APPENDIX I

Wolverine Snow Track Survey Results 2021

Date	Transect	UTM Zone 12 W		Days Since		Observation Type	Number of Individuals	Age of Track	Comments
		Easting	Northing	Last Snow	Last Wind				
26 March	WT09	537561	7149367	5	5	Tracks	1	After	Male
26 March	WT10	542740	7149936	5	5	Tracks	1	After	Male
26 March	WT10	542625	7146683	5	5	Tracks	1	After	Faint tracks
26 March	WT30	545712	7145649	5	5	Tracks	1	After	Single female
27 March	WT05	549050	7165152	5	2.5	Tracks	1	After	Same wolverine as previous observation
27 March	WT31	557294	7167528	5	2.5	Tracks	1	After	Single small female
27 March	WT07	554859	7166722	5	2.5	Tracks	1	After	Single female
27 March	WT07	551064	7166520	5	2.5	Animals	1	N/A	Live wolverine in distance, looked like large male
27 March	WT05	549681	7164722	5	2.5	Animals	1	N/A	Live animal hanging around caribou kills
28 March	WT08	549060	7157684	7	7	Tracks	1	After	Smaller, adjacent to wolf tracks
28 March	WT08	548997	7157119	7	7	Tracks	1	After	Indistinct tracks
28 March	WT08	548831	7156299	7	7	Tracks	1	After	Indistinct tracks
28 March	WT14	540066	7152438	7	7	Tracks	1	After	Single male
28 March	WT14	541209	7152828	7	7	Tracks	1	After	Slightly smaller than previous male
29 March	WT02	521322	7142918	8	8	Tracks	1	After	Small tracks heading NW, cross transect again heading SW 200m S
29 March	WT02	520373	7141379	8	8	Tracks	1	After	Same large male
29 March	WT13	521986	7137400	8	8	Tracks	1	After	Probably young male walking slowly
29 March	WT11	525323	7131904	8	8	Tracks	1	After	Small wolverine
29 March	WT12	528266	7134281	8	8	Tracks	1	After	Smaller wolverine
29 March	WT19	541674	7131612	8	8	Scavenging Site	1	N/A	Caribou carcass with lots of wolverine tracks nearby
30 March	WT22	550873	7151401	9	9	Tracks	1	After	Small female
30 March	WT21	548420	7141880	9	9	Tracks	1	After	Large male
30 March	WT29	555274	7146533	9	9	Tracks	1	After	Medium sized, tracks damaged by wind. Same tracks followed nearly the entire transect.
31 March	WT03	528595	7144596	2	6	Tracks	1	After	Large tracks heading S walking slow
31 March	WT27	530334	7139711	2	6	Tracks	1	After	Med size female
31 March	WT27	531547	7139488	2	6	Tracks	1	After	Same med female
03 April	WT18	554395	7132641	1	1	Tracks	1	After	Medium sized
03 April	WT15	539932	7140921	1	1	Scavenging Site	N/A	N/A	Wolverine stashed caribou parts near a large rock at beginning of transect

APPENDIX J

Wolverine Incidental Observations Summary 2021

Date	Number of Animals	Characteristics of Animals	Location
2021-01-13	1	Single wolverine	Two foxes and wolverine spotted in WTA: wolverine seen only by SCAP personnel before scaling fence
2021-01-16	1	Single wolverine	Wolverine spotted around Main Camp
2021-01-18	1	Single wolverine	Wolverine reported in Steel Yard
2021-05-03	1	Single wolverine	Wolverine spotted near RTX exploration site
2021-05-24	1	Single wolverine	Wolverine on ice heading towards RTX drill site
2021-11-20	1	Single wolverine	Wolverine called in on ice; ENV found prints, saw video after call; did not see animal

APPENDIX K

Pit Wall / Mine Infrastructure Raptor Survey Results 2021

Pit Wall Mine Infrastructure Raptor Nesting

Date	Area	Method Used (D/L)	Bird Species	Number of Observed	Confirm Active Nest (Y/N)	Potential Nesting (Y/N)	Young/Fledgings (#,U,N)	Comments
07-May-21	A21 North Wall	L	N/A	0	No	No	No	
07-May-21	A21 East Wall	L	N/A	0	No	No	No	
07-May-21	A21 South Wall	L	N/A	0	No	No	No	
07-May-21	A21 S Ramp	L	Rough-legged hawk	1	No	Yes	No	Circling above S Ramp
08-May-21	A21 North Wall	L	N/A	0	No	No	No	
08-May-21	A21 East Wall	L	N/A	0	No	No	No	
08-May-21	A21 South Wall	L	N/A	0	No	No	No	
08-May-21	A21 S Ramp	L	Rough-legged hawk	2	No	Yes	No	Likely resident of nest on S ramp
10-May-21	A154 N	L	N/A	0	No	No	No	
10-May-21	A154 S	L	N/A	0	No	No	No	
10-May-21	A418 N	L	N/A	0	No	No	No	
10-May-21	A418 S	L	N/A	0	No	No	No	
10-May-21	S. Tank Farm	D	N/A	0	No	No	No	
10-May-21	Process Plant	D	N/A	0	No	No	No	
10-May-21	Powerhouse 1	D	N/A	0	No	No	No	
10-May-21	Powerhouse 2	D	N/A	0	No	No	No	
10-May-21	Boiler House	D	N/A	0	No	No	No	
10-May-21	SS Line up Wall	D	N/A	0	No	No	No	
10-May-21	Backfill	D	N/A	0	No	No	No	
11-May-21	A21 North Wall	L	Rough-legged hawk	1	No	No	No	Circling above Waste Transfer
11-May-21	A21 East Wall	L	N/A	0	No	No	No	
11-May-21	A21 South Wall	L	N/A	0	No	No	No	
11-May-21	A21 S Ramp	L	N/A	0	No	No	No	
12-May-21	A21 North Wall	L	Peregrine falcon	2	No	No	No	PEFAs flying around edge of pit, briefly perching, then flying again. Blast occurred shortly after scan, second scan done after the blast
12-May-21	A21 North Wall	L	N/A	0	No	No	No	No PEFAs sighted after the blast in the pit.
12-May-21	A21 S Ramp	L	Rough-legged hawk	2	Yes	No	No	One bird flew into nest with a branch, other bird perched on power pole in vicinity
12-May-21	S. Tank Farm	D	N/A	0	No	No	No	Old nest on tank 6, no birds near it.
13-May-21	A21 North Wall	L	Peregrine falcon	1	No	Yes	No	Did not land, seemed to be looking for possible perches or nest sites
13-May-21	A21 North Wall	D	Rough-legged hawk	1	No	Yes	No	Likely resident of nest on S ramp
14-May-21	A21 North Wall	L	N/A	0	No	No	No	It was quite cold this day, no birds were flying around the pit.
14-May-21	Other	D	Rough-legged hawk	3	No	No	No	No
15-May-21	A21 S Ramp	L	Rough-legged hawk	2	Yes	No	No	Pit ops called in a bird building a second nest on the north side of the south ramp, across from where the old nest was. GC went out to investigate shortly after, could not find any sign of a new nest on the north side of the south ramp. The old nest was still there, with a Rough-legged hawk leaving the nest to join the other in flying over the northwest side of the pit.
16-May-21	A418 S	L	N/A	0	No	No	No	
16-May-21	A418 N	L	Rough-legged hawk	1	No	No	No	Did not perch at any location
16-May-21	A154 NE	D	N/A	0	No	No	No	
16-May-21	A154 NW	D	N/A	0	No	No	No	
16-May-21	Backfill	D	N/A	0	No	No	No	
16-May-21	SS Lineup Wall	D	N/A	0	No	No	No	
16-May-21	Process Plant	D	N/A	0	No	No	No	
16-May-21	Powerhouse 1	D	N/A	0	No	No	No	
16-May-21	Powerhouse 2	D	N/A	0	No	No	No	
16-May-21	S Tank Farm	D	Common raven	1	No	Yes	No	One raven on the stairs of a different tank.
16-May-21	A21 North Wall	L	N/A	0	No	No	No	
16-May-21	A21 East Wall	L	N/A	0	No	No	No	
16-May-21	A21 S Ramp	L	N/A	0	No	No	No	
17-May-21	A21 North Wall	L	N/A	0	No	No	No	
17-May-21	A21 East Wall	L	N/A	0	No	No	No	
17-May-21	A21 South Wall	L	N/A	0	No	No	No	
17-May-21	A21 S Ramp	L	N/A	0	No	Yes	No	
18-May-21	A21 North Wall	L	Peregrine falcon	1	No	Yes	No	Flew around pit and landed on east side
18-May-21	A21 East Wall	L	N/A	0	No	No	No	
18-May-21	A21 South Wall	L	N/A	0	No	No	No	
18-May-21	A21 S Ramp	L	N/A	0	No	Yes	No	
19-May-21	A21 North Wall	L	N/A	0	No	No	No	
19-May-21	A21 East Wall	L	Peregrine falcon	1	No	No	No	PEFA not seen before blast at 15:00 but when returned after blast at 16:00 it was spotted perched on the North wall approx. 100m horizontally from active drill
19-May-21	A21 South Wall	L	Peregrine falcon	1	No	No	No	spotted after blast
19-May-21	A21 S Ramp	L	Rough-legged hawk	1	No	Yes	No	spotted before and after blast
20-May-21	A21 North Wall	D	Peregrine falcon	1	No	Yes	No	Yes
20-May-21	A21 East Wall	D	Peregrine falcon	1	No	Yes	No	Yes
20-May-21	A21 South Wall	L	Peregrine falcon	1	No	Yes	No	Yes
20-May-21	A21 S Ramp	L	N/A	0	No	No	No	
21-May-21	A21 North Wall	L	N/A	0	No	No	No	
21-May-21	A21 East Wall	L	Peregrine falcon	2	No	No	No	Did not see where birds are perched
21-May-21	A21 South Wall	L	Peregrine falcon	1	No	No	No	Did not see where birds are perched
21-May-21	A21 S Ramp	L	Rough-legged hawk	1	No	Yes	No	Couldn't tell with binos and didn't have camera as it was in use for another project
22-May-21	A21 North Wall	L	N/A	0	No	No	No	
22-May-21	A21 East Wall	L	N/A	0	No	No	No	
22-May-21	A21 South Wall	L	N/A	0	No	No	No	
22-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
22-May-21	A21 East Wall	L	Peregrine falcon	1	No	No	No	Spotted ~25min after blast
23-May-21	A418 S	D	N/A	0	No	No	No	
23-May-21	A418 N	D	N/A	0	No	No	No	
23-May-21	A154 NE	D	N/A	0	No	No	No	
23-May-21	A154 NW	D	N/A	0	No	No	No	
23-May-21	Backfill	D	N/A	0	No	No	No	
23-May-21	SS Lineup Wall	L	N/A	0	No	No	No	
23-May-21	Process Plant	D	N/A	0	No	No	No	
23-May-21	Powerhouse 1	D	N/A	0	No	No	No	
23-May-21	Powerhouse 2	D	N/A	0	No	No	No	
23-May-21	S Tank Farm	L	Common raven	5	Yes	No	3	2 adults and 3? Chicks. Chicks visible when adult was on nest
23-May-21	A21 North Wall	L	N/A	0	No	No	No	
23-May-21	A21 East Wall	L	N/A	0	No	No	No	
23-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	0	Sitting on nest, rain/snow
23-May-21	A21 South Wall	L	N/A	0	No	No	No	
24-May-21	A21 North Wall	L	Peregrine falcon	1	No	Yes	No	Yes

Date	Area	Method Used (D/L)	Bird Species	Number of Observed	Confirm Active Nest (Y/N)	Potential Nesting (Y/N)	Young/Fledgings (#,U,N)	Comments
24-May-21	A21 East Wall	D	Peregrine falcon	1	No	Yes	No	Not a good nest site - may have been sheltering from wind
24-May-21	A21 South Wall	D	N/A	0	No	No	No	
24-May-21	A21 S Ramp	D	Rough-legged hawk	1	Yes	No	No	No
25-May-21	A21 North Wall	L	N/A	0	No	No	No	
25-May-21	A21 East Wall	D	N/A	0	No	No	No	
25-May-21	A21 South Wall	D	N/A	0	No	No	No	
25-May-21	A21 S Ramp	D	Rough-legged hawk	1	Yes	No	No	No
25-May-21	A21 S Ramp	L	Peregrine falcon	2	No	Yes	No	No obvious nest site, some whitewash noted
26-May-21	A21 North Wall	L	N/A	0	No	No	No	
26-May-21	A21 East Wall	D	N/A	0	No	No	No	
26-May-21	A21 South Wall	D	N/A	0	No	No	No	
26-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
27-May-21	A21 South Wall	D	N/A	0	No	No	No	No
27-May-21	A21 East Wall	D	N/A	0	No	No	No	No
27-May-21	A21 North Wall	L	N/A	0	No	No	No	No
27-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
28-May-21	A21 South Wall	D	Rough-legged hawk	1	No	Yes	No	Another PEFA appeared and was dive bombing the Rough-legged hawk
28-May-21	A21 East Wall	D	N/A	0	No	No	No	
28-May-21	A21 North Wall	L	N/A	0	No	No	No	
28-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
29-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
29-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
29-May-21	A21 North Wall	L	N/A	0	No	No	No	
29-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
30-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
30-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
30-May-21	A21 North Wall	D	N/A	0	No	No	No	
30-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
30-May-21	A154 N	L	Rough-legged hawk	3	No	Yes	No	No
30-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
30-May-21	A154 N	L	Rough-legged hawk	3	No	Yes	No	No
30-May-21	A154 S	L	N/A	0	No	No	No	
30-May-21	A418 N	L	N/A	0	No	No	No	
30-May-21	A418 S	L	N/A	0	No	No	No	
30-May-21	S. Tank Farm	D	Common raven	2	Yes	No	Unknown	No
30-May-21	Process Plant	D	N/A	0	No	No	No	
30-May-21	Powerhouse 1	D	N/A	0	No	No	No	
30-May-21	Powerhouse 2	D	N/A	0	No	No	No	
30-May-21	Boiler House	D	N/A	0	No	No	No	
30-May-21	SS Lineup Wall	D	Rough-legged hawk	1	Yes	No	No	No
30-May-21	Backfill	D	N/A	0	No	No	No	
31-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
31-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
31-May-21	A21 North Wall	D	N/A	0	No	No	No	
31-May-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
01-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
01-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
01-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
01-Jun-21	A21 S Ramp	D	Rough-legged hawk	1	Yes	No	No	No
02-Jun-21	A21 South Wall	D	N/A	0	No	No	No	
02-Jun-21	A21 East Wall	D	N/A	0	No	No	No	
02-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
02-Jun-21	A21 S Ramp	D	Rough-legged hawk	1	Yes	No	No	No
03-Jun-21	A21 South Wall	D	N/A	0	No	No	No	Before blast
03-Jun-21	A21 East Wall	D	N/A	0	No	No	No	Before blast
03-Jun-21	A21 North Wall	L	N/A	0	No	No	No	Before blast
03-Jun-21	A21 S Ramp	D	Rough-legged hawk	1	Yes	No	No	Before blast
03-Jun-21	A21 South Wall	D	N/A	0	No	No	No	After blast
03-Jun-21	A21 East Wall	D	N/A	0	No	No	No	After blast
03-Jun-21	A21 North Wall	L	N/A	0	No	No	No	After blast
03-Jun-21	A21 S Ramp	D	Rough-legged hawk	1	Yes	No	No	After blast
04-Jun-21	A21 South Wall	D	N/A	0	No	No	No	
04-Jun-21	A21 East Wall	D	N/A	0	No	No	No	
04-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
04-Jun-21	A21 S Ramp	D	Rough-legged hawk	1	Yes	No	No	It was raining, windy all day and the hawk was in its nest
05-Jun-21	A21 South Wall	D	N/A	0	No	No	No	Before blast
05-Jun-21	A21 East Wall	D	N/A	0	No	No	No	Before blast
05-Jun-21	A21 North Wall	L	N/A	0	No	No	No	Before blast
05-Jun-21	A21 S Ramp	D	Rough-legged hawk	1	Yes	No	No	Before blast, low visablity in pit due to foggy weather conditions
05-Jun-21	A21 South Wall	L	N/A	0	No	No	No	After blast
05-Jun-21	A21 East Wall	D	N/A	0	No	No	No	After blast
05-Jun-21	A21 North Wall	L	Rough-legged hawk	1	No	No	No	After blast
05-Jun-21	A21 S Ramp	L	N/A	0	No	Yes	No	After blast
06-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
06-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
06-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
06-Jun-21	A21 S Ramp	D	Rough-legged hawk	1	Yes	No	No	A bit of fog/drizzling in area
07-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
07-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
07-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
07-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	No	No	No	light snow
07-Jun-21	A418 S	L	Rough-legged hawk	1	No	Yes	No	Light snow
07-Jun-21	A418 N	L	N/A	0	No	No	No	
07-Jun-21	A154 NE	L	N/A	0	No	No	No	
07-Jun-21	A154 NW	L	N/A	0	No	No	No	
07-Jun-21	Backfill	D	N/A	0	No	No	No	
07-Jun-21	SS Lineup Wall	D	N/A	0	No	No	No	
07-Jun-21	Process Plant	D	N/A	0	No	No	No	
07-Jun-21	Powerhouse 1	D	N/A	0	No	No	No	
07-Jun-21	Powerhouse 2	D	N/A	0	No	No	No	
07-Jun-21	S Tank Farm	D	Common raven	1	Yes	No	No	No
08-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
08-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
08-Jun-21	A21 South Wall	-	N/A	0	No	No	No	

Pit Wall Mine Infrastructure Raptor Nesting

Date	Area	Method Used (D/L)	Bird Species	Number of Observed	Confirm Active Nest (Y/N)	Potential Nesting (Y/N)	Young/Fledgings (#,U,N)	Comments
08-Jun-21	A21 S Ramp	L	Rough-legged hawk	2	Yes	No	No	1 Rough-legged hawk flew to mate in nest, then left to perch on power pole nearby
08-Jun-21	S Tank Farm	D	Common raven	1	Yes	No	No	1 Common raven in nest
09-Jun-21	A21 North Wall	-	N/A	0	No	No	No	
09-Jun-21	A21 East Wall	-	N/A	0	No	No	No	
09-Jun-21	A21 South Wall	-	N/A	0	No	No	No	
09-Jun-21	A21 S Ramp	-	N/A	0	No	No	No	
09-Jun-21	S Tank Farm	-	N/A	0	No	No	No	
10-Jun-21	A21 North Wall	L	Rough-legged hawk	1	No	No	No	No
10-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
10-Jun-21	A21 South Wall	-	N/A	0	No	No	No	
10-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
10-Jun-21	S Tank Farm	D	Common raven	1	Yes	No	No	No
11-Jun-21	A21 North Wall	-	N/A	0	No	No	No	
11-Jun-21	A21 East Wall	-	N/A	0	No	No	No	
11-Jun-21	A21 South Wall	-	N/A	0	No	No	No	
11-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
11-Jun-21	S Tank Farm	L	Common raven	2	Yes	No	No	No
12-Jun-21	A21 North Wall	-	N/A	0	No	No	No	
12-Jun-21	A21 East Wall	-	N/A	0	No	No	No	
12-Jun-21	A21 South Wall	-	N/A	0	No	No	No	
12-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
13-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
13-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
13-Jun-21	A21 South Wall	-	N/A	0	No	No	No	
13-Jun-21	A21 S Ramp	L	Rough-legged hawk	2	Yes	No	No	No
13-Jun-21	A418 S	L	N/A	0	No	Yes	No	Whitewash on wall near rockslide on NW side of pit
13-Jun-21	A418 N	L	Peregrine falcon	1	No	Yes	No	Whitewash on wall near rockslide on NW side of pit
13-Jun-21	A154 NE	L	N/A	0	No	No	No	
13-Jun-21	A154 NW	L	N/A	0	No	No	No	
13-Jun-21	Backfill	D	N/A	0	No	No	No	
13-Jun-21	SS Lineup Wall	D	Rough-legged hawk	2	Yes	No	No	2 birds observed in nest. Male flew towards nest to join female incubating
13-Jun-21	Process Plant	D	N/A	0	No	No	No	
13-Jun-21	Powerhouse 1	D	N/A	0	No	No	No	
13-Jun-21	Powerhouse 2	D	N/A	0	No	No	No	
13-Jun-21	S Tank Farm	D	Common raven	3	Yes	No	Unknown	There were 4 definitely ravens in the nest.
14-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
14-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
14-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
14-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	
14-Jun-21	S Tank Farm	L	Common raven	4	Yes	No	Unknown	3 ravens in the nest, and one jumping on the stairs.
15-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
15-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
15-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
15-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
15-Jun-21	S Tank Farm	L	Common raven	4	Yes	No	Unknown	4 ravens in the nest.
16-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
16-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
16-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
16-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
16-Jun-21	S Tank Farm	L	Common raven	1	Yes	No	No	1 ravens in the nest
17-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
17-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
17-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
17-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
17-Jun-21	S Tank Farm	L	Common raven	2	Yes	No	Unknown	2 ravens in nest
19-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
19-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
19-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
19-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No
19-Jun-21	S Tank Farm	L	Common raven	3	Yes	No	Unknown	3 ravens in nest
19-Jun-21	Other	L	N/A	0	No	No	No	
20-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
20-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
20-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
20-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	
20-Jun-21	S Tank Farm	L	Common raven	3	Yes	No	No	
20-Jun-21	Other	L	N/A	0	No	No	No	
20-Jun-21	A21 North Wall	Camera	Rough-legged hawk	1	No	No	No	No
21-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
21-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
21-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
21-Jun-21	A21 S Ramp	L	N/A	0	No	No	No	
21-Jun-21	S Tank Farm	L	Common raven	4	Yes	No	No	No
22-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
22-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
22-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
22-Jun-21	A21 S Ramp	L	N/A	0	No	No	No	
22-Jun-21	S Tank Farm	L	Common raven	4	Yes	No	No	No
23-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
23-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
23-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
23-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	1 Rough-legged hawk
23-Jun-21	S Tank Farm	L	Common raven	4	Yes	No	Unknown	4 ravens in nest
24-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
24-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
24-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
24-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	1 Rough-legged hawk
24-Jun-21	S Tank Farm	L	Common raven	4	Yes	No	Unknown	4 Ravens in nest
25-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
25-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
25-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
25-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	1 Rough-legged hawk
25-Jun-21	S Tank Farm	L	Common raven	1	Yes	No	No	1 Common raven

Pit Wall Mine Infrastructure Raptor Nesting

Date	Area	Method Used (D/L)	Bird Species	Number of Observed	Confirm Active Nest (Y/N)	Potential Nesting (Y/N)	Young/Fledgings (#,U,N)	Comments
26-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
26-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
26-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
26-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	1 Rough-legged hawk
26-Jun-21	S Tank Farm	L	Common raven	6	No	Yes	No	6 Common raven sitting on bearm outside of south tank farm.
27-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
27-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
27-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
27-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	1 Rough-legged hawk
27-Jun-21	S Tank Farm	L	Common raven	4	Yes	No	Unknown	4 ravens in nest
27-Jun-21	A154 N	L	N/A	0	No	No	No	
27-Jun-21	A154 S	L	N/A	0	No	No	No	
27-Jun-21	A418 N	L	N/A	0	No	No	No	
27-Jun-21	A418 S	L	N/A	0	No	Yes	No	
27-Jun-21	S. Tank Farm	D	N/A	0	No	No	No	
27-Jun-21	Process Plant	D	N/A	0	No	Yes	No	
27-Jun-21	Powerhouse 1	D	N/A	0	No	Yes	No	
27-Jun-21	Powerhouse 2	D	N/A	0	No	Yes	No	
27-Jun-21	Boiler House	D	N/A	0	No	No	No	
27-Jun-21	SS Line up Wall	D	N/A	0	No	No	No	
27-Jun-21	Backfill	D	N/A	0	No	No	No	
28-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
28-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
28-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
28-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	1 Rough-legged hawk
28-Jun-21	S Tank Farm	-	N/A	0	No	No	No	
29-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
29-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
29-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
29-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	1 Rough-legged hawk
29-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
29-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	1 Rough-legged hawk
29-Jun-21	S Tank Farm	-	N/A	0	No	No	No	
30-Jun-21	A21 North Wall	L	N/A	0	No	No	No	
30-Jun-21	A21 East Wall	L	N/A	0	No	No	No	
30-Jun-21	A21 South Wall	L	N/A	0	No	No	No	
30-Jun-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	1 Rough-legged hawk but no camera to take picture
30-Jun-21	S Tank Farm	-	N/A	0	No	No	No	
01-Jul-21	A21 North Wall	-	N/A	0	No	No	No	No monitoring due to poor weather conditions (foggy)
01-Jul-21	A21 East Wall	-	N/A	0	No	No	No	" "
01-Jul-21	A21 South Wall	-	N/A	0	No	No	No	" "
01-Jul-21	A21 S Ramp	-	N/A	0	No	No	No	" "
01-Jul-21	S Tank Farm	-	N/A	0	No	No	No	" "
02-Jul-21	A21 North Wall	L	N/A	0	No	No	No	
02-Jul-21	A21 East Wall	L	N/A	0	No	No	No	
02-Jul-21	A21 South Wall	L	N/A	0	No	No	No	
02-Jul-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	No Rough-legged hawk on nest
02-Jul-21	S Tank Farm	-	N/A	0	No	No	No	
04-Jul-21	A21 North Wall	L	N/A	0	No	No	No	
04-Jul-21	A21 East Wall	L	N/A	0	No	No	No	
04-Jul-21	A21 South Wall	L	N/A	0	No	No	No	
04-Jul-21	A21 S Ramp	L	Rough-legged hawk	4	Yes	No	3	3? Fledglings
04-Jul-21	A418 S	L	N/A	0	No	No	No	
04-Jul-21	A418 N	L	N/A	0	No	No	No	
04-Jul-21	A154 NE	L	N/A	0	No	No	No	
04-Jul-21	A154 NW	L	Rough-legged hawk	1	No	No	No	Lots of white wash and what looked like a Rough-legged hawk perched on rock face
04-Jul-21	Backfill	D	N/A	0	No	No	No	
04-Jul-21	SS Lineup Wall	D	Rough-legged hawk	1	Yes	No	No	No
04-Jul-21	Process Plant	D	N/A	0	No	No	No	
04-Jul-21	Powerhouse 1	D	N/A	0	No	No	No	
04-Jul-21	Powerhouse 2	D	N/A	0	No	No	No	
04-Jul-21	S Tank Farm	L	Common raven	2	Yes	No	No	No
10-Jul-21	A21 North Wall	L	N/A	0	No	No	No	
10-Jul-21	A21 East Wall	L	N/A	0	No	No	No	
10-Jul-21	A21 South Wall	L	Peregrine falcon	1	No	No	No	No
10-Jul-21	A21 S Ramp	L	Rough-legged hawk	1	Yes	No	No	Perched next to the Hawk's nest
11-Jul-21	A418 S	L	N/A	0	No	No	No	3 chicks in nest, 1 adult perched near nest
11-Jul-21	A418 N	L	N/A	0	No	No	No	2 chicks in nest, 1 adult perched near nest
11-Jul-21	A154 NE	L	N/A	0	No	No	No	3 chicks near nest
11-Jul-21	A154 NW	L	N/A	0	No	Yes	No	Yes
11-Jul-21	Backfill	D	N/A	0	No	No	No	
11-Jul-21	SS Lineup Wall	L	Rough-legged hawk	5	Yes	No	4	
11-Jul-21	Process Plant	D	N/A	0	No	No	No	
11-Jul-21	Powerhouse 1	D	N/A	0	No	No	No	
11-Jul-21	Powerhouse 2	D	N/A	0	No	No	No	
11-Jul-21	S Tank Farm	L	N/A	0	No	No	No	
11-Jul-21	A21 North Wall	L	N/A	0	No	No	No	
11-Jul-21	A21 East Wall	L	N/A	0	No	No	No	
11-Jul-21	A21 South Wall	L	N/A	0	No	No	No	
11-Jul-21	A21 S Ramp	L	Rough-legged hawk	3	Yes	No	3	No
18-Jul-21	A418 S	-	N/A	0	No	No	No	
18-Jul-21	A418 N	-	N/A	0	No	No	No	
18-Jul-21	A154 NE	-	N/A	0	No	No	No	
18-Jul-21	A154 NW	-	N/A	0	No	No	No	
18-Jul-21	Backfill	D	N/A	0	No	No	No	
18-Jul-21	SS Lineup Wall	D	Rough-legged hawk	4	Yes	No	3	No
18-Jul-21	Process Plant	D	N/A	0	No	No	No	
18-Jul-21	Powerhouse 1	D	N/A	0	No	No	No	
18-Jul-21	Powerhouse 2	D	N/A	0	No	No	No	
18-Jul-21	S Tank Farm	-	N/A	0	No	No	No	
18-Jul-21	A21 North Wall	L	N/A	0	No	No	No	
18-Jul-21	A21 East Wall	L	N/A	0	No	No	No	
18-Jul-21	A21 South Wall	L	N/A	0	No	No	No	
18-Jul-21	A21 S Ramp	L	Rough-legged hawk	3	Yes	No	2	No
24-Jul-21	A418 S	L	N/A	0	No	No	No	
24-Jul-21	A418 N	L	N/A	0	No	No	No	
24-Jul-21	A154 NE	L	N/A	0	No	No	No	
24-Jul-21	A154 NW	L	N/A	0	No	No	No	
24-Jul-21	Backfill	D	N/A	0	No	No	No	
24-Jul-21	SS Lineup Wall	D	Rough-legged hawk	3	Yes	No	3	No
24-Jul-21	Process Plant	D	N/A	0	No	No	No	

Pit Wall Mine Infrastructure Raptor Nesting

Date	Area	Method Used (D/L)	Bird Species	Number of Observed	Confirm Active Nest (Y/N)	Potential Nesting (Y/N)	Young/Fledgings (#,U,N)	Comments
24-Jul-21	Powerhouse 1	D	N/A	0	No	No	No	
24-Jul-21	Powerhouse 2	D	N/A	0	No	No	No	
24-Jul-21	S Tank Farm	D	Common raven	3	Yes	No	2	No
26-Jul-21	A21 North Wall	-	N/A	0	No	No	No	
26-Jul-21	A21 East Wall	-	N/A	0	No	No	No	
26-Jul-21	A21 South Wall	-	N/A	0	No	No	No	
26-Jul-21	A21 S Ramp	-	N/A	0	No	No	No	
02-Aug-21	A154 N	L	Rough-legged hawk	1	No	Yes	No	Yes
02-Aug-21	A154 S	L	N/A	0	No	No	No	
02-Aug-21	A418 N	L	N/A	0	No	No	No	
02-Aug-21	A418 S	L	Rough-legged hawk	1	No	No	No	No
02-Aug-21	S. Tank Farm	D	Common raven	0	Yes	No	No	
02-Aug-21	Process Plant	D	N/A	0	No	No	No	
02-Aug-21	Powerhouse 1	D	N/A	0	No	No	No	
02-Aug-21	Powerhouse 2	D	N/A	0	No	No	No	
02-Aug-21	Boiler House	D	N/A	0	No	No	No	
02-Aug-21	SS Lineup Wall	D	Rough-legged hawk	4	Yes	No	3	No
02-Aug-21	Backfill	D	American robin	2	Yes	No	2	Two chicks in nest
08-Aug-21	A154 NE	L	N/A	0	No	No	No	
08-Aug-21	A154 NW	L	N/A	0	No	No	No	
08-Aug-21	A418 N	L	N/A	0	No	No	No	
08-Aug-21	A418 S	L	N/A	0	No	No	No	
08-Aug-21	S Tank Farm	D	N/A	0	No	No	No	
08-Aug-21	Process Plant	D	N/A	0	No	No	No	
08-Aug-21	Powerhouse 1	D	N/A	0	No	No	No	
08-Aug-21	Powerhouse 2	D	N/A	0	No	No	No	
08-Aug-21	SS Lineup Wall	D	Rough-legged hawk	3	Yes	No	3	No
08-Aug-21	Backfill	L	American robin	2	Yes	No	1	Pictures taken
08-Aug-21	A21 North Wall	L	N/A	0	No	No	No	
08-Aug-21	A21 East Wall	L	N/A	0	No	No	No	
08-Aug-21	A21 South Wall	D	Rough-legged hawk	2	No	No	1	Pictures taken
08-Aug-21	A21 S Ramp	D	Rough-legged hawk	1	Yes	No	1	Pictures taken
14-Aug-21	A154 NE	L	N/A	2	No	No	No	No
14-Aug-21	A154 NW	L	N/A	0	No	No	No	
14-Aug-21	A418 N	L	N/A	0	No	No	No	
14-Aug-21	A418 S	L	N/A	0	No	No	No	
14-Aug-21	S Tank Farm	D	N/A	0	No	No	No	
14-Aug-21	Process Plant	D	N/A	0	No	No	No	
14-Aug-21	Powerhouse 1	D	N/A	0	No	No	No	
14-Aug-21	Powerhouse 2	D	N/A	0	No	No	No	
14-Aug-21	SS Lineup Wall	D	Rough-legged hawk	3	No	No	3	3 fledgings perched on rocks eating
14-Aug-21	Backfill	L	N/A	0	No	No	No	1 Robin chick deceased, found on road next to nest, took pictures
14-Aug-21	A21 North Wall	L	N/A	0	No	No	No	
14-Aug-21	A21 East Wall	L	N/A	0	No	No	No	
14-Aug-21	A21 South Wall	D	N/A	0	No	No	No	
14-Aug-21	A21 S Ramp	D	N/A	0	No	No	No	Took picture of empty RHLA Nest
23-Aug-21	A154 NE	L	N/A	0	No	No	No	
23-Aug-21	A154 NW	L	Rough-legged hawk	1	No	No	No	Rough legged Hawk flying over A154 Pit
23-Aug-21	A418 N	L	N/A	0	No	No	No	
23-Aug-21	A418 S	L	N/A	0	No	No	No	
23-Aug-21	S Tank Farm	D	N/A	0	No	No	No	
23-Aug-21	Process Plant	D	N/A	0	No	No	No	
23-Aug-21	Powerhouse 1	D	N/A	0	No	No	No	
23-Aug-21	Powerhouse 2	D	N/A	0	No	No	No	
23-Aug-21	SS Lineup Wall	D	N/A	0	No	No	No	
23-Aug-21	Backfill	D	N/A	0	No	No	No	
23-Aug-21	A21 North Wall	L	N/A	0	No	No	No	
23-Aug-21	A21 East Wall	L	N/A	0	No	No	No	
23-Aug-21	A21 South Wall	L	N/A	0	No	No	No	
23-Aug-21	A21 S Ramp	D	N/A	0	No	No	No	
29-Aug-21	A154 NE	L	N/A	0	No	No	No	
29-Aug-21	A154 NW	L	N/A	0	No	No	No	
29-Aug-21	A418 N	L	N/A	0	No	No	No	
29-Aug-21	A418 S	L	N/A	0	No	No	No	
29-Aug-21	S Tank Farm	D	N/A	0	No	No	No	
29-Aug-21	Process Plant	D	N/A	0	No	No	No	
29-Aug-21	Powerhouse 1	D	N/A	0	No	No	No	
29-Aug-21	Powerhouse 2	D	N/A	0	No	No	No	
29-Aug-21	SS Lineup Wall	D	N/A	0	No	No	No	
29-Aug-21	Backfill	D	N/A	0	No	No	No	
29-Aug-21	A21 North Wall	L	N/A	0	No	No	No	
29-Aug-21	A21 East Wall	L	N/A	0	No	No	No	
29-Aug-21	A21 South Wall	L	N/A	0	No	No	No	
29-Aug-21	A21 S Ramp	D	N/A	0	No	No	No	
05-Sep-21	A154 N	L	Rough-legged hawk	3	No	No	No	No
05-Sep-21	A154 S	L	N/A	0	No	No	No	
05-Sep-21	A418 N	L	N/A	0	No	No	No	
05-Sep-21	A418 S	L	N/A	0	No	No	No	
05-Sep-21	S. Tank Farm	D	N/A	0	No	No	No	
05-Sep-21	Process Plant	D	N/A	0	No	No	No	
05-Sep-21	Powerhouse 1	D	N/A	0	No	No	No	
05-Sep-21	Powerhouse 2	D	N/A	0	No	No	No	
05-Sep-21	Boiler House	D	N/A	0	No	No	No	
05-Sep-21	SS Line up Wall	D	N/A	0	No	No	No	
05-Sep-21	Backfill	D	N/A	0	No	No	No	

APPENDIX L

Camp Population

Month	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
January	-	-	-	389	429	443	534	593	866	692	495	603	627	542	489	510	542	565	578	562	583	550
February	-	-	-	424	408	512	671	682	973	702	545	661	647	574	524	557	573	615	627	579	617	571
March	63	402	576	413	453	585	748	729	1010	712	552	672	617	559	508	556	572	635	620	580	578	584
April	-	-	-	318	570	678	743	755	1001	679	548	648	595	553	495	543	580	684	590	570	546	567
May	-	-	-	333	470	682	871	854	1021	645	610	634	618	561	509	552	642	718	614	594	616	581
June	189	523	751	326	392	746	821	873	1,028	600	612	641	611	552	500	561	694	698	587	606	606	574
July	-	-	-	443	396	736	819	857	600	378	589	588	607	524	465	554	701	692	574	583	606	545
August	-	-	-	425	399	745	768	868	990	335	623	607	625	524	442	562	703	651	562	584	597	546
September	211	681	879	432	408	755	708	943	993	526	639	648	608	547	466	586	704	670	561	609	585	563
October	-	-	-	457	390	726	714	950	1,042	524	620	646	577	546	481	564	664	649	563	589	565	550
November	-	-	-	379	425	670	704	984	1,043	536	608	648	579	515	498	550	627	618	562	604	569	566
December	287	881	766	-	386	611	524	696	1,030	453	510	546	464	452	460	498	490	518	518	545	551	505
Maximum	211	681	879	433	408	755	821	943	1,028	600	639	672	647	574	500	562	703	698	587	609	606	584

APPENDIX M

Waste Inspection Summary

Date	Location	Attractants				Wildlife				Wildlife Sign			
		Attractants Present?	Items	Number of Items Present	Comments	Wildlife Present?	Species	# of Individuals Observed	Wildlife Comments	Wildlife Sign Observed?	Wildlife Sign Observed Species	Wildlife Sign Type	Wildlife Sign Observed Comments
2021-01-03	A21	Yes	Drink Containers Recyclable, Oily Rags	8		No	-	-	-	No	-	-	-
2021-01-06	A21	No	-	0		No	-	-	-	No	-	-	-
2021-01-10	A21	Yes	Gloves	2		No	-	-	-	No	-	-	-
2021-01-13	A21	No	-	0		No	-	-	-	No	-	-	-
2021-01-17	A21	Yes	Gloves, Oily Rags	2		No	-	-	-	No	-	-	-
2021-01-20	A21	Yes	Oily Rags	1		No	-	-	-	No	-	-	-
2021-01-24	A21	No	-	0		No	-	-	-	No	-	-	-
2021-01-27	A21	Yes	Oily Rags	1		No	-	-	-	No	-	-	-
2021-01-31	A21	No	-	0		No	-	-	-	No	-	-	-
2021-02-03	A21	Yes	Drink Containers Recyclable, Gloves, Oily Rags	5		No	-	-	-	No	-	-	-
2021-02-07	A21	Yes	Oil Contaminated Waste	2		No	-	-	-	No	-	-	-
2021-02-10	A21	No	-	0		No	-	-	-	No	-	-	-
2021-02-14	A21	Yes	Oily Rags	6		No	-	-	-	No	-	-	-
2021-02-17	A21	Yes	Drink Containers Recyclable, Gloves, Oily Rags	12		No	-	-	-	No	-	-	-
2021-02-22	A21	No	-	0		No	-	-	-	No	-	-	-
2021-02-28	A21	Yes	Gloves, Other	2		No	-	-	-	No	-	-	-
2021-03-07	A21	Yes	Oily Rags	3		No	-	-	-	No	-	-	-
2021-03-10	A21	No	-	0		No	-	-	-	No	-	-	-
2021-03-13	A21	No	-	0		No	-	-	-	No	-	-	-
2021-03-17	A21	Yes	Oily Rags	20		No	-	-	-	No	-	-	-
2021-03-24	A21	Yes	Cigarette Packaging, Gloves, Oil Contaminated Waste, Oily Rags	25		No	-	-	-	No	-	-	-
2021-03-28	A21	Yes	Cigarette Packaging, Gloves, Oily Rags	35		No	-	-	-	No	-	-	-
2021-03-31	A21	No	-	0		No	-	-	-	No	-	-	-
2021-04-07	A21	Yes	Oily Rags	3		No	-	-	-	No	-	-	-
2021-04-18	A21	No	-	0		No	-	-	-	No	-	-	-
2021-04-21	A21	Yes	Gloves, Oily Rags	7		No	-	-	-	No	-	-	-
2021-04-28	A21	No	-	0		No	-	-	-	No	-	-	-
2021-05-05	A21	Yes	Oily Rags	3		No	-	-	-	No	-	-	-

Date	Location	Attractants				Wildlife				Wildlife Sign			
		Attractants Present?	Items	Number of Items Present	Comments	Wildlife Present?	Species	# of Individuals Observed	Wildlife Comments	Wildlife Sign Observed?	Wildlife Sign Observed Species	Wildlife Sign Type	Wildlife Sign Observed Comments
2021-05-13	A21	Yes	Aerosol Cans	1		No	-	-	-	No	-	-	-
2021-05-19	A21	Yes	Oily Rags	20		No	-	-	-	No	-	-	-
2021-05-26	A21	Yes	Gloves, Oil Contaminated Waste	5		No	-	-	-	No	-	-	-
2021-06-02	A21	Yes	Drink Containers Recyclable, Oily Rags, Other	8	Overalls, masks	No	-	-	-	No	-	-	-
2021-06-10	A21	Yes	Drink Containers Recyclable, Food Packaging, Gloves, Oily Rags	16		No	-	-	-	No	-	-	-
2021-06-16	A21	No	-	0		No	-	-	-	No	-	-	-
2021-06-23	A21	Yes	Gloves, Oily Rags	4		No	-	-	-	No	-	-	-
2021-07-01	A21	Yes	Oil Contaminated Waste, Oil Products and Containers, Oily Rags	4		No	-	-	-	No	-	-	-
2021-07-07	A21	Yes	Cigarette Packaging, Gloves, Oily Rags	25		No	-	-	-	No	-	-	-
2021-07-14	A21	Yes	Oily Rags, Other	7	Cardboard in non-burnable bin	No	-	-	-	No	-	-	-
2021-07-21	A21	Yes	Cigarette Packaging, Drink Containers Recyclable, Gloves, Oil Contaminated Waste, Oily Rags	17		No	-	-	-	No	-	-	-
2021-07-28	A21	Yes	Oil Products and Containers, Oily Rags	3		No	-	-	-	No	-	-	-
2021-08-04	A21	Yes	Aerosol Cans, Drink Containers Recyclable, Oil Contaminated Waste, Oil Products and Containers, Oily Rags	10		No	-	-	-	No	-	-	-
2021-08-11	A21	Yes	Gloves, Oily Rags, Other	3	Cardboard in non-burnable bin	No	-	-	-	No	-	-	-
2021-08-18	A21	No	-	0		No	-	-	-	No	-	-	-
2021-08-25	A21	Yes	Aerosol Cans	1		No	-	-	-	No	-	-	-
2021-09-01	A21	No	-	0		No	-	-	-	No	-	-	-
2021-09-09	A21	No	-	0		No	-	-	-	No	-	-	-
2021-09-15	A21	No	-	0		No	-	-	-	No	-	-	-
2021-09-25	A21	Yes	Oil Products and Containers, Oily Rags	8		No	-	-	-	No	-	-	-

Date	Location	Attractants				Wildlife				Wildlife Sign			
		Attractants Present?	Items	Number of Items Present	Comments	Wildlife Present?	Species	# of Individuals Observed	Wildlife Comments	Wildlife Sign Observed?	Wildlife Sign Observed Species	Wildlife Sign Type	Wildlife Sign Observed Comments
2021-09-29	A21	Yes	Gloves	1		No	-	-	-	No	-	-	-
2021-10-06	A21	No	-	0		No	-	-	-	No	-	-	-
2021-10-14	A21	Yes	Gloves, Oily Rags	28		No	-	-	-	No	-	-	-
2021-10-20	A21	Yes	Gloves, Oily Rags	13		No	-	-	-	No	-	-	-
2021-10-27	A21	No	-	0		No	-	-	-	No	-	-	-
2021-11-03	A21	No	-	0		No	-	-	-	No	-	-	-
2021-11-10	A21	No	-	0		No	-	-	-	No	-	-	-
2021-11-17	A21	No	-	0		No	-	-	-	No	-	-	-
2021-11-24	A21	No	-	0		No	-	-	-	No	-	-	-
2021-12-02	A21	No	-	0		No	-	-	-	No	-	-	-
2021-12-08	A21	Yes	Cigarette Packaging, Gloves, Oily Rags	10		No	-	-	-	No	-	-	-
2021-12-15	A21	No	-	0		No	-	-	-	No	-	-	-
2021-12-24	A21	No	-	0		No	-	-	-	No	-	-	-
2021-12-29	A21	No	-	0		No	-	-	-	No	-	-	-
2021-01-03	Landfill	Yes	Cigarette Packaging, Drink Containers Recyclable, Food, Food Packaging, Gloves, Oil Products and Containers, Oily Rags	33		No	-	-	-	Yes	Red fox	Tracks	Fox tracks
2021-01-12	Landfill	Yes	Drink Containers Recyclable, Gloves	4		No	-	-	-	Yes	Red fox, arctic hare	Tracks	Fox and hare tracks
2021-01-17	Landfill	Yes	Aerosol Cans, Gloves	2		No	-	-	-	Yes	Red fox	Tracks	Fox tracks
2021-01-20	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-01-24	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-01-27	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-01-31	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-02-03	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-02-07	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-02-10	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-02-14	Landfill	Yes	Food Packaging, Gloves, Oil Products and Containers, Oily Rags	15		No	-	-	-	Yes	Arctic hare	Tracks	Hare tracks
2021-02-17	Landfill	Yes	Gloves, Oily Rags	3		No	-	-	-	No	-	-	-
2021-02-23	Landfill	Yes	Drink Containers Recyclable	1		No	-	-	-	Yes	Red fox	Tracks	Fox tracks

Date	Location	Attractants				Wildlife				Wildlife Sign			
		Attractants Present?	Items	Number of Items Present	Comments	Wildlife Present?	Species	# of Individuals Observed	Wildlife Comments	Wildlife Sign Observed?	Wildlife Sign Observed Species	Wildlife Sign Type	Wildlife Sign Observed Comments
2021-02-28	Landfill	Yes	Cigarette Packaging, Drink Containers Recyclable, Gloves, Oily Rags	26		No	-	-	-	Yes	Red fox	Tracks	Fox tracks
2021-03-07	Landfill	Yes	Gloves, Oily Rags	7		No	-	-	-	No	-	-	-
2021-03-10	Landfill	Yes	Oily Rags	3		No	-	-	-	No	-	-	-
2021-03-13	Landfill	Yes	Other	1	Jacket	No	-	-	-	No	-	-	-
2021-03-17	Landfill	No	-	0		No	-	-	-	Yes	Red fox	Tracks	Fox tracks
2021-03-24	Landfill	Yes	Drink Containers Recyclable, Gloves, Oily Rags	35		No	-	-	-	No	-	-	-
2021-03-28	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-03-31	Landfill	Yes	Oil Contaminated Waste	2		No	-	-	-	No	-	-	-
2021-04-07	Landfill	Yes	Gloves, Oil Products and Containers	2		No	-	-	-	No	-	-	-
2021-04-18	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-04-21	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-04-28	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-05-05	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-05-19	Landfill	Yes	Drink Containers Recyclable, Gloves, Oily Rags	26		No	-	-	-	No	-	-	-
2021-05-26	Landfill	Yes	Aerosol Cans, Cigarette Packaging, Drink Containers Recyclable, Gloves, Oil Contaminated Waste, Oil Products and Containers, Oily Rags	41		No	-	-	-	No	-	-	-
2021-06-02	Landfill	Yes	Cigarette Packaging, Drink Containers Recyclable, Gloves, Oily Rags	11		No	-	-	-	No	-	-	-
2021-06-10	Landfill	Yes	Drink Containers Recyclable, Food, Food Packaging, Gloves, Oily Rags	11		No	-	-	-	No	-	-	-

Date	Location	Attractants				Wildlife				Wildlife Sign			
		Attractants Present?	Items	Number of Items Present	Comments	Wildlife Present?	Species	# of Individuals Observed	Wildlife Comments	Wildlife Sign Observed?	Wildlife Sign Observed Species	Wildlife Sign Type	Wildlife Sign Observed Comments
2021-06-16	Landfill	Yes	Aerosol Cans, Cigarette Packaging, Drink Containers Recyclable, Food, Food Packaging, Gloves, Oily Rags	25		No	-	-	-	No	-	-	-
2021-06-23	Landfill	Yes	Cigarette Packaging, Drink Containers Recyclable, Food, Food Packaging, Gloves, Oil Contaminated Waste, Oil Products and Containers, Oily Rags	37		No	-	-	-	No	-	-	-
2021-07-01	Landfill	Yes	Aerosol Cans, Cigarette Packaging, Food, Food Packaging, Gloves, Oil Contaminated Waste, Oily Rags	19		No	-	-	-	No	-	-	-
2021-07-07	Landfill	Yes	Drink Containers Recyclable	3		No	-	-	-	No	-	-	-
2021-07-14	Landfill	Yes	Aerosol Cans, Drink Containers Recyclable, Food Packaging, Gloves, Oily Rags	124		No	-	-	-	No	-	-	-
2021-07-21	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-07-28	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-08-04	Landfill	Yes	Gloves, Oily Rags	7		No	-	-	-	No	-	-	-
2021-08-11	Landfill	Yes	Aerosol Cans, Drink Containers Recyclable, Gloves, Oily Rags	6		No	-	-	-	No	-	-	-
2021-08-18	Landfill	Yes	Aerosol Cans, Gloves, Oily Rags	27		No	-	-	-	No	-	-	-
2021-08-25	Landfill	Yes	Aerosol Cans, Drink Containers Recyclable, Gloves, Oily Rags	63		No	-	-	-	No	-	-	-
2021-09-01	Landfill	Yes	Aerosol Cans, Gloves, Oil Products and Containers, Oily Rags, Other	8	Chemical waste	No	-	-	-	No	-	-	-
2021-09-09	Landfill	Yes	Aerosol Cans, Drink Containers Recyclable, Oil Contaminated Waste, Oil Products and Containers, Oily Rags	33		No	-	-	-	No	-	-	-

Date	Location	Attractants				Wildlife				Wildlife Sign			
		Attractants Present?	Items	Number of Items Present	Comments	Wildlife Present?	Species	# of Individuals Observed	Wildlife Comments	Wildlife Sign Observed?	Wildlife Sign Observed Species	Wildlife Sign Type	Wildlife Sign Observed Comments
2021-09-15	Landfill	Yes	Aerosol Cans, Drink Containers Recyclable, Gloves, Oil Contaminated Waste, Oil Products and Containers, Oily Rags	19		No	-	-	-	No	-	-	-
2021-09-25	Landfill	Yes	Aerosol Cans, Drink Containers Recyclable, Gloves, Oily Rags	18		No	-	-	-	No	-	-	-
2021-09-29	Landfill	Yes	Aerosol Cans, Gloves, Oily Rags	7		No	-	-	-	No	-	-	-
2021-10-06	Landfill	Yes	Drink Containers Recyclable, Food Packaging, Gloves, Oily Rags	17		No	-	-	-	No	-	-	-
2021-10-14	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-10-20	Landfill	Yes	Gloves	5		No	-	-	-	No	-	-	-
2021-10-27	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-11-03	Landfill	No	-	0		No	-	-	-	Yes	Red fox	Tracks	Fox tracks
2021-11-10	Landfill	Yes	Food Packaging	7		No	-	-	-	No	-	-	-
2021-11-17	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-11-24	Landfill	Yes	Other	20	Tires	Yes	Common raven	1	-	No	-	-	-
2021-12-02	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-12-08	Landfill	Yes	Drink Containers Recyclable, Food Packaging, Gloves, Oil Contaminated Waste, Oil Products and Containers, Oily Rags, Other	23	Large pile of unsegregated waste	No	-	-	-	Yes	Red fox	Tracks	Fox tracks
2021-12-15	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-12-24	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-12-29	Landfill	No	-	0		No	-	-	-	No	-	-	-
2021-01-03	Underground	Yes	Gloves	1		No	-	-	-	No	-	-	-
2021-01-06	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-01-10	Underground	Yes	Gloves, Oily Rags	3		No	-	-	-	No	-	-	-
2021-01-13	Underground	Yes	Oil Contaminated Waste	5		No	-	-	-	No	-	-	-
2021-01-17	Underground	No	-	0		No	-	-	-	No	-	-	-

Date	Location	Attractants				Wildlife				Wildlife Sign			
		Attractants Present?	Items	Number of Items Present	Comments	Wildlife Present?	Species	# of Individuals Observed	Wildlife Comments	Wildlife Sign Observed?	Wildlife Sign Observed Species	Wildlife Sign Type	Wildlife Sign Observed Comments
2021-01-20	Underground	Yes	Cigarette Butts	2		No	-	-	-	Yes	Wolverine	Tracks	Wolverine tracks on non-burn bin
2021-01-24	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-01-27	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-01-31	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-02-03	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-02-07	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-02-10	Underground	Yes	Gloves	4		No	-	-	-	No	-	-	-
2021-02-14	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-02-17	Underground	Yes	Cigarette Butts, Gloves	3		No	-	-	-	No	-	-	-
2021-02-22	Underground	Yes	Oily Rags	2		No	-	-	-	No	-	-	-
2021-02-28	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-03-07	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-03-10	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-03-13	Underground	Yes	Food Packaging, Oily Rags	6		No	-	-	-	No	-	-	-
2021-03-17	Underground	Yes	Gloves	4		No	-	-	-	No	-	-	-
2021-03-24	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-03-28	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-03-31	Underground	Yes	Food Packaging	1		No	-	-	-	No	-	-	-
2021-04-07	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-04-18	Underground	Yes	Gloves, Oily Rags	2		No	-	-	-	No	-	-	-
2021-04-21	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-04-28	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-05-05	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-05-12	Underground	Yes	Aerosol Cans	1		No	-	-	-	No	-	-	-
2021-05-19	Underground	Yes	Cigarette Butts, Gloves, Oily Rags	103		No	-	-	-	No	-	-	-
2021-05-26	Underground	Yes	Cigarette Butts, Drink Containers Recyclable, Gloves, Other	54	Waste on ground outside non-burn bin	No	-	-	-	No	-	-	-
2021-06-02	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-06-09	Underground	Yes	Drink Containers Recyclable, Gloves, Oily Rags	5		No	-	-	-	No	-	-	-
2021-06-16	Underground	No	-	0		No	-	-	-	No	-	-	-

Date	Location	Attractants				Wildlife				Wildlife Sign			
		Attractants Present?	Items	Number of Items Present	Comments	Wildlife Present?	Species	# of Individuals Observed	Wildlife Comments	Wildlife Sign Observed?	Wildlife Sign Observed Species	Wildlife Sign Type	Wildlife Sign Observed Comments
2021-06-23	Underground	Yes	Cigarette Butts, Gloves, Oily Rags	25		No	-	-	-	No	-	-	-
2021-07-01	Underground	Yes	Cigarette Butts, Gloves, Oily Rags	18		No	-	-	-	No	-	-	-
2021-07-07	Underground	Yes	Cigarette Butts, Drink Containers Recyclable, Food, Food Packaging, Oily Rags	113		Yes	Common raven	1	-	No	-	-	-
2021-07-14	Underground	Yes	Gloves	4		No	-	-	-	No	-	-	-
2021-07-21	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-07-28	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-08-04	Underground	Yes	Cigarette Butts, Oily Rags	8		No	-	-	-	No	-	-	-
2021-08-11	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-08-18	Underground	Yes	Cigarette Butts	2	Cigarette butts near entrances on ground	No	-	-	-	No	-	-	-
2021-08-25	Underground	Yes	Cigarette Butts, Gloves, Oily Rags	4	Cigarette butts around entrances	No	-	-	-	No	-	-	-
2021-09-01	Underground	Yes	Oil Contaminated Waste, Oily Rags	3		No	-	-	-	No	-	-	-
2021-09-09	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-09-15	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-09-25	Underground	Yes	Cigarette Butts	10		No	-	-	-	No	-	-	-
2021-09-29	Underground	Yes	Aerosol Cans, Cigarette Butts, Drink Containers Recyclable, Gloves, Oily Rags	20		No	-	-	-	No	-	-	-
2021-10-06	Underground	Yes	Cigarette Butts, Oily Rags	13		No	-	-	-	No	-	-	-
2021-10-14	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-10-20	Underground	Yes	Gloves	2		No	-	-	-	No	-	-	-
2021-10-27	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-11-03	Underground	Yes	Food Packaging, Gloves	3		No	-	-	-	No	-	-	-
2021-11-10	Underground	Yes	Food Packaging, Gloves, Oily Rags	9		No	-	-	-	No	-	-	-
2021-11-17	Underground	Yes	Food Packaging	3		No	-	-	-	No	-	-	-
2021-11-24	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-12-02	Underground	No	-	0		No	-	-	-	No	-	-	-

Date	Location	Attractants				Wildlife				Wildlife Sign			
		Attractants Present?	Items	Number of Items Present	Comments	Wildlife Present?	Species	# of Individuals Observed	Wildlife Comments	Wildlife Sign Observed?	Wildlife Sign Observed Species	Wildlife Sign Type	Wildlife Sign Observed Comments
2021-12-08	Underground	Yes	Aerosol Cans, Gloves, Oily Rags	6		No	-	-	-	No	-	-	-
2021-12-15	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-12-24	Underground	Yes	Cigarette Packaging, Food Packaging, Other	4	Helmet	No	-	-	-	Yes	Common raven	Tracks	Raven footprints in bin
2021-12-29	Underground	No	-	0		No	-	-	-	No	-	-	-
2021-01-03	Waste Transfer Area	Yes	Cigarette Packaging, Gloves	4		No	-	-	-	Yes	Red fox	Tracks	Numerous fox tracks
2021-01-10	Waste Transfer Area	Yes	Aerosol Cans	2		No	-	-	-	Yes	Red fox	Tracks	Numerous fox tracks
2021-01-13	Waste Transfer Area	Yes	Drink Containers Recyclable, Food Packaging, Gloves	10		No	-	-	-	Yes	Red fox, wolverine	Tracks, hair	Numerous tracks, wolverine hair snagged on barbed wire fence
2021-01-17	Waste Transfer Area	No	-	0		No	-	-	-	Yes	Red fox, wolverine	Tracks	Fox and wolverine tracks
2021-01-20	Waste Transfer Area	Yes	Drink Containers Recyclable, Gloves, Oily Rags	8		No	-	-	-	Yes	Red fox	Tracks	Numerous fox tracks
2021-01-24	Waste Transfer Area	Yes	Gloves, Oily Rags	200		No	-	-	-	Yes	Red fox	Tracks	Fox tracks
2021-01-27	Waste Transfer Area	Yes	Food Packaging, Other	2	Bag of spill pads in burn pit	No	-	-	-	No	-	-	-
2021-01-31	Waste Transfer Area	Yes	Gloves, Other	3	Jacket	Yes	Red fox	2	-	No	-	-	-
2021-02-03	Waste Transfer Area	No	-	0		No	-	-	-	Yes	Red fox	Tracks	Numerous fox tracks
2021-02-07	Waste Transfer Area	Yes	Cigarette Packaging, Gloves	4		No	-	-	-	No	-	-	-
2021-02-10	Waste Transfer Area	No	-	0		Yes	Red fox	1	-	No	-	-	-
2021-02-14	Waste Transfer Area	Yes	Drink Containers Recyclable, Gloves	2		No	-	-	-	Yes	Red fox	Tracks	Numerous fox tracks
2021-02-17	Waste Transfer Area	Yes	Drink Containers Recyclable	2		No	-	-	-	Yes	Red fox	Tracks	Fox tracks
2021-02-22	Waste Transfer Area	Yes	Cigarette Packaging, Drink Containers Recyclable, Gloves	7		No	-	-	-	Yes	Red fox	Tracks	Fox tracks
2021-02-28	Waste Transfer Area	Yes	Food Packaging	1		No	-	-	-	Yes	Red fox	Tracks	Fox tracks

Date	Location	Attractants				Wildlife				Wildlife Sign			
		Attractants Present?	Items	Number of Items Present	Comments	Wildlife Present?	Species	# of Individuals Observed	Wildlife Comments	Wildlife Sign Observed?	Wildlife Sign Observed Species	Wildlife Sign Type	Wildlife Sign Observed Comments
2021-03-07	Waste Transfer Area	Yes	Aerosol Cans, Food Packaging, Gloves	13		No	-	-	-	Yes	Red fox	Tracks	Fox tracks
2021-03-10	Waste Transfer Area	Yes	Drink Containers Recyclable, Other	2	Non-burn waste in burn pit	No	-	-	-	No	-	-	-
2021-03-13	Waste Transfer Area	Yes	Drink Containers Recyclable, Food Packaging, Gloves	12		No	-	-	-	No	-	-	-
2021-03-17	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-03-24	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-03-28	Waste Transfer Area	No	-	0		No	-	-	-	Yes	Red fox	Tracks	Fox tracks
2021-03-31	Waste Transfer Area	Yes	Food Packaging	2		No	-	-	-	Yes	Red fox	Tracks	Numerous fox tracks
2021-04-07	Waste Transfer Area	Yes	Drink Containers Recyclable	2		No	-	-	-	No	-	-	-
2021-04-18	Waste Transfer Area	Yes	Drink Containers Recyclable, Gloves	4		No	-	-	-	Yes	Unspecified	Tracks	Prints in snow
2021-04-21	Waste Transfer Area	Yes	Gloves	1		No	-	-	-	No	-	-	-
2021-04-28	Waste Transfer Area	Yes	Gloves, Other	3	Coveralls in burn pit	No	-	-	-	No	-	-	-
2021-05-05	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-05-13	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-05-19	Waste Transfer Area	Yes	Oil Contaminated Waste, Oily Rags	12		No	-	-	-	No	-	-	-
2021-05-26	Waste Transfer Area	Yes	Aerosol Cans, Gloves	11		No	-	-	-	No	-	-	-
2021-06-02	Waste Transfer Area	Yes	Gloves, Oily Rags	7		No	-	-	-	No	-	-	-
2021-06-10	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-06-16	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-06-23	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-

Date	Location	Attractants				Wildlife				Wildlife Sign			
		Attractants Present?	Items	Number of Items Present	Comments	Wildlife Present?	Species	# of Individuals Observed	Wildlife Comments	Wildlife Sign Observed?	Wildlife Sign Observed Species	Wildlife Sign Type	Wildlife Sign Observed Comments
2021-07-01	Waste Transfer Area	Yes	Food Packaging, Gloves, Oil Products and Containers, Oily Rags	17		No	-	-	-	No	-	-	-
2021-07-07	Waste Transfer Area	Yes	Aerosol Cans, Cigarette Packaging, Drink Containers Recyclable, Food, Food Packaging, Gloves	42		Yes	Common raven	1	-	No	-	-	-
2021-07-14	Waste Transfer Area	Yes	Food, Food Packaging, Gloves	12		No	-	-	-	No	-	-	-
2021-07-21	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-07-28	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-08-04	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-08-11	Waste Transfer Area	Yes	Cigarette Packaging, Food, Gloves, Oily Rags, Other	13	Glass (mirror)	No	-	-	-	No	-	-	-
2021-08-18	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-08-25	Waste Transfer Area	Yes	Aerosol Cans, Cigarette Packaging, Drink Containers Recyclable, Food Packaging, Gloves	16		No	-	-	-	No	-	-	-
2021-09-01	Waste Transfer Area	Yes	Other	1	Bag of PPE	No	-	-	-	No	-	-	-
2021-09-09	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-09-15	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-09-25	Waste Transfer Area	Yes	Gloves, Oily Rags	5		No	-	-	-	No	-	-	-
2021-09-29	Waste Transfer Area	Yes	Food Packaging, Gloves, Oily Rags	12		No	-	-	-	No	-	-	-
2021-10-06	Waste Transfer Area	Yes	Gloves, Oily Rags, Other	6	Winter boot	No	-	-	-	No	-	-	-
2021-10-14	Waste Transfer Area	Yes	Batteries	2		No	-	-	-	No	-	-	-

Date	Location	Attractants				Wildlife				Wildlife Sign			
		Attractants Present?	Items	Number of Items Present	Comments	Wildlife Present?	Species	# of Individuals Observed	Wildlife Comments	Wildlife Sign Observed?	Wildlife Sign Observed Species	Wildlife Sign Type	Wildlife Sign Observed Comments
2021-10-20	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-10-27	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-11-03	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-11-10	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-11-17	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-11-24	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-12-02	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-12-08	Waste Transfer Area	Yes	Food Packaging	1		No	-	-	-	Yes	Red fox	Tracks	Fox tracks around burn pit
2021-12-15	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-12-24	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-
2021-12-29	Waste Transfer Area	No	-	0		No	-	-	-	No	-	-	-

APPENDIX N

2021 Comprehensive Vegetation and Lichen Analysis Report

DIAVIK DIAMOND MINES (2012) INC.

2021 Comprehensive Vegetation and Lichen Monitoring Program

Submitted to:

Diavik Diamond Mines (2012) Inc.
PO Box 2498
300 - 5201 50th Avenue
Yellowknife, NT
X1A 2P8, Canada

DISTRIBUTION

1 Copy – Diavik Diamond Mines (2012) Inc., Yellowknife, NT
1 Copy – Golder Associates Ltd., Calgary, AB
1 Copy – Wek'èezhìı Land and Water Board

March 2022
21452119-2186-R-Rev0-2000

Doc No. 687 Rev. 1
PO No. 3104528649

Golder Associates Ltd.
16820 107 Avenue, Edmonton, Alberta, T5P 4C3, Canada
T: +1 780 483 3499 F: +1 780 483 1574

DDMI acknowledges that unsecured electronic media is susceptible to unauthorized modification, deterioration, and incompatibility and therefore DDMI cannot rely upon the unsecured electronic media versions of this Report. In the event of any discrepancy, Golder's native, secured file shall govern.

