

We are committed to providing [accessible customer service](#).

If you need accessible formats or communications supports, please [contact us](#).

Nous tenons à améliorer [l'accessibilité des services à la clientèle](#).

Si vous avez besoin de formats accessibles ou d'aide à la communication, veuillez [nous contacter](#).

# **Summary Report for 2018**

## **Fieldwork Program on the West Red Lake Property**

**Fairlie & Todd Townships, Red Lake Mining  
Division, Ontario  
52N/4**



Lydia Calhoun, M.Sc.  
John Fingas, P.Geo.,  
February 2020

## TABLE OF CONTENTS

SUMMARY .....	4
1.0 INTRODUCTION.....	4
2.0 LOCATION & ACCESS .....	5
3.0 CLAIMS & LAND STATUS .....	6
4.0 PREVIOUS WORK.....	10
5.0 GEOLOGIC SETTING.....	14
5.1 Regional Geology .....	14
5.1 Property Geology .....	16
6.0 MINERALIZATION .....	17
7.0 WEST RED LAKE 2018 WORK PROGRAM .....	18
7.1 Geologic Observations.....	19
7.2 Alteration and Mineralization.....	21
8.0 CONCLUSIONS & RECOMMENDATIONS .....	23
REFERENCES .....	24
STATEMENT OF QUALIFICATIONS .....	25

## **TABLES**

Table 1 – West Red Lake Property Claim Block.....	8
Table 2 – Previous Work on the West Red Lake Property .....	11
Table 3 – Summary of critical events for the Red Lake Greenstone Belt .....	15
Table 4 – Representative lithologies and their descriptions. ....	17
Table 5 – Significant Assays from the 2018 West Red Lake field program .....	22
Table 6 – Budget for Proposed Work Program at the West Red Lake Project.....	23

## **FIGURES**

Figure 1. West Red Lake Property location.....	6
Figure 2. West Red Lake Property land tenure.....	7
Figure 3. West Red Lake Property Geology.....	16
Figure 4. Photos from the 2018 West Red Lake field program. ....	20
Figure 5. West Red Lake structure with foliation and shear orientations.....	21

## **APPENDICES**

APPENDIX I:	Field Station Notes
APPENDIX II:	Sample Descriptions & Assays
APPENDIX III:	Assay Certificates
APPENDIX IV:	Geologic Mapping
APPENDIX V:	Cost Report

## **SUMMARY**

From August 23<sup>rd</sup> 2018 to October 20<sup>th</sup> 2018 (21 working days) Goldcorp completed a targeted geologic mapping and sampling program of the West Red Lake Property (E 424000 N 5657000, NAD 1983 Zone 15N). This work was performed under a joint venture agreement for both Goldcorp and West Red Lake Gold Mines. Historic exploration had focused on and identified multiple significant gold bearing quartz-carbonate vein systems. The purpose of the 2018 program was to:

1. Establish a property-scale litho-structural framework and determine character, style and controls on gold mineralization (e.g. potential for Red Lake-Campbell style mineralization?)
2. Evaluate potential for mineralization within a fold hinge that is potentially transposed along a WNW-trending high strain zone in the eastern portion of the property.
3. Assess overall exploration potential of property

Traverses, which were planned to target key historic outcrops and other points of interest, were covered by teams of 2 geologists to gather geologic data and samples. A total of 284 mapping stations were recorded and 76 samples taken consisting of 62 assay and 14 litho-geochemistry samples.

Mineralization throughout the West Red Lake property is characterized by discrete quartz veins hosted within or directly adjacent to relatively competent lithological units (e.g. porphyry body, felsic intrusive), typically located proximal to or at the intersection of significant structures. The interpreted transposed fold hinge in the eastern portion of the West Red Lake property is comprised dominantly of low strain intrusive rocks (i.e. ultramafic and gabbro) which do not exhibit any significant mineralization. Property-scale controls on gold mineralization include the intersection of E-trending Pipestone structures with NE-trending Golden Arm faults (Creek Zone, Porphyry Hill), as well as the intersection of E- or NE-trending structures with competent lithologic units (Rowan, Mount Jamie, Red Summit). Recommendations for future work include desktop studies to generate 3D models of areas of interest.

## **1.0 INTRODUCTION**

The West Red Lake Property (henceforth “the Property” – formerly known as the Rowan Property) is located approximately 15 kilometres northwest of the town of Red Lake, Ontario (Figure 1). The Property is currently operated as a joint venture between Red Lake Gold Mines (40%) and West Red Lake Gold Mines (60%), who act as the project operator. The Property should not be confused with the West Red Lake mine, a historic, non-producing shaft sunk on a gold prospect in Ball Township approximately 4 km southwest of the Property.

Structurally, the area is interpreted to lie within the intersection of three brittle-ductile corridors, all characterized by discrete, discontinuous shear zones that overprint and partially transpose a regional scale easterly plunging fold. The lithological setting consists of a volcano-sedimentary sequence with some similarities to the Red Lake Gold Mines, including stratigraphic units favorable to hosting gold mineralization (e.g. ultramafic, felsic intrusives), but differs in age and origin. Historic exploration focused on and identified multiple significant gold bearing quartz-carbonate vein systems.

Summer exploration activities in 2018 focused on targeted outcrop mapping and prospecting to:

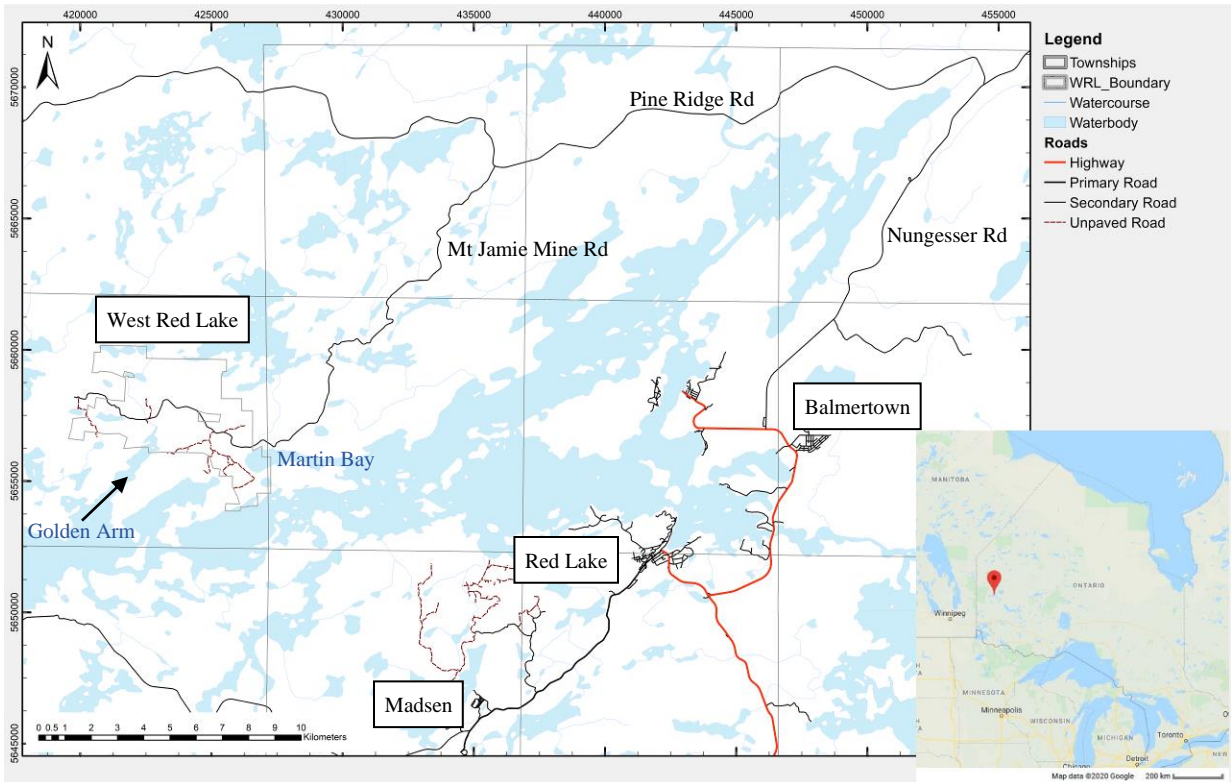
1. determine the presence and distribution of a high strain corridor
2. determine the presence and distribution of favorable lithological units and
3. to assess the potential of shear zone hosted (replacement style) mineralization.

Targeted outcrop mapping and prospecting throughout the West Red Lake area began August 23<sup>rd</sup> 2018 and was completed October 20<sup>th</sup> 2018 (21 working days). A total of 284 mapping stations were recorded and 76 samples taken consisting of 62 assay and 14 lithogeochemistry samples.

## **2.0 LOCATION & ACCESS**

The West Red Lake Property is situated in Northwestern Ontario, Canada (Figure 1). The Property overlaps the west-central part of Red Lake including sections of Martin Bay and the Golden Arm. The southwest end of the property is approximately 15 km WNW of the town of Red Lake, and 21 km due west of the Red Lake Gold Mine in Balmertown, Ontario. The nearest population centre is Madsen, Ontario, which is 11 km southwest of the Property. Red Lake & Balmertown are full-service communities which are road accessible year-round on the paved all-weather highway ON-105.

West Red Lake can be accessed from Balmertown by 4-wheel drive vehicle. To access the property, follow Highway 125 north out of Balmertown, then turn right onto Nungesser Road, a major arterial gravel-topped logging road. After following Nungesser road for 16.4 km, take a left turn onto Pine Ridge Forest Access Road, a two-lane graveled woodlands haul road, and follow the road for a further 21.4 km. Finally, take a left turn onto the partially graveled Mount Jamie Mine road and follow this for 23 km to reach the centre of the claim group.



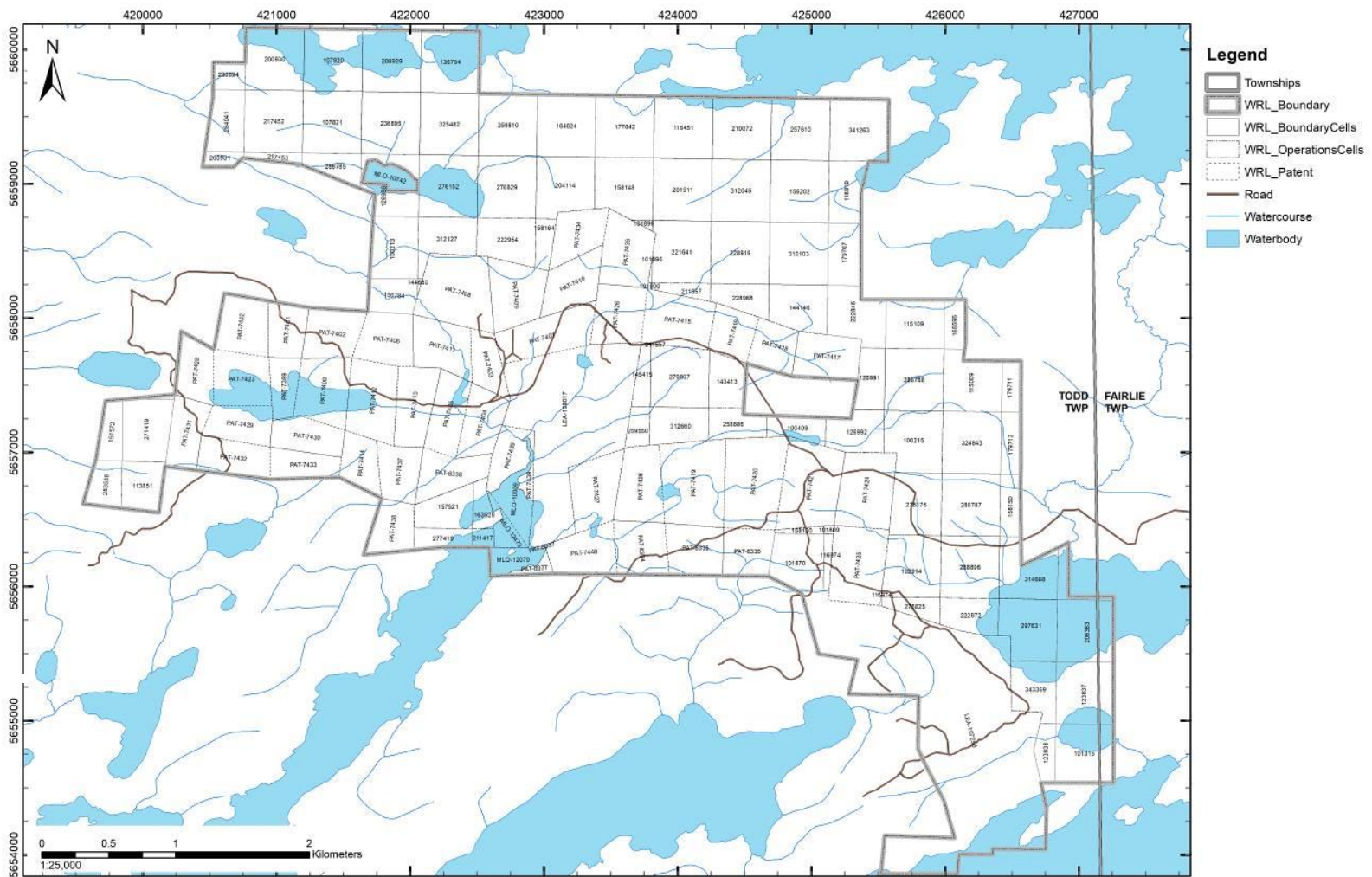
**Figure 1. West Red Lake Property location.**

### **3.0 CLAIMS & LAND STATUS**

West Red Lake Gold Mines Inc., formerly known as Hy Lake Gold Inc, entered into an Option and Joint Venture Agreement (the "2007 Joint Venture Agreement") with Red Lake Gold Mines, a general partnership of Goldcorp Inc. and Goldcorp Canada Ltd., (the partnership is hereinafter referred to as "Goldcorp") with respect to the West Red Lake Property, effective as of December 5, 2007.

In 2010, West Red Lake Gold Mines exercised its option pursuant to the terms of the Joint Venture Agreement and earned a 60% interest in the West Red Lake Property, as operator, having incurred exploration expenditures of \$2,500,000 over 3 years and issued 1,000,000 Common Shares in the capital of the Company to Goldcorp. The West Red Lake Property is subject to a 2% NSR in favour of Goldcorp.

The West Red Lake Property consists of 144 contiguous claims encompassing some 2,153.959 hectares of ground (Figure 2). The claim block includes two leases, four licenses of occupation, 47 patented claims and 91 leases including 29 boundary claims. A complete claims listing is provided in Table 2.



Drawn by: Lydia Calhoun  
January 2020

**West Red Lake**  
Township: Todd, Fairlie  
NAD 1983 UTM Zone 15N

**Figure 2. West Red Lake Property land tenure.**



**Table 1 – West Red Lake Property Claim Block**

Tenure No.	Title Type	Disposition	Township	Area (ha)	Ownership
LEA-107258	LEAS	MR	TODD	186.617	Goldcorp Canada Ltd (100%)
LEA-109017	LEAS	MR	TODD	88.529	Goldcorp Canada Ltd (100%)
MLO-10009	MLO	MR	TODD	6.702	Goldcorp Canada Ltd (100%)
MLO-10742	MLO	MR	TODD	5.556	Goldcorp Canada Ltd (100%)
MLO-12070	MLO	MR	TODD	5.358	Goldcorp Canada Ltd (100%)
MLO-12473	MLO	MR	TODD	5.346	Goldcorp Canada Ltd (100%)
PAT-7399	PATN	MSR	TODD	9.101	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7400	PATN	MSR	TODD	18.263	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7401	PATN	MSR	TODD	11.453	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7402	PATN	MSR	TODD	15.629	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7403	PATN	MSR	TODD	10.453	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7404	PATN	MSR	TODD	13.881	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7405	PATN	MSR	TODD	15.075	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7406	PATN	MSR	TODD	15.621	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7407	PATN	MSR	TODD	19.801	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7408	PATN	MSR	TODD	28.526	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7409	PATN	MSR	TODD	18.818	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7410	PATN	MSR	TODD	15.034	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7411	PATN	MSR	TODD	16.224	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7412	PATN	MSR	TODD	20.578	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7413	PATN	MSR	TODD	16.236	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7414	PATN	MSR	TODD	10.858	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7415	PATN	MSR	TODD	20.457	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7416	PATN	MSR	TODD	12.003	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7417	PATN	MSR	TODD	16.669	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7418	PATN	MSR	TODD	11.177	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7419	PATN	MSR	TODD	29.562	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7420	PATN	MSR	TODD	29.842	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7421	PATN	MSR	TODD	27.498	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7422	PATN	MSR	TODD	15.791	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7423	PATN	MSR	TODD	17.308	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7424	PATN	MSR	TODD	22.735	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7425	PATN	MSR	TODD	23.225	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7426	PATN	MSR	TODD	16.179	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7427	PATN	MSR	TODD	17.499	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7428	PATN	MSR	TODD	11.683	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7429	PATN	MSR	TODD	13.638	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7430	PATN	MSR	TODD	13.448	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7431	PATN	MSR	TODD	12.464	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7432	PATN	MSR	TODD	13.561	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7433	PATN	MSR	TODD	10.368	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7434	PATN	MSR	TODD	13.051	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7435	PATN	MSR	TODD	18.11	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7436	PATN	MSR	TODD	17.976	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7437	PATN	MSR	TODD	13.096	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7438	PATN	MSR	TODD	12.06	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7439	PATN	MSR	TODD	14.892	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-7440	PATN	MSR	TODD	15.321	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-8334	PATN	MSR	TODD	15.087	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-8335	PATN	MSR	TODD	15.621	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-8336	PATN	MSR	TODD	12.472	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-8337	PATN	MSR	TODD	4.755	Goldcorp Red Lake Nominee Ltd. (100%)
PAT-8338	PATN	MSR	TODD	14.637	Goldcorp Red Lake Nominee Ltd. (100%)
100215	SCMC	-	TODD	18.935	(100) GOLDCORP CANADA LTD.
100409	SCMC	-	TODD	7.521	(100) GOLDCORP CANADA LTD.
101869	SCMC	-	TODD	0.452	(100) GOLDCORP CANADA LTD.
101896	SCMC	-	TODD	0.953	(100) GOLDCORP CANADA LTD.
101900	SCMC	-	TODD	0.242	(100) GOLDCORP CANADA LTD.
107820	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
107821	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.

Tenure No.	Title Type	Disposition	Township	Area (ha)	Ownership
113851	SCMC	-	TODD	11.094	(100) GOLDCORP CANADA LTD.
116451	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
116974	SCMC	-	TODD	2.412	(100) GOLDCORP CANADA LTD.
126991	SCMC	-	TODD	9.55	(100) GOLDCORP CANADA LTD.
126992	SCMC	-	TODD	12.34	(100) GOLDCORP CANADA LTD.
136764	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
143413	SCMC	-	TODD	10.333	(100) GOLDCORP CANADA LTD.
144140	SCMC	-	TODD	14.535	(100) GOLDCORP CANADA LTD.
144680	SCMC	-	TODD	0.222	(100) GOLDCORP CANADA LTD.
145415	SCMC	-	TODD	5.048	(100) GOLDCORP CANADA LTD.
156202	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
157521	SCMC	-	TODD	11.255	(100) GOLDCORP CANADA LTD.
158120	SCMC	-	TODD	1.555	(100) GOLDCORP CANADA LTD.
158148	SCMC	-	TODD	18.656	(100) GOLDCORP CANADA LTD.
158164	SCMC	-	TODD	4.911	(100) GOLDCORP CANADA LTD.
162914	SCMC	-	TODD	19.342	(100) GOLDCORP CANADA LTD.
163528	SCMC	-	TODD	5.373	(100) GOLDCORP CANADA LTD.
164824	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
177642	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
200929	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
200930	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
201511	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
204114	SCMC	-	TODD	18.531	(100) GOLDCORP CANADA LTD.
210072	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
211417	SCMC	-	TODD	2.228	(100) GOLDCORP CANADA LTD.
211557	SCMC	-	TODD	4.131	(100) GOLDCORP CANADA LTD.
217452	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
221641	SCMC	-	TODD	20.074	(100) GOLDCORP CANADA LTD.
222872	SCMC	-	TODD	10.936	(100) GOLDCORP CANADA LTD.
222954	SCMC	-	TODD	13.995	(100) GOLDCORP CANADA LTD.
228919	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
228968	SCMC	-	TODD	8.75	(100) GOLDCORP CANADA LTD.
236895	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
257610	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
258810	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
258886	SCMC	-	TODD	9.01	(100) GOLDCORP CANADA LTD.
259550	SCMC	-	TODD	4.826	(100) GOLDCORP CANADA LTD.
276152	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
276176	SCMC	-	TODD	17.219	(100) GOLDCORP CANADA LTD.
276825	SCMC	-	TODD	5.843	(100) GOLDCORP CANADA LTD.
276829	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
279607	SCMC	-	TODD	19.714	(100) GOLDCORP CANADA LTD.
288787	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
288788	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
288896	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
297631	SCMC	-	TODD	18.545	(100) GOLDCORP CANADA LTD.
312045	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
312103	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
312127	SCMC	-	TODD	13.216	(100) GOLDCORP CANADA LTD.
312660	SCMC	-	TODD	11.571	(100) GOLDCORP CANADA LTD.
314668	SCMC	-	TODD	16.228	(100) GOLDCORP CANADA LTD.
324843	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
325482	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
341263	SCMC	-	TODD	20.295	(100) GOLDCORP CANADA LTD.
343359	SCMC	-	TODD	13.543	(100) GOLDCORP CANADA LTD.
100213	BCMC	-	TODD	16.3	(100) GOLDCORP CANADA LTD.
101315	BCMC	-	FAIRLIE	18.97	(100) GOLDCORP CANADA LTD.
101870	BCMC	-	TODD	15.56	(100) GOLDCORP CANADA LTD.
115009	BCMC	-	TODD	2.865	(100) GOLDCORP CANADA LTD.
115109	BCMC	-	TODD	5.108	(100) GOLDCORP CANADA LTD.
116919	BCMC	-	TODD	5.65	(100) GOLDCORP CANADA LTD.
123837	BCMC	-	FAIRLIE	17.541	(100) GOLDCORP CANADA LTD.

Tenure No.	Title Type	Disposition	Township	Area (ha)	Ownership
123838	BCMC	-	FAIRLIE	5.982	(100) GOLDCORP CANADA LTD.
126988	BCMC	-	TODD	7.616	(100) GOLDCORP CANADA LTD.
129566	BCMC	-	TODD	2.991	(100) GOLDCORP CANADA LTD.
151562	BCMC	-	TODD	0.696	(100) GOLDCORP CANADA LTD.
151572	BCMC	-	TODD	7.458	(100) GOLDCORP CANADA LTD.
156784	BCMC	-	TODD	9.138	(100) GOLDCORP CANADA LTD.
158150	BCMC	-	TODD	0.187	(100) GOLDCORP CANADA LTD.
165595	BCMC	-	TODD	4.423	(100) GOLDCORP CANADA LTD.
179707	BCMC	-	TODD	4.19	(100) GOLDCORP CANADA LTD.
179711	BCMC	-	TODD	5.492	(100) GOLDCORP CANADA LTD.
179712	BCMC	-	TODD	0.758	(100) GOLDCORP CANADA LTD.
200931	BCMC	-	TODD	3.165	(100) GOLDCORP CANADA LTD.
206363	BCMC	-	FAIRLIE	19.579	(100) GOLDCORP CANADA LTD.
217453	BCMC	-	TODD	2.903	(100) GOLDCORP CANADA LTD.
222846	BCMC	-	TODD	2.578	(100) GOLDCORP CANADA LTD.
236894	BCMC	-	TODD	4.819	(100) GOLDCORP CANADA LTD.
271419	BCMC	-	TODD	16.394	(100) GOLDCORP CANADA LTD.
277419	BCMC	-	TODD	6.431	(100) GOLDCORP CANADA LTD.
283538	BCMC	-	TODD	8.32	(100) GOLDCORP CANADA LTD.
284041	BCMC	-	TODD	12.17	(100) GOLDCORP CANADA LTD.
288785	BCMC	-	TODD	0.001	(100) GOLDCORP CANADA LTD.
296180	BCMC	-	TODD	0.071	(100) GOLDCORP CANADA LTD.

