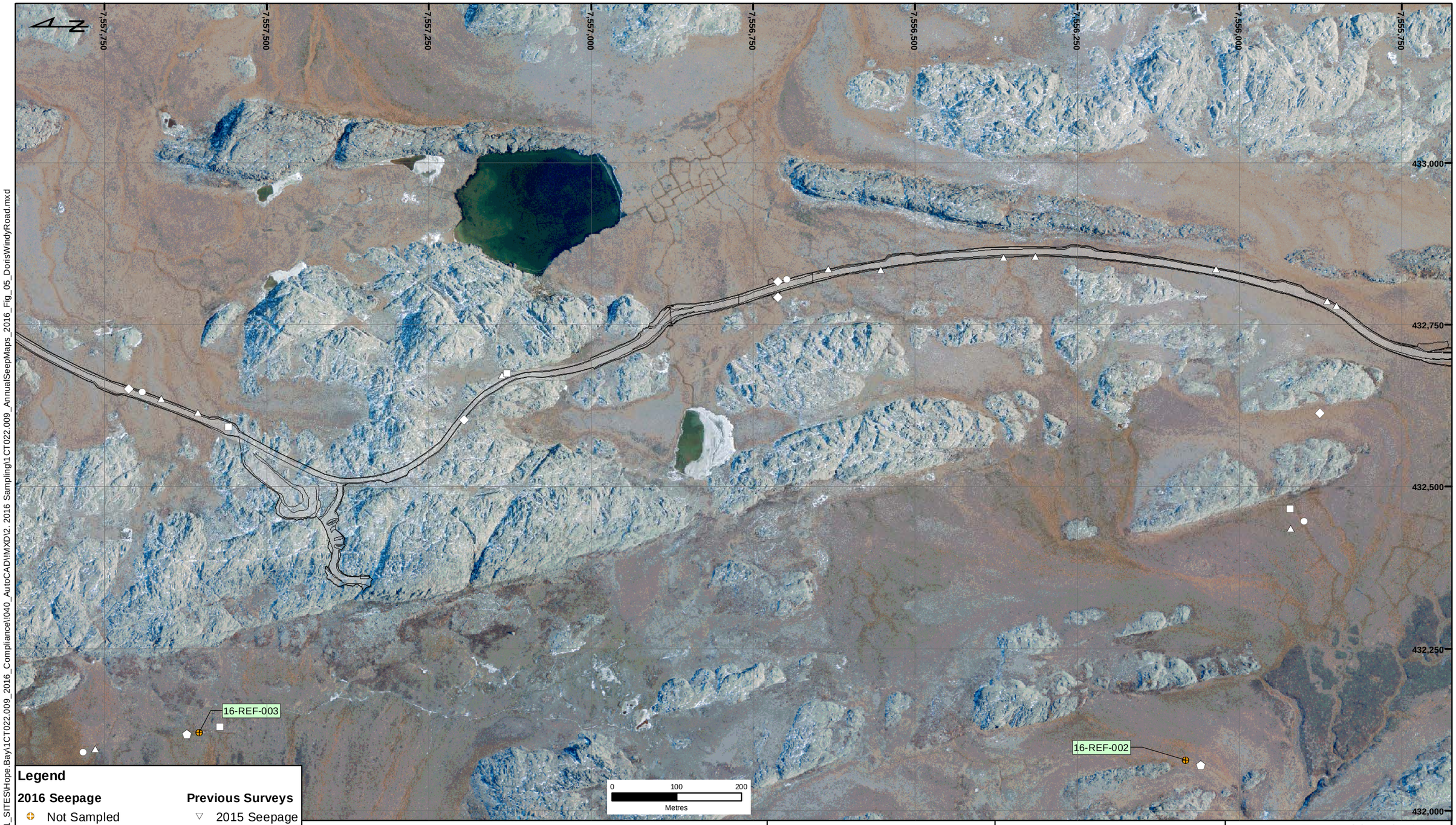

Legend

2016 Seepage
- Not Sampled
- Sampled
- As-Built Infrastructure

Previous Surveys
- 2015 Seepage
- 2014 Seepage
- 2013 Seepage
- 2012 Seepage
- 2011 Seepage
- 2010 Seepage