Executive Summary

The Diavik Diamond Mine (the Mine) is located on East Island in Lac de Gras in the Northwest Territories. Diavik Diamond Mine Inc. (DDMI) conducts vegetation and lichen monitoring programs to assess if dust deposition from the Mine is altering the abundance (i.e., percent cover) and richness (i.e., number of species) of plant species in representative plant communities. The objectives of the 2021 vegetation and lichen monitoring programs are to:

- assess changes in plant species abundance (species percent cover) and composition (species richness) between mine and reference sites over time
- determine if any detected changes in plant species abundance and composition are qualitatively related to dust deposition
- identify differences or changes in lichen chemistry between near-field and far-field areas, and relate those changes to possible implications for caribou health

The vegetation monitoring program focussed on permanent vegetation plots (PVP) that were established in two sites or areas: adjacent to the Mine site (mine plots), and on the West Island and mainland (reference plots) (Golder 2011a). In 2021, there were 15 permanent vegetation plots in each area, with five PVPs in each of three vegetation community types: Heath Tundra, Shrub and Tussock-Hummock. One PVP (PVP10) had to be re-established as its previous location overlapped the South Country Rock Pile-Waste Rock Storage Area footprint (SCRP-WRSA). Plant species percent cover was estimated for all vascular plant species (such as sedges and grasses) and non-vascular plant species (such as lichens and mosses). Plant species data from 2006 to 2021 were compiled and graphically and statistically analyzed to assess differences in the number and percent cover of plant species between mine and reference plots among years.

Overall, the results of the analysis of dust deposition and vegetation data indicate differences in plant species abundance and composition in mine and reference plots over time are likely due to Mine-related effects, such as dust deposition. Natural variation in site conditions among PVPs prior to and after mining, annual variation in climate, foraging by caribou, surveyor variability and difficulty in detecting cryptic or uncommon species have also probably influenced changes in plant species richness and cover. However, the direction and magnitude of the differences between mine and reference sites have remained largely consistent over the past 15 years, and opposite to a primary prediction (i.e., Key Question 4) in the Environmental Effects Report (EER) for the Mine (DDMI 1998). Importantly, the data show no trajectory towards a divergence in the previous and current observed temporal and spatial patterns of plant species abundance and composition. Based on the principles of adaptive management and the slow response of vegetation in the Arctic, it is recommended that this program be continued to confirm if the observed differences and changes in plant abundance and composition follow similar patterns during the remainder of mining operations. However, because dust deposition rates exceeded the trigger outlined in the 2019 memo, it is recommended that the next cycle of the program occur in 3 years (Golder 2017, 2019).

Lichens were collected at locations near and far from the Mine site for analysis of metals to determine if dust generated from mining activities is causing a measurable increase in metal concentrations near the Mine, and if concentrations have changed since they were first measured in 2010. Lichens were chosen because they are a preferred forage of caribou and effectively and preferentially bioaccumulate airborne contaminants because of their lack of roots, large surface area, and long lifespan. Thus, analysing metal concentrations in lichen provides conservative exposure concentrations for assessment of risks to caribou.

Elders have observed that caribou will avoid areas with dust on their forage by altering migration routes to target better quality forage (Tłı̨chǫ Government 2013). Science has also observed a potential link between total suspended particulates (which includes dust) near the Ekati and Diavik mines and local changes in abundance and distribution of caribou (Boulanger et al. 2012).

In 2010, two sampling areas were developed for the lichen monitoring program. A near-field area included stations surrounding the Mine site. The near-field area stations were generally located near existing dustfall collector stations. A far-field area was a concentric area 30 to 40 kilometres from the Mine site, and stations within this area were randomly selected prior to the start of the program. The original study design included 20 stations in each sampling area. During the 2013 program, Elders from the Tłı̨chǫ and Łutsel K'e communities and two researchers from the Tłı̨chǫ Research and Training Institute accompanied Golder and DDMI biologists during part of the sampling program. Based on their knowledge of caribou migration routes, the Elders selected an additional three stations located 14 to 21 kilometres from the centre of the Mine site; these stations were also sampled in 2016 and 2021. Hence, Indigenous Traditional Knowledge was applied to the program sampling design. In 2016, a far-far-field sampling area was added to collect lichen at three stations approximately 100 kilometres from the Mine site.

The Elders' Traditional Knowledge provided in 2013 remained important in 2021 for selecting specific sampling sites that were appropriate for caribou use. Although there was a random element to the station selection, the actual site of sampling was based on guidance from the Elders as to where the caribou eat (i.e., appropriate caribou habitat). Lichens identified by the Elders as those that would be consumed by caribou were recorded and collected for analysis. This is a second way in which Indigenous Traditional Knowledge has been integrated into the sampling program.

Metals concentrations in lichen were graphically and statistically compared between near-field and far-field areas, and for the 2010, 2013, 2016, and 2021 sampling events. The analysis of metal concentrations in lichen confirmed the observations of the Elders that dust deposition was higher near the Mine as most of the parameters analysed were significantly higher in lichens from the near-field area compared to the far-field area. Further analysis indicated that mine-related dust deposition declined with distance, with background (far-field) concentrations being reached within approximately 4 km from the Mine. In addition, most metals concentrations in lichens from the near-field area were significantly lower in 2021 compared to previous years. The reduction in concentrations between 2010 and 2016 may be due to the change in mining operations from above ground (open pit) to underground mining from 2010 to 2016, resulting in an overall reduction in dust levels (a small rise in depositions since 2018 notwithstanding). Currently open-pit mining occurs at A21, which began in 2017. However, this does not appear to have caused a subsequent increase in lichen metal concentrations near the Mine. Also, most metals concentrations in the far-far-field sampling area were similar to concentrations in the far-field sampling area.

The lichen monitoring program was designed to assess whether the increased metals uptake by lichen in the near-field area pose a risk to caribou health. An initial screening-level risk assessment was conducted in 2010 (Golder 2011b), with a recent study assessing spatiotemporal trends in metals concentrations and risk to caribou, which incorporated monitoring data up to 2016 (Watkinson et al. 2021). This study used conservative assumptions to estimate exposure and effects to caribou, such as that the caribou would reside in the near-field area throughout the year and obtain all their food and water from this area. Despite these conservative assumptions, the risk estimates demonstrated no adverse effects to caribou health. Given that most metals concentrations have decreased below concentrations reported in the 2010 risk assessment, a follow up risk assessment based on 2021 data is not required. Metal concentrations are predicted to remain within safe levels for caribou.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1 INTRODUCTION

Dust deposition due to industrial development has the potential to cause localized effects on vegetation abundance and composition and can also affect the quality of food resources for wildlife that eat plants. In 2013, the Tłı̨chǫ Government completed a Traditional Knowledge study on the potential effects from dust on caribou and caribou habitat. Comments from the Elders on lichen and vegetation conditions near the Diavik Diamond Mine (Mine) reflect that they noticed dust on the lichen near the Mine site, and they stated that dust reduced the quality of the forage for caribou (Tłı̨chǫ Government 2013). The Elders also stated that the caribou will avoid using the area close to the Mine as their migration route, because the caribou recognize the difference in lichen quality (by smell and taste).

Long-term monitoring is fundamental for determining changes in plant community and ecosystem dynamics over time due to anthropogenic disturbance (Condit 1995; Dale et al. 2002). As such, Diavik Diamond Mines (2012) Inc. (DDMI or Diavik) initiated a vegetation monitoring program in 2001, one year after construction began, to examine vegetation composition and abundance over time. The results of the monitoring would assist in developing appropriate and practical mitigation strategies if mining operations were having a strong adverse effect on tundra vegetation communities. Dustfall monitoring has also been conducted since 2002 as part of the environmental monitoring program. Chemical analysis of lichen was first completed by DDMI in 2005, and a more extensive monitoring program was implemented in 2010 to assess whether dust deposition generated increased metals concentrations in lichen, and subsequent possible health effects to caribou. Subsequent vegetation and lichen chemistry monitoring occurred in 2013, 2016, and 2021.

1.1 Background

The Mine is located on East Island, a 20 square kilometre (km^2) island in Lac de Gras, Northwest Territories, approximately 300 kilometres (km) northeast of Yellowknife (Figure 1.1-1). Lac de Gras is about 100 km north of the tree line in the central barren-ground tundra at the headwaters of the Coppermine River. This river, which flows north to the Arctic Ocean east of Kugluktuk, is 520 km long and has a drainage area of approximately 50,800 km^2. The area is remote, and major freight must be trucked over a seasonal winter road from Yellowknife. Worker access is by aircraft to the Mine's private airstrip.

The Mine involves the mining of four diamond-bearing kimberlite pipes. The pipes, designated as A154North, A154South, A418, and A21, are located directly off-shore of East Island. All mining, diamond recovery, support activities and infrastructure are located on the East Island.

The Environmental Assessment for the Mine was submitted in 1998 and approved in 1999 by the Federal Government. Construction of mine infrastructure began on East Island in 2000. A kimberlite processing plant, power plant, boiler plant, accommodation building, sewage treatment facility, and administration/maintenance building were constructed on the southeast part of the island. An airstrip is located on the northern edge of the island. In total, the Mine site at full development was expected to have a footprint of 12.76 km^2; the current footprint is 11.55 km^2. Full production started in 2003 in open pits, and underground mining was added in 2008. From 2012 to 2017, all mining was conducted underground. The Mine began development of the A21 pit in 2015 and open pit mining began again in 2017 and is currently ongoing (DDMI 2019).

LEGEND

- DIAVIK MINE LOCATION
- MINE LOCATION
- POPULATED PLACE
- ALL-SEASON ROAD
- HIGHWAY
- WINTER ROAD
- TREELINE
- WATERCOURSE
- WATERBODY

0 100 200

1:6,000,000 KILOMETRES

REFERENCE(S)

1. BASE DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

PROJECTION: CANADA LAMBERT CONFORMAL CONIC

CLIENT

RioTinto

PROJECT

DIAVIK DIAMOND MINES INC.

TITLE

LOCATION OF DIAVIK DIAMOND MINE

CONSULTANT

WSP GOLDER

YYYY-MM-DD	2022-03-28
DESIGNED	KS
PREPARED	LMS
REVIEWED	KS
APPROVED	JV

PROJECT NO.	PHASE	REV.	FIGURE
21452119	3000	0	**1.1-1**

PATH: I:\CLIENTS\DIAVIK\21452119\Mapping\Vegetation\Fig1_1-1_21452119-3000_ProjectLocation_Rev0.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

25mm

0

1.2 Purpose and Objectives

The purpose of the vegetation and lichen monitoring programs is to assess if dust deposition from the Mine is altering plant community structure and composition and if it is influencing lichen species. Lichen species represent one of the food sources for caribou and there is potential for lichen abundance to be altered in areas near the Mine site. Additionally, lichens have the potential to uptake metals and other chemicals that can adversely affect the health of caribou and other wildlife.

The vegetation and lichen monitoring programs include the following objectives:

- assess changes in plant species abundance (species percent cover) and composition (species richness) between mine and reference sites over time
- determine if any detected changes in plant species abundance and composition are qualitatively related to dust deposition
- identify differences or changes in lichen chemistry between near-field and far-field areas, and relate those changes to possible implications for caribou health

Additionally, the vegetation monitoring program provides a quantitative approach for testing and evaluating the predicted effects identified as part of the Environmental Effects Report (EER) for the Mine (DDMI 1998). Four measurement endpoints expressed as key questions and associated environmental effects predictions were identified in the EER for vegetation (Table 1.2-1).

Table 1.2-1: Key Questions and Associated Environmental Effects Predictions for Vegetation.

Key Question	Environmental Effects Prediction
Key Question 1: How much vegetation/land cover would be directly affected by the proposed Project?	Predicted loss of 12.67 km^2 of habitat.
Key Question 2: How would the structure of vegetation communities outside of the Mine footprint be changed as a result of the proposed Project?	Increased dust deposition may lead to potential changes in vegetation.
Key Question 3: Would any rare or endangered species or communities be lost because of the proposed Project?	No effects predicted.
Key Question 4: Would there be changes to vegetation and/or terrain diversity because of the proposed Project?	Community level richness predicted to decrease by 14%. Species diversity and richness predicted to decrease by 44%.

An additional four key questions were developed for the lichen study to address community concerns about dust and its effect on caribou (Table 1.2-2). Lichen species that were of dietary importance to caribou (i.e., that caribou would prefer to eat), were preferentially collected and analysed.

Table 1.2-2: Key Questions and Predictions for Lichen

Key Question	Environmental Effects Prediction
Is there metals uptake in lichen due to dust?	Yes.
Is there a difference between concentrations of metals in lichen near the Mine versus 30 to 40 kilometres (km) from the Mine?	Yes, but no level estimated.
Are there differences between metal concentrations in lichen over years?	Concentrations in lichen are predicted to be similar over years.
Are concentrations of metals in lichen within a safe level for caribou?	Yes.

1.3 Previous Studies

1.3.1 Vegetation Studies

Detailed vegetation data were initially collected in 2001 and have been typically collected every three years through 2016. Through adaptive management, the program frequency was reduced to every five years unless triggered by dustfall monitoring results (Golder 2017, 2019). Analysis of vegetation monitoring data from 2008 – 2016 by Watkinson et al. (2021) found that cover of vascular plants had increased while bryophyte and lichen cover had decreased at vegetation monitoring plots close to the Mine (<500 m). Further, shrub cover at all plots had increased since the onset of monitoring. Cover and richness of forbs and graminoid species were greater at plots close to the Mine in some plant community types when compared with reference plots, while lichen cover was greater at reference plots compared to plots near the Mine.

1.3.2 Lichen Chemistry

Chemical concentrations were measured in lichen collected near the Mine in four previous studies conducted in 2005, 2010, 2013, and 2016. Naeth and Wilkinson (2006) concluded that the Mine influences chemical concentrations in lichen collected near the Mine site when compared to far-field locations 30 km and 60 km away. Similar results were found by Golder (2011b), who concluded that metals concentrations in lichen collected at near-field locations were higher than at far-field locations 30 to 40 km away but were within a safe level for caribou to eat. Metals concentrations were reduced in 2016 compared to 2010 and 2013, which may have been due to the reduction in dust deposition associated with the change to underground mining (Golder 2014, 2017, 2019; Watkinson et al. 2021). Concentrations of most metals in lichen were found to decline exponentially with distance from the Mine, reaching background (far-field) concentrations within approximately 4 km from the Mine (Watkinson et al. 2021).

2 VEGETATION MONITORING PROGRAM

2.1 Study Area

The Mine is located in the subarctic tundra along the transition between taiga and upper arctic tundra ecozones (Ecosystem Classification Group 2012). The climate in this region consists of long, cold winters and short, cool summers with a mean annual temperature of -9°C and mean annual precipitation of 306 mm (unpublished data, Diavik Meteorological Stations 1999-2012).

The upland ecosystems in the region generally consist of Heath Tundra communities on well drained soils, which are dominated by ericaceous shrubs along with other members of the heath family (*Ericaceae*), and a healthy layer of lichen (Watkinson et al 2021). Shrub dominated communities exist on more moderately drained soils, where shrub cover is more extensive and nonvascular, forb, and graminoid presence is generally low. Tussock-Hummock habitats comprise vegetation communities growing on poorly drained organic soils, with a higher graminoid and forb presence on a well-developed bryophyte layer.

Dust collector locations and permanent vegetation plots (PVP) were established adjacent to the Mine (mine plots), and on the West Island and the mainland (reference plots). Figure 2.2-1 shows the location of PVPs and dust collector sampling locations.

2.2 Methods

2.2.1 Dustfall Monitoring

Dust deposition data have been collected since 2002 at various locations around the Mine, with 14 collection stations in use currently (Figure 2.2-1; Golder 2014). Dust particles typically represent the upper end of the size distribution of total suspended particulates (TSP, diameter >30 µm), a component of airborne particulate matter along with the smaller fine particulate matter ($PM_{2.5}$, diameter <2.5 µm) (Watkinson et al 2021). Larger and heavier particles settle out of the atmosphere quickly and at shorter distances from the source while smaller and lighter particles can exist as airborne matter for long periods and travel far distances. A determination of the annual rate of dust deposition (milligram per square decimetre per year [$mg/dm^2/y$]) was calculated based on the weight of the dust residue remaining, the sampling area of the gauge, and the number of days the monitoring gauge was deployed.

The dustfall data were also used to determine if deposition rates remain below the trigger value for increased survey frequency as described in the Dust Trigger for Vegetation and Lichen Monitoring technical memo (Golder 2019). The geometric mean deposition rate of three near-field gauges (Dust 05, 07, and 08) between 2019 and 2021 was compared to the upper 95% confidence interval (CI) of three reference gauges (Dust 09, C1, and C2).

LEGEND

- DUSTFALL COLLECTOR
- MINE PERMANENT VEGETATION PLOT*
- REFERENCE PERMANENT VEGETATION PLOT

0 2 4

1:100,000 KILOMETRES

NOTE(S)

* PVP10 WAS REPLACED BY PVP10A (SEE SECTION 2.2.2.1).

REFERENCE(S)

1. IMAGERY COPYRIGHT © 20200108 ESRI AND ITS LICENSORS. SOURCE: MAXAR. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT

RioTinto

PROJECT

DIAVIK DIAMOND MINES INC.

TITLE

PERMANENT VEGETATION PLOTS AND DUST COLLECTOR SAMPLING LOCATIONS

CONSULTANT

WSP GOLDER

YYYY-MM-DD	2022-03-28
DESIGNED	ML
PREPARED	ANK
REVIEWED	KS
APPROVED	JV

PROJECT NO.	PHASE	REV.	FIGURE
21452119	3000	0	2.2-1

2.2.2 Vegetation Monitoring

2.2.2.1 Data Collection

Detailed vegetation data have been collected at Diavik since 2001. As described in Naeth and Wilkinson (2009) and Golder (2011a), 10 PVPs were initially established and sampled in 2001 (nine plots in the vicinity of the Mine and one reference plot located on the mainland) and re-sampled in 2004. The program was expanded in 2006 to include five additional mine plots, which were established to replace plots lost due to Mine expansion, and eight new reference plots at three locations off East Island. This provided an equal number of mine (n=9) and reference (n=9) plots, assigned equally among three vegetation communities (Heath Tundra, Shrub and Tussock-Hummock). In 2008, the program was further expanded to include 30 plots (15 mine plots and 15 reference plots) occurring in three vegetation communities (Figure 2.2-1). A list of all plots sampled since 2001 is provided in Appendix A.

Table 2.2-1: Current Distribution of Plots by Vegetation Community.

Vegetation Community	Number of Mine Plots	Number of Reference Plots
Heath Tundra	5	5
Shrub	5	5
Tussock-Hummock	5	5
Total	**15**	**15**

All 30 PVPs were visited over eight days from July 31 to August 7, 2021. Unfortunately, during the development of the A21 pit, PVP10 was buried under the SCRP-WRSA. A new plot was established (PVP10a), and a full survey was completed. Data sampling methods followed previously established protocols (Naeth and Wilkinson 2009). Each PVP consisted of a 2 metre (m) by 2 m area that was subdivided into four, 1 square metre subplots. Starting at the northwest corner and working clockwise, a 1 m by 1 m quadrat frame with 10 centimetre (cm) increment markings on each side was used to estimate plant species percent cover for all vascular plant species rooted within the four subplots. Wherever possible, vascular plants were identified to the species level in the field and unknown specimens were collected from outside the plot and later identified using Porsild and Cody (1980) or other resources when necessary.

Non-vascular species such as lichens and bryophytes comprise a large portion of the species diversity in tundra environments and may be sensitive to disturbances, particularly dust deposition. As lichens and bryophytes were not identified to the species level prior to 2013, a comprehensive sampling program of bryophyte and lichen species was initiated in 2013. Where possible, lichens and bryophytes were identified to genus or species level, and percent cover was estimated following the same procedures used for vascular plants. In contrast to 2013, comprehensive sampling of trace non-vascular species (<1% cover) was not completed in 2016 or 2021, due to inconsistencies in sampling method replication and potential for spurious results. In general, scientific nomenclature and common names followed naming conventions consistent with the NatureServe on-line database (NatureServe 2021).

Additional parameters that were recorded for each quadrat included the percent ground cover of:

- total vegetation cover
- total rock lichen
- total terrestrial (ground) lichen
- total moss species
- fungi
- bare ground
- rock
- litter
- animal pellets

Plot boundaries were also re-staked and marked, and photographs were taken of each plot and associated quadrats.

2.2.3 Data Analysis

Analysis of Dust Deposition

The relationship between dust deposition rates and differences in plant species abundance and composition between mine and reference PVP sites is assessed qualitatively because the locations of the dust deposition gauges are not directly correlated with PVP locations (Figure 2.2-1).

Previously (Golder 2014), dust deposition statistics were computed using arithmetic averages for the period of record (i.e., 2002 to 2013), and were divided into three plot type groups: ‘Mine’, ‘None’ and ‘Reference’. Analysis of dust deposition rates in 2021 follow the updates included in the 2016 report:

- Dust deposition rates are stratified into time periods to reflect changes in mining activities over time at the Diavik mine. The periods of activity are as follows:
  - 2002 to 2005 (open pit mine construction and mining)
  - 2006 to 2009 (open pit mining and underground mine construction)
  - 2010 to 2013 (underground mining)
  - 2013 to 2017 (underground mining)
  - 2018 to present (open pit mining and underground mining)
- Dust deposition rates at each station for the 2002 to 2021 period of record are best described using a log-normal distribution instead of a normal distribution, and the rates should be tabulated as geometric averages instead of arithmetic averages (Golder 2014, 2017).
- The dust gauges were categorized as ‘Mine’ and ‘Reference’ groups, following the classification used in Watkinson et al (2021). As comparisons between dust deposition rate and the vegetation surveys

are qualitative, grouping the dust gauges based on categorical distance from the Mine footprint provides an appropriate statistical analysis of dust deposition data.

Dust deposition was compared among periods of differing mine operations and among plot types (i.e., mine vs reference). A linear mixed effects model was used with periods of mine operation and plot type as fixed effects and individual dust monitoring stations as a random effect. Interaction effects were tested using Type III Sum of Squares. The assumption of normality was tested using Shapiro-Wilk test. Interaction effects and normality were evaluated using $\alpha = 0.05$. Post-hoc pairwise comparisons were completed using least squares means employing the Kenward-Rogers adjustment (Kenward & Rogers 1997). Main effects and post-hoc tests were evaluated using $\alpha = 0.10$.

Analysis of Plant Species Abundance and Composition Data

Data analysis focused on evaluating trends and determining if there were statistical differences in vegetation abundance and composition between mine plots and reference plots among years. The variables measured included the following:

- change or difference in plant species abundance, as defined by percent species cover
- change or difference in plant species composition, as defined by plant species richness

Plant species data from 2001 and 2004 were reported in Golder (2011a), but the sampling design was biased towards mine plots and no numerical analysis could be completed. Similar to Golder (2017), the analysis here is focused on data from 2006, 2008, 2010, 2013, 2016, and 2021 to investigate potential trends in plant species cover and richness over time relative to mine and reference plots. Data were compiled and assessed for consistency in plant species names and checked for potential outliers that may represent misidentified species. Plant species that were identified to the genus level were retained for analysis, while all unidentified species were excluded from the analysis. Additionally, the two varieties of water sedge (*Carex aquatilis* var. *stans* and *Carex aquatilis* var. *aquatilis*) were grouped as one species, water sedge (*Carex aquatilis*), as it was not possible to separate the varieties on every plot.

Analyses were run separately for each of the three vegetation community types (i.e., Heath Tundra, Shrub, and Tussock-Hummock); an effective approach to reduce the within-group (i.e., mine or reference areas) variability associated with plant species cover estimates and increase the power to detect meaningful trends between mine and reference plots.

Repeated Measured Analysis of Variance

Vascular plant species abundance and richness (i.e., shrubs, forbs, graminoids, and total vascular plants [combed shrubs, forbs, and graminoids]) on mine and reference sites were analyzed from 2008 to 2021, by vegetation community type (i.e., Heath Tundra, Shrub, and Tussock-Hummock) using two-way Repeated Measures Analysis of Variance (RM-ANOVA). Statistical models were parameterized using either species richness or percent cover as the dependent variable, sampling year as the within-subject factor, plot type (either mine or reference) as the between-subjects factor, and plot ID to partition variance due to repeated measurements of vegetation plots. Prior to completing statistical analysis, data were tested for normality of residuals, sphericity, and factor interactions using R version 4.1.1 (R Core Group 2021) and the R package 'rstatix' v. 0.7.0 (Kassambara 2021). For assumptions testing, the level of statistical significance was set *a priori* at an alpha value of 0.05. If assumptions were violated, data transformations and sphericity corrections (i.e., Greenhouse-Geisser correction; Girden 1992) were applied, respectively as required. The

Greenhouse-Geisser correction reduces the degrees of freedom of the *F*-distribution by multiplying the degrees of freedom by the estimate of (non)sphericity, as a lack of sphericity can overestimate the degrees of freedom (Abdi 2010). Corrected degrees of freedom often appear as fractions (i.e., decimals) instead of whole numbers.

Lichen and bryophyte data were also analyzed using RM-ANOVA to investigate differences in mean species cover of selected lichen and bryophyte groups (from 2008 to 2021), and total species richness (2013 and 2021) between mine and reference sites, stratified by vegetation community type.

To meet the requirement of equal sample sizes for the repeated measures analyses, 2006 data were excluded as the number of plots (n=18) were different from 2008 to 2021 (n=30 per sampling event/cycle). However, the mean ± 90% confidence interval (± 90% CI) for 2006 data were calculated and plotted to provide visual comparisons.

All plant species cover data were transformed using the arcsine of the square root of the percent cover to satisfy the assumption of normality of residuals. In addition, it was assumed that parametric tests would be sufficiently robust to detect trends in the differences in plant species composition and abundance between mine plots and reference plots and across years (Zar 1999). A summary of mean percent cover of plant species and ground vegetation on mine and reference plots for 2021 is provided in Appendix B. Similar data for 2006 to 2016 are provided in Golder (2014, 2017), and summary values for all years are presented in Appendix C.

The level of statistical significance for hypothesis testing was set *a priori* at an alpha value of 0.10. Species cover and richness estimates have a high degree of variation associated with natural factors and sampling methods (e.g., observer subjectivity). Therefore, an alpha value of 0.05 was believed to be too conservative and would have increased the likelihood of not detecting a statistical effect (i.e., increased the probability of Type II error). To detect potential effects from mining activity, it was decided that an increased probability of a Type I error was preferable to a Type II error (i.e., a precautionary approach was applied).

Because many plant species were present in trace amounts and there was considerable multicollinearity (i.e., correlation among two or more variables, in this case plant species cover) in the data, vascular plant species cover values were pooled to yield percent cover by vegetation layer (i.e., shrub, forb, and grass) rather than individual species. For each plot, the total percent cover of shrubs, forbs, and grasses were determined by summing the individual species covers associated with each vegetation layer. As vegetation layer and ground cover abundance data were generally non-normally distributed, data were transformed using the arcsine of the square root of the percent cover. Total plant species richness was also determined for each plot and was also calculated for each vegetation layer. Species richness is determined by counting the total number of species present in a plot and is independent of species percent cover (Krebs 1989).

Lichen and bryophyte (moss) data were also analyzed using a similar approach to that used for analyzing the vascular plant species data. However, as many lichen and moss species were present in trace amounts, only select groups of lichen and moss species were retained for subsequent analyses and were rolled up to the genus level by summing the individual species covers associated with each genus (Table 2.2-2). Lichen and moss species groups were then selected for analyses based on their respective presence and abundance on plots, such that only those species groups present on greater than 10 plots and with greater than 1% cover on greater than or equal to 3 plots were retained for subsequent analyses. These criteria were chosen to allow the analysis to focus on those lichen and moss species groups that had sufficient

presence and abundance on both mine and reference plots to allow comparisons to be made. Total lichen species richness and total moss species richness were also determined for each plot.

Table 2.2-2: Bryophyte and Lichen Species Groupings for Analysis

Group Code	Bryophyte Species Scientific Name	Group Code	Lichen Species Scientific Name
DICSPP	*Dicranum acutifolium, Dicranum elongatum, Dicranum discescens, Dicranum scoparium, Dicranum spadiceum*	CETSPP	*Cetraria ericetorum, Cetraria islandica, Cetraria laevigata, Cetrariella delisei**
LIVSPP	Liverwort species 1, Liverwort species 2, Liverwort species 3	CLASPP	*Cladonia gracilis, Cladonia mitis, Cladonia rangiferina, Cladonia stellaris, Cladonia stygia, Cladonia* species 1
POLSPP	*Polytrichum commune, Polytrichum juniperinum, Polytrichum strictum*	FLASPP	*Flavocetraria cucullata, Flavocetraria nivalis*
SPHSPP	*Sphagnum angustifolium, Sphagnum balticum, Sphagnum capillifolium, Sphagnum compactum, Sphagnum fuscum, Sphagnum lindbergii, Sphagnum magellanicum, Sphagnum rossowii, Sphagnum warnstorfii, Sphagnum* species 1	MASSPP	*Masonhalea richardonsii*
		PELSPP	*Peltigera aphthosa, Peltigera* species 1*, Peltigera* species 2

* Grouped with *Cetraria* species to conform with previous groupings.

Multivariate Analyses

Multivariate analysis of 2021 data, specifically the ordination technique non-metric multidimensional scaling (NMDS), was used to further evaluate potential differences in vascular plant species composition between mine and reference sites. Ordination analyses were completed using R version 4.1.1 and the R package 'vegan' v. 2.5-7 (Oksanen et al. 2020). Non-metric multidimensional scaling is an ordination technique that assesses the similarity of plots in plant species space based on plant species composition data (Kruskal 1964; Prentice 1977; Kenkel & Orloci 1986). For this analysis, a chi-squared distance matrix was used to compare vegetation plots as this distance method operates on relative abundances and is relatively invariant given differences in sample size or in this case, differences in total cover at vegetation plots (Greenacre 2017). Vegetation community cover data were Wisconsin double standardized to remove effects of uneven total cover per plot prior to analysis (Cottam et al. 1978). Small distances between plots indicate that plots have greater similarities in plant community composition than plots that are positioned further apart, which indicates lower similarities. To reduce the variability in the data, only those plant species or groups (for bryophytes and lichens) that occurred on two or more plots were included in the analysis. This reduced the effect of uncommon species on the ordination.

To compliment the NMDS analysis, multivariate statistical tests using the Wisconsin double standardized chi-square distance matrix was used to compare vegetation plot species. A block two-way permutational multivariate analysis of variance (PERMANOVA) using distance matrices was used to evaluate differences in plant species cover between plot and community types. Permutations were restricted within each community type (i.e., blocked permutations). Assumptions, including multivariate homogeneity of variance and factor interactions, were tested using a permutational multivariate homogeneity of group variance (PERMDISP) test and Type III Sum of Squares (i.e., marginal SS) PERMANOVA, respectively. A total of 9,999 permutations were used for each test. If factor interactions were found not to be significant, then a reduced model with no interaction (i.e., Type II SS) was implemented. PERMANOVA and PERMDISP were implemented using R v. 4.1.1 with the R package 'vegan'.

2.3 Results

2.3.1 Dust Deposition Rates

Arithmetic and geometric mean dust deposition rates from 2002 to 2021 indicate that dustfall is higher near the mine PVPs than the reference PVPs (Table 2.3-1). As expected, due to the log-normal distribution of dust deposition data, average values using arithmetic means are greater than geometric mean values. Dust deposition rates during open pit mine construction and mining (2002 to 2005), and during open pit mining and underground mine construction (2006 to 2009) were significantly higher than during the underground mining phase (2010 to 2017) ($t=5.062$, $p<0.001$) (Figure 2.3-1). Dust deposition rates increased, though not significantly ($t=-2.135$, $p=0.209$), from a mean of 280.3 mg/dm^2/y (95% CI = 218.1 to 360.2 mg/dm^2/y) during the underground phase of 2014 to 2017 to a mean rate of 398.6 mg/dm^2/y (95% CI = 324.4 to 489.8 mg/dm^2/y) when open pit mining began again (2018 to present) (Figure 2.3-1).

Dust deposition rates for PVP's located near the Mine have had an average deposition rate of 442 mg/dm^2/y (95% CI = 383 to 511 mg/dm^2/y) over the 2002 to 2021 period of record. These deposition rates are three to four times higher than a deposition rate of 128 mg/dm^2/y (95% CI = 112 to 146 mg/dm^2/y) observed at the reference stations over the same period.

The mean geometric deposition rate over the 2019-2021 period for the dust trigger near-field stations (Dust 05, 07, 08) was 178 mg/dm^2/y (95% CI = 65 to 484 mg/dm^2/y), and 88 mg/dm^2/y (95% CI = 50 to 153 mg/dm^2/y) for the reference stations (Dust 09, C1, C2). Mean deposition rate at near-field stations (178 mg/dm^2/y) was greater than the upper 95% CI for reference stations (153 mg/dm^2/y).

Table 2.3-1: Summary Statistics of Dust Deposition Rates near the Diavik Mine, 2002 to 2021

Plot Type	Dust Gauge	Nearest PVP	Arithmetic Mean (mg/dm^2/y)	Geometric Mean (mg/dm^2/y)	Geometric 95% CI (mg/dm^2/y)
Mine	Dust 01	PVP01, PVP02, PVP03	509	469	393 – 560
	Dust 2A		567	467	353 – 618
	Dust 03	PVP07	1218	958	702 – 1307
	Dust 04	PVP04, PVP05, PVP06, PVP09, PVP20, PVP21, PVP22, PVP23	397	307	224 – 420
	Dust 06		493	392	275 – 560
	Dust 10	PVP10	370	265	162 – 433
	Dust 11		451	366	174 – 771
		Combined	**576**	**442**	**383 – 511**
Reference	Dust 05		196	138	103 – 185
	Dust 07		269	244	191 – 313
	Dust 08	PVP24, PVP31	197	171	133 – 220
	Dust 09	PVP17, PVP18, PVP19, PVP29, PVP30	95	94	66 – 133
	Dust 12		165	159	122 – 209
	Dust C1	PVP11, PVP12, PVP13, PVP26, PVP27, PVP28	75	68	53 – 88
	Dust C2	PVP14, PVP15, PVP16, PVP25	127	105	81 – 142
		Combined	**158**	**128**	**112 – 146**

PVP = permanent vegetation plot; mg/dm^2/y = milligrams per square metre per year; CI = confidence interval.

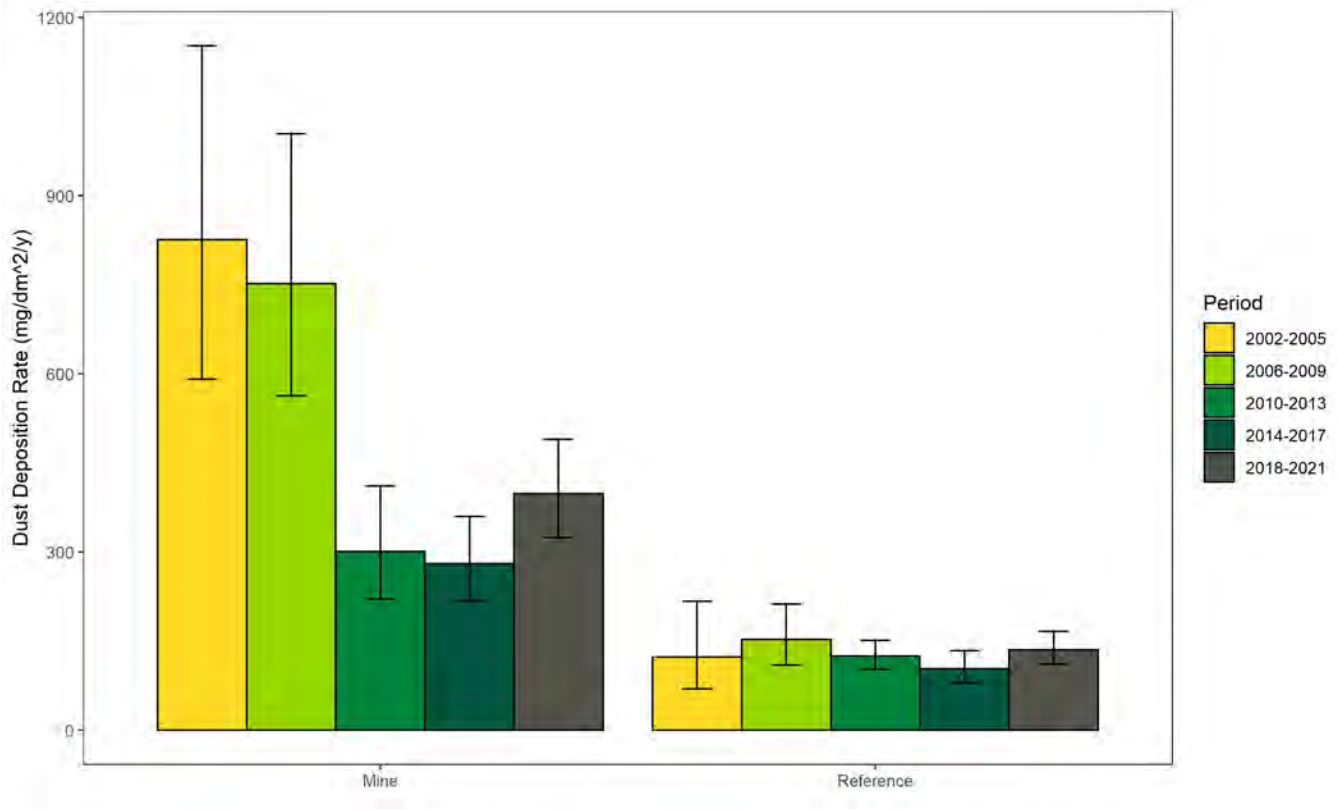


Figure 2.3-1: Geometric Average Dust Deposition Rates (± 95% Confidence Interval) near the Diavik Mine during Discrete Time Periods

2.3.2 Vascular Plant Species Cover and Richness

2.3.2.1 Mean Species Cover

Heath Tundra Vegetation Community

Mean total shrub cover did not differ significantly between mine and reference plots in the Heath Tundra community ($F_{1,8}$=1.684, p=0.231). However, shrub cover was significantly different among years ($F_{1.61,12.92}$=7.528, p=0.009), being greater in 2013, 2016, and 2021 as compared to 2008 and 2010 (Appendix C, Figure C-1a), and appears to be increasing over time. There was no significant interaction between year and plot type ($F_{4,32}$=0.070, p=0.991).

Mean total forb cover for mine plots was significantly greater than reference plots ($F_{1,8}$=6.056, p=0.039; Appendix C, Figure C-2a) but did not differ significantly among years ($F_{1.49,11.88}$=2.961, p=0.101). There was a significant interaction between year and plot type ($F_{1.49,11.88}$=7.646, p=0.011), likely due to the low mean cover and variability of forb species at reference sites compared to mine sites as well as interannual variability in forb cover at mine sites.

Mean total graminoid cover for was significantly greater at mine plots than at reference plots ($F_{1,8}$=4.799, p=0.060; Appendix C, Figure C-3a) but not significantly different among sampling years ($F_{1.27,10.20}$=2.751, p=0.123). There was no significant interaction between year and plot type ($F_{4,32}$=0.169, p=0.953).

In the Heath Tundra community, mean total litter cover did not differ significantly between mine and reference plots ($F_{1,8}$=0.719, p=0.421). However, litter cover did significantly change among years ($F_{4,32}$=27.792, p<0.001), and was greater for mine plots in 2008 and 2010 relative to other sampling periods (Appendix C, Figure C-4a). The interaction between year and plot type was significant ($F_{4,32}$=4.157, p=0.008).

Shrub Vegetation Community

In the Shrub community, mean total shrub cover did not differ between mine and reference plots ($F_{1,8}$=0.678, p=0.434) but did differ significantly among years ($F_{4,32}$=43.403, p<0.001). Similar to Heath Tundra, shrub cover was greater in 2013 and 2016 compared to previous years, as well as at mine plots compared to reference plots in 2021 (Appendix C, Figure C-1b). There was a significant interaction between year and plot type ($F_{4,32}$=3.628, p=0.015).

Similar to Heath Tundra, mean total forb cover on mine plots in the Shrub community was significantly greater than reference plots ($F_{1,8}$=3.723, p=0.090; Appendix C, Figure C-2b). Forb cover also showed significant inter-annual variation ($F_{1.64,13.11}$=3.985, p=0.051). There was no significant interaction between year and plot type ($F_{4,32}$=1.954, p=0.125).

Mean total graminoid cover for mine plots was significantly greater than reference plots ($F_{1,8}$=5.449, p=0.048; Appendix C, Figure C-3b), but did not vary significantly among years ($F_{1.36,10.86}$=1.488, p=0.259). There was no significant interaction between year and plot type ($F_{4,32}$=2.196, p=0.092).

Mean total litter cover did not differ significantly between mine and reference plots in the Shrub community ($F_{1,8}$=0.795, p=0.399). However, litter cover showed significant year-to-year variability ($F_{2.16,17.29}$=58.617, p<0.001; Appendix C, Figure C-4b). There was no significant interaction between year and plot type ($F_{4,32}$=1.711, p=0.172).

Tussock-Hummock Vegetation Community

Similar to the Heath Tundra and Shrub communities, mean total shrub cover did not differ significantly between mine and reference plots in the Tussock-Hummock community ($F_{1,8}$=0.274, p=0.615; Appendix C, Figure C-1c), but was statistically greater in 2013, 2016, and 2021 than previous years ($F_{1.18,9.42}$=16.288, p=0.002). Shrub cover appears to be increasing over time, with mean cover at both reference and mine plots being greater than previous years. There was no significant interaction between year and plot type ($F_{4,32}$=0.203, p=0.935).

Mean total forb cover did not differ significantly between plot type ($F_{1,8}$=1.088, p=0.327) but did differ significantly among years ($F_{1.24,9.91}$=15.325, p=0.002). There was no significant interaction between year and plot type ($F_{4,32}$=0.606, p=0.661) (Appendix C, Figure C-2c).

Mean total graminoid cover did not differ significantly between mine and reference plots ($F_{1,8}$=0.012, p=0.914; Appendix C, Figure C-3c). Graminoid cover varied among years in the Tussock-Hummock community ($F_{1.41,11.30}$=3.430, p=0.089) and is likely related to interannual differences in variability of graminoid cover at vegetation plots. There was no significant interaction between year and plot type ($F_{4,32}$=0.856, p=0.501).

Similar to Heath Tundra and Shrub communities, mean total litter cover did not differ significantly between mine and reference plots in the Tussock-Hummock community ($F_{1,8}$=2.770, p=0.135; Appendix C, Figure C-4c). However, unlike Heath Tundra and Shrub communities, mean total litter cover did not differ

significantly among years ($F_{4,32}$=1.854, p=0.413). A significant interaction between year and plot type was present ($F_{4,32}$=2.740, p=0.046). This is likely attributable to the variable direction of differences between reference and mine plot litter cover in past sampling years where litter cover is increasing in reference plots while decreasing in mine plots over time.

2.3.2.2 Mean Species Richness

Heath Tundra Vegetation Community

Mean total vascular plant species richness in mine plots was significantly higher than in reference plots in the Heath Tundra community ($F_{1,8}$=6.788, p=0.031; Appendix D, Figure D-1a). However, vascular plant species richness did not differ significantly among years ($F_{4,32}$=0.729, p=0.579). There was no significant interaction between year and plot type ($F_{4,32}$=0.447, p=0.774).

Mean total shrub species richness did not differ significantly between mine and reference plots ($F_{1,8}$=0.278, p=0.612). Shrub species richness differed significantly among years, with a slight increase in number of species observed in 2021 ($F_{4,32}$=4.356, p<0.001; Appendix D, Figure D-2a). There was no significant interaction between year and plot type ($F_{4,32}$=0.681, p=0.610).

In the Heath Tundra community, mean total forb species richness in mine plots was significantly higher than in reference plots ($F_{1,8}$=6.216, p=0.037; Appendix D, Figure D-3a). Forb species richness did not vary significantly among years ($F_{4,32}$=1.664, p=0.183), and there was no significant interaction between year and plot type ($F_{4, 32}$ = 0.956, p = 0.445).

Mean total graminoid species richness in mine plots was significantly higher than in reference plots ($F_{1,8}$=22.26, p=0.002), and showed some inter-annual variation in the Heath Tundra community ($F_{4,32}$=2.392, p=0.071; Appendix D, Figure D-4a). There was no significant interaction between year and plot type ($F_{4,32}$=0.33, p=0.856).

Shrub Vegetation Community

In the Shrub community, mean total vascular plant species richness did not differ significantly between plot type ($F_{1,8}$=2.371, p=0.162) or between years ($F_{4,32}$=1.169, p=0.343). There was no significant interaction between year and plot type ($F_{4,32}$=1.556, p=0.210; Appendix D, Figure D-1b).

Mean total shrub species richness did not differ significantly between mine and reference plots ($F_{1,8}$=0.377, p=0.556) or between years in the Shrub community ($F_{4,32}$=1.74, p=0.165; Appendix D, Figure D-2b). There was no significant interaction between year and plot type ($F_{4,32}$=0.909, p=0.470).

Mean total forb species richness did not differ significantly between plot type ($F_{1,8}$= $8.32E^{-32}$, p = 1.000) or among years ($F_{4,32}$=0.837, p=0.512) in the Shrub community. In addition, there was no significant interaction between year and plot type ($F_{4,32}$=0.930, p=0.459; Appendix D, Figure D-3b).

Similar to the Heath Tundra community, mean total graminoid species richness in mine plots was significantly higher than in reference plots in the Shrub community ($F_{1,8}$=11.294, p=0.010; Appendix D, Figure D-4b). However, species richness did not differ significantly among years ($F_{4,32}$=0.954, p=0.446). There was no significant interaction between year and plot type ($F_{4,32}$=0.404, p=0.805).

Tussock-Hummock Vegetation Community

Mean total vascular plant species richness did not differ significantly between mine and reference plots in the Tussock-Hummock community ($F_{1,8}$=0.021, p=0.339; Appendix D, Figure D-1c), or between years ($F_{4,32}$=1.780, p=0.211). There was no significant interaction between year and plot type ($F_{4,32}$=1.22, p=0.339).

Mean total shrub species richness did not differ significantly between mine and reference plots in the Tussock-Hummock community ($F_{1,8}$=0.524, p=0.49; Appendix D, Figure D-2c). Shrub species richness exhibited a statistically significant increase compared to previous years, increasing from an average of 6.5 between 2008 and 2016 to 7.6 in 2021 ($F_{4,32}$= 6.270, p<0.001). There was no significant interaction between year and plot type ($F_{4,32}$=0.054, p=0.994).

In the Tussock-Hummock community, mean total forb species richness did not differ significantly between mine and reference plots ($F_{1,8}$=1.025, p=0.341). However, forb species richness was statistically higher during 2010 to 2016, particularly in reference plots, and lower during 2021 at both reference and mine plots ($F_{4,32}$=7.442, p<0.001; Appendix D, Figure D-3c). There was no significant interaction between year and plot type ($F_{4,32}$=0.992, p=0.426).

Mean total graminoid species richness did not differ significantly between plot type ($F_{1,8}$=0.536, p=0.485) or across years ($F_{1.64,13.1}$=0.905, p=0.473). There was no significant interaction between year and plot type ($F_{1.64,13.1}$=1.231, p=0.317; Appendix D, Figure D-4c).

2.3.3 Lichen and Moss Species Cover and Richness

Heath Tundra Vegetation Community

In the Heath Tundra community, mean total lichen cover did not differ significantly between mine plots and reference plots ($F_{1,8}$=2.835, p=0.131; Appendix C, Figure C-5a) or among years ($F_{2.16,18.25}$=1.114, p=0.355). There was no significant interaction between year and plot type ($F_{4,32}$=1.353, p=0.272).

Mean total lichen species richness did not differ significantly between mine and reference plots ($F_{1,8}$=0.133, p=0.725) but has shown a declining trend since 2013 ($F_{2,16}$=35.534, p<0.001; Appendix D, Figure D-5a). There was no significant interaction between year and plot type ($F_{2,16}$=1.181, p=0.332).

Mean total bryophyte cover was significantly higher in mine plots than reference plots in the Heath Tundra community ($F_{1,8}$=9.629, p=0.015; Appendix C, Figure C-4a). Bryophyte cover also differed significantly among years ($F_{4,32}$=3.095, p=0.029), showing a steady increase at mine plots over time while reference plot bryophyte cover remained relatively stable. As such, there was a significant interaction between year and plot type due to this trend ($F_{4,32}$=2.831, p=0.041).

Mean total bryophyte species richness was significantly higher in mine plots than reference plots ($F_{1,8}$=5.400, p=0.049). Bryophyte species richness did not vary significantly among years in the Heath Tundra community ($F_{1,26}$=2.08, p=0.157; Appendix D, Figure D-6a). There was no significant interaction between year and plot type ($F_{2,16}$=1.12, p=0.351).

Shrub Vegetation Community

In the Shrub community, while mean total lichen cover was generally higher on reference plots compared to mine plots, it did not differ significantly ($F_{1,8}$=2.806, p=0.132; Appendix C, Figure C-5b) or among years

($F_{1.61,12.84}$=0.455, p=0.603). There was no significant interaction between year and plot type ($F_{4,32}$=0.298, p=0.877).

Like the Heath Tundra community, mean total lichen species richness did not differ significantly between mine and reference plots ($F_{1,8}$=1.392, p=0.272) but was significantly higher in 2013 than in 2016 and 2021 ($F_{2,16}$=27.626, p<0.001; Appendix D, Figure D-5b). There was no significant interaction between year and plot type ($F_{2,16}$=0.429, p=0.658).

Mean total bryophyte cover did not differ significantly between plot type ($F_{1,8}$=0.489, p=0.466) or among years
($F_{1.14,9.4}$=1.407, p=0.272). There was no significant interaction between year and plot type ($F_{4,32}$=0.489, p=0.744; Appendix C, Figure C-6b).

Mean total bryophyte species richness did not differ significantly between mine and reference plots in the Shrub community ($F_{1,8}$=0.432, p=0.529; Appendix D, Figure D-6b). Species richness has declined significantly across years ($F_{2,16}$=7.139, p=0.006). There was no significant interaction between year and plot type ($F_{2,16}$=0.628, p=0.546).

Tussock-Hummock Vegetation Community

In the Tussock-Hummock community, while mean total lichen cover was generally higher on reference plots compared to mine plots, it did not differ significantly ($F_{1,8}$=2.964, p=0.123; Appendix C, Figure C-5c) or among years ($F_{1.89,15.15}$=1.965, p=0.176). There was no significant interaction between year and plot type ($F_{4,32}$=0.226, p=0.922).

Similar to the Heath Tundra and Shrub communities, lichen species richness did not vary between mine and reference plots ($F_{1,8}$=0.365, p=0.563) but was significantly higher in 2013 than 2016 and 2021 in the Tussock-Hummock community ($F_{2,16}$=11.207, p<0.001; Appendix D, Figure D-5c). There was no significant interaction between year and plot type ($F_{2,16}$=0.363, p=0.701).

Mean total bryophyte cover did not differ significantly between plot type ($F_{1,8}$=0.636, p=0.448) or among years ($F_{1.88,15.08}$=1.831, p=0.195). There was no significant interaction between year and plot type ($F_{4,32}$=0.75, p=0.565; Figure Appendix C, Figure C-6c).

Like the Shrub community, mean total bryophyte species richness did not differ significantly between mine and reference plots ($F_{1,8}$=0.095, p=0.766) but did differ significantly among sampling years ($F_{2,16}$=22.854, p<0.001). There was a significant interaction between mine and reference plots across years ($F_{2,16}$=3.351, p=0.061; Appendix D, Figure D-6c).

2.3.4 Distribution of Vegetation Communities and Mine and Reference Sites Based on Plant Species Composition, 2021

Non-metric multidimensional scaling was used to plot and visually assess the ecological similarity between 2021 mine and reference plots for each of the three vegetation community types, based on species composition data. Small distances between plots indicate the plots have greater similarities in plant community composition than plots that are positioned further apart. Ordination scores for vegetation species/groups were overlain onto the plot ordination using dark blue points to depict the relative strengths of the relationships between plots and vegetation variables.

The NMDS ordination was highly representative of vegetation assemblages at PVPs (R^2=0.970; Figure 2.3-2). The overlap of each convex hull (i.e., the polygons that encompass all PVPs within each plot and community type) visible in ordination space indicates that vegetation cover is similar among groupings. Among the plot and vegetation community types, differences were apparent in the Tussock-Hummock community type between mine and reference plots, as the convex hulls for each plot type were clearly separated along axis 1 and did not overlap (Figure 2.3-2). In addition, convex hulls for the Shrub community only had marginal overlap between plot types. In contrast, PVPs in the Heath-Tundra community overlapped considerably in ordination space, with the reference plots being completely overlapped by the mine plots indicating these plot types have highly similar plant species cover.

Result of the PERMANOVA indicated differences in plant species cover. Assumptions testing indicated multivariate homogeneity of variance among groups (PERMDISP: $F_{5,24}$=2.440, p=0.059) and no significant interaction between plot type and community type ($F_{2,24}$=1.221, p=0.199). Two-way PERMANOVA test results indicate plant species cover similarity differed significantly by plot type ($F_{1,24}$=1.545, p=0.047; $R^2_{partial}$=0.045) and by community type ($F_{2,24}$=3.375, p=0.088; $R^2_{partial}$=0.194), which together explained 24% of observed variation in plant species cover. These results indicate that plant species cover is significantly different between mine and reference plots and among vegetation community types.

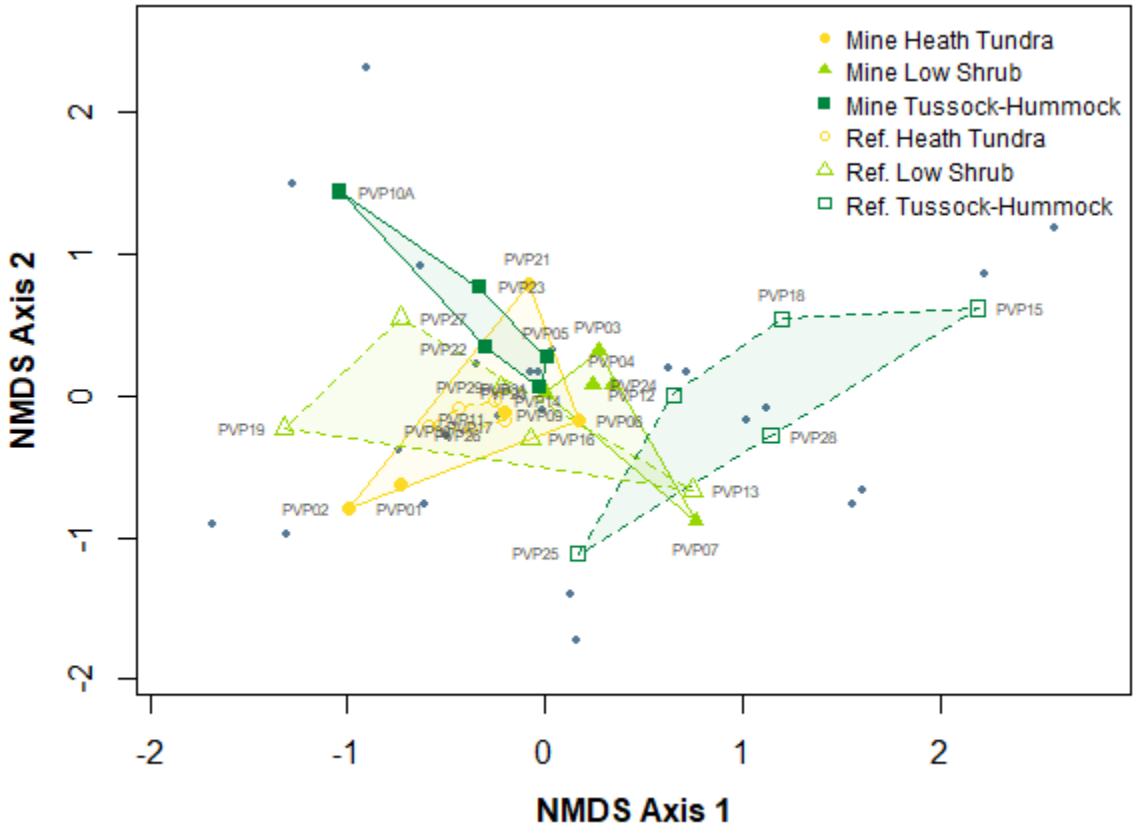


Figure 2.3-2: Non-metric Multidimensional Scaling Analysis of 2021 Plots in Plant Species Space

2.4 Discussion

The composition and dynamics of plant communities in Arctic ecosystems are inherently variable, with seasonal differences in precipitation, temperature, nutrients, as well as herbivory, interspecific competition, and successional processes (Barbour et al. 1987). This natural variability poses challenges in distinguishing changes in plant species abundance and composition that may occur due to mining activities from those due to natural factors or field sampling bias over time. Thus, long-term monitoring is fundamental to identifying changes to ecosystems, particularly in Arctic environments where changes may accumulate slowly over time.

Typically, a before-after control-impact (BACI) design that includes the monitoring of control and impacted sites before and after the establishment of a disturbance is used to account for some of this variability (Smith 2006). A BACI design was not used in this study, as permanent detailed vegetation sampling plots (i.e., PVPs) were established after the construction of the Mine. However, the vegetation monitoring program is robust enough to detect statistical changes in tundra vegetation composition and abundance. The RM-ANOVA (Zar 1999) used in this vegetation monitoring program allows for the statistical control of variation between sampling sites (PVPs or between subjects) that may be due to local site conditions prior to and after mining, and other factors such as dust and climate. The method examines the variation within each sampling site through time (within subjects), which provides a robust test of the influence of annual and cumulative dust deposition from Mine-related activities and concurrent changes in natural factors.

The results of the 2021 surveys were consistent with the patterns observed in previous monitoring reports (Golder 2011a, 2014, 2017) and a recently published study by Watkinson et al. (2021). For all three vegetation communities, there was no statistical difference in total shrub cover between mine and reference sites. However, shrub cover on mine and reference plots was greater in 2013, 2016, and 2021 relative to 2008 and 2010. Additionally, total shrub cover appears to be increasing over time in the Heath Tundra and Tussock-Hummock communities, while cover in the Shrub community appears to be declining from a high in 2013. In Heath Tundra and Shrub vegetation communities, forb and graminoid cover on mine plots were significantly greater than reference plots, but no difference was detected between plot types for the Tussock-Hummock community. However, the ecological significance of this result is uncertain given the low abundance of forbs and graminoids in Heath Tundra and Shrub communities. Forb cover in the Shrub and Tussock-Hummock appears to be declining over time, which could be due to the increasing shrub or graminoid cover in the Tussock-Hummock and Shrub communities, respectively.

Litter cover exhibited similar and opposite trends among vegetation communities with respect to changes between mine and reference plots and across time. In all three vegetation communities, litter cover was not statistically different between mine and reference sites but appeared greater within mine plots in 2008 and 2010 (Appendix C, Figure C-4). On both mine and reference plots, litter cover was significantly greater in 2008 and 2010 than in 2006, 2013, 2016, and 2021 in the Heath Tundra and Shrub communities. For the Tussock-Hummock community, litter cover has been generally greater on mine plots while declining over time, becoming lower than reference plots in 2021; this difference was not significant and litter cover did not vary significantly through time at the Tussock-Hummock community. Reasons for greater litter cover in 2008 and 2010 are uncertain. Deposition of dust onto vegetation is known to cause physiological and chemical responses in plant species, ranging from subtle changes in plant productivity (e.g., reduced photosynthesis or carbon uptake) to chlorosis or necrosis of the leaves that result in partial or complete defoliation of the plant (Spatt and Miller 1981). The higher rates of dust deposition observed during open pit mining (i.e., 2002 to 2009) may be partly responsible for greater litter cover on mine plots in 2008 and

2010. This does not however, explain the larger values of litter cover on reference plots during the same sampling periods. Temporal changes in litter cover may be also related to temperature and/or moisture patterns, which can affect leaf retention in shrubs or senescence in graminoids. Future analyses could consider the incorporation of weather as the data set may be long enough to detect relationships between vegetation and climatic variables.

Among vegetation communities, total lichen cover was generally lower on mine plots than on reference plots; these differences were more apparent for the Heath Tundra and Shrub communities than the Tussock-Hummock community, but differences were not statistically significant (Appendix C, Figure C-5). Bryophyte cover was significantly greater on mine plots in the Heath Tundra community, but no statistical differences between plot types were detected in the Shrub and Tussock-Hummock communities. Lichen cover did not vary significantly over time in any community. In the Heath Tundra community, bryophyte cover was significantly greater in 2021 at mine sites while staying consistent at the reference plots compared with previous sampling years. Bryophyte cover in the Tussock-Hummock and Shrub communities was statistically similar across time.

Vascular plant species richness among vegetation communities was primarily composed of shrub species; forb and graminoid taxa each contained 0 to 3 and 0 to 7 species, respectively, depending on the community. Total vascular plant species richness was significantly higher in the Heath Tundra community on mine plots than reference plots but did not differ significantly between plot types in the other two communities. Shrub species richness was not statistically different between mine and reference sites for any vegetation community. Forb species richness was not statistically different in the Shrub or Tussock-Hummock communities but was statistically greater at mine sites in the Heath Tundra community. Graminoid species richness was generally low in all vegetation communities and showed little difference between mine and reference sites in the Tussock-Hummock community but was significantly higher in the Heath Tundra and Shrub mine plots.

Similar to vascular plant cover, species richness exhibited some degree of variation over time among the different vegetation communities. In the Heath Tundra and Tussock-Hummock communities, shrub species richness on mine and reference plots showed temporally increasing trends, and no significant annual changes were detected in the Shrub community. In contrast, forb species richness in Tussock-Hummock was significantly lower during 2021 than previously sampling years, while no significant changes occurred in the other communities. No significant interannual variation was observed in forb species richness in the Shrub community. Graminoid richness has been variable across years in each community, with only Heath Tundra displaying a significant decrease in richness from 2010 to 2021.

Lichen and bryophyte species richness did not differ between mine and reference sites, except for the Heath Tundra community where bryophyte species richness was higher on mine plots. Lichen species richness was similar on mine and reference plots but decreased significantly from 2013 to 2021 for all vegetation communities. Bryophyte species richness in the Shrub and Tussock-Hummock communities varied significantly over time, decreasing steadily from 2013 to 2021, and decreasing from 2013-2016 to 2021, respectively. Part of this decrease in species richness was likely associated with the exclusion of trace species from the 2016 and 2021 sampling efforts relative to 2013 to control for the increased variability associated with cryptic/uncommon species and observer bias (Section 2.2.2.1). No significant temporal changes were detected in Heath Tundra community.

The results suggest that the Mine is likely having some local-scale effects on plant species abundance and composition. Most analyses showed that mine plots had greater vascular plant species cover and richness than reference plots. Although lichen cover was lower on mine plots than reference plots, lichen and bryophyte species richness were not adversely affected on mine plots relative to reference plots. It is known that many lichen and moss species are especially sensitive to the effects of dust deposition, as they derive some of their moisture and nutrient requirements from the atmosphere and are vulnerable to the smothering effects of dust (Farmer 1993). Reduced lichen cover on mine plots may be associated with a greater potential for vascular plant species to become established, which may be contributing to the greater cover and richness of some vascular plant species on mine plots in some vegetation communities. Similar results have been reported from other studies investigating the effects of road dust on plant species composition (Forbes 1995; Auerbach et al. 1997; Meyers-Smith et al. 2006), where one of the major responses of vegetation to dust was a decrease in lichen species and a corresponding increase in graminoids. Chen et al. (2017) detected a reduction in lichen cover within 1 km of the Misery road, which corresponded to dust deposition measured on dwarf birch leaves. However, the results for the Mine have detected no strong, adverse temporal patterns in plant species abundance and composition. For example, when lichen and bryophyte cover was found to vary significantly over time at mine plots, similar variation was observed at reference plots, suggesting drivers other than Mine-related effects.

The vegetation (and wildlife) monitoring programs provide data for testing the predictions associated with Key Questions from the EER Table 1.2-1; Section 1.2) (DDMI 1998). For Key Question 1, the current level of disturbance from the Mine footprint (11.6 km^2) is less than predicted in the EER (data from Wildlife Monitoring Program Report). No rare or endangered species or communities have been lost due to the Mine, which supports the prediction related to Key Question 3. Vegetation community structure, which includes plant species abundance and richness, has likely been altered due to dust deposition from the Mine, which supports the prediction for Key Question 2. Dust deposition rates have decreased significantly on mine plots since 2010 when mining went underground and has exhibited a moderate increase with open pit mining beginning again in 2017. While it has decreased from high levels prior to 2010, dust deposition is still approximately three times greater on mine sites than reference sites in 2021 (Figure 2.3-1).

Effects from the Mine have also resulted in some changes to plant community and species level diversity. Total vascular species richness on mine plots averaged 14% higher than reference plots. This was driven by the 31% higher richness in Heath Tundra mine plots. Graminoid species richness was higher on mine plots for each community type with an increase of 75%, 41%, and 33% on Heath Tundra, Tussock-Hummock, and Shrub communities, respectively. In addition, multivariate analyses on species composition data indicated no statistical difference between mine and reference plots. This contrasts Key Question 4, which predicts a decrease of 44% in species richness (Table 1.2-2).

Overall, the results of the analysis of dust deposition and vegetation data indicate differences in plant species abundance and composition in mine and reference plots over time are likely due to Mine-related effects, such as dust deposition. Natural variation in site conditions among PVPs prior to and after mining, annual variation in climate, foraging by caribou, surveyor variability, and difficulty in detecting cryptic species have also probably influenced changes in plant species cover and richness. However, the direction and magnitude of the differences between mine and reference sites have remained largely consistent over the past 15 years, and with limited and small adverse effects. Other analyses have also demonstrated a general decrease in metals concentrations in lichens sampled near the Mine site since 2010 (see Section 3.0; Appendix H Table H-2). Importantly, the data show no trajectory towards a divergence in the previous and current observed temporal and spatial patterns of plant species abundance and composition.

