Appendix WRM36-A

Fracflow_EIS-Input on Groundwater Impacts

Groundwater Conditions and Impacts – Surface Water Chemistry - Industrial Water Supply and Hydrogen Plant Site

The Groundwater Aquifer and Flow System

As noted, the industrial water supply will be taken from the three pond system (Gull [Mine] Pond, Muddy Pond and Noels Pond) with the last two ponds being fed by the discharge from the Warm Creek drainage basin. Provision of the required water flows to the Hydrogen Plant will require careful management of the water levels (the active storage) in all three ponds. This water management will result in variations in the pond levels throughout the year by 1.0 - 1.5 m relative to the base of the Noels Pond outflow control gates.

Two of the three source ponds are located on or adjacent to and contribute recharge to the thick overburden aquifer that provides groundwater to two existing well fields (Figure 1a). These two well fields are located at the bottom of the Warm Creek drainage basin. The granular aquifer in which these six production wells have been constructed is known to be up to approximately 80 m thick in the well fields where two deep monitoring wells were drilled into the underlying bedrock. The granular aquifer is underlain by fractured carbonate bedrock and is bounded on the east by an elevated area of fractured metamorphic/igneous bedrock. The hydraulic head contours in Figure 1a shows that there is a fairly uniform northeast to southwest hydraulic gradient of 0.004 - 0.006. Most of the southern part of the aquifer is covered by a 3 - 5 m thick layer of bog or peat producing a perched water table, with the depth below ground surface to the water table ranging from 16 - 24 m. Most of the ponds in this area are perched. One of the existing well fields is located between 150 and 400 m east to southeast of the Muddy Pond shoreline.

Based on the aquifer test data that is on file with DECC, the well fields are estimated to have total well yield capacity of approximately 8 - 10 m^3/min. The model simulation (Figure 1a) shows that the groundwater withdrawals from two existing well fields are not dewatering the aquifer and that the drawdowns over time will extend out underneath Muddy Pond and Noels Pond.

The granular aquifer is assumed to extend up into the Warm Creek drainage basin and to Long Gull Pond. The 3D groundwater flow and transport model hydraulic head contour map in Figure 1a demonstrates that the groundwater withdrawals from the two existing well fields are obtained from recharge on the east side of Warm Creek with an ultimate source area in the Long Gull Pond area. The hydraulic head contour lines in Figure 1a show that the surface water withdrawals by World Energy GH2 Limited Partnership on the eastern side of the aquifer will have very little impact on groundwater levels in the western side of the aquifer adjacent to Muddy Pond-Noels Pond.

Groundwater Interaction with the Source Ponds

Figure 1a shows the model simulation that was completed to evaluate what impact changing the water levels in the three source ponds would have on the groundwater system that supplies the existing well fields. The model confirms that Muddy Pond and Noels Pond both have very low permeability pond sediments that produce a perched pond condition. Muddy Pond and Noels

Pond, while both ponds do provide limited recharge to the aquifer, have little to no impact on the underlying water table elevations. This is confirmed by the actual water level measurements in three nearby monitoring wells (BH2, MW1 and NSW-S, Figure 1b) where the water level in Muddy Pond and Noels Pond are approximately 21 m above mean sea level while the average non-pumping water levels/hydraulic heads in the underlying aquifer ranges from 11 - 13 m. In addition, the Warm Creek stream bed between the community of Noels Pond and the point where Warm Creek discharges into Noels Pond is a losing stream. Changes in the water levels in Muddy Pond and in Noels Pond will have no significant negative impact on the groundwater resources that can be removed from the granular aquifer.

Figure 1a shows the strong hydraulic gradient between Gull (Mine) Pond and the adjacent granular aquifer. In this area, the average water level elevation in Gull (Mine) Pond is approximately 32 - 33 m. By contrast the hydraulic head in FMW11, immediately east of the discharge from Gull (Mine) Pond, is approximately 12.5 - 14.5 m. The hydraulic head in BH1, that is located immediately west of FMW11, is approximately 13.5 m. As one proceeds down along the flow line to FMW10, the hydraulic head decreases to 6 - 7 m. Clearly, all of the surface water systems in the Gull (Mine) Pond area are perched and changes in the water level in Gull (Mine) Pond of 1 - 3 m will have no significant impacts on the groundwater system.

Groundwater Conditions at the Former Abitibi Mill Site

Figure 2 shows the average or historical water table contours across the former Abitibi Mill site based on 2007 water level measurements. Figure 2 also shows the location of three cross-sections (Figures 3, 4 and 5) in which the ground surface and depth to the water table are plotted. These cross-sections show that the local groundwater table can be up to 8 - 10 m below ground surface and that the water table near the harbour shoreline is shallow.

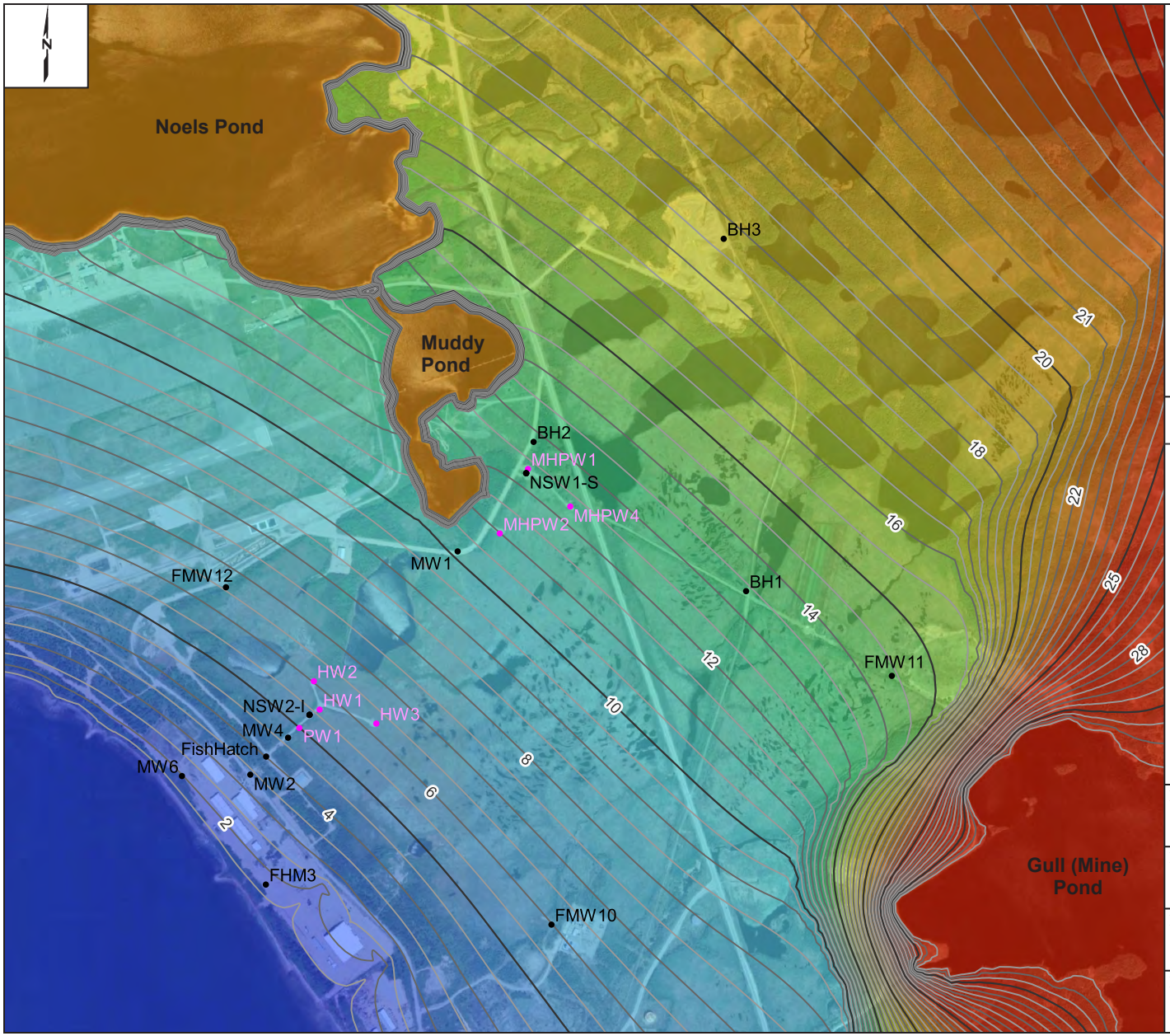
Groundwater Quality

Data from three existing monitoring wells are included to show the overburden characteristics and the groundwater chemistry. Figures 6, 7 and 8 show the logs for the three monitoring wells including the water level that were measured at the time the monitoring wells were constructed. Tables 1, 2 and 3 provide the water chemistry data from these three monitoring wells. It is important to note that FMW11 and FMW10 are both located down-gradient from old industrial landfills and as such exhibit elevated TDS. BH1 is located towards the central part of the granular aquifer but trans-gradient to down-gradient of a commercial sod farm. The water chemistry from BH1 has lower TDS that the other two monitoring wells but does show impacts from the use of fertilizers for the sod growing operation.

Surface Water Chemistry

The surface water in the three ponds, Noels Pond, Muddy Pond and Gull (Mine) Pond was sampled in the fall of 2022, in July, 2023 and in November 2023 to capture seasonal changes in water chemistry. The water samples were collected at nine locations, three in each pond. At each location a water sample was collected at approximately 1 m below the water surface and approximately 1 m above the pond bottom, except at one shallow water location in Muddy Pond.

At each of the nine locations, pond sediment samples were collected in the Fall of 2022 and analyzed for a range of parameters, including BTEX/TPH. In addition, four Level, Temperature and Fluid Conductivity (LTC) sensors were installed in February 2023 in the Warm Creek and Noels Pond system with measurements every 30 minutes. These sensors are tracking the seasonal variations in water chemistry as well as pond level. The water chemistry data for the two sampling events are attached to this document as Appendix 1.1 and 1.2.



Legend

- Production well location
- Monitoring well location

Legend

Contours, m

1 5 10 15 20 >25

0 200 400 600

Scale, m

Note: Base orthorectified image from Google Earth (2023).

Figure 1a

Contour map of the calculated water elevation (hydraulic head) at the surface-water table level under non-pumping steady-state condition.

Document Reference	FFC-NL-3168-EIS
Location	Stephenville, NL
Project No.	3168-2
Date	June 2023

FFC

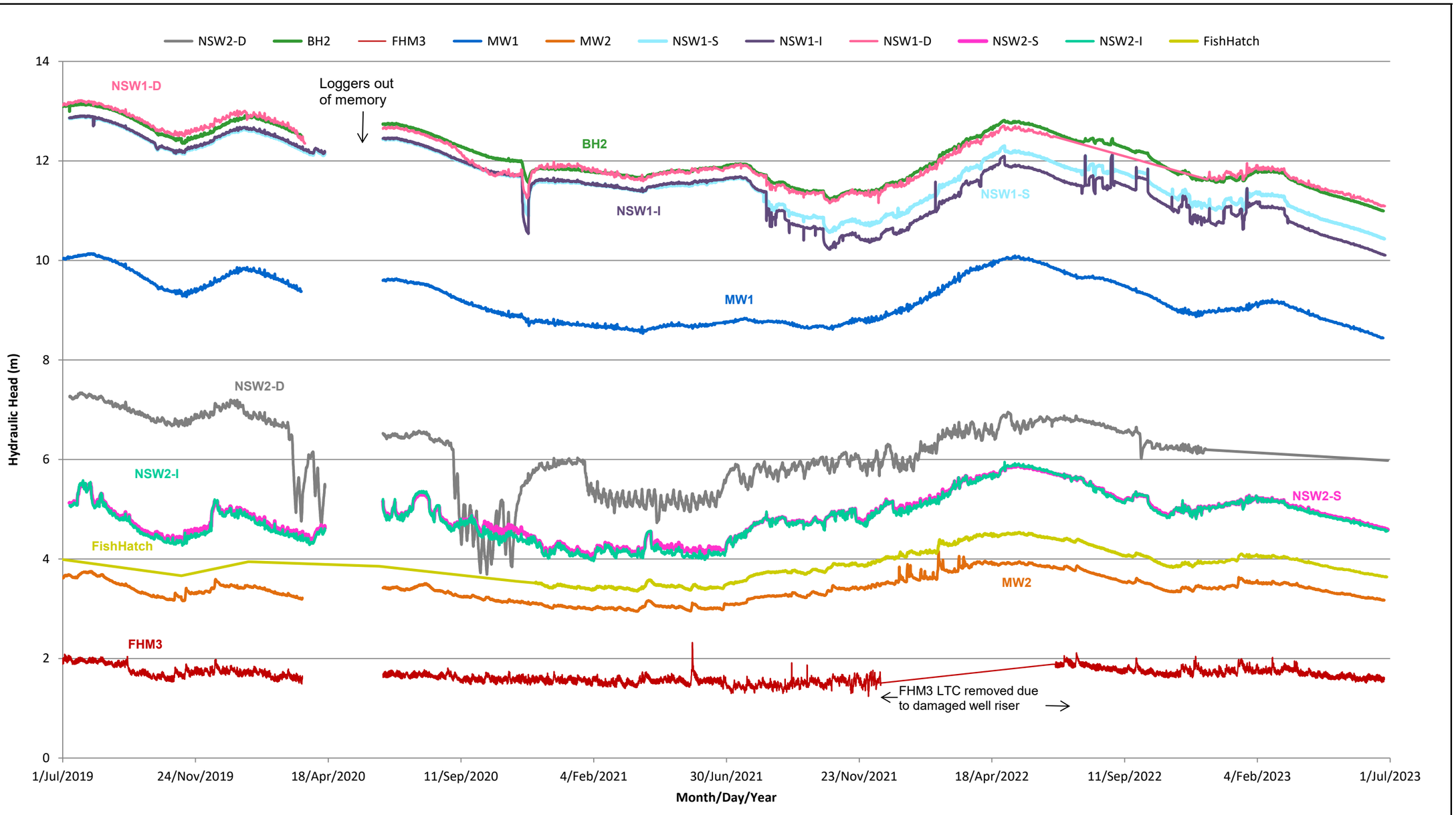


Figure 1b Plot of hydraulic head versus time for the near-field monitoring wells from June 2019 to June 2023 (page 1 of 2).

Project No.	Document Reference
3168	FFC-NL-3168-EIS
Location	Date
Stephenville, NL	August 2023

FFC

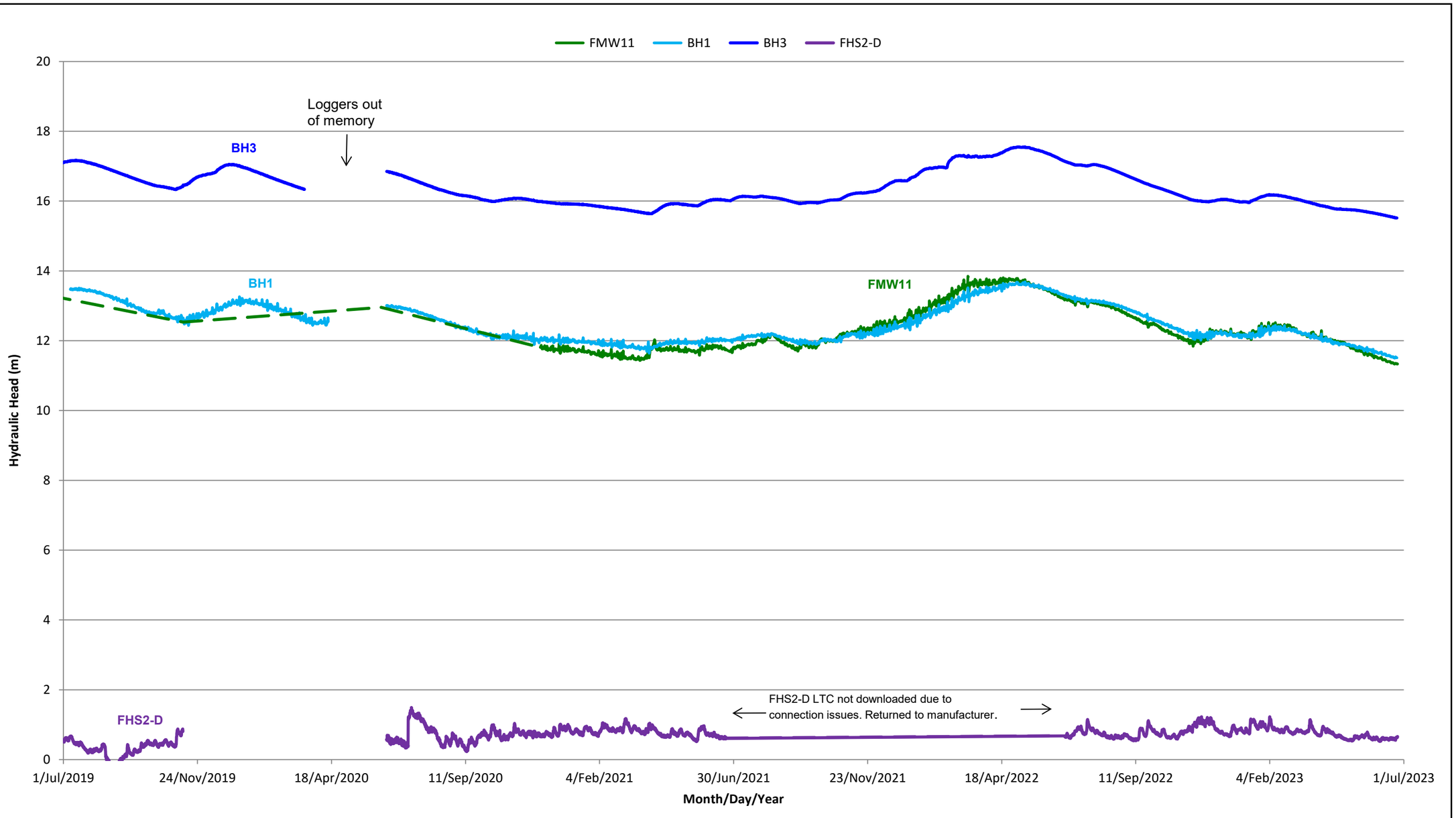


Figure 1b Plot of hydraulic head versus time for the far-field monitoring wells from June 2019 to June 2023 (page 2 of 2).

Project No.	Document Reference
3168	FFC-NL-3168-EIS
Location	Date
Stephenville, NL	August 2023

FFC

Legend

MW10 (0/5) Monitoring well location with (ground elevation and water elevation) where available

Test pit location

Water elevation contours, in 1 m intervals.

0 40 80

Scale, m

Figure 2

Water elevation contours measured in 2007 at the former Abitibi Mill site, Stephenville, NL.

Document Reference
FFC-NL-3168-EIS

Location
Stephenville, NL

Project No.
3168-2

Date
March 2023

FFC

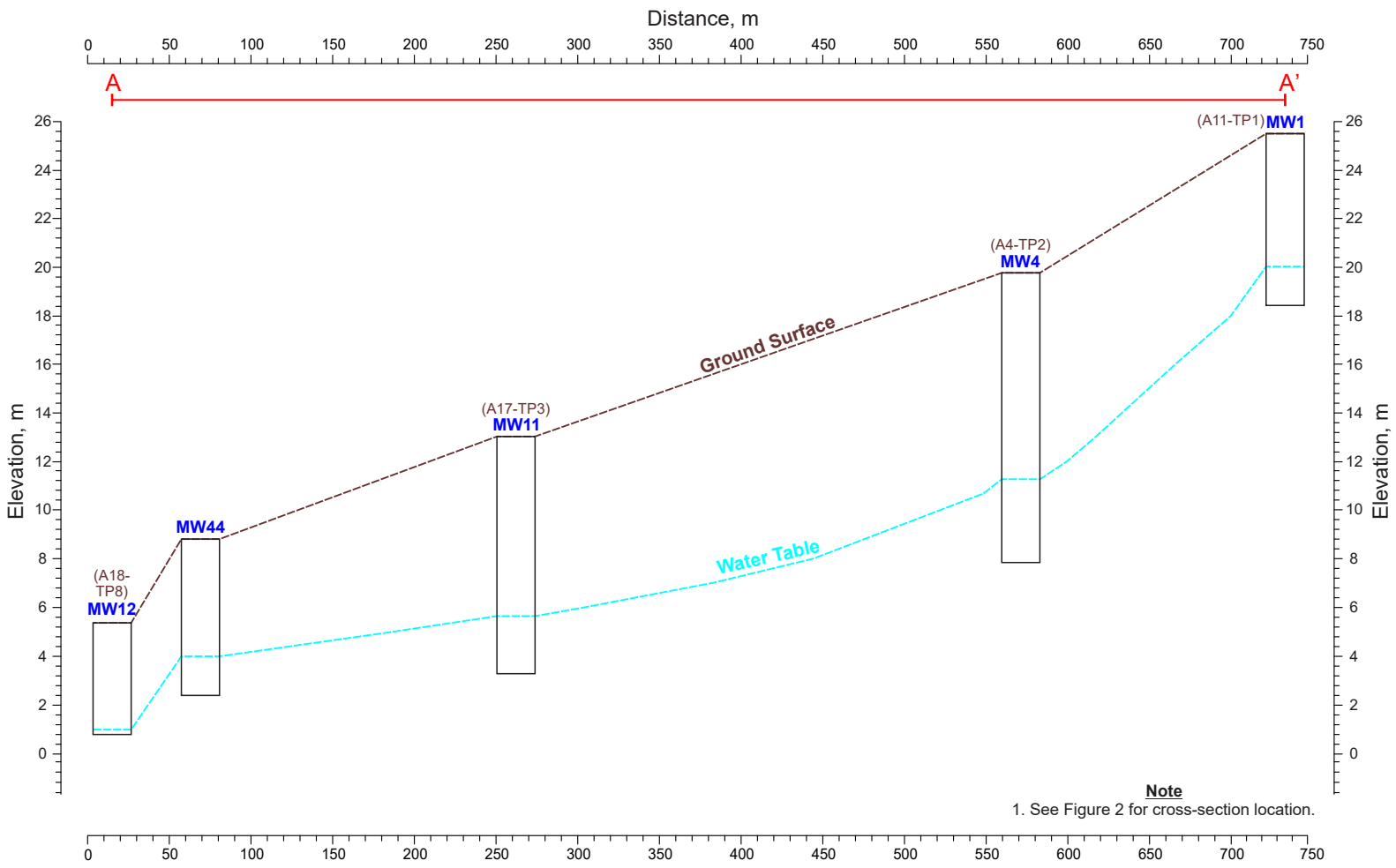


Figure 3 Monitoring well locations along cross-section A-A' at the former Abitibi Mill site, Stephenville, NL. Groundwater level data from 2007. Vertical exaggeration - 1:14.9.

Project No. 3168-2	Document Reference FFC-NL-3168-EIS
Location Stephenville, NL	Date June 2023

FFC

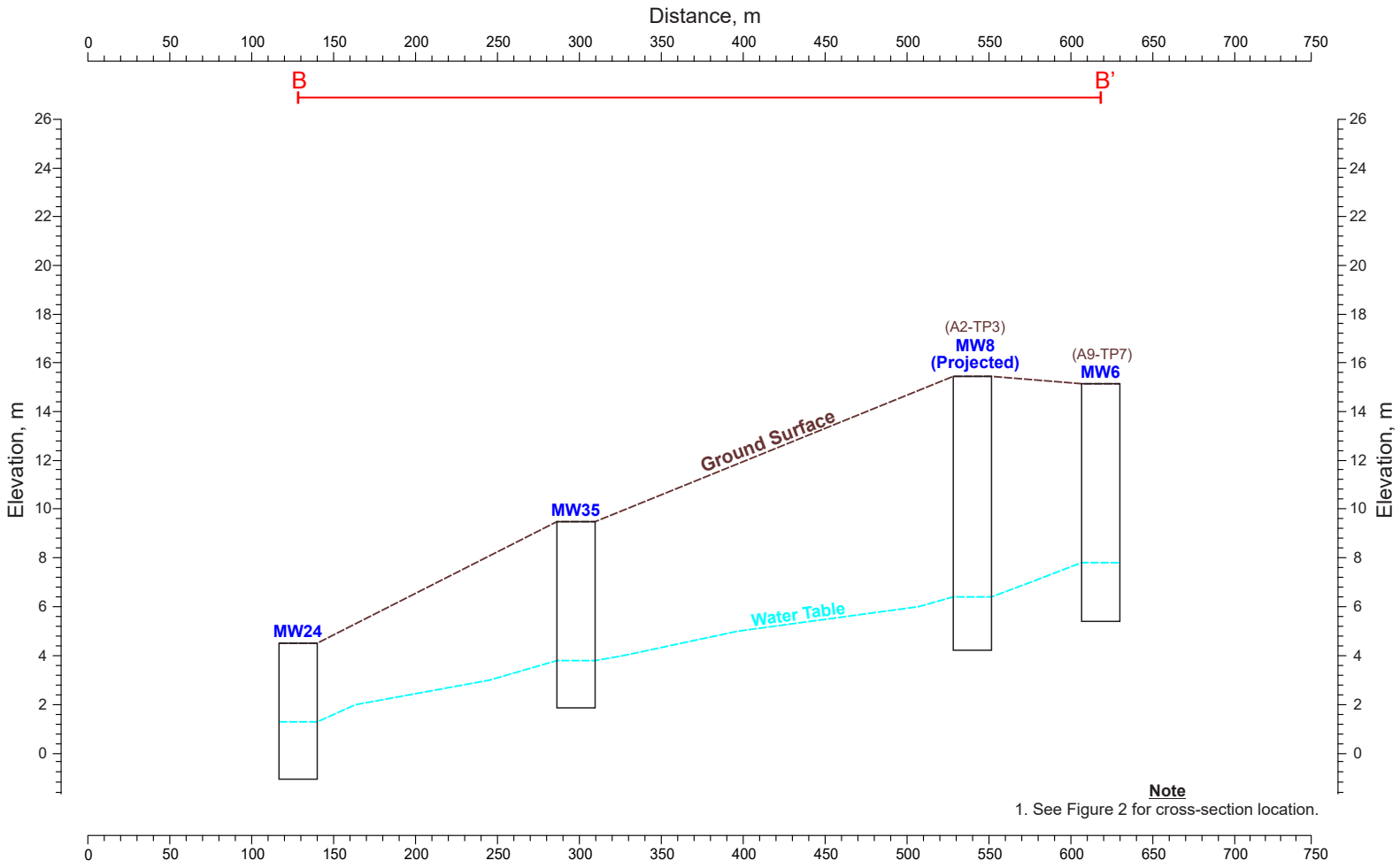


Figure 4 Monitoring well locations along cross-section B-B' at the former Abitibi Mill site, Stephenville, NL. Groundwater level data from 2007. Vertical exaggeration - 1:14.9.

Project No.	Document Reference
3168-2	FFC-NL-3168-EIS
Location	Date
Stephenville, NL	June 2023

FFC

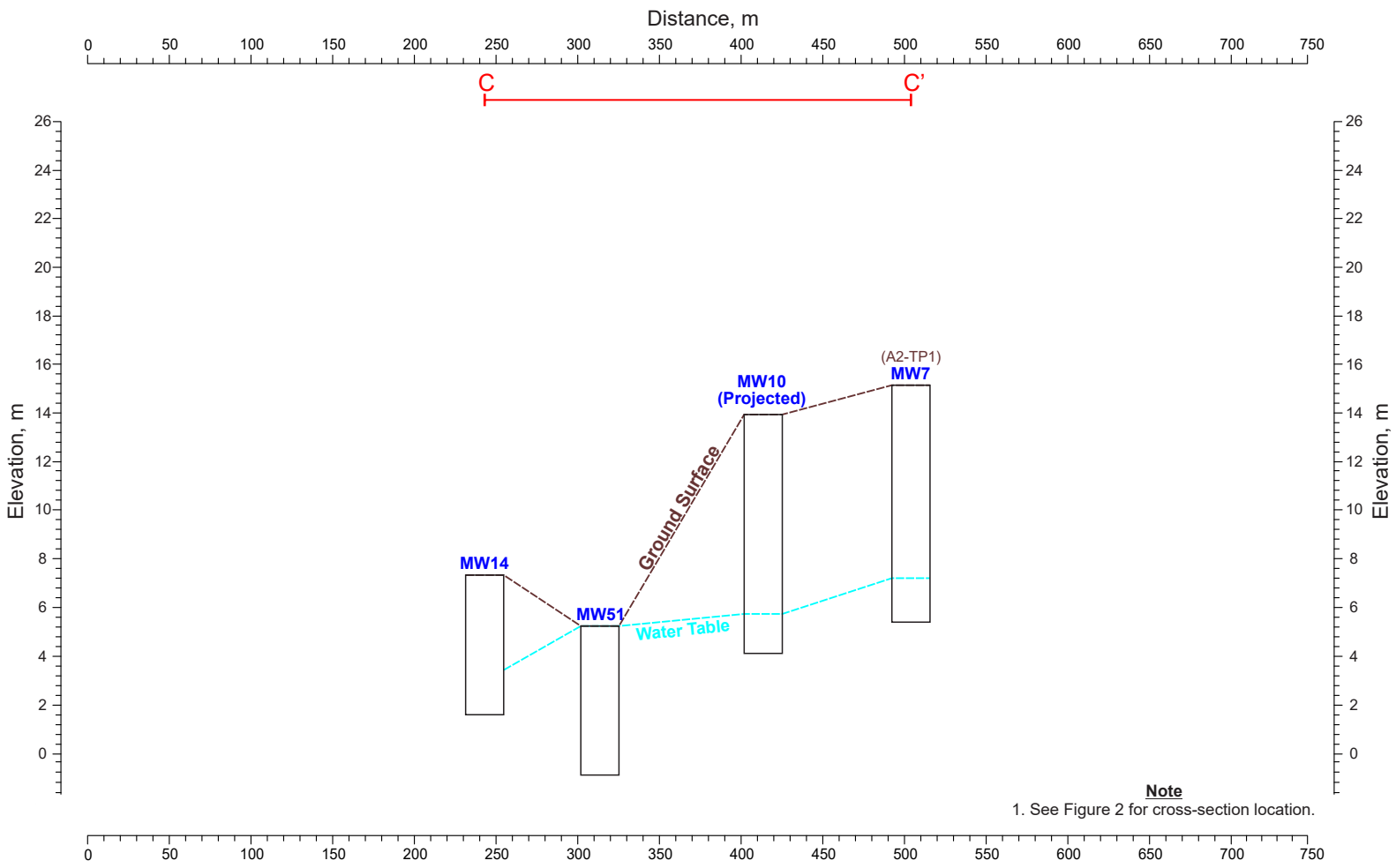


Figure 5 Monitoring well locations along cross-section C-C' at the former Abitibi Mill site, Stephenville, NL. Groundwater level data from 2007. Vertical exaggeration - 1:14.9.

Project No.	Document Reference
3168-2	FFC-NL-3168-EIS
Location	**Date**
Stephenville, NL	June 2023

FFC

Figure 6 (page 1 of 5)

Project: Geotechnical Investigation

Log of Borehole: BH1

Client:

Project No: 3113

Location: Stephenville, NL

Date: November 16 - 19, 2017

Depth (ft / m)	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data	Well Description
0 / 0		Ground Surface (GS)	31.4								Well head protection installed
		Auger	30								Cement packing from 0.05 m to 0.46 m Native sand packing from 0.46 m to 0.91 m Bentonite packing from 0.91 m to 1.12 m
5 / 1		SPT: 4 / 18 / 36 / 36 Wet, brown, medium sand	29.4	SS	1	54	31				
		Auger	28.3								0.05 m dia. riser from 0 m to 16.68 m
10 / 3		SPT: 7 / 12 / 21 / 22 Damp, brown, medium sand with red and black particles	27.7	SS	2	33	52				
		Auger	26.9								
15 / 4		SPT: 13 / 16 / 19 /14 Damp,brown, medium sand	26.3	SS	3	35	25				Native sand packing from 1.12 m to 26.48 m
		Auger	25.4								
20 / 6		SPT: 10 / 39 / 27 / 16 No recovery	24.8	SS	4	66	0				
23 / 7		Auger									

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Drilling Method: Hollow Stem Augering
Dynamic Cone Penetration Test

Driller: Formation Drilling Ltd.

Datum: Geodetic

Sheet: 1 of 5

Figure 6 (page 2 of 5)
Project: Geotechnical Investigation

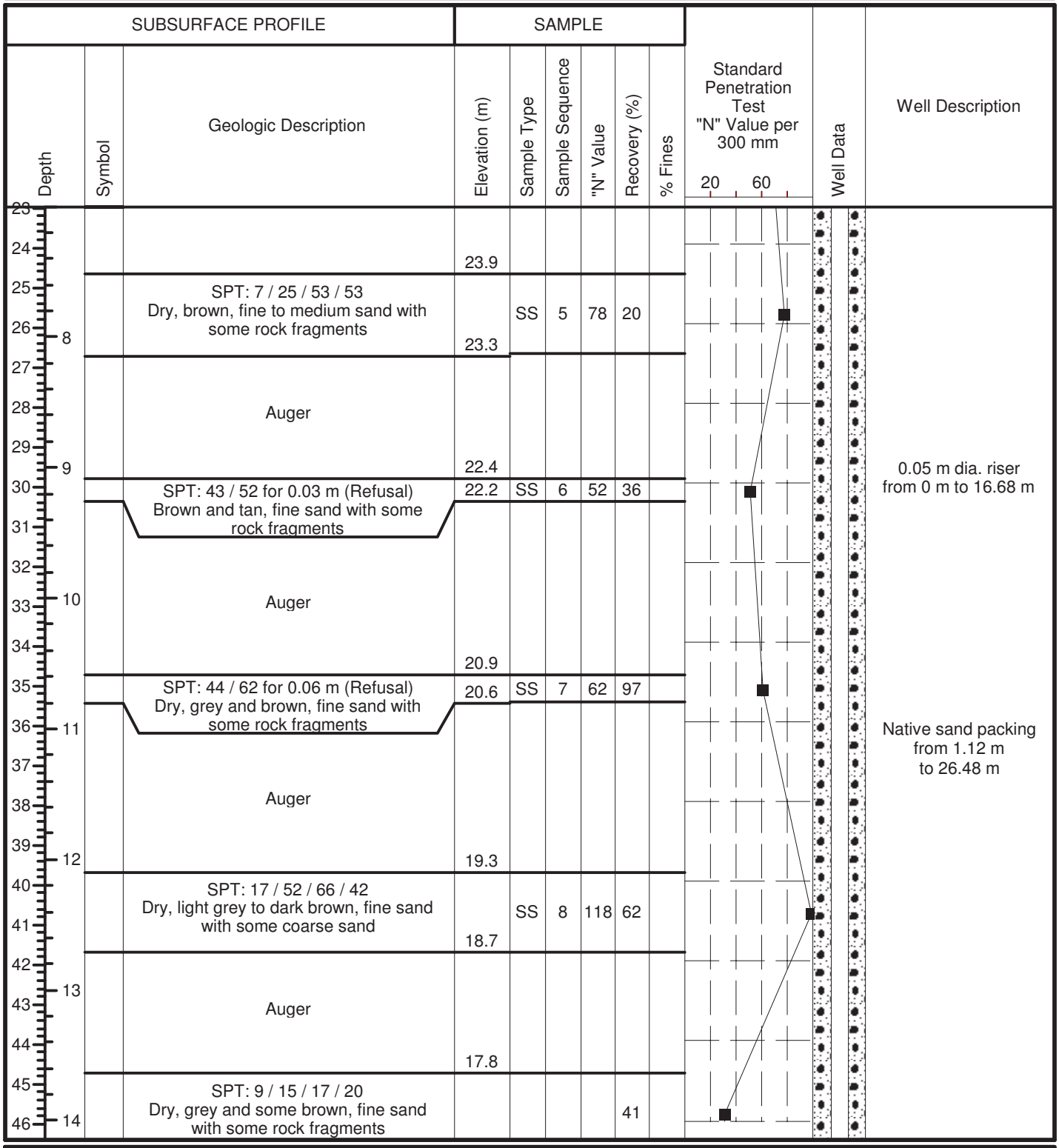
Log of Borehole: BH1

Client:

Project No: 3113

Location: Stephenville, NL

Date: November 16 - 19, 2017



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Dynamic Cone Penetration Test

Driller: Formation Drilling Ltd.

Datum: Geodetic

Figure 6 (page 3 of 5)
Project: Geotechnical Investigation

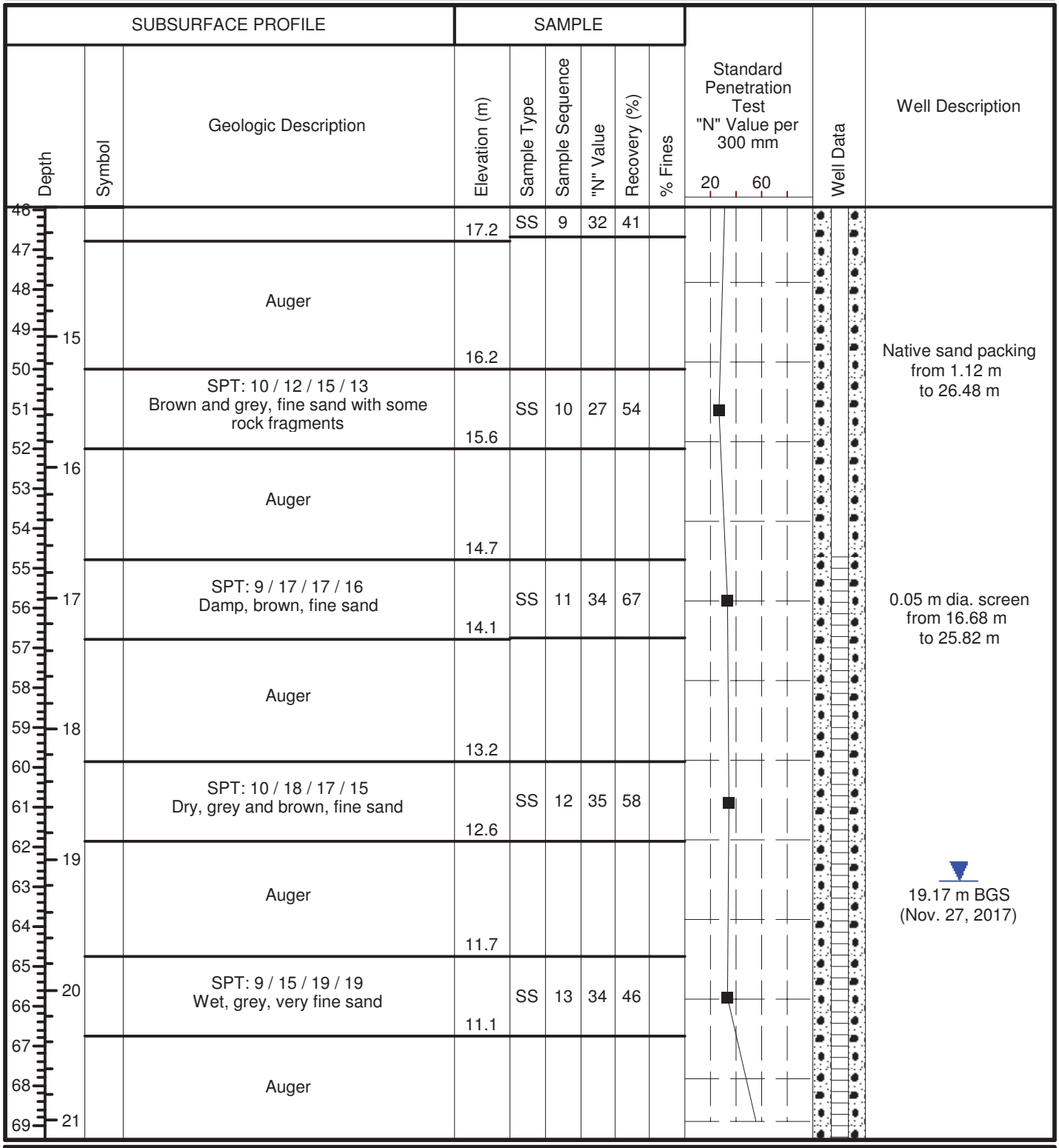
Log of Borehole: BH1

Client:

Project No: 3113

Location: Stephenville, NL

Date: November 16 - 19, 2017



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Datum: Geodetic

Sheet: 3 of 5

Figure 6 (page 4 of 5)

Project: Geotechnical Investigation

Log of Borehole: BH1

Client:

Project No: 3113

Location: Stephenville, NL

Date: November 16 - 19, 2017

Depth	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 / 60)	Well Data	Well Description
69			10.3								
70		SPT: 12 / 28 / 39 / 18 CFEM: Sand, trace Gravel, trace Silt/Clay		SS	14	67	37				
71			9.65								
72	22	Auger									0.05 m dia. screen from 16.68 m to 25.82 m
73											
74			8.68								
75		SPT: 32 / 49 / 32 / 34 CFEM: Gravelly Sand, trace Silt/Clay		SS	15	81	33				
76	23		8.07								
77		Auger									Native sand packing from 1.12 m to 26.48 m
78											
79	24		7.14								
80		SPT: 29 / 54 / 67 / 52 for 0.03 m (Refusal) No recovery		SS	16	121	0				
81			6.66								
82	25	Auger									
83											
84			5.57								Screw-on cap
85	26	SPT: 14 / 13 / 19 / 23 CFEM: Sand, some Silt/Clay, trace Gravel		SS	17	32	27				
86			4.97								
87		DCPT (Blow counts per 150 mm)		PC	--	27					
88				PC	--	28					
89	27			PC	--	37					
90				PC	--	36					
91				PC	--	39					
92	28			PC	--	33					
				PC	--	28					
				PC	--	28					
				PC	--	35					
				PC	--	28					

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Dynamic Cone Penetration Test

Driller: Formation Drilling Ltd.

Datum: Geodetic

Figure 6 (page 5 of 5)

Project: Geotechnical Investigation

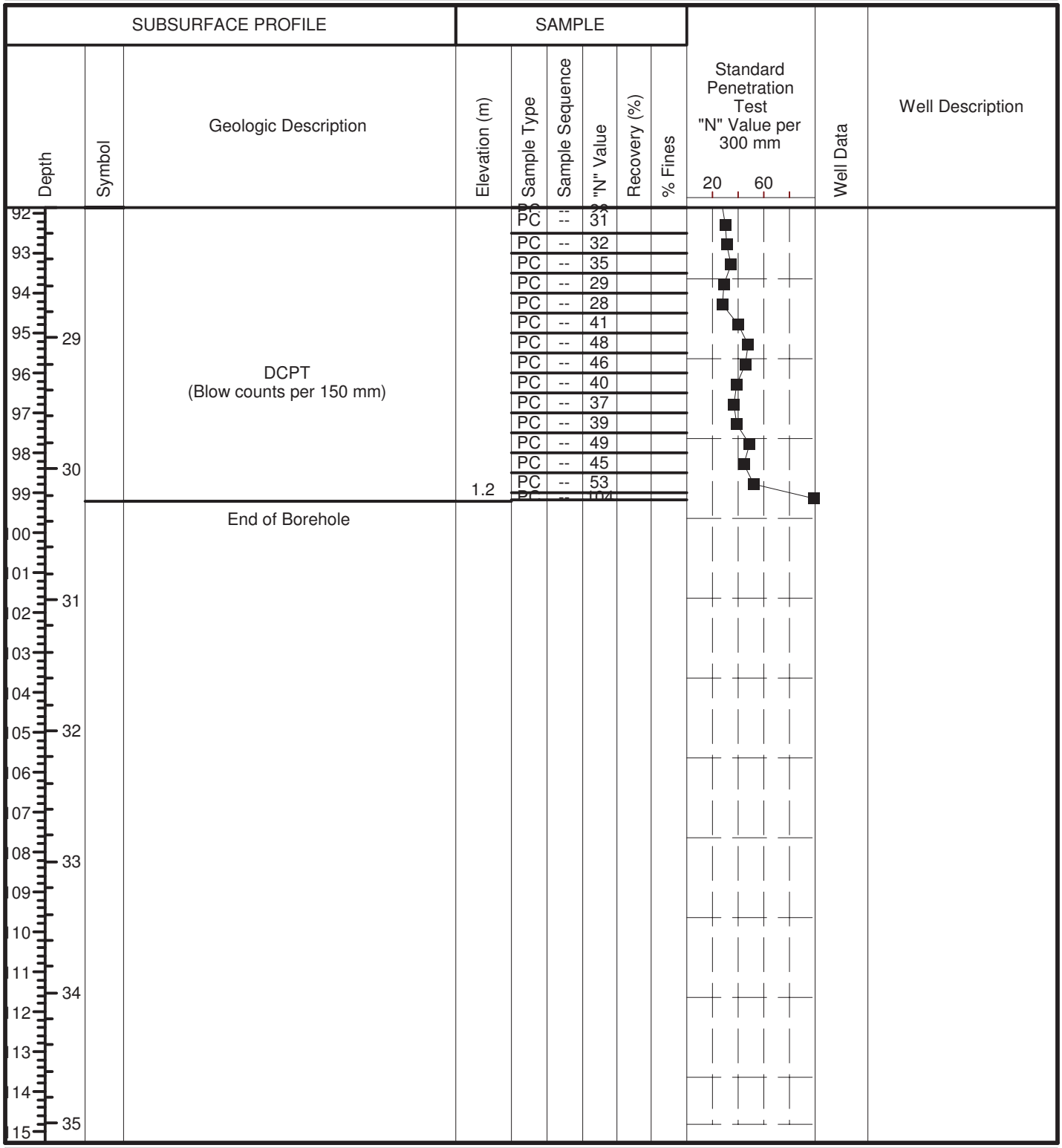
Log of Borehole: BH1

Client:

Project No: 3113

Location: Stephenville, NL

Date: November 16 - 19, 2017



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Dynamic Cone Penetration Test

Driller: Formation Drilling Ltd.

Datum: Geodetic

Sheet: 5 of 5

Figure 7 (page 1 of 3)
Project: Well Field Monitoring

Log of Monitoring Well: FMW10

Client:

Project No: 3113

Location: Stephenville, NL

Date: October 17, 2018

SUBSURFACE PROFILE				SAMPLE							
Depth (ft / m)	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data	Well Description
0 / 0		Ground Surface (GS)	26.7								
0 – 3 / 0 – 1		Augering	25.3	OB	-						Protective well casing Riser SU 0.22 m
3 – 9 / 1 – 2		Augering Dark brown sand, some cobbles	23.8	OB	-						
9 – 13 / 2 – 4		Augering Brown gravelly sand	22.2	OB	-						Native material packing from 0.00 m to 5.49 m
13 – 17 / 4 – 5		Augering Brown gravel and sand	20.7	OB	-						
17 – 22 / 5 – 7		Augering Sand, some gravel	19.2	OB	-						Bentonite packing from 5.49 m to 7.01 m
22 – 26 / 7 – 8		Augering Gravelly sand	17.7	OB	-						0.05 m dia. PVC riser from 0.00 m to 19.67 m
26 – 33 / 8 – 10		Augering Medium sand									

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Drilling Method: Hollow Stem Auger

Driller: Formation Drilling Ltd.

Datum: Geodetic

Figure 7 (page 2 of 3)
Project: Well Field Monitoring

Client:

Location: Stephenville, NL

Log of Monitoring Well: FMW10

Project No: 3113

Date: October 17, 2018

Depth	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data	Well Description
33											
34			16.2	OB	-						
35											
36	11	Augering Medium sand		OB	-						
37											
38											
39			14.7								
40	12										Native material packing from 7.01 m to 18.44 m
41		Augering Fine to medium sand		OB	-						
42											
43	13										
44			13.1								
45											
46	14	Augering		OB	-						
47											
48											
49	15		11.6								0.05 m dia. PVC riser from 0.00 m to 19.67 m
50											
51		Augering		OB	-						
52											
53	16										
54			10								
55											
56	17	Augering		OB	-						
57											
58											
59	18		8.5								No.2 silica sand packing from 18.44 m to 22.78 m
60											
61		Augering		OB	-						
62	19										
63											
64											WL 19.66 m bgs (Oct. 19, 2018)
65			6.93								
	20										

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Drilling Method: Hollow Stem Auger

Driller: Formation Drilling Ltd.

Datum: Geodetic

Figure 7 (page 3 of 3)
Project: Well Field Monitoring

Client:

Location: Stephenville, NL

Log of Monitoring Well: FMW10

Project No: 3113

Date: October 17, 2018

SUBSURFACE PROFILE				SAMPLE						
Depth	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data / Well Description
21		Augering Brown fine to medium sand Up-coning sand (0.91 m) afterwards	5.46	OB	-					0.05 m dia. PVC screen from 19.67 m to 22.71 m
22		Augering Fine to medium sand	3.91	OB	-					No.2 silica sand packing from 18.44 m to 22.78 m
23		End of Borehole								Pointed screw-on end cap at 22.71 m

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Drilling Method: Hollow Stem Auger

Driller: Formation Drilling Ltd.

Datum: Geodetic

Sheet: 3 of 3

Figure 8 (page 1 of 3)
Project: Well Field Monitoring

Log of Monitoring Well: FMW11

Client:

Project No: 3113

Location: Stephenville, NL

Date: October 14, 2018

Depth (ft / m)	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data	Well Description
0 / 0		Ground Surface (GS)	31.4								
0 – 3 / 0 – 1		Augering Bog/Overburden	29.9	OB	-						Protective well casing Riser SU 0.15 m
3 – 10 / 1 – 3		Augering Dark brown sand, some fine to medium gravel	28.4	OB	-						Native material packing from 0.00 m to 4.57 m
10 – 13 / 3 – 4		Augering Top 0.9 m: Light brown sand, some fine gravel Bottom 0.6 m fine to medium gravel	26.9	OB	-						0.05 m dia. PVC riser from 0.00 m to 19.34 m
15 – 16 / 4 – 5		SPT: 6 / 10 / 12 / 22 Brown medium to coarse sand	26.3	SS	1	22	38				Bentonite packing from 4.57 m to 6.10 m
17 – 20 / 5 – 6		Augering Brown sand, some fine to medium gravel	25.3	OB	-						
20 – 25 / 6 – 7		Augering Medium gravel and sand	23.8	OB	-						
25 – 26 / 7 – 8		SPT: 6 / 10 / 10 / 9 Fine to medium sand	23.2	SS	2	20	50				Native material packing from 6.10 m to 17.98 m
27 – 30 / 8 – 9		Augering Fine to medium gravel	22.2	OB	-						
30 – 33 / 9 – 10		Augering									

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Drilling Method: Hollow Stem Auger

Driller: Formation Drilling Ltd.

Datum: Geodetic

Figure 8 (page 2 of 3)
Project: Well Field Monitoring

Log of Monitoring Well: FMW11

Client:

Project No: 3113

Location: Stephenville, NL

Date: October 14, 2018

Depth	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data	Well Description
33											
34											
35			20.8	OB	-						
36	11	SPT: 7 / 10 / 10 / 9 Fine to medium sand	20.1	SS	3	25	58				
37											
38		Augering Medium gravel (Top) changing to fine sand (Bottom)		OB	-						
39	12		19.2								
40											
41											
42		Augering Medium to large gravel, some sand		OB	-						
43	13		17.7								
44											
45											
46	14	SPT: 20 / 32 / 16 / 36 Fine to coarse sand (Top) changing to medium gravel and rock fragments (Bottom)	17.1	SS	4	48	54				0.05 m dia. PVC riser from 0.00 m to 19.34 m
47											
48		Augering Brown gravel and sand		OB	-						
49	15		16.2								
50											
51											
52		Augering		OB	-						
53	16		14.6								
54											
55											
56	17	SPT: 7 / 13 / 15 / 28 Brown, fine to medium sand	14	SS	5	28	56				
57											
58		Augering		OB	-						No.2 Silica sand packing from 17.98 m to 22.86 m
59	18		13.1								
60											
61											
62		Augering Water table encountered		OB	-						WL 18.88 m bgs (Oct. 19, 2018)
63	19		11.6								
64											
65											
	20										

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Drilling Method: Hollow Stem Auger

Driller: Formation Drilling Ltd.

Datum: Geodetic

Figure 8 (page 3 of 3)
Project: Well Field Monitoring

Log of Monitoring Well: FMW11

Client:

Project No: 3113

Location: Stephenville, NL

Date: October 14, 2018

SUBSURFACE PROFILE				SAMPLE							
Depth	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 60)	Well Data	Well Description
66		SPT: 7 / 15 / 14 / 14 Brown medium to fine sand	11	SS	6	29	46		■		
67											
68		Augering Up-coning sand (0.10 m) at the beginning		OB	-						0.05 m dia. PVC screen from 19.34 m to 22.39 m
69	21										
70			10								
71											
72	22	Augering		OB	-						Pointed screw-on end cap at 22.39 m
73											
74											
75			8.5								
76	23	End of Borehole									
77											
78											
79	24										
80											
81											
82	25										
83											
84											
85	26										
86											
87											
88	27										
89											
90											
91											
92	28										
93											
94											
95	29										
96											
97											
98	30										

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Drilling Method: Hollow Stem Auger

Driller: Formation Drilling Ltd.

Datum: Geodetic

Sheet: 3 of 3

Table 1 Groundwater chemistry for BH1 (page 1 of 4).

Workorder No.			17K289906	19K479456	20K614700	20K658687	21K767120	22K912449
Date Sampled			28-Nov-17	11-Jun-19	15-Jun-20	28-Sep-20	06/22/2021	06/22/2022
Sample Description			3113-BH1-WS1	3113-BH1-WS2	3113-BH1-WS-200615	3113-BH1-WS-200928	3113-BH1-WS-210622	3113-BH1-WS-220622
Package Name	**Parameter Name**	**Unit**	**8944411**	**272195**	**1207836**	**1514447**	**2668129**	**4017814**
Field Paramaters	pH			7.53	6.98	7.43	7.83	8.00
	Temperature	°C		8.20	8.20	11.20	8.50	8.20
	Turbidity	NTU		2578.00	22.00	4.00	0.85	0.25
	Electrical Conductivity	umho/cm		340.00	330.60	454.40	353.90	341.70
	Dissolved Oxygen	mg/L		7.37	8.93	8.70	9.69	7.83
	Temperature (DO Meter)	°C						
Standard Water Analysis	pH		8.18	8.19	7.99		8.05	8.05
	Reactive Silica as SiO2	mg/L	7.90	7.90	10.20		11.70	7.40
	Chloride	mg/L	27.00	24.00	24.00		28.00	25.00
	Fluoride	mg/L	0.16	<0.12	<0.12		<0.12	<0.12
	Sulphate	mg/L	6.00	5.00	5.00		6.00	5.00
	Alkalinity	mg/L	128.00	125.00	115.00		124.00	119.00
	True Color	TCU	<5	<5	<5		<5.00	<5.00
	Turbidity	NTU	1.70	1.10	12.50		1.40	1.70
	Electrical Conductivity	umho/cm	333.00	352.00	335.00		345.00	348.00
	Nitrate + Nitrite as N	mg/L	0.14	0.08	0.08		0.11	0.11
	Nitrate as N	mg/L	0.14	0.08	0.08		0.11	0.11
	Nitrite as N	mg/L	<0.05	<0.05	<0.05		<0.05	<0.05
	Ammonia as N	mg/L	0.03	0.05	0.07		<0.03	<0.03
	Total Organic Carbon	mg/L	0.90	3.60	4.00		<0.5	0.80
	Ortho-Phosphate as P	mg/L	<0.01	<0.01	<0.01		0.01	<0.01
	Total Sodium	mg/L	15.60	15.20	18.40			
	Total Potassium	mg/L	2.10	1.10	1.40			
	Total Calcium	mg/L	44.40	44.20	40.00			
	Total Magnesium	mg/L	7.80	7.30	8.80			
	Dissolved Sodium	mg/L					15.60	39.40
	Dissolved Potassium	mg/L					1.00	5.46
	Dissolved Calcium	mg/L					39.70	1.04
	Dissolved Magnesium	mg/L					7.10	16.60
	Bicarb. Alkalinity (as CaCO3)	mg/L	128.00	125.00	115.00		124.00	119.00
	Carb. Alkalinity (as CaCO3)	mg/L	<10	<10	<10		<10	<10
	Hydroxide	mg/L	<5	<5	<5		<5	<5
	Calculated TDS	mg/L	181.00	172.00	167.00		172.00	164.00
	Hardness	mg/L	143.00	140.00	136.00		128.00	121.00
	Langelier Index (@20C)	NA	0.32	0.32	0.04		0.13	0.11
	Langelier Index (@ 4C)	NA	0.00	0.00	-0.28		-0.19	-0.21
	Saturation pH (@ 20C)	NA	7.86	7.87	7.95		7.92	7.94
	Saturation pH (@ 4C)	NA	8.18	8.19	8.27		8.24	8.26
	Anion Sum	me/L	3.46	3.29	3.09		3.40	3.20
	Cation sum	me/L	3.62	3.50	3.57		3.27	3.17
	% Difference/ Ion Balance	%	2.30	3.20	7.20		2.00	0.40
	Bromide	mg/L						
	Conductivity	uS/cm						
	Total Hardness (calc)	ug CaCO3/L						
	Total Kjeldahl Nitrogen as N	mg/L						
	Total Kjeldahl Nitrogen	mg/L						
	Dissolved Organic Carbon	mg/L						
UVT (Water)	UV Transmittance	% UVT						
	Total Aluminum	ug/L	119.00			15.00		
	Total Antimony	ug/L	<2			<2		
	Total Arsenic	ug/L	<2			<2		
	Total Barium	ug/L	27.00			29.00		
	Total Beryllium	ug/L	<2			<2		
	Total Bismuth	ug/L	<2			<2		
	Total Boron	ug/L	11.00			10.00		
	Total Cadmium	ug/L	<0.017			<0.017		
	Total Chromium	ug/L	2.00			2.00		
	Total Cobalt	ug/L	<1			<1		

Table 1 Groundwater chemistry for BH1 (page 2 of 4).

