.									
17												
18	60		- Auger refusal at 18.34 m on bedrock. Switched over to core below 18.34 m.									
19			LIMESTONE BEDROCK - White, competent, vertical and horizontal fractures.									
20	65											
21	70											

GEO-TECHNICAL SOIL LOG P:\PROJECTS\0112-0107-018\DESIGN\GEOLOG\SS\CHIEF PEGLIUS TRAIL SEWERMAIN.GPJ

SAMPLE TYPE Auger Grab Split Spoon Core Barrel
 CONTRACTOR **Paddock Drilling Ltd.** INSPECTOR **C. FRIESEN** APPROVED **DRAFT** DATE **11/26/12**

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲	DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★	Cu TORVANE (kPa) ◆		
								20 40 60	20 40 60	20 40 60 80	20 40 60 80		
22			- Increased fractures below 22.94 m. - Vertical fracture between 23.01 and 23.67 m.		22.2	R3	98						
23	75												
24			END OF TEST HOLE AT 26.06 m Notes: 1. Installed casagrande standpipe at a depth of 26.06 m with a stick-up of 0.64 m. 2. Backfilled test hole with silica sand between 26.06 and 22.17 m and bentonite chips from 22.17 m to grade.			R4	100						
25	80												
26	85												
27					25.8	R5	100						
28	90												
29	95												
30	100												
31													
32	105												
33													
	110												

GEO-TECHNICAL SOIL LOG P:\PROJECTS\2012\12-0107-019\DESIGN\GEOLOG\LOGS\CHIEF PEGUIS TRAIL SEWERMAIN.GPJ

SAMPLE TYPE Auger Grab Split Spoon Core Barrel

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
C. FRIESEN

APPROVED
DRAFT

DATE
11/26/12

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT Chief Peguis Bridge Sewer Replacement
SITE East of Red River and South of Chief Peguis Trail
LOCATION North of Existing Sewermain on the Lower Bank
DRILLING METHOD Acker Track Drill Rig, 125 mm ø Solid Stem and HQ Core Barrel

JOB NO. 12-0107-018
GROUND ELEV. 226.37
TOP OF PVC ELEV.
WATER ELEV.
DATE DRILLED 11/7/2012
UTM (m) N 5,534,788
 E 636,543

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ Cu TORVANE (kPa) ◆		
							PL	MC	LL
1	5		SILTY CLAY - Brown, damp, firm, intermediate plasticity, trace rootlets, trace fine grained sand, trace fine grained gravel.	S1					
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					
3	15		SAND - Brown, moist to wet, loose, fine to medium grained, trace oxidation. - Water noticed on sample below 4.57 m. - Grey, no oxidation below 5.33 m.	S3					
4	20		SILTY CLAY - Grey, moist, firm, high plasticity.	S4					
5	25		SAND - Grey, moist, loose, medium grained, trace coarse grained sand. - Some to with silt, reduced sand below 7.92 m.	S5					
6	30		SILTY CLAY - Grey, moist, firm, high plasticity, trace silt nodules, trace medium grained sand, trace fine grained gravel.	S6					

GEO TECHNICAL SOIL LOG P:\PROJECTS\2012\12-0107-018\DESIGN\GEO\LOGS\CHIEF PEGUIS TRAIL SEWERMAIN.GPJ

SAMPLE TYPE Auger Grab Core Barrel

CONTRACTOR Paddock Drilling Ltd. **INSPECTOR** C. FRIESEN

APPROVED DRAFT

DATE 11/26/12

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲	Cu POCKET PEN (kPa) ★		
						DYNAMIC CONE (N) blows/ft △	PL	MC	LL
			- Stiff below 10.06 m.						
	35		- Reduced fine grained gravel below 10.67 m.						
	40		- Grain Size Distribution: Gravel (1.2%), Sand (11.7%), Silt (30.5%), Clay (56.6%) at 11.58 m.	S8					
			- Reduced silt nodules below 12.50 m.						
	45		- Firm below 12.95 m.						
			- Grain Size Distribution: Gravel (0.8%), Sand (10.2%), Silt (23.7%), Clay (65.3%) at 13.11 m.	S9					
	50		SILTY TILL - Tan, moist, compact, with medium to coarse grained sand, some fine grained gravel, trace coarse grained gravel.						
			- Loose, reduced coarse grained sand, reduced fine to coarse grained gravel below 14.63 m.	S10					
	55		- Auger refusal at 16.76 m on bedrock. Switched over to core below 16.76 m.						
			LIMESTONE BEDROCK - White, fractured with vertical and horizontal fractures.	R1	85				
	60			R2	98				
	65		- Clay seam at 19.69 m.						
			- Clay between 20.12 and 20.19 m.						
	70		- Yellow fractured limestone between 21.41 and 22.25 m.	R4	100				