#### 4.0 PREVIOUS WORK

The West Red Lake Property has a long history, with work first reported in 1926 and extending to the present day. Rowan Mine has been the main focus of exploration on the Property, culminating in underground development on several levels and a bulk sample program by Goldquest in the 1980s. Several other areas have seen more sporadic exploration, including the Porphyry Hill Showing and the north extension of the Newman-Todd mineralized system. Exploration of the property has focused on gold, but minor silver and base metal mineralization has also been explored, particularly in the southeast corner of the property. Table 2 summarizes previous work on the West Red Lake Property.

Table 2 – Previous Work on the West Red Lake Property

Year	Company	Work Completed	Reference
1926	Dome Mines	Claims in the Martin Bay area. Staked in 1926 and later abandoned after a development program failed to locate economic mineralization	Horwood, 1940
1928	Rowan Syndicate	Discovery of gold on "Discovery Hill" (Rowan Mine)	Archibald & Kita, 2016
1934	Paulore Mines	A 1.83 m wide east-west zone of quartz stringers with minor arsenopyrite and some visible gold in diorite opened up in a series of trenches	Horwood, 1940
1935	Paulore Mines	Unknown number of drill holes testing the east-west gold-bearing zone. Drillholes failed to secure results comparable with those found in surface workings	Horwood, 1940
1936-1939	Lake Rowan Gold Mines	Establishment of the Rowan Mine Adit and drifting along the Rowan Vein from the base of Discovery Hill. Development on 3 levels (30.5 m, 76 m and 122 m levels) with both an adit and a shaft to 132 m depth. At least 487 m of lateral development. Drilling of 18 S-series surface holes; and 13 underground holes totaling 416.4 m. Mine Grid established with the Rowan shaft as 5000E, 5000N	Archibald & Kita, 2016
1937-1939	Ontario Department of Mines	Area was mapped by H.C. Horwood as part of a regional Red Lake mapping campaign	Guy 2018
1940	West Red Lake Gold Mines	Work on the "McKenzie Option" (West Red Lake Zone); trenching, sampling, mapping and drilling of M-series holes 1-18, 18 holes totaling 927 m	Guy 2018
1945-1946	Rugged Red Lake Mines Ltd.	Geological mapping, trenching and 25 diamond drill holes totaling 4746 m in the Martin Bay area	Shaftord, 1946
1945-1947	Lake Rowan Gold Mines	Surface mapping and 56 surface holes (RW-46-1 to RW-56); discovery of the Shaft extension, Creek, and 10,000 zones, and mineralization found in iron formation on Porphyry Hill. Mine grid re-established using post #3 of KRL 10,000 as 5000E, 5000N, 5000 elev.	Archibald & Kita, 2016
1950	Lake Rowan Gold Mines	8 x-ray holes from surface	Archibald & Kita, 2016
1953	Lake Rowan Gold Mines	Restarting of underground work with further development of the 3rd level to the east to test drill intersections from 1946. Additional U-series holes while drifting	Archibald & Kita, 2016
1958	Lake Rowan Gold Mines	7 drillholes totaling 1340.5 m to test the eastern and western extension of the Rowan Main Vein	Archibald & Kita, 2016
1969	Cochenour Explorations Ltd.	Geological mapping, soil sampling, magnetometer, and HLEM surveys over a portion of the Martin Bay area, followed by a program of diamond drilling consisting of 8 holes totaling 597 m. Hole MB-69-4 returned 2.06 g/t Au associated with sphalerite, arsenopyrite, pyrite and chalcopyrite	Chastko, 1969

<b>Year</b>	<b>Company</b>	<b>Work Completed</b>	<b>Reference</b>
1971	Ontario Geological Survey	Todd & Fairlie townships mapped by R. A. Riley	Riley, 1978
1971	Cochenour Explorations Ltd.	Magnetic and HLEM surveys on the "Rugged" Claim Group, including a portion of Martin Bay	Chastko, 1975
1981	Golquest Exploration Inc.	Goldquest Exploration Inc. acquires the Rowan Mine and surrounding property	Archibald & Kita, 2016
1982	Golquest Exploration Inc.	Goldquest conducts HLEM and magnetics on cut grid	Archibald & Kita, 2016
1983	Golquest Exploration Inc.	Geologic mapping at a scale of 1:2500; Radiometric survey of the property; and litho-geochemistry. Dozer stripping of DLS Carbonate, Main Vein and Headache Zones, and mapping at 1:100 scale of Main Vein and Headache Zone showings	Peden, 1983
1984	Golquest Exploration Inc.	Winter drill program, 3622.76 m in 16 holes. Dozer stripping and sampling at Martin Bay. Bulk mining test of a quartz vein above the adit level; not milled until 1988. Mine sealed and flooded below adit level	Archibald & Kita, 2016
1985	Golquest Exploration Inc.	Magnetic and HLEM surveys on a part of the Martin Bay property, as well as bulldozer stripping, washing, detailed mapping and sampling in the Martin Bay area. Drill program of 4539.45 m in 51 holes	Peden, 1985 and Durrant 1985
1986	Golquest Exploration Inc.	10,541 tons of Rowan material milled at the Dickenson mill to produce 688 oz. This bulk sample included an unknown proportion of waste rock	Archibald & Kita, 2016
1987	Golquest Exploration Inc.	8 holes drilled at Rowan for a total of 1822.1 m. Road access from Pine Ridge Forest Access Road is completed	Archibald & Kita, 2016
1988	Golquest Exploration Inc.	2,482 tons from the 1984 Rowan bulk sampled milled at the Dickenson mill to recover 610 ounces of gold.	Archibald & Kita, 2016
1989	Chevron Minerals	Regional scale geological mapping and associated rock geochemical stripping accompanied by mechanical stripping in the Martin Bay area. One 225 m drill hole testing the "Main Shear" in the Martin Bay area; 7 holes total plus one deepened hole (RW-84-59)	Archibald & Kita, 2016
1990	Chevron Minerals	7 Additional drillholes by Chevron RW-90-145 to 151 Ore reserve calculations for Rowan Mine - estimate 160,000 tonnes of gold grading 14 g/t to a depth of 250 m below surface in the vicinity of the old underground workings at Rowan Mine	Fumerton, 1990
1993	Golquest Exploration Inc.	3 holes RW-93-152 to 154; testing the fold closure east of Rowan Shaft	Archibald & Kita, 2016
1994	Goldcorp Inc.	Goldquest Exploration Inc. amalgamates with Goldcorp Inc.	Archibald & Kita, 2016
1997	Goldcorp Inc.	Goldcorp drill 2 holes RW-97-155 & 156 for a total of 995.26 m testing a fold closure	Archibald & Kita, 2016

<b>Year</b>	<b>Company</b>	<b>Work Completed</b>	<b>Reference</b>
2000	Goldcorp Inc.	Helicopter-borne magnetic, electromagnetic, VLF and radiometric surveys over a large portion of the Red Lake area, including the Rowan property	St-Hilaire, 2000
2001	Goldcorp Inc.	1738 MMI samples on blocks 10A, B & K, with a new N-S grid re-cut over these areas. Geological mapping at 1:2500 scale on claim 1234151; 8 holes in the Martin Bay area for 1974 m, and four holes in the QP zone near the Rowan Shaft for a further 1,699 m.	Archibald & Kita, 2016
2002	Goldcorp Inc.	New grid and IP gradient survey near Martin bay testing base metal potential	Archibald & Kita, 2016
2006	King's Bay Gold	Drilled 4,846 m in 23 holes testing geological and geophysical anomalies in the Rowan Mine Shaft and Porphyry Hill locations	Archibald & Kita, 2016
2007-2008	West Red Lake Gold Mines	Two-year drill program from June 2007 - September 2008; 8,317 m in 15 holes, focusing mainly on the Rowan Shaft area and testing depth and strike extensions of vein mineralization	Guy 2018
2009	West Red Lake Gold Mines	Infill sampling of previously drilled core, data compilation	Guy 2018
2010-2011	West Red Lake Gold Mines	Drilling at the Rowan Shaft Main Zone and at the northeast extension of the Newman-Todd mineralized corridor. Limited channel sampling in 2011	Guy 2018
2013	West Red Lake Gold Mines	8 drill holes totaling 3,283 m testing the main mine zones to the east of the Rowan Lake Mine	Guy 2018
2014	West Red Lake Gold Mines	10 drill holes totaling 1,416 m following up on favourable results from the 2013 program; this included testing the depth and strike extensions of the Rowan Shaft area as well as other known mineralized zones	Guy 2018
2015-2016	West Red Lake Gold Mines	22 holes from November 2015 - December 2016 for a total of 6,943 m testing the Rowan Shaft area and other mineralized zones, including the "Hinge Area" where the Pipestone Bay - St. Paul Bay Deformation Zone crosses the Newman-Todd extension	Guy 2018
2017	West Red Lake Gold Mines	15 holes totaling 6072.36 m; RLG-17-41 to 54	Guy 2018

## 5.0 GEOLOGIC SETTING

### 5.1 Regional Geology

The West Red Lake Property is hosted within the central portion of the Red Lake Greenstone Belt (RLGB), a Meso- to Neoproterozoic greenstone belt hosted within the laterally extensive Superior Craton. Specifically, the RLGB lies within the Uchi Subprovince, a linear belt approximately 80 km wide and more than 400 km long which sits along the south margin of the predominantly Neoproterozoic North Caribou Terrane, at its contact with the Neoproterozoic metasediment-dominated English River Subprovince. The Uchi Subprovince is highly gold-endowed, including several major producers in the RLGB (Campbell, Dickenson, Red Lake, Cochenour and Madsen Mines), as well as significant producers from other greenstone belts including the Uchi, Jalda, Argosy, Golden Patricia, Central Patricia and Pickle Crow mines.

The RLGB records roughly 300 million years of episodic volcanic activity, accompanied by intermittent sedimentation, plutonism, tectonic activity and gold mineralization. Since the discovery of economic gold mineralization at the Howey Deposit in 1925, the geologic evolution of the RLGB has been extensively researched; Table 3 presents a current understanding of the belt's history. The tholeiitic Balmer assemblage is the oldest unit in the belt; it consists primarily of massive to pillowed basaltic flows, with lesser interbedded komatiite, basaltic komatiite, rhyolite, intermediate volcanics and interflow sediments. Some sections also include large bedding-parallel peridotite flows or intrusions (Sanborn-Barrie 2001). The Balmer stratigraphy is exposed primarily in the eastern and south-central portions of the RLGB and is host to the most productive mines in the RLGB including the Campbell, Dickenson, Red Lake, Cochenour and Madsen Mines.

The Ball Assemblage postdates the Balmer Assemblage and may be in tectonic contact (Sanborn-Barrie 2001); the Ball Assemblage is exposed in the western half of the RLGB and is host to the Rowan Mine as well as the Mt. Jamie and Red Crest showings. The Ball Assemblage comprises calc-alkalic basalt, andesite, dacite and rhyolite along with minor komatiitic flows and, locally, stromatolitic marbles. Postdating the Ball Assemblage are the Neoproterozoic Bruce Channel Assemblage (volcaniclastic fragmental rocks, pebble conglomerate, wacke, siltstone and iron formation); the Neoproterozoic Confederation Assemblage (intermediate tuff breccia and lapilli tuff, pyroclastic tuff, rhyolitic flows, pillowed mafic volcanics, andesitic to dacitic pyroclastic rocks and synvolcanic diorite and tonalite); as well as a number of smaller assemblages (Sanborn-Barrie 2001).

Two major deformation episodes (D1 and D2) are interpreted to have postdated Confederation Assemblage volcanism (see Table 3 and O'Dea, 1999). The D2 event is interpreted as a major, long-lived episode of progressive deformation resulting in folding and a pervasively developed NW fabric, as well as plutonism, widespread carbonate alteration and Au mineralization between 2718 – 2714 Ma.

**Table 3 – Summary of critical events for the Red Lake Greenstone Belt; O’Dea (1999)**

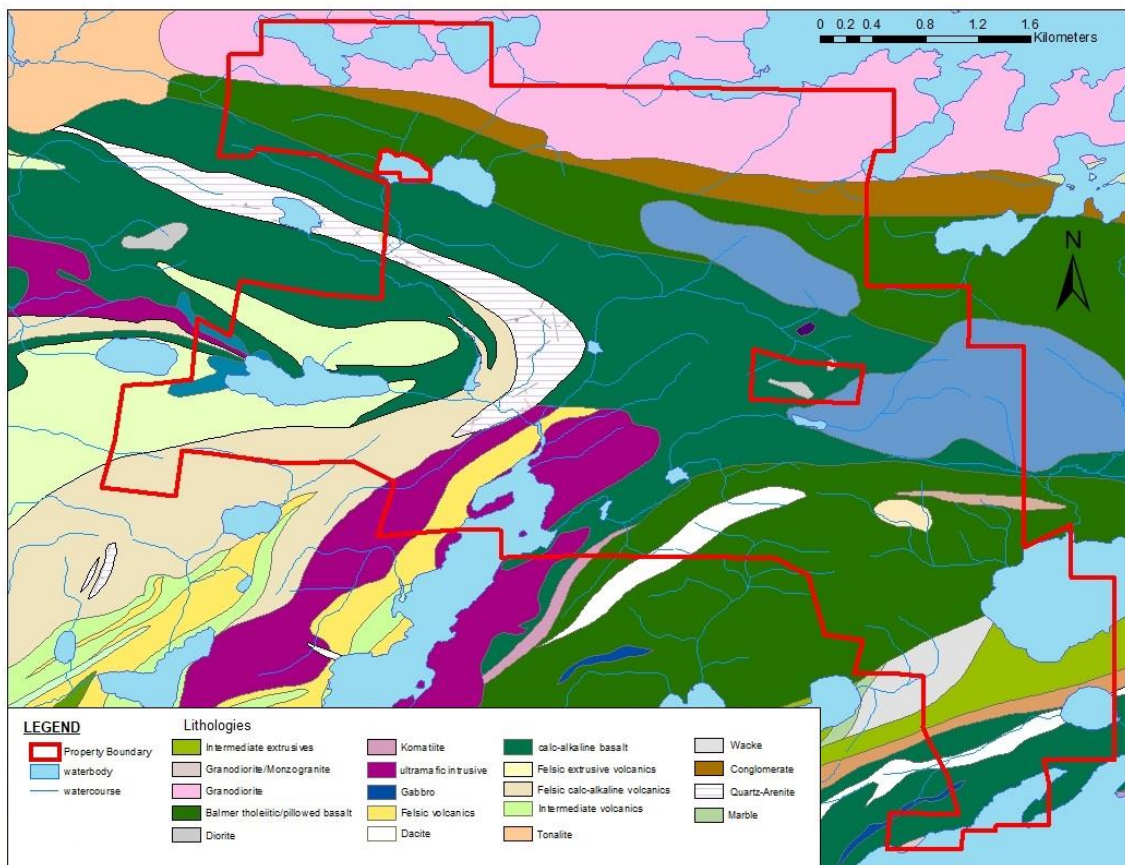
AGE	GEOLOGIC EVENT	TECTONIC CONTEXT
<p>-2714 Ma</p> <p>2730-2700 Ma</p> <p><b>REGIONAL METAMORPHISM</b></p> <p><b>REGIONAL COMPRESSION</b></p>	<p><b>D<sub>2</sub> Deformation</b></p> <ul style="list-style-type: none"> <li>- Late slip on Black Line Faults</li> <li>- Late auriferous quartz tension veins</li> <li>- Continued displacement on shear zones</li> </ul> <p>- Localization of Au mineralization and alteration in shears</p> <ul style="list-style-type: none"> <li>- Extensive Fe-Carbonate-quartz veining</li> <li>- WNW striking reverse left-lateral shear zones</li> <li>- Reactivation of extensional faults</li> <li>- Overprinting of D<sub>1</sub> structures</li> <li>- WNW striking folds and fabrics</li> </ul> <p>- NE-SW shortening during regional N-S compression</p> <p><b>D<sub>1</sub> Deformation</b></p> <ul style="list-style-type: none"> <li>- Strain shadows of plutons left relatively undeformed</li> <li>- Reverse sense reactivation of extensional faults</li> <li>- NE striking folds, thrusts and fabrics</li> </ul> <p>- NW-SE shortening during regional N-S compression</p> <p><b>Pluton Emplacement</b></p> <ul style="list-style-type: none"> <li>- Heat engine for circulating hydrothermal fluids</li> <li>- Induced onset of regional metamorphism</li> <li>- Induced localization of regional shortening</li> <li>- Thermally weakened surrounding crust</li> </ul> <p>- Subvolcanic source of Confederation Volcanics</p>	<p><b>KENORAN OROGENY</b></p> <p>Subduction-related Fold-thrust belt Development (accretionary tectonics)</p> <p>Subduction-related Fold-thrust belt Development (accretionary tectonics)</p> <p>Volcano-plutonic arc Setting</p>
<p>2750-2730 Ma</p>	<p><b>Calc-Alkaline Confederation Assemblage</b></p> <ul style="list-style-type: none"> <li>- Development of original Confederation Shear Zone</li> </ul> <p>-----</p>	<p>Volcano-plutonic arc setting And N-S extension</p> <p>Post-rift unconformity or Structural contact</p>
<p>~2894 Ma</p>	<p><b>Bruce Channel Assemblage</b></p> <ul style="list-style-type: none"> <li>- Development of original Hoyles Bay Shear Zone</li> </ul> <p>-----</p>	<p>Rift or arc setting with NW-SE extension</p> <p>Post-rift unconformity or Structural contact</p>
<p>2940-2925</p>	<p><b>Calc-Alkalic Ball Assemblage</b></p> <p>-----</p>	<p>Rift or arc setting with</p>
<p>2992-2964 Ma</p>	<p><b>Tholeiitic Balmer Assemblage</b></p>	<p>Rift setting</p>



## 5.1 Property Geology

Stratigraphy within the West Red Lake property is part of the Ball assemblage and is defined by a sequence of variable volcano-sedimentary and intrusive rocks, including mafic and felsic tuffs, massive to pillowed basalts, iron formations, olivine websterite, pyroxenite, gabbro and diorite intrusions (Figure 3, Table 4). Metamorphic grade throughout the property is dominantly greenschist facies.

The property-scale structure of the West Red Lake area is defined by a steep E to ESE-plunging antiform with associated sub-vertical axial planar cleavage that has been deformed by multiple generations of brittle-ductile faulting. The rocks are typically low strain with localized areas of moderate strain. Where present, the most common structural fabrics within the area are steep dipping foliation and discrete shear zones in one of three predominant orientations: NE, E, and ESE. These foliation orientations define three distinct generations of brittle-ductile deformation: 1) NE-trending sinistral Golden Arm Fault Zone, 2) dextral E-trending Pipestone Fault Zone and 3) dextral-reverse ESE-trending D2 Fault Zone (Figure 3).



**Figure 3. West Red Lake Property Geology, after Sanborn-Barrie et al., 2004. See also detailed maps in Appendix IV.**

**Table 4 – Representative lithologies and their descriptions.**

Lithology	Assemblage	Description
Basalt	Ball	Very fine grained to aphanitic, textures include: massive, amygdular, variolitic, pillowed. Chlorite is a common alteration mineral.
Intermediate Volcanics	Ball	Ash and crystal tuff, fine to medium grained, laminated to thick bedded. Local fragments up to 1 cm.
Felsic Volcanics	Ball	Ash-crystal tuff, foliation common. Local sub-rounded quartz fragments up to 2 mm.
Peridotite	Ball	Fine to medium grained, moderately magnetic. Black-green in color with dark brown weathering. Locally banded.
Gabbro	Ball	Fine to medium grained, dark green and massive.
Quartz Feldspar Porphyry		Light-medium grey-green. 10-15% sub-rounded quartz phenocrysts up to 0.5 cm wide. 10% interstitial chlorite.
Banded Iron Formation	Ball	Fine grained magnetite bearing siltstone and interbedded chert. Bedded, dm-scale. Laminations common.
Argillite	Ball	Associated with Banded Iron Formation. Non-magnetic grey siltstone.
Conglomerate	Ball	Poorly sorted, polymictic and matrix supported. Sub rounded clasts ranging in size from 1-3 cm.

## 6.0 MINERALIZATION

Gold is the primary commodity of interest on the West Red Lake Property. Rowan Mine is the principle showing on the Property and consists of a set of 9 or more ~E-W striking and steeply dipping veins from 0.25 – 1 m in width. Veins consist of fractured quartz containing some pyrite, pyrrhotite, chalcopyrite, sphalerite and galena (typically sulphides constitute <2% of veins overall) as well as native gold. Veins are primarily hosted within a unit of felsic porphyritic tuff, and grades die off rapidly once the veins exit this host unit. Ore shoots within the vein are variable and apparently controlled by veins intersecting other structures as well as lithologic contacts. The Rowan vein system has been traced for approximately 1 km along strike and to a depth of around 400 m (Fingas 2019). Several other narrow vein prospects peripheral to the Rowan vein system show a similar style of veining, similar geochemical characteristics, and similar controls on mineralization (including hosting within porphyritic tuff and hosting within small felsic- to intermediate plugs). Rowan-style mineralization seems distinct from Campbell-Dickenson style mineralization based on several characteristics, including host lithology, geochemical characteristics, alteration style and structural characteristics.

Other styles of mineralization have also been encountered on the property. These include Au-As mineralization with abundant visible gold in quartz veins hosted in diorite as observed near Martin Bay; gold hosted in iron formation at the Porphyry Hill showing; gold associated with chemical sediments and stromatolitic marbles in the NT zone (the northwards extension of the Newman-Todd mineral system); and base metal mineralization in the south part of the property. To date, the exact relationship between these distinct mineralization styles is poorly understood.

Reconnaissance mapping during the 2018 season was primarily directed at finding Campbell-Dickenson style Au-As mineralization. This style of mineralization was prioritized since the exploration team felt that it represented the best potential for discovery of a major deposit.

## **7.0 WEST RED LAKE 2018 WORK PROGRAM**

Mapping of the West Red Lake property, which took place from August 23<sup>rd</sup> 2018 to October 20<sup>th</sup> 2018 (21 days total), initially focused on the eastern portion and central portions of the property. Teams of 2-4 Goldcorp geologists and geotechnicians travelled to planned outcrops and recorded data (e.g. structural, lithological, photographs) using FieldMove mapping software on a GPS enabled iPad with an additional handheld Garmin GPS for navigation. Instruments used included those of geological assessment (e.g. scribes, hand lens, magnets) and Geotuls for sample collection. Samples were placed into robust plastic sample bags and closed using zip ties. A total of 284 mapping stations were recorded and 76 samples taken consisting of 62 assay and 14 lithogeochemistry samples. All samples were submitted to Activation Laboratories Ltd. in Thunder Bay for analysis. Assay samples were analyzed by 50 g fire assay with an atomic absorption finish; assay samples were also submitted for ultra-trace analysis with an aqua regia digest and an ICP-MS finish, which provided an additional suite of 62 trace and major element analyses. Lithogeochemistry samples were analyzed by Lithium Metaborate/Tetraborate Fusion with an ICP-MS finish. Specific goals of the program included:

1. Establish a property-scale litho-structural framework and determine character, style and controls on gold mineralization (e.g. potential for Red Lake-Campbell style mineralization?)
2. Evaluate potential for mineralization within fold hinge that is potentially transposed along a WNW-trending high strain zone in the eastern portion of the property.
3. Assess exploration potential of property

Following the completion of fieldwork, the geologic map of the area (Figure 3, Appendix IV) was updated using ArcGIS software. The final map incorporated data from the 2018 mapping program as well as historic, geophysical, and topographic data. Margins of units

were refined (particularly the ultramafic unit), and an intermediate volcanic unit was added proximal to the Rowan Mine within the hinge of the anticline.

## 7.1 Geologic Observations

Stratigraphy within the West Red Lake property is part of the Ball assemblage and is notably different in terms of style and composition from the volcanic rocks at the Campbell-Dickenson-Red Lake mining area, which belong to the Balmer and Bruce Channel assemblages. Mapping throughout the West Red Lake property defined a sequence of variable volcano-sedimentary and intrusive rocks, including mafic and felsic tuffs, massive to pillowed basalts, iron formations, olivine websterite, pyroxenite, gabbro and diorite intrusions (Figure 4). Mapping revealed that the ultramafic units are predominately intrusive and not volcanic.

The property-scale structure of the West Red Lake area is defined by a steep E to ESE-plunging antiform with associated sub-vertical axial planar cleavage that has been deformed by multiple generations of brittle-ductile faulting (Figure 5). The rocks are typically low strain with localized areas of moderate strain. Shear zones are rarely observed. Where present, the most common structural fabrics within the area are steep dipping foliation and discrete shear zones in one of three predominant orientations: NE, E, and ESE. These foliation orientations define three distinct generations of brittle-ductile deformation. Widths of shear zones are generally cm- to dm-scale although some shears obtain a width greater than 1 m. Locally, NE- and E- trending shear zones contain C-S fabrics, shear bands, and extensional veins exhibiting dominantly dextral displacement with minor dip-slip motion (Figure 4: E,F).