Workorder No.			17K289906	19K479456	20K614700	20K658687	21K767120	22K912449
Date Sampled			28-Nov-17	11-Jun-19	15-Jun-20	28-Sep-20	06/22/2021	06/22/2022
Sample Description			3113-BH1-WS1	3113-BH1-WS2	3113-BH1-WS-200615	3113-BH1-WS-200928	3113-BH1-WS-210622	3113-BH1-WS-220622
Package Name	**Parameter Name**	**Unit**	**8944411**	**272195**	**1207836**	**1514447**	**2668129**	**4017814**
Total Metals	Total Copper	ug/L	<1			1.00		
	Total Iron	ug/L	258.00			90.00		
	Total Lead	ug/L	<0.5			<0.5		
	Total Manganese	ug/L	32.00			<2		
	Total Molybdenum	ug/L	2.00			<2		
	Total Nickel	ug/L	4.00			3.00		
	Total Phosphorous	mg/L	0.03					
	Total Selenium	ug/L	<1			<1		
	Total Silver	ug/L	<0.1			<0.1		
	Total Strontium	ug/L	143.00			149.00		
	Total Thallium	ug/L	<0.1			<0.1		
	Total Tin	ug/L	<2			<2		
	Total Titanium	ug/L	7.00			<2		
	Total Uranium	ug/L	0.50			0.50		
	Total Vanadium	ug/L	<2			<2		
	Total Zinc	ug/L	6.00			<5		
	Total Mercury	ug/L		<0.026		<0.026		
	Sulphide as Hydrogen Sulphide Calc.	mg/L						
	Total Calcium							
	Total Lithium							
Dissolved Metals	Dissolved Aluminum	ug/L	13.00	7.00	15.00	<5	<5	14.00
	Dissolved Antimony	ug/L	<2	<2	<2	<2	<2	<1.0
	Dissolved Arsenic	ug/L	<2	<2	<2	<2	<2	<1.0
	Dissolved Barium	ug/L	26.00	25.00	30.00	30.00	29.00	24.10
	Dissolved Beryllium	ug/L	<2	<2	<2	<2	<2	<0.50
	Dissolved Bismuth	ug/L	<2	<2	<2	<2	<2	<2.0
	Dissolved Boron	ug/L	10.00	8.00	8.00	9.00	<5	10.20
	Dissolved Cadmium	ug/L	<0.017	<0.09	0.05	<0.09	<0.017	0.18
	Dissolved Chromium	ug/L	**3.00**	**3.00**	**3.00**	**2.00**	**3.00**	<2.0
	Dissolved Cobalt	ug/L	<1	<1	<1	<1	<1	<0.50
	Dissolved Copper	ug/L	<2	<2	<2	<2	<2	<1.0
	Dissolved Iron	ug/L	<50	<50	51.00	95.00	<50	14.00
	Dissolved Lead	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50
	Dissolved Lithium	ug/L						
	Dissolved Manganese	ug/L	21.00	<2	<2	<2	<2	<2.0
	Dissolved Molybdenum	ug/L	<2	<2	<2	<2	<2	<2.0
	Dissolved Nickel	ug/L	<2	<2	<2	<2	<2	<1.0
	Dissolved Phosphorus	mg/L		<0.02	<0.02		<0.02	<0.05
	Dissolved Selenium	ug/L	<1	<1	1.00	<1	<1	**2.30**
	Dissolved Silicon	ug/L						
	Dissolved Silver	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10
	Dissolved Strontium	ug/L	123.00	109.00	176.00	118.00	127.00	101.00
	Dissolved Thallium	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.30
	Dissolved Tin	ug/L	<2	<2	<2	<2	<2	<2.0
	Dissolved Titanium	ug/L	<2	<2	<2	<2	<2	<2.0
	Dissolved Uranium	ug/L	0.40	0.40	0.60	0.50	0.40	<0.50
	Dissolved Vanadium	ug/L	<2	<2	<2	<2	<2	<2.0
	Dissolved Zinc	ug/L	7.00	<5	<5	<5	<5	<5.0
	Dissolved Zirconium	ug/L						
	Dissolved Mercury	ug/L			<0.026	<0.026	<0.026	<0.026
Other Inorganics	Biochem. Oxy. Demand, 5 Day (BOD5)	mg/L						
	Chem. Oxy. Demand	mg/L						
	Benzene	mg/L	<0.001	<0.001	<0.001		<0.001	
	Toluene	mg/L	<0.001	<0.001	<0.001		<0.001	
	Ethylbenzene	mg/L	<0.001	<0.001	<0.001		<0.001	

Table 1 Groundwater chemistry for BH1 (page 3 of 4).

Workorder No.			17K289906	19K479456	20K614700	20K658687	21K767120	22K912449
Date Sampled			28-Nov-17	11-Jun-19	15-Jun-20	28-Sep-20	06/22/2021	06/22/2022
Sample Description			3113-BH1-WS1	3113-BH1-WS2	3113-BH1-WS-200615	3113-BH1-WS-200928	3113-BH1-WS-210622	3113-BH1-WS-220622
Package Name	**Parameter Name**	**Unit**	**8944411**	**272195**	**1207836**	**1514447**	**2668129**	**4017814**
Atlantic RBCA Tier 1 Hydrocarbons	Xylene (Total)	mg/L	<0.001	<0.001	<0.001		<0.001	
	C6-C10 (less BTEX)	mg/L	<0.01	<0.01	<0.01		<0.01	
	>C10-C16 Hydrocarbons	mg/L	<0.05	<0.05	<0.05		<0.05	
	>C16-C21 Hydrocarbons	mg/L	<0.05	<0.05	<0.05		<0.05	
	>C21-C32 Hydrocarbons	mg/L	<0.01	<0.01	0.03		<0.01	
	Modified TPH (Tier 1)	mg/L	<0.1	<0.1	<0.05		<0.05	
	Resemblance Comment		NR	NR	LR		NR	
	Return to Baseline at C32		Y	Y	Y		Y	
	Isobutylbenzene - EPH	%	94.00	84.00	100.00		96.00	
	Isobutylbenzene - VPH	%	100.00	84.00	112.00		78.00	
	n-Dotriacontane - EPH	%	98.00	102.00	98.00		85.00	
Polycyclic Aromatic Hydrocarbons (PAH)	1-Methylnaphthalene	ug/L						
	2-Methylnaphthalene	ug/L						
	Acenaphthene	ug/L						
	Acenaphthylene	ug/L						
	Acridine	ug/L						
	Anthracene	ug/L						
	Benzo(a)anthracene	ug/L						
	Benzo(a)pyrene	ug/L						
	Benzo(b)fluoranthene	ug/L						
	Benzo(e)pyrene	ug/L						
	Benzo(ghi)perylene	ug/L						
	Benzo(k)fluoranthene	ug/L						
	Chrysene	ug/L						
	Dibenzo(a,h)anthracene	ug/L						
	Fluoranthene	ug/L						
	Fluorene	ug/L						
	Indeno(1,2,3-cd)pyrene	ug/L						
	Naphthalene	ug/L						
	Perylene	ug/L						
	Phenanthrene	ug/L						
	Pyrene	ug/L						
	Quinoline	ug/L						
	Nitrobenzene-d5	%						
	2-Fluorobiphenyl	%						
	Terphenyl-d14	%						
PCBs	Total PCB	ug/L						
Phenols	Total Phenolics	mg/L						
OC Pesticides	Gamma-Hexachlorocyclohexane	µg/L		<0.01	<0.01			
	Heptachlor	µg/L		<0.01	<0.01			
	Aldrin	µg/L		<0.01	<0.01			
	Heptachlor Epoxide	µg/L		<0.01	<0.01			
	Endosulfan	µg/L		<0.05	<0.05			
	Chlordane	µg/L		<0.04	<0.04			
	DDE	µg/L		<0.01	<0.01			
	DDD	µg/L		<0.05	<0.05			
	DDT	µg/L		<0.04	<0.04			
	Dieldrin	µg/L		<0.02	<0.02			
	Endrin	µg/L		<0.05	<0.05			
	Methoxychlor	µg/L		<0.04	<0.04			
	Hexachlorobenzene	ug/L		<0.01	<0.01			
	Hexachlorobutadiene	ug/L		<0.01	<0.01			
	Hexachloroethane	ug/L		<0.01	<0.01			
	TCMX	%		70.00	73.00			
	Decachlorobiphenyl	%		74.00	76.00			
	alpha-BHC	µg/L					<0.01	

Table 1 Groundwater chemistry for BH1 (page 4 of 4).

Workorder No.			17K289906	19K479456	20K614700	20K658687	21K767120	22K912449
Date Sampled			28-Nov-17	11-Jun-19	15-Jun-20	28-Sep-20	06/22/2021	06/22/2022
Sample Description			3113-BH1-WS1	3113-BH1-WS2	3113-BH1-WS-200615	3113-BH1-WS-200928	3113-BH1-WS-210622	3113-BH1-WS-220622
Package Name	**Parameter Name**	**Unit**	**8944411**	**272195**	**1207836**	**1514447**	**2668129**	**4017814**
	Hexachlorobenzene	ug/L					<0.01	
	beta-BHC	µg/L					<0.05	
	Gamma-Hexachlorocyclohexane	µg/L					<0.01	
	delta-BHC	µg/L					<0.01	
	Heptachlor	µg/L					<0.01	
	Aldrin	µg/L					<0.01	
	Heptachlor Epoxide	µg/L					<0.01	
	Oxychlordane	µg/L					<0.05	
	gamma-Chlordane	µg/L					<0.1	
	op'-DDE	µg/L					<0.01	
	Endosulfan I	µg/L					<0.002	
	alpha - chlordane	µg/L					<0.05	
	pp'-DDE	µg/L					<0.05	
	Dieldrin	µg/L					<0.02	
	op'-DDD	µg/L					<0.05	
	Endrin	µg/L					<0.05	
	Endosulfan II	µg/L					<0.002	
	pp'-DDD	µg/L					<0.05	
	op'-DDT	µg/L					<0.04	
	Endrin Aldehyde	µg/L					<0.05	
	Endosulfan Sulfate	µg/L					<0.05	
	pp'-DDT	µg/L					<0.05	
	Endrin Ketone	µg/L					<0.05	
	Methoxychlor	µg/L					<0.04	
	Mirex	µg/L					<0.05	
	TCMX	%					73.00	
	Decachlorobiphenyl	%					85.00	
Triazine Pesticides	Trifluralin	µg/L		<1.0				
	Simazine	µg/L		<1.0				
	Atrazine	µg/L		<0.5				
	Metribuzin	µg/L		<0.25				
	Prometryne	µg/L		<0.25				
	Metolachlor	µg/L		<0.11				
	Alachlor	µg/L		<0.5				
	Cyanazine	µg/L		<1.0				
Phenoxy Acid Herbicides	2,4-D	µg/L			<0.5		<0.5	
	2,4,5-T	µg/L			<0.5		<0.5	
	2,4,5-TP	µg/L			<0.5		<0.5	
	Dicamba	µg/L			<0.5		<0.5	
	Dichlorprop	µg/L			<0.5		<0.5	
	Dinoseb	µg/L			<0.5		<0.5	
	Picloram	µg/L			<0.5		<0.5	
	Diclofop-methyl	µg/L			<0.5		<0.5	
	2,3,4,6-Tetrachlorophenol	µg/L			<0.5		<0.5	
	2,4-Dichlorophenol	µg/L			<0.2		<0.2	
	2,4,5-Trichlorophenol	µg/L			<0.5		<0.5	
	2,4,6-Trichlorophenol	µg/L			<0.5		<0.5	
	Bromoxynil	µg/L			<0.3		<0.3	
	MCPA	ug/L			<5.0		<5.0	
	MCPP	µg/L			<5.0		<5.0	
	Pentachlorophenol	µg/L			<0.1		<0.1	
	DCAA	%			96.00		70.00	

Table 2 Groundwater chemistry for FMW10 (page 1 of 4).

Workorder No.			18K399778	19K479456	20K614700	20K658687	21K767498	22K913584
Date Sampled			20-Oct-18	11-Jun-19	16-Jun-20	28-Sep-20	06/24/2021	06/23/2022
Sample Description			3113-FMW10-WS1	3113-FMW10-WS2	3113-FMW10-WS-200616	3113-FMW10-WS-200928	3113-FMW10-WS-210624	3113-FMW10-WS-220623
Package Name	**Parameter Name**	**Unit**	**9640943**	**272177**	**1207843**	**1514448**	**2672614**	**4028196**
Field Paramaters	pH		7.40	7.42	7.45	7.23	7.53	7.66
	Temperature	°C	8.90	10.30	9.80	9.90	8.10	9.40
	Turbidity	NTU		25.50	9.60	4.73	0.05	0.16
	Electrical Conductivity	umho/cm	501.40	450.00	473.20	607.60	485.10	347.20
	Dissolved Oxygen	mg/L		9.57	8.40	8.34	5.60	7.80
	Temperature (DO Meter)	°C						
Standard Water Analysis	pH		8.11	8.09	7.87		8.04	7.53
	Reactive Silica as SiO2	mg/L	10.00	7.10	7.60		9.30	7.40
	Chloride	mg/L	38.00	47.00	53.00		33.00	24.00
	Fluoride	mg/L	<0.12	<0.12	<0.12		<0.12	<0.12
	Sulphate	mg/L	20.00	4.00	6.00		4.00	3.00
	Alkalinity	mg/L	207.00	161.00	133.00		172.00	122.00
	True Color	TCU	<5	8.00	10.00		6.45	18.40
	Turbidity	NTU	340.00	44.60	45.10		<0.5	1.60
	Electrical Conductivity	umho/cm	520.00	504.00	459.00		489.00	323.00
	Nitrate + Nitrite as N	mg/L	0.69	0.29	0.28		0.18	0.23
	Nitrate as N	mg/L	0.69	0.29	0.28		0.18	0.23
	Nitrite as N	mg/L	<0.05	<0.05	<0.05		<0.05	<0.05
	Ammonia as N	mg/L	0.06	0.04	0.05		<0.03	17.60
	Total Organic Carbon	mg/L	1.50	1.90	1.40		1.80	1.40
	Ortho-Phosphate as P	mg/L	<0.01	<0.01	0.01		0.02	0.01
	Total Sodium	mg/L	25.60	33.60	28.60			
	Total Potassium	mg/L	2.00	1.30	1.50			
	Total Calcium	mg/L	75.50	61.20	60.70			
	Total Magnesium	mg/L	8.10	6.00	6.30			
	Dissolved Sodium	mg/L					29.20	17.70
	Dissolved Potassium	mg/L					1.30	0.66
	Dissolved Calcium	mg/L					60.80	36.30
	Dissolved Magnesium	mg/L					6.00	3.49
	Bicarb. Alkalinity (as CaCO3)	mg/L	207.00	161.00	133.00		172.00	122.00
	Carb. Alkalinity (as CaCO3)	mg/L	<10	<10	<10		<10	<10
	Hydroxide	mg/L	<5	<5	<5		<5	<5
	Calculated TDS	mg/L	297.00	251.00	237.00		238.00	182.00
	Hardness	mg/L	222.00	178.00	178.00		177.00	105.00
	Langelier Index (@20C)	NA	0.67	0.46	0.15		0.43	-0.44
	Langelier Index (@ 4C)	NA	0.35	0.14	-0.17		0.11	-0.76
	Saturation pH (@ 20C)	NA	7.44	7.63	7.72		7.61	7.97
	Saturation pH (@ 4C)	NA	7.76	7.95	8.04		7.93	8.29
	Anion Sum	me/L	5.68	4.65	4.30		4.47	3.20
	Cation sum	me/L	5.61	5.05	4.84		4.83	4.15
	% Difference/ Ion Balance	%	0.60	4.10	5.90		4.00	13.00
	Bromide	mg/L						
	Conductivity	uS/cm						
	Total Hardness (calc)	ug CaCO3/L						
	Total Kjeldahl Nitrogen as N	mg/L						
	Total Kjeldahl Nitrogen	mg/L						
	Dissolved Organic Carbon	mg/L						
UVT (Water)	UV Transmittance	% UVT						
	Total Aluminum	ug/L	11100.00			304.00		
	Total Antimony	ug/L	<2			<2		
	Total Arsenic	ug/L	6.00			<2		
	Total Barium	ug/L	97.00			34.00		
	Total Beryllium	ug/L	<2			<2		
	Total Bismuth	ug/L	<2			<2		
	Total Boron	ug/L	10.00			5.00		
	Total Cadmium	ug/L	0.15			<0.017		
	Total Chromium	ug/L	27.00			2.00		
	Total Cobalt	ug/L	17.00			1.00		

Table 2 Groundwater chemistry for FMW10 (page 2 of 4).

Workorder No.			18K399778	19K479456	20K614700	20K658687	21K767498	22K913584
Date Sampled			20-Oct-18	11-Jun-19	16-Jun-20	28-Sep-20	06/24/2021	06/23/2022
Sample Description			3113-FMW10-WS1	3113-FMW10-WS2	3113-FMW10-WS-200616	3113-FMW10-WS-200928	3113-FMW10-WS-210624	3113-FMW10-WS-220623
Package Name	**Parameter Name**	**Unit**	**9640943**	**272177**	**1207843**	**1514448**	**2672614**	**4028196**
Total Metals	Total Copper	ug/L	52.00			3.00		
	Total Iron	ug/L	19400.00			844.00		
	Total Lead	ug/L	9.80			0.90		
	Total Manganese	ug/L	1270.00			89.00		
	Total Molybdenum	ug/L	<2			<2		
	Total Nickel	ug/L	26.00			4.00		
	Total Phosphorous	mg/L						
	Total Selenium	ug/L	<1			<1		
	Total Silver	ug/L	<0.1			<0.1		
	Total Strontium	ug/L	151.00			113.00		
	Total Thallium	ug/L	0.10			<0.1		
	Total Tin	ug/L	<2			<2		
	Total Titanium	ug/L	948.00			24.00		
	Total Uranium	ug/L	1.20			0.80		
	Total Vanadium	ug/L	31.00			<2		
	Total Zinc	ug/L	43.00			<5		
	Total Mercury	ug/L		<0.026		<0.026		
	Sulphide as Hydrogen Sulphide Calc.	mg/L						
	Total Calcium							
	Total Lithium							
Dissolved Metals	Dissolved Aluminum	ug/L	15.00	<5	<5	<5	<5	15.40
	Dissolved Antimony	ug/L	<2	<2	<2	<2	<2	<1.0
	Dissolved Arsenic	ug/L	<2	<2	<2	<2	<2	<1.0
	Dissolved Barium	ug/L	35.00	30.00	26.00	36.00	32.00	21.40
	Dissolved Beryllium	ug/L	<2	<2	3.00	<2	<2	<0.50
	Dissolved Bismuth	ug/L	<2	<2	<2	<2	<2	<2.0
	Dissolved Boron	ug/L	7.00	6.00	<5	6.00	<5	<10.0
	Dissolved Cadmium	ug/L	<0.09	<0.09	0.28	<0.09	<0.017	0.26
	Dissolved Chromium	ug/L	5.00	3.00	3.00	3.00	4.00	<2.0
	Dissolved Cobalt	ug/L	<1	<1	<1	<1	<1	<0.50
	Dissolved Copper	ug/L	<2	<2	<2	<2	<2	1.80
	Dissolved Iron	ug/L	<50	<50	<50	103.00	<50	<10
	Dissolved Lead	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50
	Dissolved Lithium	ug/L						
	Dissolved Manganese	ug/L	112.00	<2	3.00	<2	<2	<2.0
	Dissolved Molybdenum	ug/L	<2	<2	<2	<2	<2	<2.0
	Dissolved Nickel	ug/L	<2	<2	3.00	3.00	<2	<1.0
	Dissolved Phosphorus	mg/L	<0.02	<0.02	<0.02		<0.02	<0.05
	Dissolved Selenium	ug/L	<1	<1	1.00	<1	<1	<1.0
	Dissolved Silicon	ug/L						
	Dissolved Silver	ug/L	0.20	<0.1	<0.1	<0.1	<0.1	0.11
	Dissolved Strontium	ug/L	150.00	101.00	135.00	107.00	119.00	84.00
	Dissolved Thallium	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.30
	Dissolved Tin	ug/L	<2	<2	<2	<2	<2	<2.0
	Dissolved Titanium	ug/L	<2	<2	<2	<2	<2	<2.0
	Dissolved Uranium	ug/L	1.00	0.80	1.10	0.90	0.90	0.71
	Dissolved Vanadium	ug/L	<2	<2	<2	<2	<2	<2.0
	Dissolved Zinc	ug/L	<5	14.00	<5	<5	<5	7.70
	Dissolved Zirconium	ug/L						
	Dissolved Mercury	ug/L			<0.026	<0.026	<0.026	<0.026
Other Inorganics	Biochem. Oxy. Demand, 5 Day (BOD5)	mg/L						
	Chem. Oxy. Demand	mg/L						
	Benzene	mg/L	<0.001	<0.001	<0.001		<0.001	
	Toluene	mg/L	<0.001	<0.001	<0.001		<0.001	
	Ethylbenzene	mg/L	<0.001	<0.001	<0.001		<0.001	

Table 2 Groundwater chemistry for FMW10 (page 3 of 4).

Workorder No.			18K399778	19K479456	20K614700	20K658687	21K767498	22K913584
Date Sampled			20-Oct-18	11-Jun-19	16-Jun-20	28-Sep-20	06/24/2021	06/23/2022
Sample Description			3113-FMW10-WS1	3113-FMW10-WS2	3113-FMW10-WS-200616	3113-FMW10-WS-200928	3113-FMW10-WS-210624	3113-FMW10-WS-220623
Package Name	**Parameter Name**	**Unit**	**9640943**	**272177**	**1207843**	**1514448**	**2672614**	**4028196**
Atlantic RBCA Tier 1 Hydrocarbons	Xylene (Total)	mg/L	<0.002	<0.001	0.00		<0.001	
	C6-C10 (less BTEX)	mg/L	<0.01	<0.01	<0.01		<0.01	
	>C10-C16 Hydrocarbons	mg/L	<0.05	<0.05	<0.05		<0.05	
	>C16-C21 Hydrocarbons	mg/L	<0.10	<0.05	<0.05		<0.05	
	>C21-C32 Hydrocarbons	mg/L	<0.1	<0.01	0.02		<0.01	
	Modified TPH (Tier 1)	mg/L	<0.1	<0.1	<0.05		<0.05	
	Resemblance Comment		NR	NR	LR		NR	
	Return to Baseline at C32		Y	Y	Y		Y	
	Isobutylbenzene - EPH	%	110.00	100.00	102.00		105.00	
	Isobutylbenzene - VPH	%	76.00	84.00	100.00		88.00	
	n-Dotriacontane - EPH	%	114.00	121.00	101.00		105.00	
Polycyclic Aromatic Hydrocarbons (PAH)	1-Methylnaphthalene	ug/L						
	2-Methylnaphthalene	ug/L						
	Acenaphthene	ug/L						
	Acenaphthylene	ug/L						
	Acridine	ug/L						
	Anthracene	ug/L						
	Benzo(a)anthracene	ug/L						
	Benzo(a)pyrene	ug/L						
	Benzo(b)fluoranthene	ug/L						
	Benzo(e)pyrene	ug/L						
	Benzo(ghi)perylene	ug/L						
	Benzo(k)fluoranthene	ug/L						
	Chrysene	ug/L						
	Dibenzo(a,h)anthracene	ug/L						
	Fluoranthene	ug/L						
	Fluorene	ug/L						
	Indeno(1,2,3-cd)pyrene	ug/L						
	Naphthalene	ug/L						
	Perylene	ug/L						
	Phenanthrene	ug/L						
	Pyrene	ug/L						
	Quinoline	ug/L						
	Nitrobenzene-d5	%						
	2-Fluorobiphenyl	%						
	Terphenyl-d14	%						
PCBs	Total PCB	ug/L						
Phenols	Total Phenolics	mg/L						
OC Pesticides	Gamma-Hexachlorocyclohexane	µg/L		<0.01	<0.01			
	Heptachlor	µg/L		<0.01	<0.01			
	Aldrin	µg/L		<0.01	<0.01			
	Heptachlor Epoxide	µg/L		<0.01	<0.01			
	Endosulfan	µg/L		<0.05	<0.05			
	Chlordane	µg/L		<0.04	<0.04			
	DDE	µg/L		<0.01	<0.01			
	DDD	µg/L		<0.05	<0.05			
	DDT	µg/L		<0.04	<0.04			
	Dieldrin	µg/L		<0.02	<0.02			
	Endrin	µg/L		<0.05	<0.05			
	Methoxychlor	µg/L		<0.04	<0.04			
	Hexachlorobenzene	ug/L		<0.01	<0.01			
	Hexachlorobutadiene	ug/L		<0.01	<0.01			
	Hexachloroethane	ug/L		<0.01	<0.01			
	TCMX	%		64.00	71.00			
	Decachlorobiphenyl	%		91.00	73.00			
	alpha-BHC	µg/L					<0.01	

Table 2 Groundwater chemistry for FMW10 (page 4 of 4).

Workorder No.			18K399778	19K479456	20K614700	20K658687	21K767498	22K913584
Date Sampled			20-Oct-18	11-Jun-19	16-Jun-20	28-Sep-20	06/24/2021	06/23/2022
Sample Description			3113-FMW10-WS1	3113-FMW10-WS2	3113-FMW10-WS-200616	3113-FMW10-WS-200928	3113-FMW10-WS-210624	3113-FMW10-WS-220623
Package Name	**Parameter Name**	**Unit**	**9640943**	**272177**	**1207843**	**1514448**	**2672614**	**4028196**
	Hexachlorobenzene	ug/L					<0.01	
	beta-BHC	µg/L					<0.05	
	Gamma-Hexachlorocyclohexane	µg/L					<0.01	
	delta-BHC	µg/L					<0.01	
	Heptachlor	µg/L					<0.01	
	Aldrin	µg/L					<0.01	
	Heptachlor Epoxide	µg/L					<0.01	
	Oxychlordane	µg/L					<0.05	
	gamma-Chlordane	µg/L					<0.1	
	op'-DDE	µg/L					<0.01	
	Endosulfan I	µg/L					<0.002	
	alpha - chlordane	µg/L					<0.05	
	pp'-DDE	µg/L					<0.05	
	Dieldrin	µg/L					<0.02	
	op'-DDD	µg/L					<0.05	
	Endrin	µg/L					<0.05	
	Endosulfan II	µg/L					<0.002	
	pp'-DDD	µg/L					<0.05	
	op'-DDT	µg/L					<0.04	
	Endrin Aldehyde	µg/L					<0.05	
	Endosulfan Sulfate	µg/L					<0.05	
	pp'-DDT	µg/L					<0.05	
	Endrin Ketone	µg/L					<0.05	
	Methoxychlor	µg/L					<0.04	
	Mirex	µg/L					<0.05	
	TCMX	%					83.00	
	Decachlorobiphenyl	%					89.00	
Triazine Pesticides	Trifluralin	µg/L		<1.0				
	Simazine	µg/L		<1.0				
	Atrazine	µg/L		<0.5				
	Metribuzin	µg/L		<0.25				
	Prometryne	µg/L		<0.25				
	Metolachlor	µg/L		<0.11				
	Alachlor	µg/L		<0.5				
	Cyanazine	µg/L		<1.0				
Phenoxy Acid Herbicides	2,4-D	µg/L			<0.5		<0.5	
	2,4,5-T	µg/L			<0.5		<0.5	
	2,4,5-TP	µg/L			<0.5		<0.5	
	Dicamba	µg/L			<0.5		<0.5	
	Dichlorprop	µg/L			<0.5		<0.5	
	Dinoseb	µg/L			<0.5		<0.5	
	Picloram	µg/L			<0.5		<0.5	
	Diclofop-methyl	µg/L			<0.5		<0.5	
	2,3,4,6-Tetrachlorophenol	µg/L			<0.5		<0.5	
	2,4-Dichlorophenol	µg/L			<0.2		<0.2	
	2,4,5-Trichlorophenol	µg/L			<0.5		<0.5	
	2,4,6-Trichlorophenol	µg/L			<0.5		<0.5	
	Bromoxynil	µg/L			<0.3		<0.3	
	MCPA	ug/L			<5.0		<5.0	
	MCPP	µg/L			<5.0		<5.0	
	Pentachlorophenol	µg/L			<0.1		<0.1	
	DCAA	%			96.00		94.00	

Table 3 Groundwater chemistry for FMW11 (page 1 of 5).

Workorder No.			18K399778	19K481097	20K613477	21K767120	22K912449
Date Sampled			17-Oct-18	15-Jun-19	11-Jun-20	06/22/2021	06/22/2022
Sample Description			3113-FMW11-WS1	3113 - FMW11-WS2	3113-FMW11-WS-200611	3113-FMW11-WS-210622	3113-FMW11-WS-220622
Package Name	**Parameter Name**	**Unit**	**9640945**	**283773**	**1201479**	**2668128**	**4017815**
Field Paramaters	pH		6.58	6.59	6.76	6.78	6.77
	Temperature	°C	7.30	7.40	6.30	7.20	8.60
	Turbidity	NTU		28.80	2.75	0.03	0.85
	Electrical Conductivity	umho/cm	1278.00	828.70	519.70	592.30	1015.00
	Dissolved Oxygen	mg/L		3.58	5.18	4.57	1.05
	Temperature (DO Meter)	°C					
Standard Water Analysis	pH		7.39	7.36	7.51	7.61	7.37
	Reactive Silica as SiO2	mg/L	22.10	16.90	9.90	13.50	9.20
	Chloride	mg/L	83.00	42.00	12.00	18.00	49.00
	Fluoride	mg/L	<0.12	<0.12	<0.12	<0.12	<0.12
	Sulphate	mg/L	2.00	3.00	4.00	3.00	3.00
	Alkalinity	mg/L	610.00	435.00	246.00	303.00	493.00
	True Color	TCU	12.00	<5	11.00	5.24	<5.00
	Turbidity	NTU	1900.00	85.30	17.10	<0.5	0.50
	Electrical Conductivity	umho/cm	1270.00	915.00	531.00	634.00	1109.00
	Nitrate + Nitrite as N	mg/L	0.12	<0.05	0.16	<0.05	0.08
	Nitrate as N	mg/L	0.12	<0.05	0.16	<0.05	0.08
	Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
	Ammonia as N	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03
	Total Organic Carbon	mg/L	24.30	<0.5	6.00	4.00	8.90
	Ortho-Phosphate as P	mg/L	<0.01	<0.01	<0.01	0.25	<0.01
	Total Sodium	mg/L	140.00	53.30	20.10		
	Total Potassium	mg/L	2.20	2.00	1.40		
	Total Calcium	mg/L	109.00	90.80	72.60		
	Total Magnesium	mg/L	44.20	26.60	17.00		
	Dissolved Sodium	mg/L				19.30	101.00
	Dissolved Potassium	mg/L				1.40	22.30
	Dissolved Calcium	mg/L				64.30	2.05
	Dissolved Magnesium	mg/L				14.10	55.00
	Bicarb. Alkalinity (as CaCO3)	mg/L	610.00	435.00	246.00	303.00	493.00
	Carb. Alkalinity (as CaCO3)	mg/L	<10	<10	<10	<10	<10
	Hydroxide	mg/L	<5	<5	<5	<5	<5
	Calculated TDS	mg/L	762.00	479.00	275.00	302.00	529.00
	Hardness	mg/L	454.00	336.00	251.00	219.00	344.00
	Langelier Index (@20C)	NA	0.54	0.30	0.13	0.26	0.41
	Langelier Index (@ 4C)	NA	0.22	-0.02	-0.19	-0.06	0.09
	Saturation pH (@ 20C)	NA	6.85	7.06	7.38	7.35	6.96
	Saturation pH (@ 4C)	NA	7.17	7.38	7.70	7.67	7.28
	Anion Sum	me/L	14.60	9.95	5.35	6.63	11.30
	Cation sum	me/L	15.80	9.10	5.93	5.25	9.32
	% Difference/ Ion Balance	%	3.90	4.40	5.10	11.60	9.60
	Bromide	mg/L					
	Conductivity	uS/cm					
	Total Hardness (calc)	ug CaCO3/L					
	Total Kjeldahl Nitrogen as N	mg/L					
	Total Kjeldahl Nitrogen	mg/L					
	Dissolved Organic Carbon	mg/L					
UVT (Water)	UV Transmittance	% UVT					
	Total Aluminum	ug/L	23800.00				
	Total Antimony	ug/L	<2				
	Total Arsenic	ug/L	25.00				
	Total Barium	ug/L	437.00				
	Total Beryllium	ug/L	<2				

Table 3 Groundwater chemistry for FMW11 (page 2 of 5).

Workorder No.			18K399778	19K481097	20K613477	21K767120	22K912449
Date Sampled			17-Oct-18	15-Jun-19	11-Jun-20	06/22/2021	06/22/2022
Sample Description			3113-FMW11-WS1	3113 - FMW11-WS2	3113-FMW11-WS-200611	3113-FMW11-WS-210622	3113-FMW11-WS-220622
Package Name	**Parameter Name**	**Unit**	**9640945**	**283773**	**1201479**	**2668128**	**4017815**
Total Metals	Total Bismuth	ug/L	<2				
	Total Boron	ug/L	33.00				
	Total Cadmium	ug/L	**0.77**				
	Total Chromium	ug/L	47.00				
	Total Cobalt	ug/L	38.00				
	Total Copper	ug/L	**137.00**				
	Total Iron	ug/L	**48900.00**				
	Total Lead	ug/L	**32.40**				
	Total Manganese	ug/L	**19700.00**				
	Total Molybdenum	ug/L	<2				
	Total Nickel	ug/L	**69.00**				
	Total Phosphorous	mg/L					
	Total Selenium	ug/L	**2.00**				
	Total Silver	ug/L	0.10				
	Total Strontium	ug/L	324.00				
	Total Thallium	ug/L	0.20				
	Total Tin	ug/L	<2				
	Total Titanium	ug/L	1240.00				
	Total Uranium	ug/L	8.30				
	Total Vanadium	ug/L	65.00				
	Total Zinc	ug/L	149.00				
	Total Mercury	ug/L		<0.026			
	Sulphide as Hydrogen Sulphide Calc.	mg/L					
	Total Calcium						
	Total Lithium						
Dissolved Metals	Dissolved Aluminum	ug/L	<5	<5	<5	<5	9.20
	Dissolved Antimony	ug/L	<2	<2	<2	<2	<1.0
	Dissolved Arsenic	ug/L	<2	<2	<2	<2	<1.0
	Dissolved Barium	ug/L	112.00	62.00	23.00	36.00	41.00
	Dissolved Beryllium	ug/L	<2	<2	<2	<2	<0.50
	Dissolved Bismuth	ug/L	<2	<2	<2	<2	<2.0
	Dissolved Boron	ug/L	20.00	28.00	20.00	13.00	25.60
	Dissolved Cadmium	ug/L	0.31	<0.09	<0.017	<0.017	<0.10
	Dissolved Chromium	ug/L	**18.00**	**9.00**	**7.00**	**7.00**	<2.0
	Dissolved Cobalt	ug/L	4.00	<1	<1	<1	<0.50
	Dissolved Copper	ug/L	**6.00**	2.00	<2	<2	<1.0
	Dissolved Iron	ug/L	<50	<50	<50	<50	<10
	Dissolved Lead	ug/L	<0.5	<0.5	<0.5	<0.5	<0.50
	Dissolved Lithium	ug/L					
	Dissolved Manganese	ug/L	**15500.00**	346.00	15.00	208.00	5.70
	Dissolved Molybdenum	ug/L	<2	<2	<2	<2	<2.0
	Dissolved Nickel	ug/L	10.00	10.00	3.00	<2	<1.0
	Dissolved Phosphorus	mg/L	<0.02	<0.02	<0.02	<0.02	<0.05
	Dissolved Selenium	ug/L	**2.00**	1.00	<1	<1	<1.0
	Dissolved Silicon	ug/L					
	Dissolved Silver	ug/L	<0.1	<0.1	<0.1	<0.1	<0.10
	Dissolved Strontium	ug/L	254.00	169.00	120.00	152.00	162.00
	Dissolved Thallium	ug/L	<0.1	<0.1	<0.1	<0.1	<0.30
	Dissolved Tin	ug/L	<2	<2	<2	<2	<2.0
	Dissolved Titanium	ug/L	<2	<2	<2	<2	2.30
	Dissolved Uranium	ug/L	6.50	6.20	4.60	4.00	4.19
	Dissolved Vanadium	ug/L	<2	<2	<2	<2	<2.0

Table 3 Groundwater chemistry for FMW11 (page 3 of 5).

Workorder No.			18K399778	19K481097	20K613477	21K767120	22K912449
Date Sampled			17-Oct-18	15-Jun-19	11-Jun-20	06/22/2021	06/22/2022
Sample Description			3113-FMW11-WS1	3113 - FMW11-WS2	3113-FMW11-WS-200611	3113-FMW11-WS-210622	3113-FMW11-WS-220622
Package Name	**Parameter Name**	**Unit**	**9640945**	**283773**	**1201479**	**2668128**	**4017815**
	Dissolved Zinc	ug/L	<5	7.00	<5	<5	<5.0
	Dissolved Zirconium	ug/L					
	Dissolved Mercury	ug/L			<0.026	<0.026	<0.026
	Biochem. Oxy. Demand, 5 Day (BOD5)	mg/L					
Other Inorganics	Chem. Oxy. Demand	mg/L					
	Benzene	mg/L	<0.001	<0.001	<0.001	<0.001	
	Toluene	mg/L	<0.001	<0.001	<0.001	<0.001	
	Ethylbenzene	mg/L	<0.001	<0.001	<0.001	<0.001	
	Xylene (Total)	mg/L	<0.002	<0.001	<0.001	<0.001	
	C6-C10 (less BTEX)	mg/L	<0.01	<0.01	<0.01	<0.01	
	>C10-C16 Hydrocarbons	mg/L	<0.05	<0.05	<0.05	<0.05	
Atlantic RBCA Tier 1 Hydrocarbons	>C16-C21 Hydrocarbons	mg/L	<0.10	<0.05	<0.05	<0.05	
	>C21-C32 Hydrocarbons	mg/L	<0.1	<0.01	<0.01	<0.01	
	Modified TPH (Tier 1)	mg/L	<0.1	<0.1	<0.1	<0.05	
	Resemblance Comment		NR	NR	NR	NR	
	Return to Baseline at C32		Y	Y	Y	Y	
	Isobutylbenzene - EPH	%	108.00	87.00	101.00	94.00	
	Isobutylbenzene - VPH	%	70.00	103.00	86.00	77.00	
	n-Dotriacontane - EPH	%	115.00	89.00	102.00	86.00	
	1-Methylnaphthalene	ug/L					
	2-Methylnaphthalene	ug/L					
	Acenaphthene	ug/L					
	Acenaphthylene	ug/L					
	Acridine	ug/L					
	Anthracene	ug/L					
	Benzo(a)anthracene	ug/L					
	Benzo(a)pyrene	ug/L					
	Benzo(b)fluoranthene	ug/L					
	Benzo(e)pyrene	ug/L					
	Benzo(ghi)perylene	ug/L					
	Benzo(k)fluoranthene	ug/L					
Polycyclic Aromatic Hydrocarbons (PAH)	Chrysene	ug/L					
	Dibenzo(a,h)anthracene	ug/L					
	Fluoranthene	ug/L					
	Fluorene	ug/L					
	Indeno(1,2,3-cd)pyrene	ug/L					
	Naphthalene	ug/L					
	Perylene	ug/L					
	Phenanthrene	ug/L					
	Pyrene	ug/L					
	Quinoline	ug/L					
	Nitrobenzene-d5	%					
	2-Fluorobiphenyl	%					
	Terphenyl-d14	%					
PCBs	Total PCB	ug/L					
Phenols	Total Phenolics	mg/L					
	Gamma-Hexachlorocyclohexane	µg/L		<0.01	<0.01		
	Heptachlor	µg/L		<0.01	<0.01		
	Aldrin	µg/L		<0.01	<0.01		

Table 3 Groundwater chemistry for FMW11 (page 4 of 5).

Workorder No.			18K399778	19K481097	20K613477	21K767120	22K912449
Date Sampled			17-Oct-18	15-Jun-19	11-Jun-20	06/22/2021	06/22/2022
Sample Description			3113-FMW11-WS1	3113 - FMW11-WS2	3113-FMW11-WS-200611	3113-FMW11-WS-210622	3113-FMW11-WS-220622
Package Name	**Parameter Name**	**Unit**	**9640945**	**283773**	**1201479**	**2668128**	**4017815**
	Heptachlor Epoxide	µg/L		<0.01	<0.01		
	Endosulfan	µg/L		<0.05	<0.05		
	Chlordane	µg/L		<0.04	<0.04		
	DDE	µg/L		<0.01	<0.01		
	DDD	µg/L		<0.05	<0.05		
OC Pesticides	DDT	µg/L		<0.04	<0.04		
	Dieldrin	µg/L		<0.02	<0.02		
	Endrin	µg/L		<0.05	<0.05		
	Methoxychlor	µg/L		<0.04	<0.04		
	Hexachlorobenzene	ug/L		<0.01	<0.01		
	Hexachlorobutadiene	ug/L		<0.01	<0.01		
	Hexachloroethane	ug/L		<0.01	<0.01		
	TCMX	%		73.00	85.00		
	Decachlorobiphenyl	%		72.00	92.00		
	alpha-BHC	µg/L				<0.01	
	Hexachlorobenzene	ug/L				<0.01	
	beta-BHC	µg/L				<0.05	
	Gamma-Hexachlorocyclohexane	µg/L				<0.01	
	delta-BHC	µg/L				<0.01	
	Heptachlor	µg/L				<0.01	
	Aldrin	µg/L				<0.01	
	Heptachlor Epoxide	µg/L				<0.01	
	Oxychlordane	µg/L				<0.05	
	gamma-Chlordane	µg/L				<0.1	
	op'-DDE	µg/L				<0.01	
	Endosulfan I	µg/L				<0.002	
	alpha - chlordane	µg/L				<0.05	
	pp'-DDE	µg/L				<0.05	
	Dieldrin	µg/L				<0.02	
	op'-DDD	µg/L				<0.05	
	Endrin	µg/L				<0.05	
	Endosulfan II	µg/L				<0.002	
	pp'-DDD	µg/L				<0.05	
	op'-DDT	µg/L				<0.04	
	Endrin Aldehyde	µg/L				<0.05	
	Endosulfan Sulfate	µg/L				<0.05	
	pp'-DDT	µg/L				<0.05	
	Endrin Ketone	µg/L				<0.05	
	Methoxychlor	µg/L				<0.04	
	Mirex	µg/L				<0.05	
	TCMX	%				106.00	
	Decachlorobiphenyl	%				109.00	
	Trifluralin	µg/L			<1.0		
	Simazine	µg/L			<1.0		
	Atrazine	µg/L			<0.5		
Triazine Pesticides	Metribuzin	µg/L			<0.25		
	Prometryne	µg/L			<0.25		
	Metolachlor	µg/L			<0.11		
	Alachlor	µg/L			<0.5		
	Cyanazine	µg/L			<1.0		
	2,4-D	µg/L		<0.5		<0.5	
	2,4,5-T	µg/L		<0.5		<0.5	

Table 3 Groundwater chemistry for FMW11 (page 5 of 5).

Workorder No.				18K399778	19K481097	20K613477	21K767120	22K912449
Date Sampled				17-Oct-18	15-Jun-19	11-Jun-20	06/22/2021	06/22/2022
Sample Description				3113-FMW11-WS1	3113 - FMW11-WS2	3113-FMW11-WS-200611	3113-FMW11-WS-210622	3113-FMW11-WS-220622
Package Name	**Parameter Name**	**Unit**		**9640945**	**283773**	**1201479**	**2668128**	**4017815**
Phenoxy Acid Herbicides	2,4,5-TP	µg/L			<0.5		<0.5	
	Dicamba	µg/L			<0.5		<0.5	
	Dichlorprop	µg/L			<0.5		<0.5	
	Dinoseb	µg/L			<0.5		<0.5	
	Picloram	µg/L			<0.5		<0.5	
	Diclofop-methyl	µg/L			<0.5		<0.5	
	2,3,4,6-Tetrachlorophenol	µg/L			<0.5		<0.5	
	2,4-Dichlorophenol	µg/L			<0.2		<0.2	
	2,4,5-Trichlorophenol	µg/L			<0.5		<0.5	
	2,4,6-Trichlorophenol	µg/L			<0.5		<0.5	
	Bromoxynil	µg/L			<0.3		<0.3	
	MCPA	ug/L			<5.0		<5.0	
	MCPP	µg/L			<5.0		<5.0	
	Pentachlorophenol	µg/L			<0.1		<0.1	
	DCAA	%			75.00		76.00	

APPENDIX 1.1

Report FFC-NL-3168-007

Active Storage and Water Quality
Noels Pond, Muddy Pond and Gull (Mine) Pond
Stephenville, NL

Fracflow Consultants Inc.
Environmental, Hydrogeological and
Geotechnical Engineering Consultants

world energy GH2

Active Storage and Water Quality
Noels Pond, Muddy Pond and Gull (Mine) Pond
Stephenville, NL

(FFC File 3168)

Prepared by:

Fracflow Consultants Inc.
154 Majors Path
St. John's, NL
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Submitted to:

World Energy GH2
87 Water Street
St. John's, NL
A1C 1A5

PROVINCE OF NEWFOUNDLAND
PERMIT HOLDER
CLASS "A"
This Permit Allows
FRACFLOW CONSULTANTS INC.
To practice Professional Engineering
in Newfoundland and Labrador.
Permit No. as issued by APEGN D0169
which is valid for the year 2022.

December 16, 2022

REGISTERED PROFESSIONAL ENGINEER
JOHN E. GALE
SIGNATURE
16 Dec 2022
DATE
PROVINCE OF NEWFOUNDLAND

Executive Summary

INTRODUCTION

World Energy GH2 is planning to develop a plant for hydrogen production within the municipal boundaries of the Town of Stephenville. World Energy GH2 is considering obtaining the required supply of industrial water from two sources, Gull (Mine) Pond (the primary source) and from Muddy Pond-Noels Pond (the secondary source). Two of the three ponds are located within the Warm Creek drainage basin.

Muddy Pond-Noels Pond is fed by the Warm Creek drainage basin which has an area of approximately 65,000,000 m^2 that is similar to the Blanche Brook drainage Basin from which the Town of Stephenville draws its potable water supply. The stream flow data from Blanche Brook, Harry's River and Barachois Brook, given their similar underlying geology, provide the available information with which to determine the precipitation runoff relationships and baseflow in Warm Creek once corrections for the differences in area were completed.

Based on the historical precipitation records for the Stephenville area and the runoff records for Harry's River, the average discharge from Warm Creek into Noels Pond was calculated at51.8 m^3/min (Fracflow, 2022a). The calculated flow exceedance calculations show that this flow is exceeded approximately 80% of the time. The projected World Energy GH2 industrial water demand is 40 m^3/min or greater and this flow is exceeded for approximately 90% of a typical year.

Muddy Pond is connected to Noels Pond via two large culverts that are currently submerged under Carolina Avenue. A large diameter pipeline was constructed between Muddy Pond-Noels Pond and Gull (Mine) Pond. This pipeline was used to provide additional industrial water to the original Liner Board Mill and subsequently to the Abitibi Mill operations. The records (The Water Resources Atlas of Newfoundland) show that the previous Abitibi Mill site operators used an average of more than 4,200 USgpm of industrial water that was drawn from the Muddy Pond-Noels Pond system through the large diameter pipeline between Muddy Pond-Noels Pond and Gull (Mine) Pond. Noels Pond was also part of the original source of the potable water for the Town of Stephenville, but was decommissioned in the early 2000s in favour of a groundwater source in the Blanche Brook drainage basin. It is estimated that more than 10,000 USgpm of water were being withdrawn from Noels Pond when both the Town of Stephenville and the industrial users were withdrawing water from Noels Pond.

ACTIVE STORAGE

The active storage in the industrial water supply system when all three ponds, Noels Pond, Muddy Pond and Gull (Mine) Pond, are combined is conservatively estimated at 47 days at the projected peak demand of 40 m^3 per minute. It is expected that completion of the planned HEC-HMS analysis of the Warm Creek drainage basin, which will take into account the additional

storage and buffering that is provided by the ponds in the upper part of the drainage basin, will produce a longer period of active storage in which the required flows needed to support fish passage into and through Noels Pond will be maintained.

INDUSTRIAL WATER SUPPLY INFRASTRUCTURE

The details of the individual components of the existing industrial water transfer infrastructure will be presented in a separate companion report. An order of magnitude estimate of the cost to re-establish and upgrade the overall industrial water supply infrastructure, including the gravity feed structure from Gull (Mine) Pond to the old Abitibi plant site will be provided. General comments are provided below.

The infrastructure on Gull (Mine) Pond is relatively old, but the earthen berm is still retaining water in the pond with limited evidence of seepage through the berm. The cleaning of the canal, road repairs, minor ditching and culvert installation, and extensions on the cribwork are a few of the changes needed with regards to developing the full active water storage.

The infrastructure on Noels Pond is in relatively good shape, and the refurbishing and upgrading work is limited to installing water control gates, a fish ladder or bypass, and removing driftwood debris.

The infrastructure on Muddy Pond is relatively old, but was well maintained during the Mill's operation. However, the key infrastructure for controlling the storage in Muddy Pond is located on Noels Pond, and water is conveyed through the culverts beneath Carolina Avenue. The pump house and equipment, located on Muddy Pond, will require significant upgrading and refurbishing.

WATER QUALITY

A sonar survey was conducted on each of the three industrial water supply ponds and bathymetry maps have been constructed from that data, showing in addition the areas that would be flooded by raising the water level in each pond by 1 m and then by 2 m. During this sonar survey, water and pond sediment samples were collected from three locations in each pond. The water and sediment samples were analyzed for a range of components that were considered to be relevant to the intake water for the proposed World Energy GH2 Hydrogen plant.

The general water chemistry for the water samples from all three ponds met FWAL guidelines, except for three noted exceedances. There was no detectable BTEX/TPH when using low-level detection analysis.

The pond sediments do show some detectable levels of petroleum hydrocarbons in the form of TPHs and PAHs.

The measured TPH values in the pond sediments are considered to reflect organic signatures but confirmation would require successive silica gel clean-ups to remove all or most residual organic material. The visible sheen observed with sample MP02-SS1 suggests that the measured TPH values reflect hydrocarbon signatures, rather than organics. Also selected metals such as selenium are most likely related to the discharge of deep bedrock ground water as noted in other parts of this ground water flow system.

The Total Suspended Solids levels are expected to vary on a seasonal basis.

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1.0 INTRODUCTION

World Energy GH2 is planning to develop a plant for hydrogen production within the municipal boundaries of the Town of Stephenville (**Figure 1**). World Energy GH2 is considering obtaining the required supply of industrial water from two sources (**Figure 2**), Gull (Mine) Pond (the primary source) and from Muddy Pond-Noels Pond (the secondary source). Two of the three ponds are located within the Warm Creek drainage basin.

Muddy Pond-Noels Pond is fed by the Warm Creek drainage basin which has an area of approximately 65,000,000 m^2 that is similar to the Blanche Brook drainage basin. The stream flow data from Blanche Brook, Harry's River and Barachois Brook, given their similar underlying geology, provide the available information with which to determine the precipitation runoff relationships and baseflow in Warm Creek once corrections for the differences in area were completed.

Muddy Pond is connected to Noels Pond via two large culverts that are currently submerged under Carolina Avenue. A large diameter pipeline was constructed between Muddy Pond-Noels Pond and Gull (Mine) Pond (**Figure 2**). This pipeline was used to provide additional industrial water to the original Linerboard Mill and subsequently to the Abitibi Mill operations. The records (The Water Resources Atlas of Newfoundland) show that the previous Abitibi Mill site operators used an average of more than 4,200 USgpm of industrial water that was drawn from the Muddy Pond-Noels Pond system through a large diameter pipeline between Muddy Pond-Noels Pond and Gull (Mine) Pond.

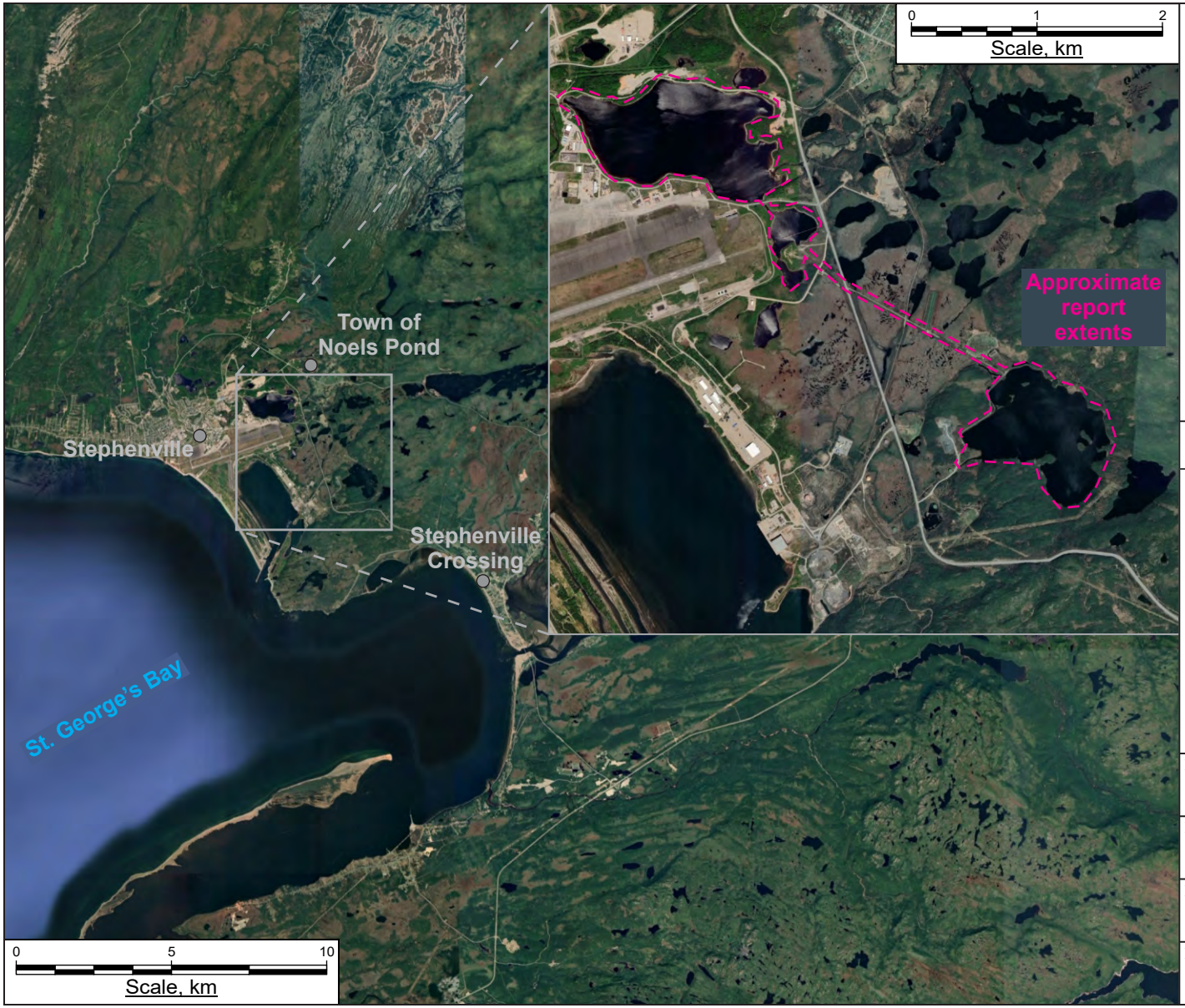
1.1 Report Structure

This Report has been structured with a brief overview of each component of the industrial water infrastructure that has been summarized from another report (Fracflow, 2022b). **Figure 2** shows the main components of the old Linerboard Mill-Abitibi Mill industrial water supply system.

The industrial water secondary supply intake area at Muddy Pond consists of an old pump house from the Linerboard Mill time period that pumped water from Muddy Pond to Gull (Mine) Pond via a pipeline. This pipeline contains a surge standpipe that is located adjacent to Route 490. A new pump house was constructed by the Town of Stephenville in 2012 to draw water from Gull (Mine) Pond to supply the current industrial water users. Muddy Pond is connected to Noels Pond by two culverts, in an excavated and covered channel, that run underneath Carolina Avenue (locally known as The Ramp). These two culverts are located about 3 m below the current water level in Muddy Pond.

The main source of additional industrial water for the proposed project is the Warm Creek drainage basin, which flows into Noels Pond through Warm Creek. Noels Pond is the former

source of potable water for the Town of Stephenville, but was decommissioned in the early 2000s in favour of a groundwater source in the Blanche Brook drainage basin.



