



To: Michelle Klaben, YG Project Manager
c:
From: Stephan Klump, TT Project Manager
Julianna Hogenson, TT, Field Scientist
Date: March 31, 2023
Memo No.: 003
File: 704-ENW.GENV03329-01
Subject: Monitoring Well Installation, McConnell Lake, Yukon

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained by the Government of Yukon (YG) to complete a hydrological assessment to determine the reason for overland flooding in recent years and to develop potential high-level mitigation options. Several residences in the Hamlet of Mount Lorne are severely affected by annually re-occurring flooding during freshet in the area of McConnell Lake near Annie Lake Road, Yukon.

This technical memorandum includes the installation of monitoring wells at three locations to the east of McConnell Lake to assess the shallow subsurface conditions in the area that may be related to the re-occurring flooding.

A hydrological assessment of the McConnell Lake area is reported under separate cover.

2.0 INSTALLATION OF MONITORING WELLS

Prior to mobilizing a drill rig to install monitoring wells in the area to the east of McConnell Lake, Arcrite Northern Ltd. (Arcrite) was retained to clear all proposed drilling locations of the presence of any underground utilities. Clearance was obtained from Arcrite on October 21, 2022. In addition, clearance was also obtained from Northwestel Inc. and Atco Electric Yukon.

Tetra Tech oversaw the installation of three (3) groundwater monitoring wells within the project area to assess the subsurface conditions and monitor groundwater elevations using dataloggers. The monitoring wells were designed to provide information needed to support the hydrological assessment of the McConnell area. In addition, the borehole logs provide pertinent information on the shallow subsurface conditions which may also be required to support the selection of future mitigation options.

The monitoring wells were drilled using a small track-mounted auger drill operated by Midnight Sun Drilling Inc of Whitehorse, Yukon on October 25-27, 2022. The monitoring wells were completed as shallow 50 mm (2-inch) diameter monitoring wells with polyvinyl chloride (PVC) standpipes. At all three locations, shallow saturated sand was encountered to a depth of about 2 to 3 m, overlying a silt and clay layer, typically more than 15 m thick. The continuous, thick silt and clay unit prevents shallow water from infiltrating deeper into the ground and hence, contributes to the flooding issues noted at the site.

Figure A details the location of the wells. Table A includes details on the boreholes and monitoring wells installed. Well logs are included in Appendix B.

The monitoring wells were developed on November 16, 2022 prior to collecting water samples on November 17, 2022. The water samples were provided to the Water Resources Branch, Government of Yukon for analysis outside of the scope of this project.

Field parameters were obtained using a YSI Professional Plus field meter. Field parameters recorded at each sample site included:

- Water temperature (°C)
- Dissolved oxygen (mg/L)
- Electrical Conductivity (µS/cm)
- pH (pH units)
- Oxidation-reduction potential (ORP; mV)

The YSI meter was calibrated each field day and checked before each site visit to ensure field measurements were accurate.

Field notes, including the measured field parameters, are appended to this memo in Appendix C.

Table A: Drilling and Monitoring Well Details

Well ID	UTM Coordinates NAD83, Zone 8		Stick-up m ag	Depth to Bottom m bg	Screen Length m	Depth to Water m bg
	Easting	Northing				
MW22-01s	505853	6700079	0.89	2.30	1.52	1.31
MW22-01d	505850	6700083	0.77	14.89	3.03	9.75
MW22-02	506139	6701688	0.91	1.80	1.20	0.77
MW22-03	507634	6703039	0.92	2.60	1.90	2.27
BH22-03d	507634	6703039	-	15.24	-	-

Notes:

m ag – metres above ground surface
 m bg – metres below ground surface

Pressure transducers with dataloggers (Solinst Levelogger Series 5 LTC) were installed in each monitoring well to continuously monitor groundwater elevations (see Table 1).