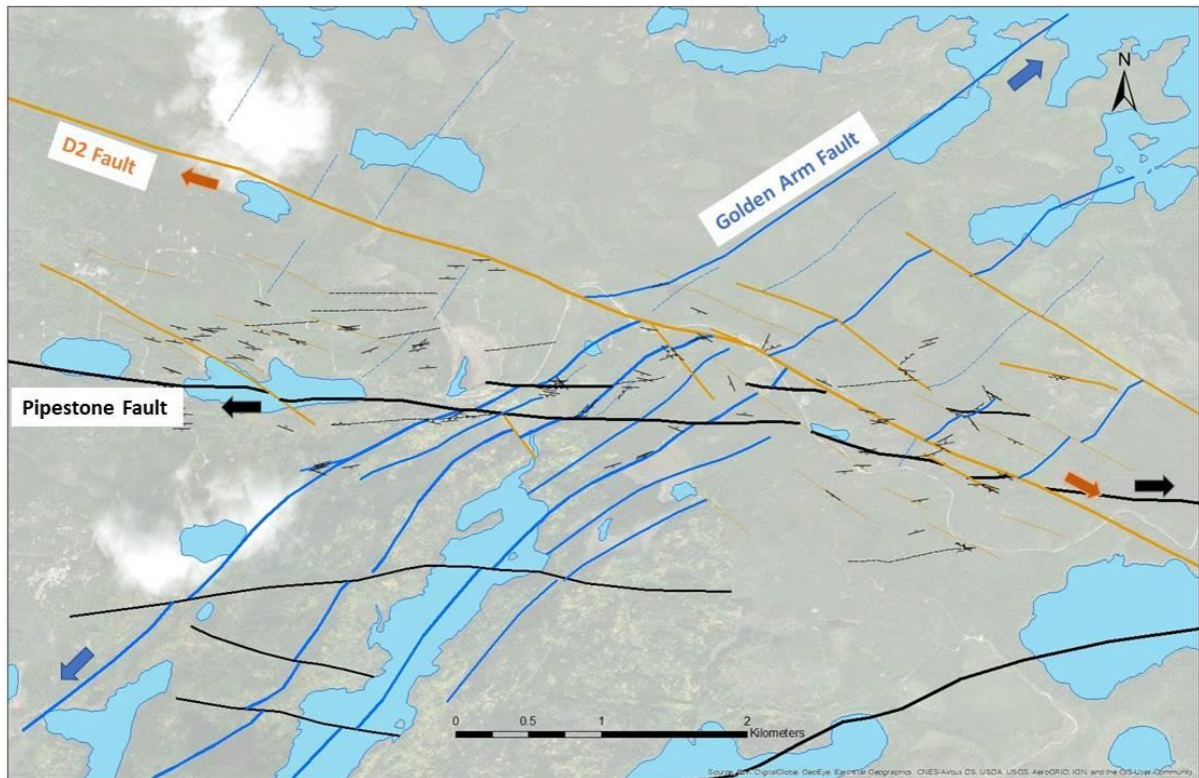
A notable exception is the Rowan Lake Shear Zone where it outcrops to the northeast of the Porphyry Hill showing; this deformation zone is more than 200 m wide, with strong partitioning of strain into mafic phases and strong associated alteration. Attempts to follow up the strain zone along strike have not duplicated the widths observed at the initial location, suggesting that the structure may be dilating/widening due to an additional geological control (e.g. bend/jog in fault geometry, intersection with separate structure).

The structural framework of the area (Figure 5) was updated based upon 2018 mapping, and historic, geophysical, and topographic data. Four dominant generations of structures were recognized, including (in chronological order): 1) early E-plunging folds, 2) NE-trending sinistral Golden Arm Fault Zone, 3) dextral E-trending Pipestone Fault Zone and 4) dextral-reverse ESE-trending 'D2' Fault Zone.



**Figure 4. Photos from the 2018 West Red Lake field program.**

*A. Feldspar porphyry. B. Ultramafic intrusive. C. Felsic Volcanics. D. Basalt. E. 20-50cm wide weakly ankeritized shear in gabbro (WRL7-055). F. Shear bands indicating dextral kinematics along main shear plane. G. Location of assay sample WRL7-03A which returned a value of 17 g/t Au. H. Samples WRL7-18B (quartz vein) and WRL-018C (footwall margin) returned values of 4.7 and 2.6 g/t Au respectively.*



**Figure 5. West Red Lake structure with foliation and shear orientations.**  
*Faults from oldest to youngest: Golden Arm Fault, Pipestone Fault, D2 Fault.*

## 7.2 Alteration and Mineralization

Alteration is generally very weakly developed, including within shear zones, and consists of minor calcite, silica (quartz veins and pervasive), and ankerite, typically infilling veins/fractures. Alteration is concentrated in the core of the anticline along trend of Mount Jamie and at the intersection of the Golden Arm and Pipestone Bay structures (e.g. Porphyry Hill, Creek Zone), with relatively low amounts of alteration east of the Golden Arm Fault Zone.

Compilation of historic information integrated with mapping data from outcrops adjacent to the historic Rowan shaft (Figure 3) suggests this deposit is located within a strongly sheared quartz lapilli tuff encased within basalt. It can be interpreted that syn-deformation, the felsic unit would have behaved in a brittle-ductile fashion forming discrete faults and gold-bearing extensional quartz veins, whereas the surrounding basalt would have deformed in a ductile fashion (e.g. analogous to Sigma-Lamaque style mineralization in Val d'Or). This same relationship was observed within narrow felsic units mapped within the basalt in the center of the property. At these locations, strain was partitioned into the felsic unit and along lithological contacts. The basalt developed a strong foliation, whereas deformation within the felsic unit was expressed as a combination of ductile fabric, brittle-ductile faults and extensional quartz veins. It is

unknown if these veins occurred contemporaneously with the Rowan deposit, and/or if they are gold bearing, however preliminary observations indicate they may be analogous.

Proximal to the western anticline core, grab samples yielded three anomalous gold values (Table 5) including 17 g/t Au (station WRL-03A, sample ID A738179), and 4.7 & 2.6 g/t Au (station WRL7-18B, sample ID A738175, and WRL7-18C, sample ID A738176). The former was taken in a thin 1-2 cm quartz vein in a strongly ankerite-altered shear zone (Figure 4G). The latter samples, WRL7-18B and C, were taken from a 40-50 cm wide quartz vein and its footwall margin respectively (Figure 4H). The vein contains around 1% pyrite & pyrrhotite, and trace chalcopyrite, and the 10-15 cm wide footwall margin is locally silicified, sheared, and sulphide oxidized. Other assay values are available from Appendix I.

**Table 5 – Significant Assays from the 2018 West Red Lake field program**

Sample ID	Easting	Northing	Au g/t	As ppm	Showing	Showing Status	Description
A738179	421249	5657731	17	29.4	DLS Carbonate	Historic	Quartz vein, 4 cm wide and concordant with foliation; hosted in intermediate tuff. Vein with trace sulphides
A738175	420647	5657775	4.7	0.9	10,000 Zone	Historic	Sugary quartz vein
A738176	420647	5657775	2.6	1.5	10,000 Zone	Historic	Sheared, rusty felsic to intermediate tuff. 0.5-1% pyrite, trace chalcopyrite and pyrrhotite. Northwest footwall contact
A738402	421431	5656876	2.03	5040	Newman-Todd Extension	Historic	Weakly sheared, ankerite veined and chlorite-fuchsite altered basaltic komatiite at contact with felsic volcanics. 30% of sample is Ankerite-quartz veinlets, 1-2% vein-controlled pyrite.
A738297	422210	5657181	1.89	38.7	Porphyry Hill	Historic	Local float. Bullish quartz-chlorite vein, milky glassy with 2% fine pyrite, hosted in a small shear; favourable appearance.
A738285	422791	5657545	1.16	10.1	N/A {3 cm veinlet}	New	Sample of a two cm quartz vein hosted in rhyolite, greyish colour, rusty spotted on surface, fairly prospective

## 8.0 CONCLUSIONS & RECOMMENDATIONS

Mineralization throughout the West Red Lake property is characterized by discrete quartz veins hosted within or directly adjacent to a relatively unaltered competent lithological unit (i.e. porphyry body, felsic intrusive), typically located proximal to or at the intersection of significant structures. This contrasts with Red Lake-Campbell style mineralization that is characterized by pervasively altered semi-continuous shear zones, often localized proximal to transposed fold hinges. The interpreted transposed fold hinge in the eastern portion of the West Red Lake property is comprised dominantly of low strain intrusive ultramafic and gabbro. This transposed fold hinge did not exhibit potential to host significant Red Lake-Campbell style mineralization.

Property-scale controls on gold mineralization include the intersection of E-trending Pipestone structures with NE-trending Golden Arm faults (Creek Zone, Porphyry Hill), as well as the intersection of E- or NE-trending structures with competent lithologic units (Rowan, Mount Jamie, Red Summit). Targets warranting follow-up exploration include the southern extension of the Mount Jamie trend where anomalous gold values were obtained, additional intersections of the Golden Arm Fault and Pipestone structure, and Golden Arm and D2 structures.

The 2018 West Red Lake exploration program was successful in refining the geological setting of the area, determining property-scale controls on mineralization, and identifying exploration targets. Recommendations for future work include desktop studies to generate 3D models of the Porphyry Hill and Creek Zones, and a 3D model for the core of fold area proximal to Rowan. Modelling should be followed up with targeted drilling. A budget for this program is presented in Table 6.

Table 6 – Budget for Proposed Work Program at the West Red Lake Project

<b>Work Item</b>	<b>Cost (CAD)</b>
3-d modeling of the Porphyry Hill Showing, Creek Zone and fold core in the vicinity of the Rowan Deposit	\$25,000
Drilling - 2,500 m	\$675,000
<b>Total Program Cost</b>	<b>\$700,000</b>



## REFERENCES

- Archibald & Kita, 2016. Technical Report and Resource Estimate on the Rowan Mine Property. Prepared for West Red Lake Gold Mines Inc., January 20, 2016.
- Corfu, F. & Andrews, A.J. 1987. Geochronological constraints on the timing of magmatism, deformation, & gold mineralization in the Red Lake greenstone belt, north-western Ontario. *Can. J. Earth Sci.*, 24, 1302-1320.
- Fingas, T.J. 2019. High-level Review of the Rowan Mine resource and the West Red Lake project. For Goldcorp Inc., April 2019, 29 pp.
- Fumerton, S. 1990. Review of Gold Mineralization at the Rowan Mine and Work by Chevron Minerals Ltd 1990
- Guy, K. 2018. Summary Report on a Diamond Drilling Programme 2016, Rowan Property – Goldcorp JV, Todd Township, Red Lake Mining Division, Ontario. For West Red Lake Gold Mines Inc., March 2018, 22 pp.
- Horwood, H.C. 1940. Geology and mineral deposits of the Red Lake Area. Ontario Department of Mines, Forty-Ninth Annual Report, VOL. XLIX, Part II, 1940
- O’Dea, M.G. 1999. Structural Framework and Targeting Strategy for the Northeastern Part of the Archean Red Lake Greenstone Belt, NW Ontario. 86 pp. Steffen Robertson & Kirsten Consulting Engineers, for Goldcorp Inc.
- Peden, K. D., December 16, 1983. Goldquest Exploration Inc. Report on the Geological Survey of Rowan Group, Todd Township, NTS 52M/1
- Peden, K.D., June 21, 1985. Goldquest Report on the Diamond Drilling Program Rowan Group, 1985 Todd Township.
- Riley, R. A., 1978. OGS Map 2406, Todd Township 1:12000 scale
- Sanborn-Barrie, M., Skulski, T. & Parker, J.A., & Dube, B., 2000. Integrated regional analysis of the Red Lake greenstone belt & its mineral deposits, western Superior Province, Ontario. *GSC Current Research 2000-C18*, 16pp.
- Sanborn-Barrie, M., Skulski, T. & Parker, J.A., 2001. Three hundred million years of Tectonic history recorded by the Red Lake greenstone belt, Ontario. *Geological Survey of Canada, Current Research 2001-C19*
- Sanborn-Barrie, M., Skulski, T. & Parker, J.A., 2004. Geology, Red Lake Greenstone Belt, Western Superior Province, Ontario. Geological Survey of Canada, Open File 4594. 1:50,000 scale colour map.

## STATEMENT OF QUALIFICATIONS

I, Thomas John Fingas, of the city of Thunder Bay, in Ontario, Canada,

Hereby Certify That:

1. I am a full-time contract employee at Newmont Mining's Red Lake Gold Mines (formerly operated by Goldcorp Inc. acquired by Newmont-Goldcorp on April 18<sup>th</sup>, 2019; rebranded as Newmont on January 6<sup>th</sup>, 2020) in Balmertown, Ontario, Canada.
2. I graduated with a bachelor's degree in Applied Science (Lassonde Mineral Engineering program) from the University of Toronto in 2009, and a master's degree in Applied Geology from Queen's University (Kingston, Ontario) in 2010.
3. I am a registered professional geoscientist with the Association of Professional Geoscientists of Ontario (APGO) (#2489).
4. I have worked continuously in the mineral exploration industry since graduation (approximately 10 years). My experience includes more than 5 years working on gold exploration projects in Northwestern Ontario.
5. I worked on the Property throughout the 2018 fieldwork program described in the attached report.
6. I have no material financial interest in this property and have disclosed any potential conflicts of interest.
7. I am a member of the Society of Economic Geologists. (SEG).

Dated this 22<sup>nd</sup> day of February 2020 at Balmertown, Ontario, Canada.



---

Thomas John Fingas, P. Geo., M.Sc.



# **APPENDIX I**

## **Field Station Notes**

## West Red Lake 2018 Reconnaissance Mapping Station Notes

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-001	421584	5657800	Silicification or just composition of litho? Hard and can smell silica. Locally quartz grains < 0.5 cm in size. Matrix fine grained. Lack of alkalis. Weathers grey, grey fresh surface. Local py disseminations <1%. Hard. Diorite quartz porphyry. Mod spaced fracture set (ten to fifteen cm).	Lydia Calhoun	Thu Aug 23 10:44:53 2018
WRL7-002	421320	5657776	Small ledge outcrop several old cans around. Possible old drill site. Medium green-grey thin-medium bedded ash-crystal tuff. Well defined light grey to medium green-grey mm-2cm scale planar ash bedding/laminations. Undefined foliation.	Jake Dove	Fri Aug 24 09:27:49 2018
WRL7-003	421249	5657731	3x2 partially moss and tree covered exposure. Most likely the DLS carbonate zone. Strong ank-lesser sil altered intermediate volcanoclastic crystal tuff and local volcanic breccia. Visible 1cm wide rounded qtz fragment (within rep sample). Ankerite/Fe carb alteration intensity increases to the south correlating to a change in rock type from a intermediate crystal tuff to a ~more mafic crystal tuff-volcanic breccia. Ankerite alteration is semi pervasive in the south mainly of the more mafic matrix. Strong local mm-4cm wide qtz veining occurring in two main sets predominantly confined to the carbonated more mafic volcanic bx visibly pinching out to th northeast into more intermediate volcanoclastics. Older set is subparallel to volcanic bedding/early fol. Younger xcutting vein set is slightly oblique to shear fabric and appears more mineralized than the ladder. Locally up to 1% vfg-fg and rarely mg subhedral/semicubic disseminated-locally vein hosted py. 1m wide strongly talc-chl altered/sheared domain at the north end of outcrop on a noticeable topographic low. Indistinguishable protolith. Possibly thinly bedded more mafic ash tuff? Northern extend covered by overburden. Majority of veining and carbonate alt occurs to the south of this sheared talc-chl alt unit.	Jake Dove	Fri Aug 24 09:59:14 2018
WRL7-004	421140	5657780	Small moss peeled ledge outcrop. Light grey to medium green weakly layered weathered surface. Medium grey intermediate crystal tuff. Weakly foliated. Weak-moderate patchy to ~banded Ankerite/Fe carb alt commonly adjacent to more chloritic bands. Weak foliation.	Jake Dove	Fri Aug 24 11:55:32 2018
WRL7-005	421094	5657787	Good walking road trending ~330 degrees.	Jake Dove	Fri Aug 24 12:08:53 2018
WRL7-006	421069	5657800	Old trench trending 210 degrees. Small patchy exposure within trench. Strongly ank-weak sil altered possible intermediate crystal tuff or less likely a volcanic flow. Weak-moderate ~creulated shear fabric with minor subparallel barren smokey-glassy qtz-chlorite stringer veinlets. Trace fg-mg semicubic disseminated py. Piece of loose 2m north of outcrop appears similar in texture but is strongly silicified gradually changing to strongly talc-chl altered with strong shear fabric. Silicified domain of loose contains minor qtz-chl veinlets and up to 1% local fg-mg semicubic disseminated py in sili groundmass.	Jake Dove	Fri Aug 24 12:11:30 2018
WRL7-007	420959	5657701	1x2m tree peeled outcrop. Light buff tan to faint brown weathered surfaces. Thick bedded intermediate ash-crystal tuff. Sharp crenulated bedding contact displayed. Finer grained bed of tuff displays weak foliation weak fol controlled ank alt and up to 1.5% vfg disseminated py. Low mag susc of 0.7.	Jake Dove	Fri Aug 24 13:16:28 2018
WRL7-008	420955	5657675	6x2m slope peeled moss outcrop. Light-dark grey weathered surface with weak-mod patchy oxidation. Strongly amygdiloidal and crudely pillowed basalt. Some patchy areas of felsic-intermediate volcanoclastic interpolated into flow giving an unusual appearance on weathered surface. Moderate foliation. Weak joint set ~perp to fol. Minor 1-3cm qtz veining both subparallel to fol and xcutting perp to/crenulated by fol. Patchy sulphide ox is visible throughout exposures Irish some concentration prox to veins.	Jake Dove	Fri Aug 24 13:56:07 2018
WRL7-009	420964	5657659	2m deep historic trench. Very poor exposure. Dark grey-faint brown vfg-fg strongly silicified possible massive basalt. Difficult to distinguish protolith due to overprinting of alt. Strong 1-10cm wide sugary qtz veins with trace-locally 1% py-cpy. Undefined fol due to pervasive silica overprint.	Jake Dove	Fri Aug 24 14:27:05 2018
WRL7-010	420984	5657989	3x2m moss peeled outcrop. Light grey green weathered surface. Dark green fg massive basalt. Weak foliation. Moderate barren 1-12cm scale qtz veins/local vein by oriented subparallel to fol. Mag susc 0.67 0.708 0.806.	Jake Dove	Sat Aug 25 08:04:40 2018
WRL7-011	420910	5657637	1x0.5m ledge outcrop. Medium grey-green intermediate crystal tuff. Local subangular-subrounded feldspar-lesser qtz fragments visible. Crude bedding of with varying grainsize and texture at 290/80 but with low confidence. Mag susc 0.278 0.354 0.456.	Jake Dove	Sat Aug 25 08:30:13 2018
WRL7-012	420892	5657615	1x1m ledge outcrop. Light-medium grey-green intermediate crystal to local volcanic breccia. Minor mafic clasts visible displaying dextral sense of shear along weak-moderate fol. Crude bedding possibly transposed into fol.	Jake Dove	Sat Aug 25 08:45:56 2018
WRL7-013	420877	5657620	Large 4x3m outcrop. Similar to previous. Intermediate-mafic crystal tuff. Slightly more mafic looking in comp than prev. Local weak silicification and minor qtz veinlets at west end of outcrop. Weak fol. Possible crude mineral lineation measured. 0.436 0.404 0 174. 1% local disseminated/blebby Po in silicified domain.	Jake Dove	Sat Aug 25 09:13:17 2018
WRL7-014	420761	5657813	BQ drill collar. No cap. 200 trend/ 45 plunge	Jake Dove	Sat Aug 25 09:50:53 2018

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-015	420761	5657816	2x2m outcrop. Buff tan to medium green weathered surface. Intermediate crystal tuff to volcanic breccia. Irregular anastomosing fabric and bedding. Moderate-strong foliation and slightly oblique crude bedding. Irregular qtz veining/flooding along some bedding planes and occasionally forming lenses/pods up to 8cm wide (reminiscent of flooded pillow triple points). Minor patchy sulphide staining. Very weak brittle jointing fabric xcutting bedding and fol.	Jake Dove	Sat Aug 25 10:02:16 2018
WRL7-016	420699	5657806	Large patchy outcrop on cut line. Light buff tan weathered surface. Strongly foliated felsic ash-crystal tuff. Weak fol controlled sulphide staining. Mag susc 0.02. Note more intermediate compositional bedding found at northwest end of outcrop.	Jake Dove	Sat Aug 25 10:37:45 2018
WRL7-017	420686	5657800	1x1m ledge outcrop. Strong oxidation on weathered surface. Staining occurs over a 1m wide width. Strongly silicified and foliated felsic-intermediate ash-crystal tuff. Up to 1% fol controlled py-po. Minor qtz-chl-actinolite(?) trace py-po veinlets at south end of oxidized domain orient d subparallel to fol. Mag susc 0.387 0.798 0.902.	Jake Dove	Sat Aug 25 11:13:34 2018
WRL7-018	420647	5657775	4x2m moss peeled outcrop. 40cm wide sugary grey-white qtz vein crosscutting silicified felsic-intermediate ash-crystal tuff. Strong silicified and weak-strongly oxidized and locally sheared vein margins about 10-15cm wide. Northeast footwall margin is significantly more oxidized than southwest hanging wall. Barren internal vein. Trace-1% py-po-trace cpy along vein margins and disseminated within silicified wall rock. Greater sulphide min on northeast footwall margin. Vein strikes subparallel to fol but dips to the southwest in opposite direction than fol. 3 samples taken across strike of vein.	Jake Dove	Sat Aug 25 12:01:28 2018
WRL7-019	420626	5657773	Old trench trending 360 degrees with strong vegetation cover. Appears to be along strike of qtz vein at previous station.	Jake Dove	Sat Aug 25 12:24:40 2018
WRL7-020	420573	5657759	Small slope outcrop on topo high.	Jake Dove	Sat Aug 25 12:36:16 2018
WRL7-021	420569	5657762	Moss peeled slope outcrop along topo high. Medium grey-green weathered surface. Dark green fg-mg massive basalt or possible gabbro. Fairly rounded topo high surface. Undefined fol. 1-2% fg-mg cubic disseminated pyrite. Slightly higher mag susc compared to previous units of 4.62 1.75 1.26. Geochem sample taken.	Jake Dove	Sat Aug 25 12:46:41 2018
WRL7-022	420527	5657738	Dark-medium green weakly foliated intermediate-mafic volcanic tuff with ~1% subhedral pyrite	Jake Dove	Sat Aug 25 13:02:31 2018
WRL7-023	420452	5657723	Large steep slope outcrop beside topo high. Directly north of low topo. Light grey to blueish green strongly foliated and silica-fuschite-minor chl altered felsic-intermediate crystal-lapilli tuff. Local patchy oxidated surface in upper area of outcrop marking the northerly fuschite-chl alteration contact. Semi pervasive fuschite-minor chl alteration increases intensity to the south. Weak sporadic 1-5cm qtz veining oriented predominantly subparallel to fol. Mag susc of 0.027.	Jake Dove	Sat Aug 25 13:38:54 2018
WRL7-024	420425	5657812	Large rounded topo high outcrop in what appears to be an old drill pad. Light buff tan strongly foliated qtz rich felsic crystal-lapilli tuff. Distinct mm-0.5cm scale subrounded-subangular qtz fragments throughout entire unit more consistently than other felsic and intermediate volcaniclastics seen. Strong semipervasive-vein controlled silicification. Intense mm-4cm wide qtz veining at several orientations both subparallel to and oblique to fol.	Jake Dove	Sat Aug 25 14:35:22 2018
WRL7-025	420668	5658088	Old trench trending 180.	Jake Dove	Sat Aug 25 15:08:45 2018
WRL7-026	420452	5657120	Large road outcrop. Light white-tan weathered surface. Felsic crystal tuff. Local subrounded qtz fragments up to 2mm visible. Crude bedding oblique to moderate foliation. Minor 2-5cm scale barren looking qtz veining at northwest end of outcrop.	Jake Dove	Sun Aug 26 08:46:15 2018
WRL7-027	420467	5657156	Peeled moss outcrop on topo high ridge. Ridge trends 110. Same as previous station. Light tan weathered surface. Felsic crystal tuff. Moderate foliation.	Jake Dove	Sun Aug 26 09:07:09 2018
WRL7-028	420465	5657218	Small ledge outcrop. Light grey weathered surface. Felsic lapilli tuff. Slightly coarser grained than units to the south. Contains abundant subrounded qtz lapilli up to 0.5mm. Moderate foliation.	Jake Dove	Sun Aug 26 09:17:58 2018
WRL7-029	420421	5657243	Large roadside outcrop. Same as previous station. Light grey weathered surface. Felsic lapilli tuff. No visible bedding. Moderate fol.	Jake Dove	Sun Aug 26 09:28:36 2018
WRL7-030	420348	5657373	1.5x0.5m moss peeled outcrop. Similar to last outcrop. Light grey weathered surface. Weak foliation. One 2cm barren looking qtz vein xcutting slightly oblique to fol.	Jake Dove	Sun Aug 26 09:46:20 2018