Basemap by Google (2022)

Figure 1

General location map of the project site in Stephenville, NL.

Project No.
3168

Location
Stephenville, NL

Document Reference
FFC-NL-3168-007

Date
November 2022

FFC

Figure 2 Location map showing source of industrial water supply, Stephenville, NL.

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3168	FFC-NL-3168-007
Location	Date
Stephenville, NL	November 2022

FFC

2.0 INDUSTRIAL WATER SUPPLY STORAGE INFRASTRUCTURE

2.1 Gull (Mine) Pond

The primary industrial water source area, Gull (Mine) Pond, which has a small drainage basin capture area, contains the main components (**Figure 3a)** of the industrial water supply system. The components highlighted in this Report are the water delivery pipeline and the overflow structure in the northwest area of Gull (Mine) Pond, and water intake channel at the southwest end of Gull (Mine) Pond. The water intake channel area was constructed by excavating in bedrock a 30 m long, 3 to 4 m wide, channel from Gull (Mine) Pond to the intake structure (**Figure 3a**).

The Gull (Mine) Pond drainage basin or the area that contributes flow to Gull (Mine) Pond is approximately 3,556,000 m^2. Gull (Mine) Pond itself has a surface area of approximately 673,900 m^2 and Oxback Pond/Upper Mine Pond has a surface area of 129,000 m^2.

Fracflow conducted a preliminary assessment in 2022 (Fracflow, 2022a) using historical records and climate data that concluded that an average of 750 USgpm of industrial water could be supplied by Gull (Mine) Pond using existing infrastructure. **Figure 4a** includes the bathymetry data for Gull (Mine) Pond using 2 m contour intervals that were generated from a sonar survey of the pond.

This bathymetry map provided the basis for estimating active storage in the primary source pond. The surface area of the pond is 653,614 m^2, when we exclude the area of the islands in the pond. **Figure 4a** shows the 1 m and the 2 m contour lines around Gull (Mine) Pond relative to the zero water level contour line recorded on September 22, 2022. The water depth in the intake channel entrance was approximately 2.5 m on September 22, 2022. To maintain peak flow of up to40 m^3/min, the depth of the water in the channel should not drop below 1 m, which would produce an acceptable water velocity of 0.16 m/s in open channel flow.

The active storage of Gull (Mine) Pond is limited by the minimum depth of water though the intake channel, and the maximum depth of water before overtopping the overflow structure. From its measured level in September 22, 2022 the water level can fall by 1.5 m and rise by 0.5 m with some minor changes to the outflow structure. There are no shallow water areas that would produce orphaned/isolated areas of the pond (**Figure 4a**) if the pond level was lowered by 1.5 m. However, a number of shallow shoals may be exposed during variations in the active storage water levels that would connect the four small islands on the pond to the shoreline.

Using a working estimate of 2 m for active storage, the computed active storage is 1,307,228 m^3, which provides approximately 22.7 days of supply at peak water usage of 40 m^3/min. Note that this is a conservative estimate since it does not include any inflow from precipitation or inflow from the stream that channels flow from the drainage basin capture area into and from active storage in Oxback Pond which is estimated to have a combined average flow of 3 m^3/min.

Figure 4a shows that Gull (Mine) Pond has a number of deep water zones, up to 20 and 28 m of depth. Assuming an average water depth of 6 m, the passive storage, below the 2 m active storage with the raised outflow control structure, is estimated to be approximately 3,500,000 m^3, which would not be accessible without significantly deepening the intake channel and creating temporarily orphaned areas of the pond. However, if submersible pumps are placed in a deeper section of the pond, a large percentage of this passive storage can be converted to active storage.

The outflow structure (**Figure 3a**) is a wooden benched structure, with a wide rectangular shape, constructed integrally with the berm and captures any flow from Gull (Mine) Pond and directs it into a small watercourse. The water once flowed through a metal grate with 25 mm openings that prevented wood/logs from entering the overflow structure. This metal grate will need to be replaced to establish the full extent of the active storage. The downstream watercourse starts as a small pool surrounded by the outflow structure, and is directed beneath Mine Pond Road by three culverts. Downstream beaver activity has raised the water level in the area. This watercourse ultimately flows through streams that cross under Route 490, and through culverts across and through the Port's property, which is known to be sensitive to flooding.

2.2 Noels Pond

Figure 3b shows the location of the outflow control structure on Noels Pond, the culvert connection between Noels Pond and Muddy Pond, and the location of the Warm Creek discharge into Noels Pond. **Figure 4b** provides a bathymetry map of Noels Pond, based on the water level in the pond on September 21, 2022 with the extended boundaries of the pond shown for given incremental rises in water level.

The main water outflow control structure in Noels Pond is the two broad crested weirs sections on either side of three flow control gates. This control structure was installed in the 1970s, and is downstream from a flood-sensitive area. The upstream and downstream faces of the weir extend from the continuous concrete base that extends across the area. The gates on the control structure have been removed, leaving a nylon sealing strip on the east-most and west-most gates. Some granular materials have also been deposited downstream of these strips.

At its September 21, 2022 water level, the area of Noels Pond was 1,078,321 m^2. The outflow channel from Noels Pond is partly filled in with sand and gravel that somewhat controls the outflow from Noels Pond since the flow control gates have been removed. The bottom of the outflow gate was 0.40 m below the observed main pond water level. Once the flow control gates have been restored, the pond level can be increased by 1.2 m before the water overflows the broad crested weir and/or the flow control gates.

Assuming an active storage of 1.2 m, before the pond water would overflow the broad crested weir or the reduced water levels would impede fish passage through an engineered control

structure (fish way), would provide approximately 22 days of active storage in Noels Pond at a withdrawal flow rate of 40 m^3 per minute. This calculation assumes that inflow from Warm Creek into Noels Pond is sufficient to maintain an acceptable outflow from Noels Pond to meet fish migration requirements.

Based on the historical precipitation records for the Stephenville area and the runoff records for Harry's River, the average discharge from Warm Creek into Noels Pond was calculated at 51.8 m^3/min (Fracflow, 2022b). The calculated flow exceedance shows in **Figure 5** that this flow is exceeded approximately 80% of the time.

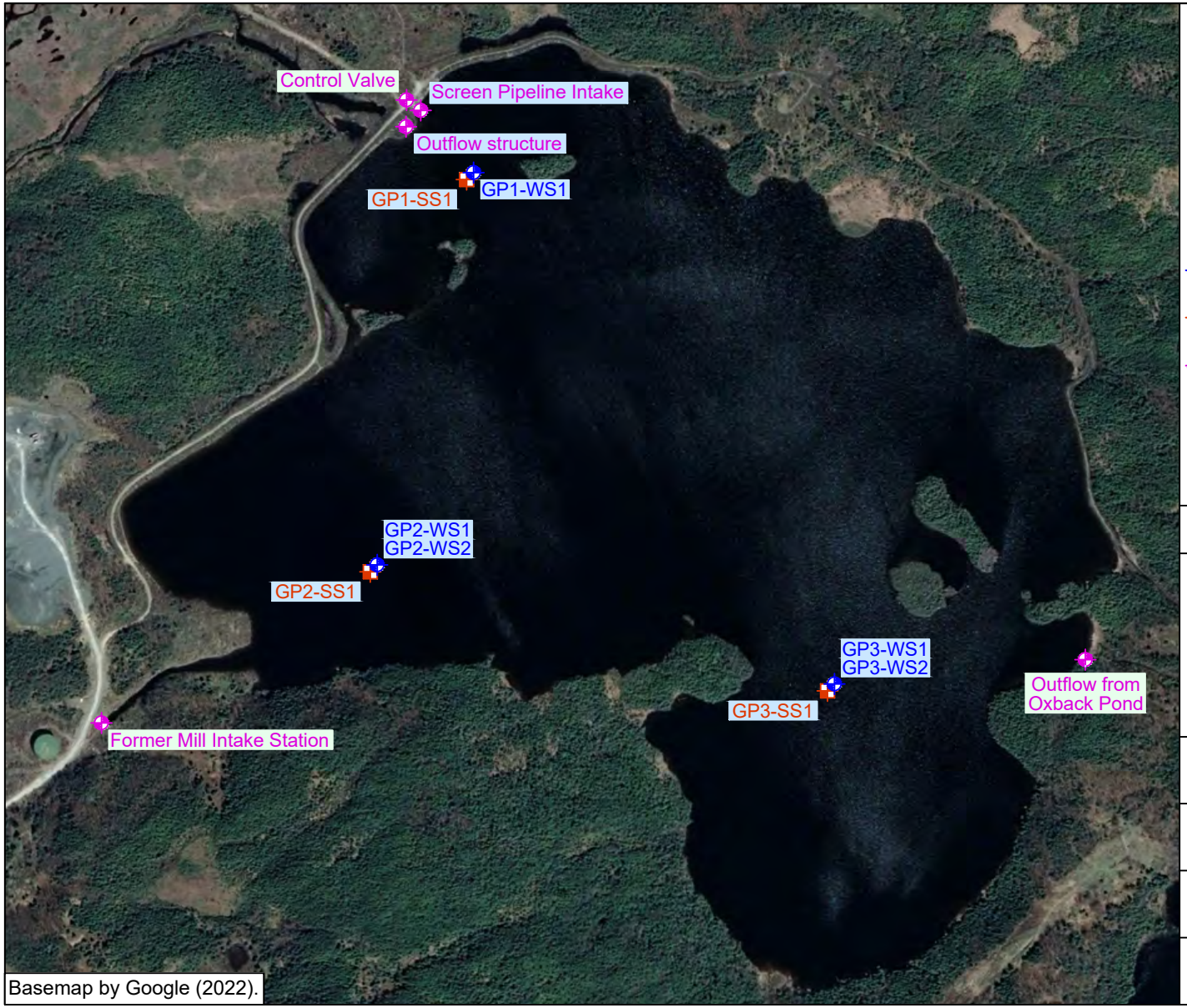
2.3 Muddy Pond

Carolina Avenue, known more commonly as "the Ramp access," crosses a narrow 40 m section between Noels Pond and Muddy Pond. Beneath this section of the paved highway there are two culverts that cross beneath the road (**Figure 3c**). Muddy Pond (**Figure 4c**) has a surface area of 133,552 m^2 and its water level is controlled by the water level in Noels Pond since the ponds are connected. The top of the culverts was approximately 3 m below the water level on September 21, 2022. At peak water demand, each culvert would have to carry 20 m^3/min and the flow would be from a submerged intake to a submerged outflow.

The active storage in Muddy Pond has to be limited to an acceptable range of water levels in Noels Pond and also by the depth below the water level of the bottom of the wet wells from which water is pulled and pumped to Gull (Mine) Pond. Applying the same 1.2 m water level change for active storage as applied to Noels Pond provides a conservative estimate of active storage of 2.3 days at a withdrawal rate of 40 m^3/min.

The southern portion of Muddy Pond is a very shallow area with a gentle sloping bottom that was difficult to navigate with a flat bottomed boat during the sonar survey. Large portions of shoreline are exposed with small changes in water levels during the summer months. The active storage water level in this pond is 1.2 m above the current level, so isolated bodies of water should not form in the shallow areas unless water levels are drawn down below the proposed active storage level.

The active storage in the industrial water supply system when all three ponds, Noels Pond, Muddy Pond and Gull (Mine) Pond, are combined is conservatively estimated at 47 days at the projected peak demand of 40 m^3 per minute. It is expected that completion of the planned HEC-HMS analysis of the Warm Creek drainage basin, which will take into account the additional storage and buffering that is provided by the ponds in the upper part of the drainage basin, will produce a longer period of active storage in which the required flows needed to support fish passage will be maintained.



N

Legend

WS1 Water sample location at specific depths.

SS1 Lake bottom sediment grab sample.

Pond Related infrastructure and related natural features.

0 250

Scale, m

Figure 3a

Gull (Mine) Pond related infrastrucutre and sampling locations.

Document Reference
FFC-NL-3168-007

Location
Stephenville, NL

Project No.
3168

Date
November 2022

FFC

Figure 3b Noels Pond related infrastructure and sampling locations.

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3168	FFC-NL-3168-007
Location	Date
Stephenville, NL	November 2022

FFC

N

Legend

WS1 Water sample location at specific depths.

SS1 Lake bottom sediment grab sample.

Pond Related infrastructure and related natural features.

0 80 160

Scale, m

Figure 3c

Muddy Pond related infrastructure and sampling locations.

Document Reference
3168-FFC-NL-007

Location
Stephenville, NL

Project No.
3168

Date
November 2022

FFC

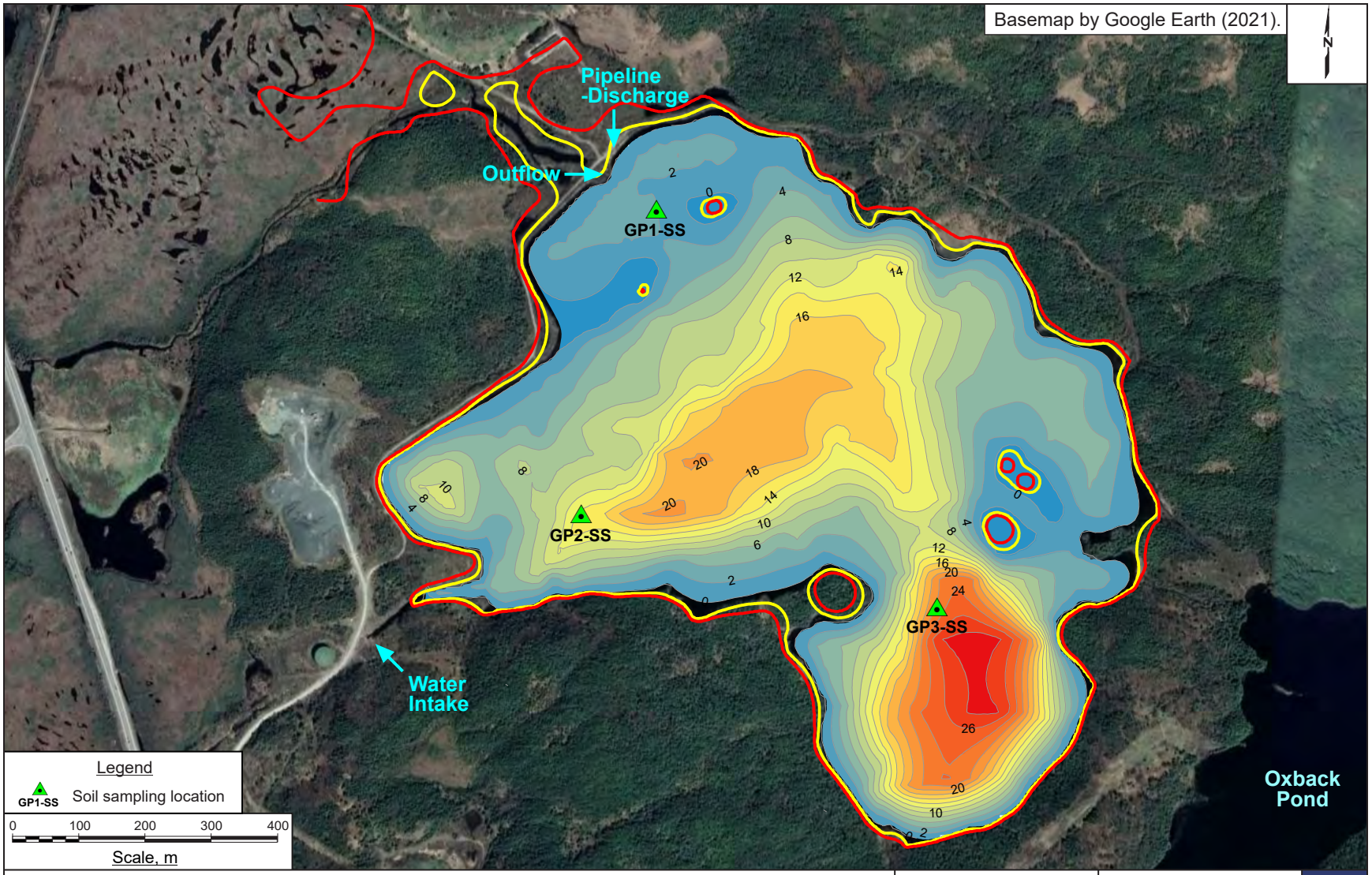

Figure 4a Contour map of the bathymetry data for Gull (Mine) Pond and outlines of the pond water surface with 1 m (yellow) and 2 m (red) increases in water depth.

Project No.	Document Reference
3168	FFC-NL-3168-007
Location	Date
Stephenville, NL	November 2022

FFC

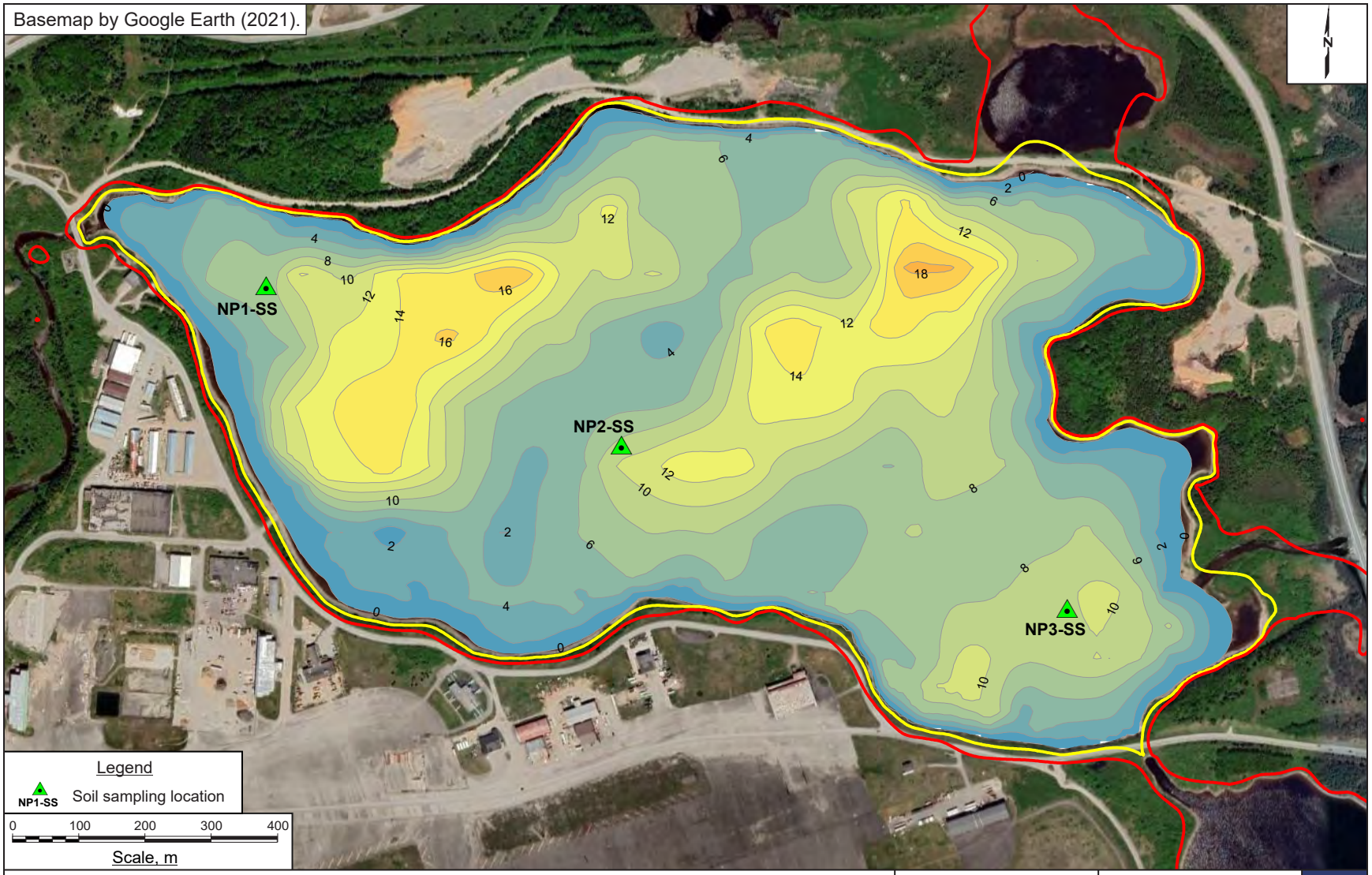

Figure 4b Contour map of the bathymetry data for Noels Pond and outlines of the pond water surface with 1 m (yellow) and 2 m (red) increases in water depth.

Project No. 3168	Document Reference FFC-NL-3168-007
Location Stephenville, NL	Date November 2022

FFC

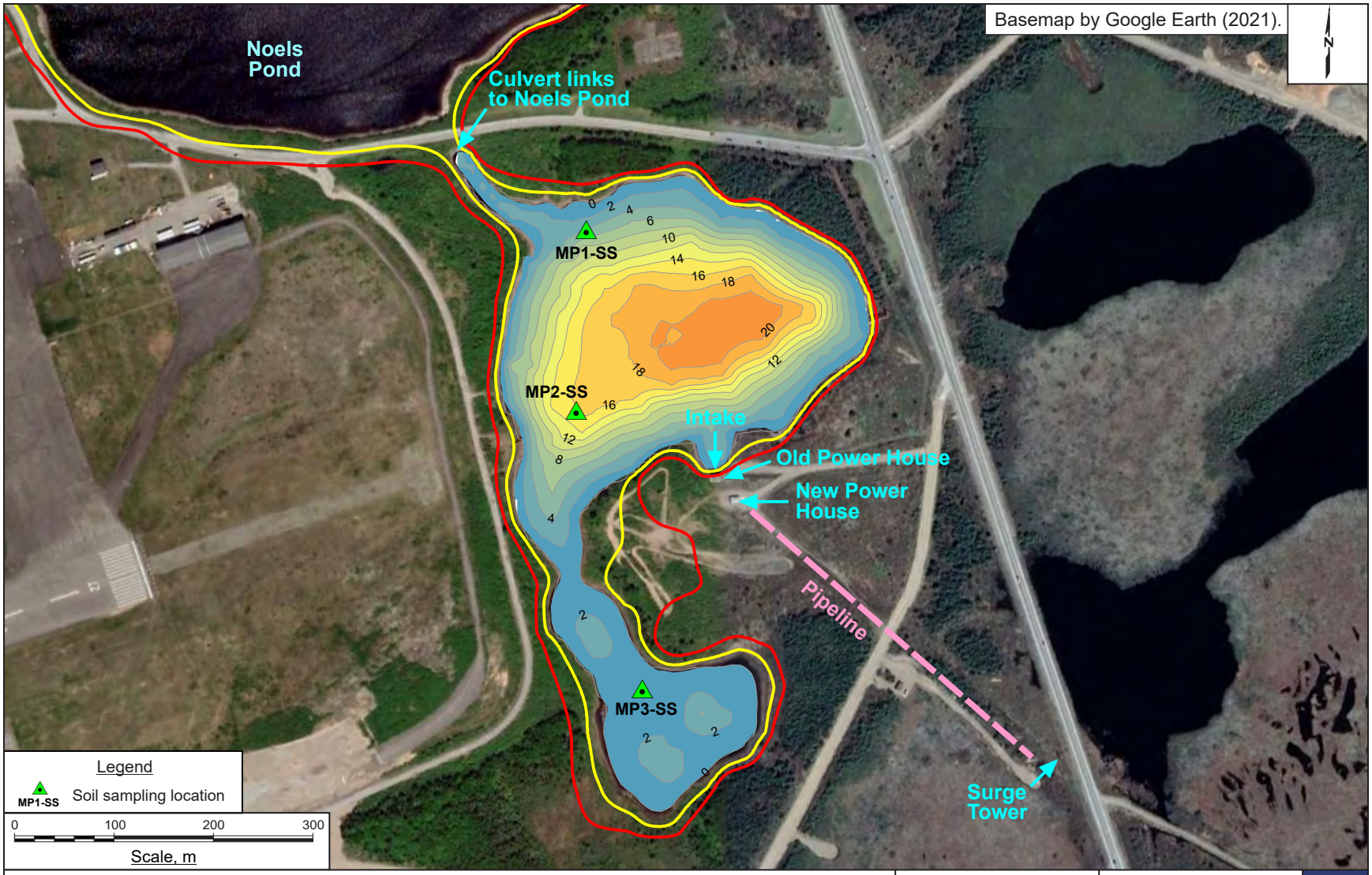

Figure 4c Contour map of the bathymetry data for Muddy Pond and outlines of the pond water surface with 1 m (yellow) and 2 m (red) increases in water depth.

Project No.	Document Reference
3168	FFC-NL-3168-004
Location	Date
Stephenville, NL	October 2022

FFC

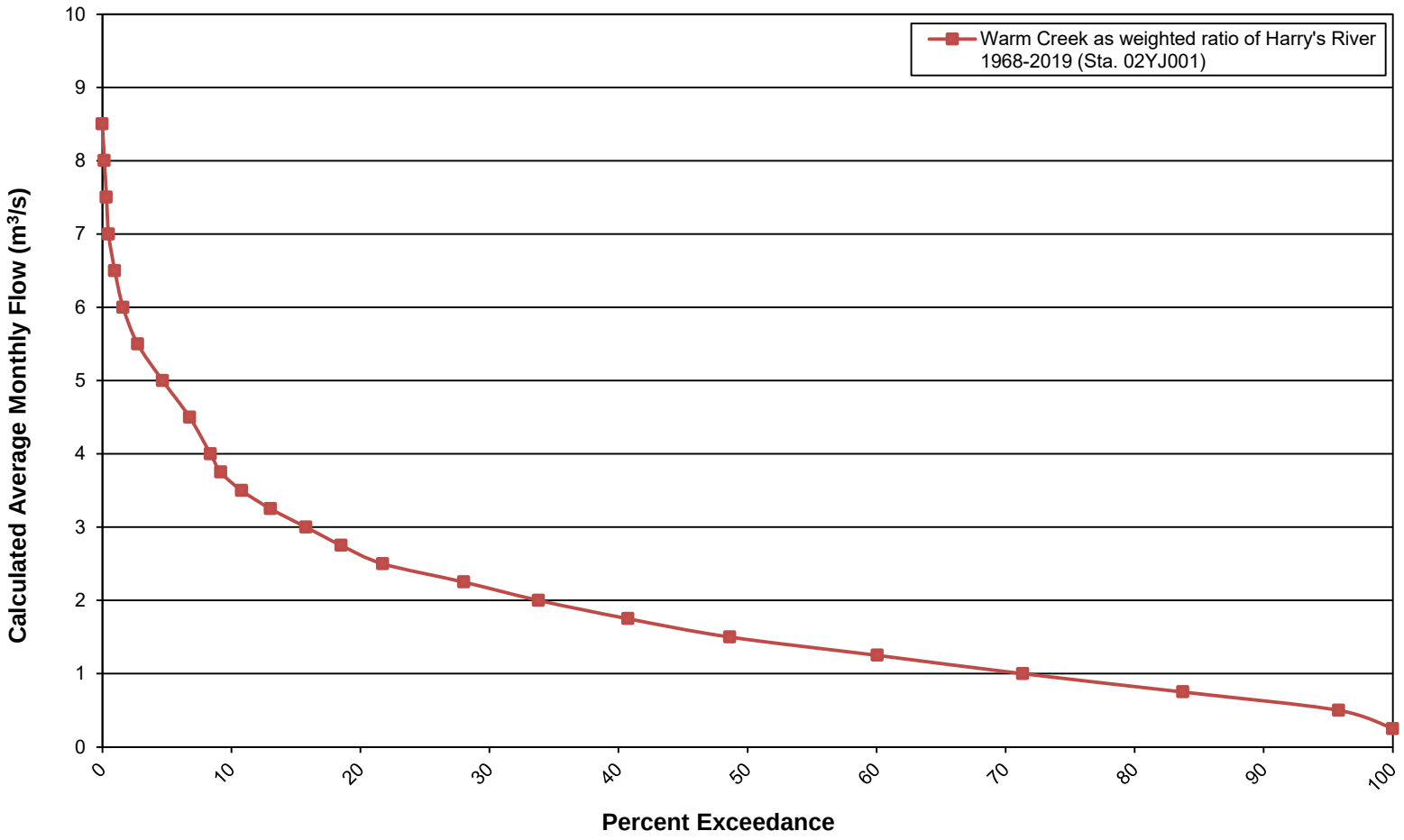

Figure 5 Flow duration curve for Warm Creek calculated from values from Harry's River (Station 02YJ001).

Project No.	Document Reference
3168	FFC-NL-3168-007
Location	Date
Stephenville, NL	November 2022

FFC

3.0 WATER QUALITY AND POND SEDIMENT CHEMISTRY DATA

Water samples and pond sediment samples were collected at three locations in each pond. The locations were selected with adequate spacing to provide a representation of the overall water chemistry. The water sample data have been compared against CCME's Freshwater Aquatic Life (FWAL) guidelines based on the assumption that the ponds are fish habitat. At each location, the water was sampled at 1.5 m below the water surface, and 1.5 m above the pond bottom except for three locations (GP01, MP01, and MP03) where the water depths were 4.1 m or less and only one water sample, at 1.5 m of depth, was collected at each of those three locations.

The pond sediment samples were collected from the pond bottom using a grab sampler. The grab sampler was decontaminated with soapy water and methanol prior to each soil sample to prevent cross-contamination.

3.1 Standard Water Analysis, Organic Carbon and Total Solids

A total of nine water samples were collected at the shallow water depths, and six water samples were collected from the deep water level at locations shown in **Figures 3a to 3c**. The samples were analyzed for typical parameters in the standard water analysis package offered by the laboratory, plus total and dissolved organic carbon, and total suspended solids (TSS) and total dissolved solids (TDS). The results are reported in **Tables 1** to **3**. One sample (GP02-WS2) fell outside the FWAL acceptable range for pH. No other parameters were identified outside FWAL guidelines (**Appendix A**).

3.2 Total Metals in Water

Water samples for total metal analysis samples were collected and acidified at each sampling location. A total of 15 samples were taken at shallow and deep water intervals at the locations shown in **Figures 3a to 3c**. The total metals data were compared against FWAL guidelines. The results are reported in **Tables 4** to **6**. One sample (NP01-WS2) exceeded guidance values for aluminum and iron. This sample (NP01-WS2) had elevated turbidity and solids, which is known to elevate iron concentrations in water in the area. No other parameters were identified outside FWAL guidelines (**Appendix A**).

3.3 Dissolved Metals in Water

Dissolved metal samples were also collected and filtered and preserved in the field. A total of 15 samples were taken at shallow and deep water intervals at the locations shown in **Figures 3a to 3c**. The samples were compared against FWAL guidelines. The results are reported in

Tables 7 to 9. One dissolved metal sample (GP03-WS2) exceeded guidance values for selenium. However, the total metal value reported for selenium did not exceed guidelines. No other parameters were identified that plot outside FWAL guidelines (**Appendix A**).

3.4 Petroleum Hydrocarbons in Water

Three water samples were collected at the shallow sampling depth for each pond, as shown in **Figures 3a to 3c**, for a total of nine samples. The samples were analyzed for total petroleum hydrocarbons (TPH) and BTEX (benzene, toluene, ethylbenzene, and xylene) using low-level detection limits. The results are reported in **Tables 10 to 12**. No BTEX/TPH components were identified above detection limits (**Appendix A**).

3.5 Volatile Organic Compounds in Water

One sample was collected at the shallow water sampling depth location for each pond, as shown in **Figures 3a to 3c**, for a total of three samples. The sample locations were chosen based on potential historical impacts (Muddy and Gull (Mine) Pond) or the furthest sample downstream (Noels Pond). The samples were analyzed using the standard list of VOCs offered by the analytical laboratory. The results are reported in **Table 13**. No parameters were identified above detection limits (**Appendix A**).

3.6 Petroleum Hydrocarbons in Soil

Samples were collected from the pond bottom using a grab sampler at three locations per pond as shown in **Figures 3a to 3c**, for a total of nine sediment samples. Field observations noted visible sheens emitting from only one of the recovered grab samples, MP02-SS1. The samples were analyzed for total petroleum hydrocarbons and BTEX using regular detection limits, and low-level on one sample (MP01-SS1). The results are reported in **Tables 14 to 16**. No BTEX components were observed above detection limits. The detected TPH values ranged from 42 to 218 mg/kg across all three ponds. The effects of suspected organic materials were evaluated with a single silica gel cleanup. After silica gel cleanup, the TPH results ranged from 17 to 136 mg/kg. The silica gel clean-up values are compared to the original values in **Tables 14 to 16**. Successive silica gel cleanups were not conducted, and the complete laboratory results can be found in **Appendix A**.

3.7 Polycyclic Aromatic Hydrocarbons in Soil

Sediment grab samples were collected at the same time as the BTEX/TPH samples were collected and analyzed for Polycyclic Aromatic Hydrocarbons (PAHs) as shown in in **Figures 3a to 3c**. The samples were analyzed using the standard list of PAHs offered by the analytical laboratory. The results are reported in **Tables 17 to 19**.

In Gull (Mine) Pond (**Table 17**), Fluoranthene and Napthalene were identified in all three sediment samples, and Acenaphthylene was identified in GP03-SS1.

In Noels Pond (**Table 18**), Fluotanthene and Perylene were found in all three sediment samples, Pyrene was found in NP02-SS2 and NP01-SS1. NP01-SS1 also had 1-Methylnaphthalene, 2-Methylnaphthalene, Acenaphthene, Anthracene, Benzo(a)pyrene, Chrysene, Fluorene, and Phenanthrene reported above detection limits.

In Muddy Pond (**Table 19**), Fluotanthene and Perylene were found in all three samples, Pyrene was found in MP01-SS1, and in MP02-SS1 Anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(j+k)fluoranthene, Benzo(e)pyrene, Fluorene, and Phenanthrene were reported above detection limits.

All other components were not identified above detection limits (**Appendix A**).

4.0 CONCLUSIONS AND OBSERVATIONS

The infrastructure on Gull (Mine) Pond is relatively old, but the earthen berm is still retaining water in the pond with limited evidence of seepage through the berm. The cleaning of the canal, road repairs, minor ditching and culvert installation, and extensions on the cribwork are a few of the changes needed with regards to developing the full active water storage.

The infrastructure on Noels Pond is in relatively good shape, and the refurbishing and upgrading work is limited to installing water control gates, a fish ladder or bypass, and removing driftwood debris.

The infrastructure on Muddy Pond is relatively old, but was well maintained during the Mill's operation. However, the key infrastructure to controlling the storage in Muddy Pond is located on Noels Pond, and water is conveyed through the culverts beneath Carolina Avenue. The pump house and equipment, located on Muddy Pond, will require significant upgrading and refurbishing.

The details of the individual components of the existing industrial water transfer infrastructure are presented in a separate companion report. An order of magnitude estimate of the cost to re-establish and upgrade the overall industrial water supply infrastructure, including the gravity feed structure from Gull (Mine) Pond to the old Abitibi Mill site will be provided in a separate report.

The general water chemistry for the water samples from all three ponds met FWAL guidelines, except for four noted exceedances. There was no detectable BTEX/TPH when using low-level detection analysis.

The pond sediments do show some detectable levels of petroleum hydrocarbons in the form of TPHs and PAHs.

The measured TPH values are considered to reflect organic signatures, except for one sample, but confirmation would require successive silica gel clean-ups to remove all or most residual organic material. Also selected metals such as selenium are most likely related to the discharge of deep bedrock groundwater as noted in other parts of this groundwater flow system.

The Total Suspended Solids levels are expected to vary on a seasonal basis.

Table 1 Analytical results of standard water analysis in water samples from Gull (Mine) Pond, Stephenville, NL (page 1 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-GP01-WS1-220923**	**3168-GP02-WS1-220923**	**3168-GP02-WS2-220923**
Sampling Date				09/23/2022	09/23/2022	09/23/2022
AGAT ID				4355773	4355762	4355770
Standard Water Analysis + Additional Parameters						
pH		6.5 - 9.0		6.6	6.59	**6.48**
Reactive Silica as SiO2	mg/L		0.5	2.1	2	2.6
Chloride	mg/L	640, 120	1	23	23	23
Fluoride	mg/L	0.12	0.12	<0.12	<0.12	<0.12
Sulphate	mg/L		2	3	4	4
Alkalinity	mg/L		5	10	11	12
True Color	TCU	Narrative	5.00	32.1	33.9	34.6
Turbidity	NTU	Narrative	0.5	1.7	<0.5	1.8
Electrical Conductivity	umho/cm		1	119	118	119
Nitrate + Nitrite as N	mg/L		0.05	<0.05	<0.05	0.06
Nitrate as N	mg/L	550, 13	0.05	<0.05	<0.05	0.06
Nitrite as N	mg/L	0.06	0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L	Fact Sheet	0.03	0.08	0.11	0.1
Total Organic Carbon	mg/L		0.5	7.3	7.2	6.8
Dissolved Organic Carbon	mg/L		0.5	5.7	5.1	4.8
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	<0.01
Total Sodium	mg/L		0.1	16	16	15
Total Potassium	mg/L		0.1	0.5	0.5	0.5
Total Calcium	mg/L		0.1	4.9	4.7	4.7
Total Magnesium	mg/L		0.1	1.8	1.8	1.8
Bicarb. Alkalinity (as CaCO3)	mg/L		5	10	11	12
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5
Calculated TDS	mg/L		1	55	57	57
Hardness	mg/L			19.6	19.1	19.1
Langelier Index (@20C)	NA			-3.27	-3.26	-3.33
Langelier Index (@ 4C)	NA			-3.59	-3.58	-3.65
Saturation pH (@ 20C)	NA			9.87	9.85	9.81
Saturation pH (@ 4C)	NA			10.2	10.2	10.1
Anion Sum	me/L			0.91	0.95	0.98
Cation Sum	me/L			1.12	1.11	1.07
% Difference/Ion Balance	%			10.1	7.5	4.5
Total Suspended Solids	mg/L	Narrative	5	<5	<5	<5
Total Dissolved Solids	mg/L		5	76	74	74

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 1 Analytical results of standard water analysis in water samples from Gull (Mine) Pond, Stephenville, NL (page 2 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-GP03-WS1-220923**	**3168-GP03-WS2-220923**	
Sampling Date				09/23/2022	09/23/2022	
AGAT ID				4355740	4355744	
Standard Water Analysis + Additional Parameters						
pH		6.5 - 9.0		7.32	6.50	
Reactive Silica as SiO2	mg/L		0.5	2.0	2.7	
Chloride	mg/L	640, 120	1	23	24	
Fluoride	mg/L	0.12	0.12	<0.12	<0.12	
Sulphate	mg/L		2	5	4	
Alkalinity	mg/L		5	12	14	
True Color	TCU	Narrative	5.00	31.4	40.1	
Turbidity	NTU	Narrative	0.5	0.7	0.7	
Electrical Conductivity	umho/cm		1	118	123	
Nitrate + Nitrite as N	mg/L		0.05	<0.05	0.08	
Nitrate as N	mg/L	550, 13	0.05	<0.05	0.08	
Nitrite as N	mg/L	0.06	0.05	<0.05	<0.05	
Ammonia as N	mg/L	Fact Sheet	0.03	0.1	0.12	
Total Organic Carbon	mg/L		0.5	7.2	6.8	
Dissolved Organic Carbon	mg/L		0.5	11.2	6.1	
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	
Total Sodium	mg/L		0.1	17	16	
Total Potassium	mg/L		0.1	0.5	0.5	
Total Calcium	mg/L		0.1	4.8	5.1	
Total Magnesium	mg/L		0.1	1.8	1.9	
Bicarb. Alkalinity (as CaCO3)	mg/L		5	12	14	
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	
Hydroxide	mg/L		5	<5	<5	
Calculated TDS	mg/L		1	60	61	
Hardness	mg/L			19.4	20.6	
Langelier Index (@20C)	NA			-2.48	-3.21	
Langelier Index (@ 4C)	NA			-2.8	-3.53	
Saturation pH (@ 20C)	NA			9.8	9.71	
Saturation pH (@ 4C)	NA			10.1	10	
Anion Sum	me/L			0.99	1.05	
Cation Sum	me/L			1.16	1.15	
% Difference/Ion Balance	%			7.6	4.6	
Total Suspended Solids	mg/L	Narrative	5	<5	<5	
Total Dissolved Solids	mg/L		5	60	72	

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 2 Analytical results of standard water analysis in water samples from Noels Pond, Stephenville, NL (page 1 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-NP01-WS1-220922**	**3168-NP01-WS2-220922**	**3168-NP02-WS2-220922**
Sampling Date				09/22/2022	09/22/2022	09/22/2022
AGAT ID				4355939	4355955	4355938
Standard Water Analysis + Additional Parameters						
pH		6.5 - 9.0		7.26	7.26	7.25
Reactive Silica as SiO2	mg/L		0.5	2.7	2.4	2.4
Chloride	mg/L	640, 120	1	7	7	7
Fluoride	mg/L	0.12	0.12	<0.12	<0.12	<0.12
Sulphate	mg/L		2	<2	<2	<2
Alkalinity	mg/L		5	57	58	57
True Color	TCU	Narrative	5.00	52.8	43.3	44.6
Turbidity	NTU	Narrative	0.5	2.5	2.7	1.2
Electrical Conductivity	umho/cm		1	140	141	139
Nitrate + Nitrite as N	mg/L		0.05	0.08	0.07	0.08
Nitrate as N	mg/L	550, 13	0.05	0.08	0.07	0.08
Nitrite as N	mg/L	0.06	0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L	Fact Sheet	0.03	<0.03	<0.03	0.07
Total Organic Carbon	mg/L		0.5	5.8	5.9	5.8
Dissolved Organic Carbon	mg/L		0.5	4.2	3.9	3.6
Ortho-Phosphate as P	mg/L		0.01	0.05	<0.01	<0.01
Total Sodium	mg/L		0.1	5.9	5.9	5.7
Total Potassium	mg/L		0.1	0.4	0.5	0.4
Total Calcium	mg/L		0.8	16.9	16.9	16.2
Total Magnesium	mg/L		0.1	3.1	3.1	2.9
Bicarb. Alkalinity (as CaCO3)	mg/L		5	57	58	57
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5
Calculated TDS	mg/L		1	68	69	67
Hardness	mg/L			55	55	52.4
Langelier Index (@20C)	NA			-1.33	-1.32	-1.35
Langelier Index (@ 4C)	NA			-1.65	-1.64	-1.67
Saturation pH (@ 20C)	NA			8.59	8.58	8.6
Saturation pH (@ 4C)	NA			8.91	8.9	8.92
Anion Sum	me/L			1.34	1.36	1.34
Cation Sum	me/L			1.37	1.41	1.32
% Difference/Ion Balance	%			1.1	1.7	0.9
Total Suspended Solids	mg/L	Narrative	5	<5	<5	<5
Total Dissolved Solids	mg/L		5	78	104	78

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 2 Analytical results of standard water analysis in water samples from Noels Pond, Stephenville, NL (page 2 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-NP02-WS1-220922**	**3168-NP03-WS1-220922**	**3168-NP03-WS2-220922**
Sampling Date				09/22/2022	09/22/2022	09/22/2022
AGAT ID				4355927	4355911	4355924
Standard Water Analysis + Additional Parameters						
pH		6.5 - 9.0		7.25	7.16	7.26
Reactive Silica as SiO2	mg/L		0.5	2.4	2.2	2.4
Chloride	mg/L	640, 120	1	7	7	7
Fluoride	mg/L	0.12	0.12	<0.12	<0.12	<0.12
Sulphate	mg/L		2	<2	<2	<2
Alkalinity	mg/L		5	57	58	61
True Color	TCU	Narrative	5.00	42.5	39	39.8
Turbidity	NTU	Narrative	0.5	2	3	1.6
Electrical Conductivity	umho/cm		1	139	138	147
Nitrate + Nitrite as N	mg/L		0.05	0.08	0.07	0.08
Nitrate as N	mg/L	550, 13	0.05	0.08	0.07	0.08
Nitrite as N	mg/L	0.06	0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L	Fact Sheet	0.03	0.07	0.06	0.07
Total Organic Carbon	mg/L		0.5	5.7	6	5.6
Dissolved Organic Carbon	mg/L		0.5	3.5	3.7	3.8
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	<0.01
Total Sodium	mg/L		0.1	5.7	5.7	5.7
Total Potassium	mg/L		0.1	0.4	0.4	0.4
Total Calcium	mg/L		0.8	16.6	16.3	18.1
Total Magnesium	mg/L		0.1	3	2.9	3.2
Bicarb. Alkalinity (as CaCO3)	mg/L		5	57	58	61
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5
Calculated TDS	mg/L		1	67	68	72
Hardness	mg/L			53.8	52.6	58.4
Langelier Index (@20C)	NA			-1.34	-1.43	-1.27
Langelier Index (@ 4C)	NA			-1.66	-1.75	-1.59
Saturation pH (@ 20C)	NA			8.59	8.59	8.53
Saturation pH (@ 4C)	NA			8.91	8.91	8.85
Anion Sum	me/L			1.34	1.36	1.42
Cation Sum	me/L			1.35	1.32	1.44
% Difference/Ion Balance	%			0.1	1.4	0.6
Total Suspended Solids	mg/L	Narrative	5	<5	<5	<5
Total Dissolved Solids	mg/L		5	78	76	74

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 3 Analytical results of standard water analysis in water samples from Muddy Pond, Stephenville, NL (page 1 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-MP01-WS1-220925**	**3168-MP02-WS1-220925**	
Sampling Date				09/25/2022	09/25/2022	
AGAT ID				4355870	4355871	
Standard Water Analysis + Additional Parameters						
pH		6.5 - 9.0		6.84	6.91	
Reactive Silica as SiO2	mg/L		0.5	1.3	1.3	
Chloride	mg/L	640, 120	1	7	7	
Fluoride	mg/L	0.12	0.12	<0.12	<0.12	
Sulphate	mg/L		2	<2	<2	
Alkalinity	mg/L		5	34	34	
True Color	TCU	Narrative	5.00	51.1	49.1	
Turbidity	NTU	Narrative	0.5	<0.5	1.1	
Electrical Conductivity	umho/cm		1	97	99	
Nitrate + Nitrite as N	mg/L		0.05	0.05	0.06	
Nitrate as N	mg/L	550, 13	0.05	0.05	0.06	
Nitrite as N	mg/L	0.06	0.05	<0.05	<0.05	
Ammonia as N	mg/L	Fact Sheet	0.03	0.24	0.07	
Total Organic Carbon	mg/L		0.5	6.1	6.5	
Dissolved Organic Carbon	mg/L		0.5	3.9	3.7	
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	
Total Sodium	mg/L		0.1	5.7	5.5	
Total Potassium	mg/L		0.1	0.4	0.4	
Total Calcium	mg/L		0.8	10.4	10.6	
Total Magnesium	mg/L		0.1	2.2	2.1	
Bicarb. Alkalinity (as CaCO3)	mg/L		5	34	34	
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	
Hydroxide	mg/L		5	<5	<5	
Calculated TDS	mg/L		1	47	47	
Hardness	mg/L			35	35.1	
Langelier Index (@20C)	NA			-2.17	-2.09	
Langelier Index (@ 4C)	NA			-2.49	-2.41	
Saturation pH (@ 20C)	NA			9.01	9	
Saturation pH (@ 4C)	NA			9.33	9.32	
Anion Sum	me/L			0.88	0.88	
Cation Sum	me/L			0.99	0.97	
% Difference/Ion Balance	%			5.7	4.7	
Total Suspended Solids	mg/L	Narrative	5	<5	<5	
Total Dissolved Solids	mg/L		5	64	54	

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 3 Analytical results of standard water analysis in water samples from Muddy Pond, Stephenville, NL (page 2 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-MP02-WS2-220925**	**3168-MP03-WS1-220925**	
Sampling Date				09/25/2022	09/25/2022	
AGAT ID				4355901	4355903	
Standard Water Analysis + Additional Parameters						
pH		6.5 - 9.0		6.76	6.83	
Reactive Silica as SiO2	mg/L		0.5	1.7	0.9	
Chloride	mg/L	640, 120	1	8	7	
Fluoride	mg/L	0.12	0.12	<0.12	<0.12	
Sulphate	mg/L		2	<2	<2	
Alkalinity	mg/L		5	28	29	
True Color	TCU	Narrative	5.00	71.6	43.7	
Turbidity	NTU	Narrative	0.5	5	4.8	
Electrical Conductivity	umho/cm		1	92	88	
Nitrate + Nitrite as N	mg/L		0.05	0.13	<0.05	
Nitrate as N	mg/L	550, 13	0.05	0.13	<0.05	
Nitrite as N	mg/L	0.06	0.05	<0.05	<0.05	
Ammonia as N	mg/L	Fact Sheet	0.03	0.08	0.06	
Total Organic Carbon	mg/L		0.5	6.9	6.7	
Dissolved Organic Carbon	mg/L		0.5	3.7	4.2	
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	
Total Sodium	mg/L		0.1	5.8	5.9	
Total Potassium	mg/L		0.1	0.4	0.4	
Total Calcium	mg/L		0.1	9.5	9.4	
Total Magnesium	mg/L		0.1	1.9	1.9	
Bicarb. Alkalinity (as CaCO3)	mg/L		5	28	29	
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	
Hydroxide	mg/L		5	<5	<5	
Calculated TDS	mg/L		1	43	42	
Hardness	mg/L			31.5	31.3	
Langelier Index (@20C)	NA			-2.37	-2.28	
Langelier Index (@ 4C)	NA			-2.69	-2.6	
Saturation pH (@ 20C)	NA			9.13	9.11	
Saturation pH (@ 4C)	NA			9.45	9.43	
Anion Sum	me/L			0.79	0.78	
Cation Sum	me/L			0.91	0.91	
% Difference/Ion Balance	%			6.9	7.8	
Total Suspended Solids	mg/L	Narrative	5	<5	10	
Total Dissolved Solids	mg/L		5	48	44	

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 4 Analytical results of total metals in water samples for Gull (Mine) Pond, Stephenville, NL (page 1 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-GP01-WS1-220923**	**3168-GP02-WS1-220923**	**3168-GP02-WS2-220923**
Sampling Date				09/23/2022	09/23/2022	09/23/2022
AGAT ID				4355773	4355762	4355770
Total Metals						
Total Aluminum	ug/L	100	5	49	44	74
Total Antimony	ug/L		2	<2	<2	3
Total Arsenic	ug/L	5	2	<2	<2	<2
Total Barium	ug/L		5	13	9	12
Total Beryillium	ug/L		2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2
Total Boron	ug/L	29000	5	6	6	5
Total Cadmium	ug/L	Equation	0.017	<0.017	<0.017	<0.017
Total Chromium	ug/L		1	<1	<1	1
Total Cobalt	ug/L		1	<1	<1	<1
Total Copper	ug/L	Equation	1	2	<1	<1
Total Iron	ug/L	300	50	72	60	113
Total Lead	ug/L	Equation	0.5	<0.5	<0.5	0.7
Total Manganese	ug/L		2	19	17	10
Total Molybdenum	ug/L	73	2	<2	<2	<2
Total Nickel	ug/L	Equation	2	<2	<2	<2
Total Phosphorous	mg/L	Fact Sheet	0.02	0.03	0.02	0.03
Total Selenium	ug/L	1	1	<1	<1	<1
Total Silver	ug/L	0.25	0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	28	26	25
Total Thallium	ug/L	0.8	0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2
Total Titanium	ug/L		2	<2	<2	<2
Total Uranium	ug/L	33, 15	0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2
Total Zinc	ug/L	30	5	<5	<5	<5
Total Metals, Mercury						
Total Mercury	ug/L	0.026	0.026	<0.026	<0.026	<0.026

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 4 Analytical results of total metals in water samples for Gull (Mine) Pond, Stephenville, NL (page 2 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-GP03-WS1-220923**	**3168-GP03-WS2-220923**	
Sampling Date				09/23/2022	09/23/2022	
AGAT ID				4355740	4355744	
Total Metals						
Total Aluminum	ug/L	100	5	53	83	
Total Antimony	ug/L		2	3	<2	
Total Arsenic	ug/L	5	2	<2	<2	
Total Barium	ug/L		5	13	10	
Total Beryillium	ug/L		2	<2	<2	
Total Bismuth	ug/L		2	<2	<2	
Total Boron	ug/L	29000	5	6	6	
Total Cadmium	ug/L	Equation	0.017	<0.017	<0.017	
Total Chromium	ug/L		1	1	<1	
Total Cobalt	ug/L		1	<1	<1	
Total Copper	ug/L	Equation	1	<1	<1	
Total Iron	ug/L	300	50	98	204	
Total Lead	ug/L	Equation	0.5	<0.5	2.2	
Total Manganese	ug/L		2	17	64	
Total Molybdenum	ug/L	73	2	<2	<2	
Total Nickel	ug/L	Equation	2	<2	<2	
Total Phosphorous	mg/L	Fact Sheet	0.02	0.03	0.03	
Total Selenium	ug/L	1	1	<1	<1	
Total Silver	ug/L	0.25	0.1	<0.1	<0.1	
Total Strontium	ug/L		5	27	31	
Total Thallium	ug/L	0.8	0.1	<0.1	<0.1	
Total Tin	ug/L		2	<2	<2	
Total Titanium	ug/L		2	<2	<2	
Total Uranium	ug/L	33, 15	0.2	<0.2	<0.2	
Total Vanadium	ug/L		2	<2	<2	
Total Zinc	ug/L	30	5	<5	<5	
Total Metals, Mercury						
Total Mercury	ug/L	0.026	0.026	<0.026	<0.026	

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 5 Analytical results of total metals in water samples for Noels Pond, Stephenville, NL (page 1 of 3).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-NP01-WS1-220922**	**RDL**	**3168-NP01-WS2-220922**
Sampling Date				09/22/2022		09/22/2022
AGAT ID				4355939		4355955
Total Metals						
Total Aluminum	ug/L	100	5	36	5	**183**
Total Antimony	ug/L		2	<2	2	<2
Total Arsenic	ug/L	5	2	<2	2	<2
Total Barium	ug/L		5	21	5	27
Total Beryillium	ug/L		2	<2	2	<2
Total Bismuth	ug/L		2	<2	2	<2
Total Boron	ug/L	29000	5	5	5	5
Total Cadmium	ug/L	Equation	0.017	<0.017	0.017	<0.017
Total Chromium	ug/L		1	<1	1	<1
Total Cobalt	ug/L		1	<1	1	<1
Total Copper	ug/L	Equation	1	<1	1	<1
Total Iron	ug/L	300	50	96	50	**391**
Total Lead	ug/L	Equation	0.5	0.5	0.5	0.5
Total Manganese	ug/L		2	27	38	176
Total Molybdenum	ug/L	73	2	<2	2	<2
Total Nickel	ug/L	Equation	2	<2	2	<2
Total Phosphorous	mg/L	Fact Sheet	0.02	0.03	0.02	0.03
Total Selenium	ug/L	1	1	<1	1	<1
Total Silver	ug/L	0.25	0.1	<0.1	0.1	<0.1
Total Strontium	ug/L		5	35	5	34
Total Thallium	ug/L	0.8	0.1	<0.1	0.1	<0.1
Total Tin	ug/L		2	<2	2	<2
Total Titanium	ug/L		2	<2	2	3
Total Uranium	ug/L	33, 15	0.2	<0.2	0.2	<0.2
Total Vanadium	ug/L		2	<2	2	<2
Total Zinc	ug/L	30	5	<5	5	<5
Total Metals, Mercury						
Total Mercury	ug/L	0.026	0.026	<0.026	0.026	<0.026

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 5 Analytical results of total metals in water samples for Noels Pond, Stephenville, NL (page 2 of 3).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-NP02-WS1-220922**	**3168-NP02-WS2-220922**	**3168-NP03-WS1-220922**
Sampling Date				09/22/2022	09/22/2022	09/22/2022
AGAT ID				4355927	4355938	4355911
Total Metals						
Total Aluminum	ug/L	100	5	34	36	39
Total Antimony	ug/L		2	<2	<2	<2
Total Arsenic	ug/L	5	2	<2	<2	<2
Total Barium	ug/L		5	19	24	22
Total Beryillium	ug/L		2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2
Total Boron	ug/L	29000	5	5	5	5
Total Cadmium	ug/L	Equation	0.017	<0.017	<0.017	<0.017
Total Chromium	ug/L		1	<1	<1	<1
Total Cobalt	ug/L		1	<1	<1	<1
Total Copper	ug/L	Equation	1	<1	<1	<1
Total Iron	ug/L	300	50	91	94	109
Total Lead	ug/L	Equation	0.5	3.1	0.8	1
Total Manganese	ug/L		2	28	27	28
Total Molybdenum	ug/L	73	2	<2	<2	<2
Total Nickel	ug/L	Equation	2	<2	<2	<2
Total Phosphorous	mg/L	Fact Sheet	0.02	0.03	0.02	0.02
Total Selenium	ug/L	1	1	<1	<1	<1
Total Silver	ug/L	0.25	0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	35	33	34
Total Thallium	ug/L	0.8	0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2
Total Titanium	ug/L		2	<2	<2	<2
Total Uranium	ug/L	33, 15	0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2
Total Zinc	ug/L	30	5	<5	<5	<5
Total Metals, Mercury						
Total Mercury	ug/L	0.026	0.026	<0.026	<0.026	<0.026