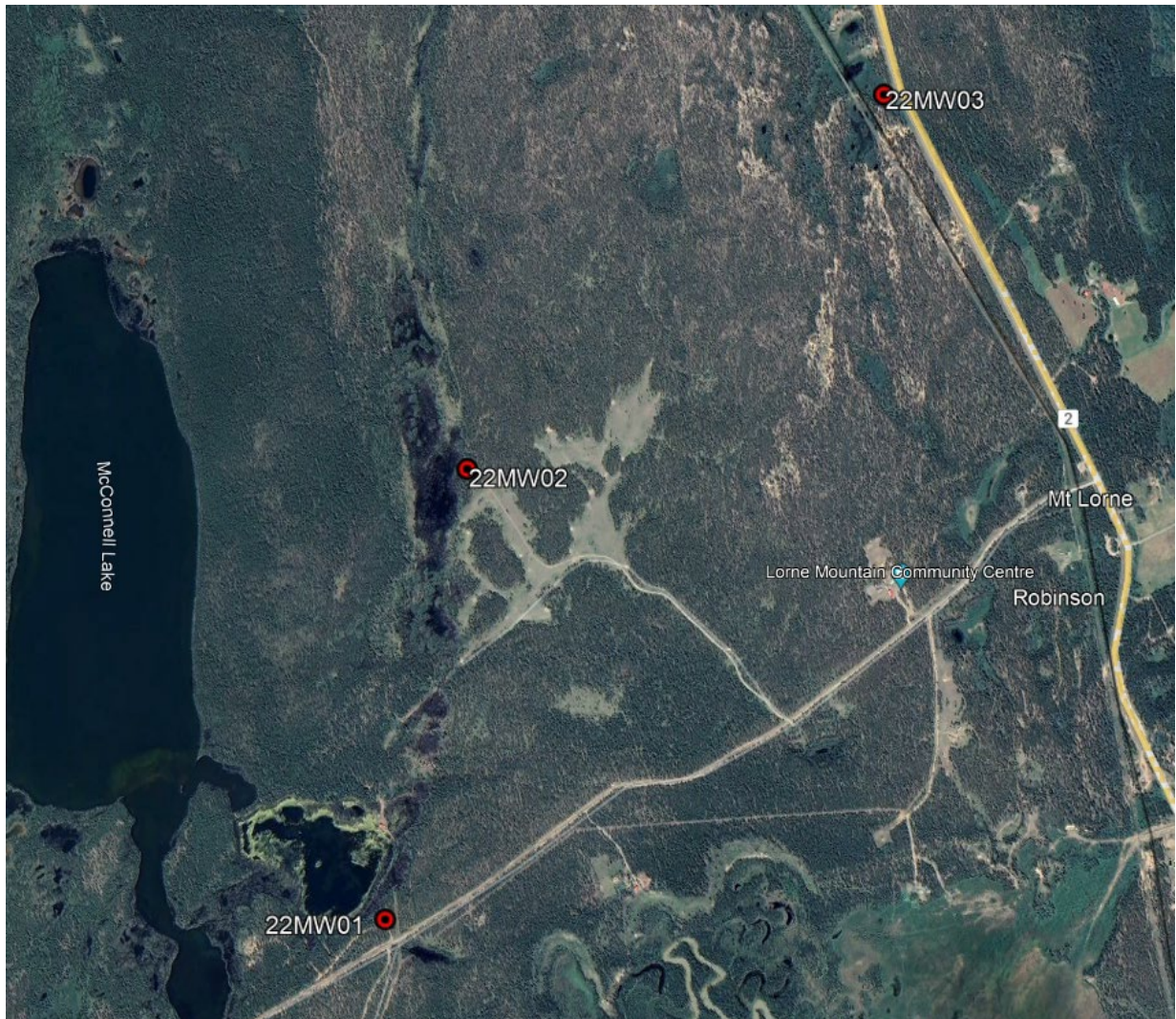


Figure A: Monitoring wells installed in the flood-prone areas to the east of McConnell Lake.

3.0 RESULTS AND CONCLUSIONS

At all three drilling locations, Tetra Tech found a shallow aquifer with a bottom depth of about two to three metres below ground surface, followed by at least about 15 m of glaciolacustrine silt and clay with a low hydraulic conductivity.

The shallow aquifer has a very limited thickness and therefore, limited opportunity to receive excess surface water. This promotes the flooding of the area during spring freshet when a significant volume of surface water occurs. The absence of an outflow from McConnell Lake and no direct access to a creek or river further favours flood occurrence throughout the area of concern.