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-031	420340	5657418	2x4m patchy moss peeled outcrop. Interesting outcrop. Locally sheared/alternated faulted and veined intermediate to locally felsic crystal-lapilli tuff. 1m wide chl-ank+/- fuschite altered shear zone occurs at north side of outcrop (ultramafic contact?) containing a large 25cm wide fragmented and curved qtz vein and smaller planar 0.5-2cm wide ~perpendicular veins within in. Small mm scale brittle fault marking the approximate southern margin on shear zone. Shear zone contains Ankerite-po stringers/veinlets subparallel to main shear fabric and 1-locally 3% fg-cm cubic disseminated py. Larger qtz veins oblique to shear fabric contain trace py at margins and ank-chl+/-minor fuschite alt halos with 1-2% cubic disseminated py.	Jake Dove	Sun Aug 26 10:18:59 2018
WRL7-032	420339	5657410	3x2m ledge outcrop at edge of too high. Intermediate ash-crystal tuff (south) and felsic qtz-lapilli tuff bedding contact. Weak thin bedding visible in intermediate portion. Moderate barren looking mm-1cm scale qtz veining in felsic portion oriented subparallel to bedding and fol. Weak-moderate fol.	Jake Dove	Sun Aug 26 12:33:09 2018
WRL7-033	420345	5657461	Small ledge outcrop north of swamp. Massive dark green mg-ch chl-actinolite rich basalt or gabbro. Weak-moderate interstitial silicification Undefined fol.	Jake Dove	Sun Aug 26 12:50:29 2018
WRL7-034	420386	5657527	Felsic ash-crystal tuff. Strong foliation. Minor local fuschite alteration forming along some fol planes. Weak barren looking mm-3qtz veins oriented parallel to fol.	Jake Dove	Sun Aug 26 13:27:22 2018
WRL7-035	420315	5657735	Small ledge outcrop. Strongly fuschite-silica altered and mineralized felsic ash tuff. One large 10-15cm wide barren a ankerite vein xcutting oblique to fol. Strong mm-1cm wine qtz+/-py-lesser Po veining xcutting ~perpendicular to larger Ankerite vein and slightly oblique to fol. Locally 2-4% fg subhedral disseminated-lesser vein hosted py and trace po mainly within silicified hostrock as replacement style min. Strong foliation. Low mag susc of 0.404.	Jake Dove	Sun Aug 26 14:23:31 2018
WRL7-036	425882	5656326	Front and ridge outcrop. Ridge trends at 121 degrees degrees. Discretely sheared and faulted basalt and cherty iron formation. Cherty BIF is approximately 1m wide appearing light to dark grey and occasionally green with a strongly sheared north hanging wall contact and east sheared south footwall contact Hanging wall contact of BIF contains a two 10-20cm wide strongly chloritized-lesser Ankerite altered mineralized shear. Shears contain 1-locally 7% vfg-fg shear-controlled py and trace possible Po. BIF contains mag susc of around 14-267 with noticeable decrease to 0.9-1.1 at or proximal to shears. 1.5cm wide chloritic fault gouge xcutting bif. Basalt at the north hanging wall side is strongly silicified with 2-4% fracture controlled-disseminated pyrite sampled. No distinct fabric. South footwall basalt appears relatively unaltered (minus chlorite) with some local Po. Weak-moderate foliation	Jake Dove	Tue Aug 28 11:36:23 2018
WRL7-037	425826	5656315	Small ledge outcrop. Possible overgrown trench perp to ledge trenching 025 degrees. BIF (north) and massive basalt (south) contact. BIF appears less chert and more magnetit bearing (almost black) on fresh surface. Strong mag susc ranges from 163-650 increasing to the north. No visible shearing or fabric in either unit. Weak bedding visible in BIF. Massive basalt to the south contains moderate mm-1cm scale qtz+/-chl-Po-py veining and vein controlled chl alt. Basalt contains 2-6% localized disseminated/blebby-lesser vein controlled Po and trace vein controlled py. Mag susc of basalt ranges from 1-6 in basalt proximal to contact. Contact between the two is fairly gradual making it difficult to measure.	Jake Dove	Tue Aug 28 13:01:53 2018
WRL7-038	425793	5656334	Tree peel/ moss peel 2m wide decent exposure. Large topo high gabbro to the north of outcrop. Silicified feldspar porphyry angular bolder ranging from .5 to 1m ( possible from felsic intrusion to the west of outcrop). Weathered surface is light gray to gray. Massive gecko skin gabbro unaltered and very little to no mineralization. No foliation noticed. Trace to 1% qtz veinlets ranging from mm to cm wide. Magnetic susceptibility ~0.5. South end of outcrop there is a ~20cm felsic dyke. Trace to 1% sulphides mostly pyrite. Strongly foliated. Sample grabbed for assay.	Jake Dove	Tue Aug 28 13:48:07 2018
WRL7-039	425690	5656410	Old grown in trench trending ~330 degrees. Light-medium grey-green weakly silicified qtz-feldspar porphyry. 10-15% subrounded qtz phenos up to 0.5cm wide in a fg-mfg felsoar marrix. 10% interstitial chlorite with associated vfg trace-1% py which define a weak foliation. Foliation difficult to see at outcrop only in broken sample. Moderate conjugate joint sets.	Jake Dove	Tue Aug 28 14:28:03 2018
WRL7-040	425611	5656456	Small ledge outcrop at edge of Labrador tea swamp. Light-medium grey and faint green porphyritic QFP/granite. Same as lay station. 10% interstitial weakly aligned chlorite. Trace-0.5% vfg-fg interstitial-disseminated py.	Jake Dove	Wed Aug 29 08:30:55 2018
WRL7-041	425594	5656420	Large rounded topo high outcrop. Same as previous massive QFP/granite. Some weak brittle fabrics similar to other grained station but less intense. Undefined fol.	Jake Dove	Wed Aug 29 08:59:06 2018
WRL7-042	425548	5656430	Small ledge outcrop. Weakly foliated QFP. Similar to previous station but with local foliation. 5-10% interstitial chl. Accessory mg euhedral muscovite books visible.	Jake Dove	Wed Aug 29 09:22:19 2018
WRL7-043	425488	5656443	Rounded topo high outcrop. Same as previous units. Massive QFP. 10% interstitial chl. Trace vfg disseminated py. Weak jointing fabric. Undefined fol.	Jake Dove	Wed Aug 29 09:43:18 2018

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-044	425478	5656483	Large ~linear topo high outcrop trending 100 degrees. Massive fg-mg and rarely cg Feldspar Porphyry. Similar to previous stations but lacking any visible qtz. 10% fg-cg subhedral biotite occasionally forming books. Similar composition to small dyke found on southeast side of pluton but lacking silicification. Undefined or chaotic fractures. Minor 1cm barren looking qtz-carb veining.	Jake Dove	Wed Aug 29 10:00:09 2018
WRL7-045	425484	5656551	Large topo high outcrop. Massive dark green fg gecko skinned gabbro or less likely a massive basalt xcutting by 1-2m scale fg-mg qtz feldspar porphyry dyke. Gabbro contains moderate jointing and weak local qtz+/-py veining mainly localized to edge of topo high. Undefined fol. Mag susc ranging from 2.67-8.9. Veining usually occurs along or subparallel to joint set striking 348. QFP dyke contains moderate mm-1cm scale barren looking qtz veining at 340 and xcut dextral offset by perpendicular fractures. Veining terminates at gabbro contact. Undefined fol. Mag susc of 0.2.	Jake Dove	Wed Aug 29 10:29:25 2018
WRL7-046	425491	5656567	Large too high outcrop. Light grey massive fg-cg strongly porphyritic feldspar porphyry. 10% fg-fg disseminated chlorite (after hbl?). Trace disseminated pyrite. Undefined foliation. No distinct jointing. Minor 2cm barren looking qtz vein striking at 015 degrees.	Jake Dove	Wed Aug 29 11:00:10 2018
WRL7-047	425484	5656603	Large topo high outcrop. Dark green vfg-fg massive basalt. Weak chaotic chl-albite+/-py stringers/fracture fillings at chaotic orientations. Minor local 3cm scale barren looking qtz veins xcut and dextrally offset by fracture set at 280 strike. undefined fol. Mag susc of 0.9.	Jake Dove	Wed Aug 29 11:34:32 2018
WRL7-048	425491	5656612	Old overgrown blast trench trending 030 degrees. Difficult to find bedrock in trench. Local float appears the same as last station massive basalt with weak chl-albite stringers/fracture fillings.	Jake Dove	Wed Aug 29 11:51:14 2018
WRL7-049	425528	5656625	Large patchy outcrop on too high. Massive fg basalt with weak sausserite fracture fillings. Weak localized anastomosing fol. Mag susc of 0.5-0.8.	Jake Dove	Wed Aug 29 12:02:29 2018
WRL7-050	425518	5656656	Small outcrop. Massive fg basalt. Moderate local fol.	Jake Dove	Wed Aug 29 12:18:10 2018
WRL7-051	425510	5656696	Large patchy outcrop moss cover on topo high. 0.8-1 mag. Medium grain massive gabbro. No foliation. Weak jointing fabric.	Jake Dove	Wed Aug 29 12:33:25 2018
WRL7-052	425487	5656742	Large subrounded topo high outcrop. Medium green vfg massive mafic volcanics with mod-strong light buff tan saussurite rite or carbonate fracture fillings at chaotic orientations. Moderate jointing fabric. Mag susc of 0.8.	Jake Dove	Wed Aug 29 12:47:59 2018
WRL7-053	425516	5656759	3-4m high cliff ridge trending 087 degrees. Massive fg basalt basalt. Moderate mm scale carbonate+/-qtz fracture fillings at chaotic orientations. Undefined fol. Mag susc of 0.7.	Jake Dove	Wed Aug 29 12:57:57 2018
WRL7-054	425508	5656823	Tiny outcrop south of road. Light pale green vfg massive basalt. Undefined fol.	Jake Dove	Wed Aug 29 13:07:54 2018
WRL7-055	425506	5656924	Very large patchy outcrops in cleared area. Massive mg-fg gabbro. Weak local fol. Mag susc of 0.9.	Jake Dove	Wed Aug 29 13:15:52 2018
WRL7-056	425629	5656943	Large outcrop on topo high. Dark grey medium grain massive gabbro. Moderately well defined joint fabric. Localized foliation in 1cm bands. 1-3 mag sus	Jake Dove	Wed Aug 29 13:44:55 2018
WRL7-057	425677	5657001	1-2m wide ledge outcrops along edge of topo high. ~3m wide shear. Could be a sheared vesicular basalt wedge (some pitting visible) or finer grained portion of gabbro. Moderate mm-4cm wide cloudy grey to vitreous/glassy qtz+/-trace localized py-po veins within and subparallel to shear. Moderate vein-shear controlled chloritization.	Jake Dove	Wed Aug 29 14:18:34 2018
WRL7-058	425702	5657042	Large cliff face. Massive fg-mg gabbro. Weak local fol. Mag susc of 0.6.	Jake Dove	Wed Aug 29 14:43:35 2018
WRL7-059	425753	5657041	Old grown in trending 033 and 280 degrees. Lots of vein material on surface of outcrop (loose). Some visible sulphides py malachite and other. Massive fg-mg gabbro with 2m wide wedge of sheared vesicular basalt. Shear basalt is strongly chloritized with weak internal 0.5-2cm wide discontinuous cloudy grey-locally glassy qtz+/-local py-malachite-other metallic blue-black copper ore mineral (covellite?) veins subparallel to shear fabric. Larger qtz veins are oblique to shear and appear weakly folded. Only ne visible 10-15cm scale qtz vein visible in bedrock subparallel to 288 trending trench. All other veins were removed as represented by loose on top of outcrop.	Jake Dove	Wed Aug 29 15:00:00 2018
WRL7-060	425744	5657093	Large cliff top outcrop. Massive mg gabbro. Weak cm scale bleached bands with local fol.	Jake Dove	Fri Aug 31 10:18:37 2018
WRL7-061	425714	5657104	Small angular pieces of gabbro loose. Massive game gabbro. Undefined fol.	Jake Dove	Fri Aug 31 10:31:59 2018
WRL7-062	425751	5657161	Small ledge outcrop. Massive mg gabbro. Undefined fol.	Jake Dove	Fri Aug 31 10:39:45 2018
WRL7-063	425707	5657226	Spruce-Labrador tea swamp. Facing north.	Jake Dove	Fri Aug 31 10:45:44 2018
WRL7-064	425710	5657236	1-3m high ledge oucrop. Light brown weathered surface with dark mg subrounded grains throughout. Dark greenish grey massive fg-mg ultramafic. Undefined fol. Moderate-strong magnetism with pen (no mag susc in field).	Jake Dove	Fri Aug 31 10:50:15 2018
WRL7-065	425737	5657252	Same as previous. Massive fg-mg uiltramafic. Undefined fol. Strong magnetism.	Jake Dove	Fri Aug 31 10:59:34 2018
WRL7-066	425774	5657230	Large whaleback topo high outcrop trending 065 degrees. Massive fg-mg gabbro with 10-15cm wide discrete shear xcutting. Shear light grey laminated and weakly wavy with moderate subangular qtz-carbonate vein fragments along fabric.	Jake Dove	Fri Aug 31 11:28:37 2018

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-067	425817	5657177	Small ledge outcrop on steep hill. Massive mg gabbro. Undefined fol.	Jake Dove	Fri Aug 31 11:51:00 2018
WRL7-068	425821	5657170	Small ledge outcrop on hill. Same as previous. Massive mg gabbro. 5cm pale tan bleached and weakly veined possible fault scutting. Possibly fault contains chlorite fabric and moderate mm-2cm wide discontinuous qtz veining.	Jake Dove	Fri Aug 31 11:57:17 2018
WRL7-069	425835	5657102	Large lichen covered outcrop on topo high. Massive fg-mg gabbro. Undefined fol. Moderate local jointing fabric.	Jake Dove	Fri Aug 31 12:09:45 2018
WRL7-070	425888	5657186	Moss peeled outcrop. Massive fg-mg gabbro. Weak local fol. Minor carbonate fracture fillings.	Jake Dove	Fri Aug 31 12:26:34 2018
WRL7-071	425929	5657248	Large lichen covered outcrop on topo high. Massive fg-mg gabbro cut by two slightly oblique 5-15cm wide shears. One larger shear truncates the smaller one. Shears experience weak-moderate ankerite alt hosting moderate 0.5-3cm scale discontinuous qtz veins locally folded and fragmented. Some veins appear as parasitic S folds suggesting sinistral sense of shear. A weaker set of qtz veins splay off oblique to shear with weak sulphide staining. No visible sulphide staining in veins. Two moderate-strong joint sets ~perpendicular to each other.	Jake Dove	Fri Aug 31 13:07:38 2018
WRL7-072	425936	5657273	Large 2-3m high ledge. Massive fg-mg gabbro. Undefined fol. Weak qtz-calcite veining at irregular orientations.	Jake Dove	Fri Aug 31 13:45:32 2018
WRL7-073	425934	5657285	Rounded ledge outcrop. Massive fg-mg ultramafic (pyroxenite?). Appears intrusive. Strongly magnetic. Undefined fol.	Jake Dove	Fri Aug 31 14:04:13 2018
WRL7-074	425995	5657344	Moss peel along small ridge poor exposure. Massive fg-mg gabbro. Undefined fol.	Jake Dove	Fri Aug 31 14:15:42 2018
WRL7-075	426020	5657361	Poor ledge exposure. Massive vfg basalt. Undefined fol.	Jake Dove	Fri Aug 31 14:25:38 2018
WRL7-076	426026	5657353	1.5m wide and 2.5m long exposure. Hand stripped. Locally sheared mafic volcanoclastic breccia. One strong 10-15cm wide chloritic shear visible at northwest side of exposure parallel to dominant fol in outcrop. Local oblique fabric (weak shear local fol?) visible at southwest corner of exposure with mm-cm scale parasitic kink folding of the dominant fol within it. The two shear fabrics possibly intersect to the northwest of outcrop under overburden. Moderate-strong shear controlled chl alt. Moderate localized shear-stringer controlled ank alt. Very strong local silicification forming 10cm wide pale green sugary band with strong disseminated sulphide mineralization (up to 5% po-lesser py) with faint mm scale internal laminations (relict bedding within thin BIF? Deformation laminations?). Weak patchy silicification in other areas of outcrop along similar trend. The mafic volcanic breccia contains minor moderately flattened slightly more felsic sigmoidal clasts up to 6cm long and 3cm wide commonly more oxidized than the chloritic matrix. Strong vfg-fg disseminated py-poss aspy-lesser po of varying proportion throughout (locally up to 6% in silicified band). Sulphides locally form mm scale laminations with chlorite along dominant fol. Trace fracture controlled/veinlet hosted cpy (sample A738343). Strong fracture filling/breccia infilling py at north side of exposure (sample A738344). No prominent qtz veining visible. Mag susc of outcrop is inconsistent ranging from 0.779-1.2 with one outlier of 32. Strong magnetic pull on compass when measuring shear at northwest corner of outcrop (45 degrees pull) but mag susc could not detect the source in outcrop (bif or ultramafic under overburden to the northwest?).	Jake Dove	Fri Aug 31 14:41:42 2018
WRL7-077	425906	5657123	Possible shear. Revisit.	Jake Dove	Fri Aug 31 15:05:56 2018
WRL7-078	426094	5657463	Small moss peeled ledge outcrop. Massive vfg basalt. Undefined fol. Trace disseminated py.	Jake Dove	Sat Sep 1 11:39:44 2018
WRL7-079	426133	5657501	Small subcrop. Same as previous. Massive fg basalt. Undefined fol.	Jake Dove	Sat Sep 1 11:49:21 2018
WRL7-080	426133	5657501	2x1m wide moss peel d topo high outcrop. Massive mg gabbro. Undefined fol. Strong jointing fabric. Minor irregular/discontinuous qtz vein breccia.	Jake Dove	Sat Sep 1 12:07:22 2018
WRL7-081	426213	5657581	Very small moss peeled outcrop. Massive vfg-fg massive basalt. Undefined fol. Moderate jointing fabric similar to last outcrop.	Jake Dove	Sat Sep 1 12:24:20 2018
WRL7-082	426278	5657561	Large topo high outcrop. Massive vfg basalt. Undefined fol.	Jake Dove	Sat Sep 1 12:43:33 2018
WRL7-083	426518	5657495	Large topo high outcrop in cleared area. Massive vfg-fg basalt. Undefined fol. Two sets of strong brittle jointing.	Jake Dove	Sat Sep 1 12:58:27 2018
WRL7-084	426491	5657481	Very large outcrop. Appears historically sampled. Strongly sheared and locally folded basalt. Contains two very large 3-7m sub parallel anastomosing shears. 3m south shear marks the basalt(north) and gabbro(south contact) and appears to pinch out to the east. The north shear contains abundant boudinaged and folded milky white qtz veining mostly barren looking with more red staining to east of outcrop. Trace pyrite observed. Strong parallel barren qtz veins up to 60cm wide. Shears are chloritized and lack other alt. Smaller .5-1m discontinuous parallel shears along major shear also contain boudined barren qtz veins	Jake Dove	Sat Sep 1 13:19:49 2018
WRL7-085	425883	5656761	Moss peeled ledge outcrop along top high edge. Massive vfg-fg basalt. Weak local fol. Minor 1cm discontinuous qtz veining subparallel to local fol.	Jake Dove	Sun Sep 2 07:57:22 2018



Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-086	425956	5656739	Large outcrop on slope of topo high. Same as previous. Massive basalt. Weak anastomosing fabric at 065 degrees forming in/proximal to cm wide weakly carbonate altered bands (possible flow bands) minor discontinuous 1-4cm scale qtz veins/lenses subparallel to weak anastomosing fabric.	Jake Dove	Sun Sep 2 08:13:25 2018
WRL7-087	426007	5656741	Small ledge outcrop on hill side of topo high. Massive vfg-fg basalt with moderate anastomosing fol. Slight brownish oxidation in comparison to previous outcrops. Minor 1-2cm scale carbonate-chl bands subparallel to fol.	Jake Dove	Sun Sep 2 08:36:09 2018
WRL7-088	426006	5656719	Large 2m high ledge on edge if topo high. Strongly foliated and moderately bedded mafic ash tuff to the northeast and massive basalt south southwest with a strongly sheared contact. Mafic ash tuff contains 1-3cm wide alternating dark green chloritic and lighter white ~planar bedding acquiring a strong fol throughout subparallel to bedding. 10-15cm wide non altered shear separates the units. Basalt contains a weak foliation and displays less intense strain. Moderate oxidation non southwest side of shear. Minor mm scale qtz stringers visible with dextral offset along xcutting fractures.	Jake Dove	Sun Sep 2 08:47:46 2018
WRL7-089	426052	5656774	Small moss peeled outcrop on edge of cliff. Weakly foliated andesite. Composition could be locally variable. 20-30cm wide angular smokey qtz-trace py-cpy block and two 1-1.5cm wide discontinuous veinlets.	Jake Dove	Sun Sep 2 09:57:09 2018
WRL7-090	426066	5656783	Bottom of cliff face. Very strong 20cm wide ankerite altered sulphidized shear/fault. Separates andesitic or basaltic flow to the south from mafic ash tuff to the north. Shear/fault is strongly oxidized with localized patchy semi massive py in some areas. Sigmoidal qtz lenses visible along shear fabric. No significant vining visible. Mafic ash tuff tho the north is thin-medium bedded with mm-3cm scale alternating green chloritic and light grey planar bedding appearing slate when broken. Low mag susc of 0.2-0.3 with 8m shear and tuff.	Jake Dove	Sun Sep 2 11:06:33 2018
WRL7-091	426109	5656807	Moss peeled ledge outcrop. Strongly Ankerite altered and moderately sulphidized 1-2m wide shear zone. Strong surface oxidation of both and sulphides. Host rock may be an intermediate ash tuff. Unaltered mafic ash tuff directly to the southwest and bleached ~felsic looking volcanic to north. Shear visibly contains 1-2% shear controlled py-po commonly forming along fabric. More sulphides likely present based on amount of oxidation. Possible brittle fault xcutting shear fabric. Higher mag susc than previous shear at 2-15.	Jake Dove	Sun Sep 2 12:10:55 2018
WRL7-092	426125	5656837	Small ledge outcrop. Massive mg gabbro. Undefined foliation. Weak jointing fabric at inconsistent orientations. Mag susc of 1.57.	Jake Dove	Sun Sep 2 12:47:47 2018
WRL7-093	426095	5656927	Large patchy outcrop on topo high. Massive mg gabbro. Undefined fol. Mag susc of 0.468-0.772.	Jake Dove	Sun Sep 2 13:09:27 2018
WRL7-094	426135	5656969	Exposure on edge of large outcrop. Appears historically blasted. Massive fg-mg gabbro with strong localized 1-5cm wand and up to 1.5m cloudy-milky white qtz veins. Smaller veins appear weakly wavy at chaotic orientations occasionally containing red oxidation within them. Lager vein is not oxidized and appears barren. Blasting targeted 1.5m vein.	Jake Dove	Sun Sep 2 13:29:59 2018
WRL7-095	426136	5657028	Large patchy outcrop. Massive mg gabbro. Undefined foliation. Stations surrounded large lichen covered gabbro outcrops. Nothing interesting visible. Mag susc of 0.548.	Jake Dove	Sun Sep 2 13:59:51 2018
WRL7-096	426174	5657050	1.5x1.5m moss peeled outcrop. Locally sheared fg-mg gabbro. Strong shear is 20-30cm wide moderately chloritized containing irregular folding and crenulated fabric with minor 1-4cm scale boudinaged/crenulated qtz veins. Veins appear barren.	Jake Dove	Sun Sep 2 14:11:55 2018
WRL7-097	426260	5657064	Edge of large whale back outcrop. Massive fg-mg gabbro. Undefined fol. Weak jointing fabric.	Jake Dove	Sun Sep 2 14:37:54 2018
WRL7-098	426349	5657067	Ledges of large topo high outcrops. Couldn't find showing. Massive mg gabbro. Possible very weak foliation but not reliable. Return to find showing in new day.	Jake Dove	Sun Sep 2 14:53:19 2018
WRL7-099	426351	5657083	Exact location of showing. Sheared and veined possible vesicular basalt. Walked by at end of day. Return for more detail.	Jake Dove	Sun Sep 2 15:00:52 2018
WRL7-100	424488	5657690	Near road. In old gravel pit like area. Knob of oc 3x3 m. Medium green weathered surface. Dark green fresh surface fine grained to very fine/ aphanitic. Gabbro. Surface texture is like sandpaper. No sulphides. Veinkets of quartz discontinuous. Generally low strain with local discrete moderate shear. Mag 0.685	Lydia Calhoun	Wed Sep 5 09:02:36 2018
WRL7-101	424521	5657694	Ridge of oc along old grown road. Outcrop is patchy into the woods, high elevation. Decent sized area. Same as last oc. Similar to last but finer grained. Selvages indicate basalt. Mag 0.6. Low percentage quartz veinlets like previous, discontinous. No sulphides or very minimal. Low strain.	Lydia Calhoun	Wed Sep 5 09:38:41 2018
WRL7-102	424554	5657691	Same. Pillows. Basalt. Has discrete shear about ten cm wide. Quartz vein to side of shear. Lineation not bserved due to anastomosing nature of shear foliation. Otherwise rocks low strain.	Lydia Calhoun	Wed Sep 5 10:04:40 2018
WRL7-103	424606	5657690	Continuation of high ridge of patchy oc.	Lydia Calhoun	Wed Sep 5 10:14:39 2018
WRL7-104	424635	5657722	Small North facing oc lower down on ridge. Half metre high. Five m long. Moss covered. Basalt. Low strain.	Lydia Calhoun	Wed Sep 5 10:25:39 2018
WRL7-105	424679	5657743	Lower down high steep ridge of rock. All basalt. Massive. Low strain. Still no alteration.	Lydia Calhoun	Wed Sep 5 10:40:13 2018