Based on the principles of adaptive management and the slow response of vegetation in the Arctic, it is recommended that this program be continued to confirm if the observed differences and changes in plant abundance and composition follow similar patterns during the remainder of mining operations. However, following the conditions outlined in the Dust Trigger for Vegetation and Lichen Monitoring technical memo (Golder 2019) the next monitoring cycle should occur in 3 years as the geometric mean dustfall values among near-field sites (177.5 mg/dm^2/y) exceed the upper 95% confidence interval of the reference sites (153.1 mg/dm^2/y).

2.5 Recommendations for Vegetation Monitoring

The following recommendations are proposed for the vegetation monitoring program.

- Continue to calculate average dust deposition rates using geometric means.

- Continue monitoring permanent vegetation plots to confirm if the observed differences and changes in plant species abundance and richness follow similar patterns during the remainder of mining operations; the next monitoring cycle should occur in 3 years (i.e., 2024).

3 LICHEN MONITORING PROGRAM

3.1 Study Objectives

The objective of the 2021 lichen sampling program was to collect lichen near and far from the Mine for analysis of metals, metalloids, and non-metals[1] to determine if dust generated from mining activities is causing a measurable increase in concentrations of metals in lichen near the Mine, and if metals concentrations in lichen have changed over time. Lichens were chosen because they are estimated to account for 87% to 90% of the diet for caribou (Thomas 1998). Lichens can also effectively and preferentially bioaccumulate airborne contaminants because of their lack of roots, large surface area, long life span, and high ion exchange capacity (Naeth and Wilkinson 2006). This allows lichens to provide “worst-case” exposure concentrations for assessment of health risks to caribou.

Soil samples were also collected at each lichen sampling location and were archived for possible future analysis if the results of the lichen chemistry indicated elevated metals concentrations relative to previous sampling events. The purpose of the soil sampling program was to incorporate exposure from inadvertent ingestion of soil by caribou while grazing on lichen.

[1] Henceforth, metals, metalloids (e.g., arsenic), and non-metals (e.g., selenium) will be referred to as metals.

3.2 Study Area

The study design includes three primary sampling zones: near-field (NF), far-field (FF), and far-far-field (FFF; Table 3.2-1). The first zone is the near-field area surrounding the Mine. The 20 stations sampled in this near-field area were selected in 2010 and are distributed 0 to 6 km from the Mine (Figure 3.2-1). Nine of these stations are located near long-term dustfall monitoring gauges (Golder 2011b).

The second zone is a far-field area, which consists of twenty-four stations (Figure 3.2-2). Of these 24 stations, 20 have been sampled since 2010 and are located within a concentric area 30 to 40 km from the Mine site. The initial 20 stations were randomly selected[2]. Another station located just outside of this area to the east was sampled in 2016 and 2021 (i.e., FF-25)[3]. Three additional stations were identified as important caribou habitat by the Elders in 2013 (Tłı̨chǫ Government 2013). The three stations selected by the Elders were located between the near-field and far-field areas at 14.0 to 20.6 km from the Mine; for this report, these are considered to be within the far-field area. In the study area, the prevailing winds blow from the southeast (Watkinson et al. 2021).

Three stations were sampled in 2021 in a far-far-field area approximately 100 km from the Mine site (Figure 3.2-3). One of these stations was also sampled in 2016 (i.e., FFF-3). Two of the three stations were moved from their 2016 locations because they were located in Nunavut, although just on the other side of the Northwest Territories-Nunavut border. These stations were moved slightly in 2021 to be within the Northwest Territories. Data collected from these stations were used to provide additional context for regional dust deposition rates and to address concerns from community members.

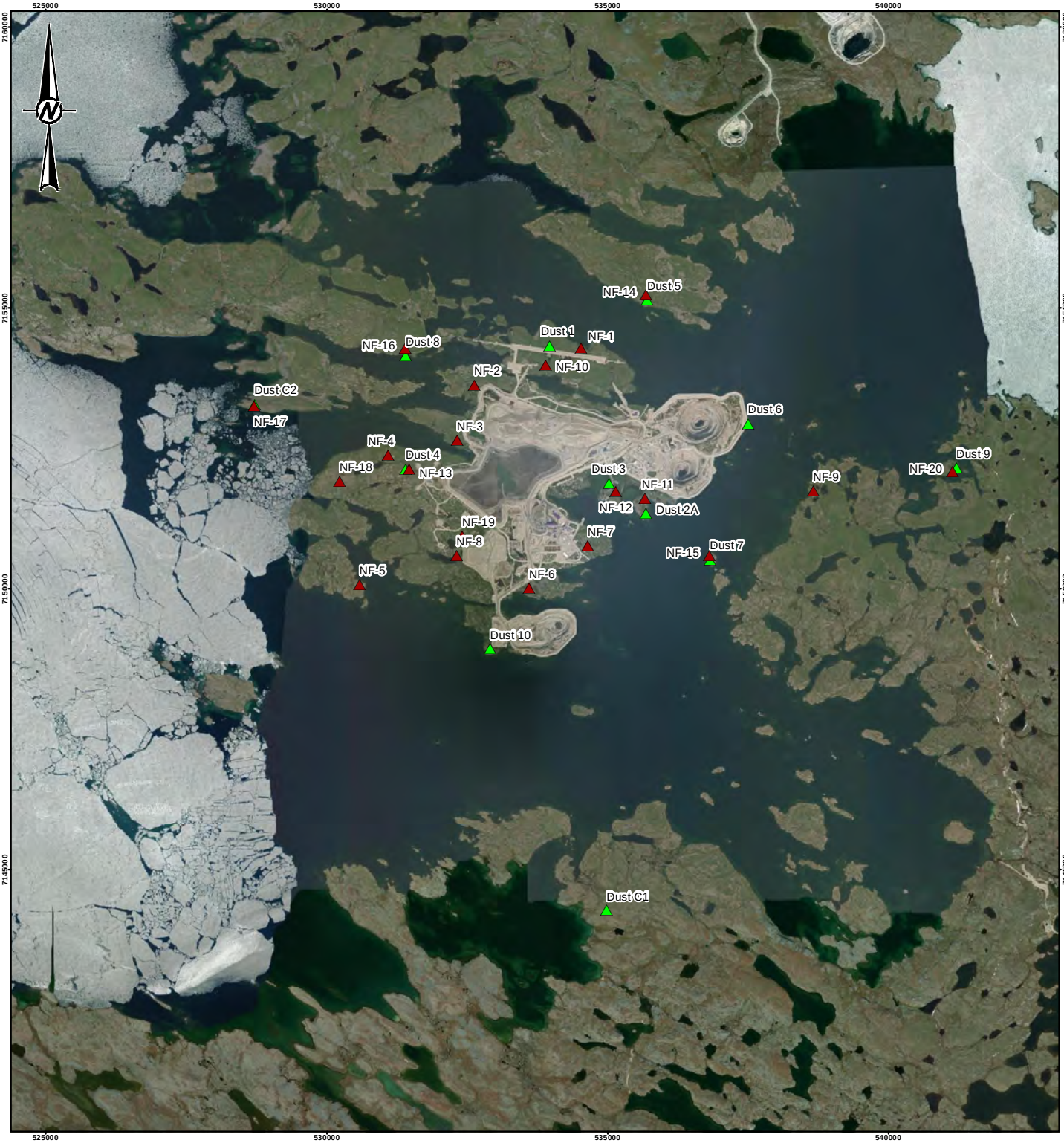
[2] In 2010, there were also four stations located in the northwest quadrant of the concentric 30 to 40 km area. These stations have not been sampled since 2013 due to the influence of Arctic Canadian Diamond Company Ltd.'s (formerly BHP Billiton and Dominion Diamond Ekati Corporation) Ekati mine on those stations.

[3] In 2013, FF-25 was located in south of the far-field area; this station was accidentally moved to a location east of the far-field area in 2016 due to a field technician error.

Table 3.2-1: Lichen and Soil Sampling Locations, 2021.

Site	Zone	Easting	Northing	Distance to Mine (km)
NF-1	Near-field	534525	7154287	0.4
NF-2	Near-field	532622	7153625	1.6
NF-3	Near-field	532312	7152640	2.4
NF-4	Near-field	531082	7152377	3.5
NF-5	Near-field	530578	7150070	5.4
NF-6	Near-field	533601	7150010	4.2
NF-7	Near-field	534647	7150761	3.5
NF-8	Near-field	532307	7150585	4.0
NF-9	Near-field	538654	7151733	5.2
NF-10	Near-field	533888	7153974	0.3
NF-11	Near-field	535676	7151494	3.1
NF-12	Near-field	535145	7151725	2.7
NF-13	Near-field	531466	7152122	3.4
NF-14	Near-field	535677	7155230	1.9
NF-15	Near-field	536811	7150582	4.5
NF-16	Near-field	531390	7154277	2.7
NF-17	Near-field	528703	7153249	5.5
NF-18	Near-field	530225	7151903	4.5
NF-19	Near-field	532405	7150932	3.7
NF-20	Near-field	541134	7152077	7.3
FF-26[(a)]	Far-field	546804	7145820	15.2
FF-27[(a)]	Far-field	547091	7159349	14.0
FF-28[(a)]	Far-field	551097	7164608	20.0
FF-1	Far-field	552050	7186774	37.2
FF-2	Far-field	559969	7168195	29.4
FF-3	Far-field	535297	7186510	32.4
FF-5	Far-field	565743	7146678	32.5
FF-7	Far-field	562992	7163745	30.4
FF-8	Far-field	569067	7137802	38.6
FF-9	Far-field	558952	7125100	38.3
FF-10	Far-field	543979	7121650	34.0
FF-11	Far-field	527387	7119180	35.7
FF-12	Far-field	516910	7126337	32.8
FF-13	Far-field	502430	7135775	36.7
FF-14	Far-field	500789	7146978	34.1
FF-15	Far-field	502003	7152495	32.2
FF-17	Far-field	565980	7175242	38.2
FF-19	Far-field	503355	7149690	31.1
FF-20	Far-field	519932	7116339	40.4
FF-21	Far-field	534501	7121764	32.4
FF-22	Far-field	507499	7127931	37.4
FF-23	Far-field	564481	7138068	34.4
FF-24	Far-field	547846	7123847	33.3
FF-25	Far-field	567049	7156214	33.0
FFF-1	Far-far-field	614669	7089163	103.6
FFF-2	Far-far-field	635651	7177417	104.2
FFF-3	Far-far-field	436420	7151897	97.8

(a) These sites were selected by the Elders in 2013 and were formerly grouped with the Near-Field sites (formerly NF-21, NF-22, and NF-23, respectively). Following Watkinson et al. (2021), these sites were grouped with the Far-Field sites for analyses.



LEGEND

- DUSTFALL COLLECTOR
- NEAR-FIELD SAMPLING LOCATION

0 2 4

1:100,000 KILOMETRES

REFERENCE(S)

1. IMAGERY COPYRIGHT © 20200108 ESRI AND ITS LICENSORS. SOURCE: MAXAR. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT

Rio Tinto

PROJECT

DIAVIK DIAMOND MINES INC.

TITLE

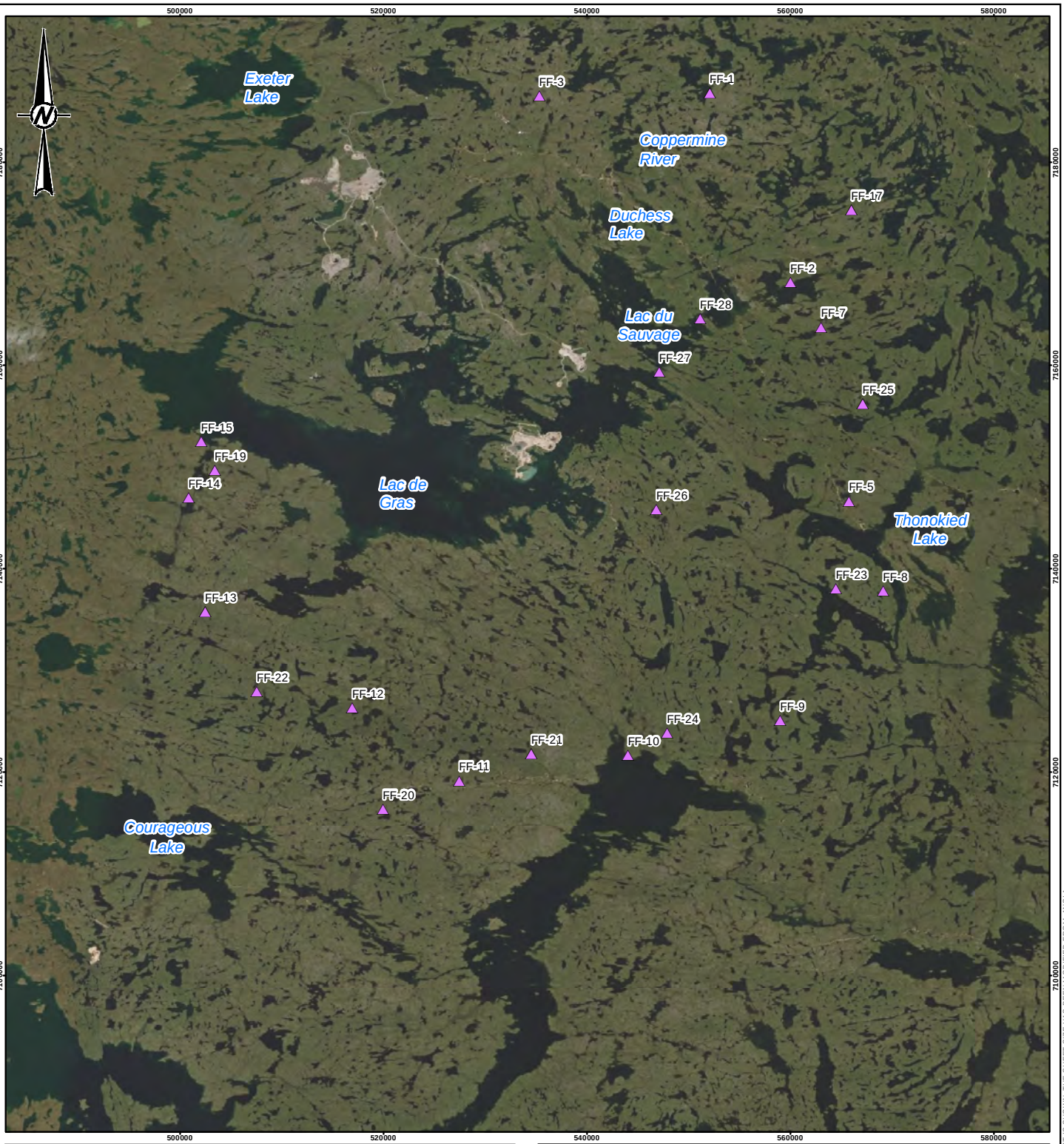
NEAR-FIELD AREA LICHEN AND SOIL SAMPLING LOCATIONS AND DUSTFALL COLLECTORS, 2021

CONSULTANT

WSP GOLDER

YYYY-MM-DD	2022-03-28
DESIGNED	ML
PREPARED	LMS
REVIEWED	KS
APPROVED	JV

PROJECT NO.	PHASE	REV.	FIGURE
21452119	3000	0	3.2-1



LEGEND

▲ FAR-FIELD SAMPLING LOCATION

0 10 20

1:550,000 KILOMETRES

REFERENCE(S)

1. IMAGERY COPYRIGHT © 2010-2021 ESRI AND ITS LICENSORS. SOURCE: MAXAR. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT

RioTinto

PROJECT

DIAVIK DIAMOND MINES INC.

TITLE

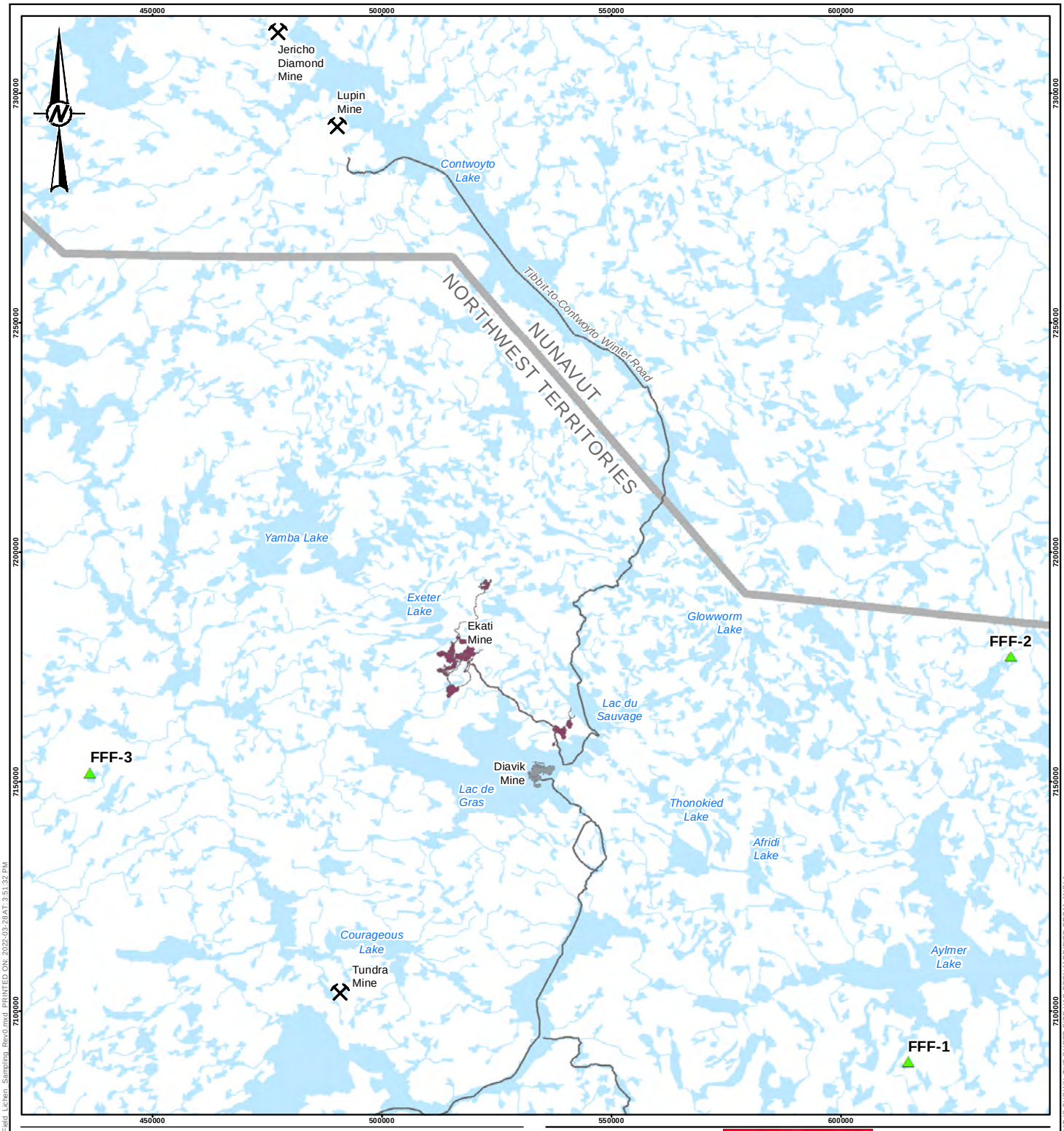
FAR-FIELD AREA LICHEN AND SOIL SAMPLING LOCATIONS, 2021

CONSULTANT

WSP GOLDER

YYYY-MM-DD	2022-03-28
DESIGNED	ML
PREPARED	ANK
REVIEWED	KS
APPROVED	JV

PROJECT NO.	PHASE	REV.	FIGURE
21452119	3000	0	3.2-2



LEGEND

- FAR-FAR-FIELD SAMPLING LOCATION
- MINE LOCATION
- WATERCOURSE
- WATERBODY
- EKATI FOOTPRINT
- DIAVIK FOOTPRINT
- TERRITORIAL BOUNDARY

0 25 50

1:1,200,000 KILOMETRES

REFERENCE(S)

1. BASE DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT

RioTinto

PROJECT

DIAVIK DIAMOND MINES INC.

TITLE

FAR-FAR-FIELD AREA LICHEN AND SOIL SAMPLING LOCATIONS, 2021

CONSULTANT

WSP GOLDER

YYYY-MM-DD	2022-03-28
DESIGNED	CS
PREPARED	ANK
REVIEWED	KS
APPROVED	JV

PROJECT NO.	PHASE	REV.	FIGURE
21452119	2000	0	3.2-3

3.3 Methods

3.3.1 Sample Site Selection at Sampling Stations

Although there was a random element to the station selection in the original study design (Golder 2011b), the actual site of sampling in 2013, 2016, and 2021 was subjective and based on the previous guidance of the Elders (Tłı̨chǫ Government 2013) as to where caribou would eat and preferred caribou habitat. Upon arrival at the station coordinates, the general area was surveyed by the Golder biologist from the helicopter and on the ground to determine a location where caribou would be likely to feed. The final sampling sites were chosen within 1 km of the 2013 coordinates.

3.3.2 Data Collection

The field investigation was completed from 8 to 15 August 2021. The investigations were carried out by a biologist and field technician from Golder. The weather during this sampling period was mainly cool, overcast, and windy, with light rain/precipitation on five days and several mornings with fog.

For each sample location, species of lichen collected, soil characteristics, and observations of caribou activity were recorded (Appendix E). Lichens previously identified by Elders as those that would potentially be consumed by caribou were observed and collected at every sample location; this includes the following species[4]:

- *Alectoria ochroleuca* (green witch's hair lichen)
- *Arctocetraria andrejevii* (Andrejev's Iceland lichen)
- *Bryocaulon divergens* (northern/heath foxhair lichen)
- *Bryoria* species
- *Cetraria islandica* (Iceland lichen)
- *Cetraria laevigata* (striped Iceland lichen)
- *Cladonia gracillis* (smooth reindeer lichen)
- *Cladonia mitis* (green reindeer lichen)
- *Cladonia rangiferina* (grey reindeer lichen)
- *Cladonia stellaris* (star-tipped reindeer lichen)
- *Cladonia stygia* (black-footed reindeer lichen)
- *Cladonia* species
- *Dactylina* species
- *Flavocetraria cucullata* (curled snow lichen)

[4] In general, scientific nomenclature and common names followed naming conventions consistent with the NatureServe on-line database (NatureServe 2021).

- *Flavocetraria nivalis* (crinkled snow lichen)
- *Masonhalea richardsonii* (arctic tumbleweed lichen)
- *Peltigera* species
- *Stereocaulon paschale* (easter foam lichen)
- *Stereocaulon species*

Clean sampling protocols were implemented so that samples were not contaminated by external sources. Powderless nitrile gloves were used for all contact with lichens and soil. Titanium scissors were used to snip the upper leafy portion from several plants within the same location at each sample site to create a composite sample. Samples were collected in resealable plastic bags and kept cool until they could be frozen and transported to the laboratory for analysis. All tools used in sampling were cleaned between sites by washing with detergent and rinsing with distilled water. New nitrile gloves were used at each sample plot. The samples collected at each plot were recorded and each plot was photographed.

Lichen samples were not washed or cleaned of dust and soil prior to analysis. A cleaning step was not considered to be appropriate given that the purpose of the lichen monitoring program was to assess dust deposition on lichen and associated effects on caribou health. Caribou are also known to inadvertently ingest dust and soil while foraging. In addition, no statistical differences in metals concentrations were observed in comparisons of washed and unwashed lichen samples in 2010 (Golder 2011b).

Soil samples were collected from the top 15 cm of the soil layer at the same locations as lichen samples using a plastic (nylon) trowel. As with lichen samples, soil was collected in resealable plastic bags and kept cool until it could be transported to the laboratory for analysis. The purpose of the soil sampling was to incorporate exposure from inadvertent ingestion of soil by caribou while grazing on lichens into a risk assessment, if deemed necessary.

Field duplicates of lichen and soil were collected to assess the variability in results within a sampling location. Seven lichen and soil duplicate samples were collected: four in the near-field area, two in the far-field area, and one in the far-far-field area. At each location, the sample was gently mixed to form a composite, and then split into two separate samples, which were analyzed separately for metals.

Lichen and soil samples were analyzed by Bureau Veritas Laboratories (BV Labs), Burnaby, British Columbia. Lichen samples were analyzed for total mercury by cold vapour atomic fluorescence (CVAF), total metals by collision/reaction cell inductively coupled plasma mass spectrometry (CRC-ICPMS), and percent moisture. The metals analyzed by CRC-ICPMS were aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, cesium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, phosphorus, potassium, selenium, silver, sodium, strontium, tellurium, thallium, thorium, tin, titanium, uranium, vanadium, zinc, and zirconium. A sub-sample of each soil sample was analyzed for mercury because mercury in soil has a short holding time (14 days). The remaining soil sample was archived for possible future metals analysis if the results of the lichen analysis indicated higher concentrations than previously observed (i.e., an increasing trend in metals concentrations).

3.3.3 Data Analysis

3.3.3.1 Comparison of Near- and Far-Field Lichen Samples

Metals concentrations in lichen collected in 2021 were tabulated and summary statistics calculated for each area (e.g., mean, median, standard deviation, standard error, minimum and maximum concentrations). Mean concentrations of parameters measured in lichen from near-field and far-field areas were statistically and graphically compared to determine if metals concentrations were different between areas. One half the reportable detection limit (RDL) was substituted for non-detect values in the dataset prior to data analyses. Data were examined for normality, using the Shapiro-Wilk test, and equality of variance (homoscedasticity) using Levene's test; log10-transformations were applied to help meet assumptions of parametric statistics. If transformed data did not meet assumptions, then a non-parametric test was used. Data that met assumptions were compared using ANOVA; data that did not meet assumptions were compared using Kruskal-Wallis tests (non-parametric equivalent of one-way ANOVA). All statistical tests used α=0.05. Metals concentrations in lichen from the far-far-field were graphically compared to near-field and far-field values. Statistical analyses were completed using R version 4.1.1 (R Core Team 2021), using base packages as well as the 'psych' package (Revelle 2021). Graphs were generated using R version 4.1.1 and the package 'ggplot2' (Wickham 2016).

3.3.3.2 Spatial Trends in Lichen Metals Concentrations

Trends in lichen metals concentrations with distance from the Mine were characterized using generalized linear models, following Watkinson et al. (2021). A power model ($y = a \cdot x^b$) was fit to metals concentration data in lichen collected in 2021 for each metal of interest. Model fit was evaluated using the coefficient of determination (R^2) and the model p-value (α=0.05). Power models of metals concentrations in lichen and distance from the Mine were visualized graphically. Models were fit to data and graphs were generated using R version 4.1.1, using base packages and the package 'ggplot2'.

3.3.3.3 Temporal Trends in Near-Field Lichen Metals Concentrations

The mean concentrations of parameters measured in lichen from the near-field area were statistically and graphically compared to determine if metals concentrations were different across 2010, 2013, 2016, and 2021. The metals concentration data collected in 2010, 2013, and 2016 are presented in Golder (2011b, 2014, 2017). Data were examined for normality and homoscedasticity. One-way ANOVA and Tukey's Honest Significant Differences (Tukey HSD) post-hoc tests were used to compare metals concentrations in lichen samples collected in the near-field areas across years. For those parameters that did not meet the statistical assumptions, Kruskal-Wallis tests and Dunn's multiple comparisons post-hoc tests were used. All statistical tests used α=0.05. Comparisons were completed using R version 4.1.1, using base packages as well as the package 'FSA' (Ogle et al. 2021). Graphs were generated using R version 4.1.1 and the package 'ggplot2'.

3.3.3.4 Comparison of Duplicates

Duplicate lichen and soil samples were analyzed to assess sample homogeneity. The results obtained from the duplicate samples were used to calculate the relative percent difference (RPD) for each parameter. A lower RPD indicates higher sample homogeneity. A RPD was considered notable when it was 30% or greater and when the mean of the duplicates was greater than five times the DL. This second criterion takes into account the potential for data accuracy error when parameter concentrations approach detection limits. Relative percent difference was calculated from the following formula:

$$RPD = \left(\frac{|sample - duplicate|}{mean}\right) \times 100$$

3.4 Results

3.4.1 Field Observations

In general, the field crew observed that the lichen in the near-field stations in close proximity to roads and the airstrip appeared in poorer health, which may be due to dust deposition. In comparison, the lichen and other vegetation in the far-field stations appeared healthier and had no apparent signs of dust deposition. Rain was relatively frequent during field collections, which may have affected signs of dust deposition. Based on field observations, both lichen cover and diversity also appeared higher at far-field sites with the exception of stations NF-5 and NF-15. These stations had higher density and diversity of lichen coverage compared with other near-field sites, which may be due to their locations in close proximity to Lac de Gras and on peninsulas or islands, respectively.

Lichen species assemblage varied between sites and included some species not observed in previous years. Generally, near-field stations had fewer lichen species that had lower coverage (mean = 7.96 species, 20% coverage) than far-field stations (mean = 9.15 species, 33% coverage). The most abundant species were *Flavocetraria nivalis*, *Flavocetraria cucullata*, *Cladonia rangiferina*, and *Cladonia stygia*, which were found at over 90% of stations. Common species also included *Bryocaulon divergens*, *Masonhalea richardsonii*, *Cladonia stellaris*, *Cladonia mitis*, and *Stereocaulon* species, which were found at ~65% of near-field stations and ~86% of far-field stations. Two species were found only at near-field stations, *Cladonia gracilis* and *Bryoria* species, occurring at 9% and 4% of stations, respectively. One species, *Dactylina* species, was found only at far-field stations and occurred at 30% of the stations.

The Elders previously documented that caribou no longer used the near-field stations adjacent to the Mine or did not use them to the same extent prior to development of the Mine (Tłı̨chǫ Government 2013). In the 2021 field surveys, signs of caribou activity (e.g., tracks, fecal pellets, grazed lichens and/or plants, or animal presence) were observed by the biologists at one near-field station (4%), although the age of these signs could not be confirmed (Table 3.4-1). No caribou were observed at near-field stations during sampling.

Table 3.4-1: Summary of Caribou Activity Observations at 2021 Sampling Stations

Sampling Area	Number of Stations with Observed Caribou Activity	Total Number of Stations	Percent of Total
Near-field	1	20	5%
Far-field	8	24	33%
Far-far-field	2	3	67%
Total	**11**	**47**	**23%**

In 2013, the far-field stations FF-5, FF-13, FF-14, FF-15, FF-19, and FF-21 were identified by Elders as no longer being of high use by caribou. Such areas were described as “sites not located on migration routes or on valuable forage areas” (Tłı̨chǫ Government 2013). Recent signs of caribou activity were observed at two of these stations (FF-5 and FF-13) in 2021. Recent caribou activity (e.g., animal sightings, fecal pellets, grazed lichens and/or plants, and trails) was observed at 8 of the far-field (38%) and 2 of the far-far field stations (Table 3.4-1).

3.4.2 Lichen Chemistry

Appendix F Table F-1 (near-field stations), Table F-2 (far-field stations), and Table F-3 (far-far-field stations) provides chemistry results by station and measured parameters for lichen samples.

Data quality and replicability were evaluated prior to analysis. Parameters with reported concentrations below RDL in more than 60% of samples were not included in the analyses (Appendix H, Table H-1). Tellurium was not detected in any lichen sample. Bismuth, lithium, selenium, and tin were detected in less than 37% of the samples; these metals were detected infrequently in the far-field samples (0 to 14%) and more frequently in the near-field samples (28 to 91%). However, over 90% of detected concentrations of antimony, beryllium, boron, selenium, silver, tellurium, and tin were within five times the detection limit, which is considered within the range of analytical uncertainty[5]. Thus, these parameters were not retained for further analysis.

Although several parameters were measured in lichen, the list of metals carried forward into the statistical analysis was limited to parameters that had the potential to be toxic to caribou or be present at high enough concentrations to cause toxicity. Parameters not retained for analysis were calcium, cesium, iron, magnesium, phosphorus, potassium, sodium, thorium, and zirconium. The 18 retained lichen chemistry parameters included:

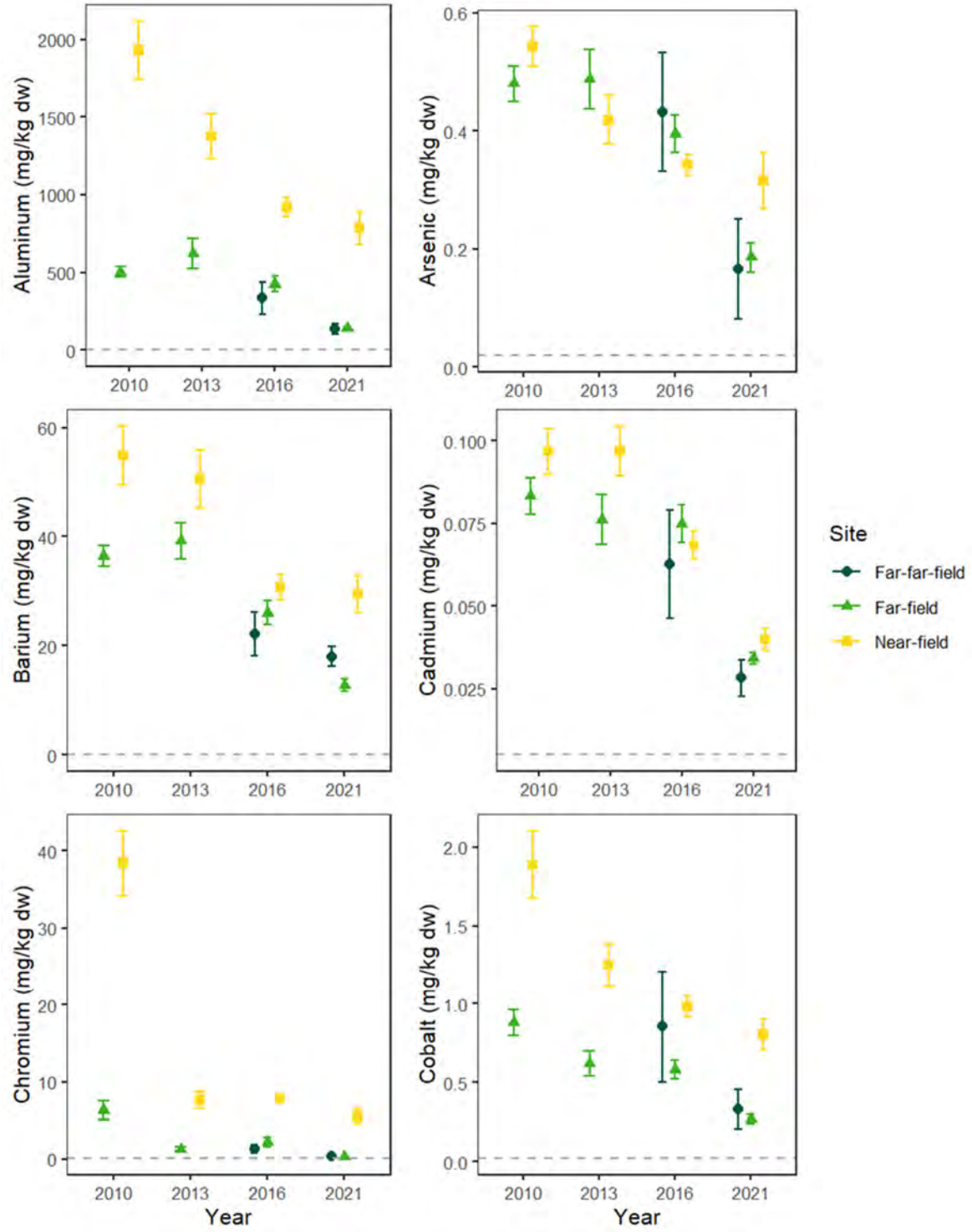
- Aluminum
- Arsenic
- Barium
- Copper
- Lead
- Manganese
- Strontium
- Thallium
- Titanium

[5] Measured concentrations that are close to the analytical detection limit have a higher level of uncertainty. Acceptability criteria in water quality monitoring programs typically take into consideration this uncertainty and relax the data quality objectives when reported values are close to the detection limit. For example, BCFSM (2013) assesses the acceptability of field duplicate results if at least one of the duplicate values is greater than five times the detection limit.

- Cadmium
- Chromium
- Cobalt
- Mercury
- Molybdenum
- Nickel
- Uranium
- Vanadium
- Zinc

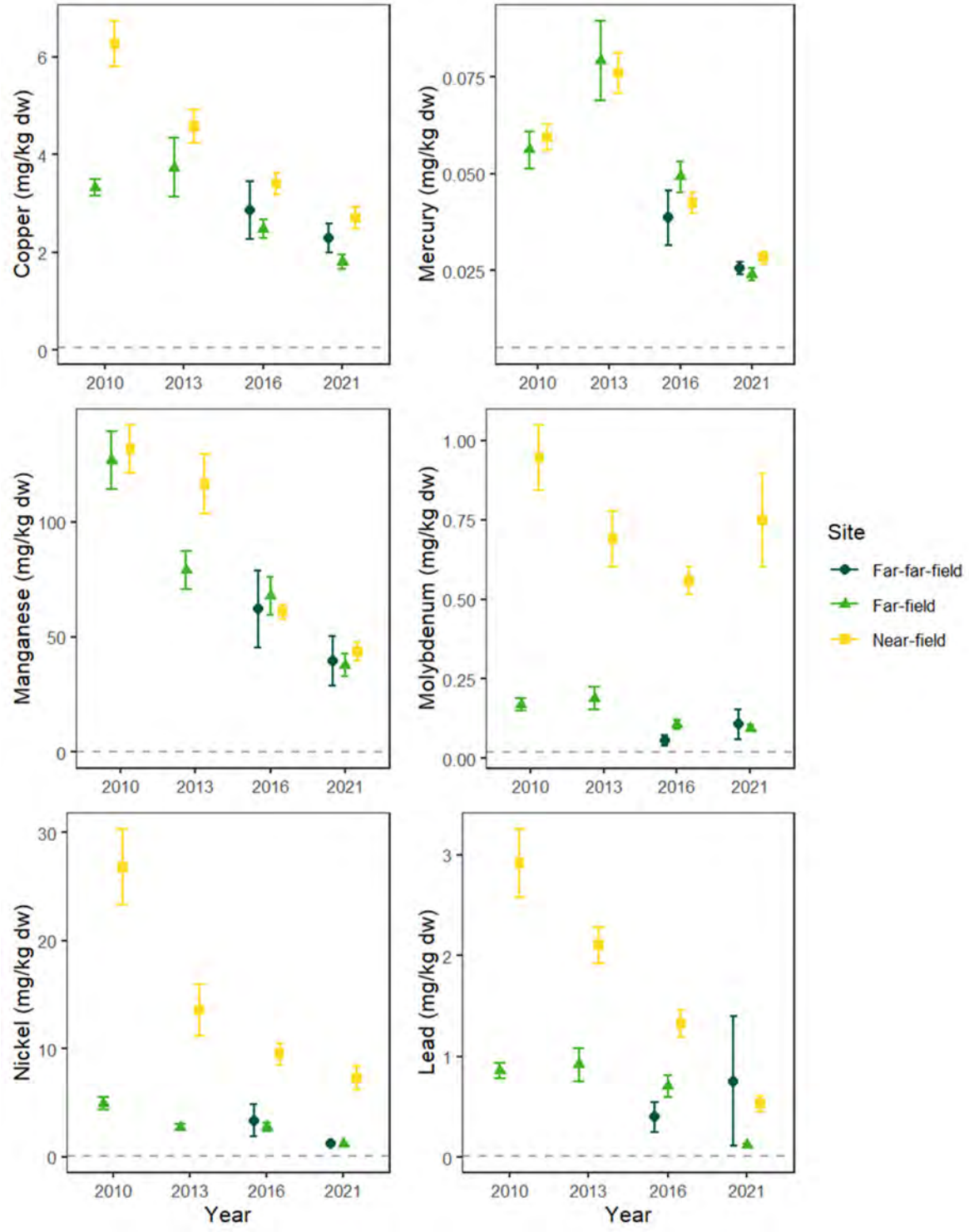
3.4.2.1 Comparison of Near- and Far-Field Lichen Samples

Mean (plus or minus [±] 1 standard error [SE]) metals concentrations in lichens collected from the near-field area were graphically compared to mean concentrations measured in the far-field area (Figure 3.4-1 to Figure 3.4-3). For most parameters, mean metals concentrations were higher in the near-field area than in the far-field area. Metals concentrations of all assessed parameters in 2021 were confirmed to be statistically higher in the near-field area compared with the far-field area ($p<0.05$) with the exception of cadmium, manganese, and zinc (Appendix H, Tables H-1, H-2). In addition, mean (±1SE) metals concentrations in lichens collected from the far-far-field area were graphically compared to mean concentrations measured in the far-field area (Figure 3.4-1 to Figure 3.4-3). For all assessed parameters, mean metals concentrations in the far-far-field area were similar or lower compared to far-field area with the exception of barium, copper, lead, and vanadium, which were higher.



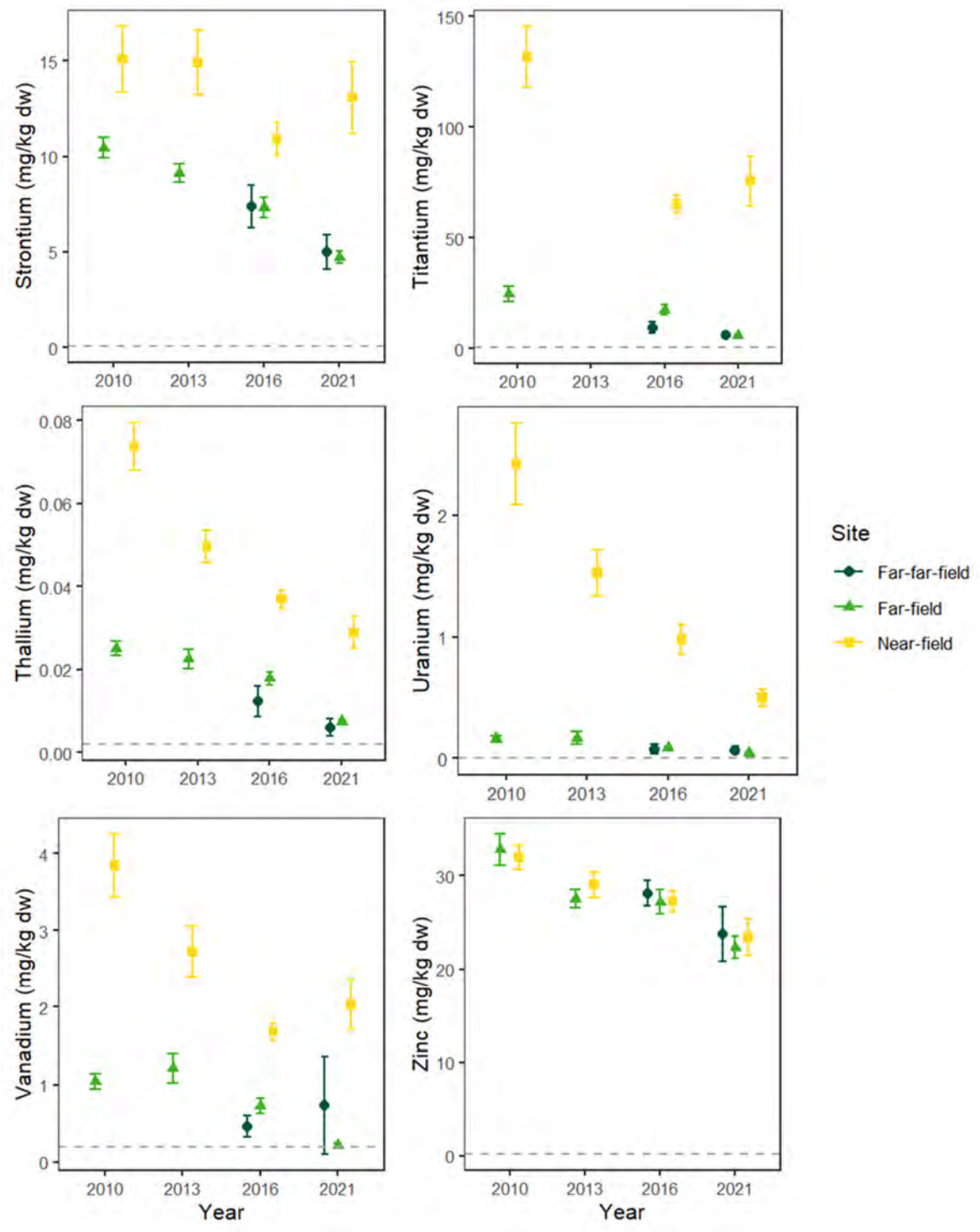
Detection limits indicated with grey dashed line. Note: scale of y-axis is different among metals.

Figure 3.4-1: Mean (± 1 Standard Error) Concentrations of Aluminum, Arsenic, Barium, Cadmium, Chromium, and Cobalt in Lichen, 2010 to 2021



Detection limits indicated with grey dashed line. Note: scale of y-axis is different among metals.

Figure 3.4-2: Mean (± 1 Standard Error) Concentrations of Copper, Mercury, Manganese, Molybdenum, Nickel, and Lead in Lichen, 2010 to 2021

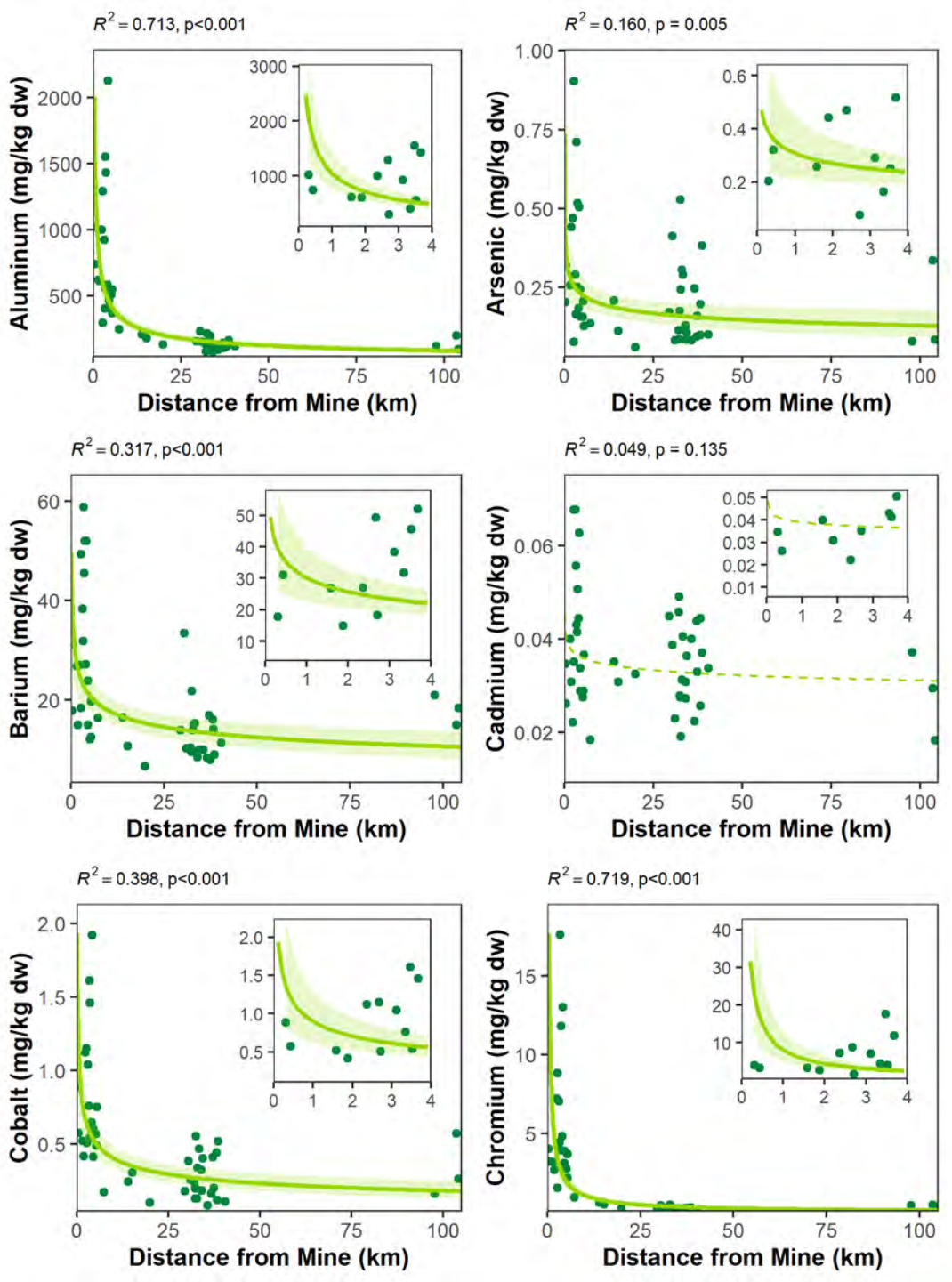


Detection limit indicated with grey dashed line. Note: titanium not measured in 2013; scale of y-axis is different among metals.

Figure 3.4-3: Mean (± 1 Standard Error) Concentrations of Strontium, Titanium, Thallium, Uranium, Vanadium, and Zinc in Lichen, 2010 to 2021

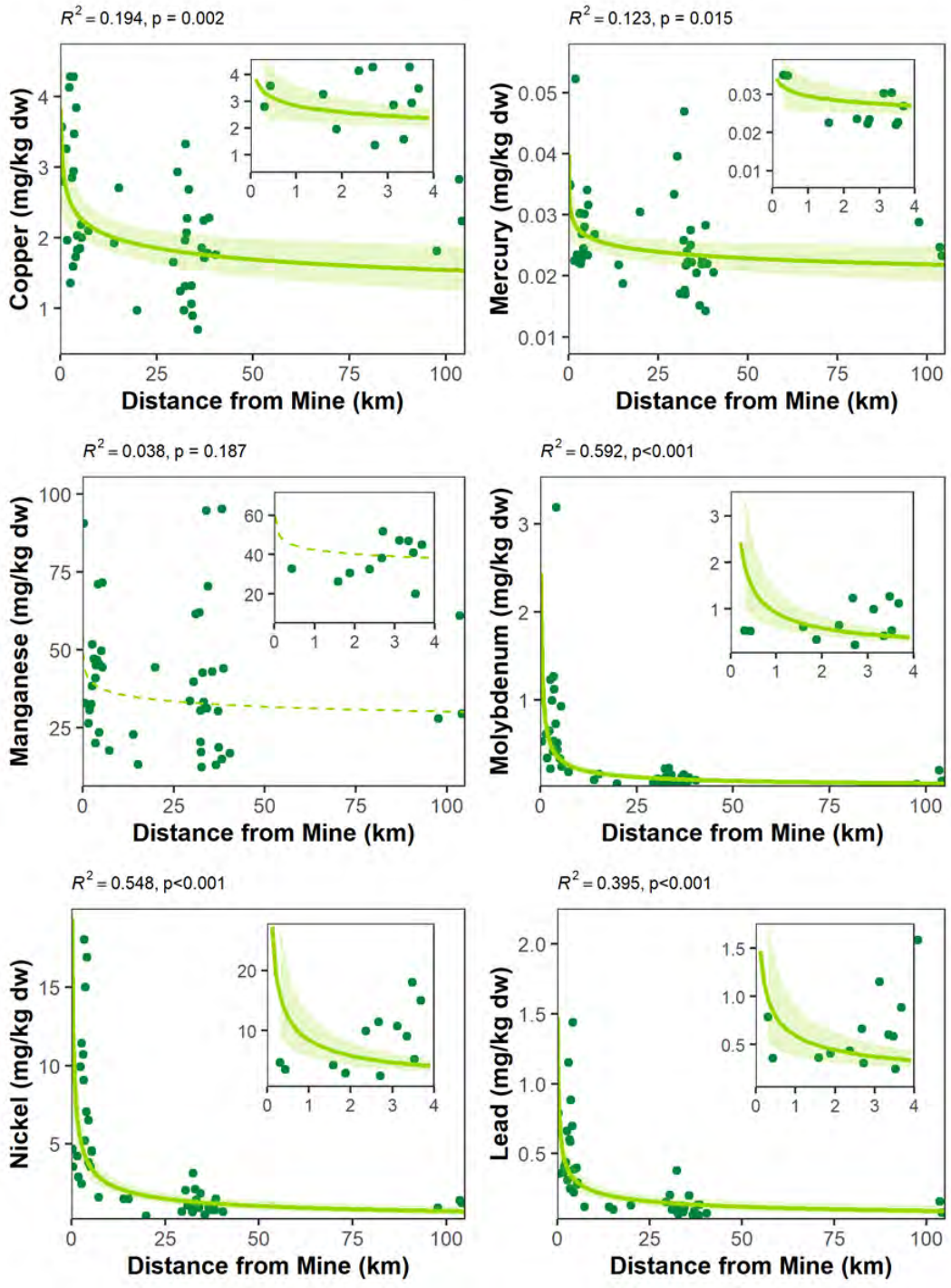
3.4.2.2 Spatial Trends in Lichen Metals Concentrations

Power models ($y = a \cdot x^b$) were used to explore trends in lichen metals concentrations with distance from the Mine (Figure 3.4-4 to Figure 3.4-6). For most metals, concentrations declined significantly ($p<0.05$) with increasing distance from the Mine (Appendix H, Table H-3); cadmium, manganese, and zinc concentrations in lichen were not significantly ($p\geq0.05$) related to distance (Appendix H, Table H-3). Most lichen samples collected further than 4 km had similar metals concentrations as far-field sites. However, arsenic, copper, and mercury concentrations were found at variable concentrations at far-field sites 30-40 km from the Mine.



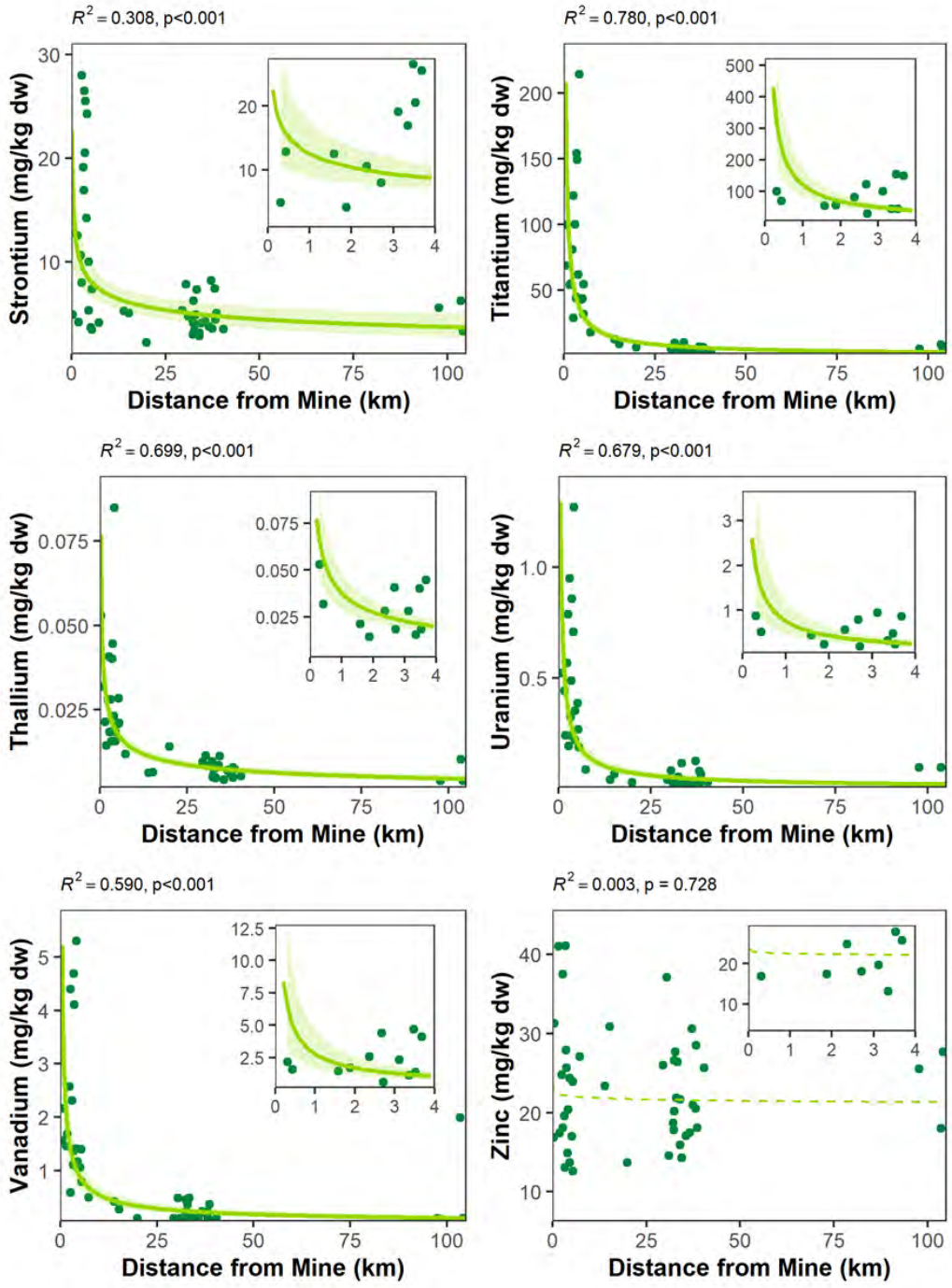
Note: The power model is shown with a solid green line, and the 95% confidence interval is shown with a light green band. Inset plots show concentrations measured within 4 km of the Mine site. Scale of y-axis is different among metals.

Figure 3.4-4: Concentrations of Aluminum, Arsenic, Barium, Cadmium), Cobalt, and Chromium in Lichen Collected at Various Distances from the Mine



Note: The power model is shown with a solid green line, and the 95% confidence interval is shown with a light green band. Inset plots show concentrations measured within 4 km of the Mine site. Scale of y-axis is different among metals.

Figure 3.4-5: Concentrations of Copper, Mercury, Manganese, Molybdenum, Nickel, and Lead in Lichen Collected at Various Distances from the Mine



Note: The power model is shown with a solid green line, and the 95% confidence interval is shown with a light green band. Zinc was not significantly related to distance, and therefore the power model is shown with a dashed green line. Inset plots show concentrations measured within 4 km of the Mine site. Scale of y-axis is different among metals.

Figure 3.4-6: Concentrations of Strontium, Titanium, Thallium, Uranium, Vanadium, and Zinc in Lichen Collected at Various Distances from the Mine

3.4.2.3 Temporal Trends in Near-field Lichen Metals Concentrations

Mean metals concentrations in lichens in the near-field area were compared among years both graphically (Figure 3.4-1 to Figure 3.4-3) and statistically (Appendix H, Table H-1). In lichen samples from the near-field area, all parameters were measured at significantly ($p<0.05$) lower concentrations or not significantly different ($p\geq0.05$) in 2021 when compared with concentrations measured in 2010, 2013, and 2016 (Table H-1).

3.4.2.4 Comparison of Duplicate Samples

The incidence of RPDs greater than 30% was generally high in the lichen duplicates, regardless of sampling areas. Duplicates ranged in number of incidences, from 3 to 13 parameters. High variability among some duplicates was also observed in 2013 and 2016 (Golder 2014, 2017).

3.4.3 Soil Chemistry

Appendix G, Table G-5 provides the mercury concentrations in soil samples collected with the lichen samples. These results are provided for future reference but are not analyzed or discussed further in this report. As stated in Section 3.1, the purpose of the soil collection and analysis was to assess uptake of metals by caribou through incidental soil ingestion, which would be necessary if a new risk assessment was required.

3.5 Discussion

Lichen species are an important and preferred food source for caribou, along with willows, birch, sedges, grasses and mushrooms (Thomas 1998; Bergerud et al. 2008). Lichens are also good indicators of air quality as they absorb metals from fossil fuel and dust emissions. The input from the Elders during the 2013 field program remained valuable in 2021 for identifying specific sampling sites near the pre-selected near-field, far-field and far-far-field station locations (Tłı̨chǫ Government 2013). The Elders pointed out the lichen species that caribou prefer to eat and commented on the lichen and vegetation conditions at the sampling sites, and how the dust from the Mine influences caribou use at the sites. Comments from the Elders on lichen and vegetation conditions near the Mine site reflect that they noticed dust on the lichen near the Mine, and they stated that this dust reduced the quality of the forage for caribou (Tłı̨chǫ Government 2013). The Elders also stated that caribou will avoid using the area close to the Mine as their migration route because caribou recognize the difference in lichen quality (by smell and taste). A previous study has also observed a potential link between total suspended particulates (which includes dust) near the Ekati and Diavik mines and local changes in abundance and distribution of caribou (Boulanger et al. 2012).

The lichen monitoring program provides data for testing the predictions associated with Key Questions in Table 1.2-2 (Section 1.2). During the 2021 sampling program, the field crew observed that the lichen communities in the near-field area and in close proximity to roads and the airstrip had lower species richness and lower coverage, which may be due to higher rates of dust deposition from traffic and flights. In comparison, the lichen communities in the far-field stations had greater richness and greater coverage, and had no apparent signs of dust deposition. However, the relatively frequent rainstorms that occurred during the field sampling program may have confounded observations of dust deposition. Similar reductions

in lichen cover were found within 1 km of the Misery road (Chen et al. 2017). Lichens are sensitive to the smothering effects of dust deposition as they derive both required nutrients and moisture from the air (Farmer 1993). The statistical analysis of metals concentrations in lichen from the near-field area confirmed the observations of the Elders that dust deposition is higher near the Mine and further supports the recent study by Watkinson et al. (2021). Most of the assessed metals (15 of 18) were higher in lichens from the near-field area compared to the far-field area and reached similar concentrations in the far-field area within 4 km of the Mine, which supports the predictions related to Key Questions 1 and 2 (Table 1.2-2).

Mining methods have changed at the Mine since the inception of lichen monitoring program. From 2010 to 2016 all kimberlite extraction had been completed using underground methods. In 2017, one of the three active kimberlite extraction operations (pit A21) began using open-pit mining methods. Dust deposition rates have increased in 2018 to 2021 from the low rates measured during the underground mining phase (Section 2.3.1); however, the observed increase is not statistically significant. Further, dust deposition rates are still below those measured during pit construction and the initial open-pit mining phases (2002 to 2009). Previously, the move from open-pit to underground extraction led to a decrease in metals concentrations measured in lichen from 2010 to 2016. Despite the recent reversion to open-pit mining at one pit, no increase in metals concentrations in lichen has been observed. Concentrations of metals measured in lichen in 2021 were significantly less than or not significantly different than concentrations measured in 2016 and 2013. Moreover, nearly all metals assessed in the near-field area were significantly lower in 2021 compared to 2010, with the exceptions of molybdenum and strontium; concentrations of these metals did not differ in the near-field area among years. These results do not support the prediction from Key Question 3 that metals concentrations in lichen would be similar over time (Table 1.2-2).

The lichen monitoring program was primarily designed to assess whether the predicted increased metals uptake by lichen near the Mine would pose a risk to the health of caribou. The 2010 risk assessment used conservative assumptions to estimate exposure and effects to caribou, such as assuming that the caribou would obtain all their food and water from the near-field area throughout the year (Golder 2011b). Despite these conservative assumptions, the risk estimates predicted no adverse effects to caribou health.

Analysis of lichen chemistry during 2013 showed that metals concentrations in the near-field (Mine site) area were higher than the far-field area; however, there was an apparent decreasing trend in metals concentrations near the Mine (Golder 2014). The analysis provided during the fourth cycle of this program provides further support for this decreasing trend as most of the metals examined were statistically lower or not significantly different in 2021 than in 2016, and most of the metals examined were statistically lower in 2021 than in 2013 and/or 2010. Also, most metals concentrations in the far-far-field sampling area were similar to concentrations in the far-field sampling area, indicating that the far-field area provided a sufficient reference for testing conditions near the Mine site.

Given that the majority of metals concentrations have decreased below concentrations reported in the 2010 risk assessment, a follow up risk assessment based on 2021 data is not required. Metals concentrations are predicted to be within safe levels for caribou (as predicted from Key Question 4; Table 1.2-2) and are expected to remain within safe levels into the future as the Mine is approaching the end of operations.

3.6 Recommendations for Lichen Monitoring

The 2021 lichen chemistry results did not identify any new recommendations for this monitoring program. Based on the principles of adaptive management, it is recommended that the sampling frequency for this study align with the frequency of the vegetation monitoring program (Section 2.5).

4 CLOSURE

We trust that the information provided in this report is sufficient for your present needs. Should you have any questions regarding the above information or require additional information please contact the undersigned.

Golder Associates Ltd.

Marc La Flèche, MSc., PBiol.
Intermediate, Terrestrial Ecologist

Nelson Zabel, MSc.
Intermediate, Ecologist

Daniel Coulton, Ph.D., RPBio.
Senior, Wildlife Biologist

Kerrie Serben, M.Sc.
Lead, Environmental Scientist

John Virgl
Senior Principal, Ecologist, PhD

DC/KS/jlb

5 REFERENCES

Abdi H. (2010). The greenhouse-geisser correction. Encyclopedia of Research Design 1(1): 544–548.

Barbour MG, Burk JH, Pitts WD. 1987. Terrestrial Plant Ecology. Second Edition. The Benjamin/Cummings Publishing Company, Inc.: Menlo Park, USA. 634 pp.

Bergerud AT, Luttich SN, Camps L. 2008. *The return of caribou to Ungava*. McGill–Queens University Press.

Boulanger J, Poole KG, Gunn A, Wierzchowski J. 2012. Estimating the zone of influence of industrial developments on wildlife: a migratory caribou Rangifer tarandus groenlandicus and diamond mine case study. Wildlife Biology 18(2): 164–179.

British Columbia Field Sampling Manual (BCFSM). 2013. Part A Quality Control and Quality Assurance. Available at: B.C. Field Sampling Manual - Province of British Columbia (gov.bc.ca). Accessed 1 March 2022.

Chen W, Leblanc SG, White HP, Prevost C, Milakovic B, Rock C, Sharam G, O'Keefe H, Corey L, Croft B, Gunn A, Van Der Wielen S, Football A, Tracz B, Pellissey JS, Boulanger J. 2017. Does dust from Arctic mines affect caribou forage? Journal of Environmental Protection 8: 258-276.

Condit R. 1995. Research in large, long-term tropical forest plots. Trends in Ecological Evolution 10:18–22.

Cottam G, Goff FG, Whittaker RH. 1978. Wisconsin comparative ordination. Ordination of Plant Communities. Springer: Dordrecht, The Netherlands. 185 – 213.