Based on the conditions encountered, the possibility of using infiltration wells or galleries to divert the flood water into the subsurface is unlikely to be a viable option. Based on the surrounding topography it is very probable that

groundwater underneath the glaciolacustrine silt and clay layer is confined and unable to receive a significant additional water volume of diverted flood water.


4.0 LIMITATIONS OF REPORT

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5.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.

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704-ENW.GENV03329-01

Julianna Hogenson, M.Sc.
Environmental Scientist
Environment and Water
Direct Line: 867.668.9226
Julianna.Hogenson@tetrattech.com

704-ENW.GENV03329-01
704-ENW.GENV03329-01
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Stephan Klump, Ph.D.
Project Director and Senior Hydrogeologist
Environment and Water
Direct Line: 867.668.9220
Stephan.Klump@tetrattech.com

TABLES

Table 1 Monitoring Wells and Dataloggers

Table 1: Monitoring Wells and Dataloggers

Well ID	UTM Coordinates NAD83, Zone 8		Stick-up m	Depth to Bottom m below TOC ¹	Depth to Water (December 8, 2022) m below TOC ¹	Time of Depth to Water Measurement	Logger Serial Number
	Easting	Northing					
MW22-01s	505853	6700079	0.89	3.00	2.20	9:45 AM	1091391
MW22-01d	505850	6700083	0.77	14.86	10.52	9:30 AM	2162866 (Barologger)
MW22-02	506139	6701688	0.91	2.71	1.68	10:20 AM	1091395
MW22-03	507634	6703039	0.92	3.44	2.27	10:52 AM	1091474

NOTES:

¹ TOC - top of casing. Measured from the marking at the top of the PVC pipe

APPENDIX A

LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

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APPENDIX B

BOREHOLE LOGS



Borehole No: 22MW01s

Project: Hydrological Assessment

Project No: ENW.GENV03329-01

Location: Annie Lake Road

McConnell Lake, Yukon

UTM: 505853 E; 6700079 N; Z 8

Depth (m)	Method	Soil Description	Notes and Comments	Depth (ft)
0				0
0.89			Pipe stickup = 0.89 metres	0.89
0.89 - 3.05	Solid and hollow stem auger	<p>SAND - trace gravel, medium to coarse grained sand, trace fine grained sand, fine grained gravel to 20 mm diameter, damp, medium brown, no discernible odour</p> <p>- moist</p> <p>- wet to very wet</p>		0.89 - 3.05
3.05 - 3.30		SILT - clayey, moist to wet, stiff to very stiff, medium brown, trace oxide staining		3.05 - 3.30
3.05		<p>END OF BOREHOLE (3.05 metres)</p> <p>water - 1.31 metres on December 8, 2022</p> <p>Monitoring well installed to 2.30 metres</p>		3.05



Contractor: Midnight Sun Drilling

Completion Depth: 3.05 m

Equipment Type: Track mounted

Start Date: 2022 October 25

Logged By: JH

Completion Date: 2022 October 25

Reviewed By:

Page 1 of 1



Borehole No: 22MW01d

Project: Hydrological Assessment

Project No: ENW.GENV03329-01

Location: Annie Lake Road

McConnell Lake, Yukon

UTM: 505850 E; 6700083 N; Z 8

Depth (m)	Method	Soil Description	Notes and Comments	Depth (ft)
0		SAND - trace gravel, trace silt, medium to coarse grained sand, gravel to 15 mm diameter, moist, loose, medium brown	Pipe stickup = 0.77 metres	0
1	Solid and hollow stem auger	- damp to moist		1
2		- wet to very wet		2
3		SILT - clayey, trace sand, damp to moist, dense, medium plastic, medium brown, trace oxides		3
4		- damp		4
5		- 100 mm thick sand layer - trace gravel, medium grained sand, gravel to 10 mm diameter, damp to moist		5
6		- moist, stiff to very stiff, medium plastic, grey, trace black streaks		6
7				7
8				8
9				9
10				10
11				11
12				12
13				13
14				14
15				15
16				16



Contractor: Midnight Sun Drilling

Completion Depth: 15.24 m

Equipment Type: Track mounted

Start Date: 2022 October 25

Logged By: JH

Completion Date: 2022 October 25

Reviewed By:

Page 1 of 4



Borehole No: 22MW01d

Project: Hydrological Assessment

Project No: ENW.GENV03329-01

Location: Annie Lake Road

McConnell Lake, Yukon

UTM: 505850 E; 6700083 N; Z 8

Depth (m)	Method	Soil Description	Notes and Comments	22MW01d	Depth (ft)
5	Solid and hollow stem auger	- moist to wet		22MW01d	17
					18
		- moist, stiff			19
6					20
					21
		- moist to wet, very soft			22
7					23
					24
		- 100 mm thick sand lens - moist, grey to medium brown			25
8					26
	- moist		27		
	- moist to wet		28		
			29		
9			30		
	- 5 mm thick sand lens - medium grained sand, brown		31		
	- alternating 100 mm thick clay and sand lenses for 400 mm		32		
10					



TETRA TECH

Contractor: Midnight Sun Drilling

Completion Depth: 15.24 m

Equipment Type: Track mounted

Start Date: 2022 October 25

Logged By: JH

Completion Date: 2022 October 25

Reviewed By:

Page 2 of 4



Borehole No: 22MW01d

Project: Hydrological Assessment

Project No: ENW.GENV03329-01

Location: Annie Lake Road

McConnell Lake, Yukon

UTM: 505850 E; 6700083 N; Z 8

Depth (m)	Method	Soil Description	Notes and Comments	22MW01d	Depth (ft)
10					
11	Solid and hollow stem auger	- moist to wet			33
		- moist, stiff, trace black streaks, trace oxides			34
		- moist to wet			35
		- moist			36
12					37
13					38
		- moist to wet			39
		- moist to wet			40
		- moist to wet			41
		- moist			42
		- moist to wet			43
					44
					45
14					46
					47
					48
15					49



Contractor: Midnight Sun Drilling

Completion Depth: 15.24 m

Equipment Type: Track mounted

Start Date: 2022 October 25

Logged By: JH

Completion Date: 2022 October 25

Reviewed By:

Page 3 of 4



Borehole No: 22MW01d

Project: Hydrological Assessment

Project No: ENW.GENV03329-01

Location: Annie Lake Road

McConnell Lake, Yukon

UTM: 505850 E; 6700083 N; Z 8

Depth (m)	Method	Soil Description	Notes and Comments	22MW01d	Depth (ft)
15					
		<p>END OF BOREHOLE (15.24 metres) slough - 14.89 metres at 0 hrs. water - 9.75 metres on December 8, 2022 Monitoring well installed to 14.89 metres</p>			50
16					51
					52
					53
					54
					55
17					56
					57
					58
					59
18					60
					61
					62
					63
					64
19					65
20					



Contractor: Midnight Sun Drilling

Completion Depth: 15.24 m

Equipment Type: Track mounted

Start Date: 2022 October 25

Logged By: JH

Completion Date: 2022 October 25

Reviewed By:

Page 4 of 4



Borehole No: 22MW02

Project: Hydrological Assessment

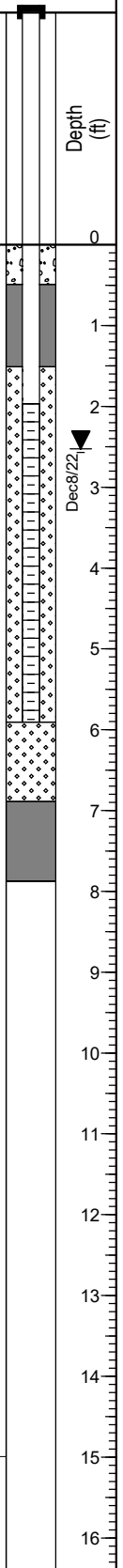
Project No: ENW.GENV03329-01

Location: Annie Lake Road

McConnell Lake, Yukon

UTM: 506139 E; 6701688 N; Z 8

Depth (m)	Method	Soil Description	Notes and Comments	Depth (ft)
0				0
0.91		SAND - trace gravel, medium to coarse grained sand, gravel to 15 mm diameter, moist to wet, brown - no visible gravel, fine to medium grained sand, well graded, wet, light brown to orange - orange oxidation staining	Pipe stickup = 0.91 metres	0.91
1.0		- very wet		1.0
2.0	Solid stem auger	SILT - some clay, trace sand, fine grained sand, moist, low plastic, brown, no to trace oxides		2.0
2.7		- moist to wet		2.7
3.0		SAND - some silt, fine to medium grained sand, well graded, wet, brown		3.0
3.5		SILT - clayey, trace sand, moist, stiff, medium plastic, grey, black streaks		3.5
3.7		wet - moist to wet		3.7
4.57		END OF BOREHOLE (4.57 metres) water - 0.77 metres on December 8, 2022 Monitoring well installed to 1.80 metres Note: Backfilled hole and moved 1.00 metre to installed monitoring well		4.57