SAMPLE TYPE Auger Grab Core Barrel

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
C. FRIESEN

APPROVED
DRAFT

DATE
11/26/12

ELEVATION (m)	DEPTH		GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ Cu TORVANE (kPa) ◆					
	(m)	(ft)						PL	MC	LL			
22				Reduced fractures below 22.25 m.	R5	100							
23	75												
24				Increased fractures below 24.69 m.	R6	100							
25	80												
26	85												
27				END OF TEST HOLE AT 25.91 m	R7	100							
28	90												
29	95												
30	100												
31	105												
32	105												
33	110												

Notes:
 1. Water level measured at 15.70 m below grade after drilling.
 2. Backfilled test hole with a thick bentonite grout mixture and bentonite chips.

GEO-TECHNICAL SOIL LOG P:\PROJECTS\2012\12-01\17-018\DESIGN\GEO\LOGS\SCHIEF PEGUIS TRAIL SEWERMAIN.GPJ



SUMMARY LOG

REFERENCE NO.

HOLE NO.
TH12-02B

SHEET 1 of 2

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT Chief Peguis Bridge Sewer Replacement
SITE East of Red River and South of Chief Peguis Trail
LOCATION ~3 m West of TH12-02
DRILLING METHOD Acker Track Drill Rig, 125 mm ø Solid Stem

JOB NO. 12-0107-018
GROUND ELEV.
TOP OF PVC ELEV.
WATER ELEV.
DATE DRILLED 11/9/2012
UTM (m) N
 E

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲	DYNAMIC CONE (N) blows/ft ▲	Cu POCKET PEN (kPa) ★		Cu TORVANE (kPa) ◆	
											20	40	60	80
		[Cross-hatched]	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.											
	1	[Diagonal lines]	SILTY CLAY - Brown, moist, stiff, high plasticity, trace fine to medium grained sand.											
	5		- Increased sand content below 1.83 m.											
	2	[Dotted]	SAND - Brown, moist, compact, fine to medium grained, trace coarse grained sand, trace silt, trace clay.											
	3	[Dotted]	SAND - Brown, moist, compact, fine to medium grained, trace coarse grained sand, trace silt, trace clay.											
	10	[Dotted]	SILTY SAND - Brown, moist, loose, fine to medium grained, with silt, trace clay.											
	4	[Dotted]	SAND - Brown, moist, compact, fine to medium grained, trace silt.											
	15		- Water noticed on sample at ~ 5.49 m.											
	5	[Dotted]	SAND - Brown, moist, compact, fine to medium grained, trace silt.											
	6	[Diagonal lines]	SANDY SILT - Brown, moist, firm, intermediate to high plasticity, trace oxidation.											
	20	[Dotted]	SILTY SAND - Brown, moist, soft, fine to medium grained, trace oxidation.											
	7	[Dotted]	- Grey, no oxidation below 6.71 m.											
	7	[Dotted]	SAND - Grey, moist, compact, medium grained, some fine and coarse grained sand.											
	25	[Diagonal lines]	SILTY CLAY - Grey, moist, firm, high plasticity.											
	8	[Dotted]	- Medium grained sand layer between 7.39 and 7.47 m.											
	8	[Dotted]	SILTY SAND - Grey, moist, soft, fine to medium grained sand, with silt.											
	9		- Organic layer between 8.53 and 8.64 m.											
	30	[Diagonal lines]	SILTY CLAY - Grey, moist, firm, high plasticity, trace fine grained sand.											
			- Increased sand between 9.75 and 9.96 m.											

GEOTECHNICAL SOIL LOG P:\PROJECTS\2012\12-0107-018\DESIGN\GEOLOGS\CHIEF PEGUIS TRAIL SEWERMAIN.GPJ

SAMPLE TYPE

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
C. FRIESEN

APPROVED
DRAFT

DATE
11/26/12

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲	DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★	Cu TORVANE (kPa) ◆
									20 40 60	20 40 60	20 40 60 80	PL MC LL %
35			- Increased sand between 10.36 and 10.52 m.									
11			SILTY SAND - Grey, moist, compact, medium grained, trace fine grained sand, trace clay. - Test hole squeezing at 10.67 m.		11.4							
12					11.6							
40			- 25 mm thick organic layer at 12.50 m.									
13			- Decreased sand between 12.95 and 13.26 m.									
45												
14			SILTY CLAY - Grey, moist, firm, high plasticity, trace coarse grained sand, trace fine grained gravel, trace silt nodules.									
15												
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.									
55												
17												
18												
60			AUGER REFUSAL AT 18.34 m									
19			Notes: 1. Stratigraphy assumed from TH12-02 drilled ~3 m away. 2. Installed casagrande standpipe at a depth of 17.68 m with a slick-up of 0.91 m. 3. Installed PN 034983 at a depth of 11.58 m. below grade. 4. Backfilled test hole with silica sand between 17.68 and 16.76 m and bentonite chips from 16.76 m to grade.									
20												
65												
21												
70												