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 5 Analytical results of total metals in water samples for Noels Pond, Stephenville, NL (page 3 of 3).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-NP03-WS2-220922**		
Sampling Date				09/22/2022		
AGAT ID				4355924		
Total Metals						
Total Aluminum	ug/L	100	5	40		
Total Antimony	ug/L		2	<2		
Total Arsenic	ug/L	5	2	<2		
Total Barium	ug/L		5	24		
Total Beryillium	ug/L		2	<2		
Total Bismuth	ug/L		2	<2		
Total Boron	ug/L	29000	5	5		
Total Cadmium	ug/L	Equation	0.017	<0.017		
Total Chromium	ug/L		1	<1		
Total Cobalt	ug/L		1	<1		
Total Copper	ug/L	Equation	1	<1		
Total Iron	ug/L	300	50	152		
Total Lead	ug/L	Equation	0.5	<0.5		
Total Manganese	ug/L		2	36		
Total Molybdenum	ug/L	73	2	<2		
Total Nickel	ug/L	Equation	2	<2		
Total Phosphorous	mg/L	Fact Sheet	0.02	0.03		
Total Selenium	ug/L	1	1	<1		
Total Silver	ug/L	0.25	0.1	<0.1		
Total Strontium	ug/L		5	40		
Total Thallium	ug/L	0.8	0.1	<0.1		
Total Tin	ug/L		2	<2		
Total Titanium	ug/L		2	<2		
Total Uranium	ug/L	33, 15	0.2	<0.2		
Total Vanadium	ug/L		2	<2		
Total Zinc	ug/L	30	5	<5		
Total Metals, Mercury						
Total Mercury	ug/L	0.026	0.026	<0.026		

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 6 Analytical results of total metals in water samples for Muddy Pond, Stephenville, NL (page 1 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-MP01-WS1-220925**	**3168-MP02-WS1-220925**	
Sampling Date				09/25/2022	09/25/2022	
AGAT ID				4355870	4355871	
Total Metals						
Total Aluminum	ug/L	100	5	72	71	
Total Antimony	ug/L		2	<2	<2	
Total Arsenic	ug/L	5	2	<2	<2	
Total Barium	ug/L		5	15	13	
Total Beryillium	ug/L		2	<2	<2	
Total Bismuth	ug/L		2	<2	<2	
Total Boron	ug/L	29000	5	5	<5	
Total Cadmium	ug/L	Equation	0.017	<0.017	<0.017	
Total Chromium	ug/L		1	<1	<1	
Total Cobalt	ug/L		1	<1	<1	
Total Copper	ug/L	Equation	1	<1	<1	
Total Iron	ug/L	300	50	118	111	
Total Lead	ug/L	Equation	0.5	1	<0.5	
Total Manganese	ug/L		2	8	7	
Total Molybdenum	ug/L	73	2	<2	<2	
Total Nickel	ug/L	Equation	2	<2	<2	
Total Phosphorous	mg/L	Fact Sheet	0.02	0.03	0.03	
Total Selenium	ug/L	1	1	<1	<1	
Total Silver	ug/L	0.25	0.1	<0.1	<0.1	
Total Strontium	ug/L		5	21	21	
Total Thallium	ug/L	0.8	0.1	<0.1	<0.1	
Total Tin	ug/L		2	<2	<2	
Total Titanium	ug/L		2	<2	<2	
Total Uranium	ug/L	33, 15	0.2	<0.2	<0.2	
Total Vanadium	ug/L		2	<2	<2	
Total Zinc	ug/L	30	5	<5	<5	
Total Metals, Mercury						
Total Mercury	ug/L	0.026	0.026	<0.026	<0.026	

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 6 Analytical results of total metals in water samples for Muddy Pond, Stephenville, NL (page 2 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-MP02-WS2-220925**	**3168-MP03-WS1-220925**	
Sampling Date				09/25/2022	09/25/2022	
AGAT ID				4355901	4355903	
Total Metals						
Total Aluminum	ug/L	100	5	85	62	
Total Antimony	ug/L		2	<2	<2	
Total Arsenic	ug/L	5	2	<2	<2	
Total Barium	ug/L		5	11	11	
Total Beryillium	ug/L		2	<2	<2	
Total Bismuth	ug/L		2	<2	<2	
Total Boron	ug/L	29000	5	<5	<5	
Total Cadmium	ug/L	Equation	0.017	<0.017	<0.017	
Total Chromium	ug/L		1	<1	1	
Total Cobalt	ug/L		1	<1	<1	
Total Copper	ug/L	Equation	1	<1	<1	
Total Iron	ug/L	300	50	119	124	
Total Lead	ug/L	Equation	0.5	<0.5	<0.5	
Total Manganese	ug/L		2	8	7	
Total Molybdenum	ug/L	73	2	<2	<2	
Total Nickel	ug/L	Equation	2	<2	<2	
Total Phosphorous	mg/L	Fact Sheet	0.02	0.03	0.03	
Total Selenium	ug/L	1	1	<1	<1	
Total Silver	ug/L	0.25	0.1	<0.1	<0.1	
Total Strontium	ug/L		5	18	18	
Total Thallium	ug/L	0.8	0.1	<0.1	<0.1	
Total Tin	ug/L		2	<2	<2	
Total Titanium	ug/L		2	<2	<2	
Total Uranium	ug/L	33, 15	0.2	<0.2	<0.2	
Total Vanadium	ug/L		2	<2	<2	
Total Zinc	ug/L	30	5	<5	<5	
Total Metals, Mercury						
Total Mercury	ug/L	0.026	0.026	<0.026	<0.026	

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 7 Analytical results of dissolved metals in water samples for Gull (Mine) Pond, Stephenville, NL (page 1 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-GP01-WS1-220923**	**3168-GP02-WS1-220923**	**3168-GP02-WS2-220923**
Sampling Date				09/23/2022	09/23/2022	09/23/2022
AGAT ID				4355773	4355762	4355770
Total Metals						
Dissolved Aluminum	mg/L	0.100	0.004	0.034	0.033	0.033
Dissolved Antimony	mg/L		0.001	<0.001	<0.001	<0.001
Dissolved Arsenic	mg/L	0.005	0.001	<0.001	<0.001	<0.001
Dissolved Barium	mg/L		0.002	0.005	0.005	0.005
Dissolved Beryllium	mg/L		0.0005	<0.0005	<0.0005	<0.0005
Dissolved Bismuth	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Boron	mg/L	29, 1.5	0.010	<0.010	<0.010	<0.010
Dissolved Cadmium	mg/L	Equation	0.0001	<0.0001	<0.0001	<0.0001
Dissolved Chromium	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Cobalt	mg/L		0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper	mg/L	Equation	0.001	0.001	0.001	0.002
Dissolved Iron	mg/L	0.300	0.010	0.057	0.062	0.067
Dissolved Lead	mg/L	Equation	0.0005	<0.0005	<0.0005	<0.0005
Dissolved Lithium	mg/L		0.05	<0.05	<0.05	<0.05
Dissolved Manganese	mg/L		0.002	<0.002	<0.002	0.005
Dissolved Molybdenum	mg/L	0.073	0.002	<0.002	<0.002	<0.002
Dissolved Nickel	mg/L	Equation	0.001	0.001	0.001	0.001
Dissolved Phosphorus	mg/L		0.05	<0.05	0.05	<0.05
Dissolved Selenium	mg/L	0.001	0.001	<0.001	0.003	<0.001
Dissolved Silicon	mg/L		0.05	0.95	1.01	1.16
Dissolved Silver	mg/L	0.00025	0.0001	<0.0001	<0.0001	<0.0001
Dissolved Strontium	mg/L		0.005	0.021	0.023	0.025
Dissolved Thallium	mg/L	0.0008	0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Titanium	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Uranium	mg/L	0.033, 0.015	0.0005	<0.0005	<0.0005	<0.0005
Dissolved Vanadium	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Zinc	mg/L	0.03	0.005	<0.005	<0.005	<0.005
Dissolved Zirconium	mg/L		0.004	<0.004	<0.004	<0.004
Dissolved Mercury						
Dissolved Mercury	ug/L	0.026	0.026	<0.026	<0.026	<0.026

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 7 Analytical results of dissolved metals in water samples for Gull (Mine) Pond, Stephenville, NL (page 2 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-GP03-WS1-220923**	**3168-GP03-WS2-220923**	
Sampling Date				09/23/2022	09/23/2022	
AGAT ID				4355740	4355744	
Total Metals						
Dissolved Aluminum	mg/L	0.100	0.004	0.028	0.043	
Dissolved Antimony	mg/L		0.001	<0.001	<0.001	
Dissolved Arsenic	mg/L	0.005	0.001	<0.001	0.001	
Dissolved Barium	mg/L		0.002	0.005	0.004	
Dissolved Beryllium	mg/L		0.0005	<0.0005	<0.0005	
Dissolved Bismuth	mg/L		0.002	<0.002	<0.002	
Dissolved Boron	mg/L	29, 1.5	0.010	<0.010	<0.010	
Dissolved Cadmium	mg/L	Equation	0.0001	<0.0001	<0.0001	
Dissolved Chromium	mg/L		0.002	<0.002	<0.002	
Dissolved Cobalt	mg/L		0.0005	<0.0005	<0.0005	
Dissolved Copper	mg/L	Equation	0.001	0.001	0.001	
Dissolved Iron	mg/L	0.3	0.010	0.047	0.1	
Dissolved Lead	mg/L	Equation	0.0005	<0.0005	<0.0005	
Dissolved Lithium	mg/L		0.05	<0.05	<0.05	
Dissolved Manganese	mg/L		0.002	<0.002	0.035	
Dissolved Molybdenum	mg/L	0.073	0.002	<0.002	<0.002	
Dissolved Nickel	mg/L	Equation	0.001	<0.001	0.001	
Dissolved Phosphorus	mg/L		0.05	<0.05	<0.05	
Dissolved Selenium	mg/L	0.001	0.001	<0.001	**0.002**	
Dissolved Silicon	mg/L		0.05	0.86	1.03	
Dissolved Silver	mg/L	0.00025	0.0001	<0.0001	<0.0001	
Dissolved Strontium	mg/L		0.005	0.023	0.024	
Dissolved Thallium	mg/L	0.0008	0.0003	<0.0003	<0.0003	
Dissolved Tin	mg/L		0.002	<0.002	<0.002	
Dissolved Titanium	mg/L		0.002	<0.002	<0.002	
Dissolved Uranium	mg/L	0.033, 0.015	0.0005	<0.0005	<0.0005	
Dissolved Vanadium	mg/L		0.002	<0.002	<0.002	
Dissolved Zinc	mg/L	0.03	0.005	<0.005	<0.005	
Dissolved Zirconium	mg/L		0.004	<0.004	<0.004	
Dissolved Mercury						
Dissolved Mercury	ug/L	0.026	0.026	<0.026	<0.026	

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 8 Analytical results of dissolved metals in water samples for Noels Pond, Stephenville, NL (page 1 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-NP01-WS1-220922**	**3168-NP01-WS2-220922**	**3168-NP02-WS1-220922**
Sampling Date				09/22/2022	09/22/2022	09/22/2022
AGAT ID				4355939	4355955	4355927
Total Metals						
Dissolved Aluminum	mg/L	0.100	0.004	0.02	0.02	0.019
Dissolved Antimony	mg/L		0.001	<0.001	<0.001	<0.001
Dissolved Arsenic	mg/L	0.005	0.001	<0.001	<0.001	<0.001
Dissolved Barium	mg/L		0.002	0.012	0.012	0.012
Dissolved Beryllium	mg/L		0.0005	<0.0005	<0.0005	<0.0005
Dissolved Bismuth	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Boron	mg/L	29, 1.5	0.010	<0.010	<0.010	<0.010
Dissolved Cadmium	mg/L	Equation	0.0001	<0.0001	<0.0001	<0.0001
Dissolved Chromium	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Cobalt	mg/L		0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper	mg/L	Equation	0.001	0.001	0.001	0.001
Dissolved Iron	mg/L	0.300	0.010	0.065	0.081	0.071
Dissolved Lead	mg/L	Equation	0.0005	<0.0005	<0.0005	<0.0005
Dissolved Lithium	mg/L		0.05	<0.05	<0.05	<0.05
Dissolved Manganese	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Molybdenum	mg/L	0.073	0.002	<0.002	<0.002	<0.002
Dissolved Nickel	mg/L	Equation	0.001	<0.001	<0.001	<0.001
Dissolved Phosphorus	mg/L		0.05	<0.05	<0.05	<0.05
Dissolved Selenium	mg/L	0.001	0.001	<0.001	<0.001	<0.001
Dissolved Silicon	mg/L		0.05	1.17	1.2	0.93
Dissolved Silver	mg/L	0.00025	0.0001	<0.0001	<0.0001	<0.0001
Dissolved Strontium	mg/L		0.005	0.032	0.031	0.027
Dissolved Thallium	mg/L	0.0008	0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Titanium	mg/L		0.002	<0.002	0.004	<0.002
Dissolved Uranium	mg/L	0.033, 0.015	0.0005	<0.0005	<0.0005	<0.0005
Dissolved Vanadium	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Zinc	mg/L	0.030	0.005	<0.005	<0.005	<0.005
Dissolved Zirconium	mg/L		0.004	<0.004	<0.004	<0.004
Dissolved Mercury						
Dissolved Mercury	ug/L	0.026	0.026	<0.026	<0.026	<0.026

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 8 Analytical results of dissolved metals in water samples for Noels Pond, Stephenville, NL (page 2 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-NP02-WS2-220922**	**3168-NP03-WS1-220922**	**3168-NP03-WS2-220922**
Sampling Date				09/22/2022	09/22/2022	09/22/2022
AGAT ID				4355938	4355911	4355924
Total Metals						
Dissolved Aluminum	mg/L	0.100	0.004	0.021	0.031	0.02
Dissolved Antimony	mg/L		0.001	<0.001	<0.001	<0.001
Dissolved Arsenic	mg/L	0.005	0.001	<0.001	<0.001	<0.001
Dissolved Barium	mg/L		0.002	0.012	0.013	0.014
Dissolved Beryllium	mg/L		0.0005	<0.0005	<0.0005	<0.0005
Dissolved Bismuth	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Boron	mg/L	29, 1.5	0.010	<0.010	<0.010	<0.010
Dissolved Cadmium	mg/L	Equation	0.0001	<0.0001	<0.0001	<0.0001
Dissolved Chromium	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Cobalt	mg/L		0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper	mg/L	Equation	0.001	0.001	0.002	0.002
Dissolved Iron	mg/L	0.3	0.010	0.061	0.069	0.068
Dissolved Lead	mg/L	Equation	0.0005	<0.0005	<0.0005	<0.0005
Dissolved Lithium	mg/L		0.05	<0.05	<0.05	<0.05
Dissolved Manganese	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Molybdenum	mg/L	0.073	0.002	<0.002	<0.002	<0.002
Dissolved Nickel	mg/L	Equation	0.001	<0.001	<0.001	<0.001
Dissolved Phosphorus	mg/L		0.05	<0.05	0.06	<0.05
Dissolved Selenium	mg/L	0.001	0.001	<0.001	<0.001	<0.001
Dissolved Silicon	mg/L		0.05	1.07	0.95	0.97
Dissolved Silver	mg/L	0.00025	0.0001	<0.0001	<0.0001	<0.0001
Dissolved Strontium	mg/L		0.005	0.032	0.03	0.036
Dissolved Thallium	mg/L	0.0008	0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Titanium	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Uranium	mg/L	0.033, 0.015	0.0005	<0.0005	<0.0005	<0.0005
Dissolved Vanadium	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Zinc	mg/L	0.03	0.005	<0.005	<0.005	<0.005
Dissolved Zirconium	mg/L		0.004	<0.004	<0.004	<0.004
Dissolved Mercury						
Dissolved Mercury	ug/L	0.026	0.026	<0.026	<0.026	<0.026

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 9 Analytical results of dissolved metals in water samples for Muddy Pond, Stephenville, NL (page 1 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-MP01-WS1-220925**	**3168-MP02-WS1-220925**	**3168-MP02-WS2-220925**
Sampling Date				09/25/2022	09/25/2022	09/25/2022
AGAT ID				4355870	4355871	4355901
Total Metals						
Dissolved Aluminum	mg/L	0.1	0.004	0.043	0.016	0.06
Dissolved Antimony	mg/L		0.001	<0.001	<0.001	<0.001
Dissolved Arsenic	mg/L	0.005	0.001	<0.001	<0.001	<0.001
Dissolved Barium	mg/L		0.002	0.009	0.008	0.006
Dissolved Beryllium	mg/L		0.0005	<0.0005	<0.0005	<0.0005
Dissolved Bismuth	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Boron	mg/L	29, 1.5	0.010	<0.010	<0.010	<0.010
Dissolved Cadmium	mg/L	Equation	0.0001	<0.0001	<0.0001	<0.0001
Dissolved Chromium	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Cobalt	mg/L		0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper	mg/L	Equation	0.001	0.003	0.001	0.002
Dissolved Iron	mg/L	0.3	0.010	0.067	0.081	0.08
Dissolved Lead	mg/L	Equation	0.0005	0.0005	<0.0005	<0.0005
Dissolved Lithium	mg/L		0.05	<0.05	<0.05	<0.05
Dissolved Manganese	mg/L		0.002	0.002	<0.002	<0.002
Dissolved Molybdenum	mg/L	0.073	0.002	<0.002	<0.002	<0.002
Dissolved Nickel	mg/L	Equation	0.001	0.001	<0.001	<0.001
Dissolved Phosphorus	mg/L		0.05	<0.05	<0.05	<0.05
Dissolved Selenium	mg/L	0.001	0.001	<0.001	**0.002**	<0.001
Dissolved Silicon	mg/L		0.05	0.58	0.48	0.8
Dissolved Silver	mg/L	0.00025	0.0001	<0.0001	<0.0001	<0.0001
Dissolved Strontium	mg/L		0.005	0.02	0.021	0.016
Dissolved Thallium	mg/L	0.0008	0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Titanium	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Uranium	mg/L	0.033, 0.015	0.0005	<0.0005	<0.0005	<0.0005
Dissolved Vanadium	mg/L		0.002	<0.002	<0.002	<0.002
Dissolved Zinc	mg/L	0.030	0.005	<0.005	<0.005	<0.005
Dissolved Zirconium	mg/L		0.004	<0.004	<0.004	<0.004
Dissolved Mercury						
Dissolved Mercury	ug/L	0.026	0.026	<0.026	<0.026	<0.026

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 9 Analytical results of dissolved metals in water samples for Muddy Pond, Stephenville, NL (page 2 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-MP03-WS1-220925**		
Sampling Date				09/25/2022		
AGAT ID				4355903		
Total Metals						
Dissolved Aluminum	mg/L	0.100	0.004	0.042		
Dissolved Antimony	mg/L		0.001	<0.001		
Dissolved Arsenic	mg/L	0.005	0.001	<0.001		
Dissolved Barium	mg/L		0.002	0.006		
Dissolved Beryllium	mg/L		0.0005	<0.0005		
Dissolved Bismuth	mg/L		0.002	<0.002		
Dissolved Boron	mg/L	29, 1.5	0.010	<0.010		
Dissolved Cadmium	mg/L	Equation	0.0001	<0.0001		
Dissolved Chromium	mg/L		0.002	<0.002		
Dissolved Cobalt	mg/L		0.0005	<0.0005		
Dissolved Copper	mg/L	Equation	0.001	0.001		
Dissolved Iron	mg/L	0.3	0.010	0.062		
Dissolved Lead	mg/L	Equation	0.0005	<0.0005		
Dissolved Lithium	mg/L		0.05	<0.05		
Dissolved Manganese	mg/L		0.002	<0.002		
Dissolved Molybdenum	mg/L	0.073	0.002	<0.002		
Dissolved Nickel	mg/L	Equation	0.001	<0.001		
Dissolved Phosphorus	mg/L		0.05	<0.05		
Dissolved Selenium	mg/L	0.001	0.001	<0.001		
Dissolved Silicon	mg/L		0.05	0.41		
Dissolved Silver	mg/L	0.00025	0.0001	<0.0001		
Dissolved Strontium	mg/L		0.005	0.018		
Dissolved Thallium	mg/L	0.0008	0.0003	<0.0003		
Dissolved Tin	mg/L		0.002	<0.002		
Dissolved Titanium	mg/L		0.002	<0.002		
Dissolved Uranium	mg/L	0.033, 0.015	0.0005	<0.0005		
Dissolved Vanadium	mg/L		0.002	<0.002		
Dissolved Zinc	mg/L	0.030	0.005	<0.005		
Dissolved Zirconium	mg/L		0.004	<0.004		
Dissolved Mercury						
Dissolved Mercury	ug/L	0.026	0.026	<0.026		

Comments:
- **Bold/Shaded** - Exceeds Guideline/Standard
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Table 10 Analytical results of BTEX/TPH in water samples for Gull (Mine) Pond, Stephenville, NL.

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G/S**	**RDL**	**3168-GP01-WS1-220923**	**3168-GP02-WS1-220923**	**3168-GP03-WS1-220923**
Sampling Date				09/23/2022	09/23/2022	09/23/2022
AGAT ID				4355773	4355762	4355740
Petroleum Hydrocarbons						
Benzene	mg/L	0.37	0.001	<0.001	<0.001	<0.001
Toluene	mg/L	0.002	0.001	<0.001	<0.001	<0.001
Ethylbenzene	mg/L	0.09	0.001	<0.001	<0.001	<0.001
Xylene (Total)	mg/L		0.002	<0.002	<0.002	<0.002
C6-C10 (less BTEX)	mg/L		0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05
>C21-C32 Hydrocarbons	mg/L		0.01	<0.01	<0.01	<0.01
Modified TPH (Tier 1)	mg/L		0.05	<0.05	<0.05	<0.05
Resemblance Comment				NR	NR	NR
Return to Baseline at C32				Y	Y	Y
Surrogate Recovery (%)						
Isobutylbenzene - EPH	%			100	88	92
Isobutylbenzene - VPH	%			105	109	111
n-Dotriacontane - EPH	%			104	79	83

Comments:
- Tier I - Atlantic RBCA Version 3 Minimum requirements and reference guidelines for environmental assessments of petroleum impacted sites in Atlantic Canada (Non-potable
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- **Bold/Shaded** - Exceeds Tier I Criteria.
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Resemblance Comment Kev:

FOF - Fuel Oil Fraction
FR - Product in Fuel Oil Range
GF - Gasoline Fraction
GR - Product in Gasoline Range
UC - Unidentified Compounds
WFOF - Weathered Fuel Oil Fraction
WGF - Weathered Gasoline Fraction
LOF - Lube Oil Fraction
LR - Lube Range
NA - Not Applicable
NR - No Resemblance

Table 11 Analytical results of BTEX/TPH in water samples for Noels Pond, Stephenville, NL.

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G/S**	**RDL**	**3168-NP01-WS1-220922**	**3168-NP02-WS1-220922**	**3168-NP03-WS1-220922**
Sampling Date				09/22/2022	09/22/2022	09/22/2022
AGAT ID				4355939	4355927	4355911
Petroleum Hydrocarbons						
Benzene	mg/L	0.37	0.001	<0.001	<0.001	<0.001
Toluene	mg/L	0.002	0.001	<0.001	<0.001	<0.001
Ethylbenzene	mg/L	0.09	0.001	<0.001	<0.001	<0.001
Xylene (Total)	mg/L		0.002	<0.002	<0.002	<0.002
C6-C10 (less BTEX)	mg/L		0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05
>C21-C32 Hydrocarbons	mg/L		0.01	<0.01	<0.01	<0.01
Modified TPH (Tier 1)	mg/L		0.05	<0.05	<0.05	<0.05
Resemblance Comment				NR	NR	NR
Return to Baseline at C32				Y	Y	Y
Surrogate Recovery (%)						
Isobutylbenzene - EPH	%			99	96	100
Isobutylbenzene - VPH	%			82	83	103
n-Dotriacontane - EPH	%			103	98	101

Comments:
- Tier I - Atlantic RBCA Version 3 Minimum requirements and reference guidelines for environmental assessments of petroleum impacted sites in Atlantic Canada (Non-potable
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- **Bold/Shaded** - Exceeds Tier I Criteria.
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Resemblance Comment Key:

FOF - Fuel Oil Fraction
FR - Product in Fuel Oil Range
GF - Gasoline Fraction
GR - Product in Gasoline Range
UC - Unidentified Compounds
WFOF - Weathered Fuel Oil Fraction
WGF - Weathered Gasoline Fraction
LOF - Lube Oil Fraction
LR - Lube Range
NA - Not Applicable
NR - No Resemblance

Table 12 Analytical results of BTEX/TPH in water samples for Muddy Pond, Stephenville, NL.

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G/S**	**RDL**	**3168-MP01-WS1-220925**	**3168-MP02-WS1-220925**	**3168-MP03-WS1-220925**
Sampling Date				09/25/2022	09/25/2022	09/25/2022
AGAT ID				4355870	4355871	4355903
Petroleum Hydrocarbons						
Benzene	mg/L	0.37	0.001	<0.001	<0.001	<0.001
Toluene	mg/L	0.002	0.001	<0.001	<0.001	<0.001
Ethylbenzene	mg/L	0.09	0.001	<0.001	<0.001	<0.001
Xylene (Total)	mg/L		0.002	<0.002	<0.002	<0.002
C6-C10 (less BTEX)	mg/L		0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05
>C21-C32 Hydrocarbons	mg/L		0.01	<0.01	<0.01	<0.01
Modified TPH (Tier 1)	mg/L		0.05	<0.05	<0.05	<0.05
Resemblance Comment				NR	NR	NR
Return to Baseline at C32				Y	Y	Y
Surrogate Recovery (%)						
Isobutylbenzene - EPH	%			100	100	100
Isobutylbenzene - VPH	%			102	102	96
n-Dotriacontane - EPH	%			101	100	101

Comments:
- Tier I - Atlantic RBCA Version 3 Minimum requirements and reference guidelines for environmental assessments of petroleum impacted sites in Atlantic Canada (Non-potable
- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the protection of Freshwater Aquatic Life, (Short Term, Long Term) (FWAL)
- **Bold/Shaded** - Exceeds Tier I Criteria.
- RDL - Reported Detection Limit;
- G / S - Guideline / Standard

Resemblance Comment Kev:

FOF - Fuel Oil Fraction
FR - Product in Fuel Oil Range
GF - Gasoline Fraction
GR - Product in Gasoline Range
UC - Unidentified Compounds
WFOF - Weathered Fuel Oil Fraction
WGF - Weathered Gasoline Fraction
LOF - Lube Oil Fraction
LR - Lube Range
NA - Not Applicable
NR - No Resemblance

Table 13 Analytical results of Volatile Organic Compounds in water samples from Gull (Mine) Pond, Muddy Pond and Noels Pond, Stephenville, NL.

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-GP02-WS1-220923**	**3168-MP02-WS1-220925**	**3168-NP01-WS1-220922**
Sampling Date				**09/23/2022**	**09/25/2022**	**09/22/2022**
AGAT ID				**4355762**	**4355871**	**4355939**
Volatile Organic Compounds						
Chloromethane	ug/L		1	<1	<1	<1
Vinyl Chloride	ug/L		0.6	<0.6	<0.6	<0.6
Bromomethane	ug/L		0.89	<0.89	<0.89	<0.89
Chloroethane	ug/L		5	<5	<5	<5
Trichlorofluoromethane (FREO	ug/L		5	<5	<5	<5
Acetone	ug/L		10	<10	<10	<10
1,1-Dichloroethylene	ug/L		0.6	<0.6	<0.6	<0.6
Methylene Chloride (Dichlorom	ug/L		2	<2	<2	<2
trans-1,2-Dichloroethylene	ug/L		2	<2	<2	<2
1,1-Dichloroethane	ug/L		1	<1	<1	<1
cis-1,2-Dichloroethylene	ug/L		2	<2	<2	<2
Chloroform	ug/L		1	<1	<1	<1
1,2-Dichloroethane	ug/L	100	2	<2	<2	<2
1,1,1-Trichloroethane	ug/L		1	<1	<1	<1
Carbon Tetrachloride	ug/L		0.56	<0.56	<0.56	<0.56
Benzene	ug/L	370	1	<1	<1	<1
1,2-Dichloropropane	ug/L		0.7	<0.7	<0.7	<0.7
Trichloroethylene	ug/L		1	<1	<1	<1
Bromodichloromethane	ug/L		1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L		0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	ug/L		0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L		1	<1	<1	<1
Toluene	ug/L	2	2	<2	<2	<2
2-Hexanone	ug/L		10.0	<10.0	<10.0	<10.0
Dibromochloromethane	ug/L		1	<1	<1	<1
1,2-Dibromoethane	ug/L		0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	ug/L		2	<2	<2	<2
1,1,1,2-Tetrachloroethane	µg/L		0.5	<0.5	<0.5	<0.5
Chlorobenzene	ug/L		1	<1	<1	<1
Ethylbenzene	ug/L	90	2	<2	<2	<2
m,p-Xylene	ug/L		4	<4	<4	<4
Bromoform	ug/L		1	<1	<1	<1
Styrene	ug/L	72	1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L		1	<1	<1	<1
o-Xylene	ug/L		1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	150	1	<1	<1	<1
1,4-Dichlorobenzene	ug/L	26	1	<1	<1	<1
1,2-Dichlorobenzene	ug/L		0.7	<0.7	<0.7	<0.7
Toluene-d8	%		1	101	100	100
4-Bromofluorobenzene	%		1	98	97	97

Comments: - RDL - Reported Detection Limit;
- G / S - Guideline / Standard
- Guideline Legend: **Exceeds Guideline**; Within Guideline; Below RDL

Table 14 Analytical results of BTEX/TPH in soil samples for Gull (Mine) Pond, Stephenville, NL (Page 1 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply							
Fracflow Sample ID	**Units**	**ESL[(1)] (mg/kg)**	**RDL**	**3168-GP01-SS1 (Original)**	**3168-GP01-SS1 (Silica Gel)**	**3168-GP02-SS1 (Original)**	**3168-GP02-SS1 (Silica Gel)**
Sampling Date				**09/21/2022**	**09/21/2022**	**09/21/2022**	**09/21/2022**
AGAT ID				**4352947**	**4352947**	**4352946**	**4352946**
Sampling Depth (m)				**2.45**	**2.45**	**13.80**	**13.80**
Petroleum Hydrocarbons							
Benzene	mg/L	31	0.02	<0.02	<0.02	<0.02	<0.02
Toluene	mg/L	75	0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/L	55	0.03	<0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/L	95	0.05	<0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX) (F1)	mg/L	210	3	<3	<3	<3	<3
>C10-C16 Hydrocarbons (F2)	mg/L	150	15	<15	<15	<15	<15
>C16-C21 Hydrocarbons (F3)	mg/L	300	15	<15	<15	16	<15
>C21-C32 Hydrocarbons (F3)	mg/L	300	15	42	17	110	44
Modified TPH (Tier 1)	mg/L		15	42	17	126	44
Resemblance Comment				LOF, UC	UC	LOF, UC	UC
Return to Baseline at C32				N	Y	N	Y
Silica Gel Clean Up				N	Y	N	Y
Surrogate Recovery (%)							
Isobutylbenzene - EPH	%			93	111	92	109
Isobutylbenzene - VPH	%			68	68	71	71
n-Dotriacontane - EPH	%			87	112	90	112
Inorganics							
% Moisture	%			68	68	90	90

Comments:
- (1) ESL: Atlantic RBCA v4 Ecological Screening Levels for the Protection of Plants and Soil Invertebrates; Direct Soil Contact - Surface Soils ≤1.5 metres below ground surface (Non-potable residential for coarse-grained soils).
- Atlantic PIRI lab protocol does not include the analysis of beyond C32 (i.e., F4).
- RDL - Reported Detection Limit
- G / S - Guideline / Standard
- Results are based on the dry weight of the soil.
- Guideline Legend:

Exceeds Guideline
Within Guideline
Below RDL

- Resemblance Comment Key:

FOF - Fuel Oil Fraction	NA - Not Applicable
FR - Product in Fuel Oil Range	NR - No Resemblance
GF - Gasoline Fraction	UC - Unidentified Compounds
GR - Product in Gasoline Range	WFOF - Weathered Fuel Oil Fraction
LOF - Lube Oil Fraction	WGF - Weathered Gasoline Fraction
LR - Lube Range	

Table 14 Analytical results of BTEX/TPH in soil samples for Gull (Mine) Pond, Stephenville, NL (Page 2 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply							
Fracflow Sample ID	**Units**	**ESL[(1)] (mg/kg)**	**RDL**	**3168-GP03-SS1 (Original)**	**3168-GP03-SS1 (Silica Gel)**	**---**	**---**
Sampling Date				**09/21/2022**	**09/21/2022**		
AGAT ID				**4352945**	**4352945**		
Sampling Depth (m)				**24.10**	**24.10**		
Petroleum Hydrocarbons							
Benzene	mg/L	31	0.02	<0.02	<0.02		
Toluene	mg/L	75	0.04	<0.04	<0.04		
Ethylbenzene	mg/L	55	0.03	<0.03	<0.03		
Xylene (Total)	mg/L	95	0.05	<0.05	<0.05		
C6-C10 (less BTEX) (F1)	mg/L	210	3	<3	<3		
>C10-C16 Hydrocarbons (F2)	mg/L	150	15	<15	<15		
>C16-C21 Hydrocarbons (F3)	mg/L	300	15	47	39		
>C21-C32 Hydrocarbons (F3)	mg/L	300	15	149	97		
Modified TPH (Tier 1)	mg/L		15	196	136		
Resemblance Comment				LOF, UC	UC		
Return to Baseline at C32				N	Y		
Silica Gel Clean Up				N	Y		
Surrogate Recovery (%)							
Isobutylbenzene - EPH	%			93	110		
Isobutylbenzene - VPH	%			70	70		
n-Dotriacontane - EPH	%			89	113		
Inorganics							
% Moisture	%			91	91		

Comments:
- (1) ESL: Atlantic RBCA v4 Ecological Screening Levels for the Protection of Plants and Soil Invertebrates; Direct Soil Contact - Surface Soils ≤1.5 metres below ground surface (Non-potable residential for coarse-grained soils).
- Atlantic PIRI lab protocol does not include the analysis of beyond C32 (i.e., F4).
- RDL - Reported Detection Limit
- G / S - Guideline / Standard
- Results are based on the dry weight of the soil.
- Guideline Legend:

Exceeds Guideline
Within Guideline
Below RDL

- Resemblance Comment Key:

FOF - Fuel Oil Fraction	NA - Not Applicable
FR - Product in Fuel Oil Range	NR - No Resemblance
GF - Gasoline Fraction	UC - Unidentified Compounds
GR - Product in Gasoline Range	WFOF - Weathered Fuel Oil Fraction
LOF - Lube Oil Fraction	WGF - Weathered Gasoline Fraction
LR - Lube Range	

Table 15 Analytical results of BTEX/TPH in soil samples for Noels Pond, Stephenville, NL (Page 1 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply							
Fracflow Sample ID	**Units**	**ESL[(1)] (mg/kg)**	**RDL**	**3168-NP01-SS1 (Original)**	**3168-NP01-SS1 (Silica Gel)**	**3168-NP02-SS1 (Original)**	**3168-NP03-SS1 (Silica Gel)**
Sampling Date				**09/21/2022**	**09/21/2022**	**09/21/2022**	**09/21/2022**
AGAT ID				**4352950**	**4352950**	**4352949**	**4352948**
Sampling Depth (m)				**7.20**	**7.20**	**12.40**	**12.40**
Petroleum Hydrocarbons							
Benzene	mg/L	31	0.02	<0.02	<0.02	<0.02	<0.02
Toluene	mg/L	75	0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/L	55	0.03	<0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/L	95	0.05	<0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX) (F1)	mg/L	210	3	<3	<3	<3	<3
>C10-C16 Hydrocarbons (F2)	mg/L	150	15	<15	<15	<15	<15
>C16-C21 Hydrocarbons (F3)	mg/L	300	15	22	18	<15	<15
>C21-C32 Hydrocarbons (F3)	mg/L	300	15	107	80	61	27
Modified TPH (Tier 1)	mg/L		15	129	98	61	27
Resemblance Comment				LOF, UC	LOF, UC	LOF, UC	UC
Return to Baseline at C32				N	Y	N	Y
Silica Gel Clean Up				N	Y	N	Y
Surrogate Recovery (%)							
Isobutylbenzene - EPH	%			95	112	95	95
Isobutylbenzene - VPH	%			121	121	121	121
n-Dotriacontane - EPH	%			91	114	88	88
Inorganics							
% Moisture	%			72	72	76	76

Comments:
- (1) ESL: Atlantic RBCA v4 Ecological Screening Levels for the Protection of Plants and Soil Invertebrates; Direct Soil Contact - Surface Soils ≤1.5 metres below ground surface (Non-potable residential for coarse-grained soils).
- Atlantic PIRI lab protocol does not include the analysis of beyond C32 (i.e., F4).
- RDL - Reported Detection Limit
- G / S - Guideline / Standard
- Results are based on the dry weight of the soil.
- Guideline Legend:

Exceeds Guideline
Within Guideline
Below RDL

- Resemblance Comment Key:

FOF - Fuel Oil Fraction	NA - Not Applicable
FR - Product in Fuel Oil Range	NR - No Resemblance
GF - Gasoline Fraction	UC - Unidentified Compounds
GR - Product in Gasoline Range	WFOF - Weathered Fuel Oil Fraction
LOF - Lube Oil Fraction	WGF - Weathered Gasoline Fraction
LR - Lube Range	

Table 15 Analytical results of BTEX/TPH in soil samples for Noels Pond, Stephenville, NL (Page 2 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply							
Fracflow Sample ID	**Units**	**ESL[(1)] (mg/kg)**	**RDL**	**3168-NP03-SS1 (Original)**	**3168-NP03-SS1 (Silica Gel)**	**---**	**---**
Sampling Date				**09/21/2022**	**09/21/2022**		
AGAT ID				**4352948**	**4352948**		
Sampling Depth (m)				**10.40**	**10.40**		
Petroleum Hydrocarbons							
Benzene	mg/L	31	0.02	<0.02	<0.02		
Toluene	mg/L	75	0.04	<0.04	<0.04		
Ethylbenzene	mg/L	55	0.03	<0.03	<0.03		
Xylene (Total)	mg/L	95	0.05	<0.05	<0.05		
C6-C10 (less BTEX) (F1)	mg/L	210	3	<3	<3		
>C10-C16 Hydrocarbons (F2)	mg/L	150	15	<15	<15		
>C16-C21 Hydrocarbons (F3)	mg/L	300	15	26	<15		
>C21-C32 Hydrocarbons (F3)	mg/L	300	15	83	30		
Modified TPH (Tier 1)	mg/L		15	109	30		
Resemblance Comment				LOF, UC	UC		
Return to Baseline at C32				N	Y		
Silica Gel Clean Up				N	Y		
Surrogate Recovery (%)							
Isobutylbenzene - EPH	%			93	109		
Isobutylbenzene - VPH	%			65	65		
n-Dotriacontane - EPH	%			89	110		
Inorganics							
% Moisture	%			70	70		

Comments:
- (1) ESL: Atlantic RBCA v4 Ecological Screening Levels for the Protection of Plants and Soil Invertebrates; Direct Soil Contact - Surface Soils ≤1.5 metres below ground surface (Non-potable residential for coarse-grained soils).
- Atlantic PIRI lab protocol does not include the analysis of beyond C32 (i.e., F4).
- RDL - Reported Detection Limit
- G / S - Guideline / Standard
- Results are based on the dry weight of the soil.
- Guideline Legend:

Exceeds Guideline
Within Guideline
Below RDL

- Resemblance Comment Key:

FOF - Fuel Oil Fraction	NA - Not Applicable
FR - Product in Fuel Oil Range	NR - No Resemblance
GF - Gasoline Fraction	UC - Unidentified Compounds
GR - Product in Gasoline Range	WFOF - Weathered Fuel Oil Fraction
LOF - Lube Oil Fraction	WGF - Weathered Gasoline Fraction
LR - Lube Range	

Table 16 Analytical results of BTEX/TPH in soil samples for Muddy Pond, Stephenville, NL (Page 1 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply							
Fracflow Sample ID	**Units**	**ESL[(1)] (mg/kg)**	**RDL**	**3168-MP01-SS1 (Original)**	**3168-MP01-SS1 (Silica Gel)**	**3168-MP02-SS1 (Original)**	**3168-MP02-SS1 (Silica Gel)**
Sampling Date				**09/25/2022**	**09/25/2022**	**09/25/2022**	**09/25/2022**
AGAT ID				**4353078**	**4353078**	**4353079**	**4353079**
Sampling Depth (m)				**4.10**	**4.10**	**16.60**	**16.60**
Petroleum Hydrocarbons							
Benzene	mg/L	31	0.02	<0.02	<0.02	<0.02	<0.02
Toluene	mg/L	75	0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/L	55	Varies	<0.03	<0.01	<0.03	<0.03
Xylene (Total)	mg/L	95	0.05	<0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX) (F1)	mg/L	210	3	<3	<3	<3	<3
>C10-C16 Hydrocarbons (F2)	mg/L	150	15	<15	<15	<15	<15
>C16-C21 Hydrocarbons (F3)	mg/L	300	15	<15	<15	30	22
>C21-C32 Hydrocarbons (F3)	mg/L	300	15	75	44	188	109
Modified TPH (Tier 1)	mg/L		15	75	44	218	131
Resemblance Comment				LOF, UC	LOF, UC	LOF, UC	LOF, UC
Return to Baseline at C32				N	Y	N	Y
Silica Gel Clean Up				N	Y	N	Y
Surrogate Recovery (%)							
Isobutylbenzene - EPH	%			95	108	94	110
Isobutylbenzene - VPH	%			117	117	118	118
n-Dotriacontane - EPH	%			90	111	92	116
Inorganics							
% Moisture	%			79	79	88	88

Comments:
- (1) ESL: Atlantic RBCA v4 Ecological Screening Levels for the Protection of Plants and Soil Invertebrates; Direct Soil Contact - Surface Soils ≤1.5 metres below ground surface (Non-potable residential for coarse-grained soils).
- Atlantic PIRI lab protocol does not include the analysis of beyond C32 (i.e., F4).
- RDL - Reported Detection Limit
- G / S - Guideline / Standard
- Results are based on the dry weight of the soil.
- Guideline Legend:

Exceeds Guideline
Within Guideline
Below RDL

- Resemblance Comment Key:

FOF - Fuel Oil Fraction	NA - Not Applicable
FR - Product in Fuel Oil Range	NR - No Resemblance
GF - Gasoline Fraction	UC - Unidentified Compounds
GR - Product in Gasoline Range	WFOF - Weathered Fuel Oil Fraction
LOF - Lube Oil Fraction	WGF - Weathered Gasoline Fraction
LR - Lube Range	

Table 16 Analytical results of BTEX/TPH in soil samples for Muddy Pond, Stephenville, NL (Page 2 of 2).

Project 3168 - Stephenville, NL - Industrial Water Supply							
Fracflow Sample ID	**Units**	**ESL[(1)] (mg/kg)**	**RDL**	**3168-MP03-SS1 (Original)**	**3168-MP03-SS1 (Silica Gel)**	**---**	**---**
Sampling Date				**09/25/2022**	**09/25/2022**		
AGAT ID				**4353080**	**4353080**		
Sampling Depth (m)				**2.00**	**2.00**		
Petroleum Hydrocarbons							
Benzene	mg/L	31	0.02	<0.02	<0.02		
Toluene	mg/L	75	0.04	<0.04	<0.04		
Ethylbenzene	mg/L	55	0.03	<0.03	<0.03		
Xylene (Total)	mg/L	95	0.05	<0.05	<0.05		
C6-C10 (less BTEX) (F1)	mg/L	210	3	<3	<3		
>C10-C16 Hydrocarbons (F2)	mg/L	150	15	<15	<15		
>C16-C21 Hydrocarbons (F3)	mg/L	300	15	47	26		
>C21-C32 Hydrocarbons (F3)	mg/L	300	15	145	71		
Modified TPH (Tier 1)	mg/L		15	192	97		
Resemblance Comment				LOF, UC	UC		
Return to Baseline at C32				N	Y		
Silica Gel Clean Up				N	Y		
Surrogate Recovery (%)							
Isobutylbenzene - EPH	%			93	108		
Isobutylbenzene - VPH	%			115	115		
n-Dotriacontane - EPH	%			92	110		
Inorganics							
% Moisture	%			88	88		

Comments:
- (1) ESL: Atlantic RBCA v4 Ecological Screening Levels for the Protection of Plants and Soil Invertebrates; Direct Soil Contact - Surface Soils ≤1.5 metres below ground surface (Non-potable residential for coarse-grained soils).
- Atlantic PIRI lab protocol does not include the analysis of beyond C32 (i.e., F4).
- RDL - Reported Detection Limit
- G / S - Guideline / Standard
- Results are based on the dry weight of the soil.
- Guideline Legend:

Exceeds Guideline
Within Guideline
Below RDL

- Resemblance Comment Key:

FOF - Fuel Oil Fraction	NA - Not Applicable
FR - Product in Fuel Oil Range	NR - No Resemblance
GF - Gasoline Fraction	UC - Unidentified Compounds
GR - Product in Gasoline Range	WFOF - Weathered Fuel Oil Fraction
LOF - Lube Oil Fraction	WGF - Weathered Gasoline Fraction
LR - Lube Range	

Table 17 Analytical results of Polycyclic Aromatic Hydrocarbons in soil samples from Gull (Mine) Pond, Stephenville, NL.

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-GP01-SS1**	**3168-GP02-SS1**	**3168-GP03-SS1**
Sampling Date				**09/21/2022**	**09/21/2022**	**09/21/2022**
AGAT ID				**4352947**	**4352946**	**4352945**
Polychclic Aromatic Hydrocarbons						
1-Methylnaphthalene	mg/kg		0.05	<0.01	<0.01	<0.01
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	0.01
Acridine	mg/kg		0.05	<0.01	<0.01	<0.01
Anthracene	mg/kg		0.03	<0.01	<0.01	<0.01
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01
Benzo(e)pyrene	mg/kg		0.05	<0.01	<0.01	<0.01
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	0.01	0.1	0.16
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	0.82	8.61	17.8
Phenanthrene	mg/kg		0.03	<0.01	<0.01	<0.01
Pyrene	mg/kg		0.05	<0.01	<0.01	<0.01
Quinoline	mg/kg		0.05	<0.01	<0.01	<0.01
Surrogate Recovery (%)						
Naphthalene-d8	%			85	81	80
Terphenyl-d14	%		1	64	60	54
Pyrene-d10 (%)	%		1	57	61	57

Comments: - RDL - Reported Detection Limit;
- G / S - Guideline / Standard

- Guideline Legend:

Exceeds Guideline
Within Guideline
Below RDL

Table 18 Analytical results of Polycyclic Aromatic Hydrocarbons in soil samples from Noels Pond, Stephenville, NL.

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-NP01-SS1**	**3168-NP02-SS1**	**3168-NP03-SS1**
Sampling Date				**09/21/2022**	**09/21/2022**	**09/21/2022**
AGAT ID				**4352950**	**4352949**	**4352948**
Polychclic Aromatic Hydrocarbons						
1-Methylnaphthalene	mg/kg		0.05	0.01	<0.01	<0.01
2-Methylnaphthalene	mg/kg		0.01	0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	0.0549	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.01	<0.01	<0.01
Anthracene	mg/kg		0.03	0.13	<0.01	<0.01
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	0.2	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01
Benzo(e)pyrene	mg/kg		0.05	0.16	<0.01	<0.01
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	0.31	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	0.53	0.12	0.03
Fluorene	mg/kg		0.01	0.06	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	3.65	3.92	1.05
Phenanthrene	mg/kg		0.03	0.46	<0.01	<0.01
Pyrene	mg/kg		0.05	0.4	0.1	<0.01
Quinoline	mg/kg		0.05	<0.01	<0.01	<0.01
Surrogate Recovery (%)						
Naphthalene-d8	%			93	93	78
Terphenyl-d14	%		1	67	62	59
Pyrene-d10 (%)	%		1	65	63	66

Comments: - RDL - Reported Detection Limit;
- G / S - Guideline / Standard

- Guideline Legend:

Exceeds Guideline
Within Guideline
Below RDL

Table 19 Analytical results of Polycyclic Aromatic Hydrocarbons in soil samples from Muddy Pond, Stephenville, NL.

Project 3168 - Stephenville, NL - Industrial Water Supply						
Fracflow Sample ID	**Units**	**G / S**	**RDL**	**3168-MP01-SS1**	**3168-MP02-SS1**	**3168-MP03-SS1**
Sampling Date				**09/25/2022**	**09/25/2022**	**09/25/2022**
AGAT ID				**4353078**	**4353079**	**4353080**
Polychclic Aromatic Hydrocarbons						
1-Methylnaphthalene	mg/kg		0.05	<0.01	<0.01	<0.01
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.01	<0.01	<0.01
Anthracene	mg/kg		0.03	<0.01	0.08	<0.01
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	0.18	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.01	0.14	<0.01
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.01	0.26	<0.01
Benzo(e)pyrene	mg/kg		0.05	<0.01	0.13	<0.01
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	0.09	0.58	0.09
Fluorene	mg/kg		0.01	<0.01	0.05	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	1.15	1.02	1.82
Phenanthrene	mg/kg		0.03	<0.01	0.33	<0.01
Pyrene	mg/kg		0.05	0.08	0.5	<0.01
Quinoline	mg/kg		0.05	<0.01	<0.01	<0.01
Surrogate Recovery (%)						
Naphthalene-d8	%			60	82	75
Terphenyl-d14	%		1	80	89	75
Pyrene-d10 (%)	%		1	74	84	68

Comments: - RDL - Reported Detection Limit;
- G / S - Guideline / Standard

- Guideline Legend:

Exceeds Guideline
Within Guideline
Below RDL

5.0 REFERENCES

Fracflow Consultants Inc., 2022a. Technical Memorandum. Assessment of the Potential to Obtain an Industrial Water Supply, North of the Port of Stephenville, NL. Report No. FFC-NL-3168-001. 13p. June 1, 2022.

Fracflow Consultants Inc., 2022b. Report. Evaluation of Industrial Water Supply. Stephenville, NL. Report No. FFC-NL-3168-004.