	pH 6.0 to 6.9	pH 7 to 7.9	pH 8 to 8.9
EC ≤ 500 µS/cm			
500µS/cm<EC<2000µS/cm			
EC>2000µS/cm			

srk consulting

Job No: 1CT022.009.700

Filename: 1CT022.009_AnnualSeepMaps_2016_Fig_05_DorisWindyRoad

TMAC RESOURCES

2016 Seepage Monitoring

Hope Bay Gold Project

Seep Survey Location
Doris Windy Road

Date:	Approved:	Figure:
Jan. 2017	LB	5

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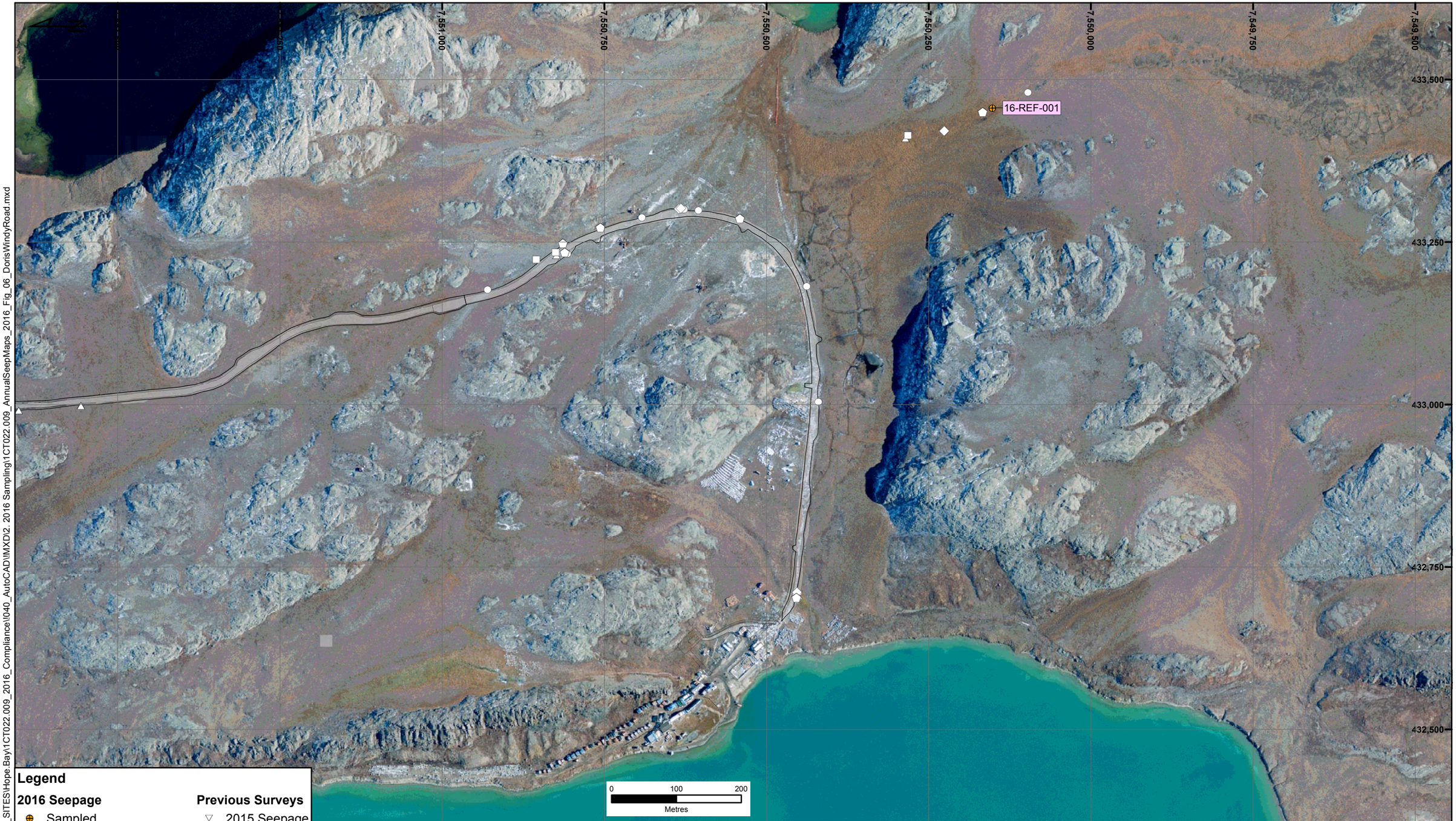