GEO TECHNICAL SOIL LOG P:\PROJECTS\2012\12-0107-318\DESIGN\GEOLOGS\CHIEF PEGUIS TRAIL SEWERMAN.GPJ

SAMPLE TYPE

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
C. FRIESEN

APPROVED
DRAFT

DATE
11/26/12

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT Chief Peguis Bridge Sewer Replacement
SITE West of Red River and South of Chief Peguis Trail
LOCATION North of Existing Sewermain on the Upper Bank
DRILLING METHOD CME Track Drill Rig, 125 mm \varnothing Solid Stem and HQ Core Barrel

JOB NO. 12-0107-018
GROUND ELEV. 230.84
TOP OF PVC ELEV.
WATER ELEV.
DATE DRILLED 11/13/2012
UTM (m) N 5,534,926
 E 636,265

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m \blacktriangle	DYNAMIC CONE (N) blows/ft \triangle	Cu POCKET PEN (kPa) \star			Cu TORVANE (kPa) \blacklozenge			
										20	40	60	80	20	40	60
			<p>SILTY CLAY FILL - Black, moist, stiff, high plasticity, trace rootlets. - Trace medium to coarse grained sand, trace fine to coarse grained gravel below 0.23 m.</p> <p>SILTY CLAY - Brown, moist, stiff, high plasticity, trace coarse grained sand.</p> <p>- No sand below 1.22 m.</p>			S1										
			<p>SILTY SAND TO SANDY SILT - Light brown, moist, soft/loose, fine grained sand.</p>			S2										
			<p>SILTY CLAY - Brown, moist, stiff, high plasticity, trace silt nodules (~1-3 mm diameter). - 10 mm diameter gravel piece at 3.73 m.</p>			S3										
			<p>- Grey below 5.49 m.</p>			S4										
			<p>- Firm below 6.10 m.</p>			S5										
			<p>- Slightly increased silt nodules (up to 5 mm diameter) below 9.14 m.</p>			S6										

GEO-TECHNICAL - SOIL LOG P:\PROJECTS\2012\12-0107-018\DESIGN\GEOLOGS\CHIEF PEGUIS TRAIL SEWERMAIN.GPJ

SAMPLE TYPE Auger Grab Split Spoon Core Barrel

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
C. FRIESEN

APPROVED
DRAFT

DATE
11/26/12

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ Cu TORVANE (kPa) ◆	
										PL	MC
11	35										
12	40		- Trace silt pockets below 12.19 m. - Trace fine grained gravel below 12.50 m.								
13											
14	45										
15	50		- Reduced silt, trace coarse grained sand, no fine grained gravel below 15.24 m.								
16											
17	55		- Occasional silt pockets/nodules below 16.92 m.								
18	60		- 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.								
19											
20	65		SILT TILL - Tan with grey, moist, compact, fine to coarse grained sand, fine grained gravel, trace clay.								
21	70		- Auger refusal at 21.03 m on bedrock. Switched over to core below 21.03 m. LIMESTONE BEDROCK - White, competent, horizontal fractures.		21.0						

GEO-TECHNICAL-SOIL LOG P:\PROJECTS\2012\12-0107-0118\DESIGN\GEOLOGSCHIEF PEGUIS TRAIL SEWERMAIN.GPJ

<p>SAMPLE TYPE</p> <p>Auger Grab Split Spoon Core Barrel</p>	<p>CONTRACTOR</p> <p>Paddock Drilling Ltd.</p>	<p>INSPECTOR</p> <p>C. FRIESEN</p>	<p>APPROVED</p> <p>DRAFT</p>	<p>DATE</p> <p>11/26/12</p>
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ELEVATION (m)	DEPTH		GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲	Cu POCKET PEN (kPa) ★		
	(m)	(ft)							DYNAMIC CONE (N) blows/ft △	20	40	60
22				<ul style="list-style-type: none"> Thin clay seam at 21.77 m. Vertical fracture between 21.84 and 22.05 m. 								
23	75											
24		80				23.9	R3	57				
25												
26		85					R4	100				
27												
28		90				27.6	R5	97				
29												
29		95		<ul style="list-style-type: none"> Rubble zone between 28.46 and 28.52 m. Vertical fracture between 28.52 and 28.70 m. 			R6	100				
30												
30				END OF TEST HOLE AT 30.02 m		29.7	R7	100				
31		100		<p>Notes:</p> <ol style="list-style-type: none"> Installed casagrande standpipe at a depth of 30.02 m with a stick-up of 0.91 m. Backfilled test hole with silica sand between 30.02 and 27.58 m, bentonite chips from 27.58 to 23.93 m, slough from 23.93 to 21.03 m and bentonite chips from 21.03 m to grade. 								
32		105										
33												
		110										