APPENDIX A

Water and Pond Sediment Chemistry Data

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: FRACFLOW CONSULTANTS
154 MAJOR'S PATH
ST. JOHN'S PATH, NL A1A5A1
(709) 739-7270
ATTENTION TO: John Gale
PROJECT: 3168 Horizon Maritime
AGAT WORK ORDER: 22K950750
TRACE ORGANICS REVIEWED BY: Dylan McCarthy, Trace Organics Lab Technician
WATER ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor
DATE REPORTED: Oct 11, 2022
PAGES (INCLUDING COVER): 35
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level Version 3.1

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-GP03-WS1	3168-GP02-WS1	3168-GP01-WS1	3168-MP01-WS1	3168-MP02-WS1	3168-MP03-WS1	3168-NP03-WS1	3168-NP02-WS1
		SAMPLE DESCRIPTION:		-220923	-220923	-220923	-220925	-220925	-220925	-220922	-220922
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-23 13:20	2022-09-23 14:30	2022-09-23 15:00	2022-09-25 10:50	2022-09-25 11:45	2022-09-25 13:40	2022-09-22 10:15	2022-09-22 11:45
Parameter	Unit	G / S	RDL	4355740	4355762	4355773	4355870	4355871	4355903	4355911	4355927
Benzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylene (Total)	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6-C10 (less BTEX)	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-C32 Hydrocarbons	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Modified TPH (Tier 1)	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sediment				NO	NO	NO	NO	NO	NO	NO	NO
Resemblance Comment				NR	NR	NR	NR	NR	NR	NR	NR
Return to Baseline at C32				Y	Y	Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits									
Isobutylbenzene - EPH	%	70-130		92	88	100	100	100	100	100	96
Isobutylbenzene - VPH	%	70-130		111	109	105	102	102	96	103	83
n-Dotriacontane - EPH	%	70-130		83	79	104	101	100	101	101	98

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level Version 3.1

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-NP01-WS1
		SAMPLE DESCRIPTION:		-220922
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-09-22 13:15
Parameter	Unit	G / S	RDL	4355939
Benzene	mg/L		0.001	<0.001
Toluene	mg/L		0.001	<0.001
Ethylbenzene	mg/L		0.001	<0.001
Xylene (Total)	mg/L		0.002	<0.002
C6-C10 (less BTEX)	mg/L		0.01	<0.01
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05
>C21-C32 Hydrocarbons	mg/L		0.01	<0.01
Modified TPH (Tier 1)	mg/L		0.05	<0.05
Sediment				NO
Resemblance Comment				NR
Return to Baseline at C32				Y
Surrogate	Unit	Acceptable Limits		
Isobutylbenzene - EPH	%	70-130		99
Isobutylbenzene - VPH	%	70-130		82
n-Dotriacontane - EPH	%	70-130		103

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AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level Version 3.1

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4355740-4355939 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Resemblance Comment Key:
GF - Gasoline Fraction
WGF - Weathered Gasoline Fraction
GR - Product in Gasoline Range
FOF - Fuel Oil Fraction
WFOF - Weathered Fuel Oil Fraction
FR - Product in Fuel Oil Range
LOF - Lube Oil Fraction
LR - Lube Range
UC - Unidentified Compounds
NR - No Resemblance
NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-GP02-WS1	3168-MP02-WS1	3168-NP01-WS1
		SAMPLE DESCRIPTION:		-220923	-220925	-220922
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2022-09-23 14:30	2022-09-25 11:45	2022-09-22 13:15
Parameter	Unit	G / S	RDL	4355762	4355871	4355939
Chloromethane	ug/L		1	<1	<1	<1
Vinyl Chloride	ug/L		0.6	<0.6	<0.6	<0.6
Bromomethane	ug/L		0.89	<0.89	<0.89	<0.89
Chloroethane	ug/L		5	<5	<5	<5
Trichlorofluoromethane (FREON 11)	ug/L		5	<5	<5	<5
Acetone	ug/L		10	<10	<10	<10
1,1-Dichloroethylene	ug/L		0.6	<0.6	<0.6	<0.6
Methylene Chloride (Dichloromethane)	ug/L		2	<2	<2	<2
trans-1,2-Dichloroethylene	ug/L		2	<2	<2	<2
1,1-Dichloroethane	ug/L		1	<1	<1	<1
cis-1,2-Dichloroethylene	ug/L		2	<2	<2	<2
Chloroform	ug/L		1	<1	<1	<1
1,2-Dichloroethane	ug/L		2	<2	<2	<2
1,1,1-Trichloroethane	ug/L		1	<1	<1	<1
Carbon Tetrachloride	ug/L		0.56	<0.56	<0.56	<0.56
Benzene	ug/L		1	<1	<1	<1
1,2-Dichloropropane	ug/L		0.7	<0.7	<0.7	<0.7
Trichloroethylene	ug/L		1	<1	<1	<1
Bromodichloromethane	ug/L		1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L		0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	ug/L		0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L		1	<1	<1	<1
Toluene	ug/L		2	<2	<2	<2
2-Hexanone	ug/L		10.0	<10.0	<10.0	<10.0
Dibromochloromethane	ug/L		1	<1	<1	<1
1,2-Dibromoethane	ug/L		0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	ug/L		2	<2	<2	<2
1,1,1,2-Tetrachloroethane	µg/L		0.5	<0.5	<0.5	<0.5

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-GP02-WS1	3168-MP02-WS1	3168-NP01-WS1
		SAMPLE DESCRIPTION:		-220923	-220925	-220922
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2022-09-23 14:30	2022-09-25 11:45	2022-09-22 13:15
Parameter	Unit	G / S	RDL	4355762	4355871	4355939
Chlorobenzene	ug/L		1	<1	<1	<1
Ethylbenzene	ug/L		2	<2	<2	<2
m,p-Xylene	ug/L		4	<4	<4	<4
Bromoform	ug/L		1	<1	<1	<1
Styrene	ug/L		1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L		1	<1	<1	<1
o-Xylene	ug/L		1	<1	<1	<1
1,3-Dichlorobenzene	ug/L		1	<1	<1	<1
1,4-Dichlorobenzene	ug/L		1	<1	<1	<1
1,2-Dichlorobenzene	ug/L		0.7	<0.7	<0.7	<0.7
Surrogate	Unit	Acceptable Limits				
Toluene-d8	%	60-140		101	100	100
4-Bromofluorobenzene	%	60-140		98	97	97

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories

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Dartmouth, Nova Scotia
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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

DOC

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-GP03-WS1	3168-GP03-WS2	3168-GP02-WS1	3168-GP02-WS2	3168-GP01-WS1	3168-MP01-WS1	3168-MP02-WS1	3168-MP02-WS2
		SAMPLE DESCRIPTION:		-220923	-220923	-220923	-220923	-220923	-220925	-220925	-220925
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-23 13:20	2022-09-23 13:55	2022-09-23 14:30	2022-09-23 14:30	2022-09-23 15:00	2022-09-25 10:50	2022-09-25 11:45	2022-09-25 12:25
Parameter	Unit	G / S	RDL	4355740	4355744	4355762	4355770	4355773	4355870	4355871	4355901
Dissolved Organic Carbon	mg/L		0.5	11.2	6.1	5.1	4.8	5.7	3.9	3.7	3.7

				3168-MP03-WS1	3168-NP03-WS1	3168-NP03-WS2	3168-NP02-WS1	3168-NP02-WS2	3168-NP01-WS1	3168-NP01-WS2
		SAMPLE DESCRIPTION:		-220925	-220922	-220922	-220922	-220922	-220922	-220922
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-25 13:40	2022-09-22 10:15	2022-09-22 11:00	2022-09-22 11:45	2022-09-22 12:15	2022-09-22 13:15	2022-09-22 14:10
Parameter	Unit	G / S	RDL	4355903	4355911	4355924	4355927	4355938	4355939	4355955
Dissolved Organic Carbon	mg/L		0.5	4.2	3.7	3.8	3.5	3.6	4.2	3.9

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Mercury Analysis in Water (Dissolved)

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-GP03-WS1	3168-GP03-WS2	3168-GP02-WS1	3168-GP02-WS2	3168-GP01-WS1	3168-MP01-WS1	3168-MP02-WS1	3168-MP02-WS2
		SAMPLE DESCRIPTION:		-220923	-220923	-220923	-220923	-220923	-220925	-220925	-220925
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-23 13:20	2022-09-23 13:55	2022-09-23 14:30	2022-09-23 14:30	2022-09-23 15:00	2022-09-25 10:50	2022-09-25 11:45	2022-09-25 12:25
Parameter	Unit	G / S	RDL	4355740	4355744	4355762	4355770	4355773	4355870	4355871	4355901
Dissolved Mercury	ug/L		0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026

				3168-MP03-WS1	3168-NP03-WS1	3168-NP03-WS2	3168-NP02-WS1	3168-NP02-WS2	3168-NP01-WS1	3168-NP01-WS2
		SAMPLE DESCRIPTION:		-220925	-220922	-220922	-220922	-220922	-220922	-220922
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-25 13:40	2022-09-22 10:15	2022-09-22 11:00	2022-09-22 11:45	2022-09-22 12:15	2022-09-22 13:15	2022-09-22 14:10
Parameter	Unit	G / S	RDL	4355903	4355911	4355924	4355927	4355938	4355939	4355955
Dissolved Mercury	ug/L		0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories

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Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Mercury Analysis in Water (Total)

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-GP03-WS1	3168-GP03-WS2	3168-GP02-WS1	3168-GP02-WS2	3168-GP01-WS1	3168-MP01-WS1	3168-MP02-WS1	3168-MP02-WS2
		SAMPLE DESCRIPTION:		-220923	-220923	-220923	-220923	-220923	-220925	-220925	-220925
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-23 13:20	2022-09-23 13:55	2022-09-23 14:30	2022-09-23 14:30	2022-09-23 15:00	2022-09-25 10:50	2022-09-25 11:45	2022-09-25 12:25
Parameter	Unit	G / S	RDL	4355740	4355744	4355762	4355770	4355773	4355870	4355871	4355901
Total Mercury	ug/L		0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026

				3168-MP03-WS1	3168-NP03-WS1	3168-NP03-WS2	3168-NP02-WS1	3168-NP02-WS2	3168-NP01-WS1	3168-NP01-WS2
		SAMPLE DESCRIPTION:		-220925	-220922	-220922	-220922	-220922	-220922	-220922
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-25 13:40	2022-09-22 10:15	2022-09-22 11:00	2022-09-22 11:45	2022-09-22 12:15	2022-09-22 13:15	2022-09-22 14:10
Parameter	Unit	G / S	RDL	4355903	4355911	4355924	4355927	4355938	4355939	4355955
Total Mercury	ug/L		0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Metals - Lab Filtered Dissolved Metals in Water (mg/L)

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-GP03-WS1	3168-GP03-WS2	3168-GP02-WS1	3168-GP02-WS2	3168-GP01-WS1	3168-MP01-WS1	3168-MP02-WS1	3168-MP02-WS2
		SAMPLE DESCRIPTION:		-220923	-220923	-220923	-220923	-220923	-220925	-220925	-220925
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-23 13:20	2022-09-23 13:55	2022-09-23 14:30	2022-09-23 14:30	2022-09-23 15:00	2022-09-25 10:50	2022-09-25 11:45	2022-09-25 12:25
Parameter	Unit	G / S	RDL	4355740	4355744	4355762	4355770	4355773	4355870	4355871	4355901
Dissolved Aluminum	mg/L		0.004	0.028	0.043	0.033	0.033	0.034	0.043	0.016	0.060
Dissolved Antimony	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Arsenic	mg/L		0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Barium	mg/L		0.002	0.005	0.004	0.005	0.005	0.005	0.009	0.008	0.006
Dissolved Beryllium	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Bismuth	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Boron	mg/L		0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dissolved Cadmium	mg/L		0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Chromium	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Cobalt	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper	mg/L		0.001	0.001	0.001	0.001	0.002	0.001	0.003	0.001	0.002
Dissolved Iron	mg/L		0.010	0.047	0.100	0.062	0.067	0.057	0.067	0.081	0.080
Dissolved Lead	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.0005
Dissolved Lithium	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Manganese	mg/L		0.002	<0.002	0.035	<0.002	0.005	<0.002	0.002	<0.002	<0.002
Dissolved Molybdenum	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Nickel	mg/L		0.001	<0.001	0.001	0.001	0.001	0.001	0.001	<0.001	<0.001
Dissolved Phosphorus	mg/L		0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Selenium	mg/L		0.001	<0.001	0.002	0.003	<0.001	<0.001	<0.001	0.002	<0.001
Dissolved Silicon	mg/L		0.05	0.86	1.03	1.01	1.16	0.95	0.58	0.48	0.80
Dissolved Silver	mg/L		0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Strontium	mg/L		0.005	0.023	0.024	0.023	0.025	0.021	0.020	0.021	0.016
Dissolved Thallium	mg/L		0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Titanium	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Uranium	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Vanadium	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Zinc	mg/L		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Metals - Lab Filtered Dissolved Metals in Water (mg/L)

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-GP03-WS1	3168-GP03-WS2	3168-GP02-WS1	3168-GP02-WS2	3168-GP01-WS1	3168-MP01-WS1	3168-MP02-WS1	3168-MP02-WS2
		SAMPLE DESCRIPTION:		-220923	-220923	-220923	-220923	-220923	-220925	-220925	-220925
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-23 13:20	2022-09-23 13:55	2022-09-23 14:30	2022-09-23 14:30	2022-09-23 15:00	2022-09-25 10:50	2022-09-25 11:45	2022-09-25 12:25
Parameter	Unit	G / S	RDL	4355740	4355744	4355762	4355770	4355773	4355870	4355871	4355901
Dissolved Zirconium	mg/L		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Lab Filtration Performed				2022/10/05	2022/10/05	2022/10/05	2022/10/05	2022/10/05	2022/10/05	2022/10/05	2022/10/05

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PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Metals - Lab Filtered Dissolved Metals in Water (mg/L)

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-MP03-WS1	3168-NP03-WS1	3168-NP03-WS2	3168-NP02-WS1	3168-NP02-WS2	3168-NP01-WS1	3168-NP01-WS2
		SAMPLE DESCRIPTION:		-220925	-220922	-220922	-220922	-220922	-220922	-220922
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-25 13:40	2022-09-22 10:15	2022-09-22 11:00	2022-09-22 11:45	2022-09-22 12:15	2022-09-22 13:15	2022-09-22 14:10
Parameter	Unit	G / S	RDL	4355903	4355911	4355924	4355927	4355938	4355939	4355955
Dissolved Aluminum	mg/L		0.004	0.042	0.031	0.020	0.019	0.021	0.020	0.020
Dissolved Antimony	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Arsenic	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Barium	mg/L		0.002	0.006	0.013	0.014	0.012	0.012	0.012	0.012
Dissolved Beryllium	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Bismuth	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Boron	mg/L		0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dissolved Cadmium	mg/L		0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Chromium	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Cobalt	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper	mg/L		0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.001
Dissolved Iron	mg/L		0.010	0.062	0.069	0.068	0.071	0.061	0.065	0.081
Dissolved Lead	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Lithium	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Manganese	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Molybdenum	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Nickel	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Phosphorus	mg/L		0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Selenium	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Silicon	mg/L		0.05	0.41	0.95	0.97	0.93	1.07	1.17	1.20
Dissolved Silver	mg/L		0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Strontium	mg/L		0.005	0.018	0.030	0.036	0.027	0.032	0.032	0.031
Dissolved Thallium	mg/L		0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Titanium	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.004
Dissolved Uranium	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Vanadium	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Zinc	mg/L		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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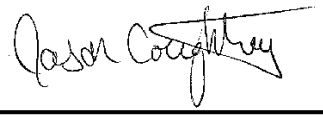

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Metals - Lab Filtered Dissolved Metals in Water (mg/L)

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-MP03-WS1	3168-NP03-WS1	3168-NP03-WS2	3168-NP02-WS1	3168-NP02-WS2	3168-NP01-WS1	3168-NP01-WS2
		SAMPLE DESCRIPTION:		-220925	-220922	-220922	-220922	-220922	-220922	-220922
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-25 13:40	2022-09-22 10:15	2022-09-22 11:00	2022-09-22 11:45	2022-09-22 12:15	2022-09-22 13:15	2022-09-22 14:10
Parameter	Unit	G / S	RDL	4355903	4355911	4355924	4355927	4355938	4355939	4355955
Dissolved Zirconium	mg/L		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Lab Filtration Performed				2022/10/05	2022/10/05	2022/10/05	2022/10/05	2022/10/05	2022/10/05	2022/10/05

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4355740-4355955 Metals analysis completed on a lab filtered sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-GP03-WS1	3168-GP03-WS2	3168-GP02-WS1	3168-GP02-WS2	3168-GP01-WS1		3168-MP01-WS1	3168-MP02-WS1
		SAMPLE DESCRIPTION:		-220923	-220923	-220923	-220923	-220923		-220925	-220925
		SAMPLE TYPE:		Water	Water	Water	Water	Water		Water	Water
		DATE SAMPLED:		2022-09-23 13:20	2022-09-23 13:55	2022-09-23 14:30	2022-09-23 14:30	2022-09-23 15:00		2022-09-25 10:50	2022-09-25 11:45
Parameter	Unit	G / S	RDL	4355740	4355744	4355762	4355770	4355773	RDL	4355870	4355871
pH				7.32	6.50	6.59	6.48	6.60		6.84	6.91
Reactive Silica as SiO2	mg/L		0.5	2.0	2.7	2.0	2.6	2.1	0.5	1.3	1.3
Chloride	mg/L		1	23	24	23	23	23	1	7	7
Fluoride	mg/L		0.12	<0.12	<0.12	<0.12	<0.12	<0.12	0.12	<0.12	<0.12
Sulphate	mg/L		2	5	4	4	4	3	2	<2	<2
Alkalinity	mg/L		5	12	14	11	12	10	5	34	34
True Color	TCU		5.00	31.4	40.1	33.9	34.6	32.1	5.00	51.1	49.1
Turbidity	NTU		0.5	0.7	0.7	<0.5	1.8	1.7	0.5	<0.5	1.1
Electrical Conductivity	umho/cm		1	118	123	118	119	119	1	97	99
Nitrate + Nitrite as N	mg/L		0.05	<0.05	0.08	<0.05	0.06	<0.05	0.05	0.05	0.06
Nitrate as N	mg/L		0.05	<0.05	0.08	<0.05	0.06	<0.05	0.05	0.05	0.06
Nitrite as N	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05
Ammonia as N	mg/L		0.03	0.10	0.12	0.11	0.10	0.08	0.03	0.24	0.07
Total Organic Carbon	mg/L		0.5	7.2	6.8	7.2	6.8	7.3	0.5	6.1	6.5
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Total Sodium	mg/L		0.1	17	16	16	15	16	0.1	5.7	5.5
Total Potassium	mg/L		0.1	0.5	0.5	0.5	0.5	0.5	0.1	0.4	0.4
Total Calcium	mg/L		0.1	4.8	5.1	4.7	4.7	4.9	0.8	10.4	10.6
Total Magnesium	mg/L		0.1	1.8	1.9	1.8	1.8	1.8	0.1	2.2	2.1
Bicarb. Alkalinity (as CaCO3)	mg/L		5	12	14	11	12	10	5	34	34
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10	<10	<10	10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5	<5	<5	5	<5	<5
Calculated TDS	mg/L		1	60	61	57	57	55	1	47	47
Hardness	mg/L			19.4	20.6	19.1	19.1	19.6		35.0	35.1
Langelier Index (@20C)	NA			-2.48	-3.21	-3.26	-3.33	-3.27		-2.17	-2.09
Langelier Index (@ 4C)	NA			-2.80	-3.53	-3.58	-3.65	-3.59		-2.49	-2.41
Saturation pH (@ 20C)	NA			9.80	9.71	9.85	9.81	9.87		9.01	9.00
Saturation pH (@ 4C)	NA			10.1	10.0	10.2	10.1	10.2		9.33	9.32

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

SAMPLE DESCRIPTION:				3168-GP03-WS1 -220923	3168-GP03-WS2 -220923	3168-GP02-WS1 -220923	3168-GP02-WS2 -220923	3168-GP01-WS1 -220923		3168-MP01-WS1 -220925	3168-MP02-WS1 -220925
SAMPLE TYPE:				Water	Water	Water	Water	Water		Water	Water
DATE SAMPLED:				2022-09-23 13:20	2022-09-23 13:55	2022-09-23 14:30	2022-09-23 14:30	2022-09-23 15:00		2022-09-25 10:50	2022-09-25 11:45
Parameter	Unit	G / S	RDL	4355740	4355744	4355762	4355770	4355773	RDL	4355870	4355871
Anion Sum	me/L			0.99	1.05	0.95	0.98	0.91		0.88	0.88
Cation sum	me/L			1.16	1.15	1.11	1.07	1.12		0.99	0.97
% Difference/ Ion Balance	%			7.6	4.6	7.5	4.5	10.1		5.7	4.7
Total Aluminum	ug/L		5	53	83	44	74	49	5	72	71
Total Antimony	ug/L		2	3	<2	<2	3	<2	2	<2	<2
Total Arsenic	ug/L		2	<2	<2	<2	<2	<2	2	<2	<2
Total Barium	ug/L		5	13	10	9	12	13	5	15	13
Total Beryllium	ug/L		2	<2	<2	<2	<2	<2	2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	<2	<2	2	<2	<2
Total Boron	ug/L		5	6	6	6	5	6	5	5	<5
Total Cadmium	ug/L		0.017	<0.017	<0.017	<0.017	<0.017	<0.017	0.017	<0.017	<0.017
Total Chromium	ug/L		1	1	<1	<1	1	<1	1	<1	<1
Total Cobalt	ug/L		1	<1	<1	<1	<1	<1	1	<1	<1
Total Copper	ug/L		1	<1	<1	<1	<1	2	1	<1	<1
Total Iron	ug/L		50	98	204	60	113	72	50	118	111
Total Lead	ug/L		0.5	<0.5	2.2	<0.5	0.7	<0.5	0.5	1.0	<0.5
Total Manganese	ug/L		2	17	64	17	10	19	2	8	7
Total Molybdenum	ug/L		2	<2	<2	<2	<2	<2	2	<2	<2
Total Nickel	ug/L		2	<2	<2	<2	<2	<2	2	<2	<2
Total Phosphorous	mg/L		0.02	0.03	0.03	0.02	0.03	0.03	0.02	0.03	0.03
Total Selenium	ug/L		1	<1	<1	<1	<1	<1	1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Total Strontium	ug/L		5	27	31	26	25	28	5	21	21
Total Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	<2	<2	2	<2	<2
Total Titanium	ug/L		2	<2	<2	<2	<2	<2	2	<2	<2
Total Uranium	ug/L		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2	<2	<2	2	<2	<2

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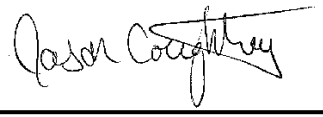

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-GP03-WS1	3168-GP03-WS2	3168-GP02-WS1	3168-GP02-WS2	3168-GP01-WS1		3168-MP01-WS1	3168-MP02-WS1
		SAMPLE DESCRIPTION:		-220923	-220923	-220923	-220923	-220923		-220925	-220925
		SAMPLE TYPE:		Water	Water	Water	Water	Water		Water	Water
		DATE SAMPLED:		2022-09-23 13:20	2022-09-23 13:55	2022-09-23 14:30	2022-09-23 14:30	2022-09-23 15:00		2022-09-25 10:50	2022-09-25 11:45
Parameter	Unit	G / S	RDL	4355740	4355744	4355762	4355770	4355773	RDL	4355870	4355871
Total Zinc	ug/L		5	<5	<5	<5	<5	<5	5	<5	<5

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DATE REPORTED: 2022-10-11

				3168-MP02-WS2	3168-MP03-WS1		3168-NP03-WS1	3168-NP03-WS2	3168-NP02-WS1	3168-NP02-WS2	3168-NP01-WS1
		SAMPLE DESCRIPTION:		-220925	-220925		-220922	-220922	-220922	-220922	-220922
		SAMPLE TYPE:		Water	Water		Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-25 12:25	2022-09-25 13:40		2022-09-22 10:15	2022-09-22 11:00	2022-09-22 11:45	2022-09-22 12:15	2022-09-22 13:15
Parameter	Unit	G / S	RDL	4355901	4355903	RDL	4355911	4355924	4355927	4355938	4355939
pH				6.76	6.83		7.16	7.26	7.25	7.25	7.26
Reactive Silica as SiO2	mg/L		0.5	1.7	0.9	0.5	2.2	2.4	2.4	2.4	2.7
Chloride	mg/L		1	8	7	1	7	7	7	7	7
Fluoride	mg/L		0.12	<0.12	<0.12	0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Sulphate	mg/L		2	<2	<2	2	<2	<2	<2	<2	<2
Alkalinity	mg/L		5	28	29	5	58	61	57	57	57
True Color	TCU		5.00	71.6	43.7	5.00	39.0	39.8	42.5	44.6	52.8
Turbidity	NTU		0.5	5.0	4.8	0.5	3.0	1.6	2.0	1.2	2.5
Electrical Conductivity	umho/cm		1	92	88	1	138	147	139	139	140
Nitrate + Nitrite as N	mg/L		0.05	0.13	<0.05	0.05	0.07	0.08	0.08	0.08	0.08
Nitrate as N	mg/L		0.05	0.13	<0.05	0.05	0.07	0.08	0.08	0.08	0.08
Nitrite as N	mg/L		0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L		0.03	0.08	0.06	0.03	0.06	0.07	0.07	0.07	<0.03
Total Organic Carbon	mg/L		0.5	6.9	6.7	0.5	6.0	5.6	5.7	5.8	5.8
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.05
Total Sodium	mg/L		0.1	5.8	5.9	0.1	5.7	5.7	5.7	5.7	5.9
Total Potassium	mg/L		0.1	0.4	0.4	0.1	0.4	0.4	0.4	0.4	0.4
Total Calcium	mg/L		0.1	9.5	9.4	0.8	16.3	18.1	16.6	16.2	16.9
Total Magnesium	mg/L		0.1	1.9	1.9	0.1	2.9	3.2	3.0	2.9	3.1
Bicarb. Alkalinity (as CaCO3)	mg/L		5	28	29	5	58	61	57	57	57
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	10	<10	<10	<10	<10	<10
Hydroxide	mg/L		5	<5	<5	5	<5	<5	<5	<5	<5
Calculated TDS	mg/L		1	43	42	1	68	72	67	67	68
Hardness	mg/L			31.5	31.3		52.6	58.4	53.8	52.4	55.0
Langelier Index (@20C)	NA			-2.37	-2.28		-1.43	-1.27	-1.34	-1.35	-1.33
Langelier Index (@ 4C)	NA			-2.69	-2.60		-1.75	-1.59	-1.66	-1.67	-1.65
Saturation pH (@ 20C)	NA			9.13	9.11		8.59	8.53	8.59	8.60	8.59
Saturation pH (@ 4C)	NA			9.45	9.43		8.91	8.85	8.91	8.92	8.91

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-MP02-WS2	3168-MP03-WS1		3168-NP03-WS1	3168-NP03-WS2	3168-NP02-WS1	3168-NP02-WS2	3168-NP01-WS1
		SAMPLE DESCRIPTION:		-220925	-220925		-220922	-220922	-220922	-220922	-220922
		SAMPLE TYPE:		Water	Water		Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-25 12:25	2022-09-25 13:40		2022-09-22 10:15	2022-09-22 11:00	2022-09-22 11:45	2022-09-22 12:15	2022-09-22 13:15
Parameter	Unit	G / S	RDL	4355901	4355903	RDL	4355911	4355924	4355927	4355938	4355939
Anion Sum	me/L			0.79	0.78		1.36	1.42	1.34	1.34	1.34
Cation sum	me/L			0.91	0.91		1.32	1.44	1.35	1.32	1.37
% Difference/ Ion Balance	%			6.9	7.8		1.4	0.6	0.1	0.9	1.1
Total Aluminum	ug/L		5	85	62	5	39	40	34	36	36
Total Antimony	ug/L		2	<2	<2	2	<2	<2	<2	<2	<2
Total Arsenic	ug/L		2	<2	<2	2	<2	<2	<2	<2	<2
Total Barium	ug/L		5	11	11	5	22	24	19	24	21
Total Beryllium	ug/L		2	<2	<2	2	<2	<2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	2	<2	<2	<2	<2	<2
Total Boron	ug/L		5	<5	<5	5	5	5	5	5	5
Total Cadmium	ug/L		0.017	<0.017	<0.017	0.017	<0.017	<0.017	<0.017	<0.017	<0.017
Total Chromium	ug/L		1	<1	1	1	<1	<1	<1	<1	<1
Total Cobalt	ug/L		1	<1	<1	1	<1	<1	<1	<1	<1
Total Copper	ug/L		1	<1	<1	1	<1	<1	<1	<1	<1
Total Iron	ug/L		50	119	124	50	109	152	91	94	96
Total Lead	ug/L		0.5	<0.5	<0.5	0.5	1.0	<0.5	3.1	0.8	0.5
Total Manganese	ug/L		2	8	7	2	28	36	28	27	27
Total Molybdenum	ug/L		2	<2	<2	2	<2	<2	<2	<2	<2
Total Nickel	ug/L		2	<2	<2	2	<2	<2	<2	<2	<2
Total Phosphorous	mg/L		0.02	0.03	0.03	0.02	0.02	0.03	0.03	0.02	0.03
Total Selenium	ug/L		1	<1	<1	1	<1	<1	<1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	18	18	5	34	40	35	33	35
Total Thallium	ug/L		0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	2	<2	<2	<2	<2	<2
Total Titanium	ug/L		2	<2	<2	2	<2	<2	<2	<2	<2
Total Uranium	ug/L		0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	2	<2	<2	<2	<2	<2

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-MP02-WS2	3168-MP03-WS1		3168-NP03-WS1	3168-NP03-WS2	3168-NP02-WS1	3168-NP02-WS2	3168-NP01-WS1
		SAMPLE DESCRIPTION:		-220925	-220925		-220922	-220922	-220922	-220922	-220922
		SAMPLE TYPE:		Water	Water		Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-25 12:25	2022-09-25 13:40		2022-09-22 10:15	2022-09-22 11:00	2022-09-22 11:45	2022-09-22 12:15	2022-09-22 13:15
Parameter	Unit	G / S	RDL	4355901	4355903	RDL	4355911	4355924	4355927	4355938	4355939
Total Zinc	ug/L		5	<5	<5	5	<5	<5	<5	<5	<5

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ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-NP01-WS2
		SAMPLE DESCRIPTION:		-220922
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-09-22 14:10
Parameter	Unit	G / S	RDL	4355955
pH				7.26
Reactive Silica as SiO2	mg/L		0.5	2.4
Chloride	mg/L		1	7
Fluoride	mg/L		0.12	<0.12
Sulphate	mg/L		2	<2
Alkalinity	mg/L		5	58
True Color	TCU		5.00	43.3
Turbidity	NTU		0.5	2.7
Electrical Conductivity	umho/cm		1	141
Nitrate + Nitrite as N	mg/L		0.05	0.07
Nitrate as N	mg/L		0.05	0.07
Nitrite as N	mg/L		0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03
Total Organic Carbon	mg/L		0.5	5.9
Ortho-Phosphate as P	mg/L		0.01	<0.01
Total Sodium	mg/L		0.1	5.9
Total Potassium	mg/L		0.1	0.5
Total Calcium	mg/L		0.8	16.9
Total Magnesium	mg/L		0.1	3.1
Bicarb. Alkalinity (as CaCO3)	mg/L		5	58
Carb. Alkalinity (as CaCO3)	mg/L		10	<10
Hydroxide	mg/L		5	<5
Calculated TDS	mg/L		1	69
Hardness	mg/L			55.0
Langelier Index (@20C)	NA			-1.32
Langelier Index (@ 4C)	NA			-1.64
Saturation pH (@ 20C)	NA			8.58
Saturation pH (@ 4C)	NA			8.90

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CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-NP01-WS2
		SAMPLE DESCRIPTION:		-220922
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-09-22 14:10
Parameter	Unit	G / S	RDL	4355955
Anion Sum	me/L			1.36
Cation sum	me/L			1.41
% Difference/ Ion Balance	%			1.7
Total Aluminum	ug/L		5	183
Total Antimony	ug/L		2	<2
Total Arsenic	ug/L		2	<2
Total Barium	ug/L		5	27
Total Beryllium	ug/L		2	<2
Total Bismuth	ug/L		2	<2
Total Boron	ug/L		5	5
Total Cadmium	ug/L		0.017	<0.017
Total Chromium	ug/L		1	<1
Total Cobalt	ug/L		1	<1
Total Copper	ug/L		1	<1
Total Iron	ug/L		50	391
Total Lead	ug/L		0.5	0.5
Total Manganese	ug/L		38	176
Total Molybdenum	ug/L		2	<2
Total Nickel	ug/L		2	<2
Total Phosphorous	mg/L		0.02	0.03
Total Selenium	ug/L		1	<1
Total Silver	ug/L		0.1	<0.1
Total Strontium	ug/L		5	34
Total Thallium	ug/L		0.1	<0.1
Total Tin	ug/L		2	<2
Total Titanium	ug/L		2	3
Total Uranium	ug/L		0.2	<0.2
Total Vanadium	ug/L		2	<2

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AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				SAMPLE DESCRIPTION:	3168-NP01-WS2 -220922
				SAMPLE TYPE:	Water
				DATE SAMPLED:	2022-09-22 14:10
Parameter	Unit	G / S	RDL	4355955	
Total Zinc	ug/L		5	<5	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4355740-4355955 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

TSS, TDS

DATE RECEIVED: 2022-09-27

DATE REPORTED: 2022-10-11

				3168-GP03-WS1	3168-GP03-WS2	3168-GP02-WS1	3168-GP02-WS2	3168-GP01-WS1	3168-MP01-WS1	3168-MP02-WS1	3168-MP02-WS2
		SAMPLE DESCRIPTION:		-220923	-220923	-220923	-220923	-220923	-220925	-220925	-220925
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-23 13:20	2022-09-23 13:55	2022-09-23 14:30	2022-09-23 14:30	2022-09-23 15:00	2022-09-25 10:50	2022-09-25 11:45	2022-09-25 12:25
Parameter	Unit	G / S	RDL	4355740	4355744	4355762	4355770	4355773	4355870	4355871	4355901
Total Suspended Solids	mg/L		5	<5	<5	<5	<5	<5	<5	<5	<5
Total Dissolved Solids	mg/L		5	60	72	76	74	74	64	54	48

				3168-MP03-WS1	3168-NP03-WS1	3168-NP03-WS2	3168-NP02-WS1	3168-NP02-WS2	3168-NP01-WS1	3168-NP01-WS2
		SAMPLE DESCRIPTION:		-220925	-220922	-220922	-220922	-220922	-220922	-220922
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-09-25 13:40	2022-09-22 10:15	2022-09-22 11:00	2022-09-22 11:45	2022-09-22 12:15	2022-09-22 13:15	2022-09-22 14:10
Parameter	Unit	G / S	RDL	4355903	4355911	4355924	4355927	4355938	4355939	4355955
Total Suspended Solids	mg/L		5	10	<5	<5	<5	<5	<5	<5
Total Dissolved Solids	mg/L		5	44	76	74	78	78	78	104

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 22K950750
PROJECT: 3168 Horizon Maritime
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Oct 11, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Volatile Organic Compounds in Water															
Chloromethane	1	4329349	< 1	< 1	NA	< 1	70%	50%	140%	76%	60%	130%	62%	50%	140%
Vinyl Chloride	1	4329349	< 0.6	< 0.6	NA	< 0.6	69%	50%	140%	64%	60%	130%	65%	50%	140%
Bromomethane	1	4329349	< 0.89	< 0.89	NA	< 0.89	109%	50%	140%	107%	60%	130%	97%	50%	140%
Chloroethane	1	4329349	< 5	< 5	NA	< 5	74%	50%	140%	72%	60%	130%	120%	50%	140%
Trichlorofluoromethane (FREON 11)	1	4329349	< 5	< 5	NA	< 5	82%	50%	140%	71%	60%	130%	82%	50%	140%
Acetone	1	4329349	< 10	< 10	NA	< 10	97%	50%	140%	94%	50%	140%	90%	50%	140%
1,1-Dichloroethylene	1	4329349	< 0.6	< 0.6	NA	< 0.6	82%	50%	140%	76%	60%	130%	76%	50%	140%
Methylene Chloride (Dichloromethane)	1	4329349	< 2	< 2	NA	< 2	91%	50%	140%	89%	60%	130%	84%	50%	140%
trans-1,2-Dichloroethylene	1	4329349	< 2	< 2	NA	< 2	88%	50%	140%	86%	60%	130%	77%	50%	140%
1,1-Dichloroethane	1	4329349	< 1	< 1	NA	< 1	90%	50%	140%	90%	60%	130%	80%	50%	140%
cis-1,2-Dichloroethylene	1	4329349	< 2	< 2	NA	< 2	97%	50%	140%	96%	60%	130%	86%	50%	140%
Chloroform	1	4329349	< 1	< 1	NA	< 1	105%	50%	140%	106%	60%	130%	83%	50%	140%
1,2-Dichloroethane	1	4329349	< 2	< 2	NA	< 2	91%	50%	140%	97%	60%	130%	91%	50%	140%
1,1,1-Trichloroethane	1	4329349	< 1	< 1	NA	< 1	91%	50%	140%	88%	60%	130%	83%	50%	140%
Carbon Tetrachloride	1	4329349	< 0.56	< 0.56	NA	< 0.56	92%	50%	140%	84%	60%	130%	84%	50%	140%
Benzene	1	4329349	< 1	< 1	NA	< 1	95%	70%	130%	94%	60%	140%	84%	60%	140%
1,2-Dichloropropane	1	4329349	< 0.7	< 0.7	NA	< 0.7	95%	50%	140%	93%	60%	130%	84%	50%	140%
Trichloroethylene	1	4329349	< 1	< 1	NA	< 1	97%	50%	140%	93%	60%	130%	84%	50%	140%
Bromodichloromethane	1	4329349	< 1	< 1	NA	< 1	94%	50%	140%	95%	60%	130%	86%	50%	140%
cis-1,3-Dichloropropene	1	4329349	< 0.5	< 0.5	NA	< 0.5	98%	50%	140%	97%	60%	130%	88%	50%	140%
trans-1,3-Dichloropropene	1	4329349	< 0.5	< 0.5	NA	< 0.5	91%	50%	140%	90%	60%	130%	79%	50%	140%
1,1,2-Trichloroethane	1	4329349	< 1	< 1	NA	< 1	94%	50%	140%	94%	60%	130%	86%	50%	140%
Toluene	1	4329349	< 2	< 2	NA	< 2	88%	70%	130%	87%	60%	140%	76%	60%	140%
2-Hexanone	1	4329349	< 10.0	< 10.0	NA	< 10.0	98%	50%	140%	95%	50%	140%	93%	50%	140%
Dibromochloromethane	1	4329349	< 1	< 1	NA	< 1	93%	50%	140%	94%	60%	130%	85%	50%	140%
1,2-Dibromoethane	1	4329349	< 0.5	< 0.5	NA	< 0.5	93%	50%	140%	91%	60%	130%	85%	50%	140%
Tetrachloroethylene	1	4329349	< 2	< 2	NA	< 2	94%	50%	140%	87%	60%	130%	80%	50%	140%
1,1,1,2-Tetrachloroethane	1	4329349	< 0.5	< 0.5	NA	< 0.5	94%	50%	140%	94%	60%	130%	82%	50%	140%
Chlorobenzene	1	4329349	< 1	< 1	NA	< 1	92%	50%	140%	92%	60%	130%	79%	50%	140%
Ethylbenzene	1	4329349	< 2	< 2	NA	< 2	90%	70%	130%	87%	60%	140%	75%	60%	140%
m,p-Xylene	1	4329349	< 4	< 4	NA	< 4	94%	70%	130%	91%	60%	140%	78%	60%	140%
Bromoform	1	4329349	< 1	< 1	NA	< 1	89%	50%	140%	89%	60%	130%	82%	50%	140%
Styrene	1	4329349	< 1	< 1	NA	< 1	92%	50%	140%	91%	60%	130%	77%	50%	140%
1,1,2,2-Tetrachloroethane	1	4329349	< 1	< 1	NA	< 1	100%	50%	140%	99%	60%	130%	93%	50%	140%
o-Xylene	1	4329349	< 1	< 1	NA	< 1	94%	70%	130%	93%	60%	140%	80%	60%	140%
1,3-Dichlorobenzene	1	4329349	< 1	< 1	NA	< 1	96%	50%	140%	91%	60%	130%	80%	50%	140%
1,4-Dichlorobenzene	1	4329349	< 1	< 1	NA	< 1	98%	50%	140%	94%	60%	130%	82%	50%	140%
1,2-Dichlorobenzene	1	4329349	< 0.7	< 0.7	NA	< 0.7	99%	50%	140%	98%	60%	130%	86%	50%	140%

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 22K950750
PROJECT: 3168 Horizon Maritime
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Oct 11, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level Version 3.1															
Benzene	1	4332051	< 0.001	< 0.001	NA	< 0.001	78%	70%	130%	86%	70%	130%			
Toluene	1	4332051	< 0.001	< 0.001	NA	< 0.001	80%	70%	130%	81%	70%	130%			
Ethylbenzene	1	4332051	< 0.001	< 0.001	NA	< 0.001	84%	70%	130%	82%	70%	130%			
Xylene (Total)	1	4332051	< 0.002	< 0.002	NA	< 0.002	89%	70%	130%	91%	70%	130%			
C6-C10 (less BTEX)	1	4332051	< 0.01	< 0.01	NA	< 0.01	111%	70%	130%	109%	70%	130%	111%	70%	130%
>C10-C16 Hydrocarbons	1	4332813	< 0.05	< 0.05	NA	< 0.05	89%	70%	130%	100%	70%	130%	99%	70%	130%
>C16-C21 Hydrocarbons	1	4332813	< 0.05	< 0.05	NA	< 0.05	86%	70%	130%	100%	70%	130%	99%	70%	130%
>C21-C32 Hydrocarbons	1	4332813	< 0.01	< 0.01	NA	< 0.01	85%	70%	130%	100%	70%	130%	99%	70%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on different sample than duplicate.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level Version 3.1															
Benzene	1	4355911	< 0.001	< 0.001	NA	< 0.001	84%	70%	130%	120%	70%	130%			
Toluene	1	4355911	< 0.001	< 0.001	NA	< 0.001	83%	70%	130%	122%	70%	130%			
Ethylbenzene	1	4355911	< 0.001	< 0.001	NA	< 0.001	83%	70%	130%	124%	70%	130%			
Xylene (Total)	1	4355911	< 0.002	< 0.002	NA	< 0.002	88%	70%	130%	120%	70%	130%			
C6-C10 (less BTEX)	1	4355911	< 0.01	< 0.01	NA	< 0.01	79%	70%	130%	98%	70%	130%	100%	70%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 22K950750
PROJECT: 3168 Horizon Maritime
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Water Analysis

RPT Date: Oct 11, 2022

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
Standard Water Analysis + Total Metals															
pH	1		6.88	6.94	0.9%	<	100%	80%	120%						
Reactive Silica as SiO2	4335113		11.9	12.3	3.1%	< 0.5	97%	80%	120%	102%	80%	120%	101%	80%	120%
Chloride	4354156		508	522	2.7%	< 1	84%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	4354156		0.17	0.18	NA	< 0.12	86%	80%	120%	NA	80%	120%	89%	70%	130%
Sulphate	4354156		10	10	NA	< 2	91%	80%	120%	NA	80%	120%	83%	70%	130%
Alkalinity	1	4359442	72	72	0.0%	< 5	118%	80%	120%						
True Color	4335113		<5.00	<5.00	NA	< 5	99%	80%	120%	90%	80%	120%	NA		
Turbidity	4355740	4355740	0.7	0.7	NA	< 0.5	99%	80%	120%	NA			NA		
Electrical Conductivity	1		113	113	0.0%	< 1	97%	90%	110%						
Nitrate as N	4354156		<0.05	<0.05	NA	< 0.05	97%	80%	120%	NA	80%	120%	89%	70%	130%
Nitrite as N	4354156		<0.05	<0.05	NA	< 0.05	81%	80%	120%	NA	80%	120%	116%	70%	130%
Ammonia as N	4355337		<0.03	<0.03	NA	< 0.03	NA	80%	120%	84%	80%	120%	103%	70%	130%
Total Organic Carbon	4335114		1.1	1.1	NA	< 0.5	100%	80%	120%	NA	80%	120%	99%	80%	120%
Ortho-Phosphate as P	4335113		<0.01	<0.01	NA	< 0.01	106%	80%	120%	109%	80%	120%	115%	80%	120%
Total Sodium	4355882		456	454	0.4%	< 0.1	101%	80%	120%	102%	80%	120%	NA	70%	130%
Total Potassium	4355882		95.6	94.4	1.2%	< 0.1	99%	80%	120%	98%	80%	120%	NA	70%	130%
Total Calcium	4355882		19.4	19.2	1.0%	< 0.1	100%	80%	120%	96%	80%	120%	NA	70%	130%
Total Magnesium	4355882		34.8	34.8	0.0%	< 0.1	101%	80%	120%	101%	80%	120%	NA	70%	130%
Bicarb. Alkalinity (as CaCO3)	1	4359442	72	72	0.0%	< 5	NA	80%	120%						
Carb. Alkalinity (as CaCO3)	1		<10	<10	NA	< 10	NA	80%	120%						
Hydroxide	1		<5	<5	NA	< 5	NA	80%	120%						
Total Aluminum	4355882		57	57	0.5%	< 5	100%	80%	120%	103%	80%	120%	110%	70%	130%
Total Antimony	4355882		<2	<2	NA	< 2	80%	80%	120%	NA	80%	120%	NA	70%	130%
Total Arsenic	4355882		9	9	NA	< 2	95%	80%	120%	98%	80%	120%	NA	70%	130%
Total Barium	4355882		141	155	9.3%	< 5	103%	80%	120%	111%	80%	120%	NA	70%	130%
Total Beryllium	4355882		<2	<2	NA	< 2	103%	80%	120%	101%	80%	120%	89%	70%	130%
Total Bismuth	4355882		<2	<2	NA	< 2	105%	80%	120%	117%	80%	120%	97%	70%	130%
Total Boron	4355882		1190	1210	1.5%	< 5	101%	80%	120%	104%	80%	120%	NA	70%	130%
Total Cadmium	4355882		0.019	<0.017	NA	< 0.09	98%	80%	120%	103%	80%	120%	91%	70%	130%
Total Chromium	4355882		3	3	NA	< 1	94%	80%	120%	98%	80%	120%	107%	70%	130%
Total Cobalt	4355882		3	3	NA	< 1	96%	80%	120%	97%	80%	120%	98%	70%	130%
Total Copper	4355882		2	2	NA	< 1	99%	80%	120%	101%	80%	120%	90%	70%	130%
Total Iron	4355882		888	876	1.3%	< 50	99%	80%	120%	100%	80%	120%	NA	70%	130%
Total Lead	4355882		0.6	0.7	NA	< 0.5	100%	80%	120%	106%	80%	120%	84%	70%	130%
Total Manganese	4355882		516	523	1.4%	< 2	97%	80%	120%	98%	80%	120%	NA	70%	130%
Total Molybdenum	4355882		2	2	NA	< 2	94%	80%	120%	95%	80%	120%	111%	70%	130%
Total Nickel	4355882		29	29	0.0%	< 2	98%	80%	120%	104%	80%	120%	NA	70%	130%
Total Phosphorous	4355882		0.9	0.9	NA	< 0.02	115%	80%	120%	114%	80%	120%	NA	70%	130%
Total Selenium	4355882		8	8	1.9%	< 1	93%	80%	120%	96%	80%	120%	NA	70%	130%

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 22K950750
PROJECT: 3168 Horizon Maritime
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Oct 11, 2022

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Silver	4355882		<0.1	<0.1	NA	< 0.1	97%	80%	120%	92%	80%	120%	77%	70%	130%
Total Strontium	4355882		145	145	0.0%	< 5	93%	80%	120%	95%	80%	120%	NA	70%	130%
Total Thallium	4355882		<0.1	<0.1	NA	< 0.1	102%	80%	120%	108%	80%	120%	88%	70%	130%
Total Tin	4355882		<2	<2	NA	< 2	96%	80%	120%	97%	80%	120%	96%	70%	130%
Total Titanium	4355882		<2	<2	NA	< 2	98%	80%	120%	99%	80%	120%	93%	70%	130%
Total Uranium	4355882		0.9	1.0	NA	< 0.2	95%	80%	120%	102%	80%	120%	95%	70%	130%
Total Vanadium	4355882		6	6	NA	< 2	91%	80%	120%	92%	80%	120%	NA	70%	130%
Total Zinc	4355882		<5	<5	NA	< 5	97%	80%	120%	100%	80%	120%	86%	70%	130%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Standard Water Analysis + Total Metals															
Reactive Silica as SiO2	4355644		15.9	14.6	8.6%	< 0.5	96%	80%	120%	106%	80%	120%	94%	80%	120%
True Color	4355644		<5.00	<5.00	NA	10.8	86%	80%	120%	89%	80%	120%	NA		
Ammonia as N	4355729		<0.03	<0.03	NA	< 0.03	105%	80%	120%	89%	80%	120%	103%	70%	130%
Total Organic Carbon	4355927	4355927	5.7	5.8	1.3%	< 0.5	100%	80%	120%	NA	80%	120%	102%	80%	120%
Ortho-Phosphate as P	4355644		<0.01	<0.01	NA	< 0.01	108%	80%	120%	109%	80%	120%	105%	80%	120%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Mercury Analysis in Water (Total)															
Total Mercury	4327973		<0.026	<0.026	NA	< 0.026	83%	80%	120%	NA	80%	120%	82%	70%	130%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Mercury Analysis in Water (Dissolved)															
Dissolved Mercury	4355740	4355740	<0.026	<0.026	NA	< 0.026	83%	80%	120%	NA	80%	120%	95%	70%	130%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
DOC															
Dissolved Organic Carbon	4357599		2.9	2.9	1.2%	< 0.5	96%	80%	120%	NA	80%	120%	102%	80%	120%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
TSS, TDS															
Total Suspended Solids	4355740	4355740	<5	<5	NA	< 5	103%	80%	120%	NA			112%	80%	120%
Total Dissolved Solids	4361872		352	334	5.2%	< 5	100%	80%	120%	NA			NA		
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
DOC															
Dissolved Organic Carbon	4355955	4355955	3.9	4.0	1.2%	< 0.5	100%	80%	120%	NA	80%	120%	101%	80%	120%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Metals - Lab Filtered Dissolved Metals in Water (mg/L)															
Dissolved Aluminum	4374486		0.016	0.018	NA	< 0.004	93%	70%	130%	105%	80%	120%	86%	70%	130%

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Quality Assurance

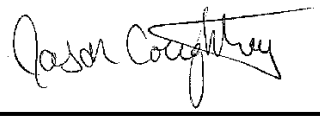
CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 22K950750
PROJECT: 3168 Horizon Maritime
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Oct 11, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Antimony	4374486		<0.001	<0.001	NA	< 0.001	97%	70%	130%	100%	80%	120%	99%	70%	130%
Dissolved Arsenic	4374486		<0.001	<0.001	NA	< 0.001	89%	70%	130%	102%	80%	120%	102%	70%	130%
Dissolved Barium	4374486		0.097	0.100	3.0%	< 0.002	94%	70%	130%	96%	80%	120%	97%	70%	130%
Dissolved Beryllium	4374486		<0.0005	<0.0005	NA	< 0.0005	98%	70%	130%	108%	80%	120%	104%	70%	130%
Dissolved Bismuth	4374486		<0.002	<0.002	NA	< 0.002	98%	70%	130%	98%	80%	120%	95%	70%	130%
Dissolved Boron	4374486		0.360	0.396	9.5%	< 0.010	98%	70%	130%	106%	80%	120%	101%	70%	130%
Dissolved Cadmium	4374486		<0.0001	<0.0001	NA	< 0.0001	97%	70%	130%	100%	80%	120%	96%	70%	130%
Dissolved Chromium	4374486		<0.002	<0.002	NA	< 0.002	94%	70%	130%	100%	80%	120%	98%	70%	130%
Dissolved Cobalt	4374486		0.0011	0.0012	NA	< 0.0005	90%	70%	130%	98%	80%	120%	95%	70%	130%
Dissolved Copper	4374486		0.002	0.002	NA	< 0.001	95%	70%	130%	99%	80%	120%	90%	70%	130%
Dissolved Iron	4374486		0.011	<0.010	NA	< 0.010	97%	70%	130%	102%	80%	120%	101%	70%	130%
Dissolved Lead	4374486		<0.0005	<0.0005	NA	< 0.0005	93%	70%	130%	97%	80%	120%	94%	70%	130%
Dissolved Lithium	4374486		0.10	0.10	NA	< 0.05	94%	70%	130%	107%	80%	120%	101%	70%	130%
Dissolved Manganese	4374486		0.308	0.297	3.6%	< 0.002	94%	70%	130%	99%	80%	120%	95%	70%	130%
Dissolved Molybdenum	4374486		0.006	0.006	NA	< 0.002	99%	70%	130%	104%	80%	120%	102%	70%	130%
Dissolved Nickel	4374486		0.002	0.002	NA	< 0.001	92%	70%	130%	98%	80%	120%	92%	70%	130%
Dissolved Phosphorus	4374486		<0.05	0.10	NA	< 0.05	94%	70%	130%	110%	80%	120%	120%	70%	130%
Dissolved Selenium	4374486		<0.001	0.002	NA	< 0.001	105%	70%	130%	110%	80%	120%	111%	70%	130%
Dissolved Silicon	4374486		5.94	5.76	3.1%	< 0.05	92%	70%	130%	109%	80%	120%	NA	70%	130%
Dissolved Silver	4374486		<0.0001	<0.0001	NA	< 0.0001	92%	70%	130%	97%	80%	120%	91%	70%	130%
Dissolved Strontium	4374486		1.59	1.52	4.5%	< 0.005	102%	70%	130%	101%	80%	120%	NA	70%	130%
Dissolved Thallium	4374486		<0.0003	<0.0003	NA	< 0.0003	97%	70%	130%	97%	80%	120%	97%	70%	130%
Dissolved Tin	4374486		<0.002	<0.002	NA	< 0.002	85%	70%	130%	89%	80%	120%	86%	70%	130%
Dissolved Titanium	4374486		<0.002	<0.002	NA	< 0.002	102%	70%	130%	111%	80%	120%	110%	70%	130%
Dissolved Uranium	4374486		0.0068	0.0069	1.5%	< 0.0005	98%	70%	130%	102%	80%	120%	102%	70%	130%
Dissolved Vanadium	4374486		<0.002	<0.002	NA	< 0.002	92%	70%	130%	101%	80%	120%	98%	70%	130%
Dissolved Zinc	4374486		<0.005	<0.005	NA	< 0.005	97%	70%	130%	102%	80%	120%	95%	70%	130%
Dissolved Zirconium	4374486		<0.004	<0.004	NA	< 0.004	100%	70%	130%	101%	80%	120%	100%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By:



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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Sediment			GC/MS/FID
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Chloromethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Vinyl Chloride	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Bromomethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Chloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Trichlorofluoromethane (FREON 11)	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Acetone	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1-Dichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Methylene Chloride (Dichloromethane)	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
trans-1,2-Dichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1-Dichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
cis-1,2-Dichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Chloroform	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,2-Dichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1,1-Trichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Carbon Tetrachloride	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Benzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,2-Dichloropropane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Trichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Bromodichloromethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
cis-1,3-Dichloropropene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
trans-1,3-Dichloropropene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1,2-Trichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Toluene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS

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Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Hexanone	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Dibromochloromethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,2-Dibromoethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Tetrachloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1,1,2-Tetrachloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Chlorobenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Ethylbenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
m,p-Xylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Bromoform	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Styrene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1,2,2-Tetrachloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
o-Xylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,3-Dichlorobenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,4-Dichlorobenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,2-Dichlorobenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Toluene-d8	VOL-120-5001	EPA SW846 5030B/8260B	GC/MS
4-Bromofluorobenzene	VOL-120-5001	EPA SW846 5030B/8260B	GC/MS

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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Dissolved Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Dissolved Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA
Total Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA
Dissolved Aluminum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Antimony	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Arsenic	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Beryllium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Bismuth	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cadmium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Chromium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cobalt	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Copper	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Iron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lead	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lithium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Manganese	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Molybdenum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Nickel	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Phosphorus	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Selenium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silicon	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silver	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Strontium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Thallium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Tin	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Titanium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS

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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dissolved Uranium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Vanadium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Zinc	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Zirconium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Lab Filtration Performed			FILTRATION
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 22K950750

PROJECT: 3168 Horizon Maritime

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Suspended Solids	INOR-121-6024, 6025	SM 2540C, D	GRAVIMETRIC
Total Dissolved Solids	INOR-121-6024, 6025	SM 2540C, D	GRAVIMETRIC

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☑ Good ☐ Poor (see notes)
Arrival Temperature: 3.2, 3.4, 4.1
Hold Time:
AGAT Job Number: 22K950750
Notes:

Report Information
Company: Fracflow Consultants Inc. (NL)
Contact: John Gale
Address: 154 Major's Path
St. John's, NL
Phone: 709-739-7270 Fax: 709-753-5101
Client Project #: 3168 Horizon Maritime
AGAT Quotation: S/O
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: John Gale (john_ffc@nfld.net)
Email: Devin Northcott (devin_ffc@bellaliant.com)
2. Name: Karen Andrews (karen_ffc@nfld.net)
Email: Chris Piercey (chris_ffc@bellaliant.com)

Report Format
☐ Single Sample per page
☑ Multiple Sample per page
☑ Excel Format Included
☐ Export:

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To Same Yes ☑ / No ☐
Company:
Contact: Karen Andrews (karen_ffc@nfld.net)
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):
☑ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☑ Coarse
☐ Tier 2 ☐ Com ☑ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☑ No **Salt Water Sample:** ☐ Yes ☑ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	Grain Size (coarse/fine)	☐ TOC - Miss ☐ FOC - Miss	Phosphates (total as P205)	Chromium (Tri & Hexavalent)	Phenols	Tier 1: TPH/BTEX (PIRI) ☑ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	Oil & Grease (TOG)	BNAE EPA 625 - Miss	PAH	PCB	Marine Sediment Package	Dioxins & Furans	Fecal Coliform ☐ MPN ☐ MF	Other: DOC	Other: TDS &TSS	Hazardous (Y/N)
3168-GP03-WS1-220923	Sept. 23, 2022 / 13:20	Water	16 ✓	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓											✓	✓	
3168-GP03-WS2-220923	Sept. 23, 2022 / 13:55	Water	11 ✓	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓																		✓	✓	
3168-GP02-WS1-220923	Sept. 23, 2022 / 14:30	Water	19	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓			✓								✓	✓	
3168-GP02-WS2-220923	Sept. 23, 2022 / 15:00	Water	11 ✓	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓																		✓	✓	
3168-GP01-WS1-220923	Sept. 23, 2022 / 15:30	Water	16 ✓	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓											✓	✓	
3168-MP01-WS1-220925	Sept. 25, 2022 / 10:50	Water	16	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓											✓	✓	
3168-MP02-WS1-220925	Sept. 25, 2022 / 11:45	Water	16	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓											✓	✓	
3168-MP02-WS2-220925	Sept. 25, 2022 / 12:25	Water	11	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓																		✓	✓	
3168-MP03-WS1-220925	Sept. 25, 2022 / 13:40	Water	16	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓											✓	✓	
				Dissolved Metals+Mercury																								
				DOC, TDS all field filtered																								

Samples Relinquished By (Print Name): KAREN L ANDREWS
Samples Relinquished By (Sign): Karen L Andrews
Date/Time: Sept 27/22 08:45
Samples Received By (Print Name): Megan Hood
Samples Received By (Sign):
Date/Time: Sept 27/22 845pm

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 2
N°: FFC-3168-COC-02

Document ID: DIV 133 1501.01

Date revised: January 2016

AGAT Laboratories

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☑ Good ☐ Poor (see notes)
Arrival Temperature: 4.6, 3.9, 4.5
Hold Time:
AGAT Job Number: 22k950750
Notes:

Report Information
Company: Fracflow Consultants Inc. (NL)
Contact: John Gale
Address: 154 Major's Path
St. John's, NL
Phone: 709-739-7270 Fax: 709-753-5101
Client Project #: 3168 Horizon Maritime
AGAT Quotation: S/O
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: John Gale (john_ffc@nfld.net)
Email: Devin Northcott (devin_ffc@bellaliant.com)
2. Name: Karen Andrews (karen_ffc@nfld.net)
Email: Chris Piercey (chris_ffc@bellaliant.com)

Report Format
☐ Single Sample per page
☑ Multiple Sample per page
☑ Excel Format Included
☐ Export:

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To Same Yes ☑ / No ☐
Company:
Contact: Karen Andrews (karen_ffc@nfld.net)
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):
☑ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☑ Coarse
☐ Tier 2 ☐ Com ☑ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☑ No **Salt Water Sample:** ☐ Yes ☑ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☑ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	Grain Size (coarse/fine)	☐ TOC - Miss ☐ FOC - Miss	Phosphates (total as P2O5)	Chromium (Tri & Hexavalent)	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	Oil & Grease (TOG)	BNAE EPA 625 - Miss	PAH	PCB	Marine Sediment Package	Dioxins & Furans	Fecal Coliform ☐ MPN ☐ MF	Other: DOC	Other: TDS &TSS	Hazardous (Y/N)
3168-NP03-WS1-220922	Sept. 22, 2022 / 10:15	Water	16	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓											✓	✓	
3168-NP03-WS2-220922	Sept. 22, 2022 / 11:00	Water	11	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓																		✓	✓	
3168-NP02-WS1-220922	Sept. 22, 2022 / 11:45	Water	16	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓											✓	✓	
3168-NP02-WS2-220922	Sept. 22, 2022 / 12:15	Water	11	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓																		✓	✓	
3168-NP01-WS1-220922	Sept. 22, 2022 / 13:45	Water	19	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓			✓								✓	✓	
3168-NP01-WS2-220922	Sept. 22, 2022 / 14:10	Water	11	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓																		✓	✓	
				Dissolved Metals+Mercury																								
				DOC, TDS all field filtered																								

Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print Name):	Date/Time
Karen L. Andrews	26/09/22 13:20	O. Atkins Sept 26, 22	1:20
Samples Relinquished By (Sign): Karen L Andrews	Date/Time	Samples Received By (Sign):	Date/Time

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 2 of 2

Nº: FFC-3168-COC-01

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CLIENT NAME: FRACFLOW CONSULTANTS
154 MAJOR'S PATH
ST. JOHN'S PATH, NL A1A5A1
(709) 739-7270
ATTENTION TO: John Gale
PROJECT: 3168 HORIZON MARITIME
AGAT WORK ORDER: 22K950371
TRACE ORGANICS REVIEWED BY: Dylan McCarthy, Trace Organics Lab Technician
DATE REPORTED: Oct 11, 2022
PAGES (INCLUDING COVER): 14
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
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- The test results reported herewith relate only to the samples as received by the laboratory.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-11

SAMPLE DESCRIPTION:				3168-GP03-SS1	3168-GP02-SS1	3168-GP01-SS1	3168-NP03-SS1	3168-NP02-SS1	3168-NP01-SS1	3168-MP01-SS1	3168-MP02-SS1
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2022-09-21 14:35	2022-09-21 14:35	2022-09-21 14:50	2022-09-21 16:38	2022-09-21 17:00	2022-09-21 17:12	2022-09-25 10:55	2022-09-25 11:20
Parameter	Unit	G / S	RDL	4352945	4352946	4352947	4352948	4352949	4352950	4353078	4353079
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons	mg/kg		15	<15	<15	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons	mg/kg		15	47	16	<15	26	<15	22	<15	30
>C21-C32 Hydrocarbons	mg/kg		15	149	110	42	83	61	107	75	188
Modified TPH (Tier 1)	mg/kg		15	196	126	42	109	61	129	75	218
Resemblance Comment				LOF, UC	LOF, UC	LOF, UC	LOF, UC	LOF, UC	LOF, UC	LOF, UC	LOF, UC
Return to Baseline at C32				N	N	N	N	N	N	N	N
Surrogate	Unit	Acceptable Limits									
Isobutylbenzene - EPH	%	60-140		93	92	93	93	95	95	95	94
Isobutylbenzene - VPH	%	60-140		70	71	68	65	121	121	117	118
n-Dotriacontane - EPH	%	60-140		89	90	87	89	88	91	90	92

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-11

				SAMPLE DESCRIPTION:	3168-MP03-SS1
				SAMPLE TYPE:	Soil
				DATE SAMPLED:	2022-09-25 13:50
Parameter	Unit	G / S	RDL		4353080
Benzene	mg/kg		0.02		<0.02
Toluene	mg/kg		0.04		<0.04
Ethylbenzene	mg/kg		0.03		<0.03
Xylene (Total)	mg/kg		0.05		<0.05
C6-C10 (less BTEX)	mg/kg		3		<3
>C10-C16 Hydrocarbons	mg/kg		15		<15
>C16-C21 Hydrocarbons	mg/kg		15		47
>C21-C32 Hydrocarbons	mg/kg		15		145
Modified TPH (Tier 1)	mg/kg		15		192
Resemblance Comment					LOF, UC
Return to Baseline at C32					N
Surrogate	Unit	Acceptable Limits			
Isobutylbenzene - EPH	%	60-140			93
Isobutylbenzene - VPH	%	60-140			115
n-Dotriacontane - EPH	%	60-140			92

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AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-11

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4352945-4353080 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Results are based on the dry weight of the soil.