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-106	424708	5657745	Basalt base of steep hill. Possibly slumped so measurements may not be fully accurate. Contains one quartz vein that's ten cm wide and an adjacent one that's one cm. Both same orientation. Minor pyrite. Mag 0.8	Lydia Calhoun	Wed Sep 5 11:04:25 2018
WRL7-107	425016	5657565	Side of hill. Boulders no longer basalt. Pink granite/ granodiorite. Possible sub crop at this location. Uncertain if in place.	Lydia Calhoun	Wed Sep 5 12:20:38 2018
WRL7-112	425001	5656830	South side of woods road. Hill of outcrop about 10x10m . Weathers light grey and looks coarse. Fresh surface medium grained green gabbro. No sulphides observed. Low strain. Massive. Discrete ten cm wide shear, weak.	Lydia Calhoun	Wed Sep 5 14:14:31 2018
WRL7-113	424929	5656686	Aphanitic to very fine grained basalt. Moss covered oc small round hill about 10x10 m. Dark green grey fresh surface. Massive. Low strain. Has weak foliation. Brown scratchable veinlets quartz carb. Offset by fractures, sinistral.	Lydia Calhoun	Wed Sep 5 14:33:40 2018
WRL7-114	425127	5656865	Roadside flat exposure of massive to weakly E-W foliated green weathering basalt. Potential relict pillows sub parallel to fol. No alteration limited strain generally unexciting.	John Fingas	Thu Sep 6 10:19:27 2018
WRL7-115	425164	5656965	Moss peel outcrop on significant east-west trending ridge south of swamp. Probably massive basalt with slightly different green colour very fine. Trace pyrite may be associated with calcite veins which contain no visible sulphides. Moderate foliation fabric. Tension gash calcite veins indicating dominant dextral with minor normal kinematics	John Fingas	Thu Sep 6 10:47:03 2018
WRL7-116	425441	5657071	Massive homogeneous fine grained gabbro - crystalline grey weathering (ie recognizably gabbro) lack of foliation or other geological features	John Fingas	Thu Sep 6 12:45:35 2018
WRL7-117	425339	5657232	Moss peel on side of swamp revealing fine grained massive crystalline basalt - locally slightly coarser grained and appears gabbroic. Could be near contact. Dm spaced pervasive NE joint set	John Fingas	Thu Sep 6 13:40:18 2018
WRL7-119	425146	5657256	Weakly foliated medium grained gabbro	John Fingas	Sat Sep 8 08:12:41 2018
WRL7-120	425160	5657250	Strongly foliated fine dark green volcanics probably right above the gabbro contact suggests the contact is sheared. No	John Fingas	Sat Sep 8 08:18:31 2018
WRL7-121	425231	5657189	Boulder mound.	John Fingas	Sat Sep 8 08:31:45 2018
WRL7-122	425261	5657193	Fine grained basalt massive a few saussaurite streaks unaltered	John Fingas	Sat Sep 8 08:39:34 2018
WRL7-123	425266	5657181	Medium grained gabbro dark green non magnetic no alteration possibly weakly foliated	John Fingas	Sat Sep 8 08:46:11 2018
WRL7-124	425286	5657182	Moderately foliated gabbro (near contact?). Gabbro also with some greyish spotting plagioclase grains. Medium green medium grained a little bit of calcite on slips.	John Fingas	Sat Sep 8 08:52:01 2018
WRL7-125	425293	5657183	Foliated medium grain variolitic gabbro. Moderately foliated with foliation parallel seams of biotite up to a mm wide and moderate orangey calcite. Some glassy/milky quartz bull tension gashes crosscutting foliation	John Fingas	Sat Sep 8 09:01:48 2018
WRL7-126	425306	5657185		John Fingas	Sat Sep 8 09:28:12 2018
WRL7-127	425314	5657209	Pillow variolitic Basalt. Pillows very subtle but with well defined milky/grainy quartz in triple points. Core of pillow consists of cm-scale subtle varioles slightly more felsic with more chloritic rims. Fo too weak to measure	John Fingas	Sat Sep 8 09:33:57 2018
WRL7-128	425420	5657342	Pretty spruce swamp	John Fingas	Sat Sep 8 09:48:54 2018
WRL7-129	425435	5657512	Fine grained gabbro unfoliated but host to a 40 cm folded shear' which hosts a 5-10 cm folded quartz vein. Vein is glassy white to grey mottled also with some pink (kspar) grains and bands. Concord ant to shearing. Structure is very discrete	John Fingas	Sat Sep 8 10:10:21 2018
WRL7-130	425432	5657536	Fine grained gabbro not foliated or mineralized but with a strong spaced cleavage spaced about 3 cm apart	John Fingas	Sat Sep 8 11:20:31 2018
WRL7-131	425450	5657553	Non magnetic actinolite almost 100% dark green needles of actinolite with a thick pale green rind actinolite needles up to 1 cm in length. Very massive rock	John Fingas	Sat Sep 8 11:32:27 2018
WRL7-132	425459	5657575	More non-magnetic actinolite fine grained here with resistant weathering black finer-grained patches in a coarser groundmass. Possibly some sort of autoclastic breccia but my guess (...) is patches of less weathered material in a jointed intrusive or flow. 1 folded greyish quartz stringer	John Fingas	Sat Sep 8 11:39:13 2018
WRL7-133	425470	5657626	A fine plagioclase pyroxenite (almost a gabbro...) dark green some felsic segregations still with upweathering fine patches in places. Cut with some felsic-lined fractures and also hosting a 5 cm grainy-milky greyish quartz vein with some fine kspar and a couple rusty patches. Cut by hairline saussaurite lined shear fracture in one place	John Fingas	Sat Sep 8 11:47:42 2018
WRL7-134	425523	5657682	Fine grained intrusive or probably a very obscurely pillowed flow with dark chloritic bands defining pillow selvages. Possibly a transitional phase	John Fingas	Sat Sep 8 12:47:54 2018
WRL7-135	425571	5657712	Fine grained dark green gritty pyroxenite less than 5% plagioclase. Minor saussaurite jointing otherwise unaltered.	John Fingas	Sat Sep 8 12:58:16 2018
WRL7-136	425593	5657724	A fine grained basalt obscurely textured probably pillowed but not totally clear. Weak foliation here moderate in places but very patchy development. Weak calcite n fractures	John Fingas	Sat Sep 8 13:07:45 2018
WRL7-137	425640	5657718	Confusing exposure of an unusual fine-grained... gabbro or mafic flow. The gabbro is cut by a 10 cm breccia vein with subrounded gabbro xenoliths in a gabbro matrix. The vein becomes diffuse and dies out over about 50 cm. The gabbro is also host to rounded diffuse felsic blotches up to 5 cm across possibly 'varioles' (immiscible felsic blobs)	John Fingas	Sat Sep 8 13:22:22 2018

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-138	425678	5657752	Fine grained massive gabbro. Dark green. Strongly jointed.	John Fingas	Sat Sep 8 13:37:10 2018
WRL7-139	425695	5657774	Medium grained gabbro whaleback. Very unaltered not foliated but some moderate cleavage.	John Fingas	Sat Sep 8 13:43:35 2018
WRL7-140	425740	5657819	South end of a coarse gabbro whaleback. Here the gabbro is in sharp but very irregular (m-scale irregularities) contact between fine and coarse gabbroic phases fine gabbro to the north. Contact measurement is approximate	John Fingas	Sat Sep 8 13:56:07 2018
WRL7-141	425729	5657832	Small subcrops in deep moss moderately foliated fine grained green basalt contains a felsic band pinching from 1 to 10 cm. Tentatively a mafic tuff well banded possibly a weak foliation parallel banding	John Fingas	Sat Sep 8 14:18:47 2018
WRL7-142	425733	5657868	Small overgrown pit striking 75 degrees 1.5 x 1.5 x 3 m apparently due to expose some saussaurite alteration in a massive basalt flow associated with 2% disseminated pyrite. 1 sample taken. Saus alteration is patchy and streaky some small pockets of silica-sulphide foliation is too weak to measure. #M py 2%	John Fingas	Sat Sep 8 14:27:22 2018
WRL7-143	425482	5657536	Gabbro	John Fingas	Sat Sep 8 15:10:31 2018
WRL7-144	423838	5657630	Good exposure along 10 m wide O60 trending ridge. Fine grained massive homogeneous gabbro. Local Early 045-070 trending cm scale shears locally displaced with apparent dextral motion along later 320 discrete shears. Local qtz veins developed within 320 shears localized near intersections w early shears. Potential analogue for larger scale qtz vein clusters	John Fingas	Mon Sep 10 10:48:23 2018
WRL7-145	424026	5657718	Similar to prev station - large ongoing ridge exposure of homogeneous massive gabbro. Weak spaced ENE cleavage. Patchy calcite within rock	John Fingas	Mon Sep 10 12:03:40 2018
WRL7-146	424041	5657753	Several meter wide hand stripping of ridge revealing white weathering felsic intrusive in irregular contact with dark green weathering basalt (could be very fine grained gabbro). Early fabric (SW-NE) well developed in felsic but dominantly overprinted in basalt by later WNW-ESE foliation. Later fabric developed as spaced discrete cleavage/fractures/brittle faults within felsic intrusive (as opposed to pervasive fol in basalt). Local C-S fabric in felsic along later fabric indicated apparent dextral kinematics. 2 sets of veins ONLY within felsic (basalt behaves ductile and doesn't vein whereas felsic behaves brittle and doesn't). One vein set parallel and within early fol (and offset by later fabric). Other set crosscut most fabric and oriented NW (possible extensional veins associated w later fabric). Potential analogue for Rowan type deposit.	John Fingas	Mon Sep 10 12:48:08 2018
WRL7-147	424007	5657937	Small hillside hand peel of relatively bland dark green weathering basalt (slightly coarse grained - could potentially be thought of as gabbro). Weak WNW foliation. Isolated pyrite adjacent to mm-scale qtz filled cavity. Local white / light colour alteration or primary feature sub parallel to foliation.	John Fingas	Mon Sep 10 13:58:44 2018
WRL7-148	423976	5658026	Multi meter hillside hand strip of massive fine grained gabbro or crystalline basalt - could go either way. Weathers dark green. Same as prev station -relatively uninteresting. Two sets of spaced fractures - 030 infilled w qtz and carb and 155 infilled w minor carb.	John Fingas	Mon Sep 10 14:20:48 2018
WRL7-149	423792	5658122	Hillside outcrop adjacent to scenic swamp and WRL 2017 drill hole (proposed by GC to test fold hinge). Intensely sheared ~5 m wide felsic extrusive (same as seen prev in day). Unit intruded basalt and contains narrow isoclinal folded and intensely sheared cm layers of basalt. Basalt is strongly sheared along contacts and transitions to massive ~ 5 m away against strike. Strain is partitioned into felsic unit. Quartz veins localized along contacts of felsic unit but strictly within unit and are sharply cut off at basalt contact (seems very much like Rowan analogy).	John Fingas	Mon Sep 10 14:56:42 2018
WRL7-150	422791	5657545	Beautiful exposure of a fold hinge in rusty highly magnetic iron formation both contacts exposed south contact is with an intensely foliated rhyolite while the north contact is with a phyllitic argillite fine and grey (not slate-like in appearance) possibly part of the same succession. Foliation is mainly confined to ten adjacent units while the bif is mainly foliated a weak cleavage is developed internally in some places and also possible crosscutting cleavage. Bif is bedded n 1-10 cm intervals mainly chert-magnetite chert dominated but with substantial magnetite as well including as well formed bands. No sulphide observed. Strong lineation fold axis parallel is observed in sheared sediments. One small rusty vein crosscutting foliation grey milky appearance with rusty patches and a 3 cm pale halo surrounding (Albite?) is developed within rhyolite just south of the bif contact (not at the contact). Bif thickness on surface about 8 m probable true width 5-6 m although compass indicates other horizons to the north (north of argillite). 1 sample taken. Nnot sunny compass too influenced and the pad is giving variance between measurements of up to 50 degrees so measures are guesstimated from compas	John Fingas	Wed Sep 12 09:42:42 2018
WRL7-151	422710	5657547	10x10m possibly recent drill pad	John Fingas	Wed Sep 12 09:58:25 2018
WRL7-152	422753	5657636	Cherty highly magnetic bif well banded with 1 cm bands of magnetite. Cherty beds are somewhat more argillitic here. No alt and this 3 m exposure is not significantly folded.	John Fingas	Wed Sep 12 11:29:55 2018

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-153	423077	5657459	Moderately foliated contact between a fine dark grey dacitic volcanic no textural features and a weird medium/olive green flow. The flow is coarse in some parts but interbreeding between the two suggests that they are both primary volcanics and the coarser sections do not follow margins of the flow. Flow tentatively identified as an andesite based on paler colour than usual unit is weakly magnetic The dacite is moderately foliated with about 1@ scattered pyrite grains also cut by a couple of milky rusty-spotted quartz veins. Two distinct fabrics are present with one paralleling contacts (flow banding possibly?) and a second one crosscutting quartz veins seem to cut both of these. Contact is strongly folded. 2 geochem samples taken and one assay. #M py 1%	John Fingas	Wed Sep 12 12:15:22 2018
WRL7-154	423075	5657455	Odd unit more olive green coarse grained mafic rock possibly a diorite or maybe an andesitic tuff? With coarse grains of pyroxene but takes up strain very well so possibly an andesitic tuff mod magnetic. Some sections seem to contain occasional grains of quartz or feldspar. This interval is sheared and gossanous with about 3% coarse pyrite sampled. #M py 3%	John Fingas	Wed Sep 12 12:46:42 2018
WRL7-155	423054	5657447	Fine dark grey rhyolite possibly a tuff based on somewhat streaky appearance but no crystals about 2z disseminated pyrite but weak strain and alt. In contact with more of the odd olive green andesite tuff this unit is sheared again with some veinlets of grainy pyrite #M py 2%	John Fingas	Wed Sep 12 13:07:40 2018
WRL7-156	423036	5657431	Intense shear of an ankeritized andesite tuff with small foliation-parallel Ankerite veins and about 10% fine grainy pyrite disseminated throughout. Outcrop has been reduced to chlorite schist with blades of rock weathering out of the hillside. By far the strongest structure I've seen to date at WRL but width is uncertain exposed for at least 5 m but mostly a rubble pile. The shear is host to some folded greyish quartz veins with minor sulphide and 3 cm bleach haloes these crosscut the main foliation and are relatively straight exegesis orientation unclear. #M py 10%	John Fingas	Wed Sep 12 13:19:38 2018
WRL7-157	423025	5657403	Very similar to last outcrop but better exposed here. Folded greyish quartz veins are hosted in a folded strongly foliated rhyolite chlorite and Ankerite altered with about 5% grains and grainy veinlets of pyrite. This unit is in contact with an intensely sheared andesite tuff unit stron by Ankerite altered also with about 5% very fine grainy pyrite. This shear is narrower probably constrained within the andesite only about 1 m wide. 2 samples. #M py 5%	John Fingas	Wed Sep 12 13:45:38 2018
WRL7-158	423019	5657389	Fine grained non magnetic dark green pyroxenite. A bit of cleavage not really deformed otherwise.	John Fingas	Wed Sep 12 14:17:14 2018
WRL7-159	423000	5657366	North contact of the Bif unit (to the south) with a rhyolite. Bif here is deeply gossanous non magnetic cherty to chloritic (ashy?) hard to get a fresh surface. The unit is strongly foliated or weakly sheared. The rhyolite is moderately foliated with about 5% fine sulphides. 1 sample of the bif (gossanous). #M py 5%	John Fingas	Wed Sep 12 14:28:30 2018
WRL7-160	422985	5657364	Rhyolite greenish weathering moderately foliated and moderate pervasive Ankerite alteration about 2% fine disseminated pyrite distinctly feldspar pophyritic on weathered surface. #M py 2%	John Fingas	Wed Sep 12 14:50:46 2018
WRL7-161	422969	5657358	Sheared Ankerite altered rhyolite here with no distinct porphyry texture". Fine pyrite content is less but about 5% pyrite in places as grainy veinlets. Quartz veining mainly bland milky veins makes a weak stockwork next to the shear. #M py 5%	John Fingas	Wed Sep 12 14:56:16 2018
WRL7-162	422937	5657349	Confusing awkward and annoying outcrop at the base of the slope leading into the swamp. Possibly an old pit into the hillside? Mostly a sheared dacite is exposed moderate Ankerite host to a 30 cm quartz Ankerite bullish milky quartz vein in the shear as well as adjacent veinlets. Just north of the shear the dacite is in contact with a fine grained dark grey unit with about 5% fine pyrite seems aluminous and probably a dirty argillite? This is conspicuously folded although it is unclear whether the folded surface is a bedding plane or not. Right to the north of this is a horizon of steep-dipping bif which runs off the outcrop only exposed over 30 cm. The bif is cherty and highly magnetic with black grainy patches of magnetite. Bif does not appear to follow the fold but is strongly foliated or sheared so possibly the fold has been dismembered. 1 sample of the 30 cm vein. No measures taken due to proximity to the bif. #M py 5%	John Fingas	Wed Sep 12 15:12:46 2018
WRL7-163	423610	5657510	A highly magnetic moderately foliated ultramafic large black porphyritic rains (to 1 cm ) of pyroxene in a fine pale grey talcose groundmass probably wehrlite in composition. No particular alteration.	John Fingas	Fri Sep 14 08:01:05 2018
WRL7-164	423627	5657493	Contact area between a fine grained medium green rock nonmagnetic with a thin pale rind massive in appearance probably a fine border phase of the ultramafic and a fine grained gabbro with a modestly developed cleavage. Fo is weak no alt not magnetic.	John Fingas	Fri Sep 14 08:17:16 2018
WRL7-165	423640	5657470	Just south again of the gabbro a medium grained pyroxenite' moderately foliated cut by a couple of more felsic fine strongly foliated dikelets probably internal apolites. No alt no talc not magnetic	John Fingas	Fri Sep 14 08:32:36 2018

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-166	423648	5657455	Pillow flow andesite low strain (no fo). Pillows are a bit coarse grained and triple points are infilled with an odd almost pegmatic diorite-like mix of plagioclase and pyroxene and some quartz. Weakly developed cleavage no alt.	John Fingas	Fri Sep 14 08:38:44 2018
WRL7-167	423654	5657445	Fine gabbro (synvolcanic type?) massive cut by some fine felsic veins and one 2 mm quartz veinlet fairly straight fo too weak to measure.	John Fingas	Fri Sep 14 08:48:48 2018
WRL7-168	423661	5657428	Andesite possibly pillowed but generally texturally indistinct. Moderately foliated with some clots of calcite alteration some clots of quartz-feldspar and a couple late quartz-calcite veins. Foliation is moderate but almost more of a cleavage and is conspicuously folded in places. and joint patterns indicate folding but hard to measure in oc steep dipping fold minor but consistent z-vergence here	John Fingas	Fri Sep 14 08:53:07 2018
WRL7-169	423655	5657414	Low strain pillow andesite	John Fingas	Fri Sep 14 09:18:46 2018
WRL7-170	423649	5657402	Innocuous looking basalt fine on breaking open it is strongly foliated or weakly sheared moderate calcite alt foliation is strongly lineated apparently an obscure crenulation	John Fingas	Fri Sep 14 09:24:13 2018
WRL7-171	423651	5657386	Massive andesite.	John Fingas	Fri Sep 14 09:38:20 2018
WRL7-172	423645	5657370	Fine grained gabbro very massive.	John Fingas	Fri Sep 14 09:40:49 2018
WRL7-173	423638	5657368	Mod heterogeneous probably the transitional phase of this synvolcanic gabbro	John Fingas	Fri Sep 14 09:43:28 2018
WRL7-174	423522	5657356	Boring fine to slightly coarser (grading to gabbro?) andesite flow' one small felsic clot	John Fingas	Fri Sep 14 09:49:41 2018
WRL7-175	423523	5657393	Unusual intrusive possibly late tectonic exposed below base of a cliff here in 2 separate and texturally distinct melanocratic outcrops. One is fine melanocratic looks like the gabbro but a bit more felsic and with some slightly coarser phases cut by some joints and a couple small quartz veinlets. Adjacent is a very coarse grained (pyroxene to almost 1 inch) melanocratic intrusive unlike anything else seen so far but also with some finer phases. Unaltered and low strain. Composition probably more towards gabbro but classified as a diorite to make it distinct from other unit.	John Fingas	Fri Sep 14 09:59:08 2018
WRL7-176	423535	5657407	Shear along a cliff scarp separating um from diorite. Um in shear is slightly magnetic intensely foliated but no mineralization (possible sericite alt? Or possibly a magnetic andesite in the shear? Doesn't look like um...). Just north of the cliff/shear is strongly foliated pyroxenite foliation is possibly folded and the Ne shear probably post dates the throughgoing foliation	John Fingas	Fri Sep 14 10:19:25 2018
WRL7-177	423572	5657416	Massive andesite. Some bullish quartz float here with minor chlorite pyrite sampled also a couple small in situ veins. #M py 1%	John Fingas	Fri Sep 14 10:44:49 2018
WRL7-178	423546	5657390		John Fingas	Fri Sep 14 10:58:26 2018
WRL7-179	423547	5657376	Good exposure of pillowed andesite on high caribou moss covered ground. Minor veining.	John Fingas	Fri Sep 14 11:00:15 2018
WRL7-180	423507	5657360	Andesite	John Fingas	Fri Sep 14 11:03:41 2018
WRL7-181	423480	5657341	Massive slightly coarse andesite weak calcite on joints.	John Fingas	Fri Sep 14 11:07:17 2018
WRL7-182	423422	5657314	Variolitic andesite patches of large (1-2 cm) round or oblong varioles coalescing into a more massive groundmass possibly defining pillows. Essentially unstrained but a couple of milky quartz-chlorite veinlets.	John Fingas	Fri Sep 14 11:10:01 2018
WRL7-183	423394	5657312	Knob of fine synvolcanic looking gabbro nonmagnetic one small granitic sweat.	John Fingas	Fri Sep 14 11:19:35 2018
WRL7-184	423373	5657304	Andesite massive	John Fingas	Fri Sep 14 11:23:32 2018
WRL7-185	423283	5657263	Andesite massive or slightly coarse to variolitic. One section is strongly foliated foliation seems a bit crenulated and may be folded around in some parts of the outcrop.	John Fingas	Fri Sep 14 11:35:09 2018
WRL7-186	423221	5657225	Moderately magnetic um probably pyroxenite no talc. Occurring here on a steep abrupt fault scarp strongly foliated/sheared paralleling the scarp which is in the golden arm direction. The um is weakly pervasively Ankerite Altered and some internal banding of unknown origin is z-folded seemingly by the fault fabric	John Fingas	Fri Sep 14 11:46:49 2018
WRL7-187	423200	5657200	Massive pale green andesite possibly a dacitic andesite. No alt weak fo.	John Fingas	Fri Sep 14 12:34:00 2018
WRL7-188	423184	5657191	A massive andesite cut by a 1 m discrete shear band which appears to control some calcite. Just to the west grades into a fine gabbro	John Fingas	Fri Sep 14 12:40:09 2018
WRL7-189	423180	5657184	andesite. Finely variolitic.	John Fingas	Fri Sep 14 12:51:10 2018
WRL7-190	423197	5657130	Abrupt scarp but not sheared. A very uniform medium grained gabbro distinct from the sun genetic gabbros observed elsewhere probably boundary phase of um.	John Fingas	Fri Sep 14 12:57:42 2018
WRL7-191	423209	5657112	In a small strea valley striking roughly 60 degrees. A moderately magnetic um green black medium grained possibly websterite composition. In situ rocks are unfoliated but some local float is moderate h foliated moderate Ankerite alteration and about 3z fine pyrite. #M py 3%	John Fingas	Fri Sep 14 13:02:14 2018
WRL7-192	423231	5657076	Moderately magnetic black green websterite (?) with 2 obscure banding directions which seem to crosscut each other. No alt and mostly massive	John Fingas	Fri Sep 14 13:17:24 2018
WRL7-193	423247	5657060	Massive fine black green moderately magnetic green in this case is serpentine and the composition is a wehrlite? No fo or alt	John Fingas	Fri Sep 14 13:25:33 2018
WRL7-194	423336	5656982	Good exposure of an unstrained massive fine andesite	John Fingas	Fri Sep 14 13:37:20 2018