Contractor: Midnight Sun Drilling

Completion Depth: 4.57 m

Equipment Type: Track mounted

Start Date: 2022 October 26

Logged By: JH

Completion Date: 2022 October 26

Reviewed By:

Page 1 of 1



Borehole No: 22MW03

Project: Hydrological Assessment

Project No: ENW.GENV03329-01

Location: Annie Lake Road

McConnell Lake, Yukon

UTM: 507634 E; 6703039 N; Z 8

Depth (m)	Method	Soil Description	Notes and Comments	Depth (ft)
0				0
0 - 0.92		SAND AND SILT - trace clay, trace gravel, trace black organics, medium grained sand, gravel to 15 mm diameter, moist to wet, loose, non plastic, brown	Pipe stickup = 0.92 metres	0 - 3.0
0.92 - 1.35		SAND - medium to coarse grained, wet, brown, trace oxide staining - very wet		3.0 - 4.4
1.35 - 2.60	Solid stem auger	- mostly coarse grained sand		4.4 - 8.5
2.60 - 3.0		SILT - clayey, trace sand, fine grained sand, moist, stiff, medium plastic, brown - medium to coarse grained sand, wet		8.5 - 9.8
3.0 - 3.35		SAND - medium to coarse grained, wet, brown, trace oxide staining		9.8 - 11.0
3.35 - 4.57		SILT - clayey, trace sand, fine grained sand, moist, stiff, medium plastic, brown - some clay for 50 mm - 80 mm thick moist medium grained sand lens		11.0 - 15.0
4.57		END OF BOREHOLE (4.57 metres) water - 1.35 metres on December 8, 2022 Monitoring well installed to 2.60 metres		15.0



Contractor: Midnight Sun Drilling

Completion Depth: 4.57 m

Equipment Type: Track mounted

Start Date: 2022 October 27

Logged By: JH

Completion Date: 2022 October 27

Reviewed By:

Page 1 of 1



Borehole No: 22BH03d

Project: Hydrological Assessment

Project No: ENW.GENV03329-01

Location: Annie Lake Road

McConnell Lake, Yukon

UTM: 507634 E; 6703039 N; Z 8

Depth (m)	Method	Soil Description	Notes and Comments	Backfill	Depth (ft)
0					0
0 - 0.3		SAND AND SILT - clay, organics, fine grained sand, moist, orange and black, oxides staining, (300 mm thick)			0 - 1
0.3 - 1.0		SAND - some silt, trace gravel, fine to medium grained sand, gravel to 15 mm diameter, moist - moist to wet, orangish brown - no visible gravel, medium to coarse grained sand, trace oxides - wet			1 - 3.3
1.0 - 2.7	Solid stem auger	SILT - clayey, trace sand, fine grained sand, moist, stiff, medium plastic, brown SAND - some silt, trace gravel, fine to medium grained sand, gravel to 15 mm diameter, moist - moist to wet, firm - moist, stiff			3.3 - 8.9
2.7 - 4.5		SILT - clayey, trace sand, fine grained sand, moist, stiff, medium plastic, brown - grey, trace black streaks - moist to wet, firm			8.9 - 14.8
4.5 - 5.0					14.8 - 16.4



Contractor: Midnight Sun Drilling

Completion Depth: 15.24 m

Equipment Type: Track mounted

Start Date: 2022 October 27

Logged By: JH

Completion Date: 2022 October 27

Reviewed By:

Page 1 of 4



Borehole No: 22BH03d

Project: Hydrological Assessment

Project No: ENW.GENV03329-01

Location: Annie Lake Road

McConnell Lake, Yukon

UTM: 507634 E; 6703039 N; Z 8

Depth (m)	Method	Soil Description	Notes and Comments	Backfill	Depth (ft)	
5						
6	Solid stem auger	- moist, stiff			17	
					18	
		- moist to wet, firm				19
						20
						21
7		- moist, stiff			22	
					23	
					24	
					25	
8		- moist to wet, firm			26	
					27	
					28	
		- moist, stiff			29	
					30	
					31	
					32	
9						
10						



Contractor: Midnight Sun Drilling

Completion Depth: 15.24 m

Equipment Type: Track mounted

Start Date: 2022 October 27

Logged By: JH

Completion Date: 2022 October 27

Reviewed By:

Page 2 of 4



Borehole No: 22BH03d

Project: Hydrological Assessment

Project No: ENW.GENV03329-01

Location: Annie Lake Road

McConnell Lake, Yukon

UTM: 507634 E; 6703039 N; Z 8

Depth (m)	Method	Soil Description	Notes and Comments	Backfill	Depth (ft)
10					
11	Solid stem auger	- moist to wet, firm			33
		- moist, stiff			34
		- moist to wet, firm			35
		- moist, stiff			36
12		- moist to wet, firm			37
		- moist, stiff			38
					39
					40
					41
		- moist to wet, firm			42
13					43
		- moist, stiff			44
					45
					46
14					47
					48
					49
15					



Contractor: Midnight Sun Drilling

Completion Depth: 15.24 m

Equipment Type: Track mounted

Start Date: 2022 October 27

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Reviewed By:

Page 3 of 4



Borehole No: 22BH03d

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Project No: ENW.GENV03329-01

Location: Annie Lake Road

McConnell Lake, Yukon

UTM: 507634 E; 6703039 N; Z 8

Depth (m)	Method	Soil Description	Notes and Comments	Backfill	Depth (ft)
15					
		END OF BOREHOLE (15.24 metres) slough - 1.22 metres at 0 hrs. Note: Backfilled at completion			50
16					51
					52
					53
					54
					55
17					56
					57
					58
					59
18					60
					61
					62
					63
					64
19					65
20					



Contractor: Midnight Sun Drilling

Completion Depth: 15.24 m

Equipment Type: Track mounted

Start Date: 2022 October 27

Logged By: JH

Completion Date: 2022 October 27

Reviewed By:

Page 4 of 4

APPENDIX C

FIELD NOTES

Groundwater Purge and Sample Form

WELL ID.: 22 MW015
 SITE: Annie Lake Rd
 WEATHER: Cloudy
 TEMPERATURE: -12°C

PROJECT NO.: 704-ENV G ENV03 329 01
 FIELD PERSONNEL: JH, EH
 DATE & TIME SAMPLED: 15 Nov 17/20
 GPS LOCATION: N: 67 0007 9 E: 505853 Zone: 08 (Map datum NAD83)

Is well ID visible? Yes No Is seal intact? Yes No Is lid/plug in place/working? Yes No
 Is well locked? Yes No General well condition - list any damage, pooled water around well etc.: _____
 Well Casing Inner Diameter (mm) 51

Depth to Water Below Top of Casing (A): 2.105 (metres) Depth to Product Below Top of Casing: _____ (metres)
 Depth to Bottom of Well Below Top of Casing (B): 3.015 (metres) Product Thickness: _____ (metres)
 Depth to Ground Below Top of Casing (stand-up): 0.89 (metres) LNAPL DNAPL Colour/Odour: _____
 Screen Interval (if known) _____ (m bTOC) Confirmed by: Bailer Interface Probe

FIELD EQUIPMENT
 Field Meters Calibrated: YSI Calibration Reference: pH, ORP, SPC
 Pump: none Waterra Submersible Peristaltic Bladder
 Bailer: none Stainless Steel Teflon PVC
 Filter: none In-line Syringe Other (i.e. vacuum)
 Equipment left in well: none Bailer Waterra Other

WELL PURGING
 Purge Volumes
 Casing In. Diam. (mm) 38 51 78 100 150
 Vol (L/m of casing)* (C) 1.1 2.0 4.5 7.9 17.7 *double for filter pack
 One well volume ((B - A) * C): _____ litres
 Purge volume to aim for: _____ litres
 or until parameters stabilize:
 Pump inlet depth (m bTOC): ~ 2.7m (m bTOC)