Legend

2016 Seepage
- Sampled
- Not Sampled
- As-Built Infrastructure
- Proposed Infrastructure

Previous Surveys
- 2015 Seepage
- 2014 Seepage
- 2013 Seepage
- 2012 Seepage
- 2011 Seepage
- 2010 Seepage

	pH 6.0 to 6.9	pH 7 to 7.9	pH 8 to 8.9
EC ≤ 500 µS/cm			
500µS/cm<EC<2000µS/cm			
EC>2000µS/cm			

srk consulting

Job No: 1CT022.009.700

Filename: 1CT022.009_AnnualSeepMaps_2016_Fig_06_DorisWindyRoad

TMAC RESOURCES

2016 Seepage Monitoring

Hope Bay Gold Project

Seep Survey Location
Doris Windy Road

Date:	Approved:	Figure:
Jan. 2017	LB	6

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Attachment B – 2016 Field Observations and Measurements

Attachment B: Field Notes and Measurements Taken in the Seep Survey from 2016

Date	Sampling Point	Area	General Observations			Field Measurements															Lab sample collected	Filtrate colour	Sediment colour	Number of filters used	Duplicate	Field Blank
			Coordinates (UTM Zone		Description of Location	pH	Conductivity	OR	Water	Water Colour	Turbidity	Precipitates/Stains	Odours	Photos Taken	Flow Measurement Calculations	t1	t2	t3	Amount	Capture	Flow						
			Easting	Northing		pH units	µS/cm	mV	ºC							sec	sec	sec	mL	%	L/s						
16-Jun-16	16-REF-001	Windy Road Area	0433456	7550152	Visible channel and strong flow. Syringe used to collect all samples. Grass on seep bed bent in direction of flow.	6.83	82.3	153	3.3	colorless	No	none	none	Yes		1.5	1.2	1.8	1000	25	2.7	GP, D-Metals, T-Metals, T-NH4	colorless	-	1	-	-
16-Jun-16	16-REF-002	Windy Road Area	0432078	7556083	Location is in low wet area. Channel visible and flow strong, grass on bottom is bent in direction of flow. Syringe used to collect all samples.	7.33	374	80	4.5	colorless	No	none	none	Yes		4.2	3	3.5	500	25	0.6	GP, D-Metals, T-Metals, T-NH4	colorless	-	1	-	-
16-Jun-16	16-REF-003	Windy Road Area	0432121	7557604	Visible channel with strong flow. Channel is wide and shallow. Grass bent in direction of flow. Syringe used to collect all samples.	7.29	252	63	3.8	colorless	No	none	none	Yes		2.5	3.2	2.8	800	25	1.1	GP, D-Metals, T-Metals, T-NH4	colorless	-	1	-	-
11-Jun-16	16-DC-01	Doris Camp	0433223	7558937	Discharge location of pollution control pond (ST-2). Shallow pool of standing water at edge of pond. Pond has been pumped down and is almost empty. Algae and sediment on bottom of pond. Ripples on surface of water may be stirring up sediment.	7.9	2720	158	11.7	colorless	No	none	none	Yes	Standing water only	-	-	-	-	-	-	GP, D-Metals, T-Metals, T-NH4	-	-	1	-	-
11-Jun-16	16-DC-02	WR road	0433331	7558876	Slow flow from berm below road below Pad G. Syringe used to collect all samples as very shallow and muddy seep.	7.88	6750	179	6.7	colorless	No	none	none	Yes		3.2	3.3	3.2	125	10	0.39	GP, D-Metals, T-NH4	-	-	1	-	-
14-Jun-16	16-TLA-01	TLA road	0434916	7558972	Grassy tundra. Visible channel from road to Tail Lake. Low flow, road dips at seep location. Syringe was used to collect all samples as shallow seep.	7.5	387	153	6.7	very light brown	No	none	none	Yes		3.7	3.2	3	225	25	0.27	GP, D-Metals, T-NH4	very pale brown	brown	1	-	-