Dale VH, Beyeler SC, Jackson B. 2002. Understory vegetation indicators of anthropogenic disturbance in longleaf pine forests at Fort Benning, Georgia, USA. Ecological Indicators 1:155-170.

DDMI. 2019. Closure and Reclamation Plan – Version 4-1.

Ecosystem Classification Group. 2012. Ecological regions of the Northwest Territories: Southern Arctic. Department of Environment and Natural Resources, Government of Northwest Territories.

Farmer AM. 1993. The effects of dust on vegetation: A review. Environmental Pollution 79: 6375.

Girden E. 1992. ANOVA Repeated Measures. Quantitative Applications in the Social Sciences series. No. 84. Sage Publications: Newbury Park, USA.

Golder (Golder Associates Ltd). 2011a. Appendix I: Vegetation Monitoring Program. Comprehensive Data Report. Submitted to Diavik Diamond Mines Inc., NWT, Canada

Golder. 2011b. Appendix II: Risk Assessment of Caribou Exposure to Metals from Dust Deposition to Lichen. Submitted to Diavik Diamond Mines Inc., NT, Canada.

Golder. 2014. Final Report: 2013 Comprehensive Vegetation and Lichen Monitoring Program. Submitted to Diavik Diamond Mines Inc., NT, Canada.

Golder. 2017. Final Report: 2016 Comprehensive Vegetation and Lichen Monitoring Program. Submitted to Diavik Diamonds Mines Inc., NT, Canada.

Golder. 2019. Technical Memorandum: Dust Trigger for Vegetation and Lichen Monitoring. Submitted to Diavik Diamonds Mines Inc., NT, Canada.

Greenacre M. 2017. 'Size' and 'shape' in the measurements of multivariate proximity. Methods in Ecology and Evolution 8: 1415-1424.

Kassambara A. 2021. rstatix: Pipe-Friendly Framework for Basic Statistical Tests. R package version 0.7.0. https://CRAN.R-project.org/package=rstatix

Kenkel, NC, Orloci, L. 1986. Applying metric and nonmetric multidimensional scaling to ecologist studies: some new results. Ecology 67(4): 919–928.

Kenward MG, Roger JH. 1997. Small sample inference for fixed effects from restricted maximum likelihood. Biometrics 53: 983–997.

Krebs CJ. 1989. Ecological Methodology. Harper and Row. New York, NY.

Kruskal JB. 1964. Nonmetric multidimensional scaling: a numerical method. Psychometrika 20(2): 115–129.

Naeth MA, Wilkinson S. 2006. Lichens as bioindicators of dust distribution and monitoring at Diavik Diamond Mine, Northwest Territories. Final Report. Submitted to Environmental Division. Diavik Diamond Mines Ltd. NT.

NatureServe. 2021. NatureServe Explorer: An online encyclopedia of life [web application]. NatureServe, Arlington, Virginia. Available: https://explorer.natureserve.org/. (Accessed: October 2021).

Ogle DH., Doll JC, Wheeler P, Dinno A. 2021. FSA: Fisheries Stock Analysis. R package version 0.9.1, https://github.com/droglenc/FSA.

Oksanen J, Blanchet FG, Friendly M, Kindt R, Legendre P, McGlinn D, Minchin PR, O'Hara RB, Simpson GL, Solymos P, Stevens MHH, Szoecs E, Wagner H. 2020. vegan: Community Ecology Package. R package version 2.5-7. https://CRAN.R-project.org/package=vegan

Porsild AE, Cody WJ. 1980. Vascular Plants of Continental Northwest Territories, Canada. National Museum of Natural Sciences. Ottawa. ON.

Prentice IC. 1977. Non-metric ordination methods in ecology. Journal of Ecology 65(1): 85–94.

R Core Team. 2021. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. Available: https://www.R-project.org/. Accessed: September 2021.

Revelle W. 2021 psych: Procedures for Personality and Psychological Research. R package. Northwestern University, Evanston, Illinois, USA, https://CRAN.R-project.org/package=psych Version = 2.1.9

Smith EP. 2006. BACI Design. Encyclopaedia of Environmetrics. Ed. A.H El-Shaarawi and W.W. Piegorsch. 1:141–148.

Spatt PD, Miller MC. 1981. Growth conditions and vitality of sphagnum in a tundra community along the Alaska Pipeline Haul Road. Arctic. 34(1):48–54.

Thomas DC. 1998. Fire-Caribou Relationships: (V) Winter Diet of the Beverly Herd in Northern Canada, 1980 to 1987. Technical Report Series No. 313. Canadian Wildlife Service, Edmonton, AB.

Tłı̨chǫ Government. 2013. Traditional Knowledge Study for Diavik Soil and Lichen Sampling Program. Tłı̨chǫ Government and Tłı̨chǫ Research and Training Institute. Behchoko, NWT, Canada. 44 pp.

Watkinson AD, Virgl J, Miller VS, Naeth MA, Kim J, Serben K, Shapka C, Sinclair S. 2021. Effects of dust deposition from diamond mining on subarctic plant communities and barren-ground caribou forage. Journal of Environmental Quality 50(4): 990–1003.

Wickham H. 2016. ggplot2: Elegant Graphics for Data Analysis. R package. Springer-Verlag New York.

Zar JH. 1999. Biostatistical Analysis – Fourth Edition. Prentice Hall. Upper Saddle River, New Jersey.

APPENDIX A

List of Permanent Vegetation Plots Sampled from 2001 to 2021

Table A-1: Permanent Vegetation Plots sampled between 2001 and 2021

PVP Number	Plot Type	Vegetation Type	UTM Zone	Easting	Northing	Year Established	Year Sampled							
							2001	2004	2006	2008	2010	2013	2016	2021
PVP01	Mine	Heath Tundra	12W	533933	7154277	2001	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PVP02	Mine	Heath Tundra	12W	533955	7154320	2001	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PVP03	Mine	Tussock-Hummock	12W	534019	7154476	2001	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PVP04a[(a)]	Mine	Tussock-Hummock	12W	n/a	n/a	2001	Yes	Yes	No	No	No	No	No	No
PVP05a[(a)]	Mine	Shrub	12W	n/a	n/a	2001	Yes	Yes	No	No	No	No	No	No
PVP06a[(a)]	Mine	Heath Tundra	12W	n/a	n/a	2001	Yes	Yes	No	No	No	No	No	No
PVP04[(b)]	Mine	Tussock-Hummock	12W	531572	7152032	2006	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PVP05[(b)]	Mine	Shrub	12W	531450	7152017	2006	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PVP06[(b)]	Mine	Heath Tundra	12W	531454	7151954	2006	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PVP07	Mine	Tussock-Hummock	12W	535039	7151919	2001	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PVP08[(c)]	Mine	Esker	12W	n/a	n/a	2001	Yes	Yes	Yes	Yes	No	No	No	No
PVP09a[(a)]	Mine	Shrub	12W	n/a	n/a	2001	Yes	Yes	No	No	No	No	No	No
PVP09[(b)]	Mine	Shrub	12W	531543	7151831	2006	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PVP10[(a)]	Mine	Shrub	12W	532982	7150215	2006	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PVP10A[(d)]	Mine	Shrub	12W	531852	7150917	2021	No	No	No	No	No	No	No	Yes
PVP11 (PVP10a)	Reference	Heath Tundra	12W	534937	7145517	2001	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PVP12	Reference	Tussock-Hummock	12W	535033	7145453	2006	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PVP13	Reference	Shrub	12W	535076	7145613	2006	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PVP14	Reference	Heath Tundra	12W	526342	7154475	2006	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PVP15	Reference	Tussock-Hummock	12W	526477	7154564	2006	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PVP16	Reference	Shrub	12W	526578	7154638	2006	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PVP17	Reference	Heath Tundra	12W	541029	7152048	2006	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PVP18	Reference	Tussock-Hummock	12W	541123	7152116	2006	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PVP19	Reference	Shrub	12W	541182	7152084	2006	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PVP20	Mine	Tussock-Hummock	12W	532096	7151695	2008	No	No	No	Yes	Yes	Yes	Yes	Yes
PVP21	Mine	Heath Tundra	12W	531972	7151655	2008	No	No	No	Yes	Yes	Yes	Yes	Yes
PVP22	Mine	Shrub	12W	531843	7151611	2008	No	No	No	Yes	Yes	Yes	Yes	Yes
PVP23	Mine	Shrub	12W	531664	7151649	2008	No	No	No	Yes	Yes	Yes	Yes	Yes
PVP24	Mine	Tussock-Hummock	12W	532528	7153617	2008	No	No	No	Yes	Yes	Yes	Yes	Yes
PVP25	Reference	Tussock-Hummock	12W	526526	7154653	2008	No	No	No	Yes	Yes	Yes	Yes	Yes
PVP26	Reference	Heath Tundra	12W	535118	7145272	2008	No	No	No	Yes	Yes	Yes	Yes	Yes
PVP27	Reference	Shrub	12W	535067	7145232	2008	No	No	No	Yes	Yes	Yes	Yes	Yes
PVP28	Reference	Tussock-Hummock	12W	535113	7145348	2008	No	No	No	Yes	Yes	Yes	Yes	Yes

Table A-1: Permanent Vegetation Plots sampled between 2001 and 2021

PVP Number	Plot Type	Vegetation Type	UTM Zone	Easting	Northing	Year Established	Year Sampled							
							2001	2004	2006	2008	2010	2013	2016	2021
PVP29	Reference	Shrub	12W	540977	7152066	2008	No	No	No	Yes	Yes	Yes	Yes	Yes
PVP30	Reference	Heath Tundra	12W	541027	7152077	2008	No	No	No	Yes	Yes	Yes	Yes	Yes
PVP31	Mine	Heath Tundra	12W	532743	7153642	2008	No	No	No	Yes	Yes	Yes	Yes	Yes

a) Plot lost due to site expansion between 2004 and 2006; no UTM coordinates available for these sites

b) New plots established in 2006 to replace plots lost due to site expansion.

c) Plot not surveyed from 2013 onwards due to site location on an Esker

d) New plot established in 2021 to replace site lost due to site expansion in 2018 with A21 rock pile

PVP = permanent vegetation plots; UTM = Universal Transverse Mercator; n/a = not applicable.

APPENDIX B

Summary of 2021 Plot Data

Table B-1: Mean Percent Cover by Species in Mine Permanent Vegetation Plots, 2021

Scientific Name	Common Name	Shrub					Heath Tundra					Tussock-Hummock				
		PVP05	PVP09	PVP10A	PVP22	PVP23	PVP01	PVP02	PVP06	PVP21	PVP31	PVP03	PVP04	PVP07	PVP20	PVP24
Trees and Shrubs																
Andromeda polifolia	bog rosemary	0	0	0	0	0	0	0	0	0	0	0	7	13	<1	<1
Arctous rubra	red bearberry	0	7	<1	14	0	20	7	0	5	24	3	0	0	8	0
Betula glandulosa	glandular birch	27	31	71	43	43	15	28	2	15	5	7	7	7	28	23
Empetrum nigrum	black crowberry	<1	2	2	21	6	11	7	1	13	19	<1	<1	1	6	0
Kalmia procumbens	alpine azalea	0	0	0	0	0	18	3	0	6	0	0	0	0	0	0
Rhododendron tomentosum	narrow-leaved Labrador tea	24	12	6	6	3	6	7	28	4	18	23	4	3	29	16
Rubus chamaemorus	cloudberry	4	2	0	0	3	0	0	7	3	0	<1	6	0	1	4
Salix fuscescens	Alaska bog willow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salix glauca	gray willow	0	0	0	0	0	4	6	0	0	0	0	0	0	0	0
Salix planifolia	diamond-leaved willow	0	0	0	18	16	0	0	0	5	0	0	0	0	0	0
Salix sp.	willow species	0	0	0	0	0	1	6	0	0	0	0	<1	<1	0	<1
Salix sp. 2	willow species	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Vaccinium oxycoccos	small cranberry	0	0	0	0	0	0	0	0	0	0	0	0	<1	0	0
Vaccinium uliginosum	alpine bilberry	10	23	6	8	50	1	<1	7	20	0	0	6	6	25	5
Vaccinium vitis-idaea	rock cranberry (lingonberry)	25	18	<1	36	3	14	15	59	11	11	11	10	<1	22	18
Forbs																
Astragalus agrestis	meadow milk-vetch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epilobium sp.	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equisetum arvense	field horsetail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Huperzia selago	fir clubmoss	0	0	0	0	0	0	0	0	0	0	0	<1	0	0	0
Oxytropis maydelliana	maydell locoweed	0	0	0	0	0	<1	<1	0	0	0	0	0	0	0	0
Pedicularis labradorica	Labrador lousewort	0	0	<1	0	0	0	0	0	<1	0	0	0	0	0	0
Pedicularis lapponica	lapland lousewort	0	0	0	0	0	<1	0	0	1	0	<1	<1	<1	<1	<1
Pinguicula villosa	hairy butterwort	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tofieldia pusilla	scotch false asphodel	0	0	0	0	0	<1	0	0	0	0	0	0	1	0	0
Graminoids																
Anthoxanthum monticola	alpine sweet grass	0	0	3	<1	0	0	0	0	0	0	0	0	0	0	0
Calamagrostis lapponica	lapland reed grass	0	0	0	0	0	0	0	<1	0	0	0	0	0	0	0
Calamagrostis stricta	slim-stem reed grass	2	1	0	5	1	0	<1	0	<1	0	3	<1	1	<1	0
Carex aquatilis	water sedge	1	0	<1	<1	0	<1	<1	0	<1	<1	0	<1	3	0	0
Carex sartwellii	Sartwell's sedge	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Carex saxatilis	russet sedge	0	0	0	0	0	0	0	<1	0	0	0	0	0	0	0
Carex sp.	sedge species	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Carex utriculata	Northwest Territory sedge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis palustris	common spikerush	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
Eleocharis quinqueflora	few-flowered spikerush	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0

Table B-1: Mean Percent Cover by Species in Mine Permanent Vegetation Plots, 2021

Scientific Name	Common Name	Shrub					Heath Tundra					Tussock-Hummock				
		PVP05	PVP09	PVP10A	PVP22	PVP23	PVP01	PVP02	PVP06	PVP21	PVP31	PVP03	PVP04	PVP07	PVP20	PVP24
Eriophorum vaginatum	tussock cotton-grass	0	0	0	0	0	0	0	0	0	0	13	5	0	<1	6
Grass species	n/a	0	0	0	0	0	<1	0	0	0	0	0	0	2	0	0
Luzula multiflora	common wood rush	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Luzula nivalis	arctic woodrush	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0
Luzula parviflora	small-flowered wood rush	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Poa arctica	arctic bluegrass	0	0	0	0	0	0	0	0	0	0	0	0	<1	0	0
Bryophytes																
Aulacomnium spp.	ribbed bog moss	3	2	39	0	0	7	11	<1	6	0	3	2	2	2	2
Ceratodon purpureus	fire moss	0	<1	0	1	0	0	0	0	<1	0	0	0	0	0	0
Dicranum spp.	sharp-leaved broom moss	1	1	16	<1	0	16	3	<1	9	<1	<1	2	7	<1	1
Drepanocladus exannulatus	n/a	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Hylocomium splendens	stair-step moss	<1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Leptobryum pyriforme	golden thread moss	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Liverwort spp.	n/a	0	2	<1	0	0	1	<1	0	0	3	0	3	3	<1	<1
Lophozia sp.	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleurozium schreberi	red-stemmed feather moss	0	0	0	0	0	0	0	0	0	0	<1	0	0	<1	0
Pohlia nutans	common nodding moss	0	<1	0	0	0	0	0	0	<1	0	0	0	4	0	<1
Polytrichum commune	common haircap moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polytrichum juniperinum	juniper haircap moss	0	0	<1	0	0	0	0	0	<1	<1	<1	0	0	<1	6
Polytrichum strictum	bog haircap moss	<1	0	0	0	0	0	0	0	0	0	0	<1	1	0	0
Ptilidium ciliare	n/a	0	0	7	0	0	2	0	0	0	0	0	0	0	0	0
Racomitrium lanuginosum	hoary rock moss	0	0	<1	0	0	0	0	1	<1	0	0	0	0	0	0
Rhytidium rugosum	wrinkle-leaved moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sanionia uncinata	sickle moss	0	0	0	0	0	0	0	0	0	0	0	0	13	7	0
Sphagnum spp.	large sphagnum moss	3	6	0	0	0	0	0	7	0	0	45	23	4	4	9
Straminergon stramineum	straw moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lichens																
Alectoria ochroleuca	green witch's hair	0	0	0	0	0	0	<1	0	<1	2	0	0	0	0	<1
Arctocetraria andrejevii	thin-man's Icelandmoss lichen	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Arctoparmelia separata	arctic ring lichen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bryocaulon divergens	arctic pretzel lichen	0	0	0	1	0	<1	2	<1	<1	9	0	2	0	0	0
Bryoria nitidula	tundra horsehair lichen	0	0	0	<1	0	<1	<1	<1	2	<1	0	0	0	0	0
Cetraria spp.	heath Icelandmoss lichen	0	<1	<1	<1	0	0	<1	7	<1	0	<1	<1	4	0	1
Cladonia spp.	smooth pixie lichen	1	2	<1	<1	0	<1	1	2	<1	2	1	<1	0	0	2
Dactylina arctica	arctic butterfingers lichen	0	0	0	0	0	<1	<1	0	<1	0	<1	0	0	0	0
Flavocetraria spp.	curled snow lichen	<1	0	<1	<1	0	4	5	2	3	5	<1	2	0	<1	<1
Gowardia nigricans	gray witch's beard lichen	0	0	0	0	0	0	<1	0	0	0	0	0	0	0	0

Table B-1: Mean Percent Cover by Species in Mine Permanent Vegetation Plots, 2021

Scientific Name	Common Name	Shrub					Heath Tundra					Tussock-Hummock				
		PVP05	PVP09	PVP10A	PVP22	PVP23	PVP01	PVP02	PVP06	PVP21	PVP31	PVP03	PVP04	PVP07	PVP20	PVP24
Icmadophila ericetorum	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Masonhalea richardsonii	arctic tumbleweed lichen	0	0	0	0	0	<1	1	0	1	<1	0	0	0	0	0
Parmelia omphalodes	smoky crottle	0	0	0	<1	0	0	0	0	0	0	0	0	0	0	0
Parmelia sp.	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peltigera spp.	n/a	1	0	3	<1	0	<1	2	<1	1	0	<1	0	0	0	0
Sphaerophorus globosus	northern coral lichen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stereocaulon paschale	cottontail foam lichen	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	0
Stereocaulon tomentosum	eyed foam lichen	0	0	0	0	0	1	0	<1	0	0	0	0	0	0	0
Thamnolia vermicularis	universal whiteworm lichen	0	0	0	0	<1	<1	0	<1	<1	0	0	0	0	0	0
Ground Cover																
Bare Ground		0	0	0	0	0	0	0	0	0	<1	0	0	0	0	0
Fungi		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Terricolous (soil) Lichen		1	<1	<1	4	<1	0	5	15	16	10	25	<1	2	4	<1
Saxicolous (rock) Lichen		0	0	1	<1	9	0	<1	<1	0	1	0	0	7	0	0
Litter		28	65	5	10	20	1	3	6	9	4	4	11	10	7	7
Moss		8	6	81	<1	0	22	21	6	16	<1	53	53	36	10	27
Animal Pellets		0	0	<1	<1	0	<1	0	<1	<1	<1	<1	0	<1	<1	<1
Rock		0	2	0	1	<1	<1	<1	0	2	0	0	<1	0	0	0
Total Vegetation		64	26	10	79	80	72	61	73	63	70	43	27	49	83	62
Water		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptobiotic Crust		0	0	0	0	0	0	0	<1	0	<1	<1	<1	0	0	0

Note: Means are rounded to the nearest whole number for presentation purposes; <1 indicates species present but with low cover. Table includes all species observed between Mine and Reference sites, even if only present within mine or reference sites. Species with '0' observations are retained in both Table B-1 and B-2 to more easily display differences in species presence by location.

Table B-2: Mean Percent Cover by Species in Reference Permanent Vegetation Plots, 2021

Scientific Name	Common Name	Shrub					Heath Tundra					Tussock-Hummock				
		PVP13	PVP16	PVP19	PVP27	PVP29	PVP11	PVP14	PVP17	PVP26	PVP30	PVP12	PVP15	PVP18	PVP25	PVP28
Trees and Shrubs																
Andromeda polifolia	bog rosemary	<1	0	0	0	0	0	0	0	0	0	19	<1	2	0	<1
Arctous rubra	red bearberry	0	<1	25	0	16	22	0	8	5	33	4	0	0	11	0
Betula glandulosa	glandular birch	16	89	40	51	58	14	13	9	15	5	5	<1	2	2	5
Empetrum nigrum	black crowberry	2	6	3	0	5	6	12	12	9	10	2	1	2	12	<1
Kalmia procumbens	alpine azalea	0	0	0	0	0	0	7	12	6	6	0	0	0	0	0
Rhododendron tomentosum	narrow-leaved Labrador tea	22	5	4	4	2	6	9	5	2	4	5	8	3	8	5
Rubus chamaemorus	cloudberry	<1	0	0	0	0	0	<1	0	0	0	55	2	4	1	2
Salix fuscescens	Alaska bog willow	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Salix glauca	gray willow	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0
Salix planifolia	diamond-leaved willow	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0
Salix sp.	willow species	0	0	0	0	<1	0	0	0	0	0	0	0	0	0	0
Salix sp. 2	willow species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vaccinium oxycoccos	small cranberry	<1	0	0	0	0	0	0	0	0	0	0	<1	<1	0	0
Vaccinium uliginosum	alpine bilberry	6	10	7	4	4	0	17	2	4	3	7	3	3	15	6
Vaccinium vitis-idaea	rock cranberry (lingonberry)	22	26	10	2	21	24	35	3	4	13	18	5	3	8	6
Forbs																
Astragalus agrestis	meadow milk-vetch	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	0
Epilobium sp.	n/a	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	0
Equisetum arvense	field horsetail	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	0
Huperzia selago	fir clubmoss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxytropis maydelliana	maydell locoweed	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	0
Pedicularis labradorica	Labrador lousewort	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedicularis lapponica	lapland lousewort	0	0	0	0	0	0	0	0	0	0	<1	0	<1	0	<1
Pinguicula villosa	hairy butterwort	0	0	0	0	0	0	0	0	0	0	0	<1	<1	0	0
Tofieldia pusilla	scotch false asphodel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Graminoids																
Anthoxanthum monticola	alpine sweet grass	0	0	<1	<1	<1	0	0	0	0	0	0	0	0	0	0
Calamagrostis lapponica	lapland reed grass	0	<1	0	0	0	0	0	0	0	0	0	0	0	3	0
Calamagrostis stricta	slim-stem reed grass	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Carex aquatilis	water sedge	0	0	0	<1	0	0	<1	0	<1	0	0	0	2	0	0
Carex sartwellii	Sartwell's sedge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carex saxatilis	russet sedge	0	0	0	0	0	0	0	0	0	0	0	2	<1	0	0
Carex sp.	sedge species	<1	0	0	0	0	0	0	0	0	0	<1	2	0	2	3
Carex utriculata	Northwest Territory sedge	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Eleocharis palustris	common spikerush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis quinqueflora	few-flowered spikerush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table B-2: Mean Percent Cover by Species in Reference Permanent Vegetation Plots, 2021

Scientific Name	Common Name	Shrub					Heath Tundra					Tussock-Hummock				
		PVP13	PVP16	PVP19	PVP27	PVP29	PVP11	PVP14	PVP17	PVP26	PVP30	PVP12	PVP15	PVP18	PVP25	PVP28
Eriophorum vaginatum	tussock cotton-grass	0	0	0	0	0	0	0	0	0	0	<1	5	8	15	44
Grass species	n/a	2	0	0	0	0	0	0	0	0	0	0	0	0	<1	0
Luzula multiflora	common wood rush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luzula nivalis	arctic woodrush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luzula parviflora	small-flowered wood rush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa arctica	arctic bluegrass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bryophytes																
Aulacomnium spp.	ribbed bog moss	<1	0	9	0	<1	0	0	0	0	0	<1	<1	<1	<1	<1
Ceratodon purpureus	fire moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dicranum spp.	sharp-leaved broom moss	<1	0	3	10	5	1	<1	0	<1	<1	<1	0	7	<1	2
Drepanocladus exannulatus	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Hylocomium splendens	stair-step moss	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Leptobryum pyriforme	golden thread moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Liverwort spp.	n/a	<1	0	0	0	0	2	0	0	<1	0	<1	0	2	2	2
Lophozia sp.	n/a	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1
Pleurozium schreberi	red-stemmed feather moss	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pohlia nutans	common nodding moss	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	0
Polytrichum commune	common haircap moss	<1	0	0	0	0	0	0	0	0	0	0	0	0	<1	0
Polytrichum juniperinum	juniper haircap moss	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	0
Polytrichum strictum	bog haircap moss	0	0	0	0	<1	0	0	<1	0	0	<1	0	1	0	<1
Ptilidium ciliare	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Racomitrium lanuginosum	hoary rock moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhytidium rugosum	wrinkle-leaved moss	0	0	3	0	4	0	0	0	0	0	0	0	0	0	0
Sanionia uncinata	sickle moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sphagnum spp.	large sphagnum moss	11	0	0	0	0	0	0	0	0	0	11	19	22	9	7
Straminergon stramineum	straw moss	0	0	0	0	0	0	0	0	0	0	0	<1	0	0	0
Lichens																
Alectoria ochroleuca	green witch's hair	0	0	<1	0	0	0	<1	<1	1	<1	0	<1	0	0	0
Arctocetraria andrejevii	thin-man's Icelandmoss lichen	0	0	0	<1	0	0	0	0	0	0	0	0	<1	0	3
Arctoparmelia separata	arctic ring lichen	0	0	0	0	0	0	0	<1	0	1	0	0	0	0	0
Bryocaulon divergens	arctic pretzel lichen	0	0	<1	0	0	5	3	5	5	<1	0	2	2	0	<1
Bryoria nitidula	tundra horsehair lichen	0	0	<1	0	0	0	1	1	0	2	0	<1	<1	0	0
Cetraria spp.	heath Icelandmoss lichen	2	0	2	4	4	0	0	0	5	<1	<1	0	<1	0	4
Cladonia spp.	smooth pixie lichen	3	0	<1	5	<1	2	3	<1	2	1	<1	7	2	1	4
Dactylina arctica	arctic butterfingers lichen	<1	0	0	0	0	0	0	<1	0	<1	<1	0	<1	0	0
Flavocetraria spp.	curled snow lichen	2	0	3	4	1	3	3	7	6	7	<1	2	6	<1	<1
Gowardia nigricans	gray witch's beard lichen	0	0	0	0	0	0	0	<1	0	<1	0	0	<1	0	0

Table B-2: Mean Percent Cover by Species in Reference Permanent Vegetation Plots, 2021

Scientific Name	Common Name	Shrub					Heath Tundra					Tussock-Hummock				
		PVP13	PVP16	PVP19	PVP27	PVP29	PVP11	PVP14	PVP17	PVP26	PVP30	PVP12	PVP15	PVP18	PVP25	PVP28
Icmadophila ericetorum	n/a	0	0	0	0	0	0	0	0	0	0	0	0	<1	0	0
Masonhalea richardsonii	arctic tumbleweed lichen	0	0	0	2	<1	<1	<1	<1	<1	<1	0	<1	2	0	0
Parmelia omphalodes	smoky crottle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parmelia sp.	n/a	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
Peltigera spp.	n/a	0	0	2	0	<1	0	0	<1	1	0	0	0	0	<1	0
Sphaerophorus globosus	northern coral lichen	0	0	0	0	0	0	0	<1	0	0	0	0	0	0	0
Stereocaulon paschale	cottontail foam lichen	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0
Stereocaulon tomentosum	eyed foam lichen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thamnolia vermicularis	universal whiteworm lichen	0	<1	0	<1	<1	0	<1	<1	0	0	0	<1	0	0	0
Ground Cover																
Bare Ground		0	0	0	0	0	0	0	0	<1	0	0	0	0	0	0
Fungi		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Terricolous (soil) Lichen		9	0	12	40	3	17	24	23	56	23	<1	5	16	2	19
Saxicolous (rock) Lichen		0	0	0	4	0	14	5	2	<1	0	0	3	0	0	0
Litter		9	9	9	25	7	7	4	4	11	4	4	3	4	4	4
Moss		21	<1	15	13	7	2	<1	<1	1	<1	26	74	55	13	26
Animal Pellets		0	0	<1	0	<1	0	<1	<1	0	<1	0	<1	<1	<1	<1
Rock		0	0	<1	1	<1	2	<1	<1	<1	0	0	<1	0	0	0
Total Vegetation		61	91	64	17	82	59	67	69	31	73	69	15	17	81	51
Water		<1	0	0	0	0	0	0	0	0	0	0	0	8	0	0
Cryptobiotic Crust		0	0	<1	0	0	<1	<1	<1	<1	<1	0	0	<1	0	<1

Note: Means are rounded to the nearest whole number for presentation purposes; <1 indicates species present but with low cover. Table includes all species observed between Mine and Reference sites, even if only present within mine or reference sites. Species with '0' observations are retained in both Table B-1 and B-2 to more easily display differences in species presence by location.

APPENDIX C

Mean Species Cover Changes over the 2006-2021 Period

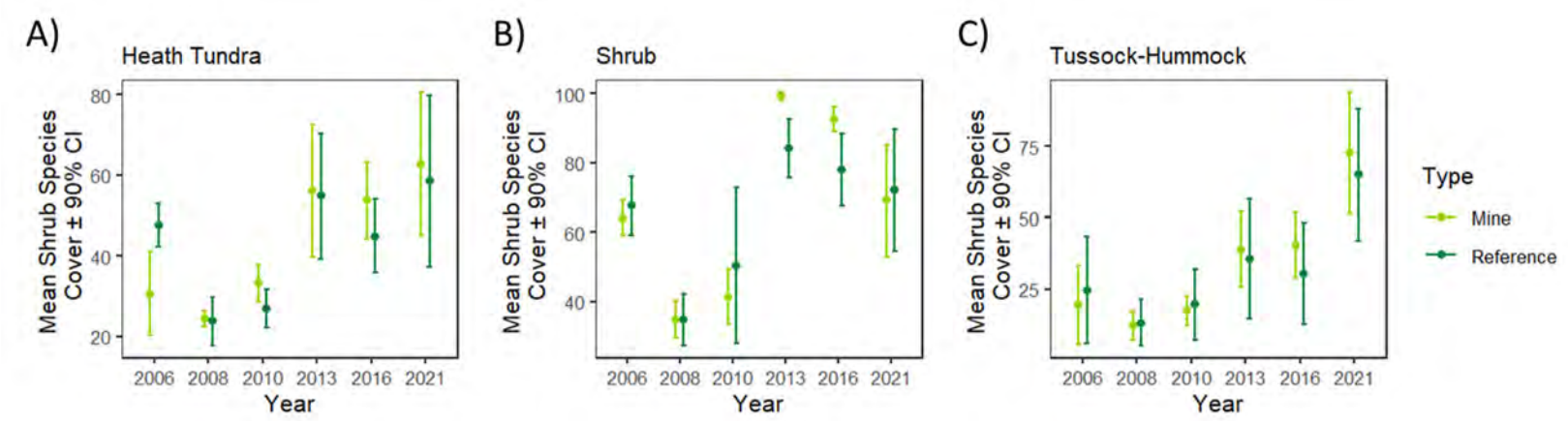


Figure C-1 **Mean (+- 95% Confidence Interval) total shrub cover (%), for mine and reference plots between A) Heath Tundra, B) Low Shrub, and C) Tussock-Hummock communities among sampling years (2006-2021)**

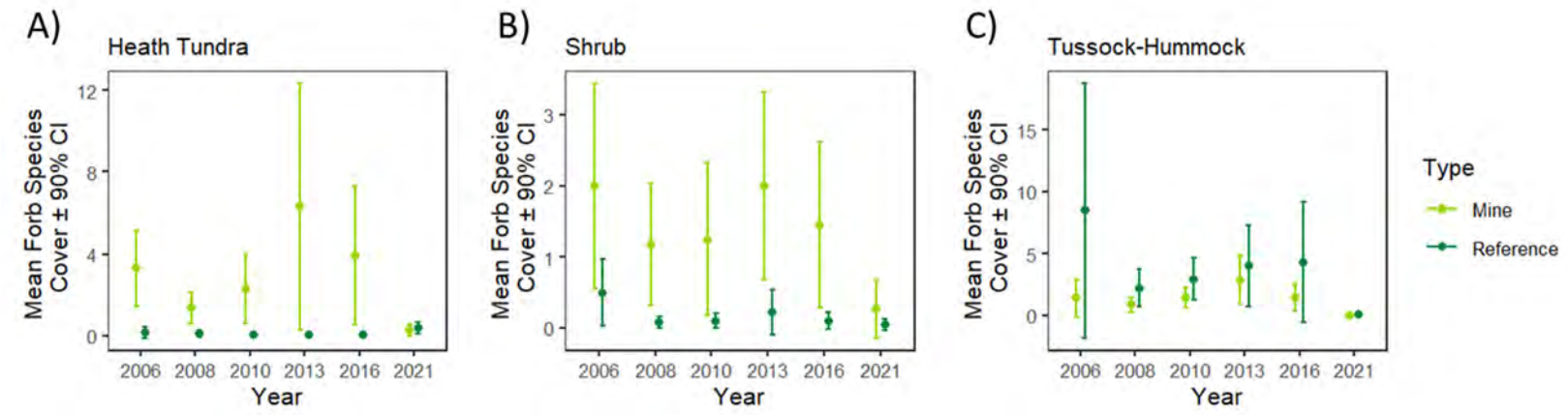


Figure C-2 **Mean (+- 95% Confidence Interval) total forb cover (%), for mine and reference plots between A) Heath Tundra, B) Low Shrub, and C) Tussock-Hummock communities among sampling years (2006-2021)**

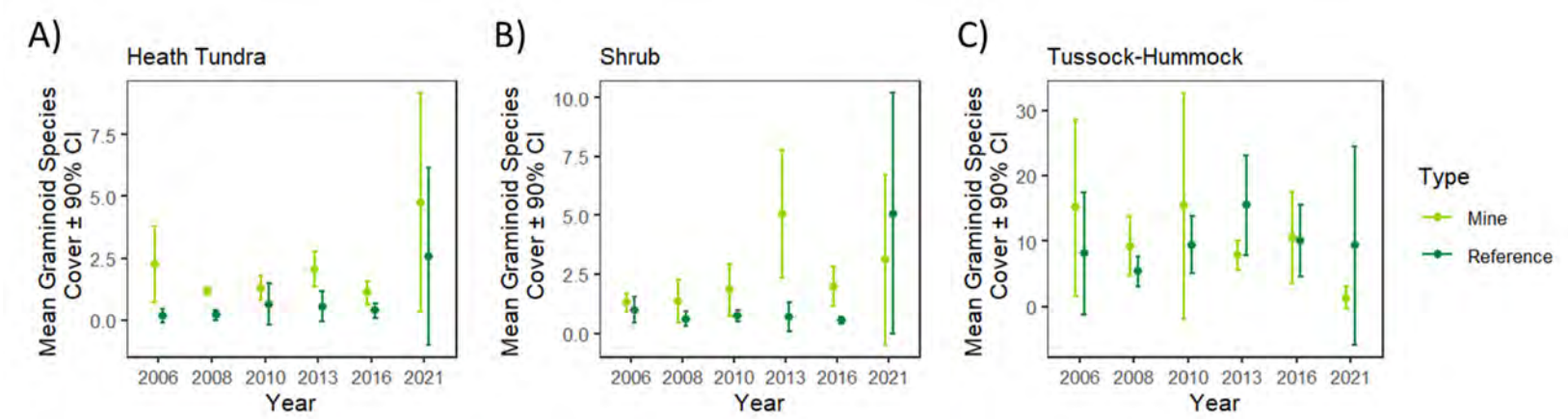


Figure C-3 **Mean (+- 95% Confidence Interval) total graminoid cover (%), for mine and reference plots between A) Heath Tundra, B) Low Shrub, and C) Tussock-Hummock communities among sampling years (2006-2021)**

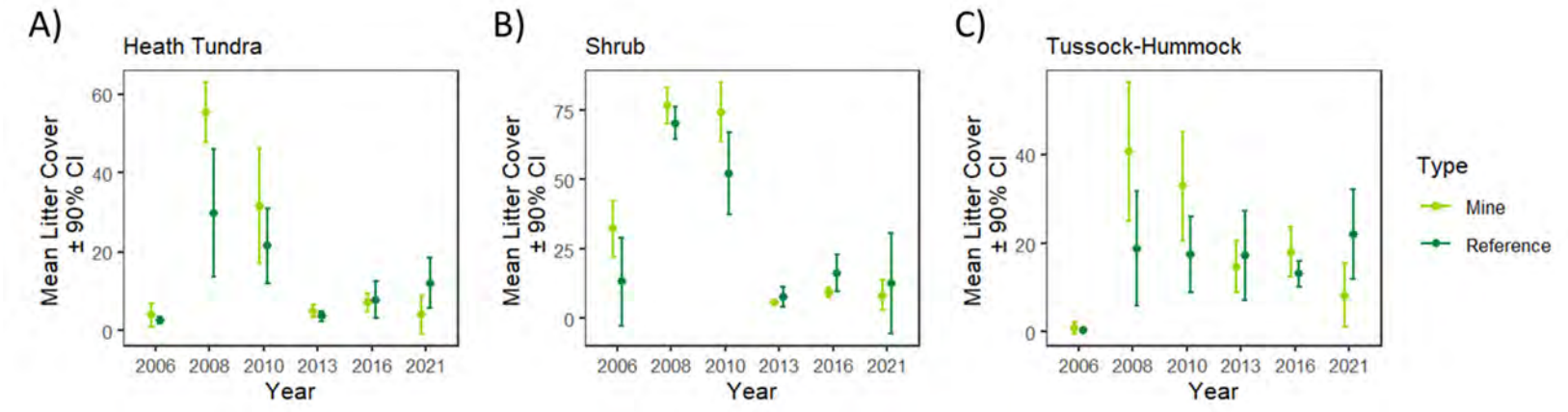


Figure C-4 **Mean (+- 95% Confidence Interval) total litter cover (%), for mine and reference plots between A) Heath Tundra, B) Low Shrub, and C) Tussock-Hummock communities among sampling years (2006-2021)**

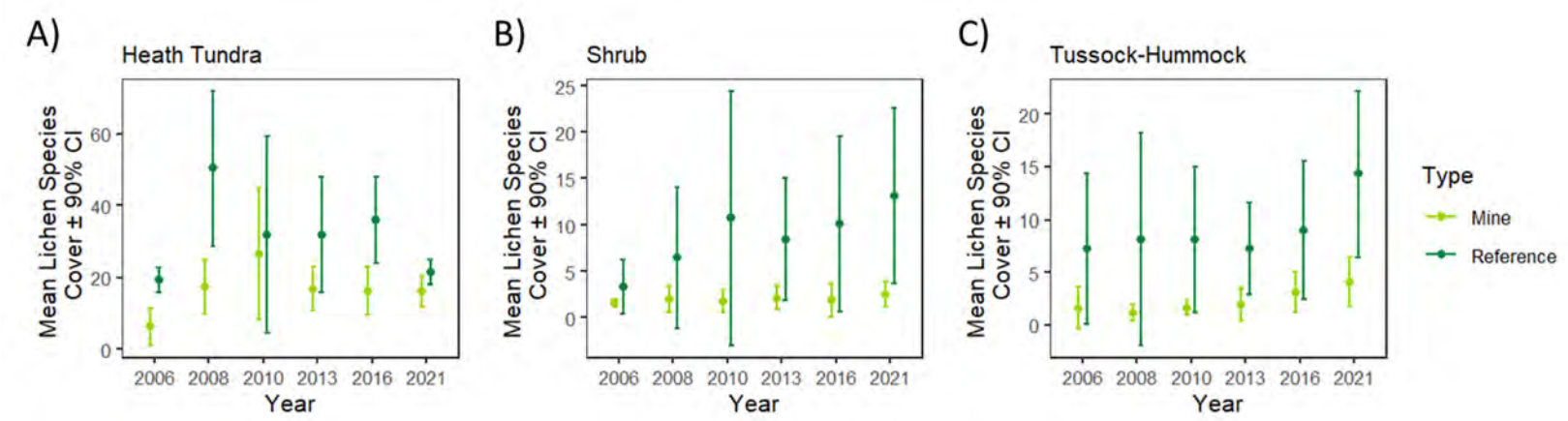


Figure C-5 **Mean (+- 95% Confidence Interval) total lichen cover (%), for mine and reference plots between A) Heath Tundra, B) Low Shrub, and C) Tussock-Hummock communities among sampling years (2006-2021)**

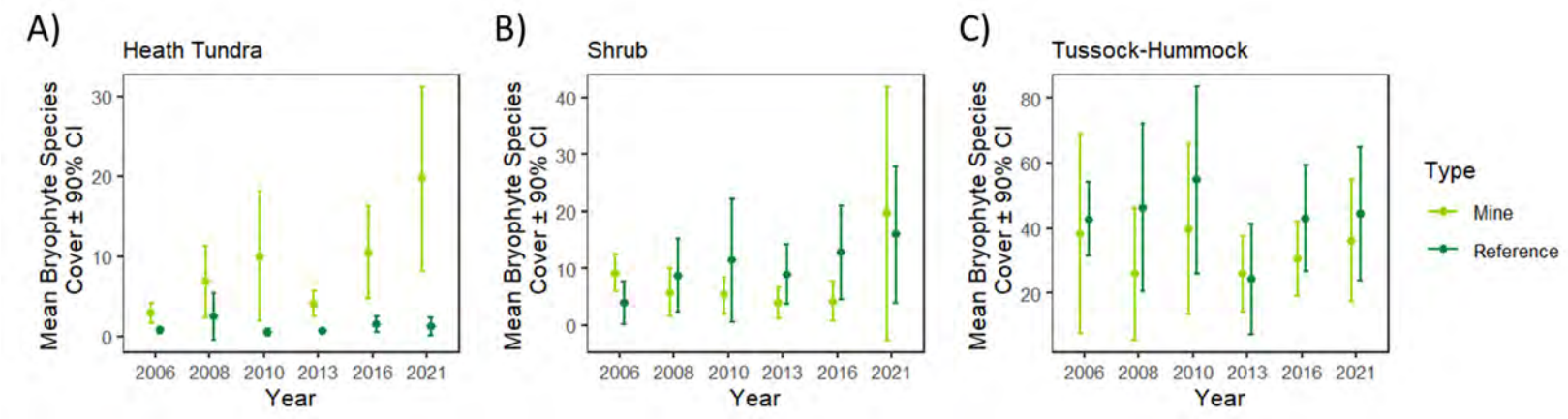


Figure C-6 **Mean (+- 95% Confidence Interval) total bryophyte cover (%), for mine and reference plots between A) Heath Tundra, B) Low Shrub, and C) Tussock-Hummock communities among sampling years (2006-2021)**

APPENDIX D

Mean Species Richness Changes over the 2006-2021 Period

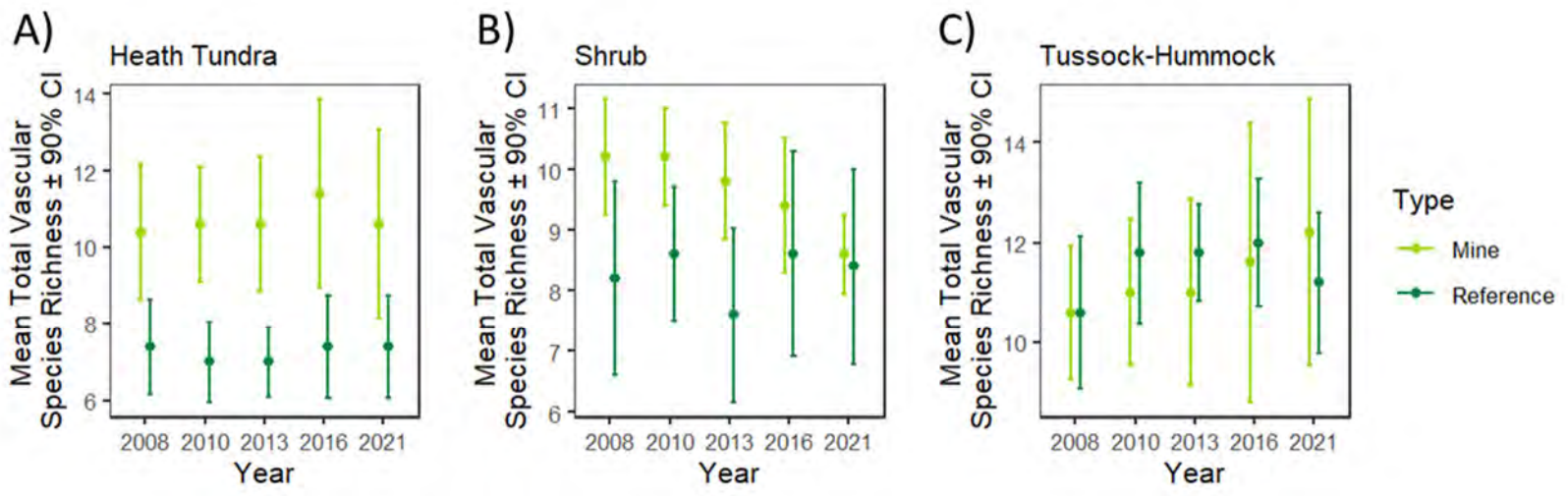


Figure D-1 **Mean (±90% Confidence Interval) total vascular species richness (%), for mine and reference plots between A) Heath Tundra, B) Low Shrub, and C) Tussock-Hummock communities among sampling years (2006-2021)**

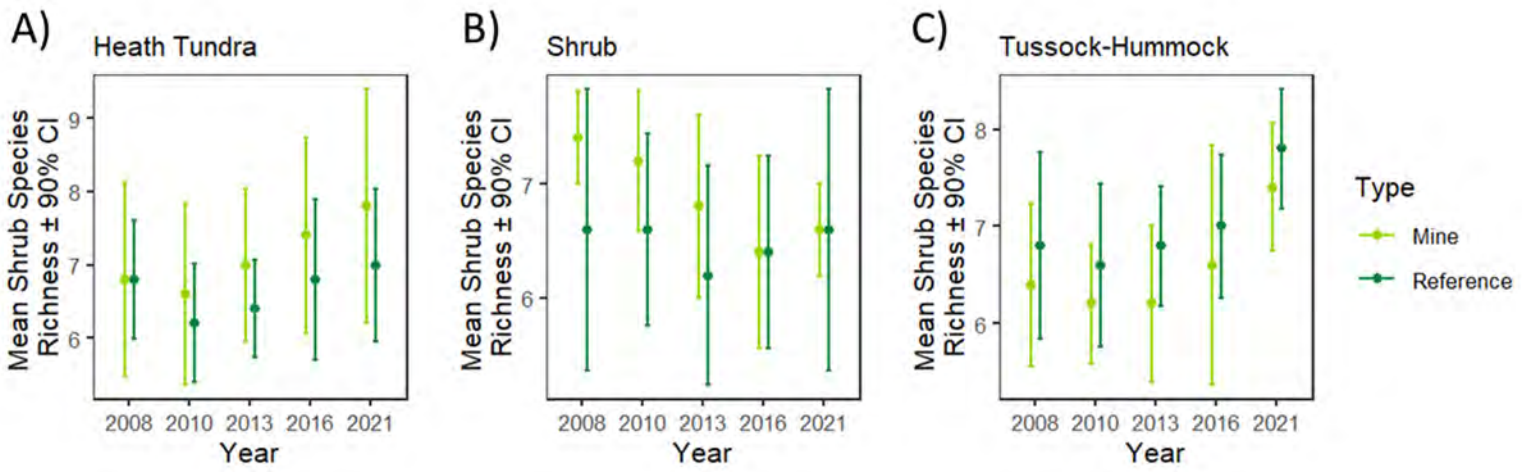


Figure D-2 **Mean (±90% Confidence Interval) shrub species richness (%), for mine and reference plots between A) Heath Tundra, B) Low Shrub, and C) Tussock-Hummock communities among sampling years (2006-2021)**

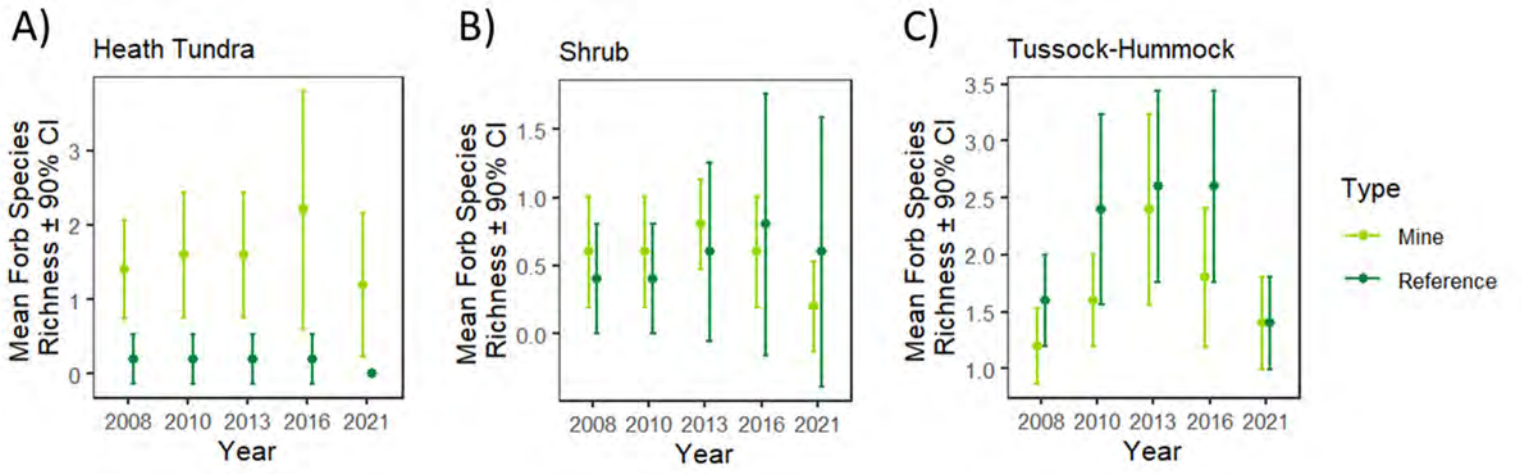


Figure D-3 **Mean (±90% Confidence Interval) forb species richness (%), for mine and reference plots between A) Heath Tundra, B) Low Shrub, and C) Tussock-Hummock communities among sampling years (2006-2021)**

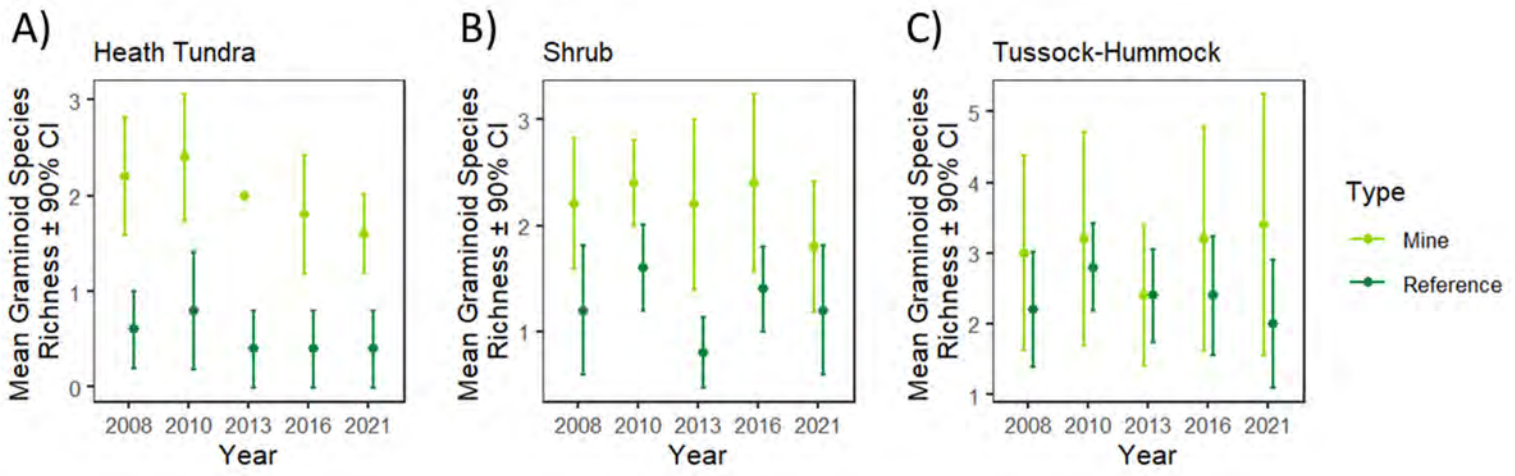


Figure D-4 **Mean (±90% Confidence Interval) graminoid species richness (%), for mine and reference plots between A) Heath Tundra, B) Low Shrub, and C) Tussock-Hummock communities among sampling years (2006-2021)**

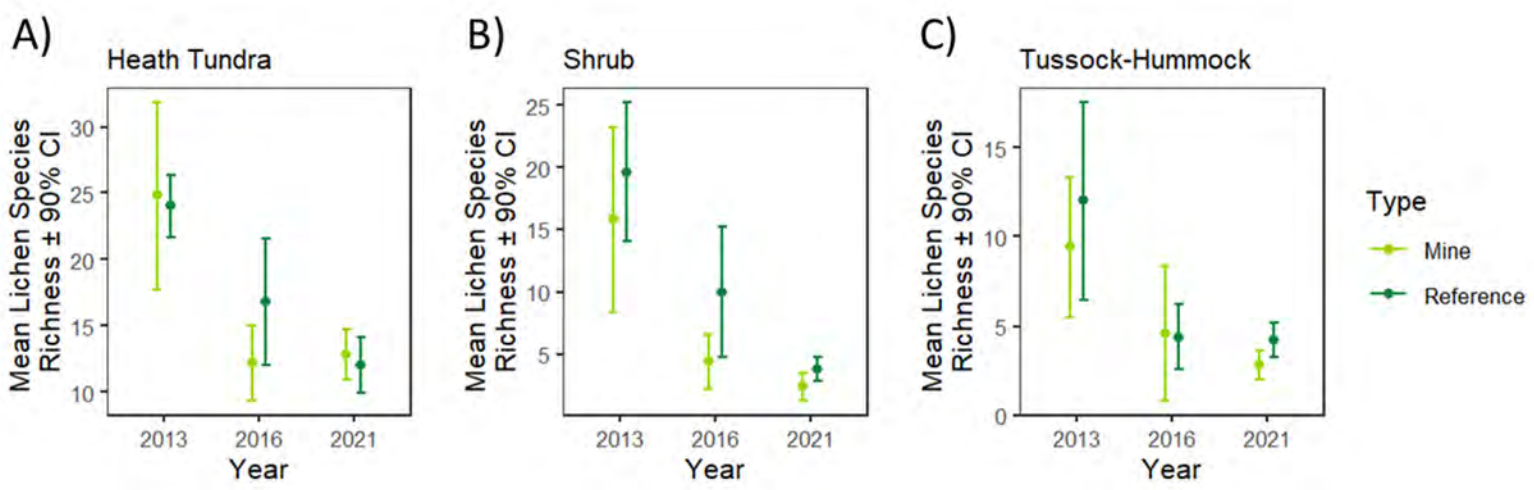


Figure D-5 **Mean (±90% Confidence Interval) lichen species richness (%), for mine and reference plots between A) Heath Tundra, B) Low Shrub, and C) Tussock-Hummock communities among sampling years (2006-2021)**

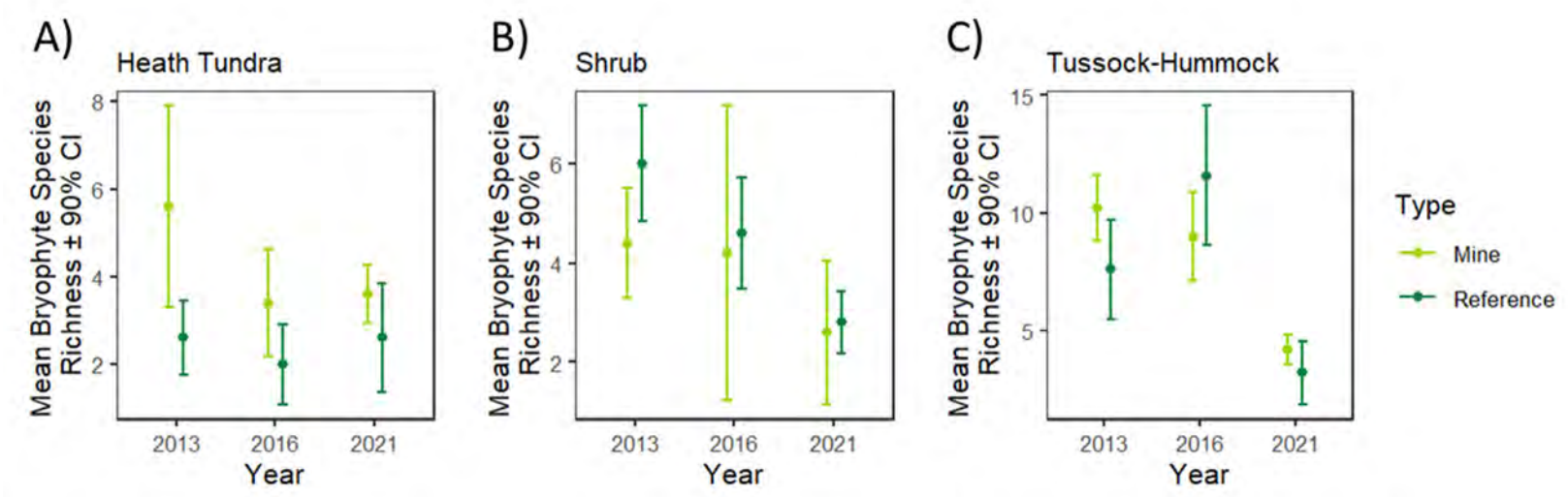


Figure D-6 **Mean (±90% Confidence Interval) bryophyte species richness (%), for mine and reference plots between A) Heath Tundra, B) Low Shrub, and C) Tussock-Hummock communities among sampling years (2006-2021)**

APPENDIX E

2021 Lichen Monitoring Field Observations

Sample Location	Lichen Species Composition	Vegetation Class	Soil Type	Caribou Activity Observed
Near-Field				
NF-1	*Flavocetraria nivalis* – 5% *F. cuculata* – 2% *Masonhalea richardsonii* – 1% *Cladonia rangiferina* – 10% *C. stellaris* – 1% *C. mitis* – 1% *C. stygia* – 15% *Stereocaulon* species – 60%	Heath Tundra	Sand	None
NF-2	*Flavocetraria nivalis* – 5% *F. cuculata* – 10% *Cladonia* stellaris – 5% *C. stygia* – 5% *Stereocaulon* species – 80% *Cetraria laevigata* – 0.1%	Heath Tundra	Sand	None
NF-3	*Flavocetraria nivalis* – 5% *F. cuculata* – 5% *Cladonia rangiferina* – 5% *C. stygia* – 5% *Stereocaulon* species – 80%	Tall Shrub	Sand	None
NF-4	*Flavocetraria nivalis* – 5% *F. cuculata* – 5% *Cladonia rangiferina* – 5% *C. stygia* – 5% *Stereocaulon* species – 70% *Cladonia* species – 2% *Arctocetraria andrejevii* – 8%	Heath Tundra	Sand	None
NF-5	*Flavocetraria nivalis* – 10% *F. cuculata* – 10% *Bryocaulon divergens* – 2% *Masonhalea richardsonii* – 1% *Cladonia rangiferina* – 10% *C. mitis* – 2% *C. stygia* – 20% *Stereocaulon* species – 40% *Arctocetraria andrejevii* – 10%	Tussock/Hummock	Sand	None
NF-6	*Flavocetraria nivalis* – 25% *F. cuculata* – 15% *Bryocaulon divergens* – 5% *Cladonia rangiferina* – 20% *C. stellaris* – 10% *C. stygia* – 20% *C.* species – 5%	Tall Shrub	Sand	None
NF-7	*Flavocetraria nivalis* – 5% *F. cuculata* – 1% *Cladonia rangiferina* – 5% *C. stellaris* – 1% *C. mitis* – 1% *C. stygia* – 5% *Stereocaulon* species – 90% *Alectoria ochroleuca* – 1%	Heath Tundra	Sand	None

Sample Location	Lichen Species Composition	Vegetation Class	Soil Type	Caribou Activity Observed
NF-8	*Flavocetraria nivalis* – 70% *F. cuculata* – 10% *Bryocaulon divergens* – 1% *Masonhalea richardsonii* – 5% *Cladonia rangiferina* – 1% *C. stellaris* – 0.1% *C. stygia* – 10% *Stereocaulon paschale* – 3% *Alectoria ochroleuca* – 0.1%	Heath Tundra	Sand	None
NF-9	*Flavocetraria nivalis* – 15% *F. cuculata* – 10% *Bryocaulon divergens* – 1% *Masonhalea richardsonii* – 1% *Cladonia rangiferina* – 15% *C. stellaris* – 3% *C. mitis* – 5% *C. stygia* – 5%	Tall Shrub	Sand	None
NF-10	*Flavocetraria nivalis* – 20% *F. cuculata* – 10% *Bryocaulon divergens* – 5% *Masonhalea richardsonii* – 5% *Cladonia rangiferina* – 20% *C. stellaris* – 5% *C. mitis* – 10% *C. stygia* – 20% *Stereocaulon* species – 5%	Heath Tundra	Sand	None
NF-11	*Flavocetraria nivalis* – 15% *F. cuculata* – 15% *Bryocaulon divergens* – 5% *Masonhalea richardsonii* – 5% *Cladonia rangiferina* – 15% *C. stellaris* – 5% *C. mitis* – 5% *C. stygia* – 30% *C. gracilis* – 5% *Arctocetraria andrejevii* – 5%	Heath Tundra	Sand	None
NF-12	*Flavocetraria nivalis* – 15% *F. cuculata* – 2% *Cladonia* stygia – 3% *Stereocaulon* species – 80% *Arctocetraria andrejevii* – 10%	Tussock/Hummock	Sand	None
NF-13	*Flavocetraria nivalis* – 40% *F. cuculata* – 20% *Masonhalea richardsonii* – 10% *Cladonia rangiferina* – 15% *C. stellaris* – 5% *C. stygia* – 10%	Heath Tundra	Sand	None
NF-14	*Flavocetraria nivalis* – 15% *F. cuculata* – 10% *Bryocaulon divergens* – 1% *Cladonia rangiferina* – 5% *C. stellaris* – 1% *C. mitis* – 3% *C. stygia* – 15% *Stereocaulon* species – 50% *Alectoria ochroleuca* – 0.1%	Esker Complex	Sand	None

Sample Location	Lichen Species Composition	Vegetation Class	Soil Type	Caribou Activity Observed
NF-15	*Flavocetraria nivalis* – 20% *F. cuculata* – 30% *Masonhalea richardsonii* – 2% *Cladonia rangiferina* – 10% *C. mitis* – 2% *C. stygia* – 20% *C.* species – 2% *Stereocaulon paschale* – 4% *Arctocetraria andrejevii* – 10%	Heath Tundra	Sand	None
NF-16	*Flavocetraria nivalis* – 30% *F. cuculata* – 15% *Bryocaulon divergens* – 5% *Masonhalea richardsonii* – 10% *Cladonia rangiferina* – 20% *C. stellaris* – 3% *C. mitis* – 2% *C. stygia* – 15%	Tall Shrub	Sand	None
NF-17	*Flavocetraria nivalis* – 20% *F. cuculata* – 20% *Cladonia rangiferina* – 30% *C. stellaris* – 0.1% *C. mitis* – 0.1% *C. stygia* – 30%	Heath Tundra	Sand	None
NF-18	*Flavocetraria nivalis* – 10% *F. cuculata* – 5% *Bryocaulon divergens* – 1% *Masonhalea richardsonii* – 1% *Cladonia rangiferina* – 10% *C. mitis* – 1% *C. stygia* – 10% *Stereocaulon paschale* – 60% *Cetraria laevigata* – 2%	Heath Tundra	Sand	None
NF-19	*Flavocetraria nivalis* – 20% *F. cuculata* – 10% *Bryocaulon divergens* – 1% *Masonhalea richardsonii* – 1% *Cladonia rangiferina* – 10% *C. stellaris* – 1% *C. mitis* – 1% *C. stygia* – 15% *Stereocaulon* species – 40% *Alectoria ochroleuca* – 1%	Heath Tundra	Sand	Caribou skeleton nearby
NF-20	*Flavocetraria nivalis* – 10% *F. cuculata* – 10% *Bryocaulon divergens* – 2% *Masonhalea richardsonii* – 1% *Cladonia rangiferina* – 10% *C. stygia* – 10% *Stereocaulon* species – 60%	Heath Tundra	Sand	None

Sample Location	Lichen Species Composition	Vegetation Class	Soil Type	Caribou Activity Observed
Far-field				
FF-26 (formerly known as NF21)	*Flavocetraria nivalis* – 5% *F. cuculata* – 5% *Bryocaulon divergens* – 1% *Masonhalea richardsonii* – 1% *Cladonia rangiferina* – 5% *C. stellaris* – 1% *C. mitis* – 1% *C. stygia* – 10% *Stereocaulon* species – 70% *Cetraria* species – 1%	Tall Shrub	Sand	None
FF-27 (formerly known as NF-22)	*Flavocetraria nivalis* – 10% *F. cuculata* – 10% *Bryocaulon divergens* – 5% *Masonhalea richardsonii* – 1% *Cladonia rangiferina* – 2% *C. stellaris* – 5% *C. mitis* – 1% *C. stygia* – 5% *C. gracilis* – 0.1% *Stereocaulon* species – 60% *Bryoria* species – 0.1% *Alectoria ochroleuca* – 0.1%	Tall Shrub	Sand	None
FF-28 (formerly known as NF-23)	*Flavocetraria nivalis* – 30% *F. cuculata* – 20% *Masonhalea richardsonii* – 10% *Cladonia rangiferina* – 20% *C. mitis* – 5% *C. stygia* – 15%	Heath Tundra	Sand	Caribou trails nearby
FF-1	*Flavocetraria nivalis* – 10% *F. cuculata* – 10% *Bryocaulon divergens* – 3% *Masonhalea richardsonii* – 2% *Cladonia rangiferina* – 30% *C. stellaris* – 15% *C. mitis* – 15% *C. stygia* – 10% *Stereocaulon* species – 5%	Tussock/Hummock	Peat/Organic materials	Caribou trails
FF-2	*Flavocetraria nivalis* – 5% *F. cuculata* – 5% *Bryocaulon divergens* – 5% *Masonhalea richardsonii* – 25% *Cladonia rangiferina* – 15% *C. stellaris* – 15% *C. mitis* – 10% *C. stygia* – 10% *Stereocaulon* species – 10% *Dactylina* species – 5%	Heath Tundra	Sand	None
FF-3	*Flavocetraria nivalis* – 15% *F. cuculata* – 15% *Bryocaulon divergens* – 15% *Masonhalea richardsonii* – 1% *Cladonia rangiferina* – 5% *C. stellaris* – 5% *C. stygia* – 5% *Stereocaulon* species – 40%	Heath Tundra	Sand	None
FF-5	*No data*	Heath Tundra	Sand	Caribou trails, signs of caribou grazing

Sample Location	Lichen Species Composition	Vegetation Class	Soil Type	Caribou Activity Observed
FF-7	*Flavocetraria nivalis* – 5% *F. cuculata* – 5% *Bryocaulon divergens* – 25% *Masonhalea richardsonii* – 5% *Cladonia rangiferina* – 10% *C. stellaris* – 10% *C. mitis* – 2.5% *C. stygia* – 2.5% *Stereocaulon* species – 30% *Dactylina* species – 5%	Heath Tundra	Sand	Caribou grazing nearby
FF-8	*Flavocetraria nivalis* – 4% *F. cuculata* – 4% *Bryocaulon divergens* – 1% *Cladonia rangiferina* – 1% *C. mitis* – 1% *C. stygia* – 20% *C.* species – 2% *Stereocaulon* species – 66% *Dactylina* species – 1% *Alectoria ochroleuca* – 0.1%	Heath Tundra	Sand	None
FF-9	*Flavocetraria nivalis* – 10% *F. cuculata* – 10% *Bryocaulon divergens* – 5% *Cladonia rangiferina* – 10% *C. stygia* – 15% *Stereocaulon* species – 50% *Alectoria ochroleuca* – 0.1% *Dactylina* species – 0.1%	Heath Tundra	Sand	Caribou trails, signs of caribou grazing
FF-10	*Flavocetraria nivalis* – 1% *F. cuculata* – 1% *Bryocaulon divergens* – 1% *Masonhalea richardsonii* – 5% *Cladonia rangiferina* – 15% *C. stellaris* – 1% *C. mitis* – 1% *C. stygia* – 75%	Tussock/Hummock	Peat/Organic materials	None
FF-11	*Flavocetraria nivalis* – 15% *F. cuculata* – 15% *Masonhalea richardsonii* – 5% *Cladonia rangiferina* – 15% *C. stellaris* – 25% *C. mitis* – 5% *C. stygia* – 15% *Stereocaulon* species – 5% Alectoria species – 1%	Esker Complex	Sand	None
FF-12	*Flavocetraria nivalis* – 0.5% *F. cuculata* – 0.5% *Bryocaulon divergens* – 1% *Masonhalea richardsonii* – 1% *Cladonia rangiferina* – 10% *C. stellaris* – 1% *C. mitis* – 1% *C. stygia* – 10% *Stereocaulon* species – 75%	Heath Tundra	Sand	None

Sample Location	Lichen Species Composition	Vegetation Class	Soil Type	Caribou Activity Observed
FF-13	*Flavocetraria nivalis* – 5% *F. cuculata* – 5% *Bryocaulon divergens* – 1% *Masonhalea richardsonii* – 2% *Cladonia rangiferina* – 15% *C. stellaris* – 2% *C. mitis* – 2% *C. stygia* – 20% *Stereocaulon* species – 40% *Cetraria laevigata* – 8%	Tall Shrub	Sand	Caribou trails
FF-14	*Flavocetraria nivalis* – 10% *F. cuculata* – 10% *Masonhalea richardsonii* – 2% *Cladonia rangiferina* – 15% *C. mitis* – 8% *C. stygia* – 15% c. species – 0.1% *Stereocaulon* species – 40%	Heath Tundra	Sand	None
FF-15	*Flavocetraria nivalis* – 20% *F. cuculata* – 15% *Bryocaulon divergens* – 5% *Masonhalea richardsonii* – 1% *Cladonia rangiferina* – 15% *C. stellaris* – 1% *C. mitis* – 5% *C. stygia* – 20% *Stereocaulon* species – 18%	Heath Tundra	Sand	None
FF-17	*Flavocetraria nivalis* – 5% *F. cuculata* – 15% *Bryocaulon divergens* – 2% *Masonhalea richardsonii* – 5% *Cladonia rangiferina* – 15% *C. stellaris* – 10% *C. mitis* – 15% *C. stygia* – 15% *Stereocaulon* species – 10% *Dactylina* species – 5%	Heath Tundra	Sand	Signs of caribou grazing
FF-19	*Flavocetraria nivalis* – 10% *F. cuculata* – 5% *Bryocaulon divergens* – 5% *Masonhalea richardsonii* – 2% *Cladonia rangiferina* – 15% *C. stellaris* – 15% *C. mitis* – 5% *C. stygia* – 15% *Stereocaulon* species – 25% *Cetraria* species – 3%	Heath Tundra	Sand	None
FF-20	*Flavocetraria nivalis* – 10% *F. cuculata* – 10% *Bryocaulon divergens* – 1% *Masonhalea richardsonii* – 1% *Cladonia rangiferina* – 15% *C. stellaris* – 5% *C. mitis* – 5% *C. stygia* – 15% *Stereocaulon* species – 40%	Heath Tundra	Sand	None

Sample Location	Lichen Species Composition	Vegetation Class	Soil Type	Caribou Activity Observed
FF-21	*Flavocetraria nivalis* – 5% *F. cuculata* – 4% *Bryocaulon divergens* – 1% *Masonhalea richardsonii* – 0.1% *Cladonia rangiferina* – 15% *C. stellaris* – 0.1% *C. mitis* – 0.1% *C. stygia* – 20% *Cetraria islandica* – 5% *Arctocetraria andrejevii* – 5% *Stereocaulon* species – 45%	Tall Shrub	Sand	None
FF-22	*Flavocetraria nivalis* – 5% *F. cuculata* – 5% *Bryocaulon divergens* – 0.1% *Masonhalea richardsonii* – 0.1% *Cladonia rangiferina* – 10% *C. stellaris* – 0.1% *C. stygia* – 10% *Stereocaulon* species – 70%	Heath Tundra	Sand	Caribou skeleton, antlers nearby
FF-23	*Flavocetraria nivalis* – 5% *F. cuculata* – 5% *Bryocaulon divergens* – 1% *Masonhalea richardsonii* – 4% *Cladonia rangiferina* – 25% *C. stellaris* – 50% *C. mitis* – 5% *C. stygia* – 5%	Tussock/Hummock	Sand	None
FF-24	*Flavocetraria nivalis* – 15% *F. cuculata* – 10% *Masonhalea richardsonii* – 1% *Cladonia rangiferina* – 10% *C. mitis* – 1% *C. stygia* – 10% *Stereocaulon paschale* – 55% *Alectoria ochroleuca* – 0.1% *Arctocetraria andrejevii* – 0.1%	Heath Tundra	Sand	None
FF-25	*Flavocetraria nivalis* – 2% *F. cuculata* – 2% *Bryocaulon divergens* – 1% *Masonhalea richardsonii* – 5% *Cladonia rangiferina* – 2% *C. stellaris* – 2% *C. mitis* – 5% *C. stygia* – 5% *Stereocaulon* species – 75% *Dactylina* species – 1%	*No data*	Sand	None
Far-far-field				
FFF-1	*Flavocetraria nivalis* – 10% *F. cuculata* – 10% *Bryocaulon divergens* – 2% *Masonhalea richardsonii* – 3% *Cladonia rangiferina* – 20% *C. stellaris* – 10% *C. mitis* – 10% *C. stygia* – 10% *Stereocaulon* species – 20% *Dactylina* species – 5%	Heath Tundra	Sand	Caribou trails, signs of caribou grazing

Sample Location	Lichen Species Composition	Vegetation Class	Soil Type	Caribou Activity Observed
FFF-2	*Flavocetraria nivalis* – 3% *F. cuculata* – 3% *Masonhalea richardsonii* – 2% *Cladonia rangiferina* – 5% *C. stellaris* – 2% *C. mitis* – 2% *C. stygia* – 1% *Stereocaulon* species – 75% *Dactylina* species – 2% *Arctocetraria andrejevii* – 5% *Peltigera* species – 0.1%	Heath Tundra	Sand	Extensive caribou trails, signs of caribou grazing
FFF-3	*Flavocetraria nivalis* – 25% *F. cuculata* – 10% *Bryocaulon divergens* – 5% *Masonhalea richardsonii* – 5% *Cladonia rangiferina* – 10% *C. stellaris* – 5% *C. stygia* – 10% *Stereocaulon* species – 30%	Heath Tundra	Sand	None

Field observations were compiled from field data forms completed by Golder staff during the field portion of the Diavik Soil and Lichen Sampling Program, August 2021.