GEOTECHNICAL SOIL LOG P:\PROJECTS\2012\12-0107-018\DESIGN\GEOLOG\SCHIEF PEGUIS TRAIL SEWERMAIN.GPJ

SAMPLE TYPE Auger Grab Split Spoon Core Barrel

CONTRACTOR **Paddock Drilling Ltd.** INSPECTOR **C. FRIESEN** APPROVED **DRAFT** DATE **11/26/12**



SUMMARY LOG

REFERENCE NO.

HOLE NO.
TH12-03B

SHEET 1 of 3

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT Chief Peguis Bridge Sewer Replacement
SITE West of Red River and South of Chief Peguis Trail
LOCATION ~2 m West of TH12-03
DRILLING METHOD CME Track Drill Rig, 125 mm ϕ Solid Stem

JOB NO. 12-0107-018
GROUND ELEV.
TOP OF PVC ELEV.
WATER ELEV.
DATE DRILLED 11/14/2012
UTM (m) N
 E

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m \blacktriangle	DYNAMIC CONE (N) blows/ft \triangle	Cu POCKET PEN (kPa) \star		Cu TORVANE (kPa) \blacklozenge	
										20	40	60	80
			SILTY CLAY FILL - Black, moist, stiff, high plasticity, trace rootlets. - 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 sand. - No sand below 1.22 m.										
	2		SILTY SAND TO SANDY SILT - Light brown, moist, soft/loose, fine grained sand.										
	3												
	4		SILTY CLAY - Brown, moist, stiff, high plasticity, trace silt nodules (~1-3 mm diameter). - 10 mm diameter gravel piece at 3.73 m.										
	5												
	6		- Grey below 5.49 m. - Firm below 6.10 m.										
	7												
	8												
	9		- Slightly increased silt nodules (up to 5 mm diameter) below 9.14 m.										

GEO/TECHNICAL - SOIL LOG P:\PROJECTS\2012\12-0107-018\DESIGN\GEOLOGS\CHIEF PEGUIS TRAIL SEWERMAN.GPJ

SAMPLE TYPE

CONTRACTOR Paddock Drilling Ltd.	INSPECTOR C. FRIESEN	APPROVED DRAFT	DATE 11/26/12
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ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ Cu TORVANE (kPa) ◆	
									PL	MC
35										
11										
40			- Trace silt pockets below 12.19 m. - Trace fine grained gravel below 12.50 m.		11.6 11.8					
13										
45										
14										
15										
50			- Reduced silt, trace coarse grained sand, no fine grained gravel below 15.24 m.							
16										
17										
55			- Occasional silt pockets/nodules below 16.92 m.							
18										
60			- Trace fine grained gravel below 18.29 m.							
19										
65			SILT TILL - Tan with grey, moist, compact, fine to coarse grained sand, fine grained gravel, trace clay.							
20										
21										
70			AUGER REFUSAL AT 20.98 m							
			Notes: 1. Stratigraphy assumed from TH12-03 drilled ~2 m away.							

GEO TECHNICAL SOIL LOG P:\PROJECTS\012\12-0107-018\DESIGN\GEOLOGS\CHIEF PEGUIS TRAIL SEWERMAIN.GPJ

SAMPLE TYPE

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
C. FRIESEN

APPROVED
DRAFT

DATE
11/26/12

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲	Cu POCKET PEN (kPa) ★
									DYNAMIC CONE (N) blows/ft △	Cu TORVANE (kPa) ◆
									20 40 60	20 40 60 80
									20 40 60	PL MC LL %
22			2. Installed casagrande standpipe at a depth of 20.96 m with a stick-up of 0.66 m.							
	75		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.							
			5. Test hole squeezing at 8.53 m shortly after drilling.							
23										
24										
	80									
25										
26										
	85									
27										
28										
29										
	95									
30										
	100									
31										
32										
	105									
33										
	110									