Resemblance Comment Key:
GF - Gasoline Fraction
WGF - Weathered Gasoline Fraction
GR - Product in Gasoline Range
FOF - Fuel Oil Fraction
WFOF - Weathered Fuel Oil Fraction
FR - Product in Fuel Oil Range
LOF - Lube Oil Fraction
LR - Lube Range
UC - Unidentified Compounds
NR - No Resemblance
NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Moisture

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-11

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: 3168-GP03-SS1	3168-GP02-SS1	3168-GP01-SS1	3168-NP03-SS1	3168-NP02-SS1	3168-NP01-SS1	3168-MP01-SS1	3168-MP02-SS1
				SAMPLE TYPE: Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED: 2022-09-21 14:35	2022-09-21 14:35	2022-09-21 14:50	2022-09-21 16:38	2022-09-21 17:00	2022-09-21 17:12	2022-09-25 10:55	2022-09-25 11:20
				4352945	4352946	4352947	4352948	4352949	4352950	4353078	4353079
% Moisture	%		1	91	90	68	70	76	72	70	79

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: 3168-MP03-SS1
				SAMPLE TYPE: Soil
				DATE SAMPLED: 2022-09-25 13:50
				4353080
% Moisture	%		1	88

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-11

SAMPLE DESCRIPTION:				3168-GP03-SS1	3168-GP02-SS1	3168-GP01-SS1	3168-NP03-SS1	3168-NP02-SS1	3168-NP01-SS1	3168-MP01-SS1	3168-MP02-SS1
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2022-09-21 14:35	2022-09-21 14:35	2022-09-21 14:50	2022-09-21 16:38	2022-09-21 17:00	2022-09-21 17:12	2022-09-25 10:55	2022-09-25 11:20
Parameter	Unit	G / S	RDL	4352945	4352946	4352947	4352948	4352949	4352950	4353078	4353079
1-Methylnaphthalene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	0.0549	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	0.010	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	mg/kg		0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.13	<0.01	0.08
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.20	<0.01	0.18
Benzo(b)fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.14
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.26
Benzo(e)pyrene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.16	<0.01	0.13
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.31	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	0.16	0.10	0.01	0.03	0.12	0.53	0.09	0.58
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06	<0.01	0.05
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	17.8	8.61	0.82	1.05	3.92	3.65	1.15	1.02
Phenanthrene	mg/kg		0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.46	<0.01	0.33
Pyrene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	0.10	0.40	0.08	0.50
Quinoline	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		80	81	85	78	93	93	60	82
Terphenyl-d14	%	50-140		54	60	64	59	62	67	80	89
Pyrene-d10 (%)	%	50-140		57	61	57	66	63	65	74	84

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-11

		SAMPLE DESCRIPTION:		3168-MP03-SS1
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2022-09-25 13:50
Parameter	Unit	G / S	RDL	4353080
1-Methylnaphthalene	mg/kg		0.05	<0.01
2-Methylnaphthalene	mg/kg		0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004
Acridine	mg/kg		0.05	<0.01
Anthracene	mg/kg		0.03	<0.01
Benzo(a)anthracene	mg/kg		0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.01
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.01
Benzo(e)pyrene	mg/kg		0.05	<0.01
Benzo(ghi)perylene	mg/kg		0.01	<0.01
Chrysene	mg/kg		0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006
Fluoranthene	mg/kg		0.05	0.09
Fluorene	mg/kg		0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01
Perylene	mg/kg		0.05	1.82
Phenanthrene	mg/kg		0.03	<0.01
Pyrene	mg/kg		0.05	<0.01
Quinoline	mg/kg		0.05	<0.01
Surrogate	Unit	Acceptable Limits		
Naphthalene-d8	%	50-140		75
Terphenyl-d14	%	50-140		75
Pyrene-d10 (%)	%	50-140		68

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-11

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4352945-4353080 Results are based on the dry weight of the soil.

Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 22K950371
PROJECT: 3168 HORIZON MARITIME
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Oct 11, 2022

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved															
Benzene	1	4338883	< 0.02	< 0.02	NA	< 0.02	72%	60%	140%	80%	60%	140%			
Toluene	1	4338883	< 0.04	< 0.04	NA	< 0.04	73%	60%	140%	71%	60%	140%			
Ethylbenzene	1	4338883	0.29	0.28	3.5%	< 0.03	72%	60%	140%	73%	60%	140%			
Xylene (Total)	1	4338883	4.94	4.97	0.6%	< 0.05	72%	60%	140%	75%	60%	140%			
C6-C10 (less BTEX)	1	4338883	< 3	< 3	NA	< 3	77%	60%	140%	96%	60%	140%	104%	30%	130%
>C10-C16 Hydrocarbons	1	4352945	< 15	< 15	NA	< 15	109%	60%	140%	101%	60%	140%	116%	30%	130%
>C16-C21 Hydrocarbons	1	4352945	47	33	NA	< 15	111%	60%	140%	101%	60%	140%	116%	30%	130%
>C21-C32 Hydrocarbons	1	4352945	149	193	25.7%	< 15	110%	60%	140%	101%	60%	140%	116%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Polycyclic Aromatic Hydrocarbons in Soil															
1-Methylnaphthalene	1	4352945	< 0.05	< 0.05	NA	< 0.05	135%	50%	140%	91%	50%	140%	98%	50%	140%
2-Methylnaphthalene	1	4352945	< 0.01	< 0.01	NA	< 0.01	113%	50%	140%	79%	50%	140%	86%	50%	140%
Acenaphthene	1	4352945	< 0.00671	< 0.00671	NA	< 0.00671	117%	50%	140%	84%	50%	140%	88%	50%	140%
Acenaphthylene	1	4352945	0.00520	0.00410	NA	< 0.004	100%	50%	140%	71%	50%	140%	76%	50%	140%
Acridine	1	4352945	< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	69%	50%	140%	77%	50%	140%
Anthracene	1	4352945	< 0.03	< 0.03	NA	< 0.03	107%	50%	140%	71%	50%	140%	78%	50%	140%
Benzo(a)anthracene	1	4352945	< 0.01	< 0.01	NA	< 0.01	87%	50%	140%	63%	50%	140%	82%	50%	140%
Benzo(a)pyrene	1	4352945	< 0.01	< 0.01	NA	< 0.01	77%	50%	140%	71%	50%	140%	80%	50%	140%
Benzo(b)fluoranthene	1	4352945	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	56%	50%	140%	90%	50%	140%
Benzo(j+k)fluoranthene	1	4352945	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	104%	50%	140%	108%	50%	140%
Benzo(e)pyrene	1	4352945	< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	82%	50%	140%	86%	50%	140%
Benzo(ghi)perylene	1	4352945	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	74%	50%	140%	87%	50%	140%
Chrysene	1	4352945	< 0.01	< 0.01	NA	< 0.01	137%	50%	140%	102%	50%	140%	98%	50%	140%
Dibenzo(a,h)anthracene	1	4352945	< 0.006	< 0.006	NA	< 0.006	69%	50%	140%	66%	50%	140%	79%	50%	140%
Fluoranthene	1	4352945	0.1626	0.1747	NA	< 0.05	98%	50%	140%	64%	50%	140%	86%	50%	140%
Fluorene	1	4352945	< 0.01	< 0.01	NA	< 0.01	104%	50%	140%	74%	50%	140%	79%	50%	140%
Indeno(1,2,3)pyrene	1	4352945	< 0.01	< 0.01	NA	< 0.01	75%	50%	140%	82%	50%	140%	102%	50%	140%
Naphthalene	1	4352945	< 0.01	< 0.01	NA	< 0.01	116%	50%	140%	80%	50%	140%	86%	50%	140%
Perylene	1	4352945	17.8314	17.7214	0.6%	< 0.05	94%	50%	140%	93%	50%	140%	NA	50%	140%
Phenanthrene	1	4352945	< 0.03	< 0.03	NA	< 0.03	123%	50%	140%	90%	50%	140%	95%	50%	140%
Pyrene	1	4352945	< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	67%	50%	140%	78%	50%	140%
Quinoline	1	4352945	< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	103%	50%	140%	104%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved												
Benzene	1	4374199	< 0.02	< 0.02	NA	< 0.02	69%	60%	140%	87%	60%	140%

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 22K950371
PROJECT: 3168 HORIZON MARITIME
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Oct 11, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Toluene	1	4374199	< 0.04	< 0.04	NA	< 0.04	71%	60%	140%	82%	60%	140%			
Ethylbenzene	1	4374199	< 0.03	< 0.03	NA	< 0.03	74%	60%	140%	83%	60%	140%			
Xylene (Total)	1	4374199	< 0.05	< 0.05	NA	< 0.05	78%	60%	140%	91%	60%	140%			
C6-C10 (less BTEX)	1	4374199	< 3	< 3	NA	< 3	91%	60%	140%	117%	60%	140%	123%	30%	130%
Polycyclic Aromatic Hydrocarbons in Soil															
1-Methylnaphthalene	1	4352945	< 0.05	< 0.05	NA	< 0.05	135%	50%	140%	91%	50%	140%	98%	50%	140%
2-Methylnaphthalene	1	4352945	< 0.01	< 0.01	NA	< 0.01	113%	50%	140%	79%	50%	140%	86%	50%	140%
Acenaphthene	1	4352945	< 0.00671	< 0.00671	NA	< 0.00671	117%	50%	140%	84%	50%	140%	88%	50%	140%
Acenaphthylene	1	4352945	0.010	0.004	NA	< 0.004	100%	50%	140%	71%	50%	140%	76%	50%	140%
Acridine	1	4352945	< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	69%	50%	140%	77%	50%	140%
Anthracene	1	4352945	< 0.03	< 0.03	NA	< 0.03	107%	50%	140%	71%	50%	140%	78%	50%	140%
Benzo(a)anthracene	1	4352945	< 0.01	< 0.01	NA	< 0.01	87%	50%	140%	63%	50%	140%	82%	50%	140%
Benzo(a)pyrene	1	4352945	< 0.01	< 0.01	NA	< 0.01	77%	50%	140%	71%	50%	140%	80%	50%	140%
Benzo(b)fluoranthene	1	4352945	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	56%	50%	140%	90%	50%	140%
Benzo(j+k)fluoranthene	1	4352945	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	104%	50%	140%	108%	50%	140%
Benzo(e)pyrene	1	4352945	< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	82%	50%	140%	86%	50%	140%
Benzo(ghi)perylene	1	4352945	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	74%	50%	140%	87%	50%	140%
Chrysene	1	4352945	< 0.01	< 0.01	NA	< 0.01	137%	50%	140%	102%	50%	140%	98%	50%	140%
Dibenzo(a,h)anthracene	1	4352945	< 0.006	< 0.006	NA	< 0.006	69%	50%	140%	66%	50%	140%	79%	50%	140%
Fluoranthene	1	4352945	0.16	0.17	NA	< 0.05	98%	50%	140%	64%	50%	140%	86%	50%	140%
Fluorene	1	4352945	< 0.01	< 0.01	NA	< 0.01	104%	50%	140%	74%	50%	140%	79%	50%	140%
Indeno(1,2,3)pyrene	1	4352945	< 0.01	< 0.01	NA	< 0.01	75%	50%	140%	82%	50%	140%	102%	50%	140%
Naphthalene	1	4352945	< 0.01	< 0.01	NA	< 0.01	116%	50%	140%	80%	50%	140%	86%	50%	140%
Perylene	1	4352945	17.8	17.7	0.6%	< 0.05	94%	50%	140%	93%	50%	140%	NA	50%	140%
Phenanthrene	1	4352945	< 0.03	< 0.03	NA	< 0.03	123%	50%	140%	90%	50%	140%	95%	50%	140%
Pyrene	1	4352945	< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	67%	50%	140%	78%	50%	140%
Quinoline	1	4352945	< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	103%	50%	140%	104%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:

AGAT Laboratories

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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013/5031	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013/5031	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013/5031	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013/5031	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013/5031	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
% Moisture	LAB-131-4024	CSSS 70.2	GRAVIMETRIC
1-Methylnaphthalene	ORG-120-5119	EPA 3570/8270E	GC/MS
2-Methylnaphthalene	ORG-120-5119	EPA 3570/8270E	GC/MS
Acenaphthene	ORG-120-5119	EPA 3570/8270E	GC/MS
Acenaphthylene	ORG-120-5119	EPA 3570/8270E	GC/MS
Acridine	ORG-120-5119	EPA 3570/8270E	GC/MS
Anthracene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(a)anthracene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(a)pyrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(b)fluoranthene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(e)pyrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(ghi)perylene	ORG-120-5119	EPA 3570/8270E	GC/MS
Chrysene	ORG-120-5119	EPA 3570/8270E	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119	EPA 3570/8270E	GC/MS
Fluoranthene	ORG-120-5119	EPA 3570/8270E	GC/MS
Fluorene	ORG-120-5119	EPA 3570/8270E	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Naphthalene	ORG-120-5119	EPA 3570/8270E	GC/MS
Perylene	ORG-120-5119	EPA 3570/8270E	GC/MS
Phenanthrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Pyrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Quinoline	ORG-120-5119	EPA 3570/8270E	GC/MS
Naphthalene-d8	ORG-120-5119	EPA 3570/8270E	GC/MS

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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Terphenyl-d14	ORG-120-5119	EPA 3570/8270E	GC/MS
Pyrene-d10 (%)	ORG-120-5119	EPA 3570/8270E	GC/MS

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☑ Good ☐ Poor (see notes)
Arrival Temperature: 4.9, 5.2, 5.5
Hold Time:
AGAT Job Number: 22K950371
Notes:

Report Information
Company: Fracflow Consultants Inc. (NL)
Contact: John Gale
Address: 154 Major's Path
St. John's, NL
Phone: 709-739-7270 Fax: 709-753-5101
Client Project #: 3168 Horizon Maritime
AGAT Quotation: S/O
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: John Gale (john_ffc@nfld.net)
Email: Devin Northcott (devin_ffc@bellaliant.com)
2. Name: Karen Andrews (karen_ffc@nfld.net)
Email: Chris Piercey (chris_ffc@bellaliant.com)

Report Format
☐ Single Sample per page
☑ Multiple Sample per page
☑ Excel Format Included
☐ Export:

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To Same Yes ☑ / No ☐
Company:
Contact: Karen Andrews (karen_ffc@nfld.net)
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):
☑ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☑ Coarse
☐ Tier 2 ☐ Com ☑ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☑ No **Salt Water Sample:** ☐ Yes ☑ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment
3168-GP03-SS1	Sept. 21, 2022 / 14:15	Soil	4	
3168-GP02-SS1	Sept. 21, 2022 / 14:35	Soil	4	
3168-GP01-SS1	Sept. 21, 2022 / 14:50	Soil	4	
3168-NP03-SS1	Sept. 21, 2022 / 16:38	Soil	4	
3168-NP02-SS1	Sept. 21, 2022 / 17:00	Soil	4	
3168-NP01-SS1	Sept. 21, 2022 / 17:12	Soil	4	

Sample Identification	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	Grain Size (coarse/fine)	☐ TOC - Miss ☐ FOC - Miss	Phosphates (total as P2O5)	Chromium (Tri & Hexavalent)	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	Oil & Grease (TOG)	BNAE EPA 625 - Miss	PAH	PCB	Marine Sediment Package	Dioxins & Furans	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
3168-GP03-SS1											✓						✓							
3168-GP02-SS1											✓						✓							
3168-GP01-SS1											✓						✓							
3168-NP03-SS1											✓						✓							
3168-NP02-SS1											✓						✓							
3168-NP01-SS1											✓						✓							

Samples Relinquished By (Print Name): Karen L. Andrews
Date/Time: 26/09/22 13:20
Samples Relinquished By (Sign): Karen L Andrews
Date/Time:
Samples Received By (Print Name): O. Aikens Sept 26/22
Date/Time: 1:20
Samples Received By (Sign):
Date/Time:

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Page 1 of 2
Nº: FFC-3168-COC-01

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 3.2, 3.4, 4.1
Hold Time:
AGAT Job Number: 22K950571
Notes:

Report Information

Company: Fracflow Consultants Inc. (NL)
Contact: John Gale
Address: 154 Major's Path
St. John's, NL
Phone: 709-739-7270 Fax: 709-753-5101
Client Project #: 3168 Horizon Maritime
AGAT Quotation: S/O
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):

1. Name: John Gale (john_ffc@nfld.net)
   Email: Devin Northcott (devin_ffc@bellaliant.com)
2. Name: Karen Andrews (karen_ffc@nfld.net)
   Email: Chris Piercey (chris_ffc@bellaliant.com)

Report Format

☐ Single Sample per page
☑ Multiple Sample per page
☑ Excel Format Included
☐ Export:

Turnaround Time Required (TAT)

Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To

Same Yes ☑ / No ☐
Company:
Contact: Karen Andrews (karen_ffc@nfld.net)
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):

☑ List Guidelines on Report ☐ Do not list Guidelines on Report
☑ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☑ Coarse
☐ Tier 2 ☐ Com ☑ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☑ No **Salt Water Sample:** ☐ Yes ☑ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info, Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	Grain Size (coarse/fine)	☐ TOC - Miss ☐ FOC - Miss	Phosphates (total as P205)	Chromium (Tri & Hexavalent)	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	Oil & Grease (TOG)	BNAE EPA 625 - Miss	PAH	PCB	Marine Sediment Package	Dioxins & Furans	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
3168-MP01-SS1	Sept. 25, 2022 / 10:55	Soil	4												✓						✓							
3168-MP02-SS1	Sept. 25, 2022 / 11:20	Soil	4												✓						✓							
3168-MP03-SS1	Sept. 25, 2022 / 13:50	Soil	4												✓						✓							

Samples Relinquished By (Print Name): KAREN L ANDREWS
Samples Relinquished By (Sign):
Date/Time: 27 Sept 22 08:45
Samples Received By (Print Name):
Samples Received By (Sign):
Date/Time: Sept 27/22
Date/Time: 845 pm

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 2 of 2
Nº: FFC-3168-COC-02

Template ID: DIV-133-1501-002

Date revised: January 2016

AGAT Laboratories

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CLIENT NAME: FRACFLOW CONSULTANTS
154 MAJOR'S PATH
ST. JOHN'S PATH, NL A1A5A1
(709) 739-7270
ATTENTION TO: John Gale
PROJECT: 3168 HORIZON MARITIME
AGAT WORK ORDER: 22K950371
TRACE ORGANICS REVIEWED BY: Dylan McCarthy, Trace Organics Lab Technician
DATE REPORTED: Oct 21, 2022
PAGES (INCLUDING COVER): 19
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.0) - Low Level + 1X Silica Gel

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-21

				SAMPLE DESCRIPTION:	3168-MP01-SS1
				SAMPLE TYPE:	Soil
				DATE SAMPLED:	2022-09-25 10:55
Parameter	Unit	G / S	RDL		4353078
Benzene	mg/kg		0.02		<0.02
Toluene	mg/kg		0.04		<0.04
Ethylbenzene	mg/kg		0.01		<0.01
Xylene (Total)	mg/kg		0.05		<0.05
C6-C10 (less BTEX)	mg/kg		3		<3
>C10-C16 Hydrocarbons	mg/kg		15		<15
>C16-C21 Hydrocarbons	mg/kg		15		<15
>C21-C32 Hydrocarbons	mg/kg		15		44
Modified TPH (Tier 1)	mg/kg		15		44
Resemblance Comment					LOF, UC
Return to Baseline at C32					Y
Silica Gel Cleanup					Y
Surrogate	Unit	Acceptable Limits			
Isobutylbenzene - EPH	%	60-140			108
Isobutylbenzene - VPH	%	60-140			117
n-Dotriacontane - EPH	%	60-140			111

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.0) - Low Level + 1X Silica Gel

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-21

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4353078 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Sample was not field preserved for VPH when received at the laboratory. Analytical results for VPH parameters should be regarded as minimum values.

Results are based on the dry weight of the soil.

Resemblance Comment Key:
GF - Gasoline Fraction
WGF - Weathered Gasoline Fraction
GR - Product in Gasoline Range
FOF - Fuel Oil Fraction
WFOF - Weathered Fuel Oil Fraction
FR - Product in Fuel Oil Range
LOF - Lube Oil Fraction
LR - Lube Range
UC - Unidentified Compounds
NR - No Resemblance
NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-21

SAMPLE DESCRIPTION:				3168-GP03-SS1	3168-GP02-SS1	3168-GP01-SS1	3168-NP03-SS1	3168-NP02-SS1	3168-NP01-SS1	3168-MP01-SS1	3168-MP02-SS1
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2022-09-21 14:35	2022-09-21 14:35	2022-09-21 14:50	2022-09-21 16:38	2022-09-21 17:00	2022-09-21 17:12	2022-09-25 10:55	2022-09-25 11:20
Parameter	Unit	G / S	RDL	4352945	4352946	4352947	4352948	4352949	4352950	4353078	4353079
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons	mg/kg		15	<15	<15	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons	mg/kg		15	47	16	<15	26	<15	22	<15	30
>C21-C32 Hydrocarbons	mg/kg		15	149	110	42	83	61	107	75	188
Modified TPH (Tier 1)	mg/kg		15	196	126	42	109	61	129	75	218
Resemblance Comment				LOF, UC	LOF, UC	LOF, UC	LOF, UC	LOF, UC	LOF, UC	LOF, UC	LOF, UC
Return to Baseline at C32				N	N	N	N	N	N	N	N
Surrogate	Unit	Acceptable Limits									
Isobutylbenzene - EPH	%	60-140		93	92	93	93	95	95	95	94
Isobutylbenzene - VPH	%	60-140		70	71	68	65	121	121	117	118
n-Dotriacontane - EPH	%	60-140		89	90	87	89	88	91	90	92

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-21

				SAMPLE DESCRIPTION:	3168-MP03-SS1
				SAMPLE TYPE:	Soil
				DATE SAMPLED:	2022-09-25 13:50
Parameter	Unit	G / S	RDL		4353080
Benzene	mg/kg		0.02		<0.02
Toluene	mg/kg		0.04		<0.04
Ethylbenzene	mg/kg		0.03		<0.03
Xylene (Total)	mg/kg		0.05		<0.05
C6-C10 (less BTEX)	mg/kg		3		<3
>C10-C16 Hydrocarbons	mg/kg		15		<15
>C16-C21 Hydrocarbons	mg/kg		15		47
>C21-C32 Hydrocarbons	mg/kg		15		145
Modified TPH (Tier 1)	mg/kg		15		192
Resemblance Comment					LOF, UC
Return to Baseline at C32					N
Surrogate	Unit	Acceptable Limits			
Isobutylbenzene - EPH	%	60-140			93
Isobutylbenzene - VPH	%	60-140			115
n-Dotriacontane - EPH	%	60-140			92

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-21

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4352945-4353080 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Results are based on the dry weight of the soil.

Resemblance Comment Key:
GF - Gasoline Fraction
WGF - Weathered Gasoline Fraction
GR - Product in Gasoline Range
FOF - Fuel Oil Fraction
WFOF - Weathered Fuel Oil Fraction
FR - Product in Fuel Oil Range
LOF - Lube Oil Fraction
LR - Lube Range
UC - Unidentified Compounds
NR - No Resemblance
NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by *)

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AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-21

SAMPLE DESCRIPTION:				3168-GP03-SS1	3168-GP02-SS1	3168-GP01-SS1	3168-NP03-SS1	3168-NP02-SS1	3168-NP01-SS1	3168-MP02-SS1	3168-MP03-SS1
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2022-09-21 14:35	2022-09-21 14:35	2022-09-21 14:50	2022-09-21 16:38	2022-09-21 17:00	2022-09-21 17:12	2022-09-25 11:20	2022-09-25 13:50
Parameter	Unit	G / S	RDL	4352945	4352946	4352947	4352948	4352949	4352950	4353079	4353080
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	39	<15	<15	<15	<15	18	22	26
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	97	44	17	30	27	80	109	71
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	136	44	17	30	27	98	131	97
Resemblance Comment				UC	UC	UC	UC	UC	LOF, UC	LOF, UC	UC
Return to Baseline at C32				Y	Y	Y	Y	Y	Y	Y	Y
Silica Gel Cleanup				Y	Y	Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits									
Isobutylbenzene - EPH	%	60-140		110	109	111	109	109	112	110	108
Isobutylbenzene - VPH	%	60-140		70	71	68	65	121	121	118	115
n-Dotriacontane - EPH	%	60-140		113	112	112	110	108	114	116	110

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-21

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4352945-4353080 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Results are based on the dry weight of the soil.

Resemblance Comment Key:
GF - Gasoline Fraction
WGF - Weathered Gasoline Fraction
GR - Product in Gasoline Range
FOF - Fuel Oil Fraction
WFOF - Weathered Fuel Oil Fraction
FR - Product in Fuel Oil Range
LOF - Lube Oil Fraction
LR - Lube Range
UC - Unidentified Compounds
NR - No Resemblance
NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by *)

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Moisture

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-21

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: 3168-GP03-SS1	3168-GP02-SS1	3168-GP01-SS1	3168-NP03-SS1	3168-NP02-SS1	3168-NP01-SS1	3168-MP01-SS1	3168-MP02-SS1
				SAMPLE TYPE: Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED: 2022-09-21 14:35	2022-09-21 14:35	2022-09-21 14:50	2022-09-21 16:38	2022-09-21 17:00	2022-09-21 17:12	2022-09-25 10:55	2022-09-25 11:20
				4352945	4352946	4352947	4352948	4352949	4352950	4353078	4353079
% Moisture	%		1	91	90	68	70	76	72	70	79

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: 3168-MP03-SS1
				SAMPLE TYPE: Soil
				DATE SAMPLED: 2022-09-25 13:50
				4353080
% Moisture	%		1	88

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

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AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-21

SAMPLE DESCRIPTION:				3168-GP03-SS1	3168-GP02-SS1	3168-GP01-SS1	3168-NP03-SS1	3168-NP02-SS1	3168-NP01-SS1	3168-MP01-SS1	3168-MP02-SS1
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2022-09-21 14:35	2022-09-21 14:35	2022-09-21 14:50	2022-09-21 16:38	2022-09-21 17:00	2022-09-21 17:12	2022-09-25 10:55	2022-09-25 11:20
Parameter	Unit	G / S	RDL	4352945	4352946	4352947	4352948	4352949	4352950	4353078	4353079
1-Methylnaphthalene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	0.0549	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	0.010	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	mg/kg		0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.13	<0.01	0.08
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.20	<0.01	0.18
Benzo(b)fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.14
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.26
Benzo(e)pyrene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.16	<0.01	0.13
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.31	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	0.16	0.10	0.01	0.03	0.12	0.53	0.09	0.58
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06	<0.01	0.05
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	17.8	8.61	0.82	1.05	3.92	3.65	1.15	1.02
Phenanthrene	mg/kg		0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.46	<0.01	0.33
Pyrene	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	0.10	0.40	0.08	0.50
Quinoline	mg/kg		0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		80	81	85	78	93	93	60	82
Terphenyl-d14	%	50-140		54	60	64	59	62	67	80	89
Pyrene-d10 (%)	%	50-140		57	61	57	66	63	65	74	84

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Certificate of Analysis

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-21

		SAMPLE DESCRIPTION:		3168-MP03-SS1
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2022-09-25 13:50
Parameter	Unit	G / S	RDL	4353080
1-Methylnaphthalene	mg/kg		0.05	<0.01
2-Methylnaphthalene	mg/kg		0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004
Acridine	mg/kg		0.05	<0.01
Anthracene	mg/kg		0.03	<0.01
Benzo(a)anthracene	mg/kg		0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.01
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.01
Benzo(e)pyrene	mg/kg		0.05	<0.01
Benzo(ghi)perylene	mg/kg		0.01	<0.01
Chrysene	mg/kg		0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006
Fluoranthene	mg/kg		0.05	0.09
Fluorene	mg/kg		0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01
Perylene	mg/kg		0.05	1.82
Phenanthrene	mg/kg		0.03	<0.01
Pyrene	mg/kg		0.05	<0.01
Quinoline	mg/kg		0.05	<0.01
Surrogate	Unit	Acceptable Limits		
Naphthalene-d8	%	50-140		75
Terphenyl-d14	%	50-140		75
Pyrene-d10 (%)	%	50-140		68

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AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2022-09-26

DATE REPORTED: 2022-10-21

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4352945-4353080 Results are based on the dry weight of the soil.

Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 22K950371
PROJECT: 3168 HORIZON MARITIME
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Oct 21, 2022

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved															
Benzene	1	4338883	< 0.02	< 0.02	NA	< 0.02	72%	60%	140%	80%	60%	140%			
Toluene	1	4338883	< 0.04	< 0.04	NA	< 0.04	73%	60%	140%	71%	60%	140%			
Ethylbenzene	1	4338883	0.29	0.28	3.5%	< 0.03	72%	60%	140%	73%	60%	140%			
Xylene (Total)	1	4338883	4.94	4.97	0.6%	< 0.05	72%	60%	140%	75%	60%	140%			
C6-C10 (less BTEX)	1	4338883	< 3	< 3	NA	< 3	77%	60%	140%	96%	60%	140%	104%	30%	130%
>C10-C16 Hydrocarbons	1	4352945	< 15	< 15	NA	< 15	81%	60%	140%	129%	60%	140%	112%	30%	130%
>C16-C21 Hydrocarbons	1	4352945	39	15	NA	< 15	86%	60%	140%	129%	60%	140%	112%	30%	130%
>C21-C32 Hydrocarbons	1	4352945	97	126	26.0%	< 15	87%	60%	140%	129%	60%	140%	112%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Polycyclic Aromatic Hydrocarbons in Soil															
1-Methylnaphthalene	1	4352945	< 0.05	< 0.05	NA	< 0.05	135%	50%	140%	91%	50%	140%	98%	50%	140%
2-Methylnaphthalene	1	4352945	< 0.01	< 0.01	NA	< 0.01	113%	50%	140%	79%	50%	140%	86%	50%	140%
Acenaphthene	1	4352945	< 0.00671	< 0.00671	NA	< 0.00671	117%	50%	140%	84%	50%	140%	88%	50%	140%
Acenaphthylene	1	4352945	0.00520	0.00410	NA	< 0.004	100%	50%	140%	71%	50%	140%	76%	50%	140%
Acridine	1	4352945	< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	69%	50%	140%	77%	50%	140%
Anthracene	1	4352945	< 0.03	< 0.03	NA	< 0.03	107%	50%	140%	71%	50%	140%	78%	50%	140%
Benzo(a)anthracene	1	4352945	< 0.01	< 0.01	NA	< 0.01	87%	50%	140%	63%	50%	140%	82%	50%	140%
Benzo(a)pyrene	1	4352945	< 0.01	< 0.01	NA	< 0.01	77%	50%	140%	71%	50%	140%	80%	50%	140%
Benzo(b)fluoranthene	1	4352945	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	56%	50%	140%	90%	50%	140%
Benzo(j+k)fluoranthene	1	4352945	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	104%	50%	140%	108%	50%	140%
Benzo(e)pyrene	1	4352945	< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	82%	50%	140%	86%	50%	140%
Benzo(ghi)perylene	1	4352945	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	74%	50%	140%	87%	50%	140%
Chrysene	1	4352945	< 0.01	< 0.01	NA	< 0.01	137%	50%	140%	102%	50%	140%	98%	50%	140%
Dibenzo(a,h)anthracene	1	4352945	< 0.006	< 0.006	NA	< 0.006	69%	50%	140%	66%	50%	140%	79%	50%	140%
Fluoranthene	1	4352945	0.1626	0.1747	NA	< 0.05	98%	50%	140%	64%	50%	140%	86%	50%	140%
Fluorene	1	4352945	< 0.01	< 0.01	NA	< 0.01	104%	50%	140%	74%	50%	140%	79%	50%	140%
Indeno(1,2,3)pyrene	1	4352945	< 0.01	< 0.01	NA	< 0.01	75%	50%	140%	82%	50%	140%	102%	50%	140%
Naphthalene	1	4352945	< 0.01	< 0.01	NA	< 0.01	116%	50%	140%	80%	50%	140%	86%	50%	140%
Perylene	1	4352945	17.8314	17.7214	0.6%	< 0.05	94%	50%	140%	93%	50%	140%	NA	50%	140%
Phenanthrene	1	4352945	< 0.03	< 0.03	NA	< 0.03	123%	50%	140%	90%	50%	140%	95%	50%	140%
Pyrene	1	4352945	< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	67%	50%	140%	78%	50%	140%
Quinoline	1	4352945	< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	103%	50%	140%	104%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved												
Benzene	1	4374199	< 0.02	< 0.02	NA	< 0.02	69%	60%	140%	87%	60%	140%

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 22K950371
PROJECT: 3168 HORIZON MARITIME
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Oct 21, 2022

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Toluene	1	4374199	< 0.04	< 0.04	NA	< 0.04	71%	60%	140%	82%	60%	140%			
Ethylbenzene	1	4374199	< 0.03	< 0.03	NA	< 0.03	74%	60%	140%	83%	60%	140%			
Xylene (Total)	1	4374199	< 0.05	< 0.05	NA	< 0.05	78%	60%	140%	91%	60%	140%			
C6-C10 (less BTEX)	1	4374199	< 3	< 3	NA	< 3	91%	60%	140%	117%	60%	140%	123%	30%	130%
Polycyclic Aromatic Hydrocarbons in Soil															
1-Methylnaphthalene	1	4352945	< 0.05	< 0.05	NA	< 0.05	135%	50%	140%	91%	50%	140%	98%	50%	140%
2-Methylnaphthalene	1	4352945	< 0.01	< 0.01	NA	< 0.01	113%	50%	140%	79%	50%	140%	86%	50%	140%
Acenaphthene	1	4352945	< 0.00671	< 0.00671	NA	< 0.00671	117%	50%	140%	84%	50%	140%	88%	50%	140%
Acenaphthylene	1	4352945	0.010	0.004	NA	< 0.004	100%	50%	140%	71%	50%	140%	76%	50%	140%
Acridine	1	4352945	< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	69%	50%	140%	77%	50%	140%
Anthracene	1	4352945	< 0.03	< 0.03	NA	< 0.03	107%	50%	140%	71%	50%	140%	78%	50%	140%
Benzo(a)anthracene	1	4352945	< 0.01	< 0.01	NA	< 0.01	87%	50%	140%	63%	50%	140%	82%	50%	140%
Benzo(a)pyrene	1	4352945	< 0.01	< 0.01	NA	< 0.01	77%	50%	140%	71%	50%	140%	80%	50%	140%
Benzo(b)fluoranthene	1	4352945	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	56%	50%	140%	90%	50%	140%
Benzo(j+k)fluoranthene	1	4352945	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	104%	50%	140%	108%	50%	140%
Benzo(e)pyrene	1	4352945	< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	82%	50%	140%	86%	50%	140%
Benzo(ghi)perylene	1	4352945	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	74%	50%	140%	87%	50%	140%
Chrysene	1	4352945	< 0.01	< 0.01	NA	< 0.01	137%	50%	140%	102%	50%	140%	98%	50%	140%
Dibenzo(a,h)anthracene	1	4352945	< 0.006	< 0.006	NA	< 0.006	69%	50%	140%	66%	50%	140%	79%	50%	140%
Fluoranthene	1	4352945	0.16	0.17	NA	< 0.05	98%	50%	140%	64%	50%	140%	86%	50%	140%
Fluorene	1	4352945	< 0.01	< 0.01	NA	< 0.01	104%	50%	140%	74%	50%	140%	79%	50%	140%
Indeno(1,2,3)pyrene	1	4352945	< 0.01	< 0.01	NA	< 0.01	75%	50%	140%	82%	50%	140%	102%	50%	140%
Naphthalene	1	4352945	< 0.01	< 0.01	NA	< 0.01	116%	50%	140%	80%	50%	140%	86%	50%	140%
Perylene	1	4352945	17.8	17.7	0.6%	< 0.05	94%	50%	140%	93%	50%	140%	NA	50%	140%
Phenanthrene	1	4352945	< 0.03	< 0.03	NA	< 0.03	123%	50%	140%	90%	50%	140%	95%	50%	140%
Pyrene	1	4352945	< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	67%	50%	140%	78%	50%	140%
Quinoline	1	4352945	< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	103%	50%	140%	104%	50%	140%
Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel															
>C10-C16 Hydrocarbons - 1X silica gel	1	4352945	< 15	< 15	NA	< 15	81%	60%	140%	129%	60%	140%	112%	30%	130%
>C16-C21 Hydrocarbons - 1X silica gel	1	4352945	39	15	NA	< 15	86%	60%	140%	129%	60%	140%	112%	30%	130%
>C21-C32 Hydrocarbons - 1X silica gel	1	4352945	97	126	26.0%	< 15	87%	60%	140%	129%	60%	140%	112%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

AGAT Laboratories

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Oct 21, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:

AGAT Laboratories

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Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013/5031	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013/5031	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013/5031	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013/5031	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013/5031	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Silica Gel Cleanup			GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C10-C16 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C21-C32 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Modified TPH (Tier 1) - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
% Moisture	LAB-131-4024	CSSS 70.2	GRAVIMETRIC
1-Methylnaphthalene	ORG-120-5119	EPA 3570/8270E	GC/MS
2-Methylnaphthalene	ORG-120-5119	EPA 3570/8270E	GC/MS
Acenaphthene	ORG-120-5119	EPA 3570/8270E	GC/MS
Acenaphthylene	ORG-120-5119	EPA 3570/8270E	GC/MS
Acridine	ORG-120-5119	EPA 3570/8270E	GC/MS
Anthracene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(a)anthracene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(a)pyrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(b)fluoranthene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(e)pyrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Benzo(ghi)perylene	ORG-120-5119	EPA 3570/8270E	GC/MS
Chrysene	ORG-120-5119	EPA 3570/8270E	GC/MS

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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 22K950371

PROJECT: 3168 HORIZON MARITIME

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dibenzo(a,h)anthracene	ORG-120-5119	EPA 3570/8270E	GC/MS
Fluoranthene	ORG-120-5119	EPA 3570/8270E	GC/MS
Fluorene	ORG-120-5119	EPA 3570/8270E	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Naphthalene	ORG-120-5119	EPA 3570/8270E	GC/MS
Perylene	ORG-120-5119	EPA 3570/8270E	GC/MS
Phenanthrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Pyrene	ORG-120-5119	EPA 3570/8270E	GC/MS
Quinoline	ORG-120-5119	EPA 3570/8270E	GC/MS
Naphthalene-d8	ORG-120-5119	EPA 3570/8270E	GC/MS
Terphenyl-d14	ORG-120-5119	EPA 3570/8270E	GC/MS
Pyrene-d10 (%)	ORG-120-5119	EPA 3570/8270E	GC/MS

AGAT Laboratories
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B3B 1M2
webearth.agatlabs.com • www.agatlabs.com
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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☑ Good ☐ Poor (see notes)
Arrival Temperature: 4.9, 5.2, 5.5
Hold Time:
AGAT Job Number: 22K950371
Notes:

Report Information
Company: Fracflow Consultants Inc. (NL)
Contact: John Gale
Address: 154 Major's Path
St. John's, NL
Phone: 709-739-7270 Fax: 709-753-5101
Client Project #: 3168 Horizon Maritime
AGAT Quotation: S/O
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: John Gale (john_ffc@nfld.net)
Email: Devin Northcott (devin_ffc@bellaliant.com)
2. Name: Karen Andrews (karen_ffc@nfld.net)
Email: Chris Piercey (chris_ffc@bellaliant.com)

Report Format
☐ Single Sample per page
☑ Multiple Sample per page
☑ Excel Format Included
☐ Export:

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To Same Yes ☑ / No ☐
Company:
Contact: Karen Andrews (karen_ffc@nfld.net)
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):
☑ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☑ Coarse
☐ Tier 2 ☐ Com ☑ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☑ No **Salt Water Sample:** ☐ Yes ☑ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment
3168-GP03-SS1	Sept. 21, 2022 / 14:15	Soil	4	
3168-GP02-SS1	Sept. 21, 2022 / 14:35	Soil	4	
3168-GP01-SS1	Sept. 21, 2022 / 14:50	Soil	4	
3168-NP03-SS1	Sept. 21, 2022 / 16:38	Soil	4	
3168-NP02-SS1	Sept. 21, 2022 / 17:00	Soil	4	
3168-NP01-SS1	Sept. 21, 2022 / 17:12	Soil	4	

Sample Identification	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	Grain Size (coarse/fine)	☐ TOC - Miss ☐ FOC - Miss	Phosphates (total as P2O5)	Chromium (Tri & Hexavalent)	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	Oil & Grease (TOG)	BNAE EPA 625 - Miss	PAH	PCB	Marine Sediment Package	Dioxins & Furans	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
3168-GP03-SS1											✓						✓							
3168-GP02-SS1											✓						✓							
3168-GP01-SS1											✓						✓							
3168-NP03-SS1											✓						✓							
3168-NP02-SS1											✓						✓							
3168-NP01-SS1											✓						✓							

Samples Relinquished By (Print Name): Karen L. Andrews
Date/Time: 26/09/22 13:20
Samples Relinquished By (Sign): Karen L Andrews
Date/Time:
Samples Received By (Print Name): O. Aikens Sept 26/22
Date/Time: 1:20
Samples Received By (Sign):
Date/Time:

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 2
Nº: FFC-3168-COC-01

AGAT Laboratories

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 3.2, 3.4, 4.1
Hold Time:
AGAT Job Number: 22K950571
Notes:

Report Information

Company: Fracflow Consultants Inc. (NL)
Contact: John Gale
Address: 154 Major's Path
St. John's, NL
Phone: 709-739-7270 Fax: 709-753-5101
Client Project #: 3168 Horizon Maritime
AGAT Quotation: S/O
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):

1. Name: John Gale (john_ffc@nfld.net)
   Email: Devin Northcott (devin_ffc@bellaliant.com)
2. Name: Karen Andrews (karen_ffc@nfld.net)
   Email: Chris Piercey (chris_ffc@bellaliant.com)

Report Format

☐ Single Sample per page
☑ Multiple Sample per page
☑ Excel Format Included
☐ Export:

Turnaround Time Required (TAT)

Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To

Same Yes ☑ / No ☐
Company:
Contact: Karen Andrews (karen_ffc@nfld.net)
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):

☑ List Guidelines on Report ☐ Do not list Guidelines on Report
☑ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☑ Coarse
☐ Tier 2 ☐ Com ☑ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube

☐ CCME
☐ Industrial
☐ Commercial
☐ Res/Park
☐ Agricultural
☐ FWAL
☐ Sediment

☐ CDWQ
☐ NSEQS-Cont Sites
☐ HRM 101
☐ Storm Water
☐ Waste Water
☐ Other

Drinking Water Sample: ☐ Yes ☑ No **Salt Water Sample:** ☐ Yes ☑ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info, Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	Grain Size (coarse/fine)	☐ TOC - Miss ☐ FOC - Miss	Phosphates (total as P205)	Chromium (Tri & Hexavalent)	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	Oil & Grease (TOG)	BNAE EPA 625 - Miss	PAH	PCB	Marine Sediment Package	Dioxins & Furans	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
3168-MP01-SS1	Sept. 25, 2022 / 10:55	Soil	4												✓						✓							
3168-MP02-SS1	Sept. 25, 2022 / 11:20	Soil	4												✓						✓							
3168-MP03-SS1	Sept. 25, 2022 / 13:50	Soil	4												✓						✓							

Samples Relinquished By (Print Name): KAREN L ANDREWS
Samples Relinquished By (Sign):
Date/Time: 27 Sept 22 08:45
Samples Received By (Print Name):
Samples Received By (Sign):
Date/Time: Sept 27/22
Date/Time: 845pm

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 2 of 2
Nº: FFC-3168-COC-02

Form ID: DIV-133-1501-002

Date revised: January 2016

APPENDIX 1.2

Report FFC-NL-3168-012

Water Quality, July 2023, in Industrial Water Supply Ponds
Noels Pond, Muddy Pond, and Gull (Mine) Pond
Stephenville, NL

Fracflow Consultants Inc.
Environmental, Hydrogeological and Geotechnical Engineering Consultants

world energy GH2

Water Quality, July 2023, in Industrial Water Supply Ponds
Noels Pond, Muddy Pond, and Gull (Mine) Pond
Stephenville, NL

(FFC File 3168)

Prepared by:

Fracflow Consultants Inc.
154 Majors Path
St. John's, NL
A1A 5A1

Submitted to:

World Energy GH2 LP
87 Water Street
St. John's, NL
A1C 1A5

August 17, 2023

PROVINCE OF NEWFOUNDLAND
PERMIT HOLDER
CLASS "A"
This Permit Allows
FRACFLOW CONSULTANTS INC.
To practice Professional Engineering
in Newfoundland and Labrador.
Permit No. as issued by APEGN D0169
which is valid for the year 2023.

REGISTERED PROFESSIONAL ENGINEER
JOHN R. GALE
SIGNATURE
17 Aug-2023
DATE
PROVINCE OF NEWFOUNDLAND

Executive Summary

Water samples and pond sediment samples were collected in July 2023 at three locations in each pond that were previously sampled in September 2022 at the same locations. The water samples were analyzed for a range of components that were considered to be relevant to the intake water for the proposed World Energy GH2 Limited Partnership Hydrogen plant. The locations were originally selected with adequate spacing to provide a representation of the overall water chemistry. The water sample data have been compared against CCME's Freshwater Aquatic Life (FWAL) guidelines based on the assumption that the ponds are fish habitats. The general water chemistry for the water samples from all three ponds met FWAL guidelines, except for the noted exceedances in laboratory reported pH values and Aluminum. The reported dissolved iron exceedance is considered to be a laboratory error and is being investigated. There was no detectable BTEX/TPH when using low-level detection analysis.

The recording devices (Leveloggers) installed in March 2023 have been recording water level, water temperature and fluid conductivity data on a continual 30-minute interval basis. These data were downloaded in July 2023 during the surface water sampling program. The Leveloggers were installed at the culvert immediately upstream of Noels Pond, and at the Noels Pond outflow weir. The recorded temperature and fluid conductivity readings show a gradual increase from winter conditions to summer conditions and these parameters are expected to decrease again sometime during fall 2023 or winter 2024. The trend in the fluid conductivity is presumed to reflect trends in TDS and TSS.

The Town of Stephenville was not able to provide any historical surface water chemistry data for Noels Pond. The 2001 water chemistry data that are available on the Town's server are for groundwater samples.

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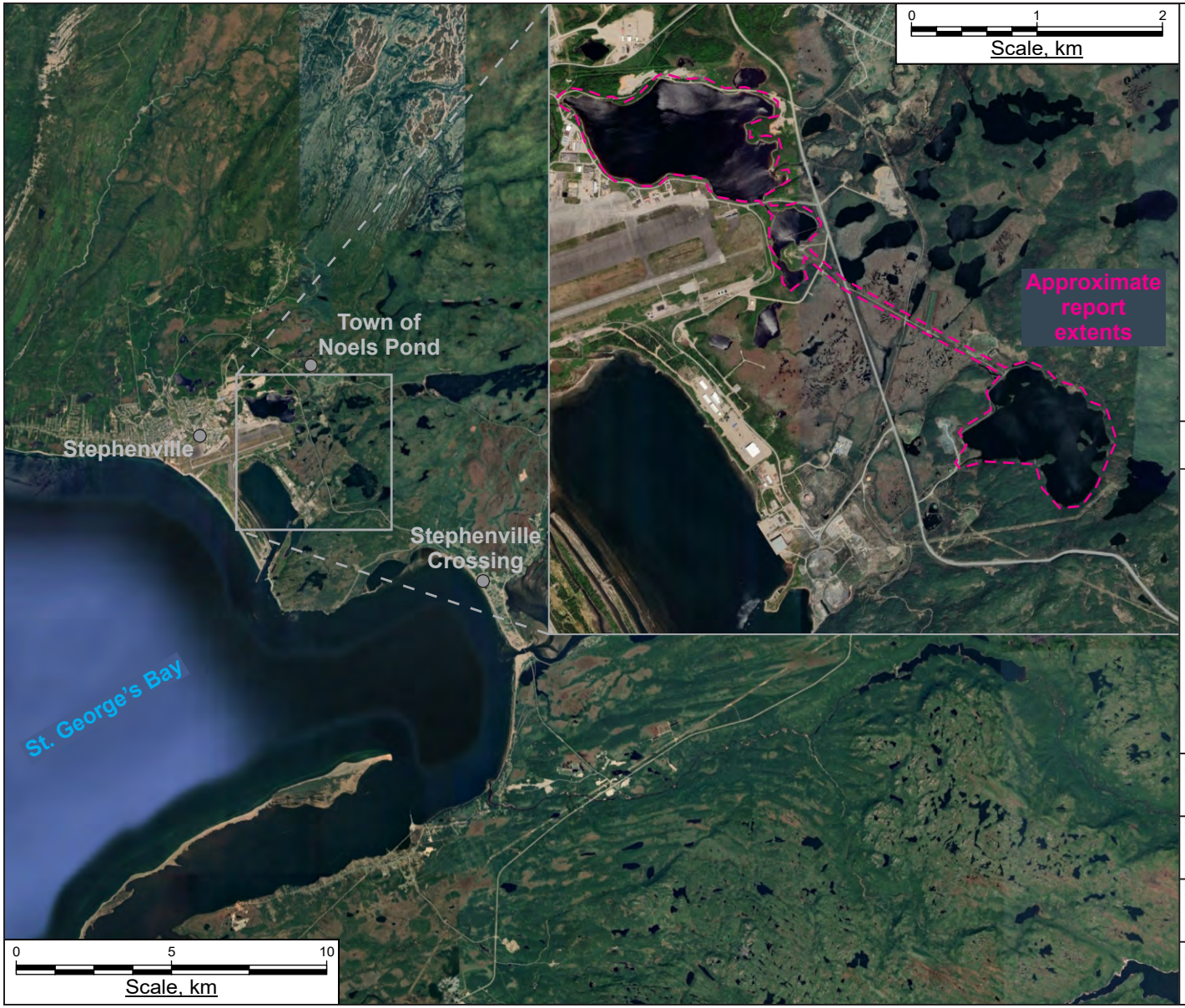
1.0 INTRODUCTION

World Energy GH2 Limited Partnership (WEGH2 LP) is planning to develop a plant for hydrogen production within the municipal boundaries of the Town of Stephenville (**Figure 1.1**). WEGH2 LP is considering obtaining the required supply of industrial water from two sources; Gull (Mine) Pond (the primary source) and from Muddy Pond-Noels Pond (the secondary source). Two of the three ponds are located within the Warm Creek drainage basin.

Muddy Pond and Noels Pond are fed by the Warm Creek drainage basin. Muddy Pond is connected to Noels Pond via two large culverts that extend under Carolina Avenue. Gull (Mine) Pond is another pond east of the Warm Creek drainage basin that is not part of Muddy Pond-Noels Pond surface drainage and capture area (Fracflow, 2022a). A large diameter pipeline was constructed in the 1970s between Muddy Pond-Noels Pond and Gull (Mine) Pond, allowing water to be pumped from Muddy Pond-Noels Pond to Gull (Mine) Pond. This pipeline was used to provide additional industrial water to the original Linerboard Mill and subsequently to the Abitibi Mill operations. The overall system is thoroughly described in another report (Fracflow, 2022b).

1.1 Report Structure

This Report has been structured with a brief overview of each laboratory analysis for a series of samples taken from each pond from July 11 to 13, 2023. The report also comments on changes in water chemistry from the previous (fall 2022) sampling event (Fracflow, 2022c).



Basemap by Google (2023)

Figure 1.1

General location map of the project site in Stephenville, NL.

Project No.	3168
Location	Stephenville, NL
Document Reference	FFC-NL-3168-012
Date	August 2023

FFC

2.0 INDUSTRIAL WATER SUPPLY STORAGE INFRASTRUCTURE

2.1 Gull (Mine) Pond

The primary industrial water source area, Gull (Mine) Pond, which has a small drainage basin capture area, contains the main components (**Figure 2.1**) of the industrial water supply system. Fracflow conducted a preliminary assessment in 2022 (Fracflow, 2022a) using historical records and climate data that estimated the volume of industrial water that could be supplied by Gull (Mine) Pond after refurbishing the existing infrastructure.

Gull (Mine) Pond has a number of deep zones, up to 20 and 28 m in water depth, but is shallower towards the west near the outflow structure. The outflow structure to Gull (Mine) Pond (**Figure 2.1**) is a wooden benched structure, with a wide rectangular shape, constructed integrally with the berm and captures any flow from Gull (Mine) Pond and directs it into a small watercourse. The downstream watercourse starts as a small pool surrounded by the outflow structure and is directed beneath Mine Pond Road by three culverts. Recent activities by others have compromised the beaver dam and caused the water level in the outflow structure to drop about 1 m in the area. This watercourse ultimately flows through streams that cross under Route 490, and through culverts across and through the former Abitibi Mill property.

2.2 Noels Pond

Figure 2.2 shows the location of the outflow control structure on Noels Pond, the culvert connection between Noels Pond and Muddy Pond, and the location of the Warm Creek discharge into Noels Pond. The main water outflow control structure in Noels Pond is the two broad crested weir sections on either side of the three former flow control gates. This control structure is located on the downstream or western reach of Noels Pond.

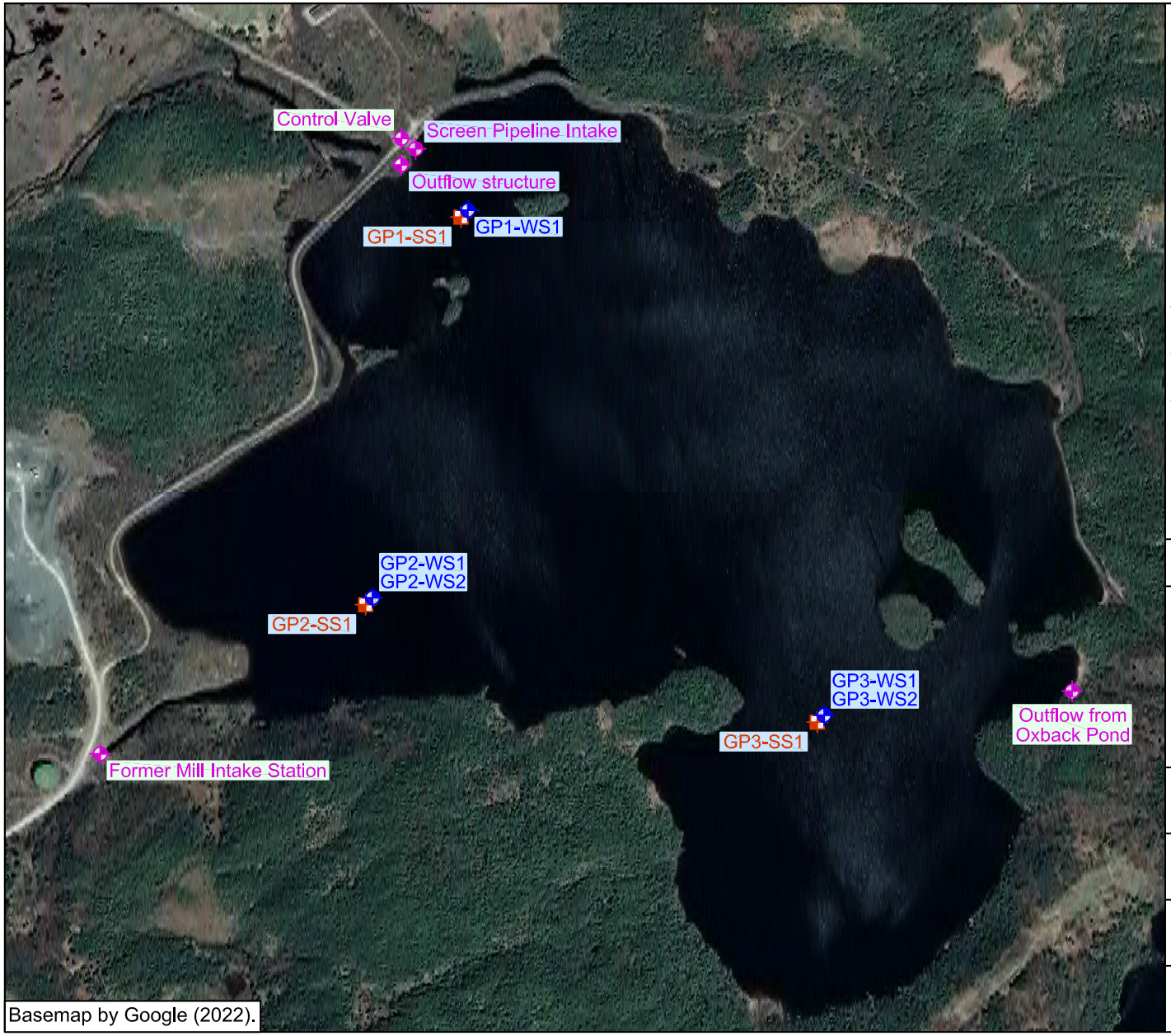
The upstream and downstream faces of the weir extend as a continuous concrete base across the outflow channel. The gates on the control structure have been removed, leaving a nylon sealing strip on the east-most and west-most gates. Some granular materials have also been deposited downstream of these strips.