APPENDIX F

Select Photos from the Vegetation and Lichen Monitoring Program

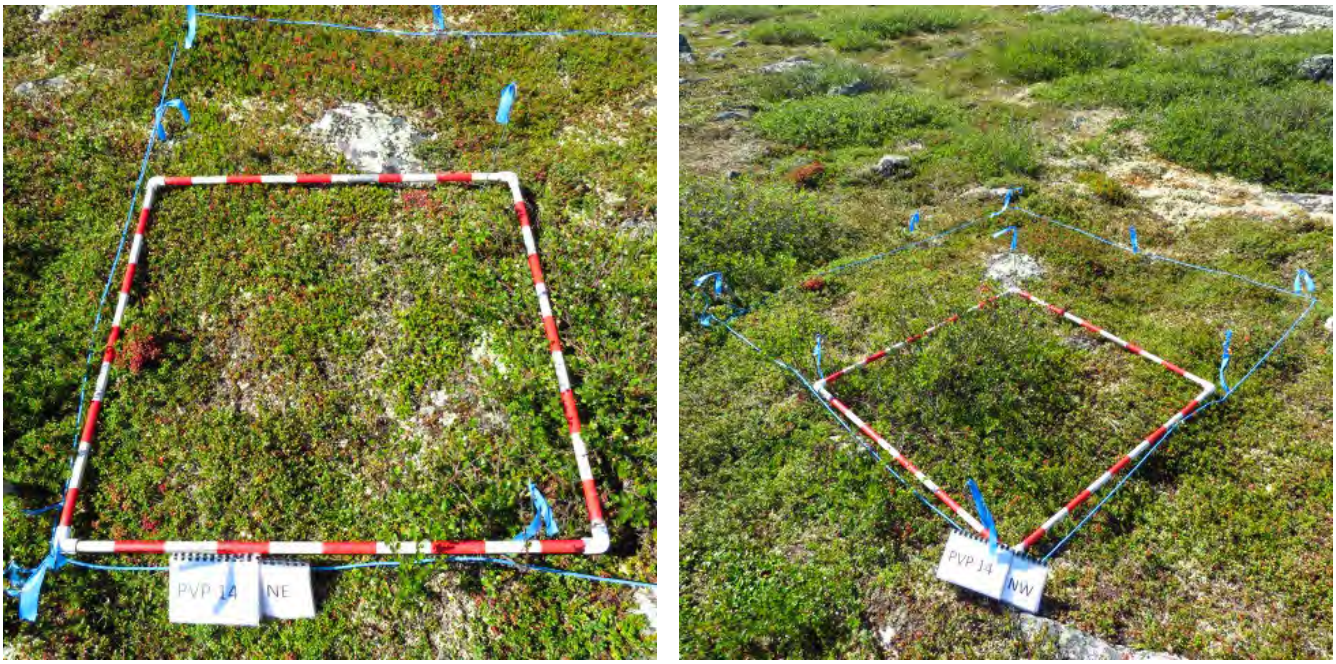


Figure F-1: Representative photos of a Heath Tundra Community plot. Permanent Vegetation Plot 14

Figure F-2: Representative photos of a Shrub Community plot. Permanent Vegetation Plot 16

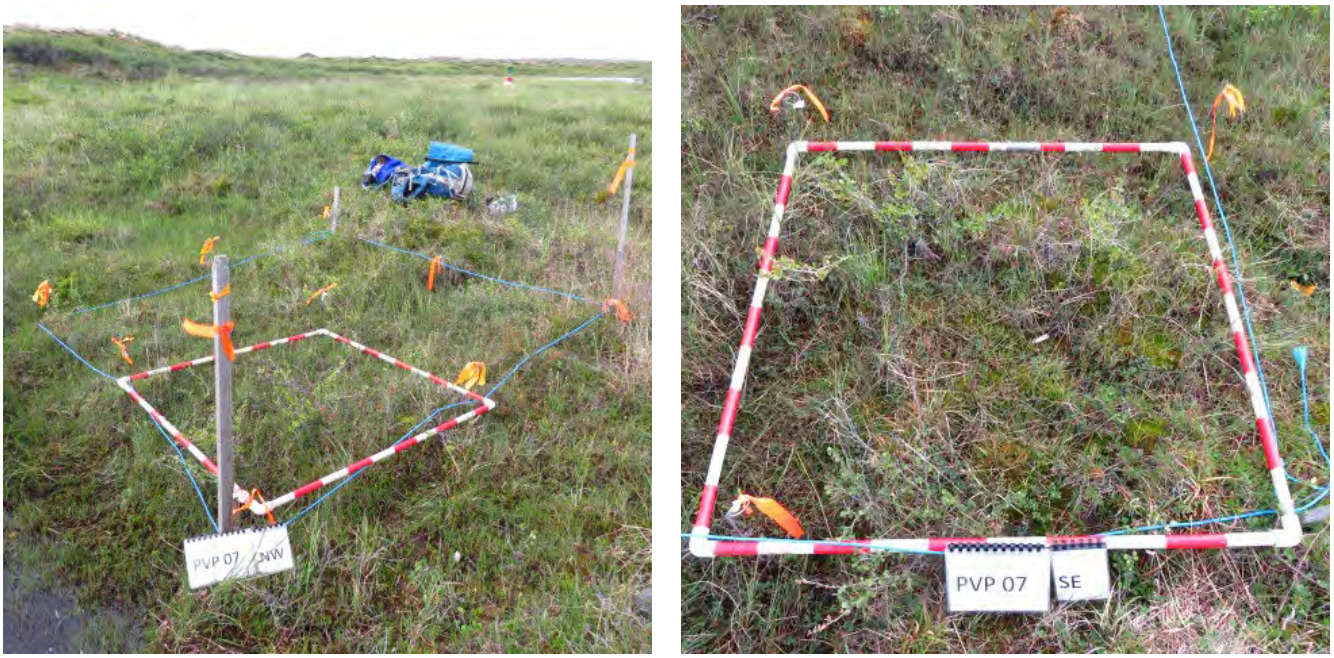


Figure F-3: Representative photos of a Tussock-Hummock Community plot. Permanent Vegetation Plot 07

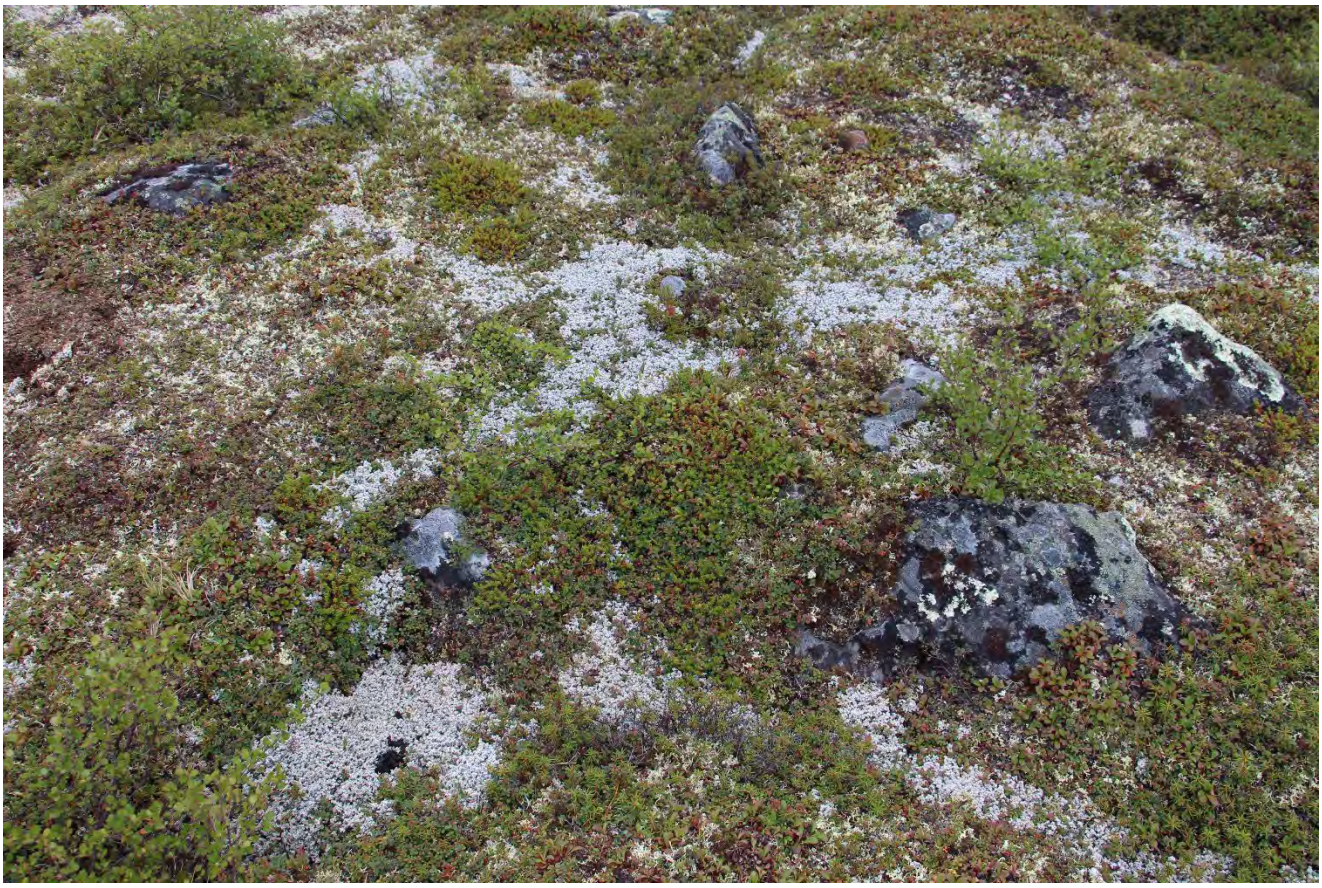


Figure F-4: Example of *Stereocaulon* spp. lichen cover at a monitoring and collection location. Far-Field 09 (FF-09)

Figure F-5: Caribou observed grazing at a lichen monitoring and collection site. Far-Field 07 (FF-07)

Figure F-6: Arctic fox observed near Permanent Vegetation Plot 09

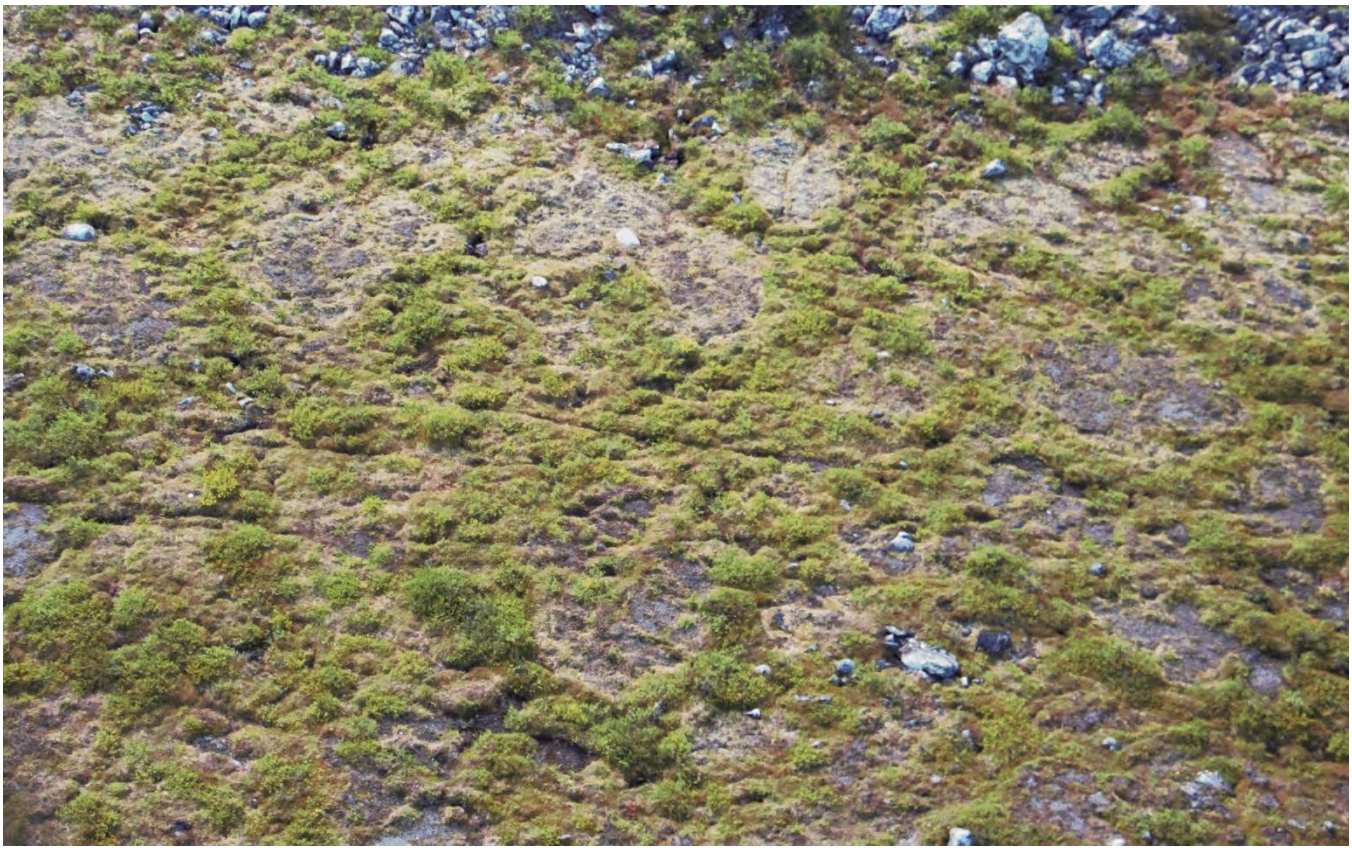


Figure 7: Caribou game trails evident near Far-Far-Field 01 (FFF-1) lichen monitoring site

APPENDIX G

Lichen and Soil Chemistry Results

Table G-1: Metals Chemistry and Moisture Content for Lichen Samples Collected from Near-Field Locations, August 2021

Parameter	UNITS	RDL	NFL-1	NFL-2	NFL-3	NFL-4	NFL-5	NFL-6	NFL-7	NFL-8	NFL-9	NFL-10	NFL-11	NFL-12	NFL-13	NFL-14	NFL-15	NFL-16	NFL-17	NFL-18	NFL-19	NFL-20
			15-Aug-21	15-Aug-21	15-Aug-21	14-Aug-21	14-Aug-21	15-Aug-21	15-Aug-21	11-Aug-21	14-Aug-21	14-Aug-21	15-Aug-21	15-Aug-21	15-Aug-21	14-Aug-21	14-Aug-21	14-Aug-21	14-Aug-21	14-Aug-21	15-Aug-21	13-Aug-21
Total Metals by CRC-ICPMS																						
Total Aluminum (Al)	mg/kg dw	1	739	620	1000	556	546	2130	1550	581	508	1020	922	1290	401	611	419	295	367	463	1430	246
Total Antimony (Sb)	mg/kg dw	0.005	0.0103	0.0056	0.0279	0.0074	0.0077	0.0342	0.0205	0.0136	0.0105	0.015	0.0222	0.0163	0.0104	0.0252	0.0095	0.0055	0.0078	0.0093	0.0251	0.0262
Total Arsenic (As)	mg/kg dw	0.02	0.32	0.257	0.47	0.252	0.207	0.504	0.711	0.184	0.157	0.204	0.291	0.904	0.164	0.441	0.243	0.077	0.128	0.158	0.516	0.136
Total Barium (Ba)	mg/kg dw	0.05	31.1	26.8	27	45.5	19.6	52	58.8	27.1	12.1	17.8	38.3	49.3	31.8	14.9	14.9	18.3	12.5	23.8	52	16.3
Total Beryllium (Be)	mg/kg dw	0.01	0.019	0.018	0.034	0.017	0.019	0.074	0.044	0.033	0.022	0.025	0.037	0.04	0.017	0.015	0.015	0.016	0.03	0.013	0.052	<0.010
Total Bismuth (Bi)	mg/kg dw	0.01	0.055	0.05	0.055	0.024	0.046	0.167	0.066	0.062	0.056	0.113	0.139	0.116	0.052	0.044	0.041	0.027	0.027	0.025 (1)	0.105	0.011
Total Boron (B)	mg/kg dw	1	1.6	1.3	1.6	1	<1.0	1.4	2.2	<1.0	1.3	1.7	<1.0	1.5	<1.0	1	<1.0	<1.0	1.2	1	1.7	1.4
Total Cadmium (Cd)	mg/kg dw	0.005	0.0261	0.0399	0.0221	0.0414	0.0288	0.0627	0.043	0.0444	0.0274	0.0346	0.0677	0.0351	0.0556	0.0308	0.0337	0.0677	0.0366	0.0288	0.0506	0.0184
Total Calcium (Ca)	mg/kg dw	10	511	1430	1230	1140	950	2960	2460	2630	879	1290	3690	3360	2330	763	1140	1270	852	929	2980	278
Total Cesium (Cs)	mg/kg dw	0.01	0.646	0.452	0.484	0.45	0.558	1.39	1.12	0.482	0.262	0.709	0.784	1.03	0.33	0.318	0.47	0.434	0.307	0.454	0.904	0.319
Total Chromium (Cr)	mg/kg dw	0.1	3.24	3.22	7.22	3.95	3.7	13	17.6	4.86	2.78	4.03	7.05	8.83	4.44	2.69	3.9	1.56	2.19	3.12	11.8	0.95
Total Cobalt (Co)	mg/kg dw	0.02	0.576	0.519	1.12	0.539	0.488	1.92	1.61	0.648	0.568	0.887	1.04	1.15	0.758	0.415	0.602	0.506	0.75	0.412	1.46	0.172
Total Copper (Cu)	mg/kg dw	0.05	3.57	3.26	4.13	2.94	2.18	3.84	4.28	1.73	1.85	2.8	2.85	4.28	1.59	1.96	1.83	1.36	2	2.03	3.47	2.1
Total Iron (Fe)	mg/kg dw	5	1050	897	1460	823	880	3060	2710	854	649	1390	1390	2920	687	899	672	387	500	705	2310	318
Total Lead (Pb)	mg/kg dw	0.01	0.354	0.363	0.435	0.246	0.278	1.44	0.584	0.694	0.397	0.787	1.15	0.66	0.601	0.405	0.385	0.309	0.289	0.222	0.885	0.117
Total Lithium (Li)	mg/kg dw	0.5	2.48	1.94	2.93	1.3	1.78	8.24	4.26	1.92	1.23	3.93	2.78	4.28	0.87	1.34	1.02	0.57	0.61	1.12	4.69	<0.50
Total Magnesium (Mg)	mg/kg dw	5	804	976	2160	1240	1060	3440	4950	1350	897	1120	2030	2420	1670	682	1170	774	690	941	3220	382
Total Manganese (Mn)	mg/kg dw	0.05	32.8	26.4	32.6	20	44.4	71	40.9	46.7	49.7	90.5	47.1	38.3	46.8	30.7	45.4	51.7	71.6	23.4	45.1	17.7
Total Molybdenum (Mo)	mg/kg dw	0.02	0.526	0.61	0.65	0.533	0.928	3.19	1.27	0.725	0.336	0.53	0.992	1.23	0.418	0.341	0.433	0.219	0.243	0.51	1.12	0.184
Total Nickel (Ni)	mg/kg dw	0.05	3.54	4.23	9.92	5.22	4.52	16.9	18	7.05	3.55	4.69	10.7	11.4	9.05	2.9	6.53	2.47	4.58	3.82	15	1.61
Total Phosphorus (P)	mg/kg dw	10	1640	1460	1100	1200	633	737	2220	605	578	667	689	1060	516	657	721	539	485	871	1070	1020
Total Potassium (K)	mg/kg dw	10	3430	3490	2640	2960	2220	2190	3950	1810	1300	1900	2080	3180	1600	1870	1970	1460	1290	2190	2680	2360
Total Selenium (Se)	mg/kg dw	0.05	<0.050	0.053	<0.050	<0.050	<0.050	0.054	0.072	<0.050	<0.050	<0.050	0.05	0.053	<0.050	0.053	<0.050	<0.050	<0.050	<0.050	0.066	<0.050
Total Silver (Ag)	mg/kg dw	0.005	0.0222	0.02	0.0161	0.0158	0.0161	0.0357	0.032	0.0155	0.0124	0.0266	0.0341	0.0366	0.0144	0.0122	0.0211	0.0198	0.0175	0.011	0.0239	0.0076
Total Sodium (Na)	mg/kg dw	10	59	42	56	37	101	159	57	138	53	78	154	72	136	35	196	100	46	38	98	27
Total Strontium (Sr)	mg/kg dw	0.05	12.8	12.5	10.6	20.5	7.35	24.3	26.5	14.2	3.64	4.86	19.1	28	16.9	4.16	5.27	7.97	3.44	10	25.5	4.1
Total Tellurium (Te)	mg/kg dw	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Thallium (Tl)	mg/kg dw	0.002	0.0318	0.0214	0.028	0.0185	0.0284	0.0849	0.0402	0.0231	0.0208	0.0529	0.0281	0.0408	0.0157	0.0144	0.0184	0.0184	0.021	0.0157	0.0446	0.0119
Total Thorium (Th)	mg/kg dw	0.05	0.719	0.562	0.644	0.333	0.371	1.49	0.979	0.452	0.389	0.942	0.733	0.888	0.295	0.469	0.312	0.197	0.209	0.302	1.01	0.139
Total Tin (Sn)	mg/kg dw	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	0.27	0.14	0.1	<0.10	0.11	0.22	0.15	0.14	0.13	<0.10	<0.10	0.1	<0.10	0.21	<0.10
Total Titanium (Ti)	mg/kg dw	0.5	68.8	53.9	80.8	44.6	54.4	214	154	61.7	43.5	99.4	100	122	43.8	55	42.5	28.8	31.6	43.6	149	18
Total Uranium (U)	mg/kg dw	0.002	0.52	0.441	0.566	0.238	0.268	1.27	0.487	0.706	0.386	0.875	0.949	0.787	0.323	0.24	0.351	0.191	0.187	0.219	0.857	0.0859
Total Vanadium (V)	mg/kg dw	0.2	1.56	1.46	2.57	1.37	1.4	5.3	4.69	1.41	1.06	2.16	2.31	4.4	1.11	1.68	1.06	0.58	0.78	1.17	4.11	0.49
Total Zinc (Zn)	mg/kg dw	0.2	31.3	41	24.8	27.9	23.9	20.4	41.1	14.9	17	16.9	19.6	37.5	13.1	17.4	13.7	18.1	12.6	24.4	25.7	27.1
Total Zirconium (Zr)	mg/kg dw	0.2	0.91	0.69	0.97	0.55	0.61	2.63	1.64	0.81	0.57	1.16	1.01	1.42	0.6	0.6	0.59	0.37	0.39	0.52	1.81	0.21
Total Mercury by CVAF																						
Total Mercury (Hg)	mg/kg dw	0.005	0.0348	0.0225	0.0235	0.0227	0.0234	0.0245	0.022	0.0237	0.0341	0.035	0.0302	0.0222	0.0303	0.0523	0.0301	0.0234	0.0316	0.028	0.0269	0.0268
Physical Parameters																						
Moisture	%	0.3	16	10	12	21	22	14	17	18	27	56	12	18	28	41	24	58	40	24	33	31

Notes

RDL = reporting detection limit; NFL = near-field lichen; % = percent; CVAF = cold vapour atomic fluorescence; mg/kg dw = milligrams per kilogram dry weight; CRC-ICPMS = collision/reaction cell inductively coupled plasma mass spectrometry; < = less than.

Table G-2: Metals Chemistry and Moisture Content for Lichen Samples Collected from Far-Field Locations, August 2021

Parameter	UNITS	RDL	FFL-26[a]	FFL-27[a]	FFL-28[a]	FFL-1	FFL-2	FFL-3	FFL-5	FFL-7	FFL-8	FFL-9	FFL-10	FFL-11	FFL-12	FFL-13	FFL-14	FFL-15	FFL-17	FFL-19	FFL-20	FFL-21	FFL-22	FFL-23	FFL-24	FFL-25
			13-Aug-21	13-Aug-21	13-Aug-21	8-Aug-21	8-Aug-21	7-Aug-21	10-Aug-21	10-Aug-21	11-Aug-21	11-Aug-21	12-Aug-21	12-Aug-21	12-Aug-21	12-Aug-21	13-Aug-21	13-Aug-21	10-Aug-21	13-Aug-21	12-Aug-21	12-Aug-21	12-Aug-21	11-Aug-21	11-Aug-21	10-Aug-21
Total Metals by CRC-ICPMS																									
Total Aluminum (Al)	mg/kg dw	1	151	191	129	143	152	120	214	231	162	79.9	81.7	87.7	147	102	74	78.5	129	150	117	92.4	106	126	194	171
Total Antimony (Sb)	mg/kg dw	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0075	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0056
Total Arsenic (As)	mg/kg dw	0.02	0.094	0.207	0.061	0.094	0.171	0.086	0.528	0.413	0.382	0.077	0.129	0.083	0.244	0.246	0.085	0.115	0.197	0.082	0.101	0.108	0.16	0.107	0.29	0.305
Total Barium (Ba)	mg/kg dw	0.05	9.19	21.1	6.59	16.9	13.9	9.59	21.8	33.4	9	12	9.44	9.91	13.9	8.3	8.42	10.4	16	10.2	11.3	8.93	7.86	9.9	15.3	15
Total Beryllium (Be)	mg/kg dw	0.01	0.012	<0.010	<0.010	0.021	0.011	0.01	0.024	0.02	0.019	<0.010	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.010	0.016	0.014	0.01
Total Bismuth (Bi)	mg/kg dw	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total Boron (B)	mg/kg dw	1	2	1.4	1.5	1.8	1.5	<1.0	2	2.9	1.3	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4
Total Cadmium (Cd)	mg/kg dw	0.005	0.0353	0.0274	0.0325	0.0438	0.0448	0.049	0.0274	0.0387	0.037	0.0237	0.0307	0.04	0.019	0.0224	0.0272	0.0457	0.0444	0.0229	0.0337	0.0257	0.0329	0.0363	0.0405	0.0312
Total Calcium (Ca)	mg/kg dw	10	582	469	542	777	677	546	416	602	852	342	894	826	274	385	554	886	1740	733	454	471	503	900	1070	718
Total Cesium (Cs)	mg/kg dw	0.01	0.165	0.259	0.52	0.239	0.304	0.255	0.213	0.323	0.186	0.251	0.131	0.22	0.267	0.372	0.167	0.459	0.08	0.645	0.321	0.195	0.148	0.205	0.142	0.114
Total Chromium (Cr)	mg/kg dw	0.1	0.43	0.56	0.25	0.3	0.21	0.31	0.34	0.46	0.34	0.14	0.26	0.25	0.2	0.2	0.25	0.25	0.29	0.28	0.17	0.22	0.25	0.27	0.35	0.49
Total Cobalt (Co)	mg/kg dw	0.02	0.307	0.22	0.099	0.41	0.177	0.129	0.551	0.382	0.518	0.089	0.324	0.083	0.129	0.161	0.183	0.239	0.441	0.256	0.107	0.166	0.202	0.403	0.467	0.338
Total Copper (Cu)	mg/kg dw	0.05	2.75	2.42	0.973	2.24	1.65	1.31	3.33	2.93	2.28	1.7	1.06	0.694	2.07	1.86	1.32	0.966	1.77	1.24	1.76	1.6	1.71	0.894	2.68	2.27
Total Iron (Fe)	mg/kg dw	5	147	210	106	178	130	124	379	331	264	74.2	161	82.2	130	129	87.9	96.2	151	125	99.7	118	132	112	411	220
Total Lead (Pb)	mg/kg dw	0.01	0.089	0.084	0.129	0.086	0.15	0.377	0.096	0.203	0.134	0.049	0.124	0.198	0.064	0.061	0.08	0.105	0.134	0.099	0.07	0.094	0.073	0.107	0.125	0.103
Total Lithium (Li)	mg/kg dw	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Magnesium (Mg)	mg/kg dw	5	387	376	335	367	354	267	256	397	368	236	369	360	210	225	286	413	609	324	245	224	245	281	350	370
Total Manganese (Mn)	mg/kg dw	0.05	13.7	27.8	44.3	30.3	33.5	30.4	17.2	39.7	44	14.9	94.7	42.9	12.3	13	31.1	61.9	95.1	61.5	16.8	26.1	18.7	70.4	33.2	42.6
Total Molybdenum (Mo)	mg/kg dw	0.02	0.154	0.094	0.047	0.149	0.061	0.048	0.121	0.106	0.115	0.065	0.148	0.035	0.088	0.124	0.04	0.048	0.07	0.059	0.086	0.156	0.077	0.054	0.224	0.05
Total Nickel (Ni)	mg/kg dw	0.05	1.45	1.6	0.429	0.969	0.686	0.653	3.15	2.04	1.5	0.705	1.11	0.5	0.975	0.977	0.933	0.789	1.24	1.12	0.707	0.818	0.787	1.84	1.44	2.12
Total Phosphorus (P)	mg/kg dw	10	976	1230	570	853	1110	584	707	1380	558	989	385	410	742	554	689	516	763	407	919	415	617	263	639	849
Total Potassium (K)	mg/kg dw	10	2860	2870	1460	2490	2290	1730	2100	2630	1660	2710	1150	1190	2150	1760	1920	1500	2100	1290	2250	1520	1860	942	2090	2080
Total Selenium (Se)	mg/kg dw	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	0.059	<0.050	<0.050	<0.050	0.072	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Silver (Ag)	mg/kg dw	0.005	0.0087	0.0115	0.0116	0.006	0.0096	0.011	0.0201	0.017	0.0176	0.0082	0.0091	0.0066	0.0071	0.0068	<0.0050	0.007	0.0064	0.0137	0.0061	0.0062	0.0061	0.0104	0.0163	0.0088
Total Sodium (Na)	mg/kg dw	10	35	73	70	49	73	38	57	45	58	21	57	47	22	26	42	103	142	41	25	26	17	43	54	35
Total Strontium (Sr)	mg/kg dw	0.05	4.75	6.47	2.18	8.16	5.28	2.97	6.19	7.81	5.02	3.81	3.11	4.25	3.36	3.72	2.81	4.35	7.42	4.69	3.46	3.47	3.53	4.06	7.29	4.84
Total Tellurium (Te)	mg/kg dw	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Thallium (Tl)	mg/kg dw	0.002	0.0052	0.0083	0.0141	0.0072	0.0095	0.0083	0.0055	0.0114	0.0074	0.0044	0.0081	0.0042	0.0072	0.0069	0.0085	0.0096	0.0079	0.0084	0.0054	0.0053	0.0062	0.0112	0.0047	0.0048
Total Thorium (Th)	mg/kg dw	0.05	0.066	0.057	<0.050	<0.050	<0.050	<0.050	0.055	0.055	0.062	<0.050	<0.050	<0.050	0.054	0.054	<0.050	<0.050	0.074	<0.050	0.059	<0.050	0.061	<0.050	0.135	0.074
Total Tin (Sn)	mg/kg dw	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Titanium (Ti)	mg/kg dw	0.5	7.37	10.9	6.43	6.76	5.26	6.61	6.25	9.96	4.72	3.06	4.02	4.26	4.41	3.67	4.32	4.63	6.56	5.45	3.23	3.61	4.77	4.44	6.97	10.2
Total Uranium (U)	mg/kg dw	0.002	0.0548	0.0349	0.0279	0.124	0.0391	0.0517	0.0524	0.0802	0.0629	0.0163	0.0184	0.0139	0.0245	0.0275	0.0171	0.0198	0.0777	0.0256	0.03	0.0312	0.0299	0.0274	0.114	0.0391
Total Vanadium (V)	mg/kg dw	0.2	0.21	0.37	<0.20	0.22	<0.20	<0.20	0.45	0.48	0.36	<0.20	<0.20	<0.20	0.21	0.23	<0.20	<0.20	0.21	<0.20	<0.20	<0.20	0.21	<0.20	0.48	0.36
Total Zinc (Zn)	mg/kg dw	0.2	32.9	29.4	13.7	30.6	26	17.8	26.6	37.1	18.1	30.4	15.9	17.1	27.7	17.5	21.7	18.7	20.5	14.6	25.7	17.2	21	14.3	26.4	21.9
Total Zirconium (Zr)	mg/kg dw	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Total Mercury by CVAF																									
Total Mercury (Hg)	mg/kg dw	0.005	0.0183	0.0224	0.0305	0.0219	0.0334	0.0469	0.017	0.0396	0.022	0.0164	0.025	0.0205	0.0217	0.0151	0.0275	0.0258	0.0283	0.0171	0.0206	0.0173	0.0226	0.0222	0.0223	0.024
Physical Parameters																									
Moisture	%	0.3	17	43	22	29	26	22	51	52	38	63	32	15	23	18	30	13	62	23	24	30	19	22	27	53

Notes
RDL = reporting detection limit; FFL = far-field lichen; % = percent; CVAF = cold vapour atomic fluorescence; mg/kg dw = milligrams per kilogram dry weight; CRC-ICPMS = collision/reaction cell inductively coupled plasma mass spectrometry; < = less than.
(a) NFL-21, NFL-22, and NFL-23 were renamed FFL-26, FFL-27, and FFL-28, respectively, to be consistent with the data analysis that considered these stations to be located in the far-field area.

Table G-3: Metals Chemistry and Moisture Content for Lichen Samples Collected fro

Parameter	UNITS	RDL	FFFL-1	FFFL-2	FFFL-3
			9-Aug-21	9-Aug-21	8-Aug-21
Total Metals by CRC-ICPMS					
Total Aluminum (Al)	mg/kg dw	1	197	108	116
Total Antimony (Sb)	mg/kg dw	0.005	0.0052	<0.0050	<0.0050
Total Arsenic (As)	mg/kg dw	0.02	0.336	0.102	0.079
Total Barium (Ba)	mg/kg dw	0.05	14.9	20.6	20.9
Total Beryllium (Be)	mg/kg dw	0.01	0.011	<0.010	<0.010
Total Bismuth (Bi)	mg/kg dw	0.01	<0.010	<0.010	<0.010
Total Boron (B)	mg/kg dw	1	<1.0	1.6	1.4
Total Cadmium (Cd)	mg/kg dw	0.005	0.0294	0.0183	0.0371
Total Calcium (Ca)	mg/kg dw	10	972	431	652
Total Cesium (Cs)	mg/kg dw	0.01	0.181	0.395	0.201
Total Chromium (Cr)	mg/kg dw	0.1	0.48	0.21	0.47
Total Cobalt (Co)	mg/kg dw	0.02	0.569	0.252	0.159
Total Copper (Cu)	mg/kg dw	0.05	2.83	2.22	1.81
Total Iron (Fe)	mg/kg dw	5	876	155	128
Total Lead (Pb)	mg/kg dw	0.01	0.157	0.078	2.03
Total Lithium (Li)	mg/kg dw	0.5	<0.50	<0.50	<0.50
Total Magnesium (Mg)	mg/kg dw	5	363	299	279
Total Manganese (Mn)	mg/kg dw	0.05	61	28.1	27.9
Total Molybdenum (Mo)	mg/kg dw	0.02	0.2	0.082	0.042
Total Nickel (Ni)	mg/kg dw	0.05	1.41	1.36	0.949
Total Phosphorus (P)	mg/kg dw	10	485	991	875
Total Potassium (K)	mg/kg dw	10	1760	2550	2270
Total Selenium (Se)	mg/kg dw	0.05	<0.050	0.055	<0.050
Total Silver (Ag)	mg/kg dw	0.005	0.0178	0.0076	0.0089
Total Sodium (Na)	mg/kg dw	10	79	29	30
Total Strontium (Sr)	mg/kg dw	0.05	6.2	3.08	5.55
Total Tellurium (Te)	mg/kg dw	0.02	<0.020	<0.020	<0.020
Total Thallium (Tl)	mg/kg dw	0.002	0.0102	0.0042	0.004
Total Thorium (Th)	mg/kg dw	0.05	0.191	<0.050	0.213
Total Tin (Sn)	mg/kg dw	0.1	<0.10	<0.10	<0.10
Total Titanium (Ti)	mg/kg dw	0.5	8.64	4.68	5.17
Total Uranium (U)	mg/kg dw	0.002	0.0963	0.0121	0.0954
Total Vanadium (V)	mg/kg dw	0.2	1.99	<0.20	<0.20
Total Zinc (Zn)	mg/kg dw	0.2	18	25.8	25.5
Total Zirconium (Zr)	mg/kg dw	0.2	0.29	<0.20	<0.20
Total Mercury by CVAF					
Total Mercury (Hg)	mg/kg dw	0.005	0.0247	0.0261	0.0288
Physical Parameters					
Moisture	%	0.3	49	16	19

Notes
RDL = reporting detection limit; FFFL = far-far-field lichen; % = percent; CVAF = cold vapour atomic fluorescence; mg/kg dw = milligrams per kilogram dry weight; CRC-ICPMS = collision/reaction cell inductively coupled plasma mass spectrometry; < = less than.

Table G-4: Relative Percent Difference of Duplicate Lichen Samples, August 2021

Parameter	UNITS	RDL	5·RDL	FFL-26[(a)] 13-Aug-21 Original	FFL-26D[(a)] 13-Aug-21 Duplicate	RPD	FFL-27[(a)] 13-Aug-21 Original	FFL-27D[(a)] 13-Aug-21 Duplicate	RPD	FFL-9 11-Aug-21 Original	FFL-9D 11-Aug-21 Duplicate	RPD	FFL-21 12-Aug-21 Original	FFL-21D 12-Aug-21 Duplicate	RPD	FFFL-2 9-Aug-21 Original	FFFL-2D 9-Aug-21 Duplicate	RPD
Total Metals by CRC-ICPMS																		
Total Aluminum (Al)	mg/kg dw	1	5	151	206	**31%**	191	222	15%	79.9	156	**65%**	92.4	150	**48%**	108	82.9	26%
Total Antimony (Sb)	mg/kg dw	0.005	0.025	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Total Arsenic (As)	mg/kg dw	0.02	0.10	0.094	0.131	**33%**	0.207	0.21	1%	0.077	0.123	46%	0.108	0.24	**76%**	0.102	0.067	41%
Total Barium (Ba)	mg/kg dw	0.05	0.25	9.19	12.2	28%	21.1	11.7	**57%**	12	16.1	29%	8.93	10.1	12%	20.6	16.2	24%
Total Beryllium (Be)	mg/kg dw	0.01	0.05	0.012	0.014	15%	<0.010	<0.010	-	<0.010	0.011	-	<0.010	0.01	-	<0.010	<0.010	-
Total Bismuth (Bi)	mg/kg dw	0.01	0.05	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
Total Boron (B)	mg/kg dw	1	5	2	1.6	22%	1.4	1.7	19%	1.2	1.6	29%	<1.0	<1.0	-	1.6	1.2	29%
Total Cadmium (Cd)	mg/kg dw	0.005	0.025	0.0353	0.0261	30%	0.0274	0.0428	**44%**	0.0237	0.0276	15%	0.0257	0.03	15%	0.0183	0.0183	0%
Total Calcium (Ca)	mg/kg dw	10	50	582	560	4%	469	487	4%	342	408	18%	471	396	17%	431	541	23%
Total Cesium (Cs)	mg/kg dw	0.01	0.05	0.165	0.18	9%	0.259	0.099	**89%**	0.251	0.232	8%	0.195	0.279	**35%**	0.395	0.429	8%
Total Chromium (Cr)	mg/kg dw	0.1	0.5	0.43	0.59	**31%**	0.56	0.7	22%	0.14	0.22	44%	0.22	0.3	31%	0.21	0.14	40%
Total Cobalt (Co)	mg/kg dw	0.02	0.10	0.307	0.299	3%	0.22	0.27	20%	0.089	0.144	**47%**	0.166	0.224	30%	0.252	0.273	8%
Total Copper (Cu)	mg/kg dw	0.05	0.25	2.75	2.66	3%	2.42	1.43	**51%**	1.7	1.86	9%	1.6	2.32	**37%**	2.22	2.25	1%
Total Iron (Fe)	mg/kg dw	5	25	147	206	**33%**	210	254	19%	74.2	131	**55%**	118	232	**65%**	155	118	27%
Total Lead (Pb)	mg/kg dw	0.01	0.05	0.089	0.104	16%	0.084	0.152	**58%**	0.049	0.066	30%	0.094	0.076	21%	0.078	0.074	5%
Total Lithium (Li)	mg/kg dw	0.5	2.5	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-
Total Magnesium (Mg)	mg/kg dw	5	25	387	375	3%	376	349	7%	236	238	1%	224	249	11%	299	265	12%
Total Manganese (Mn)	mg/kg dw	0.05	0.25	13.7	12.6	8%	27.8	17.6	**45%**	14.9	14.8	1%	26.1	14.7	**56%**	28.1	30.8	9%
Total Molybdenum (Mo)	mg/kg dw	0.02	0.10	0.154	0.161	4%	0.094	0.089	5%	0.065	0.068	5%	0.156	0.276	**56%**	0.082	0.074	10%
Total Nickel (Ni)	mg/kg dw	0.05	0.25	1.45	1.55	7%	1.6	1.43	11%	0.705	0.887	23%	0.818	0.976	18%	1.36	1.13	18%
Total Phosphorus (P)	mg/kg dw	10	50	976	870	11%	1230	514	**82%**	989	712	**33%**	415	547	27%	991	786	23%
Total Potassium (K)	mg/kg dw	10	50	2860	2600	10%	2870	1580	**58%**	2710	2130	24%	1520	1920	23%	2550	2570	1%
Total Selenium (Se)	mg/kg dw	0.05	0.25	<0.050	<0.050	-	<0.050	<0.050	-	0.072	0.053	30%	<0.050	<0.050	-	0.055	0.051	8%
Total Silver (Ag)	mg/kg dw	0.005	0.025	0.0087	0.0091	4%	0.0115	0.0119	3%	0.0082	0.0111	30%	0.0062	0.0093	40%	0.0076	0.0099	26%
Total Sodium (Na)	mg/kg dw	10	50	35	36	3%	73	36	**68%**	21	38	58%	26	27	4%	29	31	7%
Total Strontium (Sr)	mg/kg dw	0.05	0.25	4.75	5.27	10%	6.47	4	**47%**	3.81	5.04	28%	3.47	4.64	29%	3.08	3.45	11%
Total Tellurium (Te)	mg/kg dw	0.02	0.10	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
Total Thallium (Tl)	mg/kg dw	0.002	0.010	0.0052	0.0077	39%	0.0083	0.0042	66%	0.0044	0.0053	19%	0.0053	0.0047	12%	0.0042	0.0038	10%
Total Thorium (Th)	mg/kg dw	0.05	0.25	0.066	0.095	36%	0.057	0.087	42%	<0.050	<0.050	-	<0.050	0.072	-	<0.050	<0.050	-
Total Tin (Sn)	mg/kg dw	0.1	0.5	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-
Total Titanium (Ti)	mg/kg dw	0.5	2.5	7.37	10.2	**32%**	10.9	14	25%	3.06	5.26	**53%**	3.61	5.12	**35%**	4.68	3.16	**39%**
Total Uranium (U)	mg/kg dw	0.002	0.010	0.0548	0.0753	**32%**	0.0349	0.0425	20%	0.0163	0.0298	**59%**	0.0312	0.0596	**63%**	0.0121	0.0098	21%
Total Vanadium (V)	mg/kg dw	0.2	1.0	0.21	0.33	44%	0.37	0.46	22%	<0.20	<0.20	-	<0.20	0.34	-	<0.20	<0.20	-
Total Zinc (Zn)	mg/kg dw	0.2	1.0	32.9	28.9	13%	29.4	17.3	**52%**	30.4	26.6	13%	17.2	23.2	30%	25.8	29.6	14%
Total Zirconium (Zr)	mg/kg dw	0.2	1.0	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
Total Mercury by CVAF																		
Total Mercury (Hg)	mg/kg dw	0.005	0.025	0.0183	0.0191	4%	0.0224	0.0212	6%	0.0164	0.0122	29%	0.0173	0.0181	5%	0.0261	0.0204	25%
Physical Parameters																		
Moisture	%	0.3	1.5	17	18	6%	43	37	15%	63	31	**68%**	30	24	22%	16	12	29%

Notes
- = no data or not applicable
Bolded RPD values are greater than 30% and mean of duplicate samples is greater than 5·RDL.
RDL = reporting detection limit; RPD = relative percent difference; NFL = near-field lichen; FFL = far-field lichen; FFFL = far-far-field lichen; % = percent; CVAF = Cold vapour atomic fluorescence; mg/kg = milligrams per kilogram dry weight; < = less than.
(a) NFL-21 andNFL-22 were renamed FFL-26 and FFL-27, respectively, to be consistent with the data analysis that considered these stations to be located in the far-field area.

Table G-5: Total Mercury in Soil Collected with Lichen Samples, August 2021

Parameter	UNITS	RDL	NFS-1	NFS-2	NFS-3	NFS-4	NFS-5	NFS-6	NFS-7	NFS-8	NFS-9	NFS-10	NFS-11	NFS-12	NFS-13	NFS-14	NFS-15	NFS-16	NFS-17	NFS-18	NFS-19	NFS-20	FFS-26[a]	FFS-26 DUP[a]	FFS-27[a]	FFS-27 DUP[a]	FFS-28[a]
			15-Aug-21	15-Aug-21	15-Aug-21	14-Aug-21	14-Aug-21	15-Aug-21	15-Aug-21	11-Aug-21	14-Aug-21	14-Aug-21	15-Aug-21	15-Aug-21	15-Aug-21	14-Aug-21	14-Aug-21	14-Aug-21	14-Aug-21	14-Aug-21	15-Aug-21	13-Aug-21	13-Aug-21	13-Aug-21	13-Aug-21	13-Aug-21	13-Aug-21
			Original	Original	Original	Original	Original	Original	Original	Original	Original	Original	Original	Original	Original	Original	Original	Original	Original	Original	Original	Original	Original	Duplicate	Original	Duplicate	Original
Total Mercury by CVAF																											
Total Mercury (Hg)	mg/kg dw	0.0050	0.0087	0.0088	<0.0050	0.0055	<0.0050	0.0071	0.0158	<0.0050	<0.0050	0.0055	0.0095	<0.0050	<0.0050	0.0080	<0.0050	0.0144	0.0240	0.0057	0.0063	0.0061	<0.0050	<0.0050	0.0102	0.0099	<0.0050

Parameter	UNITS	RDL	FFS-1	FFS-2	FFS-3	FFS-5	FFS-7	FFS-8	FFS-9	FFS-9 DUP	FFS-10	FFS-11	FFS-12	FFS-13	FFS-14	FFS-15	FFS-17	FFS-19	FFS-20	FFS-21	FFS-21D	FFS-22	FFS-23	FFS-24	FFS-25
			8-Aug-21	8-Aug-21	7-Aug-21	10-Aug-21	10-Aug-21	11-Aug-21	11-Aug-21	11-Aug-21	12-Aug-21	12-Aug-21	12-Aug-21	12-Aug-21	13-Aug-21	13-Aug-21	10-Aug-21	13-Aug-21	12-Aug-21	12-Aug-21	12-Aug-21	12-Aug-21	11-Aug-21	11-Aug-21	10-Aug-21
			Original	Original	Original	Original	Original	Original	Original	Duplicate	Original	Original	Original	Original	Original	Original	Original	Original	Original	Original	Duplicate	Original	Original	Original	Original
Total Mercury by CVAF																									
Total Mercury (Hg)	mg/kg dw	0.0050	0.0662	0.0111	0.0088	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0067	0.0154	<0.0050	<0.0050	0.023	0.0062	<0.0050	0.0054	0.008	<0.0050	<0.0050	<0.0050	0.0061	<0.0050	<0.0050

Parameter	UNITS	RDL	FFFS-1	FFFS-2	FFFS-2 DUP	FFFS-3
			09-Aug-21	09-Aug-21	09-Aug-21	08-Aug-21
			Original	Original	Duplicate	Original
Total Mercury by CVAF						
Total Mercury (Hg)	mg/kg dw	0.0050	<0.0050	<0.0050	0.0053	<0.0050

Notes
RDL = reporting detection limit; NFS = near-field soil; FFS = far-field soil; FFFS = far-far-field soil; % = percent; CVAF = Cold vapour atomic fluorescence; mg/kg dw = milligrams per kilogram dry weight; < = less than.
(a) NFS-21, NFS-22, and NFS-23 were renamed FFS-26, FFS-27, and FFS-28, respectively, to be consistent with the data analysis that considered these stations to be located in the far-field area.