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-195	423405	5656905	Small oc of strong magnetic black green massive (wehrlite)? Some serpentine	John Fingas	Fri Sep 14 13:46:10 2018
WRL7-196	423418	5656864	Patchy fine grained synvolcanic gabbro of andesitic composition non-magnetic no part of the um body. Mod foliation	John Fingas	Fri Sep 14 13:51:28 2018
WRL7-197	423439	5656843	Fresh trail running 070	John Fingas	Fri Sep 14 13:56:53 2018
WRL7-198	423452	5656854	Fine uniform mesocratic gabbro probably not part of ten synvolcanic flows more uniform (and just... different) in appearance entered again as a diorite to separate it.	John Fingas	Fri Sep 14 13:59:04 2018
WRL7-199	423485	5656883	More massive gabbro by the road. Very uniform appearance but looks more like the synvolcanic flows... yes this is a capricious character. One small quartz veinlet 1 cm	John Fingas	Fri Sep 14 14:06:32 2018
WRL7-200	423546	5656904		John Fingas	Fri Sep 14 14:11:07 2018
WRL7-201	423635	5656935	Excellent exposure at the margin of a large swamp of a bland pale dacitic andesite or andesite texture ambiguous but vaguely suggests pillows. Foliation picks up to moderate but still sort of... patchy or uneven... along margin of swamp. Mod calcite filling uneven fractures in some places. Uneven appearance maybe due to an overprinting late cleavage	John Fingas	Fri Sep 14 14:13:21 2018
WRL7-202	423765	5657058	Fine uniform melanocratic gabbro.	John Fingas	Fri Sep 14 14:31:12 2018
WRL7-203	423907	5657122	Excellent exposure in the new bush road of a slightly coarse grained andesite weakly foliated no alt.	John Fingas	Fri Sep 14 14:40:06 2018
WRL7-204	424187	5657126	Massive rock uniform appearance probably a coarse andesite but possibly fine-grained gabbro.	John Fingas	Fri Sep 14 14:53:14 2018
WRL7-205	424202	5657127	Well developed pillows in a nice tree topple andesitic pillows no strain but flattened along bedding plane and facing is obtainable.	John Fingas	Fri Sep 14 14:57:47 2018
WRL7-206	424372	5657224	Weakly foliated andesite	John Fingas	Fri Sep 14 15:05:57 2018
WRL7-207	424393	5657229	Fractured fresh gabbroic unit	John Fingas	Fri Sep 14 15:10:44 2018
WRL7-208	424494	5657244	Andesite or fine gabbro patchy appearance suggests the former.	John Fingas	Fri Sep 14 15:13:20 2018
WRL7-210	423669	5657792	Beautifully exposed "trench" of massive greenish rhyolite. Moderately foliated and weakly but pervasively Ankerite altered. With a well developed chlorite mineral lineation on the foliation surface.	John Fingas	Fri Sep 14 15:44:31 2018
WRL7-211	421989	5657287	Rhyolite tuff? No xstqls here but an adjacent streaky green section has quartz xstals.. Strongly foliated weak Ankerite along foliation. Small outcrop has 2 well defined foliations with the later one being more spaced and the earlier being pervasive.	John Fingas	Mon Sep 17 09:10:41 2018
WRL7-212	421998	5657270	On old NS cut line; at least 10 years old	John Fingas	Mon Sep 17 09:27:36 2018
WRL7-213	422155	5657215	Small cliff on large boulder mound exposes a bright white massive rhyolite pale green-tan on fresh surface. This oc weakly cleaved no real foliation weak pervasive Ankerite in little blotches also about 1% py. 1 bull white quartz veinlet. #M py 1%	John Fingas	Mon Sep 17 09:38:54 2018
WRL7-214	422175	5657181	Old road	John Fingas	Mon Sep 17 09:49:00 2018
WRL7-215	422210	5657181	Oc described in detail in sketch. A transposed Bif hosted in massive rhyolite truncated warped and mineralized by a 105 shear. Mineralization includes pyrite and strong dark silicification (replacing chert?). Bif is a chert-chlorite (ash?) dominated thickly banded 1 m wide chlorite/ash layers contain some grainy sulphides up to 50% which may be primary. All parts are highly magnetic even in altered areas potentially fine magnetite since no Po observed. Rhyolite is pervasively ankeritized some local quartz veining. Strong foliation zone is a few metres wide and several across the outcrop but shear zone is only 50 cm or so. #M py 50%	John Fingas	Mon Sep 17 09:49:58 2018
WRL7-216	422293	5657198	Obnoxious little stripped locality very little oc showing and can't be cleared off. Rock is apparently a mix of dark green/glassy rhyolite quartz-crystal tuff and what possibly is an extremely foliated strongly Ankerite altered and almost 50% pyrite andesite?? Need better exposure. Alt points are in the other outcrop station #M py 50z	John Fingas	Mon Sep 17 11:52:31 2018
WRL7-217	422342	5657203	The "porphyry" exposed here a very fractured granitoid is medium grain and unequivocally intrusive. Possibly a diorite or a chlorite-quartz monzonite? A good NS trench here exposes at least 15 m width of the granitoid mostly fairly unaltered. However the central portion is cut by a strong 4 m shear resulting in strong Ankerite and chlorite alteration. Some veining and pyrite in local float probably adjacent this shear. Not really porphyritic. #M py 1%	John Fingas	Mon Sep 17 12:01:22 2018

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-218	422401	5657210	Porphyry hill trench. Large and beautiful exposure no attempt was made to systematically map it given its size and magnetism. Basically the showing consists of a series of ENE striking bifs total succession at least 10 m wide. Bifs are predominantly chert-magnetite+chlorite possibly with some primary sulphide. Bif is interbedded with thin (less than 1 m) andesitic flows. Both are folded around a ESE foliation probably about 105; undisturbed folding is sinistral. Competency contrasts within the bif (chlorite vs. Chert) cause unusual overfolding patterns. Adjacent units are fine rhyolite tuff sometimes with small horizons interbedded. After folding the unit appears to have been intruded by the "monzonite" which cuts bif bedding in the axial planar direction and in one place contains a folded bif xenoliths. Finally the unit was resheared along the axial planar 105 direction often but not always along axial planes of earlier faults. These reshears cause conspicuous drag folding and refolding; one section has a refolded over-fold and the interference pattern is bizarre. Offset also occurs on these shears including offsetting the monzonite finally mineralization occurs within the reshears and within adjacent bif including black silicification rusty quartz veins and abundant sulphide. Some additional complications are likely present (for instance a small limb of unexplained NS striking bif) but this is the general picture. Note that mineralization includes Ankerite. Monzonite is more... "volcanic" looking than at the previous site but contact relations provide it to be tectonic in origin	John Fingas	Mon Sep 17 12:19:43 2018
WRL7-219	422353	5657155	Black highly magnetic websterite minor talc. Rock is massive fine-medium grained looks very blah however contains minor pervasive ankerite	John Fingas	Mon Sep 17 14:24:09 2018
WRL7-220	422316	5657152	Old NS cut line	John Fingas	Mon Sep 17 14:30:11 2018
WRL7-221	422130	5657134	The other porphyry hill trench. This one is somewhat more confusing. Basic map pattern is some large (up to about 8 m wide) chert-magnetite-chlorite+/- sulphide bif these are quite straight with little folding in the south part of the outcrop. However the bif encounters a series of roughly EW shear zones which fold and offset it. Things are greatly confused by the intrusion of more of the fine Monzonite again here with a fine grained almost volcanic appearance. Again the intrusive nature is shown by the presence of a small dike branching off and cutting bedding in the shear direction many bif blocks are very irregular and beds may be discontinuous or hard to follow presumably a result of dismemberment within the intrusion. #M py 15%	John Fingas	Mon Sep 17 14:37:03 2018
WRL7-222	421834	5657243	DDh casing 140/42	John Fingas	Mon Sep 17 15:32:16 2018
WRL7-223	421619	5657201	No other outcrop visible. Appears as possible outcrop but is amongst a large boulder hill. Lithology is out of place in this area. Polymictic matrix supported conglomerate mainly containing sedimentary felsic intrusive and quartz rich clasts up to 5cm wide. Moderate selective flattening of darker quartz poor sedimentary clasts. Moderate foliation.	Jake Dove	Wed Sep 19 10:57:35 2018
WRL7-224	421601	5657171	2-5m tall ridge. Felsic crystal tuff with discrete 10cm weak-moderately chloritized shear. Shear contains moderate mm-3cm scale Ank-chl+/-py-trace cpy-py-bismuth(?) veins subparallel to shear fabric. Lesser mm-1cm wide Qtz-py veinlets cut shear fabric and ank veins within shear. Qtz veinlets also witnessed outside but proximal to shear. Weak pervasive foliation and fol controlled ank throughout majority of exposure	Jake Dove	Wed Sep 19 11:44:50 2018
WRL7-225	421610	5657149	Large boulder ridge trending 240 with thick spruce/alder swamp to the southeast.	Jake Dove	Wed Sep 19 12:49:13 2018
WRL7-226	421712	5656982	Thick spruce swamp from previous station to the northwest till here.	Jake Dove	Wed Sep 19 12:56:52 2018
WRL7-227	421854	5656872	Grassy road trending 240. No outcrop from last station until here.	Jake Dove	Wed Sep 19 13:22:22 2018
WRL7-228	421728	5656805	Continuation of road now trending 220. Large poplar and spruce to the south with alder visible further south. Upland to the north.	Jake Dove	Wed Sep 19 13:28:02 2018
WRL7-229	421623	5656855	2x3m moss peeled exposure on possible drill road trending 154. Weak-moderately foliated vfg-fg rhyolite or felsic ash/crystal tuff. Minor local rounded Qtz fragments visible up to 2mm in size. Moderate jointing slightly oblique to fol. Minor mm scale wavy non continuous Qtz stringers subparallel to fol.	Jake Dove	Wed Sep 19 13:37:18 2018
WRL7-230	421477	5656849	3-5m high ledge trending 246 degrees. ~Massive and oddly soft medium grey vfg rhyolite. Weak disseminated sericite. 2-3% localized vfg-mg disseminated-clustered py and lesser Po. Undefined fol.	Jake Dove	Wed Sep 19 14:15:02 2018
WRL7-231	421449	5656831	2m high ledge. Same as previous station. Moderately foliated and ~soft medium grey vfg-fg rhyolite or dacite. Weak-moderate disseminated sericite. 1% localized fg-mg cubic disseminated py. Undefined fol.	Jake Dove	Wed Sep 19 14:43:09 2018
WRL7-232	421431	5656876	Felsic volcanic-basalt contact. Strong local ankerite+/-chlorite-pyrite-minor Qtz veining and weak shearing at gradual contact. Moderate local chlorite-fuschite alt within weakly sheared domain. 1-3% local vfg-fg cubic disseminated and lesser anhedral vein controlled py in shear/veined domain. End of day. Return for more info.	Jake Dove	Wed Sep 19 15:35:55 2018
WRL7-233	421435	5656924	Nice road trending 060.	Jake Dove	Wed Sep 19 15:52:27 2018
WRL7-234	421811	5657158	Good road trending north.	Jake Dove	Wed Sep 19 16:03:42 2018

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-235	424308	5657522	East west trending ridge of outcrop. Moss covered. 2-3 m wide by 10 long. Fine to medium grained massive gabbro. Dark black to dark grey green. Minimal amount of quartz veinlets. No alteration. Strain very low. Non magnetic with magnet.	Lydia Calhoun	Thu Sep 20 10:08:30 2018
WRL7-236	424234	5657460	Round Hill of oc. About 15 m diameter. Moss covered. Fine grained massive gabbro, dark grey. Weakly foliated. Two veinlet sets, one shallow and less common one moderately dipping. Spaced fracture set sub parallel to weak foliation. No alteration.	Lydia Calhoun	Thu Sep 20 10:28:09 2018
WRL7-237	424221	5657410	Round oc knob ten m diameter. Lighter coloured intrusive, massive. Light grey white, pale green. More dioritic/ Monzo-gabbro. Would consider as Same unit as previous two stations. No alteration. Low to no strain.	Lydia Calhoun	Thu Sep 20 10:54:33 2018
WRL7-238	424090	5657402	Sub crop of same fine to medium grained gabbroic unit.	Lydia Calhoun	Thu Sep 20 11:09:20 2018
WRL7-239	424069	5657429	Elongate hill of gabbro trending east west for 15m. Massive. Medium grained. Dark green-grey. Quartz veinlets. No alteration.	Lydia Calhoun	Thu Sep 20 11:15:09 2018
WRL7-240	422383	5657121	Easy trail trends ENE	Lydia Calhoun	Thu Sep 20 12:49:01 2018
WRL7-241	422519	5657223	Extent of station WRL7-218	Lydia Calhoun	Thu Sep 20 13:15:24 2018
WRL7-242	422552	5657163	Swamp	Lydia Calhoun	Thu Sep 20 13:18:15 2018
WRL7-243	422626	5657056	NNE trending ridge of oc about two m high. Next to walking trail that nicely bypasses a swamp. Layered ultramafic. Some sections aphanitic, dark grey green. Well layered to more massive volcano stratigraphy. Slickenlines common with green mineral, Serpentine(?). Beds are about 20 cm to 0.5 m thick. Some beds are tuff with fragmented ultramafic. Moderately magnetic. Hard to hit unit. No alteration evident. No sulphides seen. Irregular discontinuous quartz veins.	Lydia Calhoun	Thu Sep 20 13:26:16 2018
WRL7-244	422776	5657036	Very large tall elongate ridge trending SW. Medium grained gabbro, massive. Locally intruded by intermediate felsic dioritic medium grained dikes. Associated stockwork blebby veining of quartz and k spar (granitic). No alteration or sulphides.	Lydia Calhoun	Thu Sep 20 14:22:09 2018
WRL7-245	421449	5656885	Very long 1-3m tall ridge trending 250 degrees. Several large massive Ankerite veins commonly 1-2.5m wide crosscutting a vfg-fg dacitic flow or intermediate crystal tuff. One 2m wide moderately chloritized-ankeritized shear zone visible with smaller cm scale ankerite veinlets oriented along shear fabric. Isolated shear fabric visible crosscutting through massive Ankerite veins and occasionally offsetting/slightly crenulating internal quartz veinlets with evidence of sinistral sense of shear. Weak wavy and somewhat polished shear plane visible along broken rock face within large Ankerite vein oriented oblique to larger shear zone at 040/68 but this observation is uncertain. Strong internal mm-6cm scale milky white qtz+/-chlorite-sericite-trace pyrite boxwork and ladder veining within massive ankerite veins. Local tourmaline visible in larger quartz ladder vein (sampled). One dominant ladder vein set with strong preferred orientation measured. Local chlorite+/-sericite- vein alteration halos commonly associated with internal quartz veining. Possible 10cm wide fault (strong rusting soil and root growth along it). Appears to truncate a 4cm wide quartz vein and drag the dominant fabric along it. May be the cause of differing orientation of Ankerite veins on west and east side of possible fault structure. Folded vein and fabric on west side(?)	Jake Dove	Fri Sep 21 11:49:54 2018
WRL7-246	421426	5656872	Outcrop along ridge orientated NE/SW. Decent exposure of a mafic or intermediate extrusive rock. Moderate chlorite altered shear zones extending ~1 meter wide. Larger Ankerite vein ~0.5 meter wide and little Ankerite stringers found throughout rock. Trace amount of sulphides mostly pyrite.	Jake Dove	Fri Sep 21 13:42:57 2018
WRL7-247	421413	5656868	6m tall subrounded cliff face. Medium grey-green vfg-fg andesite. One large 1.5m discontinuous Ankerite vein hosting 4-5 internal 1-3cm scale planar quartz-tourmaline ladder veins within it similar to station WRL7-245 but with no fuschite alteration halo. Quartz tourmaline veins are spaced 40-60m apart appearing barren. Ankerite vein pinches out to the northwest with irregular orientation. Moderate foliation throughout outcrop.	Jake Dove	Fri Sep 21 14:12:11 2018
WRL7-248	421222	5657138	Very small moss peeled exposure. Felsic crystal tuff. Visible 1mm wide subrounded qtz fragments visible. Strong local fol. Moderate localized 1-2cm barren looking quartz veins associated with fol domain. Veins strike ~perp to fol dipping steeply to the west.	Jake Dove	Fri Sep 21 15:00:20 2018
WRL7-249	422498	5658004	Post for drill collar HYR-08-22. No actual found near post.	Jake Dove	Wed Sep 26 09:45:25 2018
WRL7-250	422511	5657997	Large patchy outcrop at drill pad. Beautiful exposure. Thinly interbedded chert-magnetite and siltstone BIF. Bedding ranges from mm-5cm and less commonly 20cm scale. Local moderate-tight isoclinal/parasitic folding at southeastern corner of exposure potentially forming S fold. No pervasive foliation. No significant brittle deformation or veining visible. Mag susc varies from 411-1880.	Jake Dove	Wed Sep 26 09:50:42 2018
WRL7-251	422536	5658027	Small 2x1m outcrop on downhill slope of drill road. BIF. Less defined bedding than previous outcrop. No folding visible.	Jake Dove	Wed Sep 26 10:17:40 2018



Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL7-252	422563	5658137	Small 1x1m outcrop to the southeast of old drill pad. Light-medium grey vfg-fg siliceous sandstone. Beds vary from 3 to >30cm scale with local selective Ankerite-sericite alteration of thinner <5cm scale beds. Strong axial planar cleavage/fol oblique to bedding. Weak mm scale qtz stringers subparallel to axial planar cleavage.	Jake Dove	Wed Sep 26 10:33:37 2018
WRL7-253	422645	5658225	1.5x2m exposure. Massive fg basalt top of hill. Mag sus .60-1.0. Weakly foliated. No veining.	Jake Dove	Wed Sep 26 11:26:03 2018
WRL7-254	422673	5658220	2x1m moss peeled outcrop. Moderate-strongly foliated basalt. Possible weakly preserved pillows or flow textures visible. Morderate patching/foliation controlled bleaching (carbonate?). No veining. Mag susc of 0.5.	Jake Dove	Wed Sep 26 11:51:47 2018
WRL7-255	422507	5658274	1m tall and 2m long ridge outcrop. Massive to weakly foliated fg basalt. Weak fracture-foliation controlled carbonate alt. 1-locally 3% vfg anhedral disseminated Po-lesser py. Mag susc up to 1.	Jake Dove	Wed Sep 26 12:21:01 2018
WRL7-256	422342	5658231	3x2m moss peeled outcrop. Poorly sorted olyomictic matrix supported conglomerate containing 30-40% subrounded-rounded quartz-felsic intrusive-lesser dark grey sedimentary clasts. Clasts range from 1-3cm scale in a fg-mg sandstone matrix. Moderate pervasive foliation. Moderate local patchy sulphide staining. Trace-1% visible vfg-fg disseminated py-lesser Po. Minor mm scale shallow dipping extensional barren looking quartz veins.	Jake Dove	Wed Sep 26 12:53:54 2018
WRL7-257	422338	5658158	Large exposure in clearing. Strongly foliated quartz crystal tuff. Mostly 1 mm clasts subrounded good sphericity. Creamy white colour.	Jake Dove	Wed Sep 26 13:24:31 2018
WRL7-258	422246	5658203	15x4m outcrop on subrounded elongate topo high trending roughly 280 degrees. Only above 4x2m exposed at station. Not significantly oxidized in contrast to other bif stations previously. Interbedded vfg-fg quartz rich sandstone-mudstone bearing BIF. Some localized magnetite-trace pyrite within and along thicker sugary/weakly oxidized qtz sandstone beds. Strong local bedding controlled chloritization associated with magnetite rich bedding. Beds range from mm-30cm scale with dark mudstone beds discontinuous commonly forming thin elongate lenses-pods within sandstone. No observed folding or foliation. No veining. Mag susc ranges from 0.25 in non magnetite bearing beds and 10-174 in magnetite rich beds.	Jake Dove	Wed Sep 26 13:52:53 2018
WRL7-259	422402	5657960	Old drill road trending 130 degrees. Spruce-ash swamp to the south. Poplar-pine Forrest to the north with thick overburden. Lack of outcrops.	Jake Dove	Wed Sep 26 14:39:30 2018
WRL7-260	425687	5656415	Geochem sample G14. Felsic intrusive/quartz feldspar porphyry. See station WRL7-39 for details. Mag susc of 0.18.	Jake Dove	Sat Oct 20 09:02:03 2018
WRL7-261	425525	5656930	Geochem sample G9. Massive homogeneous fg-mg gabbro. Mag susc died.	Jake Dove	Sat Oct 20 09:25:00 2018
WRL7-262	425165	5656960	Geochem sample G8. Massive fg basalt. Moderate oxidation on late fractures in some areas. .No obvious pervasive alteration in sample. Some flow textures visible under ice covered surface with chalky calcite fracture fillings.	Jake Dove	Sat Oct 20 09:54:52 2018
WRL7-265	423671	5657807	Geochem sample G4. Medium buff brown-tan aphanitic rhyolite. Very siliceous. Moderate fol. Less than 5% mm scale qtz-ank veinlets in sample.	Jake Dove	Sat Oct 20 11:10:32 2018
WRL7-266	421566	5657523	Geochem sample G3. No gabbro found. Ledge outcrop on north side of road overlooking lake. Massive fg basalt. Some accicular grains visible (rare). Trace-1% disseminated Po. Weak oxidation in late fractures. Rep sample taken for reference.	Jake Dove	Sat Oct 20 11:51:14 2018
WRL7-267	422645	5657072	Geochem sample G1. 3m high cliff with swamp to the north. Dark cloudy grey-faint green fg-mg banded ultramafic. Contains black subangu.ar grains (mag?). Strongly magnetic. Minor talc alt. Serpentinealong some fracture surfaces.	Jake Dove	Sat Oct 20 12:33:08 2018
WRL8-001	421621	5657813	Rowan mine shaft cap (1 of 3) and adjacent multi meter wide outcrop. White dull to opaque weathering strongly foliated lapilli tuff containing mm scale rounded quartz crystals (correct composition is possibly quartz lattite). Matrix is opaque and appears to be completely silica altered - very little texture remains. Locally silica increases and rock has more massive character. Little alteration apart from minor iron staining along local foliation planes and very rare disseminated pyrite. Foliation is strong and oriented ~E-W may be within high strain zone. No significant veins outcropping at surface (ie Rowan gold bearing veins).	Jake Dove	Thu Aug 23 10:34:28 2018
WRL8-002	421603	5657815	Rowan shaft cap (2 of 3). Qtz Vein just to the west of shaft.	Jake Dove	Thu Aug 23 11:11:11 2018
WRL8-003	421593	5657810	Outcrop west of shaft (2 of 3). Decent exposure. Looks similar to outcrop near shaft (3 of 3) without round to sub angular quartzite. Strongly foliated. Weathered surface is a gray to light gray. Strongly silicified	Jake Dove	Thu Aug 23 11:38:45 2018
WRL8-004	421379	5657812	Roadside multi meter outcrop of tuff unit with local qtz grains volcano(clastic) clasts dismembered mm wide (early) bedding parallel qtz veins . Weather light green likely intermediate composition (latite ?). Primary layering and parallel qtz veins are isoclinaly folded along folds with steep dipping E-W axial plane and very steep W Plunging fold axis. Qtz veins are early and not associated w proposed D2 structures (ie E-W fabric). Lack of alteration very rare garners along axial planar fol and one minor locality w silica.	Jake Dove	Thu Aug 23 13:06:50 2018