GEO-TECHNICAL-SOIL LOG P:\PROJECTS\2012\12-01\07-01\DESIGN\GEOLOG\SCHIEF PEGUIS TRAIL SEWERMAIN.GPJ

SAMPLE TYPE

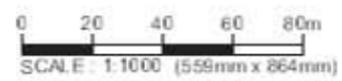
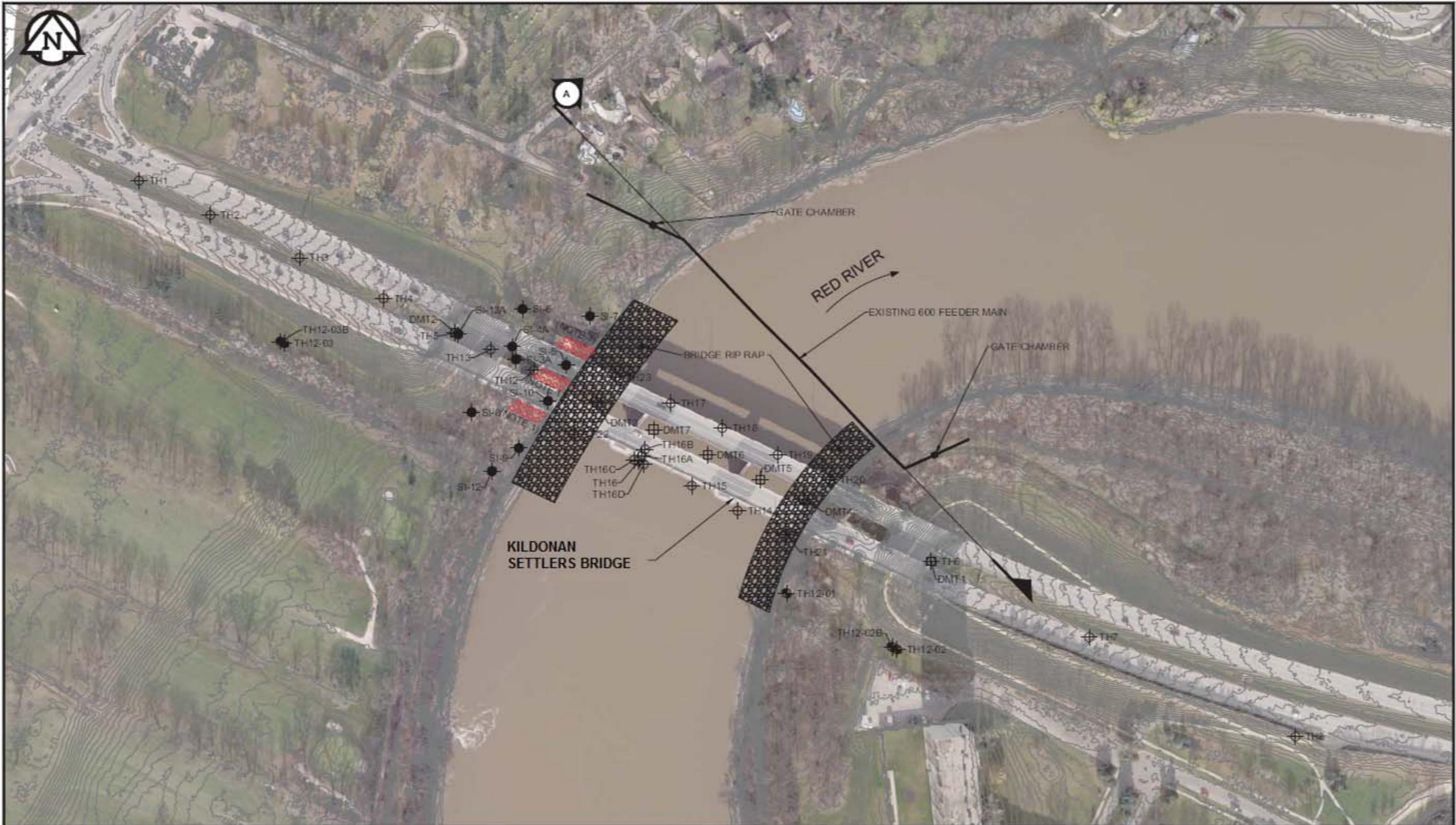
CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
C. FRIESEN

APPROVED
DRAFT

DATE
11/26/12

Tabloid (279mm x 432mm)



LEGEND :

- ⊕ TEST HOLE (KGS, 2012)
- ⊕ TEST HOLE (DYREGROV, 1988)
- ⊕ DILATMETER TESTING (DYREGROV, 2988)
- SLOPE INDICATOR (1989)
- ROCK COLUMNS

NOTES :

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