Your P.O. #: 3104474131
Your Project #: 21452119-2000
Site Location: DIAVIK MINE
Your C.O.C. #: 1OF3, 2OF3, 3OF3

Attention: Kerrie Serben

GOLDER ASSOCIATES LTD
1721 8TH Street East
Saskatoon, SK
Canada

Report Date: 2021/10/05
Report #: R3080482
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C160126
Received: 2021/08/16, 11:30

Sample Matrix: Soil
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Mercury in Soil by CVAF (1)	10	2021/08/26	2021/08/27	BBY7SOP-00012	EPA 245.7

Sample Matrix: Tissue
Samples Received: 15

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Mercury in Tissue by CVAF - Dry Wt (1)	15	N/A	2021/09/29	BBY7SOP-00012	EPA 245.7
Elements in Tissue by CRC ICPMS - Dry Wt (1)	15	2021/09/20	2021/09/25	BBY7SOP-00021 / BBY7SOP-00002	EPA 6020b R2 m
Elements in Tissue - Wet Wt (Calculated) (1)	15	N/A	2021/09/15	BBY WI-00033	Auto Calc
Moisture in Tissue (1)	15	2021/09/14	2021/09/15	BBY8SOP-00017	BCMOE BCLM Dec2000 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Vancouver, 4606 Canada Way , Burnaby, BC, V5G 1K5

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Your P.O. #: 3104474131
Your Project #: 21452119-2000
Site Location: DIAVIK MINE
Your C.O.C. #: 1OF3, 2OF3, 3OF3

Attention: Kerrie Serben

GOLDER ASSOCIATES LTD
1721 8TH Street East
Saskatoon, SK
Canada

Report Date: 2021/10/05
Report #: R3080482
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C160126
Received: 2021/08/16, 11:30

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rhecie Phayouphone, Key Account Specialist
Email: Rhecie.Phayouphone@bureauveritas.com
Phone# (403)735-2283

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

MERCURY BY COLD VAPOR (SOIL)

BV Labs ID		ADZ148	ADZ149	ADZ150	ADZ151	ADZ152	ADZ153		
Sampling Date		2021/08/08	2021/08/08	2021/08/07	2021/08/10	2021/08/10	2021/08/11		
COC Number		1OF3	1OF3	1OF3	1OF3	1OF3	1OF3		
	UNITS	**FFS-1**	**FFS-2**	**FFS-3**	**FFS-5**	**FFS-7**	**FFS-8**	**RDL**	**QC Batch**
Elements									
Total Mercury (Hg)	mg/kg	0.0662	0.0111	0.0088	<0.0050	<0.0050	<0.0050	0.0050	A332908
RDL = Reportable Detection Limit									

BV Labs ID		ADZ154	ADZ155	ADZ156	ADZ157		
Sampling Date		2021/08/11	2021/08/12	2021/08/12	2021/08/12		
COC Number		1OF3	1OF3	1OF3	1OF3		
	UNITS	**FFS-9**	**FFS-10**	**FFS-11**	**FFS-12**	**RDL**	**QC Batch**
Elements							
Total Mercury (Hg)	mg/kg	<0.0050	0.0067	0.0154	<0.0050	0.0050	A332908
RDL = Reportable Detection Limit							

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ162	ADZ163	ADZ164	ADZ165	ADZ166	ADZ167		
Sampling Date		2021/08/15	2021/08/15	2021/08/15	2021/08/14	2021/08/14	2021/08/14		
COC Number		2OF3	2OF3	2OF3	2OF3	2OF3	2OF3		
	UNITS	**NFL-11**	**NFL-12**	**NFL-13**	**NFL-14**	**NFL-15**	**NFL-16**	**RDL**	**QC Batch**
Mercury by CVAF									
Total (Dry Wt) Mercury (Hg)	mg/kg	0.0302	0.0222	0.0303	0.0523	0.0301	0.0234	0.0050	A368270
Total Metals by ICPMS									
Total (Dry Wt) Aluminum (Al)	mg/kg	922	1290	401	611	419	295	1.0	A359030
Total (Dry Wt) Antimony (Sb)	mg/kg	0.0222	0.0163	0.0104	0.0252	0.0095	0.0055	0.0050	A359030
Total (Dry Wt) Arsenic (As)	mg/kg	0.291	0.904	0.164	0.441	0.243	0.077	0.020	A359030
Total (Dry Wt) Barium (Ba)	mg/kg	38.3	49.3	31.8	14.9	14.9	18.3	0.050	A359030
Total (Dry Wt) Beryllium (Be)	mg/kg	0.037	0.040	0.017	0.015	0.015	0.016	0.010	A359030
Total (Dry Wt) Bismuth (Bi)	mg/kg	0.139	0.116	0.052	0.044	0.041	0.027	0.010	A359030
Total (Dry Wt) Boron (B)	mg/kg	<1.0	1.5	<1.0	1.0	<1.0	<1.0	1.0	A359030
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.0677	0.0351	0.0556	0.0308	0.0337	0.0677	0.0050	A359030
Total (Dry Wt) Calcium (Ca)	mg/kg	3690	3360	2330	763	1140	1270	10	A359030
Total (Dry Wt) Cesium (Cs)	mg/kg	0.784	1.03	0.330	0.318	0.470	0.434	0.010	A359030
Total (Dry Wt) Chromium (Cr)	mg/kg	7.05	8.83	4.44	2.69	3.90	1.56	0.10	A359030
Total (Dry Wt) Cobalt (Co)	mg/kg	1.04	1.15	0.758	0.415	0.602	0.506	0.020	A359030
Total (Dry Wt) Copper (Cu)	mg/kg	2.85	4.28	1.59	1.96	1.83	1.36	0.050	A359030
Total (Dry Wt) Iron (Fe)	mg/kg	1390	2920	687	899	672	387	5.0	A359030
Total (Dry Wt) Lead (Pb)	mg/kg	1.15	0.660	0.601	0.405	0.385	0.309	0.010	A359030
Total (Dry Wt) Lithium (Li)	mg/kg	2.78	4.28	0.87	1.34	1.02	0.57	0.50	A359030
Total (Dry Wt) Magnesium (Mg)	mg/kg	2030	2420	1670	682	1170	774	5.0	A359030
Total (Dry Wt) Manganese (Mn)	mg/kg	47.1	38.3	46.8	30.7	45.4	51.7	0.050	A359030
Total (Dry Wt) Molybdenum (Mo)	mg/kg	0.992	1.23	0.418	0.341	0.433	0.219	0.020	A359030
Total (Dry Wt) Nickel (Ni)	mg/kg	10.7	11.4	9.05	2.90	6.53	2.47	0.050	A359030
Total (Dry Wt) Phosphorus (P)	mg/kg	689	1060	516	657	721	539	10	A359030
Total (Dry Wt) Potassium (K)	mg/kg	2080	3180	1600	1870	1970	1460	10	A359030
Total (Dry Wt) Selenium (Se)	mg/kg	0.050	0.053	<0.050	0.053	<0.050	<0.050	0.050	A359030
Total (Dry Wt) Silver (Ag)	mg/kg	0.0341	0.0366	0.0144	0.0122	0.0211	0.0198	0.0050	A359030
Total (Dry Wt) Sodium (Na)	mg/kg	154	72	136	35	196	100	10	A359030
Total (Dry Wt) Strontium (Sr)	mg/kg	19.1	28.0	16.9	4.16	5.27	7.97	0.050	A359030
Total (Dry Wt) Tellurium (Te)	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	A359030
Total (Dry Wt) Thallium (Tl)	mg/kg	0.0281	0.0408	0.0157	0.0144	0.0184	0.0184	0.0020	A359030
Total (Dry Wt) Thorium (Th)	mg/kg	0.733	0.888	0.295	0.469	0.312	0.197	0.050	A359030
Total (Dry Wt) Tin (Sn)	mg/kg	0.22	0.15	0.14	0.13	<0.10	<0.10	0.10	A359030

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ162	ADZ163	ADZ164	ADZ165	ADZ166	ADZ167		
Sampling Date		2021/08/15	2021/08/15	2021/08/15	2021/08/14	2021/08/14	2021/08/14		
COC Number		2OF3	2OF3	2OF3	2OF3	2OF3	2OF3		
	UNITS	**NFL-11**	**NFL-12**	**NFL-13**	**NFL-14**	**NFL-15**	**NFL-16**	**RDL**	**QC Batch**
Total (Dry Wt) Titanium (Ti)	mg/kg	100	122	43.8	55.0	42.5	28.8	0.50	A359030
Total (Dry Wt) Uranium (U)	mg/kg	0.949	0.787	0.323	0.240	0.351	0.191	0.0020	A359030
Total (Dry Wt) Vanadium (V)	mg/kg	2.31	4.40	1.11	1.68	1.06	0.58	0.20	A359030
Total (Dry Wt) Zinc (Zn)	mg/kg	19.6	37.5	13.1	17.4	13.7	18.1	0.20	A359030
Total (Dry Wt) Zirconium (Zr)	mg/kg	1.01	1.42	0.60	0.60	0.59	0.37	0.20	A359030
RDL = Reportable Detection Limit									

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ168	ADZ169	ADZ170	ADZ171	ADZ174	ADZ175		
Sampling Date		2021/08/14	2021/08/14	2021/08/15	2021/08/13	2021/08/10	2021/08/09		
COC Number		2OF3	2OF3	2OF3	2OF3	3OF3	3OF3		
	UNITS	**NFL-17**	**NFL-18**	**NFL-19**	**NFL-20**	**FFL-25**	**FFFL-1**	**RDL**	**QC Batch**
Mercury by CVAF									
Total (Dry Wt) Mercury (Hg)	mg/kg	0.0316	0.0280	0.0269	0.0268	0.0240	0.0247	0.0050	A368270
Total Metals by ICPMS									
Total (Dry Wt) Aluminum (Al)	mg/kg	367	463	1430	246	171	197	1.0	A359030
Total (Dry Wt) Antimony (Sb)	mg/kg	0.0078	0.0093	0.0251	0.0262	0.0056	0.0052	0.0050	A359030
Total (Dry Wt) Arsenic (As)	mg/kg	0.128	0.158	0.516	0.136	0.305	0.336	0.020	A359030
Total (Dry Wt) Barium (Ba)	mg/kg	12.5	23.8	52.0	16.3	15.0	14.9	0.050	A359030
Total (Dry Wt) Beryllium (Be)	mg/kg	0.030	0.013	0.052	<0.010	0.010	0.011	0.010	A359030
Total (Dry Wt) Bismuth (Bi)	mg/kg	0.027	0.025 (1)	0.105	0.011	<0.010	<0.010	0.010	A359030
Total (Dry Wt) Boron (B)	mg/kg	1.2	1.0	1.7	1.4	1.4	<1.0	1.0	A359030
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.0366	0.0288	0.0506	0.0184	0.0312	0.0294	0.0050	A359030
Total (Dry Wt) Calcium (Ca)	mg/kg	852	929	2980	278	718	972	10	A359030
Total (Dry Wt) Cesium (Cs)	mg/kg	0.307	0.454	0.904	0.319	0.114	0.181	0.010	A359030
Total (Dry Wt) Chromium (Cr)	mg/kg	2.19	3.12	11.8	0.95	0.49	0.48	0.10	A359030
Total (Dry Wt) Cobalt (Co)	mg/kg	0.750	0.412	1.46	0.172	0.338	0.569	0.020	A359030
Total (Dry Wt) Copper (Cu)	mg/kg	2.00	2.03	3.47	2.10	2.27	2.83	0.050	A359030
Total (Dry Wt) Iron (Fe)	mg/kg	500	705	2310	318	220	876	5.0	A359030
Total (Dry Wt) Lead (Pb)	mg/kg	0.289	0.222	0.885	0.117	0.103	0.157	0.010	A359030
Total (Dry Wt) Lithium (Li)	mg/kg	0.61	1.12	4.69	<0.50	<0.50	<0.50	0.50	A359030
Total (Dry Wt) Magnesium (Mg)	mg/kg	690	941	3220	382	370	363	5.0	A359030
Total (Dry Wt) Manganese (Mn)	mg/kg	71.6	23.4	45.1	17.7	42.6	61.0	0.050	A359030
Total (Dry Wt) Molybdenum (Mo)	mg/kg	0.243	0.510	1.12	0.184	0.050	0.200	0.020	A359030
Total (Dry Wt) Nickel (Ni)	mg/kg	4.58	3.82	15.0	1.61	2.12	1.41	0.050	A359030
Total (Dry Wt) Phosphorus (P)	mg/kg	485	871	1070	1020	849	485	10	A359030
Total (Dry Wt) Potassium (K)	mg/kg	1290	2190	2680	2360	2080	1760	10	A359030
Total (Dry Wt) Selenium (Se)	mg/kg	<0.050	<0.050	0.066	<0.050	<0.050	<0.050	0.050	A359030
Total (Dry Wt) Silver (Ag)	mg/kg	0.0175	0.0110	0.0239	0.0076	0.0088	0.0178	0.0050	A359030
Total (Dry Wt) Sodium (Na)	mg/kg	46	38	98	27	35	79	10	A359030
Total (Dry Wt) Strontium (Sr)	mg/kg	3.44	10.0	25.5	4.10	4.84	6.20	0.050	A359030
Total (Dry Wt) Tellurium (Te)	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	A359030
Total (Dry Wt) Thallium (Tl)	mg/kg	0.0210	0.0157	0.0446	0.0119	0.0048	0.0102	0.0020	A359030
Total (Dry Wt) Thorium (Th)	mg/kg	0.209	0.302	1.01	0.139	0.074	0.191	0.050	A359030

RDL = Reportable Detection Limit
(1) Duplicate exceeds acceptance criteria due to sample non homogeneity. Reanalysis yields similar results.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ168	ADZ169	ADZ170	ADZ171	ADZ174	ADZ175		
Sampling Date		2021/08/14	2021/08/14	2021/08/15	2021/08/13	2021/08/10	2021/08/09		
COC Number		2OF3	2OF3	2OF3	2OF3	3OF3	3OF3		
	UNITS	**NFL-17**	**NFL-18**	**NFL-19**	**NFL-20**	**FFL-25**	**FFFL-1**	**RDL**	**QC Batch**
Total (Dry Wt) Tin (Sn)	mg/kg	0.10	<0.10	0.21	<0.10	<0.10	<0.10	0.10	A359030
Total (Dry Wt) Titanium (Ti)	mg/kg	31.6	43.6	149	18.0	10.2	8.64	0.50	A359030
Total (Dry Wt) Uranium (U)	mg/kg	0.187	0.219	0.857	0.0859	0.0391	0.0963	0.0020	A359030
Total (Dry Wt) Vanadium (V)	mg/kg	0.78	1.17	4.11	0.49	0.36	1.99	0.20	A359030
Total (Dry Wt) Zinc (Zn)	mg/kg	12.6	24.4	25.7	27.1	21.9	18.0	0.20	A359030
Total (Dry Wt) Zirconium (Zr)	mg/kg	0.39	0.52	1.81	0.21	<0.20	0.29	0.20	A359030
RDL = Reportable Detection Limit									

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ176	ADZ177	ADZ189		
Sampling Date		2021/08/09	2021/08/09	2021/08/08		
COC Number		3OF3	3OF3	3OF3		
	UNITS	FFFL-2	FFFL-2D	FFFL-3	RDL	QC Batch
Mercury by CVAF						
Total (Dry Wt) Mercury (Hg)	mg/kg	0.0261	0.0204	0.0288	0.0050	A368270
Total Metals by ICPMS						
Total (Dry Wt) Aluminum (Al)	mg/kg	108	82.9	116	1.0	A359030
Total (Dry Wt) Antimony (Sb)	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	A359030
Total (Dry Wt) Arsenic (As)	mg/kg	0.102	0.067	0.079	0.020	A359030
Total (Dry Wt) Barium (Ba)	mg/kg	20.6	16.2	20.9	0.050	A359030
Total (Dry Wt) Beryllium (Be)	mg/kg	<0.010	<0.010	<0.010	0.010	A359030
Total (Dry Wt) Bismuth (Bi)	mg/kg	<0.010	<0.010	<0.010	0.010	A359030
Total (Dry Wt) Boron (B)	mg/kg	1.6	1.2	1.4	1.0	A359030
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.0183	0.0183	0.0371	0.0050	A359030
Total (Dry Wt) Calcium (Ca)	mg/kg	431	541	652	10	A359030
Total (Dry Wt) Cesium (Cs)	mg/kg	0.395	0.429	0.201	0.010	A359030
Total (Dry Wt) Chromium (Cr)	mg/kg	0.21	0.14	0.47	0.10	A359030
Total (Dry Wt) Cobalt (Co)	mg/kg	0.252	0.273	0.159	0.020	A359030
Total (Dry Wt) Copper (Cu)	mg/kg	2.22	2.25	1.81	0.050	A359030
Total (Dry Wt) Iron (Fe)	mg/kg	155	118	128	5.0	A359030
Total (Dry Wt) Lead (Pb)	mg/kg	0.078	0.074	2.03	0.010	A359030
Total (Dry Wt) Lithium (Li)	mg/kg	<0.50	<0.50	<0.50	0.50	A359030
Total (Dry Wt) Magnesium (Mg)	mg/kg	299	265	279	5.0	A359030
Total (Dry Wt) Manganese (Mn)	mg/kg	28.1	30.8	27.9	0.050	A359030
Total (Dry Wt) Molybdenum (Mo)	mg/kg	0.082	0.074	0.042	0.020	A359030
Total (Dry Wt) Nickel (Ni)	mg/kg	1.36	1.13	0.949	0.050	A359030
Total (Dry Wt) Phosphorus (P)	mg/kg	991	786	875	10	A359030
Total (Dry Wt) Potassium (K)	mg/kg	2550	2570	2270	10	A359030
Total (Dry Wt) Selenium (Se)	mg/kg	0.055	0.051	<0.050	0.050	A359030
Total (Dry Wt) Silver (Ag)	mg/kg	0.0076	0.0099	0.0089	0.0050	A359030
Total (Dry Wt) Sodium (Na)	mg/kg	29	31	30	10	A359030
Total (Dry Wt) Strontium (Sr)	mg/kg	3.08	3.45	5.55	0.050	A359030
Total (Dry Wt) Tellurium (Te)	mg/kg	<0.020	<0.020	<0.020	0.020	A359030
Total (Dry Wt) Thallium (Tl)	mg/kg	0.0042	0.0038	0.0040	0.0020	A359030
Total (Dry Wt) Thorium (Th)	mg/kg	<0.050	<0.050	0.213	0.050	A359030
Total (Dry Wt) Tin (Sn)	mg/kg	<0.10	<0.10	<0.10	0.10	A359030
RDL = Reportable Detection Limit						

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ176	ADZ177	ADZ189		
Sampling Date		2021/08/09	2021/08/09	2021/08/08		
COC Number		3OF3	3OF3	3OF3		
	UNITS	FFFL-2	FFFL-2D	FFFL-3	RDL	QC Batch
Total (Dry Wt) Titanium (Ti)	mg/kg	4.68	3.16	5.17	0.50	A359030
Total (Dry Wt) Uranium (U)	mg/kg	0.0121	0.0098	0.0954	0.0020	A359030
Total (Dry Wt) Vanadium (V)	mg/kg	<0.20	<0.20	<0.20	0.20	A359030
Total (Dry Wt) Zinc (Zn)	mg/kg	25.8	29.6	25.5	0.20	A359030
Total (Dry Wt) Zirconium (Zr)	mg/kg	<0.20	<0.20	<0.20	0.20	A359030
RDL = Reportable Detection Limit						

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ162		ADZ163		ADZ164		ADZ165		
Sampling Date		2021/08/15		2021/08/15		2021/08/15		2021/08/14		
COC Number		2OF3		2OF3		2OF3		2OF3		
	UNITS	NFL-11	RDL	NFL-12	RDL	NFL-13	RDL	NFL-14	RDL	QC Batch
Calculated Parameters										
Total (Wet Wt) Aluminum (Al)	mg/kg	808	0.88	1060	0.83	287	0.72	363	0.59	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	0.0195	0.0044	0.0135	0.0041	0.0074	0.0036	0.0150	0.0030	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.255	0.018	0.746	0.017	0.117	0.014	0.262	0.012	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	33.6	0.044	40.7	0.041	22.7	0.036	8.85	0.030	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	0.0328	0.0088	0.0329	0.0083	0.0120	0.0072	0.0089	0.0059	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	0.122	0.0088	0.0957	0.0083	0.0376	0.0072	0.0260	0.0059	A330390
Total (Wet Wt) Boron (B)	mg/kg	<0.88	0.88	1.27	0.83	<0.72	0.72	0.62	0.59	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0593	0.0044	0.0290	0.0041	0.0398	0.0036	0.0183	0.0030	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	3230	8.8	2770	8.3	1670	7.2	453	5.9	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	6.18	0.088	7.28	0.083	3.18	0.072	1.60	0.059	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.909	0.018	0.948	0.017	0.543	0.014	0.246	0.012	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	2.50	0.044	3.53	0.041	1.14	0.036	1.16	0.030	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	1220	4.4	2410	4.1	492	3.6	534	3.0	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	1.00	0.0088	0.544	0.0083	0.430	0.0072	0.240	0.0059	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	1770	4.4	1990	4.1	1200	3.6	405	3.0	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	41.3	0.044	31.6	0.041	33.5	0.036	18.2	0.030	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0333	0.0088	0.0242	0.0083	0.0269	0.0072	0.0399	0.0059	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.869	0.018	1.01	0.017	0.299	0.014	0.203	0.012	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	9.40	0.044	9.38	0.041	6.48	0.036	1.73	0.030	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	603	8.8	872	8.3	369	7.2	390	5.9	A330390
Total (Wet Wt) Potassium (K)	mg/kg	1820	8.8	2620	8.3	1150	7.2	1110	5.9	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	0.044	0.044	0.044	0.041	<0.036	0.036	0.032	0.030	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0298	0.0044	0.0302	0.0041	0.0103	0.0036	0.0072	0.0030	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	135	8.8	59.4	8.3	97.4	7.2	21.0	5.9	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	16.8	0.044	23.1	0.041	12.1	0.036	2.47	0.030	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0246	0.0018	0.0337	0.0017	0.0112	0.0014	0.0086	0.0012	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	0.191	0.088	0.125	0.083	0.097	0.072	0.074	0.059	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	87.7	0.44	101	0.41	31.3	0.36	32.7	0.30	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.832	0.0018	0.650	0.0017	0.232	0.0014	0.143	0.0012	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	2.02	0.18	3.63	0.17	0.79	0.14	1.00	0.12	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	17.1	0.18	30.9	0.17	9.41	0.14	10.3	0.12	A330390

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ166		ADZ167		ADZ168		ADZ169		
Sampling Date		2021/08/14		2021/08/14		2021/08/14		2021/08/14		
COC Number		2OF3		2OF3		2OF3		2OF3		
	UNITS	NFL-15	RDL	NFL-16	RDL	NFL-17	RDL	NFL-18	RDL	QC Batch
Calculated Parameters										
Total (Wet Wt) Aluminum (Al)	mg/kg	317	0.76	125	0.42	222	0.60	350	0.76	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	0.0072	0.0038	0.0023	0.0021	0.0047	0.0030	0.0070	0.0038	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.184	0.015	0.0327	0.0085	0.078	0.012	0.120	0.015	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	11.2	0.038	7.76	0.021	7.57	0.030	18.0	0.038	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	0.0113	0.0076	0.0068	0.0042	0.0179	0.0060	0.0098	0.0076	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	0.0310	0.0076	0.0116	0.0042	0.0160	0.0060	0.0190	0.0076	A330390
Total (Wet Wt) Boron (B)	mg/kg	<0.76	0.76	<0.42	0.42	0.74	0.60	0.79	0.76	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0255	0.0038	0.0287	0.0021	0.0221	0.0030	0.0218	0.0038	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	860	7.6	539	4.2	514	6.0	702	7.6	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	2.95	0.076	0.663	0.042	1.32	0.060	2.36	0.076	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.455	0.015	0.214	0.0085	0.453	0.012	0.311	0.015	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	1.38	0.038	0.576	0.021	1.21	0.030	1.54	0.038	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	508	3.8	164	2.1	302	3.0	533	3.8	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.291	0.0076	0.131	0.0042	0.175	0.0060	0.168	0.0076	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	885	3.8	328	2.1	417	3.0	711	3.8	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	34.3	0.038	21.9	0.021	43.2	0.030	17.7	0.038	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0296	0.0076	0.0125	0.0042	0.0239	0.0060	0.0272	0.0076	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.327	0.015	0.0927	0.0085	0.147	0.012	0.386	0.015	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	4.94	0.038	1.05	0.021	2.77	0.030	2.89	0.038	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	545	7.6	228	4.2	293	6.0	658	7.6	A330390
Total (Wet Wt) Potassium (K)	mg/kg	1490	7.6	618	4.2	782	6.0	1660	7.6	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	<0.038	0.038	<0.021	0.021	<0.030	0.030	<0.038	0.038	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0159	0.0038	0.0084	0.0021	0.0106	0.0030	0.0083	0.0038	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	148	7.6	42.2	4.2	27.7	6.0	29.0	7.6	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	3.98	0.038	3.38	0.021	2.08	0.030	7.60	0.038	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0139	0.0015	0.00780	0.00085	0.0127	0.0012	0.0119	0.0015	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	<0.076	0.076	<0.042	0.042	0.062	0.060	<0.076	0.076	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	32.1	0.38	12.2	0.21	19.1	0.30	32.9	0.38	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.265	0.0015	0.0811	0.00085	0.113	0.0012	0.166	0.0015	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	0.80	0.15	0.246	0.085	0.47	0.12	0.89	0.15	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	10.4	0.15	7.67	0.085	7.61	0.12	18.5	0.15	A330390

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ170		ADZ171		ADZ174		ADZ175		
Sampling Date		2021/08/15		2021/08/13		2021/08/10		2021/08/09		
COC Number		2OF3		2OF3		3OF3		3OF3		
	UNITS	NFL-19	RDL	NFL-20	RDL	FFL-25	RDL	FFFL-1	RDL	QC Batch
Calculated Parameters										
Total (Wet Wt) Aluminum (Al)	mg/kg	954	0.67	170	0.69	79.7	0.47	101	0.52	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	0.0167	0.0033	0.0181	0.0035	0.0026	0.0023	0.0027	0.0026	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.344	0.013	0.094	0.014	0.143	0.0093	0.173	0.010	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	34.7	0.033	11.3	0.035	7.02	0.023	7.69	0.026	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	0.0344	0.0067	<0.0069	0.0069	0.0049	0.0047	0.0054	0.0052	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	0.0700	0.0067	0.0078	0.0069	<0.0047	0.0047	<0.0052	0.0052	A330390
Total (Wet Wt) Boron (B)	mg/kg	1.14	0.67	0.99	0.69	0.66	0.47	<0.52	0.52	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0337	0.0033	0.0127	0.0035	0.0146	0.0023	0.0151	0.0026	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	1990	6.7	193	6.9	335	4.7	501	5.2	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	7.85	0.067	0.656	0.069	0.231	0.047	0.249	0.052	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.972	0.013	0.119	0.014	0.158	0.0093	0.293	0.010	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	2.32	0.033	1.45	0.035	1.06	0.023	1.46	0.026	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	1540	3.3	220	3.5	103	2.3	451	2.6	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.590	0.0067	0.0809	0.0069	0.0483	0.0047	0.0810	0.0052	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	2150	3.3	264	3.5	173	2.3	187	2.6	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	30.1	0.033	12.3	0.035	19.9	0.023	31.4	0.026	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0218	0.0067	0.0248	0.0069	0.0149	0.0047	0.0164	0.0052	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.747	0.013	0.128	0.014	0.0234	0.0093	0.103	0.010	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	9.99	0.033	1.12	0.035	0.992	0.023	0.726	0.026	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	710	6.7	706	6.9	397	4.7	250	5.2	A330390
Total (Wet Wt) Potassium (K)	mg/kg	1790	6.7	1630	6.9	972	4.7	905	5.2	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	0.044	0.033	<0.035	0.035	<0.023	0.023	<0.026	0.026	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0159	0.0033	0.0053	0.0035	0.0041	0.0023	0.0092	0.0026	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	65.4	6.7	18.4	6.9	16.4	4.7	40.7	5.2	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	17.0	0.033	2.84	0.035	2.26	0.023	3.19	0.026	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0297	0.0013	0.0082	0.0014	0.00220	0.00093	0.0052	0.0010	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	0.141	0.067	<0.069	0.069	<0.047	0.047	<0.052	0.052	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	99.5	0.33	12.5	0.35	4.76	0.23	4.45	0.26	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.572	0.0013	0.0594	0.0014	0.0183	0.00093	0.0496	0.0010	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	2.74	0.13	0.34	0.14	0.167	0.093	1.03	0.10	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	17.2	0.13	18.8	0.14	10.2	0.093	9.29	0.10	A330390

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ176		ADZ177		ADZ189		
Sampling Date		2021/08/09		2021/08/09		2021/08/08		
COC Number		3OF3		3OF3		3OF3		
	UNITS	FFFL-2	RDL	FFFL-2D	RDL	FFFL-3	RDL	QC Batch
Calculated Parameters								
Total (Wet Wt) Aluminum (Al)	mg/kg	91.5	0.85	73.2	0.88	93.8	0.81	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0042	0.0042	<0.0044	0.0044	<0.0040	0.0040	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.087	0.017	0.060	0.018	0.064	0.016	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	17.4	0.042	14.3	0.044	16.8	0.040	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	<0.0085	0.0085	<0.0088	0.0088	<0.0081	0.0081	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	<0.0085	0.0085	<0.0088	0.0088	<0.0081	0.0081	A330390
Total (Wet Wt) Boron (B)	mg/kg	1.33	0.85	1.09	0.88	1.11	0.81	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0155	0.0042	0.0162	0.0044	0.0299	0.0040	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	364	8.5	478	8.8	526	8.1	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	0.176	0.085	0.125	0.088	0.382	0.081	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.213	0.017	0.241	0.018	0.128	0.016	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	1.87	0.042	1.99	0.044	1.46	0.040	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	131	4.2	104	4.4	103	4.0	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.0655	0.0085	0.0656	0.0088	1.64	0.0081	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	253	4.2	234	4.4	225	4.0	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	23.7	0.042	27.3	0.044	22.6	0.040	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0302	0.0085	0.0242	0.0088	0.0331	0.0081	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.070	0.017	0.066	0.018	0.034	0.016	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	1.15	0.042	1.00	0.044	0.766	0.040	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	838	8.5	695	8.8	706	8.1	A330390
Total (Wet Wt) Potassium (K)	mg/kg	2160	8.5	2280	8.8	1830	8.1	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	0.047	0.042	0.045	0.044	<0.040	0.040	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0064	0.0042	0.0088	0.0044	0.0072	0.0040	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	24.2	8.5	27.4	8.8	24.6	8.1	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	2.60	0.042	3.05	0.044	4.48	0.040	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0036	0.0017	0.0033	0.0018	0.0032	0.0016	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	<0.085	0.085	<0.088	0.088	<0.081	0.081	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	3.95	0.42	2.80	0.44	4.18	0.40	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.0102	0.0017	0.0087	0.0018	0.0770	0.0016	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	<0.17	0.17	<0.18	0.18	<0.16	0.16	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	21.8	0.17	26.2	0.18	20.6	0.16	A330390
RDL = Reportable Detection Limit								

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

PHYSICAL TESTING (TISSUE)

BV Labs ID		ADZ162	ADZ163	ADZ164	ADZ165	ADZ166	ADZ167	ADZ168		
Sampling Date		2021/08/15	2021/08/15	2021/08/15	2021/08/14	2021/08/14	2021/08/14	2021/08/14		
COC Number		2OF3	2OF3	2OF3	2OF3	2OF3	2OF3	2OF3		
	UNITS	**NFL-11**	**NFL-12**	**NFL-13**	**NFL-14**	**NFL-15**	**NFL-16**	**NFL-17**	**RDL**	**QC Batch**
Physical Properties										
Moisture	%	12	18	28	41	24	58	40	0.30	A351102
RDL = Reportable Detection Limit										

BV Labs ID		ADZ169	ADZ170	ADZ171	ADZ174	ADZ175	ADZ176	ADZ177		
Sampling Date		2021/08/14	2021/08/15	2021/08/13	2021/08/10	2021/08/09	2021/08/09	2021/08/09		
COC Number		2OF3	2OF3	2OF3	3OF3	3OF3	3OF3	3OF3		
	UNITS	**NFL-18**	**NFL-19**	**NFL-20**	**FFL-25**	**FFFL-1**	**FFFL-2**	**FFFL-2D**	**RDL**	**QC Batch**
Physical Properties										
Moisture	%	24	33	31	53	49	16	12	0.30	A351102
RDL = Reportable Detection Limit										

BV Labs ID		ADZ189		
Sampling Date		2021/08/08		
COC Number		3OF3		
	UNITS	**FFFL-3**	**RDL**	**QC Batch**
Physical Properties				
Moisture	%	19	0.30	A351102
RDL = Reportable Detection Limit				

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	17.3°C
Package 2	18.0°C
Package 3	18.7°C
Package 4	17.3°C

Sampling date/time not indicated on the Chain of Custody.

Version 3: Sample dates were added on all sample ID's as per client request received 2021/09/30.

Results relate only to the items tested.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

QUALITY ASSURANCE REPORT

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A332908	Total Mercury (Hg)	2021/08/27	103	75 - 125	108	75 - 125	<0.0050	mg/kg	NC	35	93	70 - 130
A351102	Moisture	2021/09/15					<0.30	%	1.7	20		
A359030	Total (Dry Wt) Aluminum (Al)	2021/09/25	NC	80 - 120	111	80 - 120	<1.0	mg/kg	1.5	40	35	17 - 93
A359030	Total (Dry Wt) Antimony (Sb)	2021/09/25	92	80 - 120	106	80 - 120	<0.0050	mg/kg	15	40		
A359030	Total (Dry Wt) Arsenic (As)	2021/09/25	94	80 - 120	100	80 - 120	<0.020	mg/kg	0.88	40	56	42 - 199
A359030	Total (Dry Wt) Barium (Ba)	2021/09/25	118	80 - 120	100	80 - 120	<0.050	mg/kg	3.3	40		
A359030	Total (Dry Wt) Beryllium (Be)	2021/09/25	80	80 - 120	114	80 - 120	<0.010	mg/kg	11	40		
A359030	Total (Dry Wt) Bismuth (Bi)	2021/09/25	92	80 - 120	98	80 - 120	<0.010	mg/kg	72 (1)	40		
A359030	Total (Dry Wt) Boron (B)	2021/09/25	82	80 - 120	114	80 - 120	<1.0	mg/kg	0.62	40	94	75 - 125
A359030	Total (Dry Wt) Cadmium (Cd)	2021/09/25	89	80 - 120	99	80 - 120	<0.0050	mg/kg	6.8	40	94	75 - 125
A359030	Total (Dry Wt) Calcium (Ca)	2021/09/25	87	80 - 120	106	80 - 120	<10	mg/kg	3.5	60	91	75 - 125
A359030	Total (Dry Wt) Cesium (Cs)	2021/09/25	105	80 - 120	100	80 - 120	<0.010	mg/kg	5.0	40		
A359030	Total (Dry Wt) Chromium (Cr)	2021/09/25	92	80 - 120	98	80 - 120	<0.10	mg/kg	1.2	40		
A359030	Total (Dry Wt) Cobalt (Co)	2021/09/25	85	80 - 120	99	80 - 120	<0.020	mg/kg	2.9	40	82	75 - 125
A359030	Total (Dry Wt) Copper (Cu)	2021/09/25	80	80 - 120	97	80 - 120	<0.050	mg/kg	0.41	40	87	75 - 125
A359030	Total (Dry Wt) Iron (Fe)	2021/09/25	NC	80 - 120	104	80 - 120	<5.0	mg/kg	1.5	40		
A359030	Total (Dry Wt) Lead (Pb)	2021/09/25	92	80 - 120	100	80 - 120	<0.010	mg/kg	7.0	40		
A359030	Total (Dry Wt) Lithium (Li)	2021/09/25	NC	80 - 120	119	80 - 120	<0.50	mg/kg	2.4	40		
A359030	Total (Dry Wt) Magnesium (Mg)	2021/09/25	NC	80 - 120	112	80 - 120	<5.0	mg/kg	2.0	40		
A359030	Total (Dry Wt) Manganese (Mn)	2021/09/25	NC	80 - 120	99	80 - 120	<0.050	mg/kg	9.6	40	92	75 - 125
A359030	Total (Dry Wt) Molybdenum (Mo)	2021/09/25	NC	80 - 120	103	80 - 120	<0.020	mg/kg	25	40		
A359030	Total (Dry Wt) Nickel (Ni)	2021/09/25	NC	80 - 120	99	80 - 120	<0.050	mg/kg	1.7	40	78	75 - 125
A359030	Total (Dry Wt) Phosphorus (P)	2021/09/25	NC	80 - 120	107	80 - 120	<10	mg/kg	0.047	40	100	75 - 125
A359030	Total (Dry Wt) Potassium (K)	2021/09/25	87	80 - 120	110	80 - 120	<10	mg/kg	0.46	40	95	75 - 125
A359030	Total (Dry Wt) Selenium (Se)	2021/09/25	97	80 - 120	97	80 - 120	<0.050	mg/kg	NC	40	98	75 - 125
A359030	Total (Dry Wt) Silver (Ag)	2021/09/25	88	80 - 120	97	80 - 120	<0.0050	mg/kg	9.6	40		
A359030	Total (Dry Wt) Sodium (Na)	2021/09/25	102	80 - 120	114	80 - 120	<10	mg/kg	16	40	90	75 - 125
A359030	Total (Dry Wt) Strontium (Sr)	2021/09/25	112	80 - 120	102	80 - 120	<0.050	mg/kg	1.7	60	106	75 - 125
A359030	Total (Dry Wt) Tellurium (Te)	2021/09/25	108	80 - 120	105	80 - 120	<0.020	mg/kg	NC	40		
A359030	Total (Dry Wt) Thallium (Tl)	2021/09/25	93	80 - 120	100	80 - 120	<0.0020	mg/kg	8.5	40		
A359030	Total (Dry Wt) Thorium (Th)	2021/09/25	86	80 - 120	84	80 - 120	<0.050	mg/kg	1.2	40		

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A359030	Total (Dry Wt) Tin (Sn)	2021/09/25	105	80 - 120	101	80 - 120	<0.10	mg/kg	NC	40		
A359030	Total (Dry Wt) Titanium (Ti)	2021/09/25	NC	80 - 120	107	80 - 120	<0.50	mg/kg	2.3	40		
A359030	Total (Dry Wt) Uranium (U)	2021/09/25	93	80 - 120	105	80 - 120	<0.0020	mg/kg	3.0	40		
A359030	Total (Dry Wt) Vanadium (V)	2021/09/25	90	80 - 120	101	80 - 120	<0.20	mg/kg	0.77	40		
A359030	Total (Dry Wt) Zinc (Zn)	2021/09/25	96	80 - 120	97	80 - 120	<0.20	mg/kg	0.91	40	88	75 - 125
A359030	Total (Dry Wt) Zirconium (Zr)	2021/09/25	NC	80 - 120	81	80 - 120	<0.20	mg/kg	6.2	40		
A368270	Total (Dry Wt) Mercury (Hg)	2021/09/29	93	80 - 120	84	80 - 120	<0.010	mg/kg	2.7	20	81	75 - 125

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

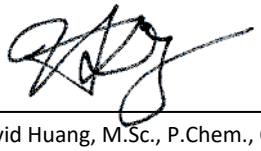
Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160126
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

681

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Page 1 of 3

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company :	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID	See		
Seal Present						
Seal Intact			Temp	After		
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Received in Yellowknife
By: J. Mercredi
@ 11:30
AUG 16 2021
See Attached

Temp:

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	BTEXS / VPH	BTEX F1	PAH	EPH	Dissolved Metals	Dissolved Mercury	Total Metals	Total Mercury	Chloride	TSS	pH	Nitrite	Total Metals by ICP-MS	Hg by CVAFS	Moisture	HOLD - DO NOT ANALYZE
1 FFS-1			SOIL															✓		
2 -2																		✓		
3 -3																		✓		
4 -5																		✓		
5 -7																		✓		
6 -8																		✓		
7 -9																		✓		
8 -10																		✓		
9 -11																		✓		
10 -12																		✓		

VOC / BTEXS / VPH	VOC / BTEX / F1	LEPH / HEPH / PAH	F2 - F4	Preserved?	Preserved?	Field Preserved?	Field Preserved?	Sulphate	COD	Alkalinity	Ammonia	MTBE	Fluoride	BOD	TDS	Conductivity	Nitrate
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
TEH	Filtered?	Filtered?															
	Dissolved Metals	Dissolved Mercury															

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

16-Aug-21 11:30
Rhecie Phayouphone
C160126
NMU INS-0148

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgement and acceptance of our terms available at https://www.bvna.com/rsc-terms-and-conditions

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #
	2021/08/16	11:30		2021/08/17	15:10	C160126

COC-1020

BBY FCD-00077/9

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Page 2 of 3

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company :	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present			Temp	See Attr		
Seal Intact						
Cooling Media						
	YES	NO	Cooler ID			
Seal Present			Temp			
Seal Intact						
Cooling Media						
	YES	NO	Cooler ID			
Seal Present			Temp			
Seal Intact						
Cooling Media						

Depot Reception

Received in Yellowknife
By: J. McRae
@ 11:30
AUG 16 2021
See Attr
Temp:

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	BTEX/VPH	VOC/BTEX/VPH	BTEX F1	VOC/BTEX/F1	PAH	LEPH/HEPH/PAH	EPH	F2-F4	TEH	MTBE	Dissolved Metals	Filtered?	Dissolved Mercury	Filtered?	Total Metals	Field Preserved?	Total Mercury	Field Preserved?	Chloride	Fluoride	TSS	TDS	BOD	pH	Conductivity	Alkalinity	Nitrite	Nitrate	Ammonia	Total Metals by ICP-MS	Hg by CVAFS	Moisture	HOLD - DO NOT ANALYZE
1 NFL-11			lichen																														✓	✓	✓	
2 -12																																	✓	✓	✓	
3 -13																																	✓	✓	✓	
4 -14																																	✓	✓	✓	
5 -15																																	✓	✓	✓	
6 -16																																	✓	✓	✓	
7 -17																																	✓	✓	✓	
8 -18																																	✓	✓	✓	
9 -19																																	✓	✓	✓	
10 -20																																	✓	✓	✓	

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at https://www.bvna.com/ror-terms-and-conditions

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #
	2021/08/16	11:30		2021/08/17	15:10	C160126

COC-1020

BBY FCD-00077/9

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Page 3 of 3

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company :	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present			Temp			
Seal Intact						
Cooling Media						
	YES	NO	Cooler ID			
Seal Present			Temp			
Seal Intact						
Cooling Media						
	YES	NO	Cooler ID			
Seal Present			Temp			
Seal Intact						
Cooling Media						

Depot Reception

Received in Yellowknife
By: J. McLean @ 11:30
AUG 16 2021
See ACR
Temp:

Analysis Requested

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	BTEXS / VPH	VOC / BTEXS / VPH	BTEX F1	VOC / BTEX / F1	PAH	LEPH / HEPH / PAH	EPH	TEH	F2 - F4	Dissolved Metals	Filtered?	Preserved?	Dissolved Mercury	Filtered?	Preserved?	Total Metals	Field Preserved?	Total Mercury	Field Preserved?	Chloride	Fluoride	TSS	TDS	BOD	pH	Conductivity	COD	Alkalinity	Nitrite	Nitrate	Ammonia	Total Metals by ICP-MS	Hg by CVAFS	Moisture	HOLD - DO NOT ANALYZE
1	FFL-25			lichen																																✓	✓	✓	
2	FFFL-1																																			✓	✓	✓	
3	-3																																			✓	✓	✓	
4	-2d																																			✓	✓	✓	
5	-3																																			✓	✓	✓	
6																																							
7																																							
8																																							
9																																							
10																																							

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at https://www.bvna.com/coc-terms-and-conditions

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #
	2021/08/16	11:30	Leah Mc Cl	2021/08/17	15:10	C160126

COC-1020

BBY FCD-00077/9

Your P.O. #: 3104474131
Your Project #: 21452119-2000
Site Location: DIAVIK MINE
Your C.O.C. #: 1OF4, 2OF4, 3OF4, 4OF4

Attention: Kerrie Serben

GOLDER ASSOCIATES LTD
1721 8TH Street East
Saskatoon, SK
Canada

Report Date: 2021/10/05
Report #: R3080480
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C160154
Received: 2021/08/16, 11:30

Sample Matrix: Soil
Samples Received: 25

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Mercury in Soil by CVAF (1)	25	2021/08/27	2021/08/27	BBY7SOP-00012	EPA 245.7

Sample Matrix: Tissue
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Mercury in Tissue by CVAF - Dry Wt (1)	10	N/A	2021/09/29	BBY7SOP-00012	EPA 245.7
Elements in Tissue by CRC ICPMS - Dry Wt (1)	7	2021/09/11	2021/09/24	BBY7SOP-00021 / BBY7SOP-00002	EPA 6020b R2 m
Elements in Tissue by CRC ICPMS - Dry Wt (1)	3	2021/09/20	2021/09/25	BBY7SOP-00021 / BBY7SOP-00002	EPA 6020b R2 m
Elements in Tissue - Wet Wt (Calculated) (1)	10	N/A	2021/09/15	BBY WI-00033	Auto Calc
Moisture in Tissue (1)	10	2021/09/14	2021/09/15	BBY8SOP-00017	BCMOE BCLM Dec2000 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Your P.O. #: 3104474131
Your Project #: 21452119-2000
Site Location: DIAVIK MINE
Your C.O.C. #: 1OF4, 2OF4, 3OF4, 4OF4

Attention: Kerrie Serben

GOLDER ASSOCIATES LTD
1721 8TH Street East
Saskatoon, SK
Canada

Report Date: 2021/10/05
Report #: R3080480
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C160154
Received: 2021/08/16, 11:30

(1) This test was performed by Bureau Veritas Vancouver, 4606 Canada Way , Burnaby, BC, V5G 1K5

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rhecie Phayouphone, Key Account Specialist
Email: Rhecie.Phayouphone@bureauveritas.com
Phone# (403)735-2283

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160154
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

MERCURY BY COLD VAPOR (SOIL)

BV Labs ID		ADZ270	ADZ271	ADZ272	ADZ273	ADZ274	ADZ275	ADZ276		
Sampling Date		2021/08/15	2021/08/15	2021/08/15	2021/08/14	2021/08/14	2021/08/15	2021/08/15		
COC Number		1OF4	1OF4	1OF4	1OF4	1OF4	1OF4	1OF4		
	UNITS	NFS-1	NFS-2	NFS-3	NFS-4	NFS-5	NFS-6	NFS-7	RDL	QC Batch
Elements										
Total Mercury (Hg)	mg/kg	0.0087	0.0088	<0.0050	0.0055	<0.0050	0.0071	0.0158	0.0050	A334043
RDL = Reportable Detection Limit										

BV Labs ID		ADZ277	ADZ278	ADZ279	ADZ286	ADZ287	ADZ288		
Sampling Date		2021/08/11	2021/08/14	2021/08/14	2021/08/15	2021/08/15	2021/08/15		
COC Number		1OF4	1OF4	1OF4	2OF4	2OF4	2OF4		
	UNITS	NFS-8	NFS-9	NFS-10	NFS-11	NFS-12	NFS-13	RDL	QC Batch
Elements									
Total Mercury (Hg)	mg/kg	<0.0050	<0.0050	0.0055	0.0095	<0.0050	<0.0050	0.0050	A334043
RDL = Reportable Detection Limit									

BV Labs ID		ADZ289	ADZ290	ADZ291	ADZ292	ADZ293	ADZ294	ADZ295		
Sampling Date		2021/08/14	2021/08/14	2021/08/14	2021/08/14	2021/08/14	2021/08/15	2021/08/13		
COC Number		2OF4	2OF4	2OF4	2OF4	2OF4	2OF4	2OF4		
	UNITS	NFS-14	NFS-15	NFS-16	NFS-17	NFS-18	NFS-19	NFS-20	RDL	QC Batch
Elements										
Total Mercury (Hg)	mg/kg	0.0080	<0.0050	0.0144	0.0240	0.0057	0.0063	0.0061	0.0050	A334043
RDL = Reportable Detection Limit										

BV Labs ID		ADZ301	ADZ302	ADZ303	ADZ317	ADZ318		
Sampling Date		2021/08/13	2021/08/13	2021/08/13	2021/08/13	2021/08/13		
COC Number		3OF4	3OF4	3OF4	4OF4	4OF4		
	UNITS	NFS-21	NFS-22	NFS-23	NFS-21 DUP	NFS-22 DUPLICATE	RDL	QC Batch
Elements								
Total Mercury (Hg)	mg/kg	<0.0050	0.0102	<0.0050	<0.0050	0.0099	0.0050	A334048
RDL = Reportable Detection Limit								

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160154
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ304	ADZ305		ADZ306		ADZ307	ADZ308		
Sampling Date		2021/08/15	2021/08/15		2021/08/15		2021/08/14	2021/08/14		
COC Number		3OF4	3OF4		3OF4		3OF4	3OF4		
	UNITS	NFL-1	NFL-2	QC Batch	NFL-3	QC Batch	NFL-4	NFL-5	RDL	QC Batch
Mercury by CVAF										
Total (Dry Wt) Mercury (Hg)	mg/kg	0.0348	0.0225	A352126	0.0235	A363646	0.0227	0.0234	0.0050	A352126
Total Metals by ICPMS										
Total (Dry Wt) Aluminum (Al)	mg/kg	739	620	A348944	1000	A358652	556	546	1.0	A348944
Total (Dry Wt) Antimony (Sb)	mg/kg	0.0103	0.0056	A348944	0.0279	A358652	0.0074	0.0077	0.0050	A348944
Total (Dry Wt) Arsenic (As)	mg/kg	0.320	0.257	A348944	0.470	A358652	0.252	0.207	0.020	A348944
Total (Dry Wt) Barium (Ba)	mg/kg	31.1	26.8	A348944	27.0	A358652	45.5	19.6	0.050	A348944
Total (Dry Wt) Beryllium (Be)	mg/kg	0.019	0.018	A348944	0.034	A358652	0.017	0.019	0.010	A348944
Total (Dry Wt) Bismuth (Bi)	mg/kg	0.055	0.050	A348944	0.055	A358652	0.024	0.046	0.010	A348944
Total (Dry Wt) Boron (B)	mg/kg	1.6	1.3	A348944	1.6	A358652	1.0	<1.0	1.0	A348944
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.0261	0.0399	A348944	0.0221	A358652	0.0414	0.0288	0.0050	A348944
Total (Dry Wt) Calcium (Ca)	mg/kg	511	1430	A348944	1230	A358652	1140	950	10	A348944
Total (Dry Wt) Cesium (Cs)	mg/kg	0.646	0.452	A348944	0.484	A358652	0.450	0.558	0.010	A348944
Total (Dry Wt) Chromium (Cr)	mg/kg	3.24	3.22	A348944	7.22	A358652	3.95	3.70	0.10	A348944
Total (Dry Wt) Cobalt (Co)	mg/kg	0.576	0.519	A348944	1.12	A358652	0.539	0.488	0.020	A348944
Total (Dry Wt) Copper (Cu)	mg/kg	3.57	3.26	A348944	4.13	A358652	2.94	2.18	0.050	A348944
Total (Dry Wt) Iron (Fe)	mg/kg	1050	897	A348944	1460	A358652	823	880	5.0	A348944
Total (Dry Wt) Lead (Pb)	mg/kg	0.354	0.363	A348944	0.435	A358652	0.246	0.278	0.010	A348944
Total (Dry Wt) Lithium (Li)	mg/kg	2.48	1.94	A348944	2.93	A358652	1.30	1.78	0.50	A348944
Total (Dry Wt) Magnesium (Mg)	mg/kg	804	976	A348944	2160	A358652	1240	1060	5.0	A348944
Total (Dry Wt) Manganese (Mn)	mg/kg	32.8	26.4	A348944	32.6	A358652	20.0	44.4	0.050	A348944
Total (Dry Wt) Molybdenum (Mo)	mg/kg	0.526	0.610	A348944	0.650	A358652	0.533	0.928	0.020	A348944
Total (Dry Wt) Nickel (Ni)	mg/kg	3.54	4.23	A348944	9.92	A358652	5.22	4.52	0.050	A348944
Total (Dry Wt) Phosphorus (P)	mg/kg	1640	1460	A348944	1100	A358652	1200	633	10	A348944
Total (Dry Wt) Potassium (K)	mg/kg	3430	3490	A348944	2640	A358652	2960	2220	10	A348944
Total (Dry Wt) Selenium (Se)	mg/kg	<0.050	0.053	A348944	<0.050	A358652	<0.050	<0.050	0.050	A348944
Total (Dry Wt) Silver (Ag)	mg/kg	0.0222	0.0200	A348944	0.0161	A358652	0.0158	0.0161	0.0050	A348944
Total (Dry Wt) Sodium (Na)	mg/kg	59	42	A348944	56	A358652	37	101	10	A348944
Total (Dry Wt) Strontium (Sr)	mg/kg	12.8	12.5	A348944	10.6	A358652	20.5	7.35	0.050	A348944
Total (Dry Wt) Tellurium (Te)	mg/kg	<0.020	<0.020	A348944	<0.020	A358652	<0.020	<0.020	0.020	A348944
Total (Dry Wt) Thallium (Tl)	mg/kg	0.0318	0.0214	A348944	0.0280	A358652	0.0185	0.0284	0.0020	A348944
Total (Dry Wt) Thorium (Th)	mg/kg	0.719	0.562	A348944	0.644	A358652	0.333	0.371	0.050	A348944
Total (Dry Wt) Tin (Sn)	mg/kg	<0.10	<0.10	A348944	<0.10	A358652	<0.10	<0.10	0.10	A348944

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160154
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ304	ADZ305		ADZ306		ADZ307	ADZ308		
Sampling Date		2021/08/15	2021/08/15		2021/08/15		2021/08/14	2021/08/14		
COC Number		3OF4	3OF4		3OF4		3OF4	3OF4		
	UNITS	NFL-1	NFL-2	QC Batch	NFL-3	QC Batch	NFL-4	NFL-5	RDL	QC Batch
Total (Dry Wt) Titanium (Ti)	mg/kg	68.8	53.9	A348944	80.8	A358652	44.6	54.4	0.50	A348944
Total (Dry Wt) Uranium (U)	mg/kg	0.520	0.441	A348944	0.566	A358652	0.238	0.268	0.0020	A348944
Total (Dry Wt) Vanadium (V)	mg/kg	1.56	1.46	A348944	2.57	A358652	1.37	1.40	0.20	A348944
Total (Dry Wt) Zinc (Zn)	mg/kg	31.3	41.0	A348944	24.8	A358652	27.9	23.9	0.20	A348944
Total (Dry Wt) Zirconium (Zr)	mg/kg	0.91	0.69	A348944	0.97	A358652	0.55	0.61	0.20	A348944

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160154
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ309	ADZ310	ADZ314		ADZ315	ADZ316		
Sampling Date		2021/08/15	2021/08/15	2021/08/11		2021/08/14	2021/08/14		
COC Number		3OF4	3OF4	4OF4		4OF4	4OF4		
	UNITS	NFL-6	NFL-7	NFL-8	QC Batch	NFL-9	NFL-10	RDL	QC Batch
Mercury by CVAF									
Total (Dry Wt) Mercury (Hg)	mg/kg	0.0245	0.0220	0.0237	A352126	0.0341	0.0350	0.0050	A363646
Total Metals by ICPMS									
Total (Dry Wt) Aluminum (Al)	mg/kg	2130	1550	581	A348944	508	1020	1.0	A358652
Total (Dry Wt) Antimony (Sb)	mg/kg	0.0342	0.0205	0.0136	A348944	0.0105	0.0150	0.0050	A358652
Total (Dry Wt) Arsenic (As)	mg/kg	0.504	0.711	0.184	A348944	0.157	0.204	0.020	A358652
Total (Dry Wt) Barium (Ba)	mg/kg	52.0	58.8	27.1	A348944	12.1	17.8	0.050	A358652
Total (Dry Wt) Beryllium (Be)	mg/kg	0.074	0.044	0.033	A348944	0.022	0.025	0.010	A358652
Total (Dry Wt) Bismuth (Bi)	mg/kg	0.167	0.066	0.062	A348944	0.056	0.113	0.010	A358652
Total (Dry Wt) Boron (B)	mg/kg	1.4	2.2	<1.0	A348944	1.3	1.7	1.0	A358652
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.0627	0.0430	0.0444	A348944	0.0274	0.0346	0.0050	A358652
Total (Dry Wt) Calcium (Ca)	mg/kg	2960	2460	2630	A348944	879	1290	10	A358652
Total (Dry Wt) Cesium (Cs)	mg/kg	1.39	1.12	0.482	A348944	0.262	0.709	0.010	A358652
Total (Dry Wt) Chromium (Cr)	mg/kg	13.0	17.6	4.86	A348944	2.78	4.03	0.10	A358652
Total (Dry Wt) Cobalt (Co)	mg/kg	1.92	1.61	0.648	A348944	0.568	0.887	0.020	A358652
Total (Dry Wt) Copper (Cu)	mg/kg	3.84	4.28	1.73	A348944	1.85	2.80	0.050	A358652
Total (Dry Wt) Iron (Fe)	mg/kg	3060	2710	854	A348944	649	1390	5.0	A358652
Total (Dry Wt) Lead (Pb)	mg/kg	1.44	0.584	0.694	A348944	0.397	0.787	0.010	A358652
Total (Dry Wt) Lithium (Li)	mg/kg	8.24	4.26	1.92	A348944	1.23	3.93	0.50	A358652
Total (Dry Wt) Magnesium (Mg)	mg/kg	3440	4950	1350	A348944	897	1120	5.0	A358652
Total (Dry Wt) Manganese (Mn)	mg/kg	71.0	40.9	46.7	A348944	49.7	90.5	0.050	A358652
Total (Dry Wt) Molybdenum (Mo)	mg/kg	3.19	1.27	0.725	A348944	0.336	0.530	0.020	A358652
Total (Dry Wt) Nickel (Ni)	mg/kg	16.9	18.0	7.05	A348944	3.55	4.69	0.050	A358652
Total (Dry Wt) Phosphorus (P)	mg/kg	737	2220	605	A348944	578	667	10	A358652
Total (Dry Wt) Potassium (K)	mg/kg	2190	3950	1810	A348944	1300	1900	10	A358652
Total (Dry Wt) Selenium (Se)	mg/kg	0.054	0.072	<0.050	A348944	<0.050	<0.050	0.050	A358652
Total (Dry Wt) Silver (Ag)	mg/kg	0.0357	0.0320	0.0155	A348944	0.0124	0.0266	0.0050	A358652
Total (Dry Wt) Sodium (Na)	mg/kg	159	57	138	A348944	53	78	10	A358652
Total (Dry Wt) Strontium (Sr)	mg/kg	24.3	26.5	14.2	A348944	3.64	4.86	0.050	A358652
Total (Dry Wt) Tellurium (Te)	mg/kg	<0.020	<0.020	<0.020	A348944	<0.020	<0.020	0.020	A358652
Total (Dry Wt) Thallium (Tl)	mg/kg	0.0849	0.0402	0.0231	A348944	0.0208	0.0529	0.0020	A358652
Total (Dry Wt) Thorium (Th)	mg/kg	1.49	0.979	0.452	A348944	0.389	0.942	0.050	A358652
Total (Dry Wt) Tin (Sn)	mg/kg	0.27	0.14	0.10	A348944	<0.10	0.11	0.10	A358652

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160154
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ309	ADZ310	ADZ314		ADZ315	ADZ316		
Sampling Date		2021/08/15	2021/08/15	2021/08/11		2021/08/14	2021/08/14		
COC Number		3OF4	3OF4	4OF4		4OF4	4OF4		
	UNITS	NFL-6	NFL-7	NFL-8	QC Batch	NFL-9	NFL-10	RDL	QC Batch
Total (Dry Wt) Titanium (Ti)	mg/kg	214	154	61.7	A348944	43.5	99.4	0.50	A358652
Total (Dry Wt) Uranium (U)	mg/kg	1.27	0.487	0.706	A348944	0.386	0.875	0.0020	A358652
Total (Dry Wt) Vanadium (V)	mg/kg	5.30	4.69	1.41	A348944	1.06	2.16	0.20	A358652
Total (Dry Wt) Zinc (Zn)	mg/kg	20.4	41.1	14.9	A348944	17.0	16.9	0.20	A358652
Total (Dry Wt) Zirconium (Zr)	mg/kg	2.63	1.64	0.81	A348944	0.57	1.16	0.20	A358652
RDL = Reportable Detection Limit									

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160154
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ304		ADZ305		ADZ306		ADZ307		
Sampling Date		2021/08/15		2021/08/15		2021/08/15		2021/08/14		
COC Number		3OF4		3OF4		3OF4		3OF4		
	UNITS	NFL-1	RDL	NFL-2	RDL	NFL-3	RDL	NFL-4	RDL	QC Batch
Calculated Parameters										
Total (Wet Wt) Aluminum (Al)	mg/kg	622	0.84	557	0.90	883	0.88	437	0.79	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	0.0087	0.0042	0.0050	0.0045	0.0246	0.0044	0.0058	0.0039	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.269	0.017	0.230	0.018	0.415	0.018	0.198	0.016	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	26.2	0.042	24.0	0.045	23.8	0.044	35.8	0.039	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	0.0158	0.0084	0.0165	0.0090	0.0300	0.0088	0.0133	0.0079	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	0.0467	0.0084	0.0450	0.0090	0.0488	0.0088	0.0189	0.0079	A330390
Total (Wet Wt) Boron (B)	mg/kg	1.31	0.84	1.19	0.90	1.44	0.88	0.81	0.79	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0219	0.0042	0.0358	0.0045	0.0195	0.0044	0.0325	0.0039	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	431	8.4	1280	9.0	1090	8.8	899	7.9	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	2.73	0.084	2.88	0.090	6.37	0.088	3.11	0.079	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.485	0.017	0.466	0.018	0.991	0.018	0.424	0.016	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	3.01	0.042	2.92	0.045	3.65	0.044	2.31	0.039	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	882	4.2	805	4.5	1290	4.4	647	3.9	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.298	0.0084	0.325	0.0090	0.384	0.0088	0.194	0.0079	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	677	4.2	875	4.5	1910	4.4	971	3.9	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	27.6	0.042	23.6	0.045	28.8	0.044	15.7	0.039	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0375	0.0084	0.0259	0.0090	0.0265	0.0088	0.0243	0.0079	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.443	0.017	0.547	0.018	0.574	0.018	0.419	0.016	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	2.98	0.042	3.80	0.045	8.76	0.044	4.10	0.039	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	1380	8.4	1310	9.0	972	8.8	946	7.9	A330390
Total (Wet Wt) Potassium (K)	mg/kg	2890	8.4	3130	9.0	2330	8.8	2330	7.9	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	<0.042	0.042	0.048	0.045	<0.044	0.044	<0.039	0.039	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0187	0.0042	0.0179	0.0045	0.0142	0.0044	0.0124	0.0039	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	49.5	8.4	37.9	9.0	49.5	8.8	29.3	7.9	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	10.8	0.042	11.2	0.045	9.38	0.044	16.1	0.039	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0267	0.0017	0.0192	0.0018	0.0247	0.0018	0.0145	0.0016	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	<0.084	0.084	<0.090	0.090	<0.088	0.088	<0.079	0.079	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	58.0	0.42	48.3	0.45	71.4	0.44	35.0	0.39	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.438	0.0017	0.396	0.0018	0.499	0.0018	0.187	0.0016	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	1.31	0.17	1.31	0.18	2.27	0.18	1.08	0.16	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	26.3	0.17	36.7	0.18	21.9	0.18	21.9	0.16	A330390

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160154
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ308		ADZ309		ADZ310		ADZ314		
Sampling Date		2021/08/14		2021/08/15		2021/08/15		2021/08/11		
COC Number		3OF4		3OF4		3OF4		4OF4		
	UNITS	NFL-5	RDL	NFL-6	RDL	NFL-7	RDL	NFL-8	RDL	QC Batch
Calculated Parameters										
Total (Wet Wt) Aluminum (Al)	mg/kg	424	0.78	1840	0.87	1280	0.83	477	0.82	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	0.0060	0.0039	0.0296	0.0043	0.0170	0.0042	0.0112	0.0041	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.161	0.016	0.436	0.017	0.591	0.017	0.151	0.016	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	15.2	0.039	45.0	0.043	48.8	0.042	22.3	0.041	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	0.0147	0.0078	0.0643	0.0087	0.0365	0.0083	0.0272	0.0082	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	0.0355	0.0078	0.144	0.0087	0.0544	0.0083	0.0512	0.0082	A330390
Total (Wet Wt) Boron (B)	mg/kg	<0.78	0.78	1.17	0.87	1.86	0.83	<0.82	0.82	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0223	0.0039	0.0542	0.0043	0.0357	0.0042	0.0365	0.0041	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	737	7.8	2560	8.7	2040	8.3	2160	8.2	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	2.87	0.078	11.3	0.087	14.6	0.083	3.99	0.082	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.379	0.016	1.66	0.017	1.33	0.017	0.532	0.016	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	1.69	0.039	3.32	0.043	3.55	0.042	1.42	0.041	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	683	3.9	2650	4.3	2250	4.2	702	4.1	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.216	0.0078	1.24	0.0087	0.485	0.0083	0.570	0.0082	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	819	3.9	2980	4.3	4110	4.2	1110	4.1	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	34.5	0.039	61.4	0.043	34.0	0.042	38.4	0.041	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0229	0.0078	0.0256	0.0087	0.0234	0.0083	0.0238	0.0082	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.720	0.016	2.76	0.017	1.06	0.017	0.596	0.016	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	3.51	0.039	14.6	0.043	14.9	0.042	5.80	0.041	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	491	7.8	637	8.7	1840	8.3	497	8.2	A330390
Total (Wet Wt) Potassium (K)	mg/kg	1720	7.8	1900	8.7	3280	8.3	1490	8.2	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	<0.039	0.039	0.047	0.043	0.059	0.042	<0.041	0.041	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0125	0.0039	0.0309	0.0043	0.0266	0.0042	0.0127	0.0041	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	78.3	7.8	137	8.7	47.2	8.3	113	8.2	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	5.70	0.039	21.0	0.043	22.0	0.042	11.6	0.041	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0220	0.0016	0.0734	0.0017	0.0334	0.0017	0.0190	0.0016	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	<0.078	0.078	0.231	0.087	0.120	0.083	0.084	0.082	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	42.2	0.39	185	0.43	128	0.42	50.7	0.41	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.208	0.0016	1.10	0.0017	0.404	0.0017	0.580	0.0016	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	1.08	0.16	4.58	0.17	3.90	0.17	1.16	0.16	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	18.5	0.16	17.7	0.17	34.1	0.17	12.2	0.16	A330390

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160154
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ315		ADZ316		
Sampling Date		2021/08/14		2021/08/14		
COC Number		4OF4		4OF4		
	UNITS	NFL-9	RDL	NFL-10	RDL	QC Batch
Calculated Parameters						
Total (Wet Wt) Aluminum (Al)	mg/kg	373	0.73	453	0.44	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	0.0077	0.0037	0.0067	0.0022	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.115	0.015	0.0903	0.0089	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	8.87	0.037	7.87	0.022	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	0.0164	0.0073	0.0112	0.0044	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	0.0412	0.0073	0.0502	0.0044	A330390
Total (Wet Wt) Boron (B)	mg/kg	0.93	0.73	0.76	0.44	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0201	0.0037	0.0153	0.0022	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	645	7.3	570	4.4	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	2.04	0.073	1.79	0.044	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.417	0.015	0.393	0.0089	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	1.36	0.037	1.24	0.022	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	476	3.7	617	2.2	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.291	0.0073	0.349	0.0044	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	658	3.7	495	2.2	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	36.5	0.037	40.1	0.022	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0315	0.0073	0.0187	0.0044	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.247	0.015	0.235	0.0089	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	2.61	0.037	2.08	0.022	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	424	7.3	295	4.4	A330390
Total (Wet Wt) Potassium (K)	mg/kg	956	7.3	840	4.4	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	<0.037	0.037	<0.022	0.022	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0091	0.0037	0.0118	0.0022	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	38.6	7.3	34.5	4.4	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	2.67	0.037	2.15	0.022	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0153	0.0015	0.0235	0.00089	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	<0.073	0.073	0.049	0.044	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	31.9	0.37	44.0	0.22	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.283	0.0015	0.388	0.00089	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	0.78	0.15	0.959	0.089	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	12.5	0.15	7.49	0.089	A330390
RDL = Reportable Detection Limit						

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160154
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

PHYSICAL TESTING (TISSUE)

BV Labs ID		ADZ304	ADZ305	ADZ306	ADZ307	ADZ308	ADZ309	ADZ310		
Sampling Date		2021/08/15	2021/08/15	2021/08/15	2021/08/14	2021/08/14	2021/08/15	2021/08/15		
COC Number		3OF4	3OF4	3OF4	3OF4	3OF4	3OF4	3OF4		
	UNITS	NFL-1	NFL-2	NFL-3	NFL-4	NFL-5	NFL-6	NFL-7	RDL	QC Batch
Physical Properties										
Moisture	%	16	10	12	21	22	14	17	0.30	A350826
RDL = Reportable Detection Limit										

BV Labs ID		ADZ314	ADZ315	ADZ316		
Sampling Date		2021/08/11	2021/08/14	2021/08/14		
COC Number		4OF4	4OF4	4OF4		
	UNITS	NFL-8	NFL-9	NFL-10	RDL	QC Batch
Physical Properties						
Moisture	%	18	27	56	0.30	A350826
RDL = Reportable Detection Limit						

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160154
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	17.3°C
Package 2	18.0°C
Package 3	18.7°C
Package 4	17.3°C

Sampling date/time was not indicated on the Chain of Custody.
Extra soil samples labeled as NFS-21 DUP and NFS-22 DUPLICATE submitted. Informed client and was directed to proceed with Mercury in soil anaysis.

Version 3: Sample dates were added on all sample ID's as per client request received 2021/09/30.