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL8-005	421579	5657933	Headache showing. Poor showing lots of vegetation covering rocks. Weather surface is a light gray to gray very little oxidation. Very massive fine grained black rock with a few little pink anhedral grains possibly garnet or kspar? 5-trace percent sulphides. Little deformation occurs no foliation viewed Mod Silicification two generations of qtz vein occur	Jake Dove	Thu Aug 23 14:35:26 2018
WRL8-006	426088	5656317	Outcrop facing 245 elongate hill about ten metres x 1 m high. Heterogenous surface texture. Weathers ligh grey. Fresh surface grey, very fine grained to aphanitic. Intermediate volcanic andesite. Quartz veinlets (2% veining ) locally contain sulphides. Two fracture sets. Low strain.	Lydia Calhoun	Tue Aug 28 10:57:54 2018
WRL8-007	426106	5656335	Small oc five square metres covered in moss. Same andesite as last station. Has cm wide ankerite veining offset by foliation(sinistral).	Lydia Calhoun	Tue Aug 28 11:32:00 2018
WRL8-008	426122	5656348	Small ridge of outcrop. Under moss. About 8 m long. Same andesite but with felsic intrusive. Intrusive weathers pink orange. Fresh surface is lighter grey than andesite, very fine grained. Silica rich hard to break and sparks when hit. Disseminated sulphides in andesite, less than one present.	Lydia Calhoun	Tue Aug 28 12:04:02 2018
WRL8-009	426143	5656349	Trench trending 300 about 10 meters long with an open pit area to the south end of the pit. Strongly foliated andesite? with some weak ankerite weathering. Quartz veining parallel to foliation. Veins About five cm thick alternating. High degree of veining. Rock is silicified. Rock light grey.	Lydia Calhoun	Tue Aug 28 12:26:09 2018
WRL8-010	426176	5656401	Area of about five square metres. Moss covered. Fine to medium grained felsic rock. Qtz grains not observed. Grey diorite. No evidence to suggest it's a tuff. Disseminated sulphides <<1%. Weathered surface is light pink, granitic looking.	Lydia Calhoun	Tue Aug 28 13:14:18 2018
WRL8-011	426174	5656446	Diorite. Same as last. Fine to medium grained. Ridge facing south about ten metres long	Lydia Calhoun	Tue Aug 28 13:48:30 2018
WRL8-012	426182	5656508	Area of boulders on outcrop about ten square metres. Old water filled pit adjacent. Weathered surface is very rusty and locally yellow gossanous weathering. Rock is very fine grained with pyrite blebs and disseminations (10%). Andesite. Low strain. Cleavage orientation not entirely certain. Discrete strong foliation in localized areas anastomosing.	Lydia Calhoun	Tue Aug 28 14:00:31 2018
WRL8-013	426061	5656424	Ridge of moss covered outcrop. Weathered surface has very fine grained green grey andesite and medium pink grained felsic. Fresh surface grey, very fine grained andesite. Sample taken	Lydia Calhoun	Tue Aug 28 14:40:29 2018
WRL8-014	421796	5657510	Drill collar rlg 17-50 and 51. Azimuth north. 000 plunge 60 and 70 respectively.	Lydia Calhoun	Wed Sep 26 09:10:53 2018
WRL8-015	421756	5657658	Rlg16-36 drill collar. Azimuth 000. Plunge 60	Lydia Calhoun	Wed Sep 26 09:16:51 2018
WRL8-016	421735	5657617	Near previous station drill collar. Elongate SW trending ridge. Primarily angular boulders, likely close to in situ. Took samples from outcrop or possible sub crop. Don't have geo tool to peel efficiently. Weathered surface has a parallel layering of the volcanic rock. Changing from fine to coarse with some interlayering. Fresh surface is light grey and salmon pink. Some surfaces break that are full of calcite alteration with a sugary look. Very fine grained Intermediate volcanic extrusive based on grain size and layering.	Lydia Calhoun	Wed Sep 26 09:30:56 2018
WRL8-017	421759	5657644	Back at drill pad. Exposure of same rock from hillside. On south end have elongate rounded nodules of mafic? material, green with localized rusting. To north side have moderate foliation of inter layered material. Could not break off sample due to flat lying smooth nature of oc.	Lydia Calhoun	Wed Sep 26 09:42:45 2018
WRL8-018	421881	5657649	Drill collar rlg16-34: Azimuth North dip 50.	Lydia Calhoun	Wed Sep 26 09:59:26 2018
WRL8-019	421901	5657659	Outcrop at drill pad at base of hill. Possibly a slumped boulder but basically in situ. Similar volcanic layering to previous stations. Fresh surface very fine grained to aphanitic grey with a mild pink hue. Mild calcite alteration. Same felsic extrusive .	Lydia Calhoun	Wed Sep 26 10:04:57 2018
WRL8-020	421918	5657741	Collar rlg 16-35. North plunging 50	Lydia Calhoun	Wed Sep 26 10:14:10 2018
WRL8-021	422013	5657773	Cut line trending east west. Decent condition.	Lydia Calhoun	Wed Sep 26 10:40:08 2018
WRL8-022	422132	5657760	Large ridge of oc. About 4 m high. Trending about east west. Dark blue green colour with positively weathering elongate to spherical sub angular pink beige fragments? Garnet. Varying in size from 0.5 to 10 cm. Possibly also as stringers. Intermixing of mafic and felsic? Soft to hammer. No indication of alteration. Pink garnets locally contain blebby pyrite at their core. Garnets primarily in green material. On hillside might be seeing weathering effect of contact between mafic and intermediate creating nodule appearance. Rep taken.	Lydia Calhoun	Wed Sep 26 10:55:05 2018
WRL8-023	422104	5657696	Drill collar rlg17-48. Azimuth north 40 plunge. Also area of outcrop about 8x8 m. Peeled off for drill pad. Same layered dark green light pink beige volcanic as previous station. Looks same as earlier in the day as well but much better exposure. Has a bleached appearance on surface that increases to north. Bleaching is strong Silica alteration. Increasing silica alteration. Locally rusty. Moderately foliated. Volcanic layering parallel to foliation. Locally fragmented. Garnets.	Lydia Calhoun	Wed Sep 26 11:31:59 2018
WRL8-024	422078	5657642	Same intermediate layered rock as previous. Dark green and beige pink. Ridge 2 m high trending eat west. Moderately foliated. Minor bleaching	Lydia Calhoun	Wed Sep 26 12:38:03 2018

Station ID	EAST 83Z15	NORTH 83Z15	Station Description	Mapper Name	Station Time
WRL8-025	422197	5657553	On trail to drill pads. Outcrop stripped on road about 2m by 4m. Same interlayered intermediate rock type. Moderately foliated. Very fine to medium grained. Mildly bleached. Light grey fresh surface. Looks andesitic. Rusty on some foliation planes. Thin Stringers of more felsic material suggesting it's not tuff.	Lydia Calhoun	Wed Sep 26 12:52:57 2018

## **APPENDIX II**

### **Sample Descriptions & Assays**

West Red Lake 2018 Sample Descriptions and Assays

Sample ID	Analysis Type	EAST 83Z15	NORTH 83Z15	Sample Description	Au ppb	As ppm
A738171	Assay	421094	5657787	3% disseminated/blebby py and trace po. Weak-moderate possible silicification. Weak-mod mag susc of 1-2.5.	226	16.5
A738172	Assay	420686	5657800	1.5cm glassy qtz-chl-actinolite(?) -trace py-po vein within chloritized-silicified intermediat tuff.	<5	7.6
A738173	Assay	420686	5657800	Strongly silicified and foliated felsic-intermediate ash-crystal tuff. Strong surface oxidation. Up to 1% fol controlled py-po.	18	0.7
A738174	Assay	420647	5657775	Sheared, oxidized felsic to intermediate tuff. Weak- medium oxidation. <1% py specks. Southwest hanging wall	712	0.8
A738175	Assay	420647	5657775	Sugary quartz vein	4704	0.9
A738176	Assay	420647	5657775	Sheared, oxidized felsic to intermediate tuff. Strong oxidation. .5-1% py, trace cp and Po. Northwest football contact	2598	1.5
A738177	Assay	420452	5657723	Fuschit -silica alt felsic-intermediat tuff. No visible sulphides.	<5	71.5
A738178	Assay	420452	5657723	Silica alt and oxidized. North contact of fuschite-chl attered domain.	25	56.8
A738179	Assay	421249	5657731	Qtz vein 1, 4cm WIDE INTERMIDATE tuff WITH Trace amount of sulphides. oriented in the same direction as the late foliation.	16999	29.4
A738181	Assay	421249	5657731	Qtz vein 2, 1cm wide in intermediate tuff cross cutting larger 4cm wide qtz vein. Vein is subparallel to shear fabric. Trace amount of sulphides	9	57.9
A738182	Assay	420964	5657659	qtz vein in Possible basalt. Trace-1% sulphides	35	21.6
A738183	Assay	421069	5657800	Qtz vein in possiboe intermediate tuff strongly ankeritized and minor amount of sluphides	<5	2.1
A738184	Assay	420340	5657418	Chl-ank-fuschite altered shear. Up to 1% veinlet hosted Po (ank veinlets) and 1-2% fg-mg cubic disseminated py.	11	57.2
A738185	Assay	420340	5657418	South margin of 25cm wide qtz vein. Trace py.	<5	7.5
A738186	Assay	420340	5657418	Smaller 0.5-2cm wide planar veins ~perpendicular to larger vein. Race-1% disseminated-lesser vein hosted py. 10-15% vein material in sample.	49	36.9
A738187	Assay	420315	5657735	Small ledge outcrop. Strongly fuschite-silica altered and mineralized felsic ash tuff. One large 10-15cm wide barren a ankerite vein xcutting oblique to fol. Strong mm-1cm wine qtz+/-py-lesser Po veining xcutting ~perpendicular to larger Ankerite vein and slightly oblique to fol. Locally 2-4% fg subhedral dusseminated-lesser vein hosted py and trace po mainly within silicified hostrock as replacement style min. Strong foliation. Low mag susc of 0.404.	53	303
A738188	Assay	425882	5656326	Sheared BIF-silicified mafic contact. Local ank-chl shear material and some semipervasive sil alt. Minor mm-0.5cm scale qtz-py veinlet sand fracture fillings. 1-locally 7% vfg-fg shear-fracture controlled py. Mag susc of 1.	<5	3.6
A738189	Assay	425882	5656326	Dark green strongly silicified basalt. 2-4% vfg-fg fracture controlled-clustered py.	<5	2
A738191	Assay	425826	5656315	Basalt proximal to bif-basalt contact. 5-10% qtz-chl-po-py veining. 3-6% disseminated/blebby-loser vein controlled Po. Trace vein controlled py.	5	2.8
A738192	Assay	425793	5656334	South end of outcrop there is a ~20cm felsic dyke. Trace to 1% sulphides mostly pyrite. Strongly foliated	<5	0.4
A738193	Assay	425611	5656456	Strongly sulphide stained 0.5-1cm wide qtz-py veinlets. 2-3% vfg-fg sub-euhedral vein controlled-lesser disseminated py. Chloritic vein alt halo. Part of dominant joint-vein orientation.	192	115
A738194	Assay	425594	5656420	4-5cm wide qtz-py veined. Weakly wavy, strongly sulphide stained. 1-3% fg mg cubic vein hosted-disseminated py. Moderate chloritic vein halo.	64	56
A738195	Assay	425677	5657001	3-4cm wide cloudy white to vitreous/glassy qtz-trace-0.5% py-cpy vein within/subparallel to sheared wedge. 20-30% vein material in sample. Moderate chloritic vein halo.	<5	4.6
A738196	Assay	425753	5657041	1cm wide qtz-py-malachite covellite(?) vein within shear. Trace-0.5% sulphide in sample.	32	1.6
A738197	Assay	425164	5656965	Silicified basalt near major scarp/ fault	8	6.6

Sample ID	Analysis Type	EAST 83Z15	NORTH 83Z15	Sample Description	Au ppb	As ppm
A738198	Assay	425435	5657512	Grey glassy quartz vein with kspar in folded shear, 5 cm	27	1.9
A738199	Assay	425733	5657868	Patchy strongly saussaurite altered basalt with 2% pyrite, including pyrite with quartz in small pods.	21	2.8
A738206	Assay	423838	5657630	Cm scale qtz veins in discrete 320 shears	1.8	1.9
A738207	Assay	423838	5657630	Intense sheared gabbro w local fragments of qtz vein	38.9	10.3
A738208	Assay	424041	5657753	Early fol parallel Q.V.	1.3	0.9
A738285	Assay	422791	5657545	Sample of a 2 cm quartz vein hosted in rhyolite, greyish colour, rusty spotted, fairly prspective	1160	10.1
A738286	Assay	423077	5657459	Quartz veinlet in dacite, glassy quartz with abundant pyrite, sample more than 50% wallrock which also has abundant pyrite	16.4	12.9
A738287	Assay	423075	5657455	Odd unit, more olive green, coarse grained mafic rock, possibly a diorite or maybe an andesitic tuff? With coarse grains of pyroxene but takes up strain very well, so possibly an andesitic tuff, mod magnetic. Some sections seem to contain occasional grains of quartz or feldspar. This interval is sheared and gossanous with about 3% coarse pyrite, sampled. #M py 3%	3.8	3.4
A738288	Assay	423036	5657431	Sheared andesite with strong pervasive Ankerite and about 10- fine grainy pyrite	27.1	94.5
A738289	Assay	423036	5657431	Greyish folded quartz veins in shear	17.5	10.1
A738291	Assay	423025	5657403	Vein of greyish quarrt@ in rhyolite with 5% py A's grains and small veinlets	13.5	33.4
A738292	Assay	423025	5657403	Shear with ankerite, 2% fine py	8.2	14.1
A738293	Assay	423000	5657366	Deeply gossanous bif, non#magnetic. Chert and chlorite	48.7	0.7
A738294	Assay	422937	5657349	Quartz Ankerite I vein in foliation, 30 cm wide, looks bullish and no sulphides	29.2	6.1
A738295	Assay	423572	5657416	Quartz vein, local float, bullish, 10 cm wide or greater, minor chlorite and 1% py	0.7	1.2
A738296	Assay	423209	5657112	Magnetic um, strongly Ankerite altered, foliated, with 3% fine diss py	7.1	9.3
A738297	Assay	422210	5657181	Local float, in shear pit. Bullish quartz-chlorite vein, milky glassy with 2% fine py, looks okay	1890	38.7
A738298	Assay	422210	5657181	Extremely silicified black-green bif with 5% euhedral pyrite, conchoidal fracture.	20.6	11.1
A738299	Assay	422210	5657181	Chlorite bif, strongly foliated, with about 50% grainy pyrite, may be primary	28.3	157
A738300	Assay	422210	5657181	Weakly black-silicified cherty bif with 2% grainy pyrite	27.2	59.1
A738337	Assay	426143	5656349	Quartz vein	<5	65.9
A738338	Assay	426182	5656508	Strong sulphidizayion. Pyrite blebs and dissemination's	19	37.6
A738341	Assay	426026	5657353	Pale green strongly silicified band. Contains faint, weakly foliated internal laminations. 3-5% vfg disseminated/blebby po-trace py. Sample contains 10% ank altered/sheared material.	14.2	3.1
A738342	Assay	426026	5657353	Weakly sheared and weakly chl-silica altered. 3-5% vfg disseminated/blebby py-trace po. 5% of sample is pure faint green qtz-trace po material.	7.4	3.1
A738343	Assay	426026	5657353	Strongly oxidized sample. Weakly sheared, moderate chlorite-ankerite-local silica altered. Minor mm scale qtz-ankerite-py-trace cpy stringer veinlets. 1-3% vfg disseminated/foliation-lesser stringer controlled py. Trace disseminated/foliation controlled po. Trace stringer hosted cpy. Trace vfg semicubic disseminated aspy in local silica altered material (steel grey, non magentic cluster of subhedral grains in contact with py grains).	7.4	3.6
A738345	Assay	426026	5657353	Strongly oxidized sample. Weakly sheared and moderately chl-ankerite altered. Chlorite is semi pervasive and ankerite is fracture controlled with strong py. Up to 6% vfg fracture controlled-lesser disseminated py-trace po within micro-mm scale ankerite/carbonate fracture fillings at chaotic orienations.	9.6	2.8
A738346	Assay	426052	5656774	20x30cm angular smokey qtz vein block/fragment. Trace py-cpy.	5.8	0.9
A738347	Assay	426066	5656783	20cm wide strong ankerite altered and sulphidized shear zone. 3-5% and locally up to 20% shear controlled-semi massive py.	6.4	20.2

Sample ID	Analysis Type	EAST 83Z15	NORTH 83Z15	Sample Description	Au ppb	As ppm
A738348	Assay	426109	5656807	Strongly ankerite and moderately sulphidized shear zone. 1-3% shear and fracture controlled py-lesser po.	7.6	0.7
A738349	Assay	424708	5657745	Ten cm wide quartz vein with some pyrite. Within basalt	41	0.9
A738401	Assay	421601	5657171	Ankerite and quartz veined, sheared felsic tuff. Moderate ank alt. weak-moderate chlorite vein halos. Up to 5% disseminated/foam controlled and lesser vein controlled py-trace Po-cpy.	736	35.8
A738402	Assay	421431	5656876	Weakly sheared, ankerite veined and chlorite-fuschite altered basalt(?) At Felsic-mafic volcanic contact. 30% Ankerite+/-py-minor qtz vein material within sample. 1-2% vein controlled py.	2030	5040
A738405	Assay	421449	5656885	10-15% mm-2cm scale translucent qtz+/-chl-sericite veinlets within massive Ankerite vein. Trace vfg subhedral py visible within Ankerite vein material.	30	83.6
A738406	Assay	421449	5656885	6cm wide cloudy white qtz-tourmaline ladder vein (30%) within massive ankerite vein. Local apple green fuschite vein alt halo visible. No visible sulphides.	10.7	113
A738407	Assay	421413	5656868	3.5cm wide cloudy white-light grey planar quartz tourmaline ladder vein (15-20%) hosted within large massive ankerite vein. Strong acicular tourmaline grains visible. No visible sulphides. Very similar to sample WRL7-245C.	19.3	6.4
A738414	Assay	422246	5658203	Magnetite-trace py bearing quartz rich sandstone bed. Adjacent chlorite alt and magnetite rich bed.	8.3	17.1
A738415	Assay	422132	5657760		15.1	13.4
A738203	Geochem	421094	5657787	1-2% disseminated/blebby pyrite.	-	6
A738204	Geochem	420569	5657762	Dark green fg-mg massive basalt or possible gabbro. Fairly rounded topographic surface. Undefined fol. 1-2% fg-mg cubic disseminated pyrite. Slightly higher mag susc compared to previous units of 4.62, 1.75, 1.26. Geochem sample taken.	-	5
A738205	Geochem	420345	5657461	Massive dark green mg-chl-actinolite rich basalt or gabbro. Weak-moderate interstitial silicification	-	< 5
A738356	Geochem	421379	5657812	Roadside multi meter outcrop of tuff unit with local qtz grains volcanic (clastic) clasts dismembered mm wide (early) bedding parallel qtz veins. Weather light green likely intermediate composition (latite?). Primary layering and parallel qtz veins are isoclinally folded along folds with steep dipping E-W axial plane and very steep W Plunging fold axis. Qtz veins are early and not associated with proposed D2 structures (ie E-W fabric). Lack of alteration very rare garnets along axial planar fol and one minor locality with silica.	-	< 5
A738357	Geochem	423077	5657459	Field id as a weakly altered dacite	-	52
A738358	Geochem	423077	5657459	Odd olive green coarse grained unit, field ided as an andesitic tuff	-	61
A738362	Geochem	421735	5657617	Near previous station drill collar. Elongate SW trending ridge. Primarily boulders angular likely close to in situ. Took samples from outcrop or possible sub crop. Don't have geo tool to peel efficiently. Weathered surface has a parallel layering of the volcanic rock. Changing from fine to coarse with some interlayering. Fresh surface is light grey and salmon pink. Some surface break that are full of calcite alteration with a sugary look. Very fine grained Intermediate volcanic extrusive based on grain size and layering.	-	< 5
A738363	Geochem	422104	5657696	Drill collar rlg17-48. Azimuth north 40 plunge. Also area of outcrop about 8x8 m. Peeled off for drill pad. Same layered dark green light pink beige volcanic as previous station. Looks same as earlier in the day as well but much better exposure. Has a bleached appearance on surface that increases to north. Bleaching is strong Silica alteration. Increasing silica alteration. Locally rusty. Moderately foliated. Volcanic layering parallel to foliation. Locally fragmented. Garnets.	-	< 5
A738521	Geochem	425525	5656930	Geochem sample G9. Massive homogeneous fg-mg gabbro. Mag susc died.	-	< 5

Sample ID	Analysis Type	EAST 83Z15	NORTH 83Z15	Sample Description	Au ppb	As ppm
A738522	Geochem	425165	5656960	Geochem sample G8. Massive fg basalt. Moderate oxidation on late fractures in some areas. .No obvious pervasive alteration in sample. Some flow textures visible under ice covered surface with chalky calcite fracture fillings.	-	< 5
A738524	Geochem	423671	5657807	Geochem sample G4. Medium buff brown-tan aphanitic rhyolite. Very siliceous. Moderate fol. Less than 5% mm scale qtz-ank veinlets in sample.	-	5
A738525	Geochem	421566	5657523	Geochem sample G3. No gabbro found. Ledge outcrop on north side of road overlooking lake. Massive fg basalt. Some accicular grains visible (rare). Trace-1% disseminated Po. Weak oxidation in late fractures. Rep sample taken for reference.	-	< 5
A738526	Geochem	422645	5657072	Geochem sample G1. 3m high cliff with swamp to the north. Dark cloudy grey-faint green fg-mg banded ultramafic. Contains black subangular grains (mag?). Strongly magnetic. Minor talc alt. Serpentine along some fracture surfaces.	-	< 5
A738528	Geochem	425687	5656415	Geochem sample G14. Felsic intrusive/quartz feldspar porphyry. See station WRL7-39 for details. Mag susc of 0.18.	-	7



## **APPENDIX III**

### **Assay Certificates**



**Date Submitted:** 05-Sep-18  
**Invoice No.:** A18-12491-Au  
**Invoice Date:** 09-Nov-18  
**Your Reference:** DIS87255

**Goldcorp Canada Ltd.**  
**17 Mine Road**  
**Balmertown Ontario P0V 1C0**  
**Canada**

**ATTN: Jamie Kristoff**

## CERTIFICATE OF ANALYSIS

27 Core samples were submitted for analysis.

The following analytical package(s) were requested:

Code 1A2-Goldcorp(ppm) Au - Fire Assay AA

Code UT-1-0.5g Aqua Regia ICP/MS

REPORT **A18-12491-Au**

This report may be reproduced without our consent. If only selected portions of the report are reproduced, permission must be obtained. If no instructions were given at time of sample submittal regarding excess material, it will be discarded within 90 days of this report. Our liability is limited solely to the analytical cost of these analyses. Test results are representative only of material submitted for analysis.

Notes:

Assays are recommended for values above the upper limit. The Au from AR-MS is only semi-quantitative. For accurate Au data, fire assay is recommended.

If value exceeds upper limit we recommend reassay by fire assay gravimetric-Code 1A3.