14-Jun-16	16-TLA-02	TLA road	0435397	7558471	Grassy tundra. Large boulder sized rock to built up road. Distinct channel downstream. Very low flow but sampling area recharges when water is extracted. Syringe was used to collect all samples as shallow seep.	7.85	1429	151	5.4	clear, very light brown	No	none	none	Yes	Flow/area of sample extraction too small to measure. Water recharged 16 mL every 5 - 10 s after extraction from small pool.	-	-	-	-	-	-	GP, D-Metals, T-NH4	light brown	gray/brown	4	-	-
15-Jun-16	16-AIRSTR-01	Airstrip	0433088	7562387	Near flight tower on North apron. Large pool at beginning of seep. Slow flow. Grassy area with large distribution of willow shrubs.	7.39	674	108	6.2	colorless	No	none	none	Yes		1.9	2.1	2.2	800	5	7.8	GP, D-Metals, T-NH4	very light brown	brown/grey	3	-	-
15-Jun-16	16-AIRSTR-02	Airstrip	0433043	7562306	West side of airstrip. Grassy tundra, small pool outlet of seepage with low flow. There is no visible channel after initial pool.	7.19	120	29	7.6	brown/grey	No	none	none	Yes		3.4	3.4	3.4	125	15	0.25	GP, D-Metals, T-NH4	brown/grey	grey/brown	6	16-AIRSTR-03	16-AIRSTR-04
15-Jun-16	16-AIRSTR-05	Airstrip	433036	7562274	Clear outlet location. Seepage visibly flowing towards northwest. No channel beyond initial outlet. Water is clear.	7.66	532	131	4.7	colorless	No	none	none	Yes		3.2	3	3	125	40	0.10	GP, D-Metals, T-NH4	colorless	grey	2	-	-
15-Jun-16	16-AIRSTR-06	Airstrip	0433036	7562267	Very close outlet to 16-AIRSTR-05 location. Clear outlet location. Seepage visibly flowing towards northwest. No channel beyond initial outlet. Water is clear.	7.67	470	130	4.4	colorless	No	none	none	Yes		3.2	3	3.4	125	30	0.13	GP, D-Metals, T-NH4	colorless	grey	2	-	-
15-Jun-16	16-AIRSTR-07	Airstrip	0433035	7562263	Very close outlet to 16-AIRSTR-05 and 16-AIRSTR-06 location. Clear outlet location. Seepage visibly flowing towards northwest. No channel beyond initial outlet. Water is clear.	7.67	486	134	3.8	colorless	No	none	none	Yes		3.1	2.8	2.9	125	20	0.21	GP, D-Metals, T-NH4	colorless	grey	1	-	-
15-Jun-16	16-AIRSTR-08	Airstrip	0432949	7561845	15m long wet spot with several outlets. Grassy with above average willow coverage. Visible flow, no visible channel, water flows northwest through tundra through a large damp area.	7.67	343	84	3.4	colorless	No	none	none	Yes		2.7	2.9	2.3	125	50	0.10	No	-	-	-	-	-
15-Jun-16	16-AIRSTR-09	Airstrip	0432881	7561548	20m long wet area. Visible flow from 2 outlets. Grassy area. No visible channel, water dissipates among tundra hummocks.	7.89	392	97	2.6	colorless	No	none	none	Yes		2.7	3.2	2.9	125	10	0.43	No	-	-	-	-	-
15-Jun-16	16-AIRSTR-10	Airstrip	0432862	7561480	Distinct channel. Visible flow. 5m stretch of water.	7.83	3.81	73	2.8	colorless	No	none	none	Yes		4	4.9	4.2	125	10	0.29	No	-	-	-	-	-
15-Jun-16	16-AIRSTR-11	Airstrip	0432827	7561327	10m long wet spot. Water dissipates into wet area, no visible channel. Low flow, not visible unless sediment is stirred up.	7.74	375	73	4.8	colorless	No	none	none	Yes		3.6	2.9	2.6	125	10	0.42	No	-	-	-	-	-
15-Jun-16	16-AIRSTR-12	Airstrip	0432815	7561250	Visible flow, channel visible and runs along toe of road for approximately 20m before following terrain into the tundra. Flow strong enough to create flow pattern in grass.	7.73	336	18	5.2	colorless	No	none	none	Yes		2.2	2.2	2.4	125	3	1.8	GP, D-Metals, T-NH4	colorless	grey	2	-	-
15-Jun-16	16-AIRSTR-13	Airstrip	0432795	7561180	Rapid flow out of outlet. Runs into visible channel.	7.57	335	59	6.2	colorless	No	none	none	Yes		3.3	4.3	2.6	125	15	0.26	No	-	-	-	-	-