Results relate only to the items tested.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160154
Report Date: 2021/10/05

QUALITY ASSURANCE REPORT

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A334043	Total Mercury (Hg)	2021/08/27	111	75 - 125	100	75 - 125	<0.0050	mg/kg	2.7	35	100	N/A
A334048	Total Mercury (Hg)	2021/08/27	115	75 - 125	108	75 - 125	<0.0050	mg/kg	NC	35	95	70 - 130
A348944	Total (Dry Wt) Aluminum (Al)	2021/09/24	NC	80 - 120	105	80 - 120	<1.0	mg/kg	1.2	40	36	17 - 93
A348944	Total (Dry Wt) Antimony (Sb)	2021/09/24	89	80 - 120	97	80 - 120	<0.0050	mg/kg	6.0	40		
A348944	Total (Dry Wt) Arsenic (As)	2021/09/24	101	80 - 120	101	80 - 120	<0.020	mg/kg	0.98	40	88	42 - 199
A348944	Total (Dry Wt) Barium (Ba)	2021/09/24	NC	80 - 120	101	80 - 120	<0.050	mg/kg	4.4	40		
A348944	Total (Dry Wt) Beryllium (Be)	2021/09/24	95	80 - 120	99	80 - 120	<0.010	mg/kg	11	40		
A348944	Total (Dry Wt) Bismuth (Bi)	2021/09/24	101	80 - 120	96	80 - 120	<0.010	mg/kg	2.0	40		
A348944	Total (Dry Wt) Boron (B)	2021/09/24	100	80 - 120	101	80 - 120	<1.0	mg/kg	1.4	40	104	75 - 125
A348944	Total (Dry Wt) Cadmium (Cd)	2021/09/24	97	80 - 120	99	80 - 120	<0.0050	mg/kg	0.59	40	90	75 - 125
A348944	Total (Dry Wt) Calcium (Ca)	2021/09/24	NC	80 - 120	102	80 - 120	<10	mg/kg	0.68	60	88	75 - 125
A348944	Total (Dry Wt) Cesium (Cs)	2021/09/24	NC	80 - 120	98	80 - 120	<0.010	mg/kg	2.2	40		
A348944	Total (Dry Wt) Chromium (Cr)	2021/09/24	NC	80 - 120	99	80 - 120	<0.10	mg/kg	0.22	40		
A348944	Total (Dry Wt) Cobalt (Co)	2021/09/24	90	80 - 120	97	80 - 120	<0.020	mg/kg	0.78	40	77	75 - 125
A348944	Total (Dry Wt) Copper (Cu)	2021/09/24	89	80 - 120	97	80 - 120	<0.050	mg/kg	0.87	40	82	75 - 125
A348944	Total (Dry Wt) Iron (Fe)	2021/09/24	98	80 - 120	103	80 - 120	<5.0	mg/kg	0.77	40		
A348944	Total (Dry Wt) Lead (Pb)	2021/09/24	103	80 - 120	97	80 - 120	<0.010	mg/kg	1.7	40		
A348944	Total (Dry Wt) Lithium (Li)	2021/09/24	100	80 - 120	100	80 - 120	<0.50	mg/kg	3.3	40		
A348944	Total (Dry Wt) Magnesium (Mg)	2021/09/24	NC	80 - 120	108	80 - 120	<5.0	mg/kg	3.0	40		
A348944	Total (Dry Wt) Manganese (Mn)	2021/09/24	NC	80 - 120	102	80 - 120	<0.050	mg/kg	1.3	40	89	75 - 125
A348944	Total (Dry Wt) Molybdenum (Mo)	2021/09/24	116	80 - 120	103	80 - 120	<0.020	mg/kg	0.46	40		
A348944	Total (Dry Wt) Nickel (Ni)	2021/09/24	96	80 - 120	99	80 - 120	<0.050	mg/kg	0.91	40	74 (1)	75 - 125
A348944	Total (Dry Wt) Phosphorus (P)	2021/09/24	109	80 - 120	101	80 - 120	<10	mg/kg	1.9	40	97	75 - 125
A348944	Total (Dry Wt) Potassium (K)	2021/09/24	NC	80 - 120	106	80 - 120	<10	mg/kg	1.6	40	91	75 - 125
A348944	Total (Dry Wt) Selenium (Se)	2021/09/24	102	80 - 120	101	80 - 120	<0.050	mg/kg	0.11	40	101	75 - 125
A348944	Total (Dry Wt) Silver (Ag)	2021/09/24	98	80 - 120	99	80 - 120	<0.0050	mg/kg	2.8	40		
A348944	Total (Dry Wt) Sodium (Na)	2021/09/24	NC	80 - 120	105	80 - 120	<10	mg/kg	5.2	40	91	75 - 125
A348944	Total (Dry Wt) Strontium (Sr)	2021/09/24	NC	80 - 120	98	80 - 120	<0.050	mg/kg	4.7	60	98	75 - 125
A348944	Total (Dry Wt) Tellurium (Te)	2021/09/24	105	80 - 120	104	80 - 120	<0.020	mg/kg	NC	40		
A348944	Total (Dry Wt) Thallium (Tl)	2021/09/24	105	80 - 120	99	80 - 120	<0.0020	mg/kg	1.1	40		
A348944	Total (Dry Wt) Thorium (Th)	2021/09/24	NC	80 - 120	82	80 - 120	<0.050	mg/kg	8.5	40		

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A348944	Total (Dry Wt) Tin (Sn)	2021/09/24	113	80 - 120	101	80 - 120	<0.10	mg/kg	1.4	40		
A348944	Total (Dry Wt) Titanium (Ti)	2021/09/24	NC	80 - 120	106	80 - 120	<0.50	mg/kg	3.0	40		
A348944	Total (Dry Wt) Uranium (U)	2021/09/24	108	80 - 120	103	80 - 120	<0.0020	mg/kg	3.5	40		
A348944	Total (Dry Wt) Vanadium (V)	2021/09/24	110	80 - 120	97	80 - 120	<0.20	mg/kg	1.8	40		
A348944	Total (Dry Wt) Zinc (Zn)	2021/09/24	99	80 - 120	102	80 - 120	<0.20	mg/kg	1.5	40	84	75 - 125
A348944	Total (Dry Wt) Zirconium (Zr)	2021/09/24	NC	80 - 120	83	80 - 120	<0.20	mg/kg	1.9	40		
A350826	Moisture	2021/09/15							8.1	20		
A352126	Total (Dry Wt) Mercury (Hg)	2021/09/29	84	80 - 120	81	80 - 120	<0.010	mg/kg	0.81	20	96	75 - 125
A358652	Total (Dry Wt) Aluminum (Al)	2021/09/25	NC	80 - 120	105	80 - 120	<1.0	mg/kg	16	40	37	17 - 93
A358652	Total (Dry Wt) Antimony (Sb)	2021/09/25	86	80 - 120	95	80 - 120	<0.0050	mg/kg	4.1	40		
A358652	Total (Dry Wt) Arsenic (As)	2021/09/25	86	80 - 120	97	80 - 120	<0.020	mg/kg	7.2	40	48	42 - 199
A358652	Total (Dry Wt) Barium (Ba)	2021/09/25	94	80 - 120	95	80 - 120	<0.050	mg/kg	6.0	40		
A358652	Total (Dry Wt) Beryllium (Be)	2021/09/25	96	80 - 120	104	80 - 120	<0.010	mg/kg	17	40		
A358652	Total (Dry Wt) Bismuth (Bi)	2021/09/25	85	80 - 120	98	80 - 120	<0.010	mg/kg	NC	40		
A358652	Total (Dry Wt) Boron (B)	2021/09/25	96	80 - 120	104	80 - 120	<1.0	mg/kg	1.5	40	108	75 - 125
A358652	Total (Dry Wt) Cadmium (Cd)	2021/09/25	85	80 - 120	95	80 - 120	<0.0050	mg/kg	2.7	40	92	75 - 125
A358652	Total (Dry Wt) Calcium (Ca)	2021/09/25	103	80 - 120	99	80 - 120	<10	mg/kg	2.3	60	90	75 - 125
A358652	Total (Dry Wt) Cesium (Cs)	2021/09/25	83	80 - 120	93	80 - 120	<0.010	mg/kg	4.7	40		
A358652	Total (Dry Wt) Chromium (Cr)	2021/09/25	91	80 - 120	93	80 - 120	<0.10	mg/kg	21	40		
A358652	Total (Dry Wt) Cobalt (Co)	2021/09/25	85	80 - 120	94	80 - 120	<0.020	mg/kg	9.3	40	81	75 - 125
A358652	Total (Dry Wt) Copper (Cu)	2021/09/25	87	80 - 120	94	80 - 120	<0.050	mg/kg	11	40	87	75 - 125
A358652	Total (Dry Wt) Iron (Fe)	2021/09/25	80	80 - 120	99	80 - 120	<5.0	mg/kg	9.4	40		
A358652	Total (Dry Wt) Lead (Pb)	2021/09/25	88	80 - 120	99	80 - 120	<0.010	mg/kg	4.1	40		
A358652	Total (Dry Wt) Lithium (Li)	2021/09/25	100	80 - 120	111	80 - 120	<0.50	mg/kg	NC	40		
A358652	Total (Dry Wt) Magnesium (Mg)	2021/09/25	103	80 - 120	104	80 - 120	<5.0	mg/kg	11	40		
A358652	Total (Dry Wt) Manganese (Mn)	2021/09/25	NC	80 - 120	95	80 - 120	<0.050	mg/kg	11	40	91	75 - 125
A358652	Total (Dry Wt) Molybdenum (Mo)	2021/09/25	88	80 - 120	98	80 - 120	<0.020	mg/kg	9.9	40		
A358652	Total (Dry Wt) Nickel (Ni)	2021/09/25	86	80 - 120	95	80 - 120	<0.050	mg/kg	11	40	78	75 - 125
A358652	Total (Dry Wt) Phosphorus (P)	2021/09/25	93	80 - 120	99	80 - 120	<10	mg/kg	7.6	40	100	75 - 125
A358652	Total (Dry Wt) Potassium (K)	2021/09/25	103	80 - 120	99	80 - 120	<10	mg/kg	6.2	40	91	75 - 125
A358652	Total (Dry Wt) Selenium (Se)	2021/09/25	92	80 - 120	101	80 - 120	<0.050	mg/kg	NC	40	96	75 - 125

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A358652	Total (Dry Wt) Silver (Ag)	2021/09/25	84	80 - 120	94	80 - 120	<0.0050	mg/kg	7.7	40		
A358652	Total (Dry Wt) Sodium (Na)	2021/09/25	106	80 - 120	104	80 - 120	<10	mg/kg	9.0	40	95	75 - 125
A358652	Total (Dry Wt) Strontium (Sr)	2021/09/25	101	80 - 120	95	80 - 120	<0.050	mg/kg	10	60	98	75 - 125
A358652	Total (Dry Wt) Tellurium (Te)	2021/09/25	106	80 - 120	111	80 - 120	<0.020	mg/kg	NC	40		
A358652	Total (Dry Wt) Thallium (Tl)	2021/09/25	88	80 - 120	99	80 - 120	<0.0020	mg/kg	12	40		
A358652	Total (Dry Wt) Thorium (Th)	2021/09/25	83	80 - 120	80	80 - 120	<0.050	mg/kg	11	40		
A358652	Total (Dry Wt) Tin (Sn)	2021/09/25	83	80 - 120	103	80 - 120	<0.10	mg/kg	NC	40		
A358652	Total (Dry Wt) Titanium (Ti)	2021/09/25	107	80 - 120	101	80 - 120	<0.50	mg/kg	10	40		
A358652	Total (Dry Wt) Uranium (U)	2021/09/25	92	80 - 120	103	80 - 120	<0.0020	mg/kg	5.3	40		
A358652	Total (Dry Wt) Vanadium (V)	2021/09/25	89	80 - 120	95	80 - 120	<0.20	mg/kg	18	40		
A358652	Total (Dry Wt) Zinc (Zn)	2021/09/25	106	80 - 120	95	80 - 120	<0.20	mg/kg	8.2	40	87	75 - 125
A358652	Total (Dry Wt) Zirconium (Zr)	2021/09/25	NC	80 - 120	82	80 - 120	<0.20	mg/kg	NC	40		
A363646	Total (Dry Wt) Mercury (Hg)	2021/09/29	90	80 - 120	83	80 - 120	<0.010	mg/kg	4.9	20	83	75 - 125

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Reference material outside acceptance criteria due to digestion limitations.

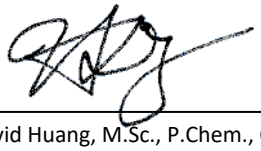
Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160154
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

681

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Page 1 of 4

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company:	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp	See ACTR		
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Received in Yellowknife
By: J. McCann
@ 11:30
AUG 16 2021
See ACTR
Temp: /

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	BTEXS / VPH	VOC / BTEXS / VPH	BTEX F1	VOC / BTEX / F1	PAH	LEPH / HEPH / PAH	EPH	F2 - F4	Dissolved Metals	Preserved?	Dissolved Mercury	Preserved?	Total Metals	Field Preserved?	Total Mercury	Field Preserved?	Chloride	Fluoride	TSS	TDS	pH	Conductivity	Nitrite	Nitrate	Total Metals by ICP-MS	Hg by CVAFS	Moisture	HOLD - DO NOT ANALYZE	MTBE	Sulphate	COD	BOD	Alkalinity	Ammonia
1 NFS-1			Soil																										✓									
2 NFS-2																													✓									
3 -3																													✓									
4 -4																													✓									
5 -5																													✓									
6 -6																													✓									
7 -7																													✓									
8 -8																													✓									
9 -9																													✓									
10 -10			V																										✓									

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at https://www.bvna.com/coc-terms-and-conditions

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #
	2021/08/16	11:30	Leslie Lee Choi	2021/08/17	15:10	C160154

COC-1020

RBY FCD-00077/9

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Page 2 of 4

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company:	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp	see		
Cooling Media						
	YES	NO	Cooler ID	ACTR		
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Received in Yellowknife
By: J.McLaren
@ 11:30
AUG 16 2021
see ACTR
Temp: /

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ VOC / BTEXS / VPH	☐ BTEXS / VPH	☐ VOC / BTEX / F1	☐ BTEX F1	☐ LEPH / HEPH / PAH	☐ PAH	☐ F2 - F4	☐ EPH	☐ MTBE	☐ Preserved?	☐ Filtered?	☐ Dissolved Metals	☐ Preserved?	☐ Filtered?	☐ Dissolved Mercury	☐ Field Preserved?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Sulphate	☐ Fluoride	☐ Chloride	☐ COD	☐ BOD	☐ TDS	☐ TSS	☐ Alkalinity	☐ Conductivity	☐ pH	☐ Ammonia	☐ Nitrate	☐ Nitrite	Total Metals by ICP-MS	Hg by CVAFS	Moisture	HOLD - DO NOT ANALYZE	Special Instructions
1 NFS-11			Soil																																			✓			**Do not rinse lichen**
2 -12																																					✓			
3 -13																																					✓			
4 -14																																					✓			
5 -15																																					✓			
6 -16																																					✓			
7 -17																																					✓			
8 -18																																					✓			
9 -19																																					✓			
10 -20			↓																																		✓			

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at https://www.bvna.com/coc-terms-and-conditions

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #
	2021/08/16	11:30		2021/08/17	15:10	C160154

Regulatory Criteria: ☐ BC CSR ☐ YK CSR ☐ CCME ☐ Drinking Water ☐ BC Water Quality ☐ Other

COC-1020

BBY FCD-00077/9

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Page 3 of 4

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company:	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Received in Yellowknife
By: J.McCann
@11:33
AUG 16 2021
See ACTIC
Temp:

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Analysis Requested

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ BTEXS / VPH	☐ VOC / BTEXS / VPH	☐ BTEX F1	☐ VOC / BTEX / F1	☐ PAH	☐ LEPH / HEPH / PAH	☐ EPH	☐ TEH	☐ Dissolved Metals	☐ F2 - F4	☐ Filtered?	☐ Dissolved Mercury	☐ Preserved?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Field Preserved?	☐ Chloride	☐ Fluoride	☐ TSS	☐ Sulphate	☐ TDS	☐ COD	☐ BOD	☐ pH	☐ Alkalinity	☐ Conductivity	☐ Nitrite	☐ Ammonia	Total Metals by ICP-MS	Hg by CVAFS	Moisture			HOLD - DO NOT ANALYZE	Special Instructions
1	NFS-21			Soil																														✓						**Do not rinse lichen**
2	-22			Soil																														✓						
3	-23			Soil																														✓						
4	NFL-1			Lichen																														✓	✓					
5	-2																																	✓	✓					
6	-3																																	✓	✓					
7	-4																																	✓	✓					
8	-5																																	✓	✓					
9	-6																																	✓	✓					
10	-7																																	✓	✓					

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at https://www.bvna.com/coc-terms-and-conditions

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #
	2021/08/16	11:30	Leah Lee Choi	2021/08/17	15:10	C160154

COC-1020

BBY FCD-00077/9

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company :	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Received in Yellowknife
By: J-Mercuro
@ 11:30
AUG 16 2021
see ACTR
Temp: /

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ MTBE	☐ VOC / BTEXS / VPH	☐ VOC / BTEX / F1	☐ LEPH / HEPH / PAH	☐ F2 - F4	☐ Preserved?	☐ Preserved?	☐ Field Preserved?	☐ Field Preserved?	☐ Sulphate	☐ COD	☐ Alkalinity	☐ Ammonia	Total Metals by ICP-MS	Hg by CVAFS	Moisture	HOLD - DO NOT ANALYZE
						☐ BTEXS / VPH	☐ BTEX F1	☐ PAH	☐ EPH	☐ Dissolved Metals	☐ Dissolved Mercury	☐ Total Metals	☐ Total Mercury	☐ Chloride	☐ TSS	☐ pH	☐ Nitrite					
1	NFL-8			lichen															✓	✓	✓	
2	-9			↓															✓	✓	✓	
3	-10																		✓	✓	✓	
4																						
5																						
6																						
7																						
8																						
9																						
10																						

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #
	2021/08/16	11:30		2021/08/17	15:10	C16D154

COC-1020

BBY FCD-00077/9

Your P.O. #: 3104474131
Your Project #: 21452119-200
Site Location: DIAVIK MINE
Your C.O.C. #: 1OF3, 2OF3, 3OF3

Attention: Kerrie Serben

GOLDER ASSOCIATES LTD
1721 8TH Street East
Saskatoon, SK
Canada

Report Date: 2021/10/05
Report #: R3080478
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C160186
Received: 2021/08/16, 11:30

Sample Matrix: Soil
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Mercury in Soil by CVAF (1)	10	2021/08/26	2021/08/27	BBY7SOP-00012	EPA 245.7

Sample Matrix: Tissue
Samples Received: 14

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Mercury in Tissue by CVAF - Dry Wt (1)	14	N/A	2021/09/29	BBY7SOP-00012	EPA 245.7
Elements in Tissue by CRC ICPMS - Dry Wt (1)	13	2021/09/11	2021/09/24	BBY7SOP-00021 / BBY7SOP-00002	EPA 6020b R2 m
Elements in Tissue by CRC ICPMS - Dry Wt (1)	1	2021/09/20	2021/09/25	BBY7SOP-00021 / BBY7SOP-00002	EPA 6020b R2 m
Elements in Tissue - Wet Wt (Calculated) (1)	14	N/A	2021/09/15	BBY WI-00033	Auto Calc
Moisture in Tissue (1)	14	2021/09/14	2021/09/15	BBY8SOP-00017	BCMOE BCLM Dec2000 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Your P.O. #: 3104474131
Your Project #: 21452119-200
Site Location: DIAVIK MINE
Your C.O.C. #: 1OF3, 2OF3, 3OF3

Attention: Kerrie Serben

GOLDER ASSOCIATES LTD
1721 8TH Street East
Saskatoon, SK
Canada

Report Date: 2021/10/05
Report #: R3080478
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C160186
Received: 2021/08/16, 11:30

(1) This test was performed by Bureau Veritas Vancouver, 4606 Canada Way , Burnaby, BC, V5G 1K5

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rhecie Phayouphone, Key Account Specialist
Email: Rhecie.Phayouphone@bureauveritas.com
Phone# (403)735-2283
==========
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: C160186
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

MERCURY BY COLD VAPOR (SOIL)

BV Labs ID		ADZ441	ADZ442	ADZ443	ADZ444	ADZ445	ADZ446		
Sampling Date		2021/08/11	2021/08/12	2021/08/12	2021/08/11	2021/08/11	2021/08/10		
COC Number		1OF3	1OF3	1OF3	1OF3	1OF3	1OF3		
	UNITS	**FFS-9D**	**FFS-21D**	**FFS-22**	**FFS-23**	**FFS-24**	**FFS-25**	**RDL**	**QC Batch**
Elements									
Total Mercury (Hg)	mg/kg	<0.0050	<0.0050	<0.0050	0.0061	<0.0050	<0.0050	0.0050	A332908
RDL = Reportable Detection Limit									

BV Labs ID		ADZ447	ADZ448	ADZ449	ADZ450		
Sampling Date		2021/08/09	2021/08/09	2021/08/09	2021/08/08		
COC Number		1OF3	1OF3	1OF3	1OF3		
	UNITS	**FFFS-1**	**FFFS-2**	**FFFS-2D**	**FFFS-3**	**RDL**	**QC Batch**
Elements							
Total Mercury (Hg)	mg/kg	<0.0050	<0.0050	0.0053	<0.0050	0.0050	A332908
RDL = Reportable Detection Limit							

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160186
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ451	ADZ452	ADZ453	ADZ454	ADZ455	ADZ456		
Sampling Date		2021/08/12	2021/08/12	2021/08/12	2021/08/12	2021/08/13	2021/08/13		
COC Number		2OF3	2OF3	2OF3	2OF3	2OF3	2OF3		
	UNITS	**FFL-10**	**FFL-11**	**FFL-12**	**FFL-13**	**FFL-14**	**FFL-15**	**RDL**	**QC Batch**
Mercury by CVAF									
Total (Dry Wt) Mercury (Hg)	mg/kg	0.0250	0.0205	0.0217	0.0151	0.0275	0.0258	0.0050	A352126
Total Metals by ICPMS									
Total (Dry Wt) Aluminum (Al)	mg/kg	81.7	87.7	147	102	74.0	78.5	1.0	A348944
Total (Dry Wt) Antimony (Sb)	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A348944
Total (Dry Wt) Arsenic (As)	mg/kg	0.129	0.083	0.244	0.246	0.085	0.115	0.020	A348944
Total (Dry Wt) Barium (Ba)	mg/kg	9.44	9.91	13.9	8.30	8.42	10.4	0.050	A348944
Total (Dry Wt) Beryllium (Be)	mg/kg	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A348944
Total (Dry Wt) Bismuth (Bi)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A348944
Total (Dry Wt) Boron (B)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	A348944
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.0307	0.0400	0.0190	0.0224	0.0272	0.0457	0.0050	A348944
Total (Dry Wt) Calcium (Ca)	mg/kg	894	826	274	385	554	886	10	A348944
Total (Dry Wt) Cesium (Cs)	mg/kg	0.131	0.220	0.267	0.372	0.167	0.459	0.010	A348944
Total (Dry Wt) Chromium (Cr)	mg/kg	0.26	0.25	0.20	0.20	0.25	0.25	0.10	A348944
Total (Dry Wt) Cobalt (Co)	mg/kg	0.324	0.083	0.129	0.161	0.183	0.239	0.020	A348944
Total (Dry Wt) Copper (Cu)	mg/kg	1.06	0.694	2.07	1.86	1.32	0.966	0.050	A348944
Total (Dry Wt) Iron (Fe)	mg/kg	161	82.2	130	129	87.9	96.2	5.0	A348944
Total (Dry Wt) Lead (Pb)	mg/kg	0.124	0.198	0.064	0.061	0.080	0.105	0.010	A348944
Total (Dry Wt) Lithium (Li)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A348944
Total (Dry Wt) Magnesium (Mg)	mg/kg	369	360	210	225	286	413	5.0	A348944
Total (Dry Wt) Manganese (Mn)	mg/kg	94.7	42.9	12.3	13.0	31.1	61.9	0.050	A348944
Total (Dry Wt) Molybdenum (Mo)	mg/kg	0.148	0.035	0.088	0.124	0.040	0.048	0.020	A348944
Total (Dry Wt) Nickel (Ni)	mg/kg	1.11	0.500	0.975	0.977	0.933	0.789	0.050	A348944
Total (Dry Wt) Phosphorus (P)	mg/kg	385	410	742	554	689	516	10	A348944
Total (Dry Wt) Potassium (K)	mg/kg	1150	1190	2150	1760	1920	1500	10	A348944
Total (Dry Wt) Selenium (Se)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A348944
Total (Dry Wt) Silver (Ag)	mg/kg	0.0091	0.0066	0.0071	0.0068	<0.0050	0.0070	0.0050	A348944
Total (Dry Wt) Sodium (Na)	mg/kg	57	47	22	26	42	103	10	A348944
Total (Dry Wt) Strontium (Sr)	mg/kg	3.11	4.25	3.36	3.72	2.81	4.35	0.050	A348944
Total (Dry Wt) Tellurium (Te)	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	A348944
Total (Dry Wt) Thallium (Tl)	mg/kg	0.0081	0.0042	0.0072	0.0069	0.0085	0.0096	0.0020	A348944
Total (Dry Wt) Thorium (Th)	mg/kg	<0.050	<0.050	0.054	0.054	<0.050	<0.050	0.050	A348944
Total (Dry Wt) Tin (Sn)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A348944

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160186
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ451	ADZ452	ADZ453	ADZ454	ADZ455	ADZ456		
Sampling Date		2021/08/12	2021/08/12	2021/08/12	2021/08/12	2021/08/13	2021/08/13		
COC Number		2OF3	2OF3	2OF3	2OF3	2OF3	2OF3		
	UNITS	FFL-10	FFL-11	FFL-12	FFL-13	FFL-14	FFL-15	RDL	QC Batch
Total (Dry Wt) Titanium (Ti)	mg/kg	4.02	4.26	4.41	3.67	4.32	4.63	0.50	A348944
Total (Dry Wt) Uranium (U)	mg/kg	0.0184	0.0139	0.0245	0.0275	0.0171	0.0198	0.0020	A348944
Total (Dry Wt) Vanadium (V)	mg/kg	<0.20	<0.20	0.21	0.23	<0.20	<0.20	0.20	A348944
Total (Dry Wt) Zinc (Zn)	mg/kg	15.9	17.1	27.7	17.5	21.7	18.7	0.20	A348944
Total (Dry Wt) Zirconium (Zr)	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A348944

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160186
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ457		ADZ458	ADZ459	ADZ460	ADZ463		
Sampling Date		2021/08/10		2021/08/13	2021/08/12	2021/08/12	2021/08/12		
COC Number		2OF3		2OF3	2OF3	2OF3	3OF3		
	UNITS	FFL-17	QC Batch	FFL-19	FFL-20	FFL-21	FFL-21D	RDL	QC Batch
Mercury by CVAF									
Total (Dry Wt) Mercury (Hg)	mg/kg	0.0283	A363646	0.0171	0.0206	0.0173	0.0181	0.0050	A352126
Total Metals by ICPMS									
Total (Dry Wt) Aluminum (Al)	mg/kg	129	A358652	150	117	92.4	150	1.0	A348944
Total (Dry Wt) Antimony (Sb)	mg/kg	<0.0050	A358652	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A348944
Total (Dry Wt) Arsenic (As)	mg/kg	0.197	A358652	0.082	0.101	0.108	0.240	0.020	A348944
Total (Dry Wt) Barium (Ba)	mg/kg	16.0	A358652	10.2	11.3	8.93	10.1	0.050	A348944
Total (Dry Wt) Beryllium (Be)	mg/kg	<0.010	A358652	0.013	<0.010	<0.010	0.010	0.010	A348944
Total (Dry Wt) Bismuth (Bi)	mg/kg	<0.010	A358652	<0.010	<0.010	<0.010	<0.010	0.010	A348944
Total (Dry Wt) Boron (B)	mg/kg	1.2	A358652	<1.0	<1.0	<1.0	<1.0	1.0	A348944
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.0444	A358652	0.0229	0.0337	0.0257	0.0300	0.0050	A348944
Total (Dry Wt) Calcium (Ca)	mg/kg	1740	A358652	733	454	471	396	10	A348944
Total (Dry Wt) Cesium (Cs)	mg/kg	0.080	A358652	0.645	0.321	0.195	0.279	0.010	A348944
Total (Dry Wt) Chromium (Cr)	mg/kg	0.29	A358652	0.28	0.17	0.22	0.30	0.10	A348944
Total (Dry Wt) Cobalt (Co)	mg/kg	0.441	A358652	0.256	0.107	0.166	0.224	0.020	A348944
Total (Dry Wt) Copper (Cu)	mg/kg	1.77	A358652	1.24	1.76	1.60	2.32	0.050	A348944
Total (Dry Wt) Iron (Fe)	mg/kg	151	A358652	125	99.7	118	232	5.0	A348944
Total (Dry Wt) Lead (Pb)	mg/kg	0.134	A358652	0.099	0.070	0.094	0.076	0.010	A348944
Total (Dry Wt) Lithium (Li)	mg/kg	<0.50	A358652	<0.50	<0.50	<0.50	<0.50	0.50	A348944
Total (Dry Wt) Magnesium (Mg)	mg/kg	609	A358652	324	245	224	249	5.0	A348944
Total (Dry Wt) Manganese (Mn)	mg/kg	95.1	A358652	61.5	16.8	26.1	14.7	0.050	A348944
Total (Dry Wt) Molybdenum (Mo)	mg/kg	0.070	A358652	0.059	0.086	0.156	0.276	0.020	A348944
Total (Dry Wt) Nickel (Ni)	mg/kg	1.24	A358652	1.12	0.707	0.818	0.976	0.050	A348944
Total (Dry Wt) Phosphorus (P)	mg/kg	763	A358652	407	919	415	547	10	A348944
Total (Dry Wt) Potassium (K)	mg/kg	2100	A358652	1290	2250	1520	1920	10	A348944
Total (Dry Wt) Selenium (Se)	mg/kg	<0.050	A358652	<0.050	<0.050	<0.050	<0.050	0.050	A348944
Total (Dry Wt) Silver (Ag)	mg/kg	0.0064	A358652	0.0137	0.0061	0.0062	0.0093	0.0050	A348944
Total (Dry Wt) Sodium (Na)	mg/kg	142	A358652	41	25	26	27	10	A348944
Total (Dry Wt) Strontium (Sr)	mg/kg	7.42	A358652	4.69	3.46	3.47	4.64	0.050	A348944
Total (Dry Wt) Tellurium (Te)	mg/kg	<0.020	A358652	<0.020	<0.020	<0.020	<0.020	0.020	A348944
Total (Dry Wt) Thallium (Tl)	mg/kg	0.0079	A358652	0.0084	0.0054	0.0053	0.0047	0.0020	A348944
Total (Dry Wt) Thorium (Th)	mg/kg	0.074	A358652	<0.050	0.059	<0.050	0.072	0.050	A348944
Total (Dry Wt) Tin (Sn)	mg/kg	<0.10	A358652	<0.10	<0.10	<0.10	<0.10	0.10	A348944

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160186
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ457		ADZ458	ADZ459	ADZ460	ADZ463		
Sampling Date		2021/08/10		2021/08/13	2021/08/12	2021/08/12	2021/08/12		
COC Number		2OF3		2OF3	2OF3	2OF3	3OF3		
	UNITS	**FFL-17**	**QC Batch**	**FFL-19**	**FFL-20**	**FFL-21**	**FFL-21D**	**RDL**	**QC Batch**
Total (Dry Wt) Titanium (Ti)	mg/kg	6.56	A358652	5.45	3.23	3.61	5.12	0.50	A348944
Total (Dry Wt) Uranium (U)	mg/kg	0.0777	A358652	0.0256	0.0300	0.0312	0.0596	0.0020	A348944
Total (Dry Wt) Vanadium (V)	mg/kg	0.21	A358652	<0.20	<0.20	<0.20	0.34	0.20	A348944
Total (Dry Wt) Zinc (Zn)	mg/kg	20.5	A358652	14.6	25.7	17.2	23.2	0.20	A348944
Total (Dry Wt) Zirconium (Zr)	mg/kg	<0.20	A358652	<0.20	<0.20	<0.20	<0.20	0.20	A348944

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160186
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ464	ADZ465	ADZ466		
Sampling Date		2021/08/12	2021/08/11	2021/08/11		
COC Number		3OF3	3OF3	3OF3		
	UNITS	FFL-22	FFL-23	FFL-24	RDL	QC Batch
Mercury by CVAF						
Total (Dry Wt) Mercury (Hg)	mg/kg	0.0226	0.0222	0.0223	0.0050	A352126
Total Metals by ICPMS						
Total (Dry Wt) Aluminum (Al)	mg/kg	106	126	194	1.0	A348944
Total (Dry Wt) Antimony (Sb)	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	A348944
Total (Dry Wt) Arsenic (As)	mg/kg	0.160	0.107	0.290	0.020	A348944
Total (Dry Wt) Barium (Ba)	mg/kg	7.86	9.90	15.3	0.050	A348944
Total (Dry Wt) Beryllium (Be)	mg/kg	<0.010	0.016	0.014	0.010	A348944
Total (Dry Wt) Bismuth (Bi)	mg/kg	<0.010	<0.010	<0.010	0.010	A348944
Total (Dry Wt) Boron (B)	mg/kg	<1.0	<1.0	<1.0	1.0	A348944
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.0329	0.0363	0.0405	0.0050	A348944
Total (Dry Wt) Calcium (Ca)	mg/kg	503	900	1070	10	A348944
Total (Dry Wt) Cesium (Cs)	mg/kg	0.148	0.205	0.142	0.010	A348944
Total (Dry Wt) Chromium (Cr)	mg/kg	0.25	0.27	0.35	0.10	A348944
Total (Dry Wt) Cobalt (Co)	mg/kg	0.202	0.403	0.467	0.020	A348944
Total (Dry Wt) Copper (Cu)	mg/kg	1.71	0.894	2.68	0.050	A348944
Total (Dry Wt) Iron (Fe)	mg/kg	132	112	411	5.0	A348944
Total (Dry Wt) Lead (Pb)	mg/kg	0.073	0.107	0.125	0.010	A348944
Total (Dry Wt) Lithium (Li)	mg/kg	<0.50	<0.50	<0.50	0.50	A348944
Total (Dry Wt) Magnesium (Mg)	mg/kg	245	281	350	5.0	A348944
Total (Dry Wt) Manganese (Mn)	mg/kg	18.7	70.4	33.2	0.050	A348944
Total (Dry Wt) Molybdenum (Mo)	mg/kg	0.077	0.054	0.224	0.020	A348944
Total (Dry Wt) Nickel (Ni)	mg/kg	0.787	1.84	1.44	0.050	A348944
Total (Dry Wt) Phosphorus (P)	mg/kg	617	263	639	10	A348944
Total (Dry Wt) Potassium (K)	mg/kg	1860	942	2090	10	A348944
Total (Dry Wt) Selenium (Se)	mg/kg	<0.050	<0.050	<0.050	0.050	A348944
Total (Dry Wt) Silver (Ag)	mg/kg	0.0061	0.0104	0.0163	0.0050	A348944
Total (Dry Wt) Sodium (Na)	mg/kg	17	43	54	10	A348944
Total (Dry Wt) Strontium (Sr)	mg/kg	3.53	4.06	7.29	0.050	A348944
Total (Dry Wt) Tellurium (Te)	mg/kg	<0.020	<0.020	<0.020	0.020	A348944
Total (Dry Wt) Thallium (Tl)	mg/kg	0.0062	0.0112	0.0047	0.0020	A348944
Total (Dry Wt) Thorium (Th)	mg/kg	0.061	<0.050	0.135	0.050	A348944
Total (Dry Wt) Tin (Sn)	mg/kg	<0.10	<0.10	<0.10	0.10	A348944

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160186
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ464	ADZ465	ADZ466		
Sampling Date		2021/08/12	2021/08/11	2021/08/11		
COC Number		3OF3	3OF3	3OF3		
	UNITS	FFL-22	FFL-23	FFL-24	RDL	QC Batch
Total (Dry Wt) Titanium (Ti)	mg/kg	4.77	4.44	6.97	0.50	A348944
Total (Dry Wt) Uranium (U)	mg/kg	0.0299	0.0274	0.114	0.0020	A348944
Total (Dry Wt) Vanadium (V)	mg/kg	0.21	<0.20	0.48	0.20	A348944
Total (Dry Wt) Zinc (Zn)	mg/kg	21.0	14.3	26.4	0.20	A348944
Total (Dry Wt) Zirconium (Zr)	mg/kg	<0.20	<0.20	<0.20	0.20	A348944
RDL = Reportable Detection Limit						

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160186
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ451		ADZ452		ADZ453		ADZ454		
Sampling Date		2021/08/12		2021/08/12		2021/08/12		2021/08/12		
COC Number		2OF3		2OF3		2OF3		2OF3		
	UNITS	FFL-10	RDL	FFL-11	RDL	FFL-12	RDL	FFL-13	RDL	QC Batch
Calculated Parameters										
Total (Wet Wt) Aluminum (Al)	mg/kg	55.6	0.68	74.9	0.85	114	0.77	83.4	0.82	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0034	0.0034	<0.0043	0.0043	<0.0039	0.0039	<0.0041	0.0041	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.088	0.014	0.071	0.017	0.189	0.015	0.202	0.016	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	6.42	0.034	8.46	0.043	10.8	0.039	6.82	0.041	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	0.0068	0.0068	<0.0085	0.0085	<0.0077	0.0077	<0.0082	0.0082	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	<0.0068	0.0068	<0.0085	0.0085	<0.0077	0.0077	<0.0082	0.0082	A330390
Total (Wet Wt) Boron (B)	mg/kg	<0.68	0.68	<0.85	0.85	<0.77	0.77	<0.82	0.82	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0209	0.0034	0.0342	0.0043	0.0147	0.0039	0.0184	0.0041	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	608	6.8	705	8.5	212	7.7	316	8.2	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	0.180	0.068	0.211	0.085	0.152	0.077	0.164	0.082	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.220	0.014	0.071	0.017	0.100	0.015	0.132	0.016	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	0.722	0.034	0.593	0.043	1.60	0.039	1.53	0.041	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	109	3.4	70.2	4.3	101	3.9	106	4.1	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.0845	0.0068	0.169	0.0085	0.0493	0.0077	0.0501	0.0082	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	251	3.4	307	4.3	162	3.9	185	4.1	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	64.4	0.034	36.7	0.043	9.49	0.039	10.7	0.041	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0223	0.0068	0.0211	0.0085	0.0223	0.0077	0.0169	0.0082	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.101	0.014	0.030	0.017	0.068	0.015	0.102	0.016	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	0.752	0.034	0.427	0.043	0.755	0.039	0.802	0.041	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	262	6.8	350	8.5	574	7.7	455	8.2	A330390
Total (Wet Wt) Potassium (K)	mg/kg	784	6.8	1010	8.5	1670	7.7	1450	8.2	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	<0.034	0.034	<0.043	0.043	<0.039	0.039	<0.041	0.041	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0062	0.0034	0.0057	0.0043	0.0055	0.0039	0.0056	0.0041	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	38.8	6.8	39.8	8.5	17.4	7.7	21.2	8.2	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	2.11	0.034	3.63	0.043	2.60	0.039	3.05	0.041	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0055	0.0014	0.0036	0.0017	0.0056	0.0015	0.0056	0.0016	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	<0.068	0.068	<0.085	0.085	<0.077	0.077	<0.082	0.082	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	2.73	0.34	3.64	0.43	3.41	0.39	3.01	0.41	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.0125	0.0014	0.0118	0.0017	0.0189	0.0015	0.0226	0.0016	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	<0.14	0.14	<0.17	0.17	0.17	0.15	0.19	0.16	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	10.8	0.14	14.6	0.17	21.4	0.15	14.3	0.16	A330390

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160186
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ455		ADZ456		ADZ457		ADZ458		
Sampling Date		2021/08/13		2021/08/13		2021/08/10		2021/08/13		
COC Number		2OF3		2OF3		2OF3		2OF3		
	UNITS	FFL-14	RDL	FFL-15	RDL	FFL-17	RDL	FFL-19	RDL	QC Batch
Calculated Parameters										
Total (Wet Wt) Aluminum (Al)	mg/kg	52.0	0.70	68.4	0.87	49.3	0.38	116	0.77	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0035	0.0035	<0.0044	0.0044	<0.0019	0.0019	<0.0039	0.0039	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.060	0.014	0.100	0.017	0.0755	0.0077	0.063	0.015	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	5.92	0.035	9.05	0.044	6.12	0.019	7.90	0.039	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	<0.0070	0.0070	<0.0087	0.0087	<0.0038	0.0038	0.0097	0.0077	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	<0.0070	0.0070	<0.0087	0.0087	<0.0038	0.0038	<0.0077	0.0077	A330390
Total (Wet Wt) Boron (B)	mg/kg	<0.70	0.70	<0.87	0.87	0.45	0.38	<0.77	0.77	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0191	0.0035	0.0399	0.0044	0.0170	0.0019	0.0177	0.0039	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	389	7.0	773	8.7	665	3.8	567	7.7	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	0.177	0.070	0.217	0.087	0.110	0.038	0.220	0.077	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.129	0.014	0.209	0.017	0.169	0.0077	0.198	0.015	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	0.931	0.035	0.842	0.044	0.680	0.019	0.957	0.039	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	61.8	3.5	83.9	4.4	57.9	1.9	96.9	3.9	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.0562	0.0070	0.0917	0.0087	0.0515	0.0038	0.0763	0.0077	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	201	3.5	360	4.4	233	1.9	251	3.9	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	21.9	0.035	54.0	0.044	36.4	0.019	47.6	0.039	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0255	0.0070	0.0290	0.0087	0.0132	0.0038	0.0169	0.0077	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.028	0.014	0.042	0.017	0.0270	0.0077	0.045	0.015	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	0.656	0.035	0.688	0.044	0.474	0.019	0.869	0.039	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	484	7.0	450	8.7	292	3.8	315	7.7	A330390
Total (Wet Wt) Potassium (K)	mg/kg	1350	7.0	1310	8.7	806	3.8	1000	7.7	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	<0.035	0.035	<0.044	0.044	<0.019	0.019	<0.039	0.039	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	<0.0035	0.0035	0.0061	0.0044	0.0025	0.0019	0.0106	0.0039	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	29.9	7.0	90.2	8.7	54.2	3.8	32.0	7.7	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	1.97	0.035	3.79	0.044	2.84	0.019	3.63	0.039	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0060	0.0014	0.0084	0.0017	0.00300	0.00077	0.0065	0.0015	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	<0.070	0.070	<0.087	0.087	<0.038	0.038	<0.077	0.077	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	3.04	0.35	4.04	0.44	2.51	0.19	4.22	0.39	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.0120	0.0014	0.0172	0.0017	0.0298	0.00077	0.0198	0.0015	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	<0.14	0.14	<0.17	0.17	0.080	0.077	<0.15	0.15	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	15.3	0.14	16.3	0.17	7.84	0.077	11.3	0.15	A330390

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160186
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ459		ADZ460		ADZ463		ADZ464		
Sampling Date		2021/08/12		2021/08/12		2021/08/12		2021/08/12		
COC Number		2OF3		2OF3		3OF3		3OF3		
	UNITS	FFL-20	RDL	FFL-21	RDL	FFL-21D	RDL	FFL-22	RDL	QC Batch
Calculated Parameters										
Total (Wet Wt) Aluminum (Al)	mg/kg	89.6	0.77	64.8	0.70	114	0.76	86.0	0.81	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0038	0.0038	<0.0035	0.0035	<0.0038	0.0038	<0.0040	0.0040	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.077	0.015	0.076	0.014	0.182	0.015	0.129	0.016	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	8.61	0.038	6.26	0.035	7.67	0.038	6.35	0.040	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	<0.0077	0.0077	<0.0070	0.0070	0.0077	0.0076	<0.0081	0.0081	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	<0.0077	0.0077	<0.0070	0.0070	<0.0076	0.0076	<0.0081	0.0081	A330390
Total (Wet Wt) Boron (B)	mg/kg	<0.77	0.77	<0.70	0.70	<0.76	0.76	<0.81	0.81	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0258	0.0038	0.0180	0.0035	0.0227	0.0038	0.0266	0.0040	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	347	7.7	331	7.0	300	7.6	407	8.1	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	0.129	0.077	0.152	0.070	0.227	0.076	0.200	0.081	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.082	0.015	0.116	0.014	0.170	0.015	0.163	0.016	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	1.35	0.038	1.12	0.035	1.76	0.038	1.38	0.040	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	76.3	3.8	83.1	3.5	176	3.8	107	4.0	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.0532	0.0077	0.0658	0.0070	0.0581	0.0076	0.0589	0.0081	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	187	3.8	157	3.5	189	3.8	198	4.0	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	12.9	0.038	18.3	0.035	11.2	0.038	15.1	0.040	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0209	0.0077	0.0151	0.0070	0.0184	0.0076	0.0222	0.0081	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.066	0.015	0.110	0.014	0.209	0.015	0.062	0.016	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	0.541	0.038	0.573	0.035	0.740	0.038	0.636	0.040	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	703	7.7	291	7.0	415	7.6	498	8.1	A330390
Total (Wet Wt) Potassium (K)	mg/kg	1720	7.7	1070	7.0	1460	7.6	1510	8.1	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	<0.038	0.038	<0.035	0.035	<0.038	0.038	<0.040	0.040	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0047	0.0038	0.0043	0.0035	0.0070	0.0038	0.0049	0.0040	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	19.1	7.7	18.2	7.0	20.6	7.6	14.1	8.1	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	2.64	0.038	2.43	0.035	3.52	0.038	2.85	0.040	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0041	0.0015	0.0037	0.0014	0.0036	0.0015	0.0050	0.0016	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	<0.077	0.077	<0.070	0.070	<0.076	0.076	<0.081	0.081	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	2.47	0.38	2.53	0.35	3.89	0.38	3.86	0.40	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.0230	0.0015	0.0219	0.0014	0.0453	0.0015	0.0242	0.0016	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	<0.15	0.15	<0.14	0.14	0.25	0.15	0.17	0.16	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	19.7	0.15	12.0	0.14	17.6	0.15	17.0	0.16	A330390

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160186
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ465		ADZ466		
Sampling Date		2021/08/11		2021/08/11		
COC Number		3OF3		3OF3		
	UNITS	FFL-23	RDL	FFL-24	RDL	QC Batch
Calculated Parameters						
Total (Wet Wt) Aluminum (Al)	mg/kg	98.0	0.78	141	0.73	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0039	0.0039	<0.0036	0.0036	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.083	0.016	0.211	0.015	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	7.70	0.039	11.1	0.036	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	0.0124	0.0078	0.0105	0.0073	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	<0.0078	0.0078	<0.0073	0.0073	A330390
Total (Wet Wt) Boron (B)	mg/kg	<0.78	0.78	<0.73	0.73	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0283	0.0039	0.0294	0.0036	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	700	7.8	775	7.3	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	0.206	0.078	0.256	0.073	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.314	0.016	0.339	0.015	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	0.695	0.039	1.95	0.036	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	86.8	3.9	298	3.6	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.0836	0.0078	0.0904	0.0073	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	219	3.9	254	3.6	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	54.8	0.039	24.1	0.036	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0222	0.0078	0.0227	0.0073	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.042	0.016	0.163	0.015	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	1.43	0.039	1.04	0.036	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	205	7.8	464	7.3	A330390
Total (Wet Wt) Potassium (K)	mg/kg	733	7.8	1520	7.3	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	<0.039	0.039	<0.036	0.036	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0081	0.0039	0.0118	0.0036	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	33.7	7.8	39.1	7.3	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	3.16	0.039	5.29	0.036	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0087	0.0016	0.0034	0.0015	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	<0.078	0.078	<0.073	0.073	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	3.46	0.39	5.06	0.36	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.0213	0.0016	0.0826	0.0015	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	<0.16	0.16	0.35	0.15	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	11.1	0.16	19.2	0.15	A330390
RDL = Reportable Detection Limit						

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160186
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

PHYSICAL TESTING (TISSUE)

BV Labs ID		ADZ451	ADZ452	ADZ453	ADZ454	ADZ455	ADZ456	ADZ457		
Sampling Date		2021/08/12	2021/08/12	2021/08/12	2021/08/12	2021/08/13	2021/08/13	2021/08/10		
COC Number		2OF3	2OF3	2OF3	2OF3	2OF3	2OF3	2OF3		
	UNITS	FFL-10	FFL-11	FFL-12	FFL-13	FFL-14	FFL-15	FFL-17	RDL	QC Batch
Physical Properties										
Moisture	%	32	15	23	18	30	13	62	0.30	A350826
RDL = Reportable Detection Limit										

BV Labs ID		ADZ458	ADZ459	ADZ460		ADZ463	ADZ464	ADZ465		
Sampling Date		2021/08/13	2021/08/12	2021/08/12		2021/08/12	2021/08/12	2021/08/11		
COC Number		2OF3	2OF3	2OF3		3OF3	3OF3	3OF3		
	UNITS	FFL-19	FFL-20	FFL-21	QC Batch	FFL-21D	FFL-22	FFL-23	RDL	QC Batch
Physical Properties										
Moisture	%	23	24	30	A350826	24	19	22	0.30	A353305
RDL = Reportable Detection Limit										

BV Labs ID		ADZ466		
Sampling Date		2021/08/11		
COC Number		3OF3		
	UNITS	FFL-24	RDL	QC Batch
Physical Properties				
Moisture	%	27	0.30	A353305
RDL = Reportable Detection Limit				

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	17.3°C
Package 2	18.0°C
Package 3	22.0°C
Package 4	17.3°C

Sampling date/time not indicated on the Chain of Custody.

Version 3: Sample dates were added on all sample ID's as per client request received 2021/09/30.

Results relate only to the items tested.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160186
Report Date: 2021/10/05

QUALITY ASSURANCE REPORT

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A332908	Total Mercury (Hg)	2021/08/27	103	75 - 125	108	75 - 125	<0.0050	mg/kg	NC	35	93	70 - 130
A348944	Total (Dry Wt) Aluminum (Al)	2021/09/24	NC	80 - 120	105	80 - 120	<1.0	mg/kg	1.2	40	36	17 - 93
A348944	Total (Dry Wt) Antimony (Sb)	2021/09/24	89	80 - 120	97	80 - 120	<0.0050	mg/kg	6.0	40		
A348944	Total (Dry Wt) Arsenic (As)	2021/09/24	101	80 - 120	101	80 - 120	<0.020	mg/kg	0.98	40	88	42 - 199
A348944	Total (Dry Wt) Barium (Ba)	2021/09/24	NC	80 - 120	101	80 - 120	<0.050	mg/kg	4.4	40		
A348944	Total (Dry Wt) Beryllium (Be)	2021/09/24	95	80 - 120	99	80 - 120	<0.010	mg/kg	11	40		
A348944	Total (Dry Wt) Bismuth (Bi)	2021/09/24	101	80 - 120	96	80 - 120	<0.010	mg/kg	2.0	40		
A348944	Total (Dry Wt) Boron (B)	2021/09/24	100	80 - 120	101	80 - 120	<1.0	mg/kg	1.4	40	104	75 - 125
A348944	Total (Dry Wt) Cadmium (Cd)	2021/09/24	97	80 - 120	99	80 - 120	<0.0050	mg/kg	0.59	40	90	75 - 125
A348944	Total (Dry Wt) Calcium (Ca)	2021/09/24	NC	80 - 120	102	80 - 120	<10	mg/kg	0.68	60	88	75 - 125
A348944	Total (Dry Wt) Cesium (Cs)	2021/09/24	NC	80 - 120	98	80 - 120	<0.010	mg/kg	2.2	40		
A348944	Total (Dry Wt) Chromium (Cr)	2021/09/24	NC	80 - 120	99	80 - 120	<0.10	mg/kg	0.22	40		
A348944	Total (Dry Wt) Cobalt (Co)	2021/09/24	90	80 - 120	97	80 - 120	<0.020	mg/kg	0.78	40	77	75 - 125
A348944	Total (Dry Wt) Copper (Cu)	2021/09/24	89	80 - 120	97	80 - 120	<0.050	mg/kg	0.87	40	82	75 - 125
A348944	Total (Dry Wt) Iron (Fe)	2021/09/24	98	80 - 120	103	80 - 120	<5.0	mg/kg	0.77	40		
A348944	Total (Dry Wt) Lead (Pb)	2021/09/24	103	80 - 120	97	80 - 120	<0.010	mg/kg	1.7	40		
A348944	Total (Dry Wt) Lithium (Li)	2021/09/24	100	80 - 120	100	80 - 120	<0.50	mg/kg	3.3	40		
A348944	Total (Dry Wt) Magnesium (Mg)	2021/09/24	NC	80 - 120	108	80 - 120	<5.0	mg/kg	3.0	40		
A348944	Total (Dry Wt) Manganese (Mn)	2021/09/24	NC	80 - 120	102	80 - 120	<0.050	mg/kg	1.3	40	89	75 - 125
A348944	Total (Dry Wt) Molybdenum (Mo)	2021/09/24	116	80 - 120	103	80 - 120	<0.020	mg/kg	0.46	40		
A348944	Total (Dry Wt) Nickel (Ni)	2021/09/24	96	80 - 120	99	80 - 120	<0.050	mg/kg	0.91	40	74 (1)	75 - 125
A348944	Total (Dry Wt) Phosphorus (P)	2021/09/24	109	80 - 120	101	80 - 120	<10	mg/kg	1.9	40	97	75 - 125
A348944	Total (Dry Wt) Potassium (K)	2021/09/24	NC	80 - 120	106	80 - 120	<10	mg/kg	1.6	40	91	75 - 125
A348944	Total (Dry Wt) Selenium (Se)	2021/09/24	102	80 - 120	101	80 - 120	<0.050	mg/kg	0.11	40	101	75 - 125
A348944	Total (Dry Wt) Silver (Ag)	2021/09/24	98	80 - 120	99	80 - 120	<0.0050	mg/kg	2.8	40		
A348944	Total (Dry Wt) Sodium (Na)	2021/09/24	NC	80 - 120	105	80 - 120	<10	mg/kg	5.2	40	91	75 - 125
A348944	Total (Dry Wt) Strontium (Sr)	2021/09/24	NC	80 - 120	98	80 - 120	<0.050	mg/kg	4.7	60	98	75 - 125
A348944	Total (Dry Wt) Tellurium (Te)	2021/09/24	105	80 - 120	104	80 - 120	<0.020	mg/kg	NC	40		
A348944	Total (Dry Wt) Thallium (Tl)	2021/09/24	105	80 - 120	99	80 - 120	<0.0020	mg/kg	1.1	40		
A348944	Total (Dry Wt) Thorium (Th)	2021/09/24	NC	80 - 120	82	80 - 120	<0.050	mg/kg	8.5	40		
A348944	Total (Dry Wt) Tin (Sn)	2021/09/24	113	80 - 120	101	80 - 120	<0.10	mg/kg	1.4	40		

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A348944	Total (Dry Wt) Titanium (Ti)	2021/09/24	NC	80 - 120	106	80 - 120	<0.50	mg/kg	3.0	40		
A348944	Total (Dry Wt) Uranium (U)	2021/09/24	108	80 - 120	103	80 - 120	<0.0020	mg/kg	3.5	40		
A348944	Total (Dry Wt) Vanadium (V)	2021/09/24	110	80 - 120	97	80 - 120	<0.20	mg/kg	1.8	40		
A348944	Total (Dry Wt) Zinc (Zn)	2021/09/24	99	80 - 120	102	80 - 120	<0.20	mg/kg	1.5	40	84	75 - 125
A348944	Total (Dry Wt) Zirconium (Zr)	2021/09/24	NC	80 - 120	83	80 - 120	<0.20	mg/kg	1.9	40		
A350826	Moisture	2021/09/15							8.1	20		
A352126	Total (Dry Wt) Mercury (Hg)	2021/09/29	84	80 - 120	81	80 - 120	<0.010	mg/kg	0.81	20	96	75 - 125
A353305	Moisture	2021/09/15							5.1	20		
A358652	Total (Dry Wt) Aluminum (Al)	2021/09/25	NC	80 - 120	105	80 - 120	<1.0	mg/kg	16	40	37	17 - 93
A358652	Total (Dry Wt) Antimony (Sb)	2021/09/25	86	80 - 120	95	80 - 120	<0.0050	mg/kg	4.1	40		
A358652	Total (Dry Wt) Arsenic (As)	2021/09/25	86	80 - 120	97	80 - 120	<0.020	mg/kg	7.2	40	48	42 - 199
A358652	Total (Dry Wt) Barium (Ba)	2021/09/25	94	80 - 120	95	80 - 120	<0.050	mg/kg	6.0	40		
A358652	Total (Dry Wt) Beryllium (Be)	2021/09/25	96	80 - 120	104	80 - 120	<0.010	mg/kg	17	40		
A358652	Total (Dry Wt) Bismuth (Bi)	2021/09/25	85	80 - 120	98	80 - 120	<0.010	mg/kg	NC	40		
A358652	Total (Dry Wt) Boron (B)	2021/09/25	96	80 - 120	104	80 - 120	<1.0	mg/kg	1.5	40	108	75 - 125
A358652	Total (Dry Wt) Cadmium (Cd)	2021/09/25	85	80 - 120	95	80 - 120	<0.0050	mg/kg	2.7	40	92	75 - 125
A358652	Total (Dry Wt) Calcium (Ca)	2021/09/25	103	80 - 120	99	80 - 120	<10	mg/kg	2.3	60	90	75 - 125
A358652	Total (Dry Wt) Cesium (Cs)	2021/09/25	83	80 - 120	93	80 - 120	<0.010	mg/kg	4.7	40		
A358652	Total (Dry Wt) Chromium (Cr)	2021/09/25	91	80 - 120	93	80 - 120	<0.10	mg/kg	21	40		
A358652	Total (Dry Wt) Cobalt (Co)	2021/09/25	85	80 - 120	94	80 - 120	<0.020	mg/kg	9.3	40	81	75 - 125
A358652	Total (Dry Wt) Copper (Cu)	2021/09/25	87	80 - 120	94	80 - 120	<0.050	mg/kg	11	40	87	75 - 125
A358652	Total (Dry Wt) Iron (Fe)	2021/09/25	80	80 - 120	99	80 - 120	<5.0	mg/kg	9.4	40		
A358652	Total (Dry Wt) Lead (Pb)	2021/09/25	88	80 - 120	99	80 - 120	<0.010	mg/kg	4.1	40		
A358652	Total (Dry Wt) Lithium (Li)	2021/09/25	100	80 - 120	111	80 - 120	<0.50	mg/kg	NC	40		
A358652	Total (Dry Wt) Magnesium (Mg)	2021/09/25	103	80 - 120	104	80 - 120	<5.0	mg/kg	11	40		
A358652	Total (Dry Wt) Manganese (Mn)	2021/09/25	NC	80 - 120	95	80 - 120	<0.050	mg/kg	11	40	91	75 - 125
A358652	Total (Dry Wt) Molybdenum (Mo)	2021/09/25	88	80 - 120	98	80 - 120	<0.020	mg/kg	9.9	40		
A358652	Total (Dry Wt) Nickel (Ni)	2021/09/25	86	80 - 120	95	80 - 120	<0.050	mg/kg	11	40	78	75 - 125
A358652	Total (Dry Wt) Phosphorus (P)	2021/09/25	93	80 - 120	99	80 - 120	<10	mg/kg	7.6	40	100	75 - 125
A358652	Total (Dry Wt) Potassium (K)	2021/09/25	103	80 - 120	99	80 - 120	<10	mg/kg	6.2	40	91	75 - 125
A358652	Total (Dry Wt) Selenium (Se)	2021/09/25	92	80 - 120	101	80 - 120	<0.050	mg/kg	NC	40	96	75 - 125

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A358652	Total (Dry Wt) Silver (Ag)	2021/09/25	84	80 - 120	94	80 - 120	<0.0050	mg/kg	7.7	40		
A358652	Total (Dry Wt) Sodium (Na)	2021/09/25	106	80 - 120	104	80 - 120	<10	mg/kg	9.0	40	95	75 - 125
A358652	Total (Dry Wt) Strontium (Sr)	2021/09/25	101	80 - 120	95	80 - 120	<0.050	mg/kg	10	60	98	75 - 125
A358652	Total (Dry Wt) Tellurium (Te)	2021/09/25	106	80 - 120	111	80 - 120	<0.020	mg/kg	NC	40		
A358652	Total (Dry Wt) Thallium (Tl)	2021/09/25	88	80 - 120	99	80 - 120	<0.0020	mg/kg	12	40		
A358652	Total (Dry Wt) Thorium (Th)	2021/09/25	83	80 - 120	80	80 - 120	<0.050	mg/kg	11	40		
A358652	Total (Dry Wt) Tin (Sn)	2021/09/25	83	80 - 120	103	80 - 120	<0.10	mg/kg	NC	40		
A358652	Total (Dry Wt) Titanium (Ti)	2021/09/25	107	80 - 120	101	80 - 120	<0.50	mg/kg	10	40		
A358652	Total (Dry Wt) Uranium (U)	2021/09/25	92	80 - 120	103	80 - 120	<0.0020	mg/kg	5.3	40		
A358652	Total (Dry Wt) Vanadium (V)	2021/09/25	89	80 - 120	95	80 - 120	<0.20	mg/kg	18	40		
A358652	Total (Dry Wt) Zinc (Zn)	2021/09/25	106	80 - 120	95	80 - 120	<0.20	mg/kg	8.2	40	87	75 - 125
A358652	Total (Dry Wt) Zirconium (Zr)	2021/09/25	NC	80 - 120	82	80 - 120	<0.20	mg/kg	NC	40		
A363646	Total (Dry Wt) Mercury (Hg)	2021/09/29	90	80 - 120	83	80 - 120	<0.010	mg/kg	4.9	20	83	75 - 125

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Reference material outside acceptance criteria due to digestion limitations.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160186
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-200
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company :	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present			Temp	See		
Seal Intact				Attr		
Cooling Media						
	YES	NO	Cooler ID			
Seal Present			Temp			
Seal Intact						
Cooling Media						
	YES	NO	Cooler ID			
Seal Present			Temp			
Seal Intact						
Cooling Media						

Depot Reception

Received in Yellowknife
By: J. McRae
@ 11:30
AUG 16 2021
See Attr
Temp:

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	VOC / BTEXS / VPH	MTBE	VOC / BTEX / F1	LEPH / HEPH / PAH	F2 - F4	Preserved?	Preserved?	Field Preserved?	Field Preserved?	Sulphate	COD	Alkalinity	Ammonia	Total Metals by ICP-MS	Hg by CVAFS	Moisture			HOLD - DO NOT ANALYZE
1 FFS-9d			Soil		BTEXS / VPH		BTEX F1	PAH	EPH	Dissolved Metals	Dissolved Mercury	Total Metals	Total Mercury	Chloride	TSS	pH	Nitrite						
2 -21d															BOD								
3 -22									TEH	Filtered?	Filtered?			Fluoride	TDS	Conductivity	Nitrate						
4 -23																							
5 -24																							
6 -25																							
7 FFFS-1			Lichen																				
8 -2																							
9 -2d																							
10 -3																							

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #
	2021/08/16	11:30	Leah Lee Choi	2021/08/17	15:10	C160186

COC-1020

BBY FCD-00077/9

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Page 2 3 of 4

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company :	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID	See		
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Received in Yellowknife
By: J. BERARD
@ 11:30
AUG 16 2021
see COC
Temp: /

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	BTEXS / VPH	VOC / BTEXS / VPH	BTEX F1	VOC / BTEX / F1	PAH	LEPH / HEPH / PAH	EPH	TEH	Dissolved Metals	F2 - F4	Dissolved Mercury	Preserved?	Total Metals	Field Preserved?	Total Mercury	Field Preserved?	Chloride	Fluoride	TSS	Sulphate	TDS	pH	COD	BOD	Conductivity	Alkalinity	Nitrite	Nitrate	Ammonia	Total Metals by ICP-MS	Hg by CVAFS	Moisture	HOLD - DO NOT ANALYZE
1 FFL-10			lichen			MTBE		VOC / BTEX / F1		LEPH / HEPH / PAH		TEH		F2 - F4		Preserved?		Field Preserved?		Field Preserved?		Fluoride		Sulphate		TDS		COD	BOD	Conductivity	Alkalinity	Nitrite	Nitrate	Ammonia	✓	✓	✓	
2 -11																Preserved?		Field Preserved?															✓	✓	✓	
3 -12																Preserved?																	✓	✓	✓	
4 -13																																	✓	✓	✓	
5 -14																																	✓	✓	✓	
6 -15																																	✓	✓	✓	
7 -17																																	✓	✓	✓	
8 -19																																	✓	✓	✓	
9 -20																																	✓	✓	✓	
10 -21																																	✓	✓	✓	

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at https://www.bvna.com/coc-terms-and-conditions

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #
	2021/08/16	11:30	Leo Chai	2021/08/17	15:10	C160186

COC-1020

BBY FCD-00077/9

BUREAU VERITAS

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company :	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Received in Yellowknife
By: J.Mercer
@ 11:30
AUG 16 2021
See ACTN
Temp: / /

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	MTBE	VOC / BTEXS / VPH	VOC / BTEX / F1	LEPH / HEPH / PAH	F2 - F4	Preserved?	Preserved?	Field Preserved?	Field Preserved?	Sulphate	COD	Alkalinity	Ammonia	Total Metals by ICP-MS	Hg by CVAFS	Moisture				HOLD - DO NOT ANALYZE
						BTEXS / VPH	BTEX F1	PAH	EPH	Dissolved Metals	Dissolved Mercury	Total Metals	Total Mercury	Chloride	TSS	pH	Nitrite							
						VOC / BTEXS / VPH			TEH	Filtered?	Filtered?			Fluoride	TDS	Conductivity	Nitrate							
															BOD									
1 FFL-21d			lichen															✓	✓	✓				
2 -22			↓															✓	✓	✓				
3 -23																		✓	✓	✓				
4 -24																								
5																								
6																								
7																								
8																								
9																								
10																								

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #
	2021/08/16	11:30		2021/08/17		C16 0186

COC-1020

BBY FCD-00077/9

Your P.O. #: 3104474131
Your Project #: 21452119-2000
Site Location: DIAVIK MINE
Your C.O.C. #: 1of2, 2of2

Attention: Kerrie Serben

GOLDER ASSOCIATES LTD
1721 8TH Street East
Saskatoon, SK
Canada

Report Date: 2021/10/05
Report #: R3080477
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C160235
Received: 2021/08/16, 11:20

Sample Matrix: Soil
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Mercury in Soil by CVAF (1)	7	2021/08/27	2021/08/27	BBY7SOP-00012	EPA 245.7

Sample Matrix: Tissue
Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Mercury in Tissue by CVAF - Dry Wt (1)	13	N/A	2021/09/29	BBY7SOP-00012	EPA 245.7
Elements in Tissue by CRC ICPMS - Dry Wt (1)	13	2021/09/20	2021/09/25	BBY7SOP-00021 / BBY7SOP-00002	EPA 6020b R2 m
Elements in Tissue - Wet Wt (Calculated) (1)	13	N/A	2021/09/15	BBY WI-00033	Auto Calc
Moisture in Tissue (1)	13	2021/09/14	2021/09/15	BBY8SOP-00017	BCMOE BCLM Dec2000 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Vancouver, 4606 Canada Way , Burnaby, BC, V5G 1K5

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Your P.O. #: 3104474131
Your Project #: 21452119-2000
Site Location: DIAVIK MINE
Your C.O.C. #: 1of2, 2of2

Attention: Kerrie Serben

GOLDER ASSOCIATES LTD
1721 8TH Street East
Saskatoon, SK
Canada

Report Date: 2021/10/05
Report #: R3080477
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C160235
Received: 2021/08/16, 11:20

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rhecie Phayouphone, Key Account Specialist
Email: Rhecie.Phayouphone@bureauveritas.com
Phone# (403)735-2283

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160235
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

MERCURY BY COLD VAPOR (SOIL)

BV Labs ID		ADZ641	ADZ642	ADZ643	ADZ644	ADZ645	ADZ646	ADZ647		
Sampling Date		2021/08/12	2021/08/13	2021/08/13	2021/08/10	2021/08/13	2021/08/12	2021/08/12		
COC Number		1of2	1of2	1of2	1of2	1of2	1of2	1of2		
	UNITS	**FFS-13**	**FFS-14**	**FFS-15**	**FFS-17**	**FFS-19**	**FFS-20**	**FFS-21**	**RDL**	**QC Batch**
Elements										
Total Mercury (Hg)	mg/kg	<0.0050	0.0230	0.0062	<0.0050	0.0054	0.0080	<0.0050	0.0050	A334048
RDL = Reportable Detection Limit										

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160235
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ648	ADZ649	ADZ650	ADZ653	ADZ654	ADZ655		
Sampling Date		2021/08/13	2021/08/13	2021/08/13	2021/08/13	2021/08/13	2021/08/08		
COC Number		1of2	1of2	1of2	2of2	2of2	2of2		
	UNITS	NFL-21	NFL-21D	NFL-22	NFL-22D	NFL-23	FFL-1	RDL	QC Batch
Mercury by CVAF									
Total (Dry Wt) Mercury (Hg)	mg/kg	0.0183	0.0191	0.0224	0.0212	0.0305	0.0219	0.0050	A363646
Total Metals by ICPMS									
Total (Dry Wt) Aluminum (Al)	mg/kg	151	206	191	222	129	143	1.0	A358652
Total (Dry Wt) Antimony (Sb)	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A358652
Total (Dry Wt) Arsenic (As)	mg/kg	0.094	0.131	0.207	0.210	0.061	0.094	0.020	A358652
Total (Dry Wt) Barium (Ba)	mg/kg	9.19	12.2	21.1	11.7	6.59	16.9	0.050	A358652
Total (Dry Wt) Beryllium (Be)	mg/kg	0.012	0.014	<0.010	<0.010	<0.010	0.021	0.010	A358652
Total (Dry Wt) Bismuth (Bi)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A358652
Total (Dry Wt) Boron (B)	mg/kg	2.0	1.6	1.4	1.7	1.5	1.8	1.0	A358652
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.0353	0.0261	0.0274	0.0428	0.0325	0.0438	0.0050	A358652
Total (Dry Wt) Calcium (Ca)	mg/kg	582	560	469	487	542	777	10	A358652
Total (Dry Wt) Cesium (Cs)	mg/kg	0.165	0.180	0.259	0.099	0.520	0.239	0.010	A358652
Total (Dry Wt) Chromium (Cr)	mg/kg	0.43	0.59	0.56	0.70	0.25	0.30	0.10	A358652
Total (Dry Wt) Cobalt (Co)	mg/kg	0.307	0.299	0.220	0.270	0.099	0.410	0.020	A358652
Total (Dry Wt) Copper (Cu)	mg/kg	2.75	2.66	2.42	1.43	0.973	2.24	0.050	A358652
Total (Dry Wt) Iron (Fe)	mg/kg	147	206	210	254	106	178	5.0	A358652
Total (Dry Wt) Lead (Pb)	mg/kg	0.089	0.104	0.084	0.152	0.129	0.086	0.010	A358652
Total (Dry Wt) Lithium (Li)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A358652
Total (Dry Wt) Magnesium (Mg)	mg/kg	387	375	376	349	335	367	5.0	A358652
Total (Dry Wt) Manganese (Mn)	mg/kg	13.7	12.6	27.8	17.6	44.3	30.3	0.050	A358652
Total (Dry Wt) Molybdenum (Mo)	mg/kg	0.154	0.161	0.094	0.089	0.047	0.149	0.020	A358652
Total (Dry Wt) Nickel (Ni)	mg/kg	1.45	1.55	1.60	1.43	0.429	0.969	0.050	A358652
Total (Dry Wt) Phosphorus (P)	mg/kg	976	870	1230	514	570	853	10	A358652
Total (Dry Wt) Potassium (K)	mg/kg	2860	2600	2870	1580	1460	2490	10	A358652
Total (Dry Wt) Selenium (Se)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A358652
Total (Dry Wt) Silver (Ag)	mg/kg	0.0087	0.0091	0.0115	0.0119	0.0116	0.0060	0.0050	A358652
Total (Dry Wt) Sodium (Na)	mg/kg	35	36	73	36	70	49	10	A358652
Total (Dry Wt) Strontium (Sr)	mg/kg	4.75	5.27	6.47	4.00	2.18	8.16	0.050	A358652
Total (Dry Wt) Tellurium (Te)	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	A358652
Total (Dry Wt) Thallium (Tl)	mg/kg	0.0052	0.0077	0.0083	0.0042	0.0141	0.0072	0.0020	A358652
Total (Dry Wt) Thorium (Th)	mg/kg	0.066	0.095	0.057	0.087	<0.050	<0.050	0.050	A358652
Total (Dry Wt) Tin (Sn)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A358652