2.3 Muddy Pond

Carolina Avenue, known more commonly as “the Ramp access,” crosses over a narrow 40 m section between Noels Pond and Muddy Pond. Beneath this section of the paved highway there are two large culverts that cross beneath the road which connect Noels Pond and Muddy Pond (**Figure 2.3**). The water level in Muddy Pond is controlled by the water level in Noels Pond

since the ponds are connected. The top of the culverts was approximately 3 m below the water level on September 21, 2022.

The southern portion of Muddy Pond is a very shallow area with a gentle sloping bottom that was difficult to navigate with a flat bottomed boat during the sonar survey. Large portions of shoreline are exposed with small changes in water levels during the summer months.



N

Legend

WS1 Water sample location at specific depths.

SS1 Lake bottom sediment grab sample.

Pond Related infrastructure and related natural features.

0 250

Scale, m

Figure 2.1

Gull (Mine) Pond related infrastrucutre and sampling locations.

Document Reference
FFC-NL-3168-012

Location
Stephenville, NL

Project No.
3168

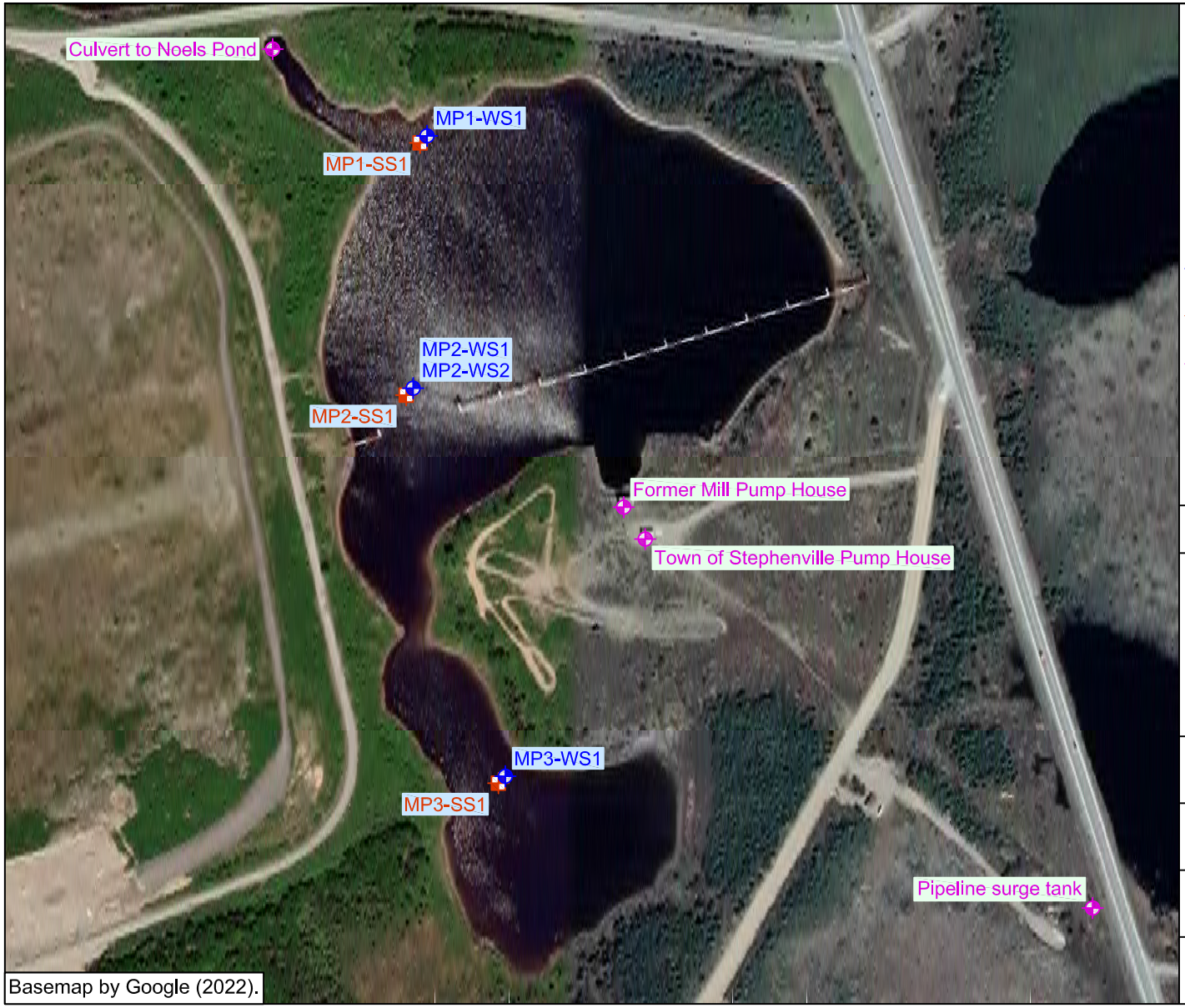
Date
August 2023

FFC

Figure 2.2 Noels Pond related infrastructure and sampling locations.

Project No.	Document No.
3168	FFC-NL-3168-012
Location	Date
Stephenville, NL	August 2023

FFC



N

Legend

WS1 Water sample location at specific depths.

SS1 Lake bottom sediment grab sample.

Pond Related infrastructure and related natural features.

0 80 160

Scale, m

Figure 2.3

Muddy Pond related infrastructure and sampling locations.

Document Reference
3168-FFC-NL-012

Location
Stephenville, NL

Project No.
3168

Date
August 2023

FFC

3.0 WATER QUALITY AND CHEMISTRY DATA

Water samples and pond sediment samples were collected in each pond that was sampled at each of the three locations in September 2022 (Fracflow, 2022c). The locations were originally selected with adequate spacing to provide a representation of the overall water chemistry. The water sample data have been compared against CCME's Freshwater Aquatic Life (FWAL) guidelines based on the assumption that the ponds are fish habitats.

At each location, the water was sampled at 1.5 m below the water surface, and 1.5 m above the pond bottom. The exception was for three locations (GP01, MP01, and MP03) where the water depths were 4.1 m or less, therefore only one water sample, at 1.5 m of depth, was collected at each of those three locations.

Pond sediment samples were not collected from the pond bottom during this sampling event. The September soil sample data are presented in a previous report (Fracflow, 2022c).

Leveloggers were installed at the upstream and downstream ends of Noels Pond in March 2023, and have been recording water level, temperature and fluid conductivity on a continual 30-minute interval basis. The recorded temperature and fluid conductivity readings have been plotted in **Figure 3.1**. The graph shows the gradual increase in temperature from winter conditions in March, to summer conditions in July. The fluid conductivity also shows a gradual increase, which are assumed to be related to increases in the Total Dissolved Solids and/or suspended particles in the water.

3.1 Standard Water Analysis, Organic Carbon and Total Solids

A total of nine water samples were collected at the shallow water depths, and six water samples were collected from the deeper water levels at locations shown in **Figures 2.1 to 2.3**. The samples were analyzed for typical parameters in the standard water analysis package offered by the laboratory, plus total and dissolved organic carbon, and total suspended solids (TSS) and total dissolved solids (TDS). The results are reported in **Tables 3.1.1 to 3.1.4**. The parameters that exceeded guidelines are identified below. pH values were below guideline values for Gull (Mine) Pond and Muddy Pond. Two parameters were identified in the duplicate sample that was well outside the acceptable 30% error reported by the laboratory for a duplicate sample. No other parameters were identified that exceeded FWAL guidelines (**Appendix A**).

<u>Gull (Mine) Pond</u>

- All samples – Laboratory **pH** values ranged from 6.15 to 6.24 relative to the guideline value of 6.5. All field measured pH values were above guideline values of 6.5 with an average pH of 6.90.

Noels Pond

- AP01-WS1 (Duplicate of N02-WS1) – **Fluoride** was 0.53 mg/L relative to the guideline value of 0.13 mg/L and **Nitrite as N** was 0.66 mg/L relative to the guidelines value of 0.05 mg/L. These duplicate sample parameters are greater than 30% of the actual sample, and other similar samples from the pond. Noels Pond had an average field measured pH of 7.20.

Muddy Pond

- MP03-WS1 – Laboratory **pH** value was 6.43 relative to the guideline value of 6.5. The field measured pH was above the guideline value of 6.5 with an average pH of 7.05.

3.2 Total Metals in Water

Water samples for total metal analysis were collected and acidified at each sampling location. A total of 15 samples were taken at shallow and deep water intervals at the locations shown in **Figures 2.1 to 2.3**. The total metals data were compared against FWAL guidelines. The results are reported in **Tables 3.2.1 to 3.2.4**.

The exceedances for FWAL guidelines are all related to aluminum concentrations. The exceedances are discussed below. No other parameters were identified outside FWAL guidelines (**Appendix A**). The duplicate shown in **Table 3.2.4** shows no variance when compared to the actual water sample taken at the same time (NP02-WS1) in **Table 3.2.2**.

Gull (Mine) Pond

- All samples – **Total aluminum** ranged from 55 to 73 µg/L relative to the guideline value of 5 µg/L when the laboratory reported pH was less than 6.5.

Muddy Pond

- MP03-WS1 – **Total aluminum** was 96 µg/L relative to the guideline value of 5 µg/L when the laboratory reported pH was less than 6.5.

3.3 Dissolved Metals in Water

Dissolved metal samples were also collected and filtered and preserved in the field. A total of 15 samples were taken at shallow and deep water intervals at the locations shown in **Figures 2.1 to 2.3**. The samples were compared against FWAL guidelines. The results are reported in **Tables 3.3.1 to 3.3.4**.

The exceedances for FWAL guidelines are all related to aluminum concentrations when the pH was less than 6.5. The exceedances are discussed below. One dissolved metal sample (MP02-WS2) exceeded guidance values for dissolved iron. The total metal value reported for selenium did not exceed guidelines. No other parameters were identified that plot outside the FWAL guidelines (**Appendix A**). The duplicate data shown in **Table 3.3.4** show no variance when compared to the data for the sample taken at the same time (NP02-WS1) in **Table 3.3.2**.

Gull (Mine) Pond

- All samples – **Total aluminum** ranged from 41 to 61 µg/L relative to the guideline value of 5 µg/L when the laboratory reported pH was less than 6.5.

Muddy Pond

- MP03-WS1 – **Dissolved aluminum** was 62 µg/L relative to the guideline value of 5 µg/L when the laboratory reported pH was less that 6.5; and
- MP02-WS2 – **Dissolved iron** was 1,240 µg/L relative to the guideline value of 300 µg/L, which is an order of magnitude greater than total iron (109 µg/L), indicating that that the result is a laboratory error which is being investigated.

3.4 Petroleum Hydrocarbons in Water

Three water samples were collected at the shallow sampling depth for each pond, as shown in **Figures 2.1 to 2.3**, for a total of nine samples. The samples were analyzed for total petroleum hydrocarbons (TPH) and BTEX (benzene, toluene, ethylbenzene, and xylene) using low-level detection limits. The results are reported in **Tables 3.4.1 to 3.4.3**. No BTEX/TPH components were identified above detection limits (**Appendix A**).

3.5 Volatile Organic Compounds in Water

One sample was collected at the shallow water sampling depth location for each pond, as shown in **Figures 2.1 to 2.3**, for a total of three samples. The sample locations were chosen based on potential historical impacts (Muddy and Gull (Mine) Pond) or the furthest sample downstream (Noels Pond). The samples were analyzed using the standard list of VOCs offered by the analytical laboratory. The results are reported in **Table 3.5**. No parameters were identified above reported detection limits (**Appendix A**).

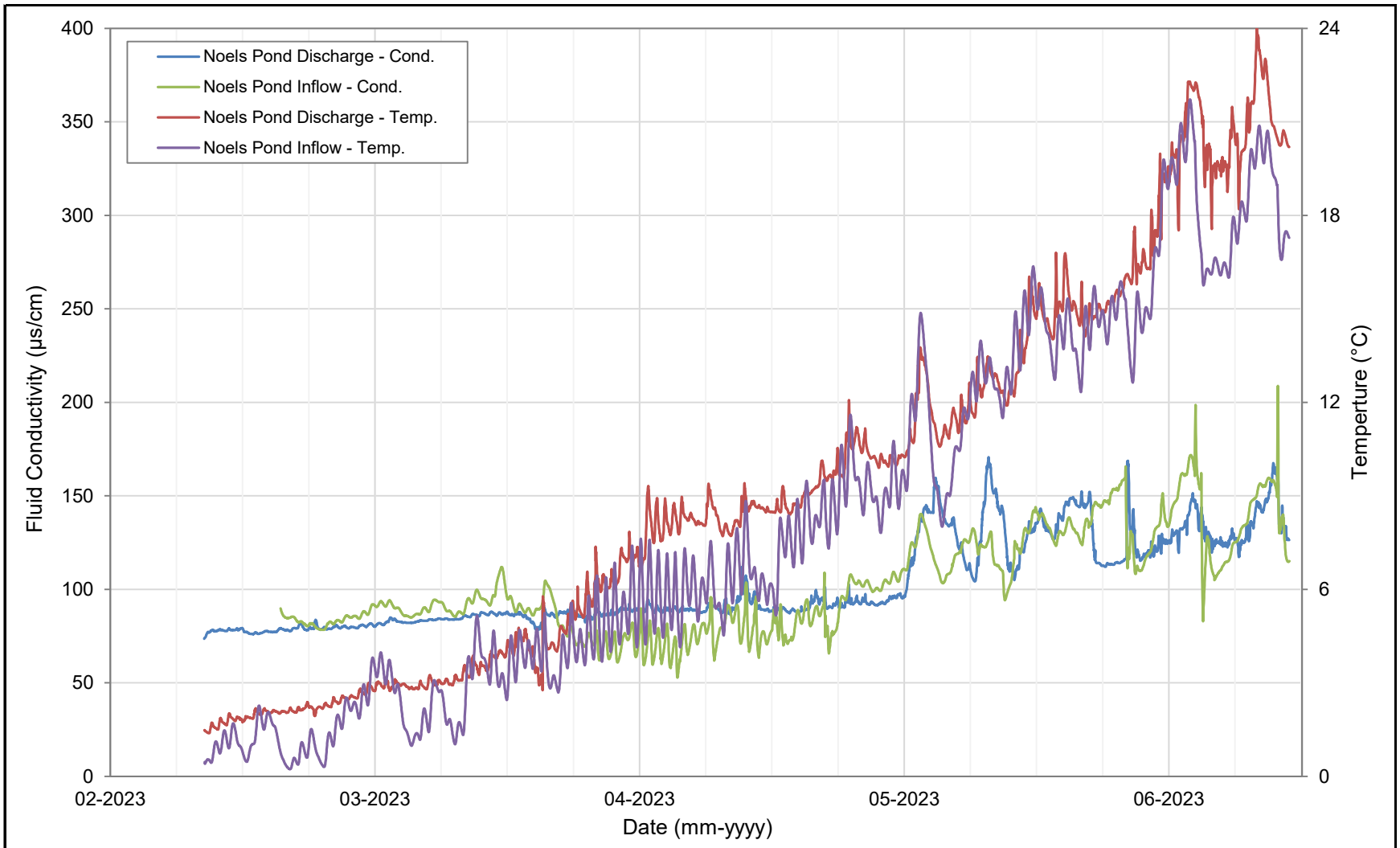


Figure 3.1 Fluid conductivity and temperature recorded at the inflow culvert and discharge weir on Noels Pond, Stephenville, NL.

Project No.	Document Reference
3168	FFC-NL-3168-012
Location	Date
Stephenville, NL	August 2023

FFC

4.0 CONCLUSIONS AND OBSERVATIONS

The general water chemistry for the water samples from all three ponds met FWAL guidelines, except for the noted exceedances, mostly either laboratory reported pH values and/or aluminum. Field measured pH values were above guideline. There was no detectable BTEX/TPH when using low-level detection analysis.

The seasonal variance between September 2022 and July 2023 for standard water analysis shows a slight reduction in laboratory measured pH during summer 2023 when compared to the fall 2022 pH data, which is best shown in Noels Pond. This reduction also changes the guideline values for aluminum which is otherwise relatively unchanged. The TDS varies 15-25% on a seasonal basis, and is likely influenced by an increase in precipitation runoff. Total iron, a good indicator for turbidity in the local geological setting, was higher during summer 2023 compared to fall 2022.

The field measurements of water temperature and fluid conductivity at the Noels Pond inflow and the outflow show a distinct seasonal pattern.

5.0 REFERENCES

Fracflow Consultants Inc., 2022a. Technical Memorandum. Assessment of the Potential to Obtain an Industrial Water Supply, North of the Port of Stephenville, NL. Report No. FFC-NL-3168-001. June 1, 2022. 13p.

Fracflow Consultants Inc., 2022b. Report. Evaluation of Industrial Water Supply. Stephenville, NL. Report No. FFC-NL-3168-004. 139p.

Fracflow Consultants Inc., 2022c. Report. Marine Sediment and Groundwater Inflow Chemistry. Port Harmon, Stephenville, NL, Report FFC-NL-3168-008. December 22, 2022. Revised January 11, 2023. 209p.

APPENDIX A

Water and Pond Sediment Chemistry Data

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FAX (709 747-2139
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CLIENT NAME: FRACFLOW CONSULTANTS
154 MAJOR'S PATH
ST. JOHN'S PATH, NL A1A5A1
(709) 739-7270
ATTENTION TO: John Gale
PROJECT: 3168 Work Energy GH2
AGAT WORK ORDER: 23K047262
TRACE ORGANICS REVIEWED BY: Dylan McCarthy, Trace Organics Lab Technician
WATER ANALYSIS REVIEWED BY: Ashleigh Dussault, Inorganics Laboratory Supervisor
DATE REPORTED: Jul 25, 2023
PAGES (INCLUDING COVER): 32
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (709)747-8573

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
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- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level (NB) Version 3.1

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

				3168-GP03-WS1	3168-GP02-WS1	3168-GP01-WS1	3168-MP03-WS1	3168-MP01-WS1	3168-MP02-WS1	3168-NP03-WS1
		SAMPLE DESCRIPTION:		-230711	-230711	-230711	-230712	-230712	-230712	-230712
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-07-11 14:50	2023-07-11 15:25	2023-07-11 16:15	2023-07-12 10:45	2023-07-12 11:05	2023-07-12 11:20	2023-07-12 14:20
Parameter	Unit	G / S	RDL	5143332	5143338	5143340	5143341	5143342	5143344	5143346
Benzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylene (Total)	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6-C10 (less BTEX)	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
>C16-C21 Hydrocarbons	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
>C21-C32 Hydrocarbons	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Modified TPH (Tier 1)	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sediment				NO	NO	NO	NO	NO	NO	NO
Resemblance Comment				NR	NR	NR	NR	NR	NR	NR
Return to Baseline at C32				Y	Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits								
Isobutylbenzene - EPH	%	70-130		103	102	103	79	102	108	108
Isobutylbenzene - VPH	%	70-130		99	101	98	97	99	95	102
n-Dotriacontane - EPH	%	70-130		114	102	110	79	103	108	113

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level (NB) Version 3.1

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5143332-5143346 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Resemblance Comment Key:
GF - Gasoline Fraction
WGF - Weathered Gasoline Fraction
GR - Product in Gasoline Range
FOF - Fuel Oil Fraction
WFOF - Weathered Fuel Oil Fraction
FR - Product in Fuel Oil Range
LOF - Lube Oil Fraction
LR - Lube Range
UC - Unidentified Compounds
NR - No Resemblance
NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

HALIFAX - Volatile Organic Compounds in Water (ug/L)

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

				3168-GP02-WS1	3168-MP02-WS1
		SAMPLE DESCRIPTION:		-230711	-230712
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2023-07-11 15:25	2023-07-12 11:20
Parameter	Unit	G / S	RDL	5143338	5143344
Chloromethane	µg/L		1	<1	<1
Vinyl Chloride	µg/L		0.6	<0.6	<0.6
Bromomethane	µg/L		0.89	<0.89	<0.89
Chloroethane	µg/L		5	<5	<5
Trichlorofluoromethane	µg/L		5	<5	<5
Acetone	µg/L		10	<10	<10
1,1-Dichloroethylene	µg/L		0.6	<0.6	<0.6
Methylene Chloride	µg/L		2	<2	<2
trans-1,2-Dichloroethylene	µg/L		2	<2	<2
1,1-Dichloroethane	µg/L		1	<1	<1
cis-1,2-Dichloroethylene	ug/L		2	<2	<2
Chloroform	µg/L		1	<1	<1
1,2-Dichloroethane	µg/L		2	<2	<2
1,1,1-Trichloroethane	µg/L		1	<1	<1
Carbon Tetrachloride	µg/L		0.56	<0.56	<0.56
Benzene	µg/L		1	<1	<1
1,2-Dichloropropane	µg/L		0.7	<0.7	<0.7
Trichloroethylene	µg/L		1	<1	<1
Bromodichloromethane	µg/L		1	<1	<1
trans-1,3-Dichloropropene	µg/L		0.5	<0.5	<0.5
cis-1,3-Dichloropropene	µg/L		0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L		1	<1	<1
Toluene	µg/L		2	<2	<2
2-Hexanone	µg/L		10.0	<10.0	<10.0
Dibromochloromethane	µg/L		1	<1	<1
1,2-Dibromoethane	µg/L		0.5	<0.5	<0.5
Tetrachloroethylene	µg/L		2	<2	<2
1,1,1,2-Tetrachloroethane	µg/L		0.5	<0.5	<0.5

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

HALIFAX - Volatile Organic Compounds in Water (ug/L)

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

				3168-GP02-WS1	3168-MP02-WS1
		SAMPLE DESCRIPTION:		-230711	-230712
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2023-07-11 15:25	2023-07-12 11:20
Parameter	Unit	G / S	RDL	5143338	5143344
Chlorobenzene	µg/L		1.0	<1.0	<1.0
Ethylbenzene	µg/L		2	<2	<2
m,p-Xylenes	µg/L		4	<4	<4
Bromoform	µg/L		1	<1	<1
Styrene	µg/L		1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L		1	<1	<1
o-Xylene	µg/L		1	<1	<1
1,3-Dichlorobenzene	µg/L		1	<1	<1
1,4-Dichlorobenzene	µg/L		1	<1	<1
1,2-Dichlorobenzene	µg/L		0.7	<0.7	<0.7
Xylenes	µg/L		0.5	<0.5	<0.5
Surrogate	Unit	Acceptable Limits			
Toluene-d8	%	50-140		84	93

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5143338-5143344 1,1,2,2-Tetrachloroethane reported only for samples matrices which can be purged. Otherwise N/A.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Calgary (unless marked by *)

Certified By:

AGAT Laboratories

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TEL (709)747-8573
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Ammonia

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

				3168-GP02-WS2
			SAMPLE DESCRIPTION:	-230711
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2023-07-11 15:45
Parameter	Unit	G / S	RDL	5143339
Ammonia as N	mg/L		0.02	<0.02

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Ashleigh Dussault

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

				3168-GP03-WS2	3168-GP03-WS1	3168-GP02-WS1	3168-GP02-WS2	3168-GP01-WS1	3168-MP03-WS1	3168-MP01-WS1	3168-MP02-WS1
		SAMPLE DESCRIPTION:		-230711	-230711	-230711	-230711	-230711	-230712	-230712	-230712
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-07-11 14:20	2023-07-11 14:50	2023-07-11 15:25	2023-07-11 15:45	2023-07-11 16:15	2023-07-12 10:45	2023-07-12 11:05	2023-07-12 11:20
Parameter	Unit	G / S	RDL	5143293	5143332	5143338	5143339	5143340	5143341	5143342	5143344
Dissolved Aluminum	ug/L	Variable	8	61	47	47	43	41	62	52	51
Dissolved Antimony	ug/L		5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Arsenic	ug/L	5	2	<2	<2	<2	<2	<2	<2	<2	<2
Dissolved Barium	ug/L		5	7	7	6	6	7	8	10	10
Dissolved Beryllium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Dissolved Bismuth	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Dissolved Boron	ug/L	29000,	8	10	10	10	8	8	<8	<8	<8
Dissolved Cadmium	ug/L	1.0, 0.09	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Chromium	ug/L		1	<1	<1	<1	<1	<1	<1	<1	<1
Dissolved Cobalt	ug/L		1	<1	<1	<1	<1	<1	<1	<1	<1
Dissolved Copper	ug/L	Equation	4	<4	<4	<4	<4	<4	<4	<4	<4
Dissolved Iron	ug/L	300	57	<57	<57	<57	<57	<57	144	<57	<57
Dissolved Lead	ug/L	Equation	0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Dissolved Manganese	ug/L		2	<2	<2	<2	<2	3	4	<2	<2
Dissolved Molybdenum	ug/L	73	2	<2	<2	<2	<2	<2	<2	<2	<2
Dissolved Nickel	ug/L	Equation	3	<3	<3	<3	<3	<3	<3	<3	<3
Dissolved Selenium	ug/L	1.0	1	<1	<1	<1	<1	<1	<1	<1	<1
Dissolved Silver	ug/L	0.25	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Dissolved Strontium	ug/L		5	27	28	27	27	27	20	24	24
Dissolved Thallium	ug/L	0.8	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Dissolved Tin	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Dissolved Titanium	ug/L		5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Uranium	ug/L	33, 15	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Dissolved Vanadium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Dissolved Zinc	ug/L	30	5	12	<5	<5	<5	<5	<5	<5	<5

Certified By: Ashleigh Dussault

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

				3168-MP02-WS2	3168-NP03-WS1	3168-NP03-WS2
		SAMPLE DESCRIPTION:		-230712	-230712	-230712
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2023-07-12 11:50	2023-07-12 14:20	2023-07-12 14:40
Parameter	Unit	G / S	RDL	5143345	5143346	5143347
Dissolved Aluminum	ug/L	Variable	8	54	39	27
Dissolved Antimony	ug/L		5	<5	<5	<5
Dissolved Arsenic	ug/L	5	2	<2	<2	<2
Dissolved Barium	ug/L		5	9	17	18
Dissolved Beryllium	ug/L		2	<2	<2	<2
Dissolved Bismuth	ug/L		2	<2	<2	<2
Dissolved Boron	ug/L	29000,	8	<8	<8	<8
Dissolved Cadmium	ug/L	1.0, 0.09	0.10	<0.10	<0.10	<0.10
Dissolved Chromium	ug/L		1	1	<1	<1
Dissolved Cobalt	ug/L		1	<1	<1	<1
Dissolved Copper	ug/L	Equation	4	<4	<4	<4
Dissolved Iron	ug/L	300	57	1240	89	121
Dissolved Lead	ug/L	Equation	0.9	<0.9	<0.9	<0.9
Dissolved Manganese	ug/L		2	8	<2	138
Dissolved Molybdenum	ug/L	73	2	<2	<2	<2
Dissolved Nickel	ug/L	Equation	3	<3	<3	<3
Dissolved Selenium	ug/L	1.0	1	<1	<1	<1
Dissolved Silver	ug/L	0.25	0.4	<0.4	<0.4	<0.4
Dissolved Strontium	ug/L		5	21	35	35
Dissolved Thallium	ug/L	0.8	0.2	<0.2	<0.2	<0.2
Dissolved Tin	ug/L		2	<2	<2	<2
Dissolved Titanium	ug/L		5	<5	<5	<5
Dissolved Uranium	ug/L	33, 15	0.3	<0.3	<0.3	<0.3
Dissolved Vanadium	ug/L		2	<2	<2	<2
Dissolved Zinc	ug/L	30	5	<5	<5	<5

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5143293-5143347 Metals analysis completed on a filtered sample.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Ashleigh Dussault

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AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Mercury Analysis in Water (Dissolved)

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

				3168-GP03-WS2	3168-GP03-WS1	3168-GP02-WS1	3168-GP02-WS2	3168-GP01-WS1	3168-MP03-WS1	3168-MP01-WS1	3168-MP02-WS1
		SAMPLE DESCRIPTION:		-230711	-230711	-230711	-230711	-230711	-230712	-230712	-230712
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-07-11 14:20	2023-07-11 14:50	2023-07-11 15:25	2023-07-11 15:45	2023-07-11 16:15	2023-07-12 10:45	2023-07-12 11:05	2023-07-12 11:20
Parameter	Unit	G / S	RDL	5143293	5143332	5143338	5143339	5143340	5143341	5143342	5143344
Dissolved Mercury	ug/L	0.026	0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026

				3168-MP02-WS2	3168-NP03-WS1	3168-NP03-WS2
		SAMPLE DESCRIPTION:		-230712	-230712	-230712
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2023-07-12 11:50	2023-07-12 14:20	2023-07-12 14:40
Parameter	Unit	G / S	RDL	5143345	5143346	5143347
Dissolved Mercury	ug/L	0.026	0.026	<0.026	<0.026	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Ashleigh Dussault

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Mercury Analysis in Water (Total)

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

				3168-GP03-WS2	3168-GP03-WS1	3168-GP02-WS1	3168-GP02-WS2	3168-GP01-WS1	3168-MP03-WS1	3168-MP01-WS1	3168-MP02-WS1
		SAMPLE DESCRIPTION:		-230711	-230711	-230711	-230711	-230711	-230712	-230712	-230712
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-07-11 14:20	2023-07-11 14:50	2023-07-11 15:25	2023-07-11 15:45	2023-07-11 16:15	2023-07-12 10:45	2023-07-12 11:05	2023-07-12 11:20
Parameter	Unit	G / S	RDL	5143293	5143332	5143338	5143339	5143340	5143341	5143342	5143344
Total Mercury	ug/L	0.026	0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026

				3168-MP02-WS2	3168-NP03-WS1	3168-NP03-WS2
		SAMPLE DESCRIPTION:		-230712	-230712	-230712
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2023-07-12 11:50	2023-07-12 14:20	2023-07-12 14:40
Parameter	Unit	G / S	RDL	5143345	5143346	5143347
Total Mercury	ug/L	0.026	0.026	<0.026	<0.026	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Halifax (unless marked by *)

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Ortho Phosphate, Reactive Silica, Ammonia & Colour

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

				3168-GP03-WS2	3168-GP03-WS1	3168-GP02-WS1	3168-GP01-WS1	3168-MP03-WS1	3168-MP01-WS1	3168-MP02-WS1	3168-MP02-WS2
		SAMPLE DESCRIPTION:		-230711	-230711	-230711	-230711	-230712	-230712	-230712	-230712
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-07-11 14:20	2023-07-11 14:50	2023-07-11 15:25	2023-07-11 16:15	2023-07-12 10:45	2023-07-12 11:05	2023-07-12 11:20	2023-07-12 11:50
Parameter	Unit	G / S	RDL	5143293	5143332	5143338	5143340	5143341	5143342	5143344	5143345
Reactive Silica	mg/L		0.05	2.95	2.29	2.30	2.27	0.93	0.95	0.97	1.83
Ammonia as N	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
True Colour	TCU		2.50	33.4	32.4	31.1	31.5	47.2	33.9	33.7	45.3
Ortho Phosphate as P	mg/L		0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

				3168-NP03-WS1	3168-NP03-WS2
		SAMPLE DESCRIPTION:		-230712	-230712
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2023-07-12 14:20	2023-07-12 14:40
Parameter	Unit	G / S	RDL	5143346	5143347
Reactive Silica	mg/L		0.05	2.00	2.42
Ammonia as N	mg/L		0.02	<0.02	<0.02
True Colour	TCU		2.50	34.8	30.6
Ortho Phosphate as P	mg/L		0.10	<0.10	<0.10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Ashleigh Dussault

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Reactive Silica, Ortho-P & Colour

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

			SAMPLE DESCRIPTION:	3168-GP02-WS2 -230711
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2023-07-11 15:45
Parameter	Unit	G / S	RDL	5143339
Reactive Silica	mg/L		0.05	2.42
True Colour	TCU		2.50	27.5
Ortho Phosphate as P	mg/L		0.10	<0.10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Ashleigh Dussault

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

Parameter	Unit	G / S	RDL	3168-GP03-WS2 -230711 Water 2023-07-11 14:20 5143293	3168-GP03-WS1 -230711 Water 2023-07-11 14:50 5143332	3168-GP02-WS1 -230711 Water 2023-07-11 15:25 5143338	3168-GP02-WS2 -230711 Water 2023-07-11 15:45 5143339	3168-GP01-WS1 -230711 Water 2023-07-11 16:15 5143340	3168-MP03-WS1 -230712 Water 2023-07-12 10:45 5143341	3168-MP01-WS1 -230712 Water 2023-07-12 11:05 5143342	3168-MP02-WS1 -230712 Water 2023-07-12 11:20 5143344
pH		6.5-9.0		6.15	6.21	6.23	6.23	6.24	6.43	6.53	6.57
Chloride	mg/L	640, 120	1	24	24	24	24	24	8	9	8
Fluoride	mg/L	0.12	0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Sulphate	mg/L		2	3	3	3	3	3	<2	<2	<2
Alkalinity	mg/L		5	11	11	11	11	11	23	35	35
Turbidity	NTU	Narrative	0.50	1.57	2.11	1.69	1.03	1.61	1.44	0.99	0.95
Electrical Conductivity	umho/cm		1	120	119	118	119	117	86	106	106
Nitrate + Nitrite as N	mg/L		0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate as N	mg/L	550, 13	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrite as N	mg/L	0.06	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L	Fact Sheet	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Total Organic Carbon	mg/L		0.5	6.8	7.5	7.2	6.7	7.5	9.7	5.8	5.8
Total Sodium	mg/L		0.1	15.0	15.2	15.1	15.3	16.2	5.6	5.7	5.6
Total Potassium	mg/L		0.1	0.5	0.5	0.5	0.5	0.6	0.1	0.4	0.4
Total Calcium	mg/L		0.1	4.6	4.7	4.6	4.5	4.9	9.1	12.2	11.6
Total Magnesium	mg/L		0.1	1.8	1.8	1.8	1.8	1.9	2.0	2.3	2.3
Bicarb. Alkalinity (as CaCO3)	mg/L		5	11	11	11	11	11	23	35	35
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10	<10	<10	<10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5	<5	<5	<5	<5	<5
Calculated TDS	mg/L		1	56	56	56	56	57	39	51	49
Hardness	mg/L			18.9	19.1	18.9	18.6	20.1	31.0	39.9	38.4
Langelier Index (@20C)	NA			-3.71	-3.64	-3.63	-3.64	-3.59	-2.80	-2.40	-2.38
Langelier Index (@ 4C)	NA			-4.03	-3.96	-3.95	-3.96	-3.91	-3.12	-2.72	-2.70
Saturation pH (@ 20C)	NA			9.86	9.85	9.86	9.87	9.83	9.23	8.93	8.95
Saturation pH (@ 4C)	NA			10.2	10.2	10.2	10.2	10.2	9.55	9.25	9.27
Anion Sum	me/L			0.96	0.96	0.96	0.96	0.96	0.69	0.95	0.93
Cation sum	me/L			1.05	1.07	1.06	1.06	1.13	0.88	1.07	1.03
% Difference/ Ion Balance	%			4.4	5.3	4.9	5.0	8.3	12.7	5.6	5.5

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

				3168-GP03-WS2	3168-GP03-WS1	3168-GP02-WS1	3168-GP02-WS2	3168-GP01-WS1	3168-MP03-WS1	3168-MP01-WS1	3168-MP02-WS1
		SAMPLE DESCRIPTION:		-230711	-230711	-230711	-230711	-230711	-230712	-230712	-230712
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-07-11 14:20	2023-07-11 14:50	2023-07-11 15:25	2023-07-11 15:45	2023-07-11 16:15	2023-07-12 10:45	2023-07-12 11:05	2023-07-12 11:20
Parameter	Unit	G / S	RDL	5143293	5143332	5143338	5143339	5143340	5143341	5143342	5143344
Total Aluminum	ug/L	Variable	5	59	55	60	62	73	96	69	71
Total Antimony	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Arsenic	ug/L	5	2	<2	<2	<2	<2	<2	<2	<2	<2
Total Barium	ug/L		5	6	7	7	6	7	8	11	11
Total Beryllium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Boron	ug/L	29000,	5	9	9	9	8	9	7	7	7
Total Cadmium	ug/L	1.0, 0.09	0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Cobalt	ug/L		1	<1	<1	<1	<1	<1	<1	<1	<1
Total Copper	ug/L	Equation	2	<2	<2	<2	<2	<2	<2	<2	<2
Total Iron	ug/L	300	50	72	74	98	54	92	220	78	69
Total Lead	ug/L	Equation	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Manganese	ug/L		2	6	10	10	5	13	15	5	4
Total Molybdenum	ug/L	73	2	<2	<2	<2	<2	<2	<2	<2	<2
Total Nickel	ug/L	Equation	2	<2	<2	<2	<2	<2	<2	<2	<2
Total Phosphorous	mg/L	Fact Sheet	0.07	0.50	0.39	0.44	0.44	0.39	0.15	0.18	0.19
Total Selenium	ug/L	1	1	<1	<1	<1	<1	<1	<1	<1	<1
Total Silver	ug/L	0.25	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	27	28	27	28	30	21	26	25
Total Thallium	ug/L	0.8	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Titanium	ug/L		3	<3	<3	<3	<3	<3	<3	<3	<3
Total Uranium	ug/L	33, 15	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2
Total Zinc	ug/L	30	5	<5	<5	<5	<5	<5	<5	<5	<5

Certified By: Ashleigh Dussault

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

				3168-MP02-WS2	3168-NP03-WS1	3168-NP03-WS2
		SAMPLE DESCRIPTION:		-230712	-230712	-230712
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2023-07-12 11:50	2023-07-12 14:20	2023-07-12 14:40
Parameter	Unit	G / S	RDL	5143345	5143346	5143347
pH		6.5-9.0		6.50	6.73	6.71
Chloride	mg/L	640, 120	1	8	9	9
Fluoride	mg/L	0.12	0.12	<0.12	<0.12	<0.12
Sulphate	mg/L		2	<2	2	2
Alkalinity	mg/L		5	30	51	52
Turbidity	NTU	Narrative	0.50	0.78	0.75	1.15
Electrical Conductivity	umho/cm		1	100	142	144
Nitrate + Nitrite as N	mg/L		0.05	0.14	0.11	0.11
Nitrate as N	mg/L	550, 13	0.05	0.14	0.11	0.11
Nitrite as N	mg/L	0.06	0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L	Fact Sheet	0.02	<0.02	<0.02	<0.02
Total Organic Carbon	mg/L		0.5	6.1	5.1	4.4
Total Sodium	mg/L		0.1	5.6	5.7	5.8
Total Potassium	mg/L		0.1	0.4	0.4	0.4
Total Calcium	mg/L		0.1	10.8	17.5	17.6
Total Magnesium	mg/L		0.1	2.2	3.1	3.2
Bicarb. Alkalinity (as CaCO3)	mg/L		5	30	51	52
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5
Calculated TDS	mg/L		1	46	69	70
Hardness	mg/L			36.0	56.5	57.1
Langelier Index (@20C)	NA			-2.54	-1.89	-1.90
Langelier Index (@ 4C)	NA			-2.86	-2.21	-2.22
Saturation pH (@ 20C)	NA			9.04	8.62	8.61
Saturation pH (@ 4C)	NA			9.36	8.94	8.93
Anion Sum	me/L			0.84	1.32	1.34
Cation sum	me/L			0.99	1.40	1.42
% Difference/ Ion Balance	%			8.3	2.8	2.9

Certified By: Ashleigh Dussault

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

				3168-MP02-WS2	3168-NP03-WS1	3168-NP03-WS2
		SAMPLE DESCRIPTION:		-230712	-230712	-230712
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2023-07-12 11:50	2023-07-12 14:20	2023-07-12 14:40
Parameter	Unit	G / S	RDL	5143345	5143346	5143347
Total Aluminum	ug/L	Variable	5	74	53	55
Total Antimony	ug/L		2	<2	<2	<2
Total Arsenic	ug/L	5	2	<2	<2	<2
Total Barium	ug/L		5	10	18	19
Total Beryllium	ug/L		2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2
Total Boron	ug/L	29000,	5	7	7	9
Total Cadmium	ug/L	1.0, 0.09	0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L		2	<2	<2	<2
Total Cobalt	ug/L		1	<1	<1	<1
Total Copper	ug/L	Equation	2	<2	<2	<2
Total Iron	ug/L	300	50	109	134	210
Total Lead	ug/L	Equation	0.5	<0.5	<0.5	<0.5
Total Manganese	ug/L		2	6	10	163
Total Molybdenum	ug/L	73	2	<2	<2	<2
Total Nickel	ug/L	Equation	2	<2	<2	<2
Total Phosphorous	mg/L	Fact Sheet	0.07	0.32	0.37	0.41
Total Selenium	ug/L	1	1	<1	<1	<1
Total Silver	ug/L	0.25	0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	23	35	37
Total Thallium	ug/L	0.8	0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2
Total Titanium	ug/L		3	<3	<3	<3
Total Uranium	ug/L	33, 15	0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2
Total Zinc	ug/L	30	5	<5	<5	<5

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5143293-5143347 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

Analysis performed at AGAT Halifax (unless marked by *)

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Certificate of Analysis

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

TSS, DOC, TDS

DATE RECEIVED: 2023-07-14

DATE REPORTED: 2023-07-25

				3168-GP03-WS2	3168-GP03-WS1	3168-GP02-WS1	3168-GP02-WS2	3168-GP01-WS1	3168-MP03-WS1	3168-MP01-WS1	3168-MP02-WS1
		SAMPLE DESCRIPTION:		-230711	-230711	-230711	-230711	-230711	-230712	-230712	-230712
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-07-11 14:20	2023-07-11 14:50	2023-07-11 15:25	2023-07-11 15:45	2023-07-11 16:15	2023-07-12 10:45	2023-07-12 11:05	2023-07-12 11:20
Parameter	Unit	G / S	RDL	5143293	5143332	5143338	5143339	5143340	5143341	5143342	5143344
Dissolved Organic Carbon	mg/L		0.5	7.0	7.4	7.2	6.6	7.0	8.9	5.7	5.9
Total Suspended Solids	mg/L	Narrative	5	<5	<5	<5	<5	<5	<5	<5	<5
Total Dissolved Solids	mg/L		5	66	58	54	64	72	62	70	62

				3168-MP02-WS2	3168-NP03-WS1	3168-NP03-WS2
		SAMPLE DESCRIPTION:		-230712	-230712	-230712
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2023-07-12 11:50	2023-07-12 14:20	2023-07-12 14:40
Parameter	Unit	G / S	RDL	5143345	5143346	5143347
Dissolved Organic Carbon	mg/L		0.5	6.1	5.2	4.4
Total Suspended Solids	mg/L	Narrative	5	<5	<5	<5
Total Dissolved Solids	mg/L		5	66	82	82

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

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Exceedance Summary

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
5143293	3168-GP03-WS2-230711	NS-CCME FWAL	Standard Water Analysis + Total Metals	pH		6.5-9.0	6.15
5143332	3168-GP03-WS1-230711	NS-CCME FWAL	Standard Water Analysis + Total Metals	pH		6.5-9.0	6.21
5143338	3168-GP02-WS1-230711	NS-CCME FWAL	Standard Water Analysis + Total Metals	pH		6.5-9.0	6.23
5143339	3168-GP02-WS2-230711	NS-CCME FWAL	Standard Water Analysis + Total Metals	pH		6.5-9.0	6.23
5143340	3168-GP01-WS1-230711	NS-CCME FWAL	Standard Water Analysis + Total Metals	pH		6.5-9.0	6.24
5143341	3168-MP03-WS1-230712	NS-CCME FWAL	Standard Water Analysis + Total Metals	pH		6.5-9.0	6.43
5143345	3168-MP02-WS2-230712	NS-CCME FWAL	Dissolved Metals	Dissolved Iron	ug/L	300	1240

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 23K047262
PROJECT: 3168 Work Energy GH2
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Jul 25, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level (NB) Version 3.1															
Benzene	1	5143332	< 0.001	< 0.001	NA	< 0.001	109%	70%	130%	109%	70%	130%			
Toluene	1	5143332	< 0.001	< 0.001	NA	< 0.001	111%	70%	130%	109%	70%	130%			
Ethylbenzene	1	5143332	< 0.001	< 0.001	NA	< 0.001	112%	70%	130%	109%	70%	130%			
Xylene (Total)	1	5143332	< 0.002	< 0.002	NA	< 0.002	111%	70%	130%	107%	70%	130%			
C6-C10 (less BTEX)	1	5143332	< 0.01	< 0.01	NA	< 0.01	102%	70%	130%	98%	70%	130%	102%	70%	130%
>C10-C16 Hydrocarbons	1	5143332	< 0.02	< 0.02	NA	< 0.02	89%	70%	130%	106%	70%	130%	101%	70%	130%
>C16-C21 Hydrocarbons	1	5143332	< 0.02	< 0.02	NA	< 0.02	89%	70%	130%	106%	70%	130%	101%	70%	130%
>C21-C32 Hydrocarbons	1	5143332	< 0.02	< 0.02	NA	< 0.02	103%	70%	130%	106%	70%	130%	101%	70%	130%
HALIFAX - Volatile Organic Compounds in Water (ug/L)															
Chloromethane	4689	5148745	< 1	< 1	NA	< 1	131%	50%	140%	119%	50%	140%	134%	50%	140%
Vinyl Chloride	4689	5148745	< 0.6	< 0.6	NA	< 0.6	96%	50%	140%	94%	50%	140%	81%	50%	140%
Bromomethane	4689	5148745	< 0.89	< 0.89	NA	< 0.89	96%	50%	140%	96%	50%	140%	80%	50%	140%
Chloroethane	4689	5148745	< 5	< 5	NA	< 5	97%	50%	140%	93%	50%	140%	82%	50%	140%
Trichlorofluoromethane	4689	5148745	< 5	< 5	NA	< 5	95%	50%	140%	94%	60%	130%	81%	50%	140%
Acetone	4689	5148745	< 10	< 10	NA	< 10	108%	50%	140%	93%	50%	140%	137%	50%	140%
1,1-Dichloroethylene	4689	5148745	< 0.6	< 0.6	NA	< 0.6	84%	50%	140%	94%	60%	130%	82%	50%	140%
Methylene Chloride	4689	5148745	< 2	< 2	NA	< 2	95%	50%	140%	97%	60%	130%	86%	50%	140%
trans-1,2-Dichloroethylene	4689	5148745	< 2	< 2	NA	< 2	87%	50%	140%	94%	60%	130%	84%	50%	140%
1,1-Dichloroethane	4689	5148745	< 1	< 1	NA	< 1	96%	50%	140%	89%	60%	130%	86%	50%	140%
cis-1,2-Dichloroethylene	4689	5148745	< 2	< 2	NA	< 2	80%	50%	140%	87%	60%	130%	93%	50%	140%
Chloroform	4689	5148745	< 1	< 1	NA	< 1	102%	50%	140%	103%	60%	130%	106%	50%	140%
1,2-Dichloroethane	4689	5148745	< 2	< 2	NA	< 2	90%	50%	140%	93%	60%	130%	96%	50%	140%
1,1,1-Trichloroethane	4689	5148745	< 1	< 1	NA	< 1	105%	50%	140%	103%	60%	130%	105%	50%	140%
Carbon Tetrachloride	4689	5148745	< 0.56	< 0.56	NA	< 0.56	114%	50%	140%	109%	60%	130%	93%	50%	140%
Benzene	4689	5148745	< 1	< 1	NA	< 1	92%	50%	140%	102%	60%	130%	97%	50%	140%
1,2-Dichloropropane	4689	5148745	< 0.7	< 0.7	NA	< 0.7	87%	50%	140%	93%	60%	130%	92%	50%	140%
Trichloroethylene	4689	5148745	< 1	< 1	NA	< 1	90%	50%	140%	97%	60%	130%	69%	50%	140%
Bromodichloromethane	4689	5148745	< 1	< 1	NA	< 1	99%	50%	140%	97%	60%	130%	97%	50%	140%
trans-1,3-Dichloropropene	4689	5148745	< 0.5	< 0.5	NA	< 0.5	74%	50%	140%	94%	60%	130%	86%	50%	140%
cis-1,3-Dichloropropene	4689	5148745	< 0.5	< 0.5	NA	< 0.5	72%	50%	140%	82%	60%	130%	82%	50%	140%
1,1,2-Trichloroethane	4689	5148745	< 1	< 1	NA	< 1	89%	50%	140%	95%	60%	130%	93%	50%	140%
Toluene	4689	5148745	< 2	< 2	NA	< 2	84%	50%	140%	98%	60%	130%	89%	50%	140%
2-Hexanone	4689	5148745	< 10.0	< 10.0	NA	< 10.0	81%	50%	140%	105%	50%	140%	87%	50%	140%
Dibromochloromethane	4689	5148745	< 1	< 1	NA	< 1	103%	50%	140%	103%	60%	130%	75%	50%	140%
1,2-Dibromoethane	4689	5148745	< 0.5	< 0.5	NA	< 0.5	96%	50%	140%	103%	60%	130%	80%	50%	140%
Tetrachloroethylene	4689	5148745	< 2	< 2	NA	< 2	121%	50%	140%	123%	60%	130%	99%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 23K047262
PROJECT: 3168 Work Energy GH2
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Jul 25, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
1,1,1,2-Tetrachloroethane	4689	5148745	< 0.5	< 0.5	NA	< 0.5	117%	50%	140%	114%	60%	130%	117%	50%	140%
Chlorobenzene	4689	5148745	< 1.0	< 1.0	NA	< 1.0	89%	50%	140%	104%	60%	130%	106%	50%	140%
Ethylbenzene	4689	5148745	< 2	< 2	NA	< 2	76%	50%	140%	107%	60%	130%	105%	50%	140%
m,p-Xylenes	4689	5148745	< 4	< 4	NA	< 4	94%	50%	140%	107%	60%	130%	105%	50%	140%
Bromoform	4689	5148745	< 1	< 1	NA	< 1	107%	50%	140%	106%	60%	130%	105%	50%	140%
Styrene	4689	5148745	< 1	< 1	NA	< 1	73%	50%	140%	99%	60%	130%	90%	50%	140%
o-Xylene	4689	5148745	< 1	< 1	NA	< 1	94%	50%	140%	109%	60%	130%	106%	50%	140%
1,3-Dichlorobenzene	4689	5148745	< 1	< 1	NA	< 1	94%	50%	140%	119%	60%	130%	114%	50%	140%
1,4-Dichlorobenzene	4689	5148745	< 1	< 1	NA	< 1	68%	50%	140%	114%	60%	130%	113%	50%	140%
1,2-Dichlorobenzene	4689	5148745	< 0.7	< 0.7	NA	< 0.7	97%	50%	140%	113%	60%	130%	115%	50%	140%

Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.
The sample spikes and dups are not from the same sample ID.