Attachment C – 2016 Laboratory Water Quality Data

Attachment C: Laboratory Results of the 2016 Seep Survey Samples

Area	Sample ID	Field pH	Lab pH	Field EC	Lab EC	ORP	Total Hardness	TSS	TDS	Acidity	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Alkalinity, Phenolphthalein (as CaCO3)	Total Alkalinity	Total Ammonia	Br
		s.u.	s.u.	µS/cm	µS/cm	mV	mg $CaCO_3$/L	mg/L	mg/L	mg $CaCO_3$/L	-	-	-	-	mg CaCO3/L	mg N/L	mg/L
	CCME guideline*	*6.5-9*	*6.5-9*	-	-	-	-	-	-	-	-	-	-	-	-	*4***	-
Reference (Windy Road)	16-REF-001	6.8	7.5	82	70	150	27	<3.0	35	2.3	23	<1.0	<1.0	<2.0	23	0.0069	<0.050
	16-REF-002	7.3	8.0	370	230	80	93	9.5	120	1.8	70	<1.0	<1.0	<2.0	70	0.009	0.065
	16-REF-003	7.3	7.9	250	190	63	52	<3.0	96	1.7	45	<1.0	<1.0	<2.0	45	0.0052	0.061
Waste Rock Influenced Area	16-DC-01	7.9	8.0	2700	2600	160	770	3.5	1400	4.9	93	<1.0	<1.0	<2.0	93	**6.5**	<1.0
Tail Lake Access (TLA) Road	16-TLA-01	7.5	7.5	390	350	150	170	31	190	9.5	130	<1.0	<1.0	<2.0	130	0.0098	<0.050
	16-TLA-02	7.9	8.0	1400	1300	150	180	42	740	4.3	110	<1.0	<1.0	<2.0	110	**14**	0.76
Airstrip	16-AIRSTR-01	7.4	7.6	670	630	110	220	8.3	370	14	260	<1.0	<1.0	<2.0	260	0.017	0.27
	16-AIRSTR-02	7.2	7.6	120	650	29	250	29	370	130	260	<1.0	<1.0	<2.0	260	0.048	0.3
	16-AIRSTR-03	7.2	7.6	120	630	29	240	26	360	3.3	250	<1.0	<1.0	<2.0	250	0.057	0.29
	16-AIRSTR-05	7.7	8.0	530	500	130	190	<3.0	270	1.1	150	<1.0	<1.0	<2.0	150	0.05	0.17
	16-AIRSTR-06	7.7	8.0	470	440	130	170	14	240	<1.0	130	<1.0	<1.0	<2.0	130	0.015	0.13
	16-AIRSTR-07	7.7	8.3	490	440	130	170	<3.0	250	<1.0	130	<1.0	<1.0	<2.0	130	0.011	0.14
	16-AIRSTR-12	7.7	8.2	340	300	18	100	4.1	160	<1.0	88	<1.0	<1.0	<2.0	88	0.34	0.1