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160235
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ648	ADZ649	ADZ650	ADZ653	ADZ654	ADZ655		
Sampling Date		2021/08/13	2021/08/13	2021/08/13	2021/08/13	2021/08/13	2021/08/08		
COC Number		1of2	1of2	1of2	2of2	2of2	2of2		
	UNITS	NFL-21	NFL-21D	NFL-22	NFL-22D	NFL-23	FFL-1	RDL	QC Batch
Total (Dry Wt) Titanium (Ti)	mg/kg	7.37	10.2	10.9	14.0	6.43	6.76	0.50	A358652
Total (Dry Wt) Uranium (U)	mg/kg	0.0548	0.0753	0.0349	0.0425	0.0279	0.124	0.0020	A358652
Total (Dry Wt) Vanadium (V)	mg/kg	0.21	0.33	0.37	0.46	<0.20	0.22	0.20	A358652
Total (Dry Wt) Zinc (Zn)	mg/kg	32.9	28.9	29.4	17.3	13.7	30.6	0.20	A358652
Total (Dry Wt) Zirconium (Zr)	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A358652

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160235
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ656	ADZ657	ADZ658	ADZ659	ADZ660	ADZ661		
Sampling Date		2021/08/08	2021/08/07	2021/08/10	2021/08/10	2021/08/11	2021/08/11		
COC Number		2of2	2of2	2of2	2of2	2of2	2of2		
	UNITS	FFL-2	FFL-3	FFL-5	FFL-7	FFL-8	FFL-9	RDL	QC Batch
Mercury by CVAF									
Total (Dry Wt) Mercury (Hg)	mg/kg	0.0334	0.0469	0.0170	0.0396	0.0220	0.0164	0.0050	A363646
Total Metals by ICPMS									
Total (Dry Wt) Aluminum (Al)	mg/kg	152	120	214	231	162	79.9	1.0	A358652
Total (Dry Wt) Antimony (Sb)	mg/kg	<0.0050	<0.0050	0.0075	<0.0050	<0.0050	<0.0050	0.0050	A358652
Total (Dry Wt) Arsenic (As)	mg/kg	0.171	0.086	0.528	0.413	0.382	0.077	0.020	A358652
Total (Dry Wt) Barium (Ba)	mg/kg	13.9	9.59	21.8	33.4	9.00	12.0	0.050	A358652
Total (Dry Wt) Beryllium (Be)	mg/kg	0.011	0.010	0.024	0.020	0.019	<0.010	0.010	A358652
Total (Dry Wt) Bismuth (Bi)	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A358652
Total (Dry Wt) Boron (B)	mg/kg	1.5	<1.0	2.0	2.9	1.3	1.2	1.0	A358652
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.0448	0.0490	0.0274	0.0387	0.0370	0.0237	0.0050	A358652
Total (Dry Wt) Calcium (Ca)	mg/kg	677	546	416	602	852	342	10	A358652
Total (Dry Wt) Cesium (Cs)	mg/kg	0.304	0.255	0.213	0.323	0.186	0.251	0.010	A358652
Total (Dry Wt) Chromium (Cr)	mg/kg	0.21	0.31	0.34	0.46	0.34	0.14	0.10	A358652
Total (Dry Wt) Cobalt (Co)	mg/kg	0.177	0.129	0.551	0.382	0.518	0.089	0.020	A358652
Total (Dry Wt) Copper (Cu)	mg/kg	1.65	1.31	3.33	2.93	2.28	1.70	0.050	A358652
Total (Dry Wt) Iron (Fe)	mg/kg	130	124	379	331	264	74.2	5.0	A358652
Total (Dry Wt) Lead (Pb)	mg/kg	0.150	0.377	0.096	0.203	0.134	0.049	0.010	A358652
Total (Dry Wt) Lithium (Li)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A358652
Total (Dry Wt) Magnesium (Mg)	mg/kg	354	267	256	397	368	236	5.0	A358652
Total (Dry Wt) Manganese (Mn)	mg/kg	33.5	30.4	17.2	39.7	44.0	14.9	0.050	A358652
Total (Dry Wt) Molybdenum (Mo)	mg/kg	0.061	0.048	0.121	0.106	0.115	0.065	0.020	A358652
Total (Dry Wt) Nickel (Ni)	mg/kg	0.686	0.653	3.15	2.04	1.50	0.705	0.050	A358652
Total (Dry Wt) Phosphorus (P)	mg/kg	1110	584	707	1380	558	989	10	A358652
Total (Dry Wt) Potassium (K)	mg/kg	2290	1730	2100	2630	1660	2710	10	A358652
Total (Dry Wt) Selenium (Se)	mg/kg	<0.050	0.059	<0.050	<0.050	<0.050	0.072	0.050	A358652
Total (Dry Wt) Silver (Ag)	mg/kg	0.0096	0.0110	0.0201	0.0170	0.0176	0.0082	0.0050	A358652
Total (Dry Wt) Sodium (Na)	mg/kg	73	38	57	45	58	21	10	A358652
Total (Dry Wt) Strontium (Sr)	mg/kg	5.28	2.97	6.19	7.81	5.02	3.81	0.050	A358652
Total (Dry Wt) Tellurium (Te)	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	A358652
Total (Dry Wt) Thallium (Tl)	mg/kg	0.0095	0.0083	0.0055	0.0114	0.0074	0.0044	0.0020	A358652
Total (Dry Wt) Thorium (Th)	mg/kg	<0.050	<0.050	0.055	0.055	0.062	<0.050	0.050	A358652
Total (Dry Wt) Tin (Sn)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A358652

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160235
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ656	ADZ657	ADZ658	ADZ659	ADZ660	ADZ661		
Sampling Date		2021/08/08	2021/08/07	2021/08/10	2021/08/10	2021/08/11	2021/08/11		
COC Number		2of2	2of2	2of2	2of2	2of2	2of2		
	UNITS	FFL-2	FFL-3	FFL-5	FFL-7	FFL-8	FFL-9	RDL	QC Batch
Total (Dry Wt) Titanium (Ti)	mg/kg	5.26	6.61	6.25	9.96	4.72	3.06	0.50	A358652
Total (Dry Wt) Uranium (U)	mg/kg	0.0391	0.0517	0.0524	0.0802	0.0629	0.0163	0.0020	A358652
Total (Dry Wt) Vanadium (V)	mg/kg	<0.20	<0.20	0.45	0.48	0.36	<0.20	0.20	A358652
Total (Dry Wt) Zinc (Zn)	mg/kg	26.0	17.8	26.6	37.1	18.1	30.4	0.20	A358652
Total (Dry Wt) Zirconium (Zr)	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A358652
RDL = Reportable Detection Limit									

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160235
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ662		
Sampling Date		2021/08/11		
COC Number		2of2		
	UNITS	FFL-9D	RDL	QC Batch
Mercury by CVAF				
Total (Dry Wt) Mercury (Hg)	mg/kg	0.0122	0.0050	A363646
Total Metals by ICPMS				
Total (Dry Wt) Aluminum (Al)	mg/kg	156	1.0	A358652
Total (Dry Wt) Antimony (Sb)	mg/kg	<0.0050	0.0050	A358652
Total (Dry Wt) Arsenic (As)	mg/kg	0.123	0.020	A358652
Total (Dry Wt) Barium (Ba)	mg/kg	16.1	0.050	A358652
Total (Dry Wt) Beryllium (Be)	mg/kg	0.011	0.010	A358652
Total (Dry Wt) Bismuth (Bi)	mg/kg	<0.010	0.010	A358652
Total (Dry Wt) Boron (B)	mg/kg	1.6	1.0	A358652
Total (Dry Wt) Cadmium (Cd)	mg/kg	0.0276	0.0050	A358652
Total (Dry Wt) Calcium (Ca)	mg/kg	408	10	A358652
Total (Dry Wt) Cesium (Cs)	mg/kg	0.232	0.010	A358652
Total (Dry Wt) Chromium (Cr)	mg/kg	0.22	0.10	A358652
Total (Dry Wt) Cobalt (Co)	mg/kg	0.144	0.020	A358652
Total (Dry Wt) Copper (Cu)	mg/kg	1.86	0.050	A358652
Total (Dry Wt) Iron (Fe)	mg/kg	131	5.0	A358652
Total (Dry Wt) Lead (Pb)	mg/kg	0.066	0.010	A358652
Total (Dry Wt) Lithium (Li)	mg/kg	<0.50	0.50	A358652
Total (Dry Wt) Magnesium (Mg)	mg/kg	238	5.0	A358652
Total (Dry Wt) Manganese (Mn)	mg/kg	14.8	0.050	A358652
Total (Dry Wt) Molybdenum (Mo)	mg/kg	0.068	0.020	A358652
Total (Dry Wt) Nickel (Ni)	mg/kg	0.887	0.050	A358652
Total (Dry Wt) Phosphorus (P)	mg/kg	712	10	A358652
Total (Dry Wt) Potassium (K)	mg/kg	2130	10	A358652
Total (Dry Wt) Selenium (Se)	mg/kg	0.053	0.050	A358652
Total (Dry Wt) Silver (Ag)	mg/kg	0.0111	0.0050	A358652
Total (Dry Wt) Sodium (Na)	mg/kg	38	10	A358652
Total (Dry Wt) Strontium (Sr)	mg/kg	5.04	0.050	A358652
Total (Dry Wt) Tellurium (Te)	mg/kg	<0.020	0.020	A358652
Total (Dry Wt) Thallium (Tl)	mg/kg	0.0053	0.0020	A358652
Total (Dry Wt) Thorium (Th)	mg/kg	<0.050	0.050	A358652
Total (Dry Wt) Tin (Sn)	mg/kg	<0.10	0.10	A358652
RDL = Reportable Detection Limit				

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160235
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - DRY WT (TISSUE)

BV Labs ID		ADZ662		
Sampling Date		2021/08/11		
COC Number		2of2		
	UNITS	FFL-9D	RDL	QC Batch
Total (Dry Wt) Titanium (Ti)	mg/kg	5.26	0.50	A358652
Total (Dry Wt) Uranium (U)	mg/kg	0.0298	0.0020	A358652
Total (Dry Wt) Vanadium (V)	mg/kg	<0.20	0.20	A358652
Total (Dry Wt) Zinc (Zn)	mg/kg	26.6	0.20	A358652
Total (Dry Wt) Zirconium (Zr)	mg/kg	<0.20	0.20	A358652
RDL = Reportable Detection Limit				

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160235
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ648		ADZ649		ADZ650		ADZ653		
Sampling Date		2021/08/13		2021/08/13		2021/08/13		2021/08/13		
COC Number		1of2		1of2		1of2		2of2		
	UNITS	NFL-21	RDL	NFL-21D	RDL	NFL-22	RDL	NFL-22D	RDL	QC Batch
Calculated Parameters										
Total (Wet Wt) Aluminum (Al)	mg/kg	125	0.83	170	0.82	109	0.57	140	0.63	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0042	0.0042	<0.0041	0.0041	<0.0029	0.0029	<0.0032	0.0032	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.078	0.017	0.108	0.016	0.118	0.011	0.132	0.013	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	7.63	0.042	10.1	0.041	12.1	0.029	7.40	0.032	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	0.0101	0.0083	0.0114	0.0082	<0.0057	0.0057	<0.0063	0.0063	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	<0.0083	0.0083	<0.0082	0.0082	<0.0057	0.0057	<0.0063	0.0063	A330390
Total (Wet Wt) Boron (B)	mg/kg	1.63	0.83	1.36	0.82	0.79	0.57	1.05	0.63	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0293	0.0042	0.0215	0.0041	0.0157	0.0029	0.0270	0.0032	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	483	8.3	461	8.2	268	5.7	307	6.3	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	0.356	0.083	0.482	0.082	0.319	0.057	0.442	0.063	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.255	0.017	0.247	0.016	0.126	0.011	0.170	0.013	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	2.28	0.042	2.19	0.041	1.39	0.029	0.904	0.032	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	122	4.2	169	4.1	120	2.9	160	3.2	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.0735	0.0083	0.0853	0.0082	0.0482	0.0057	0.0959	0.0063	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	322	4.2	308	4.1	215	2.9	220	3.2	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	11.4	0.042	10.4	0.041	15.9	0.029	11.1	0.032	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0211	0.0083	0.0218	0.0082	0.0167	0.0057	0.0170	0.0063	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.128	0.017	0.132	0.016	0.054	0.011	0.056	0.013	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	1.20	0.042	1.28	0.041	0.917	0.029	0.903	0.032	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	810	8.3	716	8.2	705	5.7	324	6.3	A330390
Total (Wet Wt) Potassium (K)	mg/kg	2370	8.3	2140	8.2	1640	5.7	993	6.3	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	<0.042	0.042	<0.041	0.041	<0.029	0.029	<0.032	0.032	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0073	0.0042	0.0075	0.0041	0.0066	0.0029	0.0075	0.0032	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	29.3	8.3	29.9	8.2	41.7	5.7	22.9	6.3	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	3.95	0.042	4.34	0.041	3.70	0.029	2.52	0.032	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0043	0.0017	0.0063	0.0016	0.0048	0.0011	0.0026	0.0013	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	<0.083	0.083	<0.082	0.082	<0.057	0.057	<0.063	0.063	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	6.12	0.42	8.40	0.41	6.25	0.29	8.81	0.32	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.0455	0.0017	0.0619	0.0016	0.0200	0.0011	0.0268	0.0013	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	0.18	0.17	0.27	0.16	0.21	0.11	0.29	0.13	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	27.3	0.17	23.8	0.16	16.8	0.11	10.9	0.13	A330390

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160235
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ654		ADZ655		ADZ656		ADZ657		
Sampling Date		2021/08/13		2021/08/08		2021/08/08		2021/08/07		
COC Number		2of2		2of2		2of2		2of2		
	UNITS	NFL-23	RDL	FFL-1	RDL	FFL-2	RDL	FFL-3	RDL	QC Batch
Calculated Parameters										
Total (Wet Wt) Aluminum (Al)	mg/kg	100	0.78	101	0.71	113	0.74	94.1	0.78	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0039	0.0039	<0.0035	0.0035	<0.0037	0.0037	<0.0039	0.0039	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.047	0.016	0.067	0.014	0.127	0.015	0.068	0.016	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	5.12	0.039	11.9	0.035	10.3	0.037	7.52	0.039	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	<0.0078	0.0078	0.0148	0.0071	0.0084	0.0074	0.0080	0.0078	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	<0.0078	0.0078	<0.0071	0.0071	<0.0074	0.0074	<0.0078	0.0078	A330390
Total (Wet Wt) Boron (B)	mg/kg	1.18	0.78	1.29	0.71	1.08	0.74	<0.78	0.78	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0252	0.0039	0.0309	0.0035	0.0332	0.0037	0.0384	0.0039	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	420	7.8	549	7.1	502	7.4	428	7.8	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	0.197	0.078	0.209	0.071	0.158	0.074	0.247	0.078	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.077	0.016	0.289	0.014	0.131	0.015	0.101	0.016	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	0.755	0.039	1.58	0.035	1.22	0.037	1.03	0.039	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	82.3	3.9	126	3.5	96.7	3.7	97.3	3.9	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.100	0.0078	0.0605	0.0071	0.111	0.0074	0.296	0.0078	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	260	3.9	259	3.5	263	3.7	209	3.9	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	34.4	0.039	21.4	0.035	24.9	0.037	23.9	0.039	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0304	0.0078	0.0206	0.0071	0.0320	0.0074	0.0460	0.0078	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.036	0.016	0.105	0.014	0.045	0.015	0.038	0.016	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	0.333	0.039	0.684	0.035	0.509	0.037	0.512	0.039	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	442	7.8	602	7.1	825	7.4	458	7.8	A330390
Total (Wet Wt) Potassium (K)	mg/kg	1130	7.8	1760	7.1	1700	7.4	1360	7.8	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	<0.039	0.039	<0.035	0.035	<0.037	0.037	0.046	0.039	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0090	0.0039	0.0042	0.0035	0.0072	0.0037	0.0087	0.0039	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	54.2	7.8	34.8	7.1	54.4	7.4	29.9	7.8	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	1.69	0.039	5.76	0.035	3.91	0.037	2.33	0.039	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0109	0.0016	0.0051	0.0014	0.0071	0.0015	0.0065	0.0016	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	<0.078	0.078	<0.071	0.071	<0.074	0.074	<0.078	0.078	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	4.99	0.39	4.77	0.35	3.91	0.37	5.18	0.39	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.0216	0.0016	0.0876	0.0014	0.0290	0.0015	0.0405	0.0016	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	<0.16	0.16	0.16	0.14	<0.15	0.15	<0.16	0.16	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	10.6	0.16	21.6	0.14	19.3	0.15	14.0	0.16	A330390

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160235
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ658		ADZ659		ADZ660		ADZ661		
Sampling Date		2021/08/10		2021/08/10		2021/08/11		2021/08/11		
COC Number		2of2		2of2		2of2		2of2		
	UNITS	FFL-5	RDL	FFL-7	RDL	FFL-8	RDL	FFL-9	RDL	QC Batch
Calculated Parameters										
Total (Wet Wt) Aluminum (Al)	mg/kg	105	0.49	111	0.48	100	0.62	29.8	0.37	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	0.0037	0.0025	<0.0024	0.0024	<0.0031	0.0031	<0.0019	0.0019	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.259	0.0098	0.199	0.0096	0.236	0.012	0.0288	0.0075	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	10.7	0.025	16.1	0.024	5.56	0.031	4.48	0.019	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	0.0115	0.0049	0.0094	0.0048	0.0117	0.0062	<0.0037	0.0037	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	<0.0049	0.0049	<0.0048	0.0048	<0.0062	0.0062	<0.0037	0.0037	A330390
Total (Wet Wt) Boron (B)	mg/kg	0.99	0.49	1.38	0.48	0.80	0.62	0.45	0.37	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0134	0.0025	0.0186	0.0024	0.0229	0.0031	0.0089	0.0019	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	204	4.9	290	4.8	527	6.2	127	3.7	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	0.166	0.049	0.220	0.048	0.208	0.062	0.051	0.037	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.270	0.0098	0.184	0.0096	0.320	0.012	0.0333	0.0075	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	1.63	0.025	1.41	0.024	1.41	0.031	0.635	0.019	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	186	2.5	159	2.4	163	3.1	27.7	1.9	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.0470	0.0049	0.0975	0.0048	0.0830	0.0062	0.0183	0.0037	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	125	2.5	191	2.4	227	3.1	87.8	1.9	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	8.43	0.025	19.1	0.024	27.2	0.031	5.57	0.019	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0115	0.0049	0.0245	0.0048	0.0186	0.0062	0.0091	0.0037	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.0595	0.0098	0.0512	0.0096	0.071	0.012	0.0243	0.0075	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	1.54	0.025	0.980	0.024	0.930	0.031	0.263	0.019	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	347	4.9	662	4.8	345	6.2	369	3.7	A330390
Total (Wet Wt) Potassium (K)	mg/kg	1030	4.9	1270	4.8	1030	6.2	1010	3.7	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	<0.025	0.025	<0.024	0.024	<0.031	0.031	0.027	0.019	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0099	0.0025	0.0082	0.0024	0.0109	0.0031	0.0031	0.0019	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	28.0	4.9	21.5	4.8	35.9	6.2	7.9	3.7	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	3.03	0.025	3.75	0.024	3.10	0.031	1.42	0.019	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.00270	0.00098	0.00550	0.00096	0.0046	0.0012	0.00170	0.00075	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	<0.049	0.049	<0.048	0.048	<0.062	0.062	<0.037	0.037	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	3.06	0.25	4.79	0.24	2.92	0.31	1.14	0.19	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.0257	0.00098	0.0386	0.00096	0.0389	0.0012	0.00610	0.00075	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	0.218	0.098	0.233	0.096	0.22	0.12	<0.075	0.075	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	13.0	0.098	17.8	0.096	11.2	0.12	11.3	0.075	A330390

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

ELEMENTS BY ATOMIC SPECTROSCOPY - WET WT (TISSUE)

BV Labs ID		ADZ662		
Sampling Date		2021/08/11		
COC Number		2of2		
	UNITS	FFL-9D	RDL	QC Batch
Calculated Parameters				
Total (Wet Wt) Aluminum (Al)	mg/kg	107	0.69	A330390
Total (Wet Wt) Antimony (Sb)	mg/kg	<0.0034	0.0034	A330390
Total (Wet Wt) Arsenic (As)	mg/kg	0.085	0.014	A330390
Total (Wet Wt) Barium (Ba)	mg/kg	11.1	0.034	A330390
Total (Wet Wt) Beryllium (Be)	mg/kg	0.0077	0.0069	A330390
Total (Wet Wt) Bismuth (Bi)	mg/kg	<0.0069	0.0069	A330390
Total (Wet Wt) Boron (B)	mg/kg	1.10	0.69	A330390
Total (Wet Wt) Cadmium (Cd)	mg/kg	0.0190	0.0034	A330390
Total (Wet Wt) Calcium (Ca)	mg/kg	281	6.9	A330390
Total (Wet Wt) Chromium (Cr)	mg/kg	0.150	0.069	A330390
Total (Wet Wt) Cobalt (Co)	mg/kg	0.099	0.014	A330390
Total (Wet Wt) Copper (Cu)	mg/kg	1.28	0.034	A330390
Total (Wet Wt) Iron (Fe)	mg/kg	89.8	3.4	A330390
Total (Wet Wt) Lead (Pb)	mg/kg	0.0453	0.0069	A330390
Total (Wet Wt) Magnesium (Mg)	mg/kg	164	3.4	A330390
Total (Wet Wt) Manganese (Mn)	mg/kg	10.2	0.034	A330390
Total (Wet Wt) Mercury (Hg)	mg/kg	0.0165	0.0069	A330390
Total (Wet Wt) Molybdenum (Mo)	mg/kg	0.047	0.014	A330390
Total (Wet Wt) Nickel (Ni)	mg/kg	0.610	0.034	A330390
Total (Wet Wt) Phosphorus (P)	mg/kg	490	6.9	A330390
Total (Wet Wt) Potassium (K)	mg/kg	1470	6.9	A330390
Total (Wet Wt) Selenium (Se)	mg/kg	0.037	0.034	A330390
Total (Wet Wt) Silver (Ag)	mg/kg	0.0076	0.0034	A330390
Total (Wet Wt) Sodium (Na)	mg/kg	26.5	6.9	A330390
Total (Wet Wt) Strontium (Sr)	mg/kg	3.47	0.034	A330390
Total (Wet Wt) Thallium (Tl)	mg/kg	0.0037	0.0014	A330390
Total (Wet Wt) Tin (Sn)	mg/kg	<0.069	0.069	A330390
Total (Wet Wt) Titanium (Ti)	mg/kg	3.62	0.34	A330390
Total (Wet Wt) Uranium (U)	mg/kg	0.0205	0.0014	A330390
Total (Wet Wt) Vanadium (V)	mg/kg	<0.14	0.14	A330390
Total (Wet Wt) Zinc (Zn)	mg/kg	18.3	0.14	A330390
RDL = Reportable Detection Limit				

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160235
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

PHYSICAL TESTING (TISSUE)

BV Labs ID		ADZ648	ADZ649	ADZ650	ADZ653	ADZ654	ADZ655	ADZ656		
Sampling Date		2021/08/13	2021/08/13	2021/08/13	2021/08/13	2021/08/13	2021/08/08	2021/08/08		
COC Number		1of2	1of2	1of2	2of2	2of2	2of2	2of2		
	UNITS	NFL-21	NFL-21D	NFL-22	NFL-22D	NFL-23	FFL-1	FFL-2	RDL	QC Batch
Physical Properties										
Moisture	%	17	18	43	37	22	29	26	0.30	A351024
RDL = Reportable Detection Limit										

BV Labs ID		ADZ657	ADZ658	ADZ659	ADZ660	ADZ661	ADZ662		
Sampling Date		2021/08/07	2021/08/10	2021/08/10	2021/08/11	2021/08/11	2021/08/11		
COC Number		2of2	2of2	2of2	2of2	2of2	2of2		
	UNITS	FFL-3	FFL-5	FFL-7	FFL-8	FFL-9	FFL-9D	RDL	QC Batch
Physical Properties									
Moisture	%	22	51	52	38	63	31	0.30	A351024
RDL = Reportable Detection Limit									

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	17.3°C
Package 2	18.0°C
Package 3	18.7°C
Package 4	17.3°C

Sampling date/time not indicated on the Chain of Custody.

Version 3: Sample dates were added on all sample ID's as per client request received 2021/09/30.

Results relate only to the items tested.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160235
Report Date: 2021/10/05

QUALITY ASSURANCE REPORT

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A334048	Total Mercury (Hg)	2021/08/27	115	75 - 125	108	75 - 125	<0.0050	mg/kg	NC	35	95	70 - 130
A351024	Moisture	2021/09/15					<0.30	%	1.6	20		
A358652	Total (Dry Wt) Aluminum (Al)	2021/09/25	NC	80 - 120	105	80 - 120	<1.0	mg/kg	16	40	37	17 - 93
A358652	Total (Dry Wt) Antimony (Sb)	2021/09/25	86	80 - 120	95	80 - 120	<0.0050	mg/kg	4.1	40		
A358652	Total (Dry Wt) Arsenic (As)	2021/09/25	86	80 - 120	97	80 - 120	<0.020	mg/kg	7.2	40	48	42 - 199
A358652	Total (Dry Wt) Barium (Ba)	2021/09/25	94	80 - 120	95	80 - 120	<0.050	mg/kg	6.0	40		
A358652	Total (Dry Wt) Beryllium (Be)	2021/09/25	96	80 - 120	104	80 - 120	<0.010	mg/kg	17	40		
A358652	Total (Dry Wt) Bismuth (Bi)	2021/09/25	85	80 - 120	98	80 - 120	<0.010	mg/kg	NC	40		
A358652	Total (Dry Wt) Boron (B)	2021/09/25	96	80 - 120	104	80 - 120	<1.0	mg/kg	1.5	40	108	75 - 125
A358652	Total (Dry Wt) Cadmium (Cd)	2021/09/25	85	80 - 120	95	80 - 120	<0.0050	mg/kg	2.7	40	92	75 - 125
A358652	Total (Dry Wt) Calcium (Ca)	2021/09/25	103	80 - 120	99	80 - 120	<10	mg/kg	2.3	60	90	75 - 125
A358652	Total (Dry Wt) Cesium (Cs)	2021/09/25	83	80 - 120	93	80 - 120	<0.010	mg/kg	4.7	40		
A358652	Total (Dry Wt) Chromium (Cr)	2021/09/25	91	80 - 120	93	80 - 120	<0.10	mg/kg	21	40		
A358652	Total (Dry Wt) Cobalt (Co)	2021/09/25	85	80 - 120	94	80 - 120	<0.020	mg/kg	9.3	40	81	75 - 125
A358652	Total (Dry Wt) Copper (Cu)	2021/09/25	87	80 - 120	94	80 - 120	<0.050	mg/kg	11	40	87	75 - 125
A358652	Total (Dry Wt) Iron (Fe)	2021/09/25	80	80 - 120	99	80 - 120	<5.0	mg/kg	9.4	40		
A358652	Total (Dry Wt) Lead (Pb)	2021/09/25	88	80 - 120	99	80 - 120	<0.010	mg/kg	4.1	40		
A358652	Total (Dry Wt) Lithium (Li)	2021/09/25	100	80 - 120	111	80 - 120	<0.50	mg/kg	NC	40		
A358652	Total (Dry Wt) Magnesium (Mg)	2021/09/25	103	80 - 120	104	80 - 120	<5.0	mg/kg	11	40		
A358652	Total (Dry Wt) Manganese (Mn)	2021/09/25	NC	80 - 120	95	80 - 120	<0.050	mg/kg	11	40	91	75 - 125
A358652	Total (Dry Wt) Molybdenum (Mo)	2021/09/25	88	80 - 120	98	80 - 120	<0.020	mg/kg	9.9	40		
A358652	Total (Dry Wt) Nickel (Ni)	2021/09/25	86	80 - 120	95	80 - 120	<0.050	mg/kg	11	40	78	75 - 125
A358652	Total (Dry Wt) Phosphorus (P)	2021/09/25	93	80 - 120	99	80 - 120	<10	mg/kg	7.6	40	100	75 - 125
A358652	Total (Dry Wt) Potassium (K)	2021/09/25	103	80 - 120	99	80 - 120	<10	mg/kg	6.2	40	91	75 - 125
A358652	Total (Dry Wt) Selenium (Se)	2021/09/25	92	80 - 120	101	80 - 120	<0.050	mg/kg	NC	40	96	75 - 125
A358652	Total (Dry Wt) Silver (Ag)	2021/09/25	84	80 - 120	94	80 - 120	<0.0050	mg/kg	7.7	40		
A358652	Total (Dry Wt) Sodium (Na)	2021/09/25	106	80 - 120	104	80 - 120	<10	mg/kg	9.0	40	95	75 - 125
A358652	Total (Dry Wt) Strontium (Sr)	2021/09/25	101	80 - 120	95	80 - 120	<0.050	mg/kg	10	60	98	75 - 125
A358652	Total (Dry Wt) Tellurium (Te)	2021/09/25	106	80 - 120	111	80 - 120	<0.020	mg/kg	NC	40		
A358652	Total (Dry Wt) Thallium (Tl)	2021/09/25	88	80 - 120	99	80 - 120	<0.0020	mg/kg	12	40		
A358652	Total (Dry Wt) Thorium (Th)	2021/09/25	83	80 - 120	80	80 - 120	<0.050	mg/kg	11	40		

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A358652	Total (Dry Wt) Tin (Sn)	2021/09/25	83	80 - 120	103	80 - 120	<0.10	mg/kg	NC	40		
A358652	Total (Dry Wt) Titanium (Ti)	2021/09/25	107	80 - 120	101	80 - 120	<0.50	mg/kg	10	40		
A358652	Total (Dry Wt) Uranium (U)	2021/09/25	92	80 - 120	103	80 - 120	<0.0020	mg/kg	5.3	40		
A358652	Total (Dry Wt) Vanadium (V)	2021/09/25	89	80 - 120	95	80 - 120	<0.20	mg/kg	18	40		
A358652	Total (Dry Wt) Zinc (Zn)	2021/09/25	106	80 - 120	95	80 - 120	<0.20	mg/kg	8.2	40	87	75 - 125
A358652	Total (Dry Wt) Zirconium (Zr)	2021/09/25	NC	80 - 120	82	80 - 120	<0.20	mg/kg	NC	40		
A363646	Total (Dry Wt) Mercury (Hg)	2021/09/29	90	80 - 120	83	80 - 120	<0.010	mg/kg	4.9	20	83	75 - 125

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

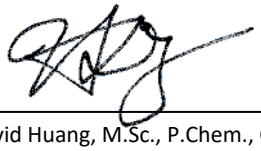
Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C160235
Report Date: 2021/10/05

GOLDER ASSOCIATES LTD
Client Project #: 21452119-2000
Site Location: DIAVIK MINE
Your P.O. #: 3104474131
Sampler Initials: .

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

681

BUREAU VERITAS

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Page 1 of 2

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company :	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID		Temp			
Seal Present								
Seal Intact								
Cooling Media								

	YES	NO	Cooler ID		Temp			
Seal Present								
Seal Intact								
Cooling Media								

	YES	NO	Cooler ID		Temp			
Seal Present								
Seal Intact								
Cooling Media								

Depot Reception

Received in Yellowknife
By: J. McNeil
@ 11:22
AUG 16 2021
see ACTL
Temp: / /

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	BTEXS / VPH	VOC / BTEXS / VPH	BTEX F1	VOC / BTEX / F1	PAH	LEPH / HEPH / PAH	EPH	F2 - F4	Dissolved Metals	Preserved?	Dissolved Mercury	Preserved?	Total Metals	Field Preserved?	Total Mercury	Field Preserved?	Chloride	Fluoride	TSS	Sulphate	pH	COD	BOD	Alkalinity	Conductivity	Nitrite	Ammonia	Nitrate	Total Metals by ICP-MS	Hg by CVAFS	Moisture	HOLD - DO NOT ANALYZE
1 FFS-13			Soil			MTBE																											✓		
2 -14			↓																														✓		
3 -15																																	✓		
4 -17																																	✓		
5 -19																																	✓		
6 -20																																	✓		
7 -21																																	✓		
8 NFL-21			lichen																													✓	✓	✓	
9 21d			↓																													✓	✓	✓	
10 22																																✓	✓	✓	

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

16-Aug-21 11:20
Rhecie Phayouphone
C160235
NMU INS-0026

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at https://www.bvna.com/coc-terms-and-conditions

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #
	2021/08/16	11:30		2021/08/17	15:10	

COC-1020

BBY FCD-00077/9

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Page 2 of 2

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company :	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID	See		
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Received in Yellowknife
By: J. McLeod
@ 11:30
AUG 16 2021
See ACTR
Temp: /

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ BTEXS / VPH	☐ VOC / BTEXS / VPH	☐ MTBE	☐ BTEX F1	☐ VOC / BTEX / F1	☐ PAH	☐ LEPH / HEPH / PAH	☐ EPH	☐ F2 - F4	☐ TEH	☐ Dissolved Metals	☐ Preserved?	☐ Filtered?	☐ Dissolved Mercury	☐ Preserved?	☐ Filtered?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Field Preserved?	☐ Chloride	☐ Fluoride	☐ TSS	☐ BOD	☐ pH	☐ Conductivity	☐ Nitrite	☐ Alkalinity	☐ Nitrate	☐ Ammonia	Total Metals by ICP-MS	Hg by CVAFS	Moisture	HOLD - DO NOT ANALYZE
1 NFL-22 d			lichen																															✓	✓	✓	
2 -23																																					
3 FFL-1																																					
4 -2																																					
5 -3																																					
6 -5																																					
7 -7																																					
8 -8																																					
9 -9																																					
10 -9d			↓																																		

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at https://www.bvna.com/coc-terms-and-conditions

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #
	2021/08/16	11:30	Isabel Ko Choi	2021/08/17	15:10	C161235

COC-1020

BBY FCD-00077/9

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Page 1 of 4

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company:	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation:		☑ 5 - 7 Days Regular (Most analyses)
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:

Laboratory Use Only							Depot Reception
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							

Analysis Requested

Regulatory Criteria: ☐ BC CSR ☐ YK CSR ☐ CCME ☐ Drinking Water ☐ BC Water Quality ☐ Other

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ VOC / BTEXS / VPH	☐ BTEXS / VPH	☐ VOC / BTEX / F1	☐ BTEX F1	☐ LEPH / HEPH / PAH	☐ PAH	☐ F2 - F4	☐ EPH	☐ Preserved?	☐ Filtered?	☐ Preserved?	☐ Filtered?	☐ Field Preserved?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Sulphate	☐ Fluoride	☐ COD	☐ TDS	☐ Alkalinity	☐ Conductivity	☐ Ammonia	☐ Nitrate	☐ Nitrite	Total Metals by ICP-MS	Hg by CVAFS	Moisture				HOLD - DO NOT ANALYZE	Special Instructions
1	NFS-1			Soil																											✓					**Do not rinse lichen**
2	NFS-2			↓																											✓					
3	-3																														✓					
4	-4																														✓					
5	-5																														✓					
6	-6																														✓					
7	-7																														✓					
8	-8																														✓					
9	-9																														✓					
10	-10			↓																											✓					

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #
[signature]	2021/03/16	11:30				

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information (if differs from Invoice)		Project Information		Turnaround Time (TAT) Required	
Company :	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only							Depot Reception
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							

Analysis Requested

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ VOC / BTEXS / VPH	☐ VOC / BTEX / F1	☐ LEPH / HEPH / PAH	☐ F2 - F4	☐ Preserved?	☐ Preserved?	☐ Field Preserved?	☐ Field Preserved?	☐ Sulphate	☐ COD	☐ Alkalinity	☐ Ammonia	Hg by CVAFS	Moisture	HOLD - DO NOT ANALYZE	Special Instructions
					☐ VPH	☐ BTEX F1	☐ PAH	☐ EPH	☐ Filtered?	☐ Filtered?	☐ Field Preserved	☐ Total Metals	☐ Chloride	☐ TSS	☐ pH	☐ Nitrite	Total Metals by ICP-MS				
1 NFS-11			Soil											☐ BOD	☐ Conductivity	☐ Nitrate				**Do not rinse lichen**
2 -12			↓											☐ TDS						
3 -13																				
4 -14																				
5 -15																				
6 -16																				
7 -17																				
8 -18																				
9 -19																				
10 -20			↓																	

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)
Contact Name	Mark Nelson, Nicole Goodman	Contact Name	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address		Address	1721 8th Street East			Rush TAT (Surcharges will be applied)
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days
Phone/Fax		Phone/Fax	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days
Email	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:
Copies	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:

Laboratory Use Only							Depot Reception
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ VOC / BTEXS / VPH	☐ BTEXS / VPH	☐ VOC / BTEX / F1	☐ BTEX F1	☐ LEPH / HEPH / PAH	☐ PAH	☐ F2 - F4	☐ TEH	☐ EPH	☐ Preserved?	☐ Filtered?	☐ Dissolved Metals	☐ Preserved?	☐ Filtered?	☐ Dissolved Mercury	☐ Field Preserved?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Sulphate	☐ Fluoride	☐ Chloride	☐ COD	☐ BOD	☐ TDS	☐ TSS	☐ Alkalinity	☐ Conductivity	☐ pH	☐ Ammonia	☐ Nitrate	☐ Nitrite	Total Metals by ICP-MS	Hg by CVAFS	Moisture				HOLD - DO NOT ANALYZE
1	NFS-21			Soil																																		✓						
2	-22			Soil																																		✓						
3	-23			Soil																																		✓						
4	NFL-1			Lichen																																	✓	✓	✓						
5	-2			↓																																	✓	✓	✓						
6	-3																																				✓	✓	✓						
7	-4																																				✓	✓	✓						
8	-5																																				✓	✓	✓						
9	-6																																				✓	✓	✓						
10	-7																																				✓	✓	✓						

Regulatory Criteria	Special Instructions
☐ BC CSR	**Do not rinse lichen**
☐ YK CSR	
☐ CCME	
☐ Drinking Water	
☐ BC Water Quality	
☐ Other	

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company:	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only							Depot Reception
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							

Analysis Requested

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ VOC / BTEXS / VPH	☐ BTEXS / VPH	☐ VOC / BTEX / F1	☐ BTEX F1	☐ LEPH / HEPH / PAH	☐ PAH	☐ F2 - F4	☐ EPH	☐ MTBE	☐ TEH	☐ Preserved?	☐ Filtered?	☐ Preserved?	☐ Filtered?	☐ Field Preserved?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Sulphate	☐ Fluoride	☐ COD	☐ BOD	☐ TDS	☐ Alkalinity	☐ Conductivity	☐ pH	☐ Ammonia	☐ Nitrate	☐ Nitrite	Total Metals by ICP-MS	Hg by CVAFS	Moisture			HOLD - DO NOT ANALYZE	Special Instructions
1 NFL-8			lichen																														✓	✓	✓				**Do not rinse lichen**
2 -9			↓																														✓	✓	✓				
3 -10																																	✓	✓	✓				
4																																							
5																																							
6																																							
7																																							
8																																							
9																																							
10																																							

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #

2

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Page 1 of 3

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company:	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation:		☑ 5 - 7 Days Regular (Most analyses)
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:

Laboratory Use Only							Depot Reception
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ VOC / BTEXS / VPH	☐ BTEXS / VPH	☐ MTBE	☐ VOC / BTEX / F1	☐ BTEX F1	☐ VOC / BTEX / HEPH / PAH	☐ PAH	☐ F2 - F4	☐ TEH	☐ EPH	☐ Preserved?	☐ Filtered?	☐ Dissolved Metals	☐ Preserved?	☐ Filtered?	☐ Dissolved Mercury	☐ Field Preserved?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Sulphate	☐ Fluoride	☐ Chloride	☐ COD	☐ TDS	☐ TSS	☐ Alkalinity	☐ Conductivity	☐ pH	☐ Ammonia	☐ Nitrate	☐ Nitrite	Total Metals by ICP-MS	Hg by CVAFS	Moisture				HOLD - DO NOT ANALYZE
1 FFS-1			SOIL																																			✓					
2 -2																																						✓					
3 -3																																						✓					
4 -5																																						✓					
5 -7																																						✓					
6 -8																																						✓					
7 -9																																						✓					
8 -10																																						✓					
9 -11																																						✓					
10 -12																																						✓					

Regulatory Criteria	Special Instructions
☐ BC CSR	**Do not rinse lichen**
☐ YK CSR	
☐ CCME	
☐ Drinking Water	
☐ BC Water Quality	
☐ Other	

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required
Company:	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:

Laboratory Use Only							Depot Reception
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ VOC / BTEXS / VPH	☐ BTEXS / VPH	☐ VOC / BTEX / F1	☐ BTEX F1	☐ LEPH / HEPH / PAH	☐ PAH	☐ F2 - F4	☐ TEH	☐ EPH	☐ Preserved?	☐ Filtered?	☐ Dissolved Metals	☐ Preserved?	☐ Filtered?	☐ Dissolved Mercury	☐ Field Preserved?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Sulphate	☐ Fluoride	☐ Chloride	☐ COD	☐ BOD	☐ TDS	☐ TSS	☐ Alkalinity	☐ Conductivity	☐ pH	☐ Ammonia	☐ Nitrate	☐ Nitrite	Total Metals by ICP MS	Hg by CVAFS	Moisture			HOLD - DO NOT ANALYZE
1	NFL-11			lichen																																	✓	✓	✓				
2	-12																																				✓	✓	✓				
3	-13																																				✓	✓	✓				
4	-14																																				✓	✓	✓				
5	-15																																				✓	✓	✓				
6	-16																																				✓	✓	✓				
7	-17																																				✓	✓	✓				
8	-18																																				✓	✓	✓				
9	-19																																				✓	✓	✓				
10	-20																																				✓	✓	✓				

Regulatory Criteria	Special Instructions
☐ BC CSR	**Do not rinse lichen**
☐ YK CSR	
☐ CCME	
☐ Drinking Water	
☐ BC Water Quality	
☐ Other	

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company:	Diavik Diamond Mines (2012) Inc	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present			Temp			
Seal Intact						
Cooling Media						
	YES	NO	Cooler ID			
Seal Present			Temp			
Seal Intact						
Cooling Media						
	YES	NO	Cooler ID			
Seal Present			Temp			
Seal Intact						
Cooling Media						

Depot Reception

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ BTEXS / VPH	☐ VOC / BTEXS / VPH	☐ MTBE	☐ VOC / BTEX / F1	☐ BTEX F1	☐ LEPH / HEPH / PAH	☐ PAH	☐ F2 - F4	☐ TEH	☐ EPH	☐ Preserved?	☐ Filtered?	☐ Dissolved Metals	☐ Preserved?	☐ Filtered?	☐ Dissolved Mercury	☐ Field Preserved?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Sulphate	☐ Fluoride	☐ Chloride	☐ COD	☐ BOD	☐ TDS	☐ TSS	☐ Alkalinity	☐ Conductivity	☐ pH	☐ Ammonia	☐ Nitrate	☐ Nitrite	Total Metals by ICP-MS	Hg by CVAFS	Moisture				HOLD - DO NOT ANALYZE
1 FFL-25			lichen																																		✓	✓	✓						
2 FFL-1																																					✓	✓	✓						
3 -3																																					✓	✓	✓						
4 -2d																																					✓	✓	✓						
5 -3																																					✓	✓	✓						
6																																													
7																																													
8																																													
9																																													
10																																													

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company:	Diavik Diamond Mines (2012) Inc	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only							Depot Reception
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							
	YES	NO	Cooler ID				
Seal Present			Temp				
Seal Intact							
Cooling Media							

	Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ VOC / BTEXS / VPH	☐ BTEX F1	☐ PAH	☐ MTBE	☐ VOC / BTEX / F1	☐ EPH / HEPH / PAH	☐ F2 - F4	☐ TEH	☐ EPH	☐ Preserved?	☐ Filtered?	☐ Dissolved Metals	☐ Preserved?	☐ Filtered?	☐ Dissolved Mercury	☐ Field Preserved?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Sulphate	☐ Fluoride	☐ Chloride	☐ COD	☐ BOD	☐ TDS	☐ TSS	☐ Alkalinity	☐ Conductivity	☐ pH	☐ Ammonia	☐ Nitrate	☐ Nitrite	Total Metals by ICP-MS	Hg by CVAFS	Moisture				HOLD - DO NOT ANALYZE
1	FFS-9d			Soil																																			✓						**Do not rinse lichen**
2	-21d																																					✓						
3	-22																																					✓						
4	-23																																					✓						
5	-24																																					✓						
6	-25																																					✓						
7	FFFS-1			Liquid																																			✓						
8	-2																																					✓						
9	-22d																																					✓						
10	-3																																					✓						

Regulatory Criteria: ☐ BC CSR ☐ YK CSR ☐ CCME ☐ Drinking Water ☐ BC Water Quality ☐ Other

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Page 2 of 3

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company:	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present			Temp			
Seal Intact						
Cooling Media						
	YES	NO	Cooler ID			
Seal Present			Temp			
Seal Intact						
Cooling Media						
	YES	NO	Cooler ID			
Seal Present			Temp			
Seal Intact						
Cooling Media						

Depot Reception

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ VOC / BTEXS / VPH	☐ BTEXS / VPH	☐ MTBE	☐ VOC / BTEX / F1	☐ BTEX F1	☐ LEPH / HEPH / PAH	☐ PAH	☐ F2 - F4	☐ TEH	☐ EPH	☐ Preserved?	☐ Filtered?	☐ Dissolved Metals	☐ Preserved?	☐ Filtered?	☐ Dissolved Mercury	☐ Field Preserved?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Sulphate	☐ Fluoride	☐ Chloride	☐ COD	☐ BOD	☐ TDS	☐ TSS	☐ Alkalinity	☐ Conductivity	☐ pH	☐ Ammonia	☐ Nitrate	☐ Nitrite	Total Metals by ICP-MS	Hg by CVAFS	Moisture			HOLD - DO NOT ANALYZE
1 FFL-10			Lichen																																			✓	✓	✓			
2 -11																																					✓	✓	✓			
3 -12																																					✓	✓	✓			
4 -13																																					✓	✓	✓			
5 -14																																					✓	✓	✓			
6 -15																																					✓	✓	✓			
7 -17																																					✓	✓	✓			
8 -19																																					✓	✓	✓			
9 -20																																					✓	✓	✓			
10 -21																																					✓	✓	✓			

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria. 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information (if differs from Invoice)		Project Information		Turnaround Time (TAT) Required	
Company :	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119 2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ VOC / BTEXS / VPH	☐ BTEXS / VPH	☐ VOC / BTEX / F1	☐ BTEX F1	☐ LEPH / HEPH / PAH	☐ PAH	☐ F2 - F4	☐ TEH	☐ EPH	☐ Preserved?	☐ Filtered?	☐ Dissolved Metals	☐ Preserved?	☐ Filtered?	☐ Dissolved Mercury	☐ Field Preserved?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Sulphate	☐ Fluoride	☐ Chloride	☐ COD	☐ BOD	☐ TDS	☐ TSS	☐ Alkalinity	☐ Conductivity	☐ pH	☐ Ammonia	☐ Nitrate	☐ Nitrite	Total Metals by ICP-MS	Hg by CVAFS	Moisture				HOLD - DO NOT ANALYZE
1 FFL-21d			lichen																																		✓	✓	✓					
2 -22			↓																																		✓	✓	✓					
3 -23																																					✓	✓	✓					
4 -24																																												
5																																												
6																																												
7																																												
8																																												
9																																												
10																																												

Regulatory Criteria

- ☐ BC CSR
- ☐ YK CSR
- ☐ CCME
- ☐ Drinking Water
- ☐ BC Water Quality
- ☐ Other

Special Instructions

Do not rinse lichen

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #

4

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria: 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Page 1 of 2

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company	Diavik Diamond Mines (2012) Inc.	Company	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name	Mark Nelson, Nicole Goodman	Contact Name	Kerrie Serben	P.O. #/AFE#		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address		Address	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #	21452119-2000	☐ Same Day ☐ 2 Days	
Phone/Fax		Phone/Fax	306 667 1531	Site Location	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email	mark.nelson2@riotinto.com	Email	kserben@golder.com	Site #		Date Required:	
Copies	nicole.goodman@riotinto.com	Copies	cshapka@golder.com	Sampled By		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ VOC / BTEXS / VPH	☐ BTEXS / VPH	☐ MTBE	☐ VOC / BTEX / F1	☐ BTEX F1	☐ LEPH / HEPH / PAH	☐ PAH	☐ F2 - F4	☐ EPH	☐ Preserved?	☐ Filtered?	☐ Dissolved Metals	☐ Preserved?	☐ Filtered?	☐ Dissolved Mercury	☐ Field Preserved?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Sulphate	☐ Fluoride	☐ Chloride	☐ COD	☐ BOD	☐ TDS	☐ TSS	☐ Alkalinity	☐ Conductivity	☐ pH	☐ Ammonia	☐ Nitrate	☐ Nitrite	Total Metals by ICP-MS	Hg by CVAFS	Moisture				HOLD - DO NOT ANALYZE
1 FFS-13			Soil																																			✓						
2 -14			↓																																			✓						
3 -15																																						✓						
4 -17																																						✓						
5 -19																																						✓						
6 -20																																						✓						
7 -21			↓																																			✓						
8 NFL-21			Lichen																																		✓	✓	✓						
9 21d			↓																																		✓	✓	✓						
10 22																																					✓	✓	✓						

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #

Burnaby 4606 Canada Way, Burnaby, BC V5G 1K5 Toll Free (800) 665 8566
Victoria 460 Tennyson Place, Unit 1, Victoria, BC V8Z 6S8 Toll Free (866) 385-6112
bvna.com

CHAIN OF CUSTODY RECORD

Invoice Information		Report Information (if differs from invoice)		Project Information		Turnaround Time (TAT) Required	
Company:	Diavik Diamond Mines (2012) Inc.	Company:	Golder Associates Ltd.	Quotation		☑ 5 - 7 Days Regular (Most analyses)	
Contact Name:	Mark Nelson, Nicole Goodman	Contact Name:	Kerrie Serben	P.O. #/AFE#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address:		Address:	1721 8th Street East			Rush TAT (Surcharges will be applied)	
	PC:		Saskatoon, SK PC:	Project #:	21452119 2000	☐ Same Day ☐ 2 Days	
Phone/Fax:		Phone/Fax:	306 667 1531	Site Location:	Diavik Mine	☐ 1 Day ☐ 3-4 Days	
Email:	mark.nelson2@riotinto.com	Email:	kserben@golder.com	Site #:		Date Required:	
Copies:	nicole.goodman@riotinto.com	Copies:	cshapka@golder.com	Sampled By:		Rush Confirmation #:	

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Analysis Requested

Sample Identification	Date Sampled (yyyy/mm/dd)	Time Sampled (hh:mm)	Matrix	# of Containers	☐ BTEXS / VPH	☐ VOC / BTEXS / VPH	☐ BTEX F1	☐ VOC / BTEX / F1	☐ PAH	☐ LEPH / HEPH / PAH	☐ EPH	☐ TEH	☐ F2 - F4	☐ Dissolved Metals	☐ Filtered?	☐ Preserved?	☐ Dissolved Mercury	☐ Filtered?	☐ Preserved?	☐ Total Metals	☐ Field Preserved?	☐ Total Mercury	☐ Field Preserved?	☐ Chloride	☐ Fluoride	☐ Sulphate	☐ TSS	☐ TDS	☐ COD	☐ BOD	☐ pH	☐ Conductivity	☐ Alkalinity	☐ Nitrite	☐ Nitrate	☐ Ammonia	Total Metals by ICP-MS	Hg by CVAFS	Moisture	HOLD - DO NOT ANALYZE
1 NFL-22d			lichen																																✓	✓	✓		
2 -22																																							
3 FFL-1																																							
4 -2																																							
5 -3																																							
6 -5																																							
7 -7																																							
8 -8																																							
9 -9																																							
10 -9d																																							

Regulatory Criteria

☐ BC CSR
☐ YK CSR
☐ CCME
☐ Drinking Water
☐ BC Water Quality
☐ Other

Special Instructions

Do not rinse lichen

Relinquished by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	Received by: (Signature/ Print)	Date (yyyy/mm/dd):	Time (hh:mm):	BV Job #

APPENDIX H

Statistical Analyses for Lichen Chemistry

Table H-1: Summary Statistics of Metals Concentrations in Lichen, August 2021

Parameter	Units	Near-Field									Far-Field									Far-Far-Field								
		n	# of ND	Detection Frequency (%)	Mean	Median	SD	SE	Min	Max	n	# of ND	Detection Frequency (%)	Mean	Median	SD	SE	Min	Max	n	# of ND	Detection Frequency (%)	Mean	Median	SD	SE	Min	Max
Total Aluminum (Al)	mg/kg dw	20	0	100%	785	596	490	110	246	785	24	0	100%	139	129	43	9	74	231	3	0	100%	136	116	54	31	95	197
Total Arsenic (As)	mg/kg dw	20	0	100%	0.316	0.248	0.214	0.048	0.077	0.316	24	0	100%	0.186	0.145	0.122	9.478	0.061	0.528	3	0	100%	0.167	0.085	0.147	0.085	0.079	0.336
Total Barium (Ba)	mg/kg dw	20	0	100%	29.5	26.9	14.9	3.3	12.1	29.5	24	0	100%	12.8	10.5	5.7	9.5	6.6	33.4	3	0	100%	18.1	18.4	3.0	1.7	14.9	20.9
Total Cadmium (Cd)	mg/kg dw	20	0	100%	0.0398	0.0359	0.0145	0.0032	0.0184	0.0398	24	0	100%	0.0341	0.0333	0.0081	9.4776	0.0190	0.0490	3	0	100%	0.0283	0.0294	0.0095	0.0055	0.0183	0.0371
Total Chromium (Cr)	mg/kg dw	20	0	100%	5.51	3.93	4.29	0.96	0.95	5.51	24	0	100%	0.30	0.27	0.11	9.48	0.17	0.63	3	0	100%	0.38	0.47	0.17	0.10	0.18	0.48
Total Cobalt (Co)	mg/kg dw	20	0	100%	0.81	0.63	0.45	0.10	0.17	0.81	24	0	100%	0.27	0.24	0.14	9.48	0.08	0.55	3	0	100%	0.33	0.26	0.21	0.12	0.16	0.57
Total Copper (Cu)	mg/kg dw	20	0	100%	2.70	2.49	0.96	0.22	1.36	2.70	24	0	100%	1.81	1.78	0.68	9.48	0.69	3.33	3	0	100%	2.29	2.24	0.51	0.30	1.81	2.83
Total Lead (Pb)	mg/kg dw	20	0	100%	0.530	0.401	0.332	0.074	0.117	0.530	24	0	100%	0.120	0.104	0.067	9.478	0.058	0.377	3	0	100%	0.754	0.157	1.106	0.638	0.076	2.030
Total Manganese (Mn)	mg/kg dw	20	0	100%	43.6	44.8	18.1	4.1	17.7	43.6	24	0	100%	37.7	32.2	24.0	9.5	12.3	95.1	3	0	100%	39.5	29.5	18.7	10.8	27.9	61.0
Total Mercury (Hg)	mg/kg dw	20	0	100%	0.0284	0.0269	0.0071	0.0016	0.0220	0.0284	24	0	100%	0.0240	0.0221	0.0076	9.4776	0.0143	0.0469	3	0	100%	0.0256	0.0247	0.0029	0.0017	0.0233	0.0288
Total Molybdenum (Mo)	mg/kg dw	20	0	100%	0.749	0.532	0.662	0.148	0.184	0.749	24	0	100%	0.095	0.082	0.053	9.478	0.035	0.224	3	0	100%	0.107	0.078	0.083	0.048	0.042	0.200
Total Nickel (Ni)	mg/kg dw	20	0	100%	7.28	4.96	4.90	1.10	1.61	7.28	24	0	100%	1.19	0.98	0.62	9.48	0.43	3.15	3	0	100%	1.20	1.25	0.23	0.13	0.95	1.41
Total Strontium (Sr)	mg/kg dw	20	0	100%	13.08	11.55	8.38	1.87	3.44	13.08	24	0	100%	4.72	4.39	1.63	9.48	2.18	8.16	3	0	100%	5.01	5.55	1.54	0.89	3.27	6.20
Total Thallium (Tl)	mg/kg dw	20	0	100%	0.0290	0.0223	0.0172	0.0038	0.0119	0.0290	24	0	100%	0.0075	0.0072	0.0024	9.4776	0.0042	0.0141	3	0	100%	0.0061	0.0040	0.0036	0.0021	0.0040	0.0102
Total Titanium (Ti)	mg/kg dw	20	0	100%	75.5	54.7	50.4	11.3	18.0	75.5	24	0	100%	5.9	5.0	2.3	9.5	3.2	12.5	3	0	100%	5.9	5.2	2.4	1.4	3.9	8.6
Total Uranium (U)	mg/kg dw	20	0	100%	0.497	0.414	0.316	0.071	0.086	0.497	24	0	100%	0.045	0.034	0.029	9.478	0.014	0.124	3	0	100%	0.068	0.095	0.049	0.028	0.011	0.096
Total Vanadium (V)	mg/kg dw	20	0	100%	2.03	1.44	1.44	0.32	0.49	2.03	24	12	50%	0.22	0.21	0.14	9.48	0.10	0.48	3	2	33%	0.73	0.10	1.09	0.63	0.10	1.99
Total Zinc (Zn)	mg/kg dw	20	0	100%	23.4	22.2	8.8	2.0	12.6	23.4	24	0	100%	22.3	21.4	6.0	9.5	13.7	37.1	3	0	100%	23.7	25.5	5.1	2.9	18.0	27.7

Notes
mg/kg dw = milligrams per kilogram dry weight; n = number; ND = non-detect (values below reporting detection limit); SD = standard deviation; SE = standard error; min = minimum; max = maximum

Table H-2: Statistical Comparisons of Metal Concentrations in Lichen

Parameter	2021 Near-Field vs. Far Field Comparison				2010, 2013, 2016, & 2021 Comparisons			Post-hoc Tests (adj. p-values)				Mean Concentration (mg/kg dw)			
	Transform.?	Test	p-value	Difference	Transform.?	Test	p-value	Test	2021-2010	2021-2013	2021-2016	2010	2013	2016	2021
Total Aluminum (Al)	*none*	KW	<0.001	NF > FF	none	KW	<0.001	Dunn	<0.001	0.003	0.201	1930	1260	857	705
Total Arsenic (As)	log_{10}	ANOVA	0.008	NF > FF	*none*	KW	<0.001	Dunn	<0.001	0.110	0.282	0.543	0.412	0.342	0.292
Total Barium (Ba)	log_{10}	ANOVA	<0.001	NF > FF	log_{10}	ANOVA	<0.001	Tukey HSD	<0.001	0.001	0.901	54.8	48.6	29.6	27.1
Total Cadmium (Cd)	*none*	ANOVA	0.204	none	log_{10}	ANOVA	<0.001	Tukey HSD	<0.001	<0.001	<0.001	0.0967	0.0937	0.0663	0.0389
Total Chromium (Cr)	*none*	KW	<0.001	NF > FF	log_{10}	ANOVA	<0.001	Tukey HSD	<0.001	0.121	0.010	38.42	6.78	7.17	4.85
Total Cobalt (Co)	log_{10}	ANOVA	<0.001	NF > FF	log_{10}	ANOVA	<0.001	Tukey HSD	<0.001	0.006	0.059	1.89	1.17	0.93	0.73
Total Copper (Cu)	*none*	ANOVA	0.001	NF > FF	log_{10}	ANOVA	<0.001	Tukey HSD	<0.001	<0.001	0.059	6.26	4.58	3.27	2.59
Total Lead (Pb)	log_{10}	ANOVA	<0.001	NF > FF	log_{10}	ANOVA	<0.001	Tukey HSD	<0.001	<0.001	<0.001	2.915	1.951	1.234	0.476
Total Manganese (Mn)	log_{10}	ANOVA	0.135	none	log_{10}	ANOVA	<0.001	Tukey HSD	<0.001	<0.001	0.006	131.9	107.9	58.3	41.4
Total Mercury (Hg)	log_{10}	ANOVA	0.022	NF > FF	log_{10}	ANOVA	<0.001	Tukey HSD	<0.001	<0.001	<0.001	0.0595	0.0757	0.0424	0.0278
Total Molybdenum (Mo)	log_{10}	ANOVA	<0.001	NF > FF	log_{10}	ANOVA	0.029	Tukey HSD	0.177	0.999	0.845	0.946	0.622	0.514	0.665
Total Nickel (Ni)	log_{10}	ANOVA	<0.001	NF > FF	log_{10}	ANOVA	<0.001	Tukey HSD	<0.001	0.015	0.230	26.80	12.20	8.79	6.48
Total Strontium (Sr)	*none*	KW	<0.001	NF > FF	*none*	KW	0.232	*none*	-	-	-	15.11	14.04	10.39	11.92
Total Thallium (Tl)	log_{10}	ANOVA	<0.001	NF > FF	log_{10}	ANOVA	<0.001	Tukey HSD	<0.001	<0.001	0.022	0.0739	0.0457	0.0342	0.0263
Total Titanium (Ti)	*none*	KW	<0.001	NF > FF	*none*	KW	<0.001	Dunn	<0.001	-	0.997	131.6	-	60.1	66.8
Total Uranium (U)	log_{10}	ANOVA	<0.001	NF > FF	log_{10}	ANOVA	<0.001	Tukey HSD	<0.001	<0.001	0.002	2.420	1.343	0.889	0.438
Total Vanadium (V)	*none*	KW	<0.001	NF > FF	log_{10}	ANOVA	<0.001	Tukey HSD	<0.001	0.098	0.994	3.85	2.49	1.57	1.80
Total Zinc (Zn)	log_{10}	ANOVA	0.854	none	*none*	KW	0.002	Dunn	<0.001	0.088	0.192	3.8	2.2	1.1	0.8

Notes
KW = Kruskal-Wallis test; Tukey HSD = Tukey Honest Significant Difference; Dunn = Dunn's multiple comparisons; NF = near-field; FF = far-field; < = less than; > = greater than; adj. = adjusted; mg/kg dw = milligrams per kilogram dry weight

Table H-3: Power Model (ln y = a·ln[x] + b) Parameters Characterizing Relationships Between Metals Concentrations and Distance from the Mine

Parameter	Slope (a)			Intercept (b)			Model p-value	R^2
	value	SE	p-value	value	SE	p-value		
Total Aluminum (Al)	-0.553	0.052	<0.001	6.956	0.149	<0.001	<0.001	0.713
Total Arsenic (As)	-0.189	0.065	0.005	-1.177	0.185	<0.001	0.005	0.160
Total Barium (Ba)	-0.227	0.050	<0.001	3.405	0.142	<0.001	<0.001	0.317
Total Cadmium (Cd)	-0.049	0.032	0.135	-3.245	0.093	<0.001	0.135	0.049
Total Chromium (Cr)	-0.872	0.081	<0.001	2.095	0.232	<0.001	<0.001	0.719
Total Cobalt (Co)	-0.348	0.064	<0.001	-0.107	0.182	0.561	<0.001	0.398
Total Copper (Cu)	-0.133	0.040	0.002	1.046	0.116	<0.001	0.002	0.194
Total Lead (Pb)	-0.413	0.076	<0.001	-0.524	0.218	0.020	<0.001	0.395
Total Manganese (Mn)	-0.075	0.056	0.187	3.749	0.159	<0.001	0.187	0.038
Total Mercury (Hg)	-0.065	0.026	0.015	-3.522	0.074	<0.001	0.015	0.123
Total Molybdenum (Mo)	-0.627	0.078	<0.001	-0.088	0.222	0.693	<0.001	0.592
Total Nickel (Ni)	-0.533	0.072	<0.001	2.132	0.206	<0.001	<0.001	0.548
Total Strontium (Sr)	-0.266	0.059	<0.001	2.528	0.170	<0.001	<0.001	0.308
Total Thallium (Tl)	-0.458	0.045	<0.001	-3.276	0.128	<0.001	<0.001	0.699
Total Titanium (Ti)	-0.816	0.065	<0.001	4.789	0.185	<0.001	<0.001	0.780
Total Uranium (U)	-0.792	0.081	<0.001	-0.276	0.232	0.241	<0.001	0.679
Total Vanadium (V)	-0.707	0.088	<0.001	1.022	0.251	<0.001	<0.001	0.590
Total Zinc (Zn)	-0.011	0.032	0.728	3.112	0.093	<0.001	0.728	0.003

Notes
SE = standard error; R^2 = coefficient of determination; < = les than