TIME	PURGE RATE (L/min)	VOLUME REMOVED (L)	TEMP (°C)	pH (UNITS)	COND. (uS/cm)	Redox (mV)	DIS.O ₂ (mg/L) or % 0.2mg/L or +/- 10%	Water Level (m bTOC)	REMARKS (colour, odour, sheen, brittle film, silt content, etc.)
Stabilisation Criteria			+/- 0.5	+/- 0.1	+/- 5%			+/- 0.1m if low flow	Visual observations (colour, turbidity, odour etc should be stable)
10:40		0.40	2.6	8.58	7270	-670	4.73	2.115	- med turbidity - Brown
10:47		0.90	1.8	7.33	1958	-14.1	2.01	2.118	to orange No odor
10:50		1.4	2.0	7.07	1900	-7.8	1.42	2.121	
10:57		1.9	1.8	6.85	1762	28.3	1.60	2.124	
11:02		2.4	1.9	6.80	1746	39.7	1.67	2.127	
11:07		2.9	2.0	6.78	1742	42.1	1.51	2.130	
11:12		3.4	2.6	6.77	1740	44.2	1.58	2.133	- Slight less turbid Brown to orange

SAMPLING Water Odour: No Yes (describe) _____ Sheen No Yes (describe) _____
 Turbidity: _____ NTU or relative scale (circle as appropriate): Clear 1 2 3 4 5 6 7 8 9 10 Very Silty

QA/QC Sample/s - Yes No QA/QC Type and ID - _____

Other (comments, notes, observations, recovery if well dried up, headspace measurements):

Groundwater Purge and Sample Form

WELL ID: 22 MW01d

PROJECT NO: 209-FNW-GWV033290

SITE: Annalake

FIELD PERSONNEL: JN, EH

WEATHER: Cloudy

DATE & TIME SAMPLED: Nov 17 12 2

TEMPERATURE: -12K

GPS LOCATION: N: 6700083 E: 505970 Zone: 09V (Map datum NAD83)

Is well ID visible? Yes No Is seal intact? Yes No Is lid/plug in place/working? Yes No
 Is well locked? Yes No General well condition - list any damage, pooled water around well etc.: _____
 Well Casing Inner Diameter (mm) 51

Depth to Water Below Top of Casing (A): 10.650 (metres) Depth to Product Below Top of Casing: _____ (metres)
 Depth to Bottom of Well Below Top of Casing (B): 15.176 (metres) Product Thickness: _____ (metres)
 Depth to Ground Below Top of Casing (stand-up): 0.77 (metres) LNAPL DNAPL Colour/Odour: _____
 Screen Interval (if known) _____ (m bTOC) Confirmed by: Bailer Interface Probe

FIELD EQUIPMENT

Field Meters Calibrated: YSI Calibration Reference: pH, ORP, SPC
 Pump: none ^{hand} Watterra Submersible Peristaltic Bladder
 Bailer: none Stainless Steel Teflon PVC
 Filter: none In-line Syringe Other (i.e. vacuum)
 Equipment left in well: none Bailer Watterra Other

WELL PURGING

Purge Volumes One well volume ((B - A) * C): 9048 litres
 Casing In. Diam. (mm) 38 51 78 100 150 Purge volume to aim for: 27144 litres
 Vol (L/m of casing)* (C) 1.1 2.0 4.5 7.9 17.7 *double for filter pack or until parameters stabilize: _____
 Pump inlet depth (m bTOC): _____ (m bTOC)

TIME	PURGE RATE (L/min)	VOLUME REMOVED (L)	TEMP (°C)	pH (UNITS)	COND. (uS/cm)	Redox (mV)	DIS.O ₂ (mg/L) or %	Water Level (m bTOC)	REMARKS (colour, odour, sheen, brittle film, silt content, etc.)
	Stabilisation Criteria		± 0.5	± 0.1	± 5%		0.2mg/L or ± 10%	± 0.1m if low flow	Visual observations (colour, turbidity, odour etc should be stable)
<u>14:35</u>			<u>1.4</u>	<u>7.42</u>	<u>2.07</u>	<u>105.4</u>	<u>7.56</u>		<u>- very turbid, high sus. sed.</u> <u>- brown-grey colour, no odour</u>