Certified By:

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 23K047262
PROJECT: 3168 Work Energy GH2
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Water Analysis

RPT Date: Jul 25, 2023

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	Dup #2	RPD	Method Blank	REFERENCE MATERIAL Measured Value	Acceptable Limits Lower	Upper	METHOD BLANK SPIKE Recovery	Acceptable Limits Lower	Upper	MATRIX SPIKE Recovery	Acceptable Limits Lower	Upper
Standard Water Analysis + Total Metals															
pH	5138308		7.31	6.99	4.5%	<	100%	80%	120%	NA			NA		
Chloride	5137459		26	28	7.9%	< 1	87%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	5137459		<0.12	<0.12	NA	< 0.12	95%	80%	120%	NA	80%	120%	89%	70%	130%
Sulphate	5137459		4	4	NA	< 2	100%	80%	120%	NA	80%	120%	96%	70%	130%
Alkalinity	5138308		99	89	11.4%	< 5	91%	80%	120%	NA			NA		
Turbidity	5138308		4.51	4.33	3.9%	< 0.5	NA	80%	120%	NA			NA		
Electrical Conductivity	5138308		208	208	0%	< 1	98%	90%	110%	NA			NA		
Nitrate as N	5137459		0.08	0.07	NA	< 0.05	95%	80%	120%	NA	80%	120%	90%	70%	130%
Nitrite as N	5137459		<0.05	<0.05	NA	< 0.05	92%	80%	120%	NA	80%	120%	92%	70%	130%
Total Organic Carbon	5137294		9.2	9.4	2.1%	< 0.5	104%	80%	120%	NA	80%	120%	101%	80%	120%
Total Sodium	5143347	5143347	5.8	5.7	1.1%	< 0.1	102%	80%	120%	97%	80%	120%	101%	70%	130%
Total Potassium	5143347	5143347	0.4	0.4	NA	< 0.1	104%	80%	120%	100%	80%	120%	102%	70%	130%
Total Calcium	5143347	5143347	17.6	18.8	6.4%	< 0.1	104%	80%	120%	108%	80%	120%	NA	70%	130%
Total Magnesium	5143347	5143347	3.2	3.2	0.7%	< 0.1	104%	80%	120%	100%	80%	120%	103%	70%	130%
Bicarb. Alkalinity (as CaCO3)	5138308		99	89	11.4%	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	5138308		<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	5138308		<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	5143347	5143347	55	49	11.6%	< 5	103%	80%	120%	99%	80%	120%	102%	70%	130%
Total Antimony	5143347	5143347	<2	<2	NA	< 2	98%	80%	120%	100%	80%	120%	100%	70%	130%
Total Arsenic	5143347	5143347	<2	<2	NA	< 2	103%	80%	120%	99%	80%	120%	102%	70%	130%
Total Barium	5143347	5143347	19	19	NA	< 5	102%	80%	120%	97%	80%	120%	102%	70%	130%
Total Beryllium	5143347	5143347	<2	<2	NA	< 2	102%	80%	120%	97%	80%	120%	101%	70%	130%
Total Bismuth	5143347	5143347	<2	<2	NA	< 2	103%	80%	120%	102%	80%	120%	102%	70%	130%
Total Boron	5143347	5143347	9	16	NA	< 5	101%	80%	120%	99%	80%	120%	98%	70%	130%
Total Cadmium	5143347	5143347	<0.09	<0.09	NA	< 0.09	101%	80%	120%	98%	80%	120%	100%	70%	130%
Total Chromium	5143347	5143347	<2	<2	NA	< 1	103%	80%	120%	100%	80%	120%	103%	70%	130%
Total Cobalt	5143347	5143347	<1	<1	NA	< 1	108%	80%	120%	104%	80%	120%	105%	70%	130%
Total Copper	5143347	5143347	<2	<2	NA	< 1	108%	80%	120%	101%	80%	120%	106%	70%	130%
Total Iron	5143347	5143347	210	205	NA	< 50	105%	80%	120%	100%	80%	120%	104%	70%	130%
Total Lead	5143347	5143347	<0.5	<0.5	NA	< 0.5	104%	80%	120%	101%	80%	120%	102%	70%	130%
Total Manganese	5143347	5143347	163	160	1.7%	< 2	103%	80%	120%	100%	80%	120%	NA	70%	130%
Total Molybdenum	5143347	5143347	<2	<2	NA	< 2	98%	80%	120%	97%	80%	120%	103%	70%	130%
Total Nickel	5143347	5143347	<2	<2	NA	< 2	107%	80%	120%	103%	80%	120%	105%	70%	130%
Total Phosphorous	5143347	5143347	0.41	0.49	19.3%	< 0.02	106%	80%	120%	103%	80%	120%	118%	70%	130%
Total Selenium	5143347	5143347	<1	<1	NA	< 1	106%	80%	120%	95%	80%	120%	105%	70%	130%
Total Silver	5143347	5143347	<0.1	<0.1	NA	< 0.1	100%	80%	120%	99%	80%	120%	100%	70%	130%
Total Strontium	5143347	5143347	37	37	0.9%	< 5	103%	80%	120%	100%	80%	120%	102%	70%	130%
Total Thallium	5143347	5143347	<0.1	<0.1	NA	< 0.1	103%	80%	120%	102%	80%	120%	101%	70%	130%
Total Tin	5143347	5143347	<2	<2	NA	< 2	97%	80%	120%	98%	80%	120%	102%	70%	130%

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 23K047262
PROJECT: 3168 Work Energy GH2
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jul 25, 2023

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Titanium	5143347	5143347	<3	<3	NA	< 2	102%	80%	120%	98%	80%	120%	104%	70%	130%
Total Uranium	5143347	5143347	<0.2	<0.2	NA	< 0.2	102%	80%	120%	100%	80%	120%	101%	70%	130%
Total Vanadium	5143347	5143347	<2	<2	NA	< 2	103%	80%	120%	97%	80%	120%	100%	70%	130%
Total Zinc	5143347	5143347	<5	<5	NA	< 5	104%	80%	120%	100%	80%	120%	104%	70%	130%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Dissolved Metals															
Dissolved Aluminum	5140675		190	187	1.4%	< 5	105%	80%	120%	101%	80%	120%	92%	70%	130%
Dissolved Antimony	5140675		<5	<5	NA	< 2	99%	80%	120%	100%	80%	120%	92%	70%	130%
Dissolved Arsenic	5140675		<2	<2	NA	< 2	104%	80%	120%	98%	80%	120%	92%	70%	130%
Dissolved Barium	5140675		9	10	NA	< 5	102%	80%	120%	98%	80%	120%	92%	70%	130%
Dissolved Beryllium	5140675		<2	<2	NA	< 2	104%	80%	120%	101%	80%	120%	93%	70%	130%
Dissolved Bismuth	5140675		<2	<2	NA	< 2	105%	80%	120%	101%	80%	120%	93%	70%	130%
Dissolved Boron	5140675		17	16	NA	< 5	104%	80%	120%	101%	80%	120%	90%	70%	130%
Dissolved Cadmium	5140675		<0.10	<0.10	NA	< 0.09	101%	80%	120%	98%	80%	120%	92%	70%	130%
Dissolved Chromium	5140675		<1	<1	NA	< 1	104%	80%	120%	100%	80%	120%	92%	70%	130%
Dissolved Cobalt	5140675		<1	<1	NA	< 1	104%	80%	120%	102%	80%	120%	94%	70%	130%
Dissolved Copper	5140675		<4	<4	NA	< 2	107%	80%	120%	102%	80%	120%	95%	70%	130%
Dissolved Iron	5140675		341	318	7.0%	< 50	105%	80%	120%	101%	80%	120%	83%	70%	130%
Dissolved Lead	5140675		<0.9	<0.9	NA	< 0.5	104%	80%	120%	101%	80%	120%	95%	70%	130%
Dissolved Manganese	5140675		137	132	3.5%	< 2	104%	80%	120%	101%	80%	120%	NA	70%	130%
Dissolved Molybdenum	5140675		<2	<2	NA	< 2	102%	80%	120%	101%	80%	120%	93%	70%	130%
Dissolved Nickel	5140675		<3	<3	NA	< 2	108%	80%	120%	102%	80%	120%	94%	70%	130%
Dissolved Selenium	5140675		<1	<1	NA	< 1	107%	80%	120%	99%	80%	120%	91%	70%	130%
Dissolved Silver	5140675		<0.4	<0.4	NA	< 0.1	101%	80%	120%	101%	80%	120%	86%	70%	130%
Dissolved Strontium	5140675		24	23	NA	< 5	105%	80%	120%	101%	80%	120%	92%	70%	130%
Dissolved Thallium	5140675		<0.2	<0.2	NA	< 0.1	103%	80%	120%	100%	80%	120%	93%	70%	130%
Dissolved Tin	5140675		<2	<2	NA	< 2	102%	80%	120%	101%	80%	120%	95%	70%	130%
Dissolved Titanium	5140675		<5	<5	NA	< 2	102%	80%	120%	101%	80%	120%	92%	70%	130%
Dissolved Uranium	5140675		<0.3	<0.3	NA	< 0.1	102%	80%	120%	99%	80%	120%	93%	70%	130%
Dissolved Vanadium	5140675		<2	<2	NA	< 2	104%	80%	120%	101%	80%	120%	92%	70%	130%
Dissolved Zinc	5140675		5	11	NA	< 5	105%	80%	120%	99%	80%	120%	94%	70%	130%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Mercury Analysis in Water (Total)															
Total Mercury	5143347	5143347	<0.026	<0.026	NA	< 0.026	103%	80%	120%	NA	80%	120%	109%	70%	130%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Mercury Analysis in Water (Dissolved)															
Dissolved Mercury	5143293	5143293	<0.026	<0.026	NA	< 0.026	103%	80%	120%	NA	80%	120%	115%	70%	130%

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 23K047262
PROJECT: 3168 Work Energy GH2
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jul 25, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
TSS, DOC, TDS															
Dissolved Organic Carbon	5143293	5143293	7.0	7.1	1%	< 0.5	104%	80%	120%	NA	80%	120%	102%	80%	120%
Total Suspended Solids	5147432		<5	<5	NA	< 5	100%	80%	120%	NA			107%	80%	120%
Total Dissolved Solids	5143341	5143341	62	62	0%	< 5	96%	80%	120%	NA			NA		
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Standard Water Analysis + Total Metals															
Total Organic Carbon	5143347	5143347	4.4	4.4	0.1%	< 0.5	102%	80%	120%	NA	80%	120%	110%	80%	120%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Standard Water Analysis + Total Metals															
Total Organic Carbon	1		4.4	4.4	0.0%	< 0.5		80%	120%		80%	120%		80%	120%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Ortho Phosphate, Reactive Silica, Ammonia & Colour															
Reactive Silica	5152708		10.8	11.3	4.5%	< 0.05	105%	90%	110%	108%	90%	110%	110%	80%	120%
Ammonia as N	5155114		<0.02	<0.02	NA	< 0.02	100%	70%	130%	98%	80%	120%	97%	70%	130%
True Colour	5152758		9.13	9.02	NA	< 2.5	100%	90%	110%						
Ortho Phosphate as P	5155113		<0.10	<0.10	NA	< 0.10	92%	70%	130%	99%	80%	120%	97%	70%	130%
Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.															
Ortho Phosphate, Reactive Silica, Ammonia & Colour															
Ammonia as N	5143342	5143342	<0.02	<0.02	NA	< 0.02	99%	70%	130%	100%	80%	120%	95%	70%	130%
Ammonia															
Ammonia as N	5143339	5143339	<0.02	<0.02	NA	< 0.02	105%	70%	130%	98%	80%	120%	100%	70%	130%
Reactive Silica, Ortho-P & Colour															
Reactive Silica	5154615		3.04	3.00	1.3%	< 0.05	107%	90%	110%	103%	90%	110%	103%	80%	120%
True Colour	5154067		20.9	21.1	1.0%	< 2.5	103%	90%	110%						
Ortho Phosphate as P	5152162		<0.13	<0.13	NA	< 0.10	96%	70%	130%	103%	80%	120%	98%	70%	130%
Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.															

Certified By: Ashleigh Dussault

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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

ATTENTION TO: John Gale

SAMPLING SITE:

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Sediment			GC/MS/FID
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Chloromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Vinyl Chloride	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Bromomethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Chloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Trichlorofluoromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Acetone	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1-Dichloroethylene	TO-0330	EPA SW-846 8260	GC/MS
Methylene Chloride	TO-0330	EPA SW-846 5030 & 8260	GC/MS
trans-1,2-Dichloroethylene	TO-0330	EPA SW-846 8260	GC/MS
1,1-Dichloroethane	TO-0330	EPA SW-846 8260	GC/MS
cis-1,2-Dichloroethylene	TO-0330	EPA SW-846 8260	GC/MS
Chloroform	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,1-Trichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Carbon Tetrachloride	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Benzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dichloropropane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Trichloroethylene	TO-0330	EPA SW-846 8260	GC/MS
Bromodichloromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
trans-1,3-Dichloropropene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
cis-1,3-Dichloropropene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,2-Trichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Toluene	TO-0330	EPA SW-846 5030 & 8260	GC/MS

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Hexanone	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Dibromochloromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dibromoethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Tetrachloroethylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,1,2-Tetrachloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Chlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Ethylbenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
m,p-Xylenes	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Bromoform	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Styrene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,2,2-Tetrachloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
o-Xylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,3-Dichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,4-Dichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Xylenes	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Toluene-d8	TO-0330	EPA SW-846 5030 & 8260	GC/MS

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Method Summary

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Dissolved Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Antimony	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA
Total Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA

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Method Summary

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PROJECT: 3168 Work Energy GH2

ATTENTION TO: John Gale

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Reactive Silica	INOR-93-6070	modified from SM 4500-SIO2 F	LACHAT FIA
True Colour	INOR-93-6074	modified from SM 2120 B	LACHAT FIA
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
Turbidity	INOR-121-6001	SM 2130 B	PC TITRATE
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

AGAT Laboratories

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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 23K047262

PROJECT: 3168 Work Energy GH2

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Total Suspended Solids	INOR-121-6024, 6025	SM 2540C, D	GRAVIMETRIC
Total Dissolved Solids	INOR-121-6024, 6025	SM 2540C, D	GRAVIMETRIC

AGAT Laboratories

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 6.8, 6.2, 6.1
Hold Time:
AGAT Job Number: 23K047262
Notes:

Report Information
Company: Fracflow Consultants Inc. (NL)
Contact: John Gale
Address: 154 Major's Path
St. John's, NL
Phone: 709-739-7270 Fax: 709-753-5101
Client Project #: 3168 World Energy GH2
AGAT Quotation: S/O
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: John Gale (john_ffc@nfld.net)
Email: Devin Northcott (devin_ffc@bellaliant.com)
2. Name: Karen Andrews (karen_ffc@nfld.net)
Email: Chris Piercey (chris_ffc@bellaliant.com)

Report Format
☐ Single Sample per page
☑ Multiple Sample per page
☑ Excel Format included
☐ Export:

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To Same Yes ☑ / No ☐
Company:
Contact: Karen Andrews (karen_ffc@nfld.net)
Address:
Phone: Fax:
PO/Credit Card#: 4285

Regulatory Requirements (Check):
☑ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☑ Coarse
☐ Tier 2 ☐ Com ☑ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☑ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☑ FWAL ☐ Other
☐ Sediment

Drinking Water Sample: ☐ Yes ☑ No **Salt Water Sample:** ☐ Yes ☑ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	Grain Size (coarse/fine)	☐ TOC - Miss ☐ FOC - Miss	Phosphates (total as P205)	Chromium (Tri & Hexavalent)	Phenols	Tier 1: TPH/BTEX (PIRI) ☑ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	Oil & Grease (TOG)	BNAE EPA 625 - Miss	PAH	PCB	Marine Sediment Package	Dioxins & Furans	Fecal Coliform ☐ MPN ☐ MF	Other: DOC	Other: TDS &TSS	Hazardous (Y/N)
3168-GP03-WS2-230711	July 11, 2023 / 14:20	Water	11	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓																		✓	✓	
3168-GP03-WS1-230711	July 11, 2023 / 14:50	Water	16	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓											✓	✓	
3168-GP02-WS1-230711	July 11, 2023 / 15:25	Water	19	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓			✓								✓	✓	
3168-GP02-WS2-230711	July 11, 2023 / 15:45	Water	11	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓																		✓	✓	
3168-GP01-WS1-230711	July 11, 2023 / 16:15	Water	16	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓											✓	✓	
				Dissolved Metals+Mercury																								
				DOC, TDS all field filtered																								

Samples Relinquished By (Print Name): Eunpeong Sok
Samples Relinquished By (Sign):
Date/Time: July 14/23
Date/Time: 11:20
Samples Received By (Print Name):
Samples Received By (Sign):
Date/Time: July 14/23
Date/Time: July 15 1300 1120

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 2
N°: FFC-3168-COC-05

27, 3.5, 3.3

Document ID: DW 133-1501-002
Date revised: January 2018

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 6.8, 6.2, 6.1
Hold Time:
AGAT Job Number: 23K 047262
Notes:

Report Information
Company: Fracflow Consultants Inc. (NL)
Contact: John Gale
Address: 154 Major's Path
St. John's, NL
Phone: 709-739-7270 Fax: 709-753-5101
Client Project #: 3168 World Energy GH2
AGAT Quotation: S/O
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: John Gale (john_ffc@nfld.net)
Email: Devin Northcott (devin_ffc@bellaliant.com)
2. Name: Karen Andrews (karen_ffc@nfld.net)
Email: Chris Piercey (chris_ffc@bellaliant.com)

Report Format
☐ Single Sample per page
☑ Multiple Sample per page
☑ Excel Format Included
☐ Export:

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To Same Yes ☑ / No ☐
Company:
Contact: Karen Andrews (karen_ffc@nfld.net)
Address:
Phone: Fax:
PO/Credit Card#: 4285

Regulatory Requirements (Check):
☑ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☑ Coarse
☐ Tier 2 ☐ Com ☑ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☑ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☑ FWAL ☐ Other
☐ Sediment

Drinking Water Sample: ☐ Yes ☑ No **Salt Water Sample:** ☐ Yes ☑ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☒ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	Grain Size (coarse/fine)	☐ TOC - Miss ☐ FOC - Miss	Phosphates (total as P2O5)	Chromium (Tri & Hexavalent)	Phenols	Tier 1: TPH/BTEX (PIRI) ☒ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	Oil & Grease (TOG)	BNAE EPA 625 - Miss	PAH	PCB	Marine Sediment Package	Dioxins & Furans	Fecal Coliform ☐ MPN ☐ MF	Other: DOC	Other: TDS &TSS	Hazardous (Y/N)
3168-MP03-WS1-230712	July 12, 2023 / 10:45	Water	16	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓											✓	✓	
3168-MP01-WS1-230712	July 12, 2023 / 11:05	Water	16	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓											✓	✓	
3168-MP02-WS1-230712	July 12, 2023 / 11:20	Water	19	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓			✓								✓	✓	
3168-MP02-WS2-230712	July 12, 2023 / 11:50	Water	11	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓																		✓	✓	
3168-NP03-WS1-230712	July 12, 2023 / 14:20	Water	16	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓							✓											✓	✓	
3168-NP03-WS2-230712	July 12, 2023 / 14:40	Water	11	Total Metals+Hg & Dissolved Metals+Hg	✓	✓	✓	✓																		✓	✓	
				Dissolved Metals+Mercury																								
				DOC, TDS all field filtered																								

Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print Name):	Date/Time
Eunjeong Seo	July 14/23		July 14/23
Samples Relinquished By (Sign):	Date/Time	Samples Received By (Sign):	Date/Time
	11:20	July 15 1300	1120.

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 2 of 2
N°: FFC-3168-COC-05

27,3,3,33

Document ID: DIV 133 1501 002
Date revised: January 2016

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CLIENT NAME: FRACFLOW CONSULTANTS
154 MAJOR'S PATH
ST. JOHN'S PATH, NL A1A5A1
(709) 739-7270
ATTENTION TO: John Gale
PROJECT: 3168 WORLD ENERGY GH2
AGAT WORK ORDER: 23K047728
TRACE ORGANICS REVIEWED BY: Dylan McCarthy, Trace Organics Lab Technician
WATER ANALYSIS REVIEWED BY: Ashleigh Dussault, Inorganics Laboratory Supervisor
DATE REPORTED: Jul 26, 2023
PAGES (INCLUDING COVER): 26
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (709)747-8573

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.*

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Certificate of Analysis

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level Version 3.1

DATE RECEIVED: 2023-07-17

DATE REPORTED: 2023-07-26

				3168-NP02-WS1	3168-NP01-WS1
		SAMPLE DESCRIPTION:		-230713	-230713
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2023-07-13 11:35	2023-07-13 12:05
Parameter	**Unit**	**G / S**	**RDL**	**5146025**	**5146032**
Benzene	mg/L	0.370	0.001	<0.001	<0.001
Toluene	mg/L	0.002	0.001	<0.001	<0.001
Ethylbenzene	mg/L	0.09	0.001	<0.001	<0.001
Xylene (Total)	mg/L		0.002	<0.002	<0.002
C6-C10 (less BTEX)	mg/L		0.01	<0.01	<0.01
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05	<0.05
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05	<0.05
>C21-C32 Hydrocarbons	mg/L		0.01	<0.01	<0.01
Modified TPH (Tier 1)	mg/L		0.05	<0.05	<0.05
Sediment				NO	NO
Resemblance Comment				NR	NR
Return to Baseline at C32				Y	Y
Surrogate	**Unit**	**Acceptable Limits**			
Isobutylbenzene - EPH	%	70-130		112	110
Isobutylbenzene - VPH	%	70-130		92	92
n-Dotriacontane - EPH	%	70-130		110	111

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level Version 3.1

DATE RECEIVED: 2023-07-17 **DATE REPORTED: 2023-07-26**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5146025-5146032 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Resemblance Comment Key:
GF - Gasoline Fraction
WGF - Weathered Gasoline Fraction
GR - Product in Gasoline Range
FOF - Fuel Oil Fraction
WFOF - Weathered Fuel Oil Fraction
FR - Product in Fuel Oil Range
LOF - Lube Oil Fraction
LR - Lube Range
UC - Unidentified Compounds
NR - No Resemblance
NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories

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FAX (709 747-2139
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Certificate of Analysis

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

HALIFAX - Volatile Organic Compounds in Water (ug/L)

DATE RECEIVED: 2023-07-17

DATE REPORTED: 2023-07-26

				3168-NP01-WS1
		SAMPLE DESCRIPTION:		-230713
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2023-07-13 12:05
Parameter	Unit	G / S	RDL	5146032
Chloromethane	µg/L		1	<1
Vinyl Chloride	µg/L		0.6	<0.6
Bromomethane	µg/L		0.89	<0.89
Chloroethane	µg/L		5	<5
Trichlorofluoromethane	µg/L		5	<5
Acetone	µg/L		10	<10
1,1-Dichloroethylene	µg/L		0.6	<0.6
Methylene Chloride	µg/L		2	<2
trans-1,2-Dichloroethylene	µg/L		2	<2
1,1-Dichloroethane	µg/L		1	<1
cis-1,2-Dichloroethylene	ug/L		2	<2
Chloroform	µg/L		1	<1
1,2-Dichloroethane	µg/L		2	<2
1,1,1-Trichloroethane	µg/L		1	<1
Carbon Tetrachloride	µg/L		0.56	<0.56
Benzene	µg/L		1	<1
1,2-Dichloropropane	µg/L		0.7	<0.7
Trichloroethylene	µg/L		1	<1
Bromodichloromethane	µg/L		1	<1
trans-1,3-Dichloropropene	µg/L		0.5	<0.5
cis-1,3-Dichloropropene	µg/L		0.5	<0.5
1,1,2-Trichloroethane	µg/L		1	<1
Toluene	µg/L	0.002	**2**	<2
2-Hexanone	µg/L		10.0	<10.0
Dibromochloromethane	µg/L		1	<1
1,2-Dibromoethane	µg/L		0.5	<0.5
Tetrachloroethylene	µg/L		2	<2
1,1,1,2-Tetrachloroethane	µg/L		0.5	<0.5

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

HALIFAX - Volatile Organic Compounds in Water (ug/L)

DATE RECEIVED: 2023-07-17

DATE REPORTED: 2023-07-26

				3168-NP01-WS1
		SAMPLE DESCRIPTION:		-230713
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2023-07-13 12:05
Parameter	**Unit**	**G / S**	**RDL**	**5146032**
Chlorobenzene	µg/L		1.0	<1.0
Ethylbenzene	µg/L	0.09	**2**	<2
m,p-Xylenes	µg/L		4	<4
Bromoform	µg/L		1	<1
Styrene	µg/L	0.09	**1**	<1
1,1,2,2-Tetrachloroethane	µg/L		1	<1
o-Xylene	µg/L		1	<1
1,3-Dichlorobenzene	µg/L		1	<1
1,4-Dichlorobenzene	µg/L		1	<1
1,2-Dichlorobenzene	µg/L		0.7	<0.7
Xylenes	µg/L		4	<4
Surrogate	**Unit**	**Acceptable Limits**		
Toluene-d8	%	50-140		68

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5146032 1,1,2,2-Tetrachloroethane reported only for samples matrices which can be purged. Otherwise N/A.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Calgary (unless marked by *)

Certified By:

AGAT Laboratories

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St. John's, NL
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FAX (709 747-2139
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Certificate of Analysis

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals

DATE RECEIVED: 2023-07-17

DATE REPORTED: 2023-07-26

				3168-NP02-WS2	3168-NP02-WS1	3168-AP01-WS1	3168-NP01-WS1	3168-NP01-WS2
		SAMPLE DESCRIPTION:		-230713	-230713	-230713	-230713	-230713
		SAMPLE TYPE:		Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-07-13 11:20	2023-07-13 11:35	2023-07-13 11:50	2023-07-13 12:05	2023-07-13 12:25
Parameter	**Unit**	**G / S**	**RDL**	**5146020**	**5146025**	**5146029**	**5146032**	**5146272**
Dissolved Aluminum	ug/L	Variable	8	27	41	43	40	32
Dissolved Antimony	ug/L		5	<5	<5	<5	<5	<5
Dissolved Arsenic	ug/L	5	2	<2	<2	<2	<2	<2
Dissolved Barium	ug/L		5	18	56	57	20	17
Dissolved Beryllium	ug/L		2	<2	<2	<2	<2	<2
Dissolved Bismuth	ug/L		2	<2	<2	<2	<2	<2
Dissolved Boron	ug/L	29000,	8	<8	9	9	10	9
Dissolved Cadmium	ug/L	1.0, 0.09	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Chromium	ug/L		1	<1	<1	<1	<1	<1
Dissolved Cobalt	ug/L		1	<1	<1	<1	<1	<1
Dissolved Copper	ug/L	Equation	4	<4	<4	<4	<4	<4
Dissolved Iron	ug/L	300	57	<57	104	107	96	<57
Dissolved Lead	ug/L	Equation	0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Dissolved Manganese	ug/L		2	<2	<2	<2	<2	<2
Dissolved Molybdenum	ug/L	73	2	<2	<2	<2	<2	<2
Dissolved Nickel	ug/L	Equation	3	<3	<3	<3	<3	<3
Dissolved Selenium	ug/L	1.0	1	<1	<1	<1	<1	<1
Dissolved Silver	ug/L	0.25	**0.4**	<0.4	<0.4	<0.4	<0.4	<0.4
Dissolved Strontium	ug/L		5	39	41	42	41	37
Dissolved Thallium	ug/L	0.8	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Dissolved Tin	ug/L		2	<2	<2	<2	<2	<2
Dissolved Titanium	ug/L		5	<5	<5	<5	<5	<5
Dissolved Uranium	ug/L	33, 15	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Dissolved Vanadium	ug/L		2	<2	<2	<2	<2	<2
Dissolved Zinc	ug/L	30	5	<5	7	9	<5	<5

Certified By: Ashleigh Dussault

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Certificate of Analysis

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals

DATE RECEIVED: 2023-07-17

DATE REPORTED: 2023-07-26

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5146020-5146272 Metals analysis completed on a filtered sample.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Ashleigh Dussault

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AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Mercury Analysis in Water (Dissolved)

DATE RECEIVED: 2023-07-17

DATE REPORTED: 2023-07-26

				3168-NP02-WS2	3168-NP02-WS1	3168-AP01-WS1	3168-NP01-WS1	3168-NP01-WS2
			SAMPLE DESCRIPTION:	-230713	-230713	-230713	-230713	-230713
			SAMPLE TYPE:	Water	Water	Water	Water	Water
			DATE SAMPLED:	2023-07-13 11:20	2023-07-13 11:35	2023-07-13 11:50	2023-07-13 12:05	2023-07-13 12:25
Parameter	**Unit**	**G / S**	**RDL**	**5146020**	**5146025**	**5146029**	**5146032**	**5146272**
Dissolved Mercury	ug/L	0.026	0.026	<0.026	<0.026	<0.026	<0.026	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Ashleigh Dussault

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Certificate of Analysis

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Mercury Analysis in Water (Total)

DATE RECEIVED: 2023-07-17

DATE REPORTED: 2023-07-26

				3168-NP02-WS2	3168-NP02-WS1	3168-AP01-WS1	3168-NP01-WS1	3168-NP01-WS2
			SAMPLE DESCRIPTION:	-230713	-230713	-230713	-230713	-230713
			SAMPLE TYPE:	Water	Water	Water	Water	Water
			DATE SAMPLED:	2023-07-13 11:20	2023-07-13 11:35	2023-07-13 11:50	2023-07-13 12:05	2023-07-13 12:25
Parameter	**Unit**	**G / S**	**RDL**	**5146020**	**5146025**	**5146029**	**5146032**	**5146272**
Total Mercury	ug/L	0.026	0.026	<0.026	<0.026	<0.026	<0.026	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Halifax (unless marked by *)

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Certificate of Analysis

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Ortho Phosphate, Reactive Silica, Ammonia & Colour

DATE RECEIVED: 2023-07-17

DATE REPORTED: 2023-07-26

				3168-NP02-WS2	3168-NP02-WS1	3168-AP01-WS1	3168-NP01-WS1	3168-NP01-WS2
			SAMPLE DESCRIPTION:	-230713	-230713	-230713	-230713	-230713
			SAMPLE TYPE:	Water	Water	Water	Water	Water
			DATE SAMPLED:	2023-07-13 11:20	2023-07-13 11:35	2023-07-13 11:50	2023-07-13 12:05	2023-07-13 12:25
Parameter	**Unit**	**G / S**	**RDL**	**5146020**	**5146025**	**5146029**	**5146032**	**5146272**
Reactive Silica	mg/L		0.05	2.49	1.92	1.93	2.02	2.19
Ammonia as N	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	<0.02
True Colour	TCU		2.50	24.7	32.2	32.1	32.6	26.7
Ortho Phosphate as P	mg/L		0.10	<0.10	<0.10	<0.10	<0.10	<0.10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Ashleigh Dussault

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Certificate of Analysis

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2023-07-17

DATE REPORTED: 2023-07-26

				3168-NP02-WS2	3168-NP02-WS1	3168-AP01-WS1	3168-NP01-WS1	3168-NP01-WS2
		SAMPLE DESCRIPTION:		-230713	-230713	-230713	-230713	-230713
		SAMPLE TYPE:		Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-07-13 11:20	2023-07-13 11:35	2023-07-13 11:50	2023-07-13 12:05	2023-07-13 12:25
Parameter	Unit	G / S	RDL	5146020	5146025	5146029	5146032	5146272
pH		6.5-9.0		6.52	6.63	6.66	6.66	6.64
Chloride	mg/L	640, 120	1	11	10	19	9	8
Fluoride	mg/L	0.12	0.12	<0.12	<0.12	**0.53**	<0.12	<0.12
Sulphate	mg/L		2	2	2	11	<2	<2
Alkalinity	mg/L		5	48	51	52	51	53
Turbidity	NTU	Narrative	0.5	1.0	1.5	0.7	<0.5	<0.5
Electrical Conductivity	umho/cm		1	132	134	139	140	140
Nitrate + Nitrite as N	mg/L		0.05	0.24	0.15	1.33	0.11	0.12
Nitrate as N	mg/L	550, 13	0.05	0.24	0.15	0.67	0.11	0.12
Nitrite as N	mg/L	0.06	0.05	<0.05	<0.05	**0.66**	<0.05	<0.05
Ammonia as N	mg/L	Fact Sheet	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Total Organic Carbon	mg/L		0.5	3.9	4.7	5.4	5.1	4.2
Total Sodium	mg/L		0.1	5.7	5.8	5.7	5.9	5.8
Total Potassium	mg/L		0.1	0.4	0.4	0.4	0.4	0.4
Total Calcium	mg/L		0.1	17.1	17.1	17.3	17.2	16.5
Total Magnesium	mg/L		0.1	2.9	3.0	3.0	3.1	3.0
Bicarb. Alkalinity (as CaCO3)	mg/L		5	48	51	52	51	53
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5	<5	<5
Calculated TDS	mg/L		1	69	70	94	67	66
Hardness	mg/L			54.6	55.1	55.6	55.7	53.6
Langelier Index (@20C)	NA			-2.14	-2.00	-1.97	-1.97	-1.99
Langelier Index (@ 4C)	NA			-2.46	-2.32	-2.29	-2.29	-2.31
Saturation pH (@ 20C)	NA			8.66	8.63	8.63	8.63	8.63
Saturation pH (@ 4C)	NA			8.98	8.95	8.95	8.95	8.95
Anion Sum	me/L			1.33	1.35	1.90	1.28	1.29
Cation sum	me/L			1.36	1.37	1.38	1.39	1.34
% Difference/ Ion Balance	%			1.2	0.7	15.9	4.1	1.8

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Certificate of Analysis

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2023-07-17

DATE REPORTED: 2023-07-26

				3168-NP02-WS2	3168-NP02-WS1	3168-AP01-WS1	3168-NP01-WS1	3168-NP01-WS2
		SAMPLE DESCRIPTION:		-230713	-230713	-230713	-230713	-230713
		SAMPLE TYPE:		Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-07-13 11:20	2023-07-13 11:35	2023-07-13 11:50	2023-07-13 12:05	2023-07-13 12:25
Parameter	Unit	G / S	RDL	5146020	5146025	5146029	5146032	5146272
Total Aluminum	ug/L	Variable	5	58	48	44	48	41
Total Antimony	ug/L		2	<2	<2	<2	<2	<2
Total Arsenic	ug/L	5	2	<2	<2	<2	<2	<2
Total Barium	ug/L		5	16	17	17	17	17
Total Beryllium	ug/L		2	<2	<2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	<2	<2
Total Boron	ug/L	29000,	5	5	9	6	7	10
Total Cadmium	ug/L	1.0, 0.09	0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L		2	<2	<2	<2	<2	<2
Total Cobalt	ug/L		1	<1	<1	<1	<1	<1
Total Copper	ug/L	Equation	2	<2	<2	<2	<2	<2
Total Iron	ug/L	300	50	96	123	119	126	73
Total Lead	ug/L	Equation	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Manganese	ug/L		2	26	7	8	8	9
Total Molybdenum	ug/L	73	2	<2	<2	<2	<2	<2
Total Nickel	ug/L	Equation	2	<2	<2	<2	<2	<2
Total Phosphorous	mg/L	Fact Sheet	0.07	0.42	0.32	0.35	0.33	0.37
Total Selenium	ug/L	1	1	<1	<1	<1	<1	<1
Total Silver	ug/L	0.25	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	33	35	35	36	34
Total Thallium	ug/L	0.8	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	<2	<2
Total Titanium	ug/L		3	<3	<3	<3	<3	<3
Total Uranium	ug/L	33, 15	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2	<2	<2
Total Zinc	ug/L	30	5	<5	7	<5	<5	<5

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Certificate of Analysis

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2023-07-17

DATE REPORTED: 2023-07-26

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5146020-5146025 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

5146029 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result
Ion Balance is biased high, contributing parameters have been confirmed.

5146032-5146272 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Ashleigh Dussault

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Certificate of Analysis

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

TSS, DOC, TDS

DATE RECEIVED: 2023-07-17

DATE REPORTED: 2023-07-26

				3168-NP02-WS2	3168-NP02-WS1	3168-AP01-WS1	3168-NP01-WS1	3168-NP01-WS2
		SAMPLE DESCRIPTION:		-230713	-230713	-230713	-230713	-230713
		SAMPLE TYPE:		Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-07-13 11:20	2023-07-13 11:35	2023-07-13 11:50	2023-07-13 12:05	2023-07-13 12:25
Parameter	**Unit**	**G / S**	**RDL**	**5146020**	**5146025**	**5146029**	**5146032**	**5146272**
Dissolved Organic Carbon	mg/L		0.5	3.9	5.0	5.0	4.9	4.2
Total Suspended Solids	mg/L	Narrative	5	<5	<5	<5	<5	<5
Total Dissolved Solids	mg/L		5	54	70	66	56	56

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME FWAL - update 2015
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Ashleigh Dussault

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Exceedance Summary

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

CLIENT NAME: FRACFLOW CONSULTANTS

ATTENTION TO: John Gale

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
5146029	3168-AP01-WS1-230713	NS-CCME FWAL	Standard Water Analysis + Total Metals	Fluoride	mg/L	0.12	0.53
5146029	3168-AP01-WS1-230713	NS-CCME FWAL	Standard Water Analysis + Total Metals	Nitrite as N	mg/L	0.06	0.66

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 23K047728
PROJECT: 3168 WORLD ENERGY GH2
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Jul 26, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Atlantic RBCA Tier 1 Hydrocarbons in Water - Low Level Version 3.1															
Benzene	1	5143332	< 0.001	< 0.001	NA	< 0.001	109%	70%	130%	109%	70%	130%			
Toluene	1	5143332	< 0.001	< 0.001	NA	< 0.001	111%	70%	130%	109%	70%	130%			
Ethylbenzene	1	5143332	< 0.001	< 0.001	NA	< 0.001	112%	70%	130%	109%	70%	130%			
Xylene (Total)	1	5143332	< 0.002	< 0.002	NA	< 0.002	111%	70%	130%	107%	70%	130%			
C6-C10 (less BTEX)	1	5143332	< 0.01	< 0.01	NA	< 0.01	102%	70%	130%	98%	70%	130%	102%	70%	130%
>C10-C16 Hydrocarbons	1	5143332	< 0.05	< 0.05	NA	< 0.05	89%	70%	130%	106%	70%	130%	101%	70%	130%
>C16-C21 Hydrocarbons	1	5143332	< 0.05	< 0.05	NA	< 0.05	89%	70%	130%	106%	70%	130%	101%	70%	130%
>C21-C32 Hydrocarbons	1	5143332	< 0.01	< 0.01	NA	< 0.01	103%	70%	130%	106%	70%	130%	101%	70%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

HALIFAX - Volatile Organic Compounds in Water (ug/L)															
Chloromethane	4690	5147565	< 1	< 1	NA	< 1	128%	50%	140%	116%	50%	140%	130%	50%	140%
Vinyl Chloride	4690	5147565	< 0.6	< 0.6	NA	< 0.6	80%	50%	140%	83%	50%	140%	98%	50%	140%
Bromomethane	4690	5147565	< 0.89	< 0.89	NA	< 0.89	67%	50%	140%	85%	50%	140%	85%	50%	140%
Chloroethane	4690	5147565	< 5	< 5	NA	< 5	90%	50%	140%	90%	50%	140%	100%	50%	140%
Trichlorofluoromethane	4690	5147565	< 5	< 5	NA	< 5	88%	50%	140%	90%	60%	130%	105%	50%	140%
Acetone	4690	5147565	< 10	< 10	NA	< 10	119%	50%	140%	98%	50%	140%	135%	50%	140%
1,1-Dichloroethylene	4690	5147565	< 0.6	< 0.6	NA	< 0.6	96%	50%	140%	93%	60%	130%	112%	50%	140%
Methylene Chloride	4690	5147565	< 2	< 2	NA	< 2	89%	50%	140%	87%	60%	130%	99%	50%	140%
trans-1,2-Dichloroethylene	4690	5147565	< 2	< 2	NA	< 2	98%	50%	140%	92%	60%	130%	89%	50%	140%
1,1-Dichloroethane	4690	5147565	< 1	< 1	NA	< 1	97%	50%	140%	92%	60%	130%	103%	50%	140%
cis-1,2-Dichloroethylene	4690	5147565	< 2	< 2	NA	< 2	95%	50%	140%	80%	60%	130%	107%	50%	140%
Chloroform	4690	5147565	31	33	6.3%	< 1	119%	50%	140%	107%	60%	130%	116%	50%	140%
1,2-Dichloroethane	4690	5147565	< 2	< 2	NA	< 2	91%	50%	140%	97%	60%	130%	105%	50%	140%
1,1,1-Trichloroethane	4690	5147565	< 1	< 1	NA	< 1	97%	50%	140%	99%	60%	130%	124%	50%	140%
Carbon Tetrachloride	4690	5147565	< 0.56	< 0.56	NA	< 0.56	101%	50%	140%	107%	60%	130%	131%	50%	140%
Benzene	4690	5147565	< 1	< 1	NA	< 1	95%	50%	140%	119%	60%	130%	106%	50%	140%
1,2-Dichloropropane	4690	5147565	< 0.7	< 0.7	NA	< 0.7	73%	50%	140%	92%	60%	130%	76%	50%	140%
Trichloroethylene	4690	5147565	< 1	< 1	NA	< 1	77%	50%	140%	94%	60%	130%	61%	50%	140%
Bromodichloromethane	4690	5147565	4	5	NA	< 1	72%	50%	140%	96%	60%	130%	74%	50%	140%
trans-1,3-Dichloropropene	4690	5147565	< 0.5	< 0.5	NA	< 0.5	85%	50%	140%	97%	60%	130%	66%	50%	140%
cis-1,3-Dichloropropene	4690	5147565	< 0.5	< 0.5	NA	< 0.5	81%	50%	140%	109%	60%	130%	82%	50%	140%
1,1,2-Trichloroethane	4690	5147565	< 1	< 1	NA	< 1	112%	50%	140%	113%	60%	130%	64%	50%	140%
Toluene	4690	5147565	< 2	< 2	NA	< 2	104%	50%	140%	115%	60%	130%	80%	50%	140%
2-Hexanone	4690	5147565	< 10.0	< 10.0	NA	< 10.0	96%	50%	140%	109%	50%	140%	84%	50%	140%
Dibromochloromethane	4690	5147565	< 1	< 1	NA	< 1	118%	50%	140%	116%	60%	130%	83%	50%	140%
1,2-Dibromoethane	4690	5147565	< 0.5	< 0.5	NA	< 0.5	110%	50%	140%	116%	60%	130%	69%	50%	140%
Tetrachloroethylene	4690	5147565	< 2	< 2	NA	< 2	105%	50%	140%	109%	60%	130%	78%	50%	140%

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Jul 26, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
1,1,1,2-Tetrachloroethane	4690	5147565	< 0.5	< 0.5	NA	< 0.5	116%	50%	140%	111%	60%	130%	101%	50%	140%
Chlorobenzene	4690	5147565	< 1.0	< 1.0	NA	< 1.0	104%	50%	140%	112%	60%	130%	104%	50%	140%
Ethylbenzene	4690	5147565	< 2	< 2	NA	< 2	76%	50%	140%	100%	60%	130%	93%	50%	140%
m,p-Xylenes	4690	5147565	< 4	< 4	NA	< 4	85%	50%	140%	94%	60%	130%	87%	50%	140%
Bromoform	4690	5147565	< 1	< 1	NA	< 1	111%	50%	140%	111%	60%	130%	94%	50%	140%
Styrene	4690	5147565	< 1	< 1	NA	< 1	74%	50%	140%	97%	60%	130%	82%	50%	140%
o-Xylene	4690	5147565	< 1	< 1	NA	< 1	74%	50%	140%	96%	60%	130%	85%	50%	140%
1,3-Dichlorobenzene	4690	5147565	< 1	< 1	NA	< 1	62%	50%	140%	98%	60%	130%	88%	50%	140%
1,4-Dichlorobenzene	4690	5147565	< 1	< 1	NA	< 1	71%	50%	140%	106%	60%	130%	98%	50%	140%
1,2-Dichlorobenzene	4690	5147565	< 0.7	< 0.7	NA	< 0.7	77%	50%	140%	94%	60%	130%	88%	50%	140%

Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.
The sample spikes and dups are not from the same sample ID.

Certified By:

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AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Jul 26, 2023

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Total Metals															
pH	5155134		6.58	6.50	1.2%	<	101%	80%	120%						
Chloride	5146020	5146020	11	11	0.3%	< 1	102%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	5146020	5146020	<0.12	<0.12	NA	< 0.12	108%	80%	120%	NA	80%	120%	NA	70%	130%
Sulphate	5146020	5146020	2	2	NA	< 2	108%	80%	120%	NA	80%	120%	NA	70%	130%
Alkalinity	5155134		19	19	NA	< 5	91%	80%	120%						
Nitrate as N	5146020	5146020	0.24	0.24	NA	< 0.05	102%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrite as N	5146020	5146020	<0.05	<0.05	NA	< 0.05	83%	80%	120%	NA	80%	120%	NA	70%	130%
Total Organic Carbon	5141212		4.2	4.2	1.4%	< 0.5	102%	80%	120%	NA	80%	120%	108%	80%	120%
Total Sodium	5146272	5146272	5.8	5.7	2.3%	< 0.1	105%	80%	120%	102%	80%	120%	98%	70%	130%
Total Potassium	5146272	5146272	0.4	0.4	NA	< 0.1	104%	80%	120%	102%	80%	120%	95%	70%	130%
Total Calcium	5146272	5146272	16.5	17.4	5.3%	< 0.1	99%	80%	120%	105%	80%	120%	NA	70%	130%
Total Magnesium	5146272	5146272	3.0	3.0	1.6%	< 0.1	105%	80%	120%	103%	80%	120%	97%	70%	130%
Bicarb. Alkalinity (as CaCO3)	5155134		19	19	NA	< 5	NA	80%	120%						
Carb. Alkalinity (as CaCO3)	5155134		< 10	< 10	0.0%	< 10	NA	80%	120%						
Total Aluminum	5146272	5146272	41	40	2.3%	< 5	105%	80%	120%	102%	80%	120%	96%	70%	130%
Total Antimony	5146272	5146272	<2	<2	NA	< 2	101%	80%	120%	101%	80%	120%	97%	70%	130%
Total Arsenic	5146272	5146272	<2	<2	NA	< 2	104%	80%	120%	101%	80%	120%	96%	70%	130%
Total Barium	5146272	5146272	17	16	NA	< 5	102%	80%	120%	99%	80%	120%	97%	70%	130%
Total Beryllium	5146272	5146272	<2	<2	NA	< 2	101%	80%	120%	99%	80%	120%	98%	70%	130%
Total Bismuth	5146272	5146272	<2	<2	NA	< 2	104%	80%	120%	100%	80%	120%	98%	70%	130%
Total Boron	5146272	5146272	10	8	NA	< 5	100%	80%	120%	101%	80%	120%	96%	70%	130%
Total Cadmium	5146272	5146272	<0.09	<0.09	NA	< 0.09	102%	80%	120%	102%	80%	120%	95%	70%	130%
Total Chromium	5146272	5146272	<2	<2	NA	< 1	103%	80%	120%	102%	80%	120%	97%	70%	130%
Total Cobalt	5146272	5146272	<1	<1	NA	< 1	106%	80%	120%	105%	80%	120%	98%	70%	130%
Total Copper	5146272	5146272	<2	<2	NA	< 1	109%	80%	120%	105%	80%	120%	100%	70%	130%
Total Iron	5146272	5146272	73	69	NA	< 50	105%	80%	120%	102%	80%	120%	98%	70%	130%
Total Lead	5146272	5146272	<0.5	<0.5	NA	< 0.5	104%	80%	120%	100%	80%	120%	98%	70%	130%
Total Manganese	5146272	5146272	9	9	NA	< 2	104%	80%	120%	101%	80%	120%	97%	70%	130%
Total Molybdenum	5146272	5146272	<2	<2	NA	< 2	101%	80%	120%	103%	80%	120%	100%	70%	130%
Total Nickel	5146272	5146272	<2	<2	NA	< 2	106%	80%	120%	105%	80%	120%	99%	70%	130%
Total Phosphorous	5146272	5146272	0.37	0.35	5.3%	< 0.02	108%	80%	120%	111%	80%	120%	101%	70%	130%
Total Selenium	5146272	5146272	<1	<1	NA	< 1	111%	80%	120%	98%	80%	120%	92%	70%	130%
Total Silver	5146272	5146272	<0.1	<0.1	NA	< 0.1	103%	80%	120%	103%	80%	120%	97%	70%	130%
Total Strontium	5146272	5146272	34	33	1.7%	< 5	104%	80%	120%	101%	80%	120%	98%	70%	130%
Total Thallium	5146272	5146272	<0.1	<0.1	NA	< 0.1	102%	80%	120%	100%	80%	120%	98%	70%	130%
Total Tin	5146272	5146272	<2	<2	NA	< 2	102%	80%	120%	103%	80%	120%	99%	70%	130%
Total Titanium	5146272	5146272	<3	<3	NA	< 2	104%	80%	120%	104%	80%	120%	99%	70%	130%
Total Uranium	5146272	5146272	<0.2	<0.2	NA	< 0.2	102%	80%	120%	99%	80%	120%	98%	70%	130%
Total Vanadium	5146272	5146272	<2	<2	NA	< 2	105%	80%	120%	101%	80%	120%	96%	70%	130%

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS
AGAT WORK ORDER: 23K047728
PROJECT: 3168 WORLD ENERGY GH2
ATTENTION TO: John Gale
SAMPLING SITE:
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jul 26, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Zinc	5146272	5146272	<5	<5	NA	< 5	104%	80%	120%	102%	80%	120%	96%	70%	130%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Dissolved Metals															
Dissolved Aluminum	5146272	5146272	32	34	NA	< 5	109%	80%	120%	104%	80%	120%	111%	70%	130%
Dissolved Antimony	5146272	5146272	<5	<5	NA	< 2	103%	80%	120%	104%	80%	120%	109%	70%	130%
Dissolved Arsenic	5146272	5146272	<2	<2	NA	< 2	108%	80%	120%	104%	80%	120%	111%	70%	130%
Dissolved Barium	5146272	5146272	17	17	NA	< 5	105%	80%	120%	101%	80%	120%	112%	70%	130%
Dissolved Beryllium	5146272	5146272	<2	<2	NA	< 2	108%	80%	120%	99%	80%	120%	105%	70%	130%
Dissolved Bismuth	5146272	5146272	<2	<2	NA	< 2	109%	80%	120%	104%	80%	120%	111%	70%	130%
Dissolved Boron	5146272	5146272	9	10	NA	< 5	108%	80%	120%	99%	80%	120%	111%	70%	130%
Dissolved Cadmium	5146272	5146272	<0.10	<0.10	NA	< 0.09	105%	80%	120%	104%	80%	120%	111%	70%	130%
Dissolved Chromium	5146272	5146272	<1	<1	NA	< 1	109%	80%	120%	105%	80%	120%	110%	70%	130%
Dissolved Cobalt	5146272	5146272	<1	<1	NA	< 1	111%	80%	120%	108%	80%	120%	110%	70%	130%
Dissolved Copper	5146272	5146272	<4	<4	NA	< 2	111%	80%	120%	105%	80%	120%	111%	70%	130%
Dissolved Iron	5146272	5146272	<57	<57	NA	< 50	110%	80%	120%	105%	80%	120%	110%	70%	130%
Dissolved Lead	5146272	5146272	<0.9	<0.9	NA	< 0.5	108%	80%	120%	104%	80%	120%	112%	70%	130%
Dissolved Manganese	5146272	5146272	<2	2	NA	< 2	110%	80%	120%	104%	80%	120%	109%	70%	130%
Dissolved Molybdenum	5146272	5146272	<2	<2	NA	< 2	105%	80%	120%	105%	80%	120%	113%	70%	130%
Dissolved Nickel	5146272	5146272	<3	<3	NA	< 2	112%	80%	120%	107%	80%	120%	111%	70%	130%
Dissolved Selenium	5146272	5146272	<1	<1	NA	< 1	118%	80%	120%	100%	80%	120%	121%	70%	130%
Dissolved Silver	5146272	5146272	<0.4	<0.4	NA	< 0.1	104%	80%	120%	103%	80%	120%	112%	70%	130%
Dissolved Strontium	5146272	5146272	37	36	3.2%	< 5	110%	80%	120%	105%	80%	120%	110%	70%	130%
Dissolved Thallium	5146272	5146272	<0.2	<0.2	NA	< 0.1	108%	80%	120%	103%	80%	120%	112%	70%	130%
Dissolved Tin	5146272	5146272	<2	<2	NA	< 2	106%	80%	120%	105%	80%	120%	113%	70%	130%
Dissolved Titanium	5146272	5146272	<5	<5	NA	< 2	109%	80%	120%	109%	80%	120%	113%	70%	130%
Dissolved Uranium	5146272	5146272	<0.3	<0.3	NA	< 0.1	106%	80%	120%	102%	80%	120%	110%	70%	130%
Dissolved Vanadium	5146272	5146272	<2	<2	NA	< 2	109%	80%	120%	102%	80%	120%	108%	70%	130%
Dissolved Zinc	5146272	5146272	<5	<5	NA	< 5	109%	80%	120%	105%	80%	120%	111%	70%	130%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Mercury Analysis in Water (Total)															
Total Mercury	5140127		<0.026	<0.026	NA	< 0.026	103%	80%	120%	NA	80%	120%	115%	70%	130%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Mercury Analysis in Water (Dissolved)															
Dissolved Mercury	5143293		<0.026	<0.026	NA	< 0.026	103%	80%	120%	NA	80%	120%	115%	70%	130%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
TSS, DOC, TDS															
Dissolved Organic Carbon	5145930		0.76	0.81	NA	< 0.5	103%	80%	120%	NA	80%	120%	107%	80%	120%

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Quality Assurance

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jul 26, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Suspended Solids	5148567		<5	<5	NA	< 5	100%	80%	120%	NA			98%	80%	120%
Total Dissolved Solids	5148559		176	180	2.2%	< 5	88%	80%	120%	NA			NA		

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Standard Water Analysis + Total Metals

Total Organic Carbon	5146025	5146025	4.7	4.8	1.9%	< 0.5	105%	80%	120%	NA	80%	120%	104%	80%	120%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Ortho Phosphate, Reactive Silica, Ammonia & Colour

Reactive Silica	5152708		10.8	11.3	4.7%	< 0.05	105%	90%	110%	108%	90%	110%	110%	80%	120%
Ammonia as N	5143342		<0.02	<0.02	NA	< 0.02	99%	70%	130%	100%	80%	120%	95%	70%	130%
True Colour	5152758		9.13	9.02	NA	< 2.5	100%	90%	110%						
Ortho Phosphate as P	5155113		<0.10	<0.10	NA	< 0.10	92%	70%	130%	99%	80%	120%	97%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By: Ashleigh Dussault

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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS | **AGAT WORK ORDER: 23K047728**

PROJECT: 3168 WORLD ENERGY GH2 | **ATTENTION TO: John Gale**

SAMPLING SITE: | **SAMPLED BY:**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Sediment			GC/MS/FID
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Chloromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Vinyl Chloride	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Bromomethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Chloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Trichlorofluoromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Acetone	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1-Dichloroethylene	TO-0330	EPA SW-846 8260	GC/MS
Methylene Chloride	TO-0330	EPA SW-846 5030 & 8260	GC/MS
trans-1,2-Dichloroethylene	TO-0330	EPA SW-846 8260	GC/MS
1,1-Dichloroethane	TO-0330	EPA SW-846 8260	GC/MS
cis-1,2-Dichloroethylene	TO-0330	EPA SW-846 8260	GC/MS
Chloroform	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,1-Trichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Carbon Tetrachloride	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Benzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dichloropropane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Trichloroethylene	TO-0330	EPA SW-846 8260	GC/MS
Bromodichloromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
trans-1,3-Dichloropropene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
cis-1,3-Dichloropropene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,2-Trichloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Toluene	TO-0330	EPA SW-846 5030 & 8260	GC/MS

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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

ATTENTION TO: John Gale

SAMPLING SITE:

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Hexanone	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Dibromochloromethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dibromoethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Tetrachloroethylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,1,2-Tetrachloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Chlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Ethylbenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
m,p-Xylenes	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Bromoform	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Styrene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,1,2,2-Tetrachloroethane	TO-0330	EPA SW-846 5030 & 8260	GC/MS
o-Xylene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,3-Dichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,4-Dichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
1,2-Dichlorobenzene	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Xylenes	TO-0330	EPA SW-846 5030 & 8260	GC/MS
Toluene-d8	TO-0330	EPA SW-846 5030 & 8260	GC/MS

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TEL (709)747-8573
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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS | **AGAT WORK ORDER: 23K047728**

PROJECT: 3168 WORLD ENERGY GH2 | **ATTENTION TO: John Gale**

SAMPLING SITE: | **SAMPLED BY:**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Dissolved Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Antimony	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA
Total Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA
Reactive Silica	INOR-93-6070	modified from SM 4500-SIO2 F	LACHAT FIA

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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
True Colour	INOR-93-6074	modified from SM 2120 B	LACHAT FIA
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
Turbidity	INOR-121-6001	SM 2130 B	PC TITRATE
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Method Summary

CLIENT NAME: FRACFLOW CONSULTANTS

AGAT WORK ORDER: 23K047728

PROJECT: 3168 WORLD ENERGY GH2

ATTENTION TO: John Gale

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Total Suspended Solids	INOR-121-6024, 6025	SM 2540C, D	GRAVIMETRIC
Total Dissolved Solids	INOR-121-6024, 6025	SM 2540C, D	GRAVIMETRIC

AGAT Laboratories

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 8.1, 7.9, 8.2
Hold Time:
AGAT Job Number: 23K047728
Notes: 100 x HNO3 x2 - TMS + DMS
40ml HNO3 x4 - HG - FILTERED
100 H2SO4 x2 - TOC + NUTRIENTS/DOC

Report Information
Company: Fracflow Consultants Inc. (NL)
Contact: John Gale
Address: 154 Major's Path
St. John's, NL
Phone: 709-739-7270 Fax: 709-753-5101
Client Project #: 3168 World Energy GH2
AGAT Quotation: S/O
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: John Gale (john_ffc@nfld.net)
Email: Devin Northcott (devin_ffc@bellaliant.com)
2. Name: Karen Andrews (karen_ffc@nfld.net)
Email: Chris Piercey (chris_ffc@bellaliant.com)

Report Format
☐ Single Sample per page
☑ Multiple Sample per page
☑ Excel Format Included
☐ Export:

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To Same Yes ☑ / No ☐
Company:
Contact: Karen Andrews (karen_ffc@nfld.net)
Address:
Phone: Fax:
PO/Credit Card#: 4286

Regulatory Requirements (Check):
☑ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☑ Coarse
☐ Tier 2 ☐ Com ☑ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☑ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☑ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☑ No **Salt Water Sample:** ☐ Yes ☑ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment
3168-NP02-WS2-230713	July 13, 2023 / 11:20	Water	11	Total Metals+Hg & Dissolved Metals+Hg
3168-NP02-WS1-230713	July 13, 2023 / 11:35	Water	16	Total Metals+Hg & Dissolved Metals+Hg
3168-AP01-WS1-230713	July 13, 2023 / 11:50	Water	11	Total Metals+Hg & Dissolved Metals+Hg
3168-NP01-WS1-230713	July 13, 2023 / 12:05	Water	19	Total Metals+Hg & Dissolved Metals+Hg
3168-NP01-WS2-230713	July 13, 2023 / 12:25	Water	11	Total Metals+Hg & Dissolved Metals+Hg
				Dissolved Metals+Mercury
				DOC, TDS all field filtered

Field Filtered/Preserved	Standard Water Analysis	Metals: ☑ Total ☑ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	Grain Size (coarse/fine)	☐ TOC - Miss ☐ FOC - Miss	Phosphates (total as P2O5)	Chromium (Tri & Hexavalent)	Phenols	Tier 1: TPH/BTEX (PIRI) ☑ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	Oil & Grease (TOG)	BNAE EPA 625 - Miss	PAH	PCB	Marine Sediment Package	Dioxins & Furans	Fecal Coliform ☐ MPN ☐ MF	Other: DOC	Other: TDS &TSS	Hazardous (Y/N)
✓	✓	✓	✓																		✓	✓	
✓	✓	✓	✓							✓											✓	✓	
✓	✓	✓	✓																		✓	✓	
✓	✓	✓	✓							✓			✓								✓	✓	
✓	✓	✓	✓																		✓	✓	

Samples Relinquished By (Print Name): Eunjeong Seok
Samples Relinquished By (Sign):
Date/Time: July 17/23
Date/Time: 11:30
Samples Received By (Print Name):
Samples Received By (Sign):
Date/Time: July 17/23
Date/Time: 1130

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Document ID: DIV-133 1501 002
Date revised: January 2016

Appendix WRM42-A

Water Usage for Industrial and Residential Users – Gull (Mine) Pond

Table 4.1 Water usage for industrial and residential users, Gull (Mine) Pond, Stephenville, NL.

Date		Days	Gallons			Average Usage	
From	To		Start	Finish	Total	Gal/day	m^3/day
--	1 Feb 2017	--	--	656,774	--		
1 Feb 2017	12 Jul 2017	160.9	656,774	669,521	12,747	79.2	0.3
12 Jul 2017	15 Jan 2018	186.9	669,521	721,370	51,849	277.5	1.1
15 Jan 2018	16 Apr 2018	91.0	721,370	722,421	1,051	11.5	0.0
16 Apr 2018	16 Jul 2018	91.1	722,421	746,049	23,628	259.4	1.0
16 Jul 2018	28 Sep 2018	74.0	746,049	776,024	29,975	405.0	1.5
28 Sep 2018	10 Dec 2018	73.0	776,024	788,288	12,264	167.9	0.6
10 Dec 2018	1 Mar 2019	80.8	788,288	788,473	185	2.3	0.0
1 Mar 2019	23 Apr 2019	53.1	788,473	788,915	442	8.3	0.0
23 Apr 2019	4 Jul 2019	72.1	788,915	804,071	15,156	210.3	0.8
4 Jul 2019	24 Sep 2019	81.8	804,071	835,434	31,363	383.4	1.5
24 Sep 2019	14 Jan 2020	112.0	835,434	838,120	2,686	24.0	0.1
14 Jan 2020	6 Apr 2020	83.0	838,120	838,694	574	6.9	0.0
6 Apr 2020	30 Jun 2020	85.0	838,694	848,694	10,000	117.6	0.4
30 Jun 2020	9 Sep 2020	71.1	848,694	883,377	34,683	487.8	1.8
9 Sep 2020	11 Dec 2020	92.8	883,377	890,577	7,200	77.6	0.3
11 Dec 2020	5 Apr 2021	115.2	890,577	890,638	61	0.5	0.0
5 Apr 2021	30 Jun 2021	85.9	890,638	907,148	16,510	192.1	0.7
30 Jun 2021	4 Nov 2021	127.1	907,148	928,327	21,179	166.6	0.6
4 Nov 2021	28 Jun 2022	235.9	928,327	953,188	24,861	105.4	0.4
28 Jun 2022	29 Aug 2022	62.0	953,188	979,916	26,728	431.4	1.6