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*Comparisons to CCME water quality guidelines for the protection of aquatic life are intended for screening purposes and are not directly applicable because the seepage sites do not support aquatic life.

Values in bold indicates value exceeds respective water quality guideline for the parameter.

**Guideline for ammonia is pH and temperature dependent. Seepage waters had an average temperature of 5.2ºC at time of sampling and an average pH of 7.6. This guideline value is approximate.

***Guideline calculated based on the average hardness of the seepage samples of 330 mg $CaCO_3$ mg/L

Cl	F	NO_3	NO2	Total P	SO_4	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe
mg/L	mg/L	mg N/L	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
120 mg/L	-	*3 mg N/L*	-	-	-	*0.1*	-	*0.005*	-	-	-	-	*0.00037****	-	-	-	*0.004****	*0.3*
6.9	0.065	<0.0050	<0.0010	0.0069	<0.30	0.052	<0.00010	0.0002	0.0027	<0.000020	<0.000050	<0.010	<0.0000050	5.6	0.00054	<0.00010	0.00088	0.18
28	0.069	<0.0050	<0.0010	0.0077	0.74	0.019	<0.00010	0.00031	0.0045	<0.000020	<0.000050	<0.010	<0.0000050	24	0.00035	0.00012	0.0013	0.097
29	<0.020	<0.0050	<0.0010	0.0061	3.6	0.02	<0.00010	0.00011	0.0039	<0.000020	<0.000050	<0.010	<0.0000050	14	0.00014	<0.00010	0.00091	0.12
700	<0.40	**25**	0.26	0.011	74	0.015	0.00018	0.00063	0.038	<0.000020	<0.000050	0.18	0.000066	250	<0.00010	0.0011	**0.0046**	0.011
39	0.048	0.03	0.0014	0.02	1.3	0.072	<0.00010	0.00025	0.015	<0.000020	<0.000050	<0.010	0.000011	47	0.00068	0.00055	0.0028	0.19
190	<0.10	**51**	3.7	0.042	16	**0.14**	0.00011	0.00067	0.018	<0.000020	<0.000050	0.14	0.000024	35	0.00059	0.0011	**0.0077**	0.14
48	0.13	<0.0050	<0.0010	0.071	25	0.022	<0.00010	0.0011	0.0092	<0.000020	<0.000050	0.066	<0.0000050	55	0.00053	0.00035	0.0021	**0.39**
50	0.14	<0.0050	<0.0010	0.14	21	0.044	<0.00010	0.0017	0.015	<0.000020	<0.000050	0.039	0.0000065	69	0.00092	0.0017	0.0026	**4.1**
48	0.13	0.01	0.0011	0.13	22	0.05	<0.00010	0.0016	0.013	<0.000020	<0.000050	0.043	<0.0000050	66	0.00083	0.0014	0.003	**3.2**
54	0.033	**3.4**	0.0081	0.0046	16	0.0079	<0.00010	0.00041	0.0058	<0.000020	<0.000050	0.042	0.0000076	59	<0.00010	0.00019	**0.0061**	0.06
42	0.036	2.9	0.0067	0.16	16	0.0089	<0.00010	0.00042	0.0053	<0.000020	<0.000050	0.036	0.0000066	55	0.0001	0.00013	**0.0069**	0.029
42	0.035	**3.2**	0.0045	0.0062	17	0.0057	<0.00010	0.00053	0.0053	<0.000020	<0.000050	0.043	0.0000061	55	<0.00010	0.00014	**0.0071**	0.027
32	0.041	1.6	0.09	0.0085	7.9	0.013	<0.00010	0.00033	0.015	<0.000020	<0.000050	0.024	<0.0000050	30	0.00013	0.0002	0.0019	0.1

Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
*0.007***	-	-	-	*0.000026*	-	*0.15****	-	-	*0.001*	-	-	-	-	-	*0.0008*	-	-	-	-	*0.03*	-
<0.000050	0.0036	3.2	0.0016	<0.0000050	0.00023	0.0026	<0.050	0.72	<0.000050	2.1	<0.000010	4.2	0.014	<0.50	<0.000010	<0.00010	0.00053	0.00002	<0.00050	0.0044	0.00058
<0.000050	0.0028	8	0.0019	<0.0000050	0.00017	0.0027	<0.050	1.3	0.000064	3.3	<0.000010	12	0.091	0.62	<0.000010	<0.00010	0.00051	0.000027	<0.00050	0.002	0.00032
<0.000050	<0.0010	4	0.0074	<0.0000050	<0.000050	<0.00050	<0.050	0.72	<0.000050	1.6	<0.000010	17	0.029	1.4	<0.000010	<0.00010	<0.00030	<0.000010	<0.00050	0.0022	<0.00030
<0.000050	0.026	35	0.3	<0.0000050	0.0028	0.0019	<0.050	12	0.00078	1.5	<0.000010	180	0.89	26	0.00003	<0.00010	<0.00030	0.00064	<0.00050	0.0019	<0.00030
<0.000050	0.0058	12	0.16	0.0000054	0.0003	0.0034	<0.050	2.2	<0.000050	5.2	<0.000010	12	0.062	0.82	<0.000010	<0.00010	0.0012	0.000039	<0.00050	0.0048	0.00051
0.00024	0.0023	22	0.073	0.000007	0.00083	0.002	<0.050	13	0.00048	2.8	<0.000010	150	0.12	6.1	0.000057	<0.00010	0.0026	0.00013	0.00065	0.0024	0.00045
<0.000050	0.005	19	0.11	<0.0000050	0.0013	0.0018	<0.050	3.5	0.00013	3.4	<0.000010	64	0.078	8.5	<0.000010	<0.00010	0.00074	0.00033	0.0005	0.0029	0.00032
0.000077	0.0072	19	0.98	0.0000059	0.0011	0.0029	0.064	1.4	0.00013	4.6	<0.000010	54	0.08	8.1	<0.000010	<0.00010	0.0016	0.00016	0.0013	0.015	0.00066
0.000079	0.0069	18	0.76	<0.0000050	0.0014	0.0024	0.064	1.6	0.00016	4.4	<0.000010	53	0.077	8.4	<0.000010	<0.00010	0.0017	0.00017	0.0012	0.0013	0.00062
<0.000050	0.0024	9.1	0.0026	<0.0000050	0.00049	0.0015	<0.050	2.1	0.00031	2.3	<0.000010	32	0.052	5.8	<0.000010	<0.00010	<0.00030	0.001	<0.00050	0.0028	<0.00030
<0.000050	0.0026	8.8	0.0016	<0.0000050	0.00055	0.0018	<0.050	2	0.00033	2.3	<0.000010	25	0.052	5.5	<0.000010	<0.00010	<0.00030	0.00065	<0.00050	0.0052	<0.00030
<0.000050	0.0029	8.9	0.0015	<0.0000050	0.00061	0.0013	<0.050	2.1	0.0004	2.3	<0.000010	27	0.057	5.9	<0.000010	<0.00010	<0.00030	0.00072	<0.00050	0.005	<0.00030
<0.000050	0.0017	6.8	0.037	<0.0000050	0.00025	0.0015	<0.050	1.7	0.000094	1.7	<0.000010	23	0.046	2.9	<0.000010	<0.00010	<0.00030	0.000055	<0.00050	<0.0010	<0.00030