SAMPLING Water Odour: No Yes (describe) _____ Sheen No Yes (describe) _____
 Turbidity: _____ NTU or relative scale (circle as appropriate): Clear 1 2 3 4 5 6 7 8 9 10 Very Silty

QA/QC Samples - Yes No QA/QC Type and ID - _____

Other (comments, notes, observations, recovery if well dried up, headspace measurements):
10:20 - Purged ~ 9-10L of very turbid, high sus. sed., brown to grey water - no odor - Mon day
- Very slow recharge, will return @ end of day.
#14:30 depth to water: 11.614 m bTOC

Groundwater Purge and Sample Form

WELL ID: 22MW02

PROJECT NO.: 704-ENV. GENVD 3322-0

SITE: Annie Lave Rd

FIELD PERSONNEL: JH, EH

WEATHER: overcast

DATE & TIME SAMPLED: Nov 17/12

TEMPERATURE: -12°C

GPS LOCATION: N: 6701688 E: 506139 Zone: 02N Map datum NAD83

Is well ID visible? Yes No Is seal intact? Yes No Is lid/j-plug in place/working? Yes No
 Is well locked? Yes No General well condition - list any damage, pooled water around well etc.: _____
 Well Casing Inner Diameter (mm) 51

Depth to Water Below Top of Casing (A): 1.605 (metres) Depth to Product Below Top of Casing: _____ (metres)
 Depth to Bottom of Well Below Top of Casing (B): 2.166 (metres) Product Thickness: _____ (metres)
 Depth to Ground Below Top of Casing (stand-up): 0.905 (metres) LNAPL DNAPL Colour/Odour: _____
 Screen Interval (if known) _____ (m bTOC) Confirmed by: Bailer Interface Probe

FIELD EQUIPMENT

Field Meters Calibrated: YST Calibration Reference: pH, SPC, OAP
 Pump: none Waterra Submersible Peristaltic Bladder
 Bailer: none Stainless Steel Teflon PVC
 Filter: none In-line Syringe Other (i.e. vacuum)
 Equipment left in well: none Bailer Waterra Other

WELL PURGING

Purge Volumes One well volume ((B - A) * C): _____ litres
 Purge volume to aim for: _____ litres
 or until parameters stabilize:
 Casing In. Diam. (mm) 38 51 78 100 150 Pump inlet depth (m bTOC): ~2.9 (m bTOC)
 Vol (L/m of casing)* (C) 1.1 2.0 4.5 7.9 17.7 *double for filter pack

TIME	PURGE RATE (L/min)	VOLUME REMOVED (L)	TEMP (°C)	pH (UNITS)	COND. (uS/cm)	Redox (mV)	DIS.O ₂ (mg/L) or %	Water Level (m bTOC)	REMARKS (colour, odour, sheen, brittle film, silt content, etc.)
Stabilisation Criteria			±0.5	±0.1	±5%		0.2mg/L or ±10%	±0.1m if low flow	Visual observations (colour, turbidity, odour etc should be stable)
12:15		0.3L	0.9	7.26	1807	-36.7	3.86	1.634	- med turbidity, B to into
12:20		0.7L	0.7	6.84	1729	-30.5	2.40	1.635	orange, no odor,
12:25		1.1	0.6	6.72	1747	-20.6	2.03	1.635	in some s.s. sed.
12:30		1.5	0.5	6.59	1745	-7.0	1.91	1.636	
12:35		1.9	0.5	6.53	1745	-0.08	2.40	1.636	
12:40		2.4	0.4	6.52	1739	4.1	3.41	1.637	
12:45		2.9	0.5	6.50	1732	6.1	3.52	1.638	- less turbid, st. (some orange/brown)

SAMPLING Water Odour: No Yes (describe) _____ Sheen No Yes (describe) _____

Turbidity: _____ NTU or relative scale (circle as appropriate): Clear 1 2 3 4 5 6 7 8 9 10 Very Silty

QA/QC Sample/s - Yes No QA/QC Type and ID - _____

Other (comments, notes, observations, recovery if well dried up, headspace measurements):