CERTIFIED BY:

A handwritten signature in black ink, appearing to read "Emmanuel Esemé". The signature is stylized with a large, sweeping initial 'E' and is written over a horizontal line.

Emmanuel Esemé, Ph.D.  
Quality Control

**ACTIVATION LABORATORIES LTD.**  
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5  
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613  
E-MAIL Ancaster@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Analyte Symbol	Au	Au
Unit Symbol	ppm	ppm
Lower Limit	0.005	0.030
Method Code	FA-AA	FA- GRA
A738171	0.226	
A738172	< 0.005	
A738173	0.018	
A738174	0.712	
A738175	4.704	
A738176	2.598	
A738177	< 0.005	
A738178	0.025	
A738179	> 10.000	16.999
A738180	< 0.005	
A738181	0.009	
A738182	0.035	
A738183	< 0.005	
A738184	0.011	
A738185	< 0.005	
A738186	0.049	
A738187	0.053	
A738188	< 0.005	
A738189	< 0.005	
A738190	0.217	
A738191	0.005	
A738192	< 0.005	
A738193	0.192	
A738194	0.064	
A738337	< 0.005	
A738338	0.019	

Analyte Symbol	Au	Au
Unit Symbol	ppm	ppm
Lower Limit	0.005	0.030
Method Code	FA-AA	FA- GRA
OREAS 216 (Fire Assay) Meas		6.808
OREAS 216 (Fire Assay) Cert		6.66
OREAS 254 Meas	2.589	
OREAS 254 Cert	2.55	
A738180 Orig	< 0.005	
A738180 Dup	< 0.005	
A738191 Orig	0.005	
A738191 Dup	0.006	
A738338 Split Orig PREP DUP	0.019	
A738338 Split PREP DUP	0.021	
Method Blank	< 0.005	
Method Blank	< 0.005	
Method Blank	< 0.005	
Method Blank		< 0.030



**Date Submitted:** 05-Sep-18  
**Invoice No.:** A18-12491-UT1  
**Invoice Date:** 05-Nov-18  
**Your Reference:** DIS87255

**Goldcorp Canada Ltd.**  
**17 Mine Road**  
**Balmertown Ontario P0V 1C0**  
**Canada**

**ATTN: Jamie Kristoff**

## CERTIFICATE OF ANALYSIS

27 Core samples were submitted for analysis.

The following analytical package(s) were requested:

Code UT-1-0.5g Aqua Regia ICP/MS

REPORT      **A18-12491-UT1**

This report may be reproduced without our consent. If only selected portions of the report are reproduced, permission must be obtained. If no instructions were given at time of sample submittal regarding excess material, it will be discarded within 90 days of this report. Our liability is limited solely to the analytical cost of these analyses. Test results are representative only of material submitted for analysis.

Notes:

Assays are recommended for values above the upper limit. The Au from AR-MS is only semi-quantitative. For accurate Au data, fire assay is recommended.

CERTIFIED BY:

A handwritten signature in black ink, appearing to be "Emmanuel Esemé". The signature is stylized with loops and is positioned above a horizontal line.

Emmanuel Esemé , Ph.D.  
Quality Control

**ACTIVATION LABORATORIES LTD.**  
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5  
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613  
E-MAIL [Ancaster@actlabs.com](mailto:Ancaster@actlabs.com) ACTLABS GROUP WEBSITE [www.actlabs.com](http://www.actlabs.com)

## Results

## Activation Laboratories Ltd.

## Report: A18-12491

Analyte Symbol	Ti	S	P	Li	Be	B	Na	Mg	Al	K	Bi	Ca	Sc	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge
Unit Symbol	%	%	%	ppm	ppm	ppm	%	%	%	%	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.001	1	0.001	0.1	0.1	1	0.001	0.01	0.01	0.01	0.02	0.01	0.1	1	1	1	0.01	0.1	0.1	0.2	0.1	0.02	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
A738171	0.258	< 1	0.021	57.9	0.3	9	0.336	1.46	5.42	1.73	< 0.02	2.29	17.8	219	171	1680	5.66	35.5	66.8	63.4	49.5	8.14	0.1
A738172	0.092	< 1	0.012	16.3	< 0.1	2	0.025	1.06	1.88	0.39	0.13	0.43	16.0	53	106	733	2.70	37.4	201	42.9	120	2.98	0.1
A738173	0.056	< 1	0.020	4.9	0.1	2	0.026	0.27	0.98	0.39	0.16	0.03	4.2	32	64	174	3.93	7.7	15.8	121	25.3	1.87	0.1
A738174	0.089	< 1	0.014	19.8	0.2	5	0.027	1.25	1.61	0.25	0.65	0.17	10.8	81	69	506	3.10	19.4	36.7	102	97.4	4.13	0.1
A738175	0.008	< 1	0.004	5.3	< 0.1	1	0.019	0.32	0.41	0.04	0.09	0.02	1.3	12	68	136	0.79	3.9	10.0	23.2	38.9	1.10	0.1
A738176	0.006	< 1	0.009	16.7	0.1	4	0.028	0.64	0.91	0.11	0.29	0.06	3.8	32	94	222	1.82	9.9	20.1	104	57.8	2.34	0.1
A738177	< 0.001	< 1	0.003	1.0	< 0.1	1	0.052	0.03	0.41	0.18	0.16	< 0.01	1.8	13	123	28	0.38	2.1	17.8	5.8	22.8	0.73	< 0.1
A738178	0.001	< 1	0.026	5.6	0.3	1	0.072	0.12	0.54	0.08	0.32	0.05	0.3	7	26	53	4.73	0.4	16.2	13.2	27.4	3.14	0.1
A738179	0.049	< 1	0.005	29.1	0.2	2	0.020	3.10	2.35	0.32	69.3	3.42	28.3	76	1840	1070	4.24	80.5	1230	23.9	48.9	4.24	0.1
A738180	0.098	< 1	0.036	19.9	< 0.1	< 1	0.102	0.27	0.69	0.50	0.07	0.25	2.3	18	36	212	1.49	4.0	5.5	8.2	39.8	3.86	< 0.1
A738181	0.041	< 1	0.009	14.5	0.2	1	0.018	3.79	1.53	0.24	0.75	6.01	15.8	55	1330	1950	5.34	77.8	868	37.0	35.0	2.83	0.2
A738182	0.102	< 1	0.026	17.4	0.1	4	0.046	0.73	1.50	0.66	3.11	1.97	6.6	56	96	636	2.51	47.0	75.6	94.8	23.7	2.93	0.1
A738183	0.014	< 1	0.011	14.9	< 0.1	< 1	0.018	6.29	1.60	0.08	0.64	9.17	10.8	50	1510	1450	4.34	40.4	815	9.9	45.8	4.59	0.3
A738184	0.006	< 1	0.005	82.4	0.2	< 1	0.021	7.31	4.50	0.04	0.47	9.18	24.6	135	2300	2280	9.08	96.4	891	83.2	132	9.47	0.2
A738185	0.001	< 1	0.030	9.6	< 0.1	1	0.028	0.75	0.71	0.11	0.16	0.80	3.3	20	176	382	1.58	13.5	73.3	4.7	24.8	1.37	0.1
A738186	0.006	< 1	0.004	47.0	< 0.1	< 1	0.015	5.41	2.84	0.02	0.48	7.26	21.2	100	1400	1910	6.51	55.7	485	25.7	92.4	5.74	0.2
A738187	0.004	1	0.003	15.7	< 0.1	3	0.015	2.10	1.29	0.02	0.91	2.11	8.6	36	575	559	3.75	74.0	714	34.7	115	2.88	0.2
A738188	0.004	3	0.038	0.4	< 0.1	3	0.026	0.18	0.11	0.03	0.35	0.32	< 0.1	3	37	160	8.06	29.6	39.3	577	9.2	0.65	0.2
A738189	0.005	1	0.027	0.3	< 0.1	2	0.035	0.23	0.12	0.04	0.23	0.46	0.2	3	69	198	4.86	18.0	21.3	531	9.9	0.76	0.2
A738190	0.234	1	0.175	8.6	0.6	11	0.565	0.56	2.72	0.50	1.66	2.08	5.6	193	428	323	3.82	50.8	2280	2390	58.2	7.41	0.1
A738191	0.322	2	0.017	11.5	0.2	2	0.080	1.40	3.03	0.40	0.42	1.97	11.2	139	192	810	8.19	33.2	86.3	328	66.9	6.89	0.3
A738192	0.105	< 1	0.046	8.1	0.2	5	0.084	0.71	1.33	0.39	0.08	1.31	1.7	22	51	267	1.76	8.1	8.6	36.7	26.6	4.93	< 0.1
A738193	0.032	2	0.033	3.8	< 0.1	3	0.022	0.34	1.49	0.25	6.45	0.05	0.3	14	28	1070	6.13	2.9	5.6	129	30.4	4.95	0.1
A738194	< 0.001	1	0.008	0.4	< 0.1	2	0.022	0.02	0.23	0.13	1.92	0.03	< 0.1	3	39	64	1.78	4.0	3.9	131	12.9	0.72	< 0.1
A738337	0.002	< 1	0.003	2.8	< 0.1	4	0.026	0.38	0.33	0.07	1.34	1.70	2.1	9	121	601	1.47	8.1	21.5	22.5	17.2	0.87	0.1
A738338	0.239	2	0.016	4.9	< 0.1	3	0.051	0.98	2.23	0.04	0.68	2.38	9.1	93	158	687	5.02	35.1	75.0	535	38.4	4.02	0.2

## Results

## Activation Laboratories Ltd.

## Report: A18-12491

Analyte Symbol	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Te	Cs	Ba	La	Ce	Cd	Pr	Nd	Sm	Se	Eu	Gd
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.1	0.1	0.5	0.01	0.1	0.1	0.01	0.002	0.02	0.05	0.02	0.02	0.02	0.5	0.5	0.01	0.01	0.1	0.02	0.1	0.1	0.1	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
A738171	16.5	45.6	48.9	7.61	4.7	< 0.1	0.31	0.693	< 0.02	0.06	0.05	< 0.02	3.44	119	2.5	4.95	0.08	0.8	3.71	1.1	< 0.1	0.3	1.5
A738172	7.6	9.5	6.6	2.22	4.7	< 0.1	0.37	0.633	< 0.02	0.06	0.04	0.03	0.69	87.7	1.4	2.17	0.22	0.3	1.36	0.3	< 0.1	< 0.1	0.4
A738173	0.7	8.1	5.1	1.34	3.5	< 0.1	0.25	1.25	< 0.02	< 0.05	0.06	0.08	0.49	82.8	0.6	1.40	0.06	0.2	0.87	0.2	0.9	< 0.1	0.3
A738174	0.8	9.9	2.2	2.21	3.2	0.1	0.68	0.693	< 0.02	0.19	0.03	0.35	1.35	93.2	0.8	1.81	0.18	0.2	0.99	0.1	< 0.1	< 0.1	0.3
A738175	0.9	1.1	0.6	0.35	2.3	0.4	0.47	0.516	< 0.02	< 0.05	< 0.02	0.06	0.11	23.6	< 0.5	0.80	0.06	< 0.1	0.34	< 0.1	< 0.1	< 0.1	< 0.1
A738176	1.5	2.2	3.8	0.48	3.9	0.2	0.79	2.09	< 0.02	0.05	< 0.02	0.56	0.16	47.4	0.9	1.59	0.52	0.2	0.75	< 0.1	< 0.1	< 0.1	0.1
A738177	71.5	4.3	4.5	0.13	1.9	0.2	0.64	0.465	< 0.02	< 0.05	0.26	0.15	0.10	95.0	< 0.5	0.92	< 0.01	0.1	0.55	< 0.1	< 0.1	< 0.1	< 0.1
A738178	56.8	2.0	6.1	0.45	9.4	0.1	2.29	0.383	< 0.02	< 0.05	0.33	< 0.02	0.10	57.3	7.8	13.4	0.02	1.3	4.23	0.6	< 0.1	0.1	0.5
A738179	29.4	11.5	35.8	2.10	2.5	< 0.1	166	0.805	< 0.02	< 0.05	0.08	44.4	2.04	73.0	< 0.5	0.93	0.10	0.1	0.64	0.1	1.1	0.1	0.3
A738180	< 0.1	35.9	13.5	3.93	31.3	0.4	0.65	0.029	< 0.02	0.84	0.03	< 0.02	1.30	62.8	64.5	123	< 0.01	12.0	39.3	6.0	< 0.1	0.3	3.4
A738181	57.9	9.8	75.6	2.73	1.5	0.2	0.44	0.082	< 0.02	< 0.05	0.17	0.37	1.85	68.9	0.8	1.68	0.22	0.2	1.14	0.4	0.6	0.2	0.4
A738182	21.6	15.9	12.7	3.78	9.1	0.5	0.86	1.89	< 0.02	0.14	0.07	0.46	1.43	69.3	1.0	2.46	0.19	0.3	1.65	0.3	0.6	0.2	0.6
A738183	2.1	2.9	186	2.25	2.0	< 0.1	0.25	0.599	< 0.02	< 0.05	0.06	0.28	1.08	21.1	3.1	4.23	0.55	0.6	2.72	0.4	0.6	0.3	0.5
A738184	57.2	1.1	92.5	2.27	2.7	< 0.1	0.20	0.308	0.03	< 0.05	0.06	0.26	0.11	31.0	0.8	1.89	0.16	0.2	1.32	0.2	1.2	0.3	0.5
A738185	7.5	2.8	12.7	1.19	6.3	0.3	0.19	0.060	< 0.02	< 0.05	< 0.02	0.06	0.13	57.6	4.2	9.01	0.04	1.1	4.21	0.9	< 0.1	0.2	0.5
A738186	36.9	0.5	76.2	1.84	2.0	< 0.1	0.17	0.220	0.02	< 0.05	0.04	0.27	0.09	28.2	0.7	1.61	0.19	0.2	1.02	0.5	0.6	0.2	0.5
A738187	303	0.5	27.6	0.39	2.1	0.2	0.57	0.630	< 0.02	< 0.05	0.30	0.53	0.04	20.9	< 0.5	0.39	0.88	< 0.1	0.21	< 0.1	0.2	< 0.1	< 0.1
A738188	3.6	0.9	1.0	1.88	2.5	0.4	5.57	0.349	< 0.02	< 0.05	0.99	1.08	0.10	13.1	1.7	3.72	< 0.01	0.4	1.67	0.3	1.0	0.1	0.3
A738189	2.0	0.8	1.5	1.47	2.3	0.5	7.48	0.202	< 0.02	< 0.05	0.33	0.52	0.07	23.5	1.1	2.21	< 0.01	0.2	0.97	0.2	0.9	< 0.1	0.3
A738190	55.2	42.4	143	9.38	7.0	0.6	8.51	0.868	0.21	4.22	1.63	0.22	3.92	40.3	16.7	37.0	0.13	4.6	19.4	3.6	2.6	0.6	3.2
A738191	2.8	22.6	40.3	3.69	4.3	0.3	76.0	0.177	0.03	0.21	0.44	0.56	4.17	44.1	1.6	3.12	0.08	0.4	1.95	0.3	0.6	0.2	0.7
A738192	0.7	13.5	21.5	3.74	4.8	0.4	1.52	0.049	< 0.02	0.08	0.29	< 0.02	1.63	103	20.7	41.6	0.05	4.4	16.4	1.9	< 0.1	0.5	1.6
A738193	115	9.7	12.8	1.07	8.1	0.1	0.46	3.09	0.26	0.05	0.49	0.56	0.44	17.2	6.2	11.3	< 0.01	1.2	3.97	0.7	0.6	0.2	0.4
A738194	56.0	3.4	5.2	0.31	1.9	0.4	0.53	1.21	0.04	< 0.05	0.38	0.20	0.12	33.4	3.0	5.70	< 0.01	0.6	2.14	0.2	0.2	0.1	0.2
A738337	65.9	3.1	11.0	1.39	1.3	0.6	0.52	0.375	< 0.02	0.06	0.43	0.14	0.45	21.0	0.8	1.17	0.14	0.2	0.97	< 0.1	< 0.1	0.2	0.3
A738338	37.6	1.0	16.2	5.93	5.6	0.4	17.8	0.972	< 0.02	0.22	1.87	0.35	0.07	13.8	0.9	2.28	0.06	0.4	1.96	0.6	1.7	0.3	1.0

Analyte Symbol	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Re	Au	Tl	Pb	Th	U	Hg
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppb
Lower Limit	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.001	0.5	0.02	0.1	0.1	0.1	10
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
A738171	0.2	1.7	0.3	1.0	0.1	0.9	0.1	< 0.1	< 0.05	1.3	< 0.001	307	0.30	4.5	0.4	< 0.1	< 10
A738172	< 0.1	0.4	< 0.1	0.3	< 0.1	0.4	< 0.1	0.1	< 0.05	6.9	< 0.001	< 0.5	0.07	2.3	0.1	< 0.1	< 10
A738173	< 0.1	0.4	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.05	0.3	< 0.001	5.8	0.05	3.1	0.1	< 0.1	< 10
A738174	< 0.1	0.4	< 0.1	0.2	< 0.1	0.3	< 0.1	< 0.1	< 0.05	2.8	< 0.001	246	0.06	7.4	0.2	< 0.1	< 10
A738175	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	0.3	< 0.001	2080	< 0.02	1.5	< 0.1	< 0.1	< 10
A738176	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	1.5	< 0.001	1700	< 0.02	7.6	0.2	< 0.1	< 10
A738177	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	0.3	< 0.001	< 0.5	0.08	10.1	< 0.1	< 0.1	< 10
A738178	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.05	0.6	< 0.001	3.2	0.08	9.4	1.7	0.2	270
A738179	< 0.1	0.4	< 0.1	0.2	< 0.1	0.3	< 0.1	< 0.1	< 0.05	1.4	0.085	3900	0.06	4.0	< 0.1	< 0.1	< 10
A738180	0.3	1.2	0.2	0.4	< 0.1	0.2	< 0.1	0.8	< 0.05	2.7	< 0.001	< 0.5	0.33	10.7	44.3	1.7	< 10
A738181	< 0.1	0.4	0.1	0.4	< 0.1	0.3	< 0.1	< 0.1	< 0.05	1.9	< 0.001	< 0.5	0.05	2.8	0.1	< 0.1	< 10
A738182	0.1	0.7	0.2	0.6	< 0.1	0.6	< 0.1	0.2	< 0.05	> 200	0.001	8.1	0.09	171	0.3	< 0.1	< 10
A738183	< 0.1	0.4	< 0.1	0.3	< 0.1	0.2	< 0.1	< 0.1	< 0.05	7.1	< 0.001	< 0.5	0.03	3.8	0.1	< 0.1	< 10
A738184	< 0.1	0.4	< 0.1	0.4	< 0.1	0.3	< 0.1	< 0.1	< 0.05	10.9	< 0.001	2.4	< 0.02	5.4	< 0.1	< 0.1	< 10
A738185	< 0.1	0.3	< 0.1	0.1	< 0.1	0.1	< 0.1	0.1	< 0.05	1.5	< 0.001	< 0.5	< 0.02	1.2	1.2	0.1	< 10
A738186	< 0.1	0.4	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.05	1.6	< 0.001	26.7	< 0.02	4.9	< 0.1	< 0.1	< 10
A738187	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	2.1	< 0.001	29.3	< 0.02	2.3	< 0.1	< 0.1	< 10
A738188	< 0.1	0.3	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.05	2.6	0.002	< 0.5	0.17	8.9	0.2	0.3	10
A738189	< 0.1	0.2	< 0.1	0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.05	2.0	0.002	< 0.5	0.04	2.5	0.2	< 0.1	< 10
A738190	0.4	1.9	0.4	0.8	0.1	0.7	< 0.1	0.2	< 0.05	1.6	0.004	220	0.92	14.2	11.0	2.2	10
A738191	0.1	0.7	0.2	0.4	< 0.1	0.4	< 0.1	0.1	< 0.05	2.2	0.017	2.2	0.25	1.2	0.1	< 0.1	< 10
A738192	0.1	0.8	0.1	0.4	< 0.1	0.3	< 0.1	< 0.1	< 0.05	3.3	< 0.001	< 0.5	0.12	2.0	4.8	1.1	< 10
A738193	< 0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.05	8.6	< 0.001	104	0.04	66.7	3.0	0.9	< 10
A738194	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	0.8	< 0.001	39.0	< 0.02	16.6	0.6	0.3	< 10
A738337	< 0.1	0.3	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.05	0.4	< 0.001	< 0.5	0.03	17.1	< 0.1	< 0.1	< 10
A738338	0.2	1.1	0.3	0.7	< 0.1	0.7	0.1	0.2	< 0.05	1.0	0.006	14.9	< 0.02	3.0	< 0.1	< 0.1	< 10



Analyte Symbol	Ti	S	P	Li	Be	B	Na	Mg	Al	K	Bi	Ca	Sc	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge
Unit Symbol	%	%	%	ppm	ppm	ppm	%	%	%	%	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.001	1	0.001	0.1	0.1	1	0.001	0.01	0.01	0.01	0.02	0.01	0.1	1	1	1	0.01	0.1	0.1	0.2	0.1	0.02	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
OREAS 45d (Aqua Regia) Meas		< 1	0.033	16.1			0.041	0.16	5.99	0.13	0.26	0.09	42.6	189	459	417	13.0	25.5	191	320	37.1	17.1	
OREAS 45d (Aqua Regia) Cert		0.045	0.035	11.9			0.031	0.144	4.860	0.097	0.30	0.09	41.50	201.0	467	400.000	13.650	26.2	176.0	345.0	30.6	17.9	
Oreas 621 (Aqua Regia) Meas		4	0.034	7.5	0.5		0.194	0.32	1.91	0.41	3.90	1.71	2.2	12	37	571	3.48	30.5	27.9	3710	> 5000	10.3	
Oreas 621 (Aqua Regia) Cert		4.50	0.0335	8.17	0.530		0.160	0.436	1.60	0.333	3.85	1.65	2.20	10.9	31.3	520	3.43	27.9	25.8	3660	51700	9.29	
A738192 Orig	0.105	< 1	0.047	8.2	0.2	5	0.085	0.71	1.34	0.40	0.07	1.32	1.6	22	54	267	1.78	8.0	8.5	36.9	26.3	4.88	< 0.1
A738192 Dup	0.105	< 1	0.045	8.0	0.2	4	0.083	0.70	1.32	0.38	0.08	1.29	1.8	22	49	268	1.73	8.1	8.7	36.6	26.9	4.97	< 0.1
A738338 Orig	0.239	2	0.016	4.9	< 0.1	3	0.051	0.98	2.23	0.04	0.68	2.38	9.1	93	158	687	5.02	35.1	75.0	535	38.4	4.02	0.2
A738338 Split PREP DUP	0.230	2	0.015	4.5	< 0.1	3	0.049	0.90	2.06	0.03	0.69	2.24	8.4	86	141	640	4.68	33.8	71.8	506	35.4	3.73	0.2
Method Blank	< 0.001	< 1	0.002	< 0.1	< 0.1	< 1	0.014	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.1	< 1	< 1	< 1	< 0.01	< 0.1	< 0.1	0.4	0.4	0.12	0.1

Analyte Symbol	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Te	Cs	Ba	La	Ce	Cd	Pr	Nd	Sm	Se	Eu	Gd
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.1	0.1	0.5	0.01	0.1	0.1	0.01	0.002	0.02	0.05	0.02	0.02	0.02	0.5	0.5	0.01	0.01	0.1	0.02	0.1	0.1	0.1	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
OREAS 45d (Aqua Regia) Meas	4.2	20.3	12.8	4.27					0.08	1.93				84.9	9.8	23.2							
OREAS 45d (Aqua Regia) Cert	6.50	20.9	11.0	5.08					0.085	1.950				80	9.960	24.8							
Oreas 621 (Aqua Regia) Meas	75.8		20.2	7.61	69.4		13.2	67.3	1.98	2.74	91.2		1.00		19.9	41.1	316				4.0		
Oreas 621 (Aqua Regia) Cert	75.0		18.9	6.87	55.0		13.3	68.0	1.73	2.68	107		1.01		19.4	39.6	278				5.64		
A738192 Orig	0.4	13.7	21.3	3.74	6.1	0.4	1.56	0.056	< 0.02	0.09	0.30	< 0.02	1.66	106	20.5	41.3	0.06	4.4	16.3	2.1	< 0.1	0.5	1.4
A738192 Dup	0.9	13.4	21.6	3.75	3.5	0.4	1.48	0.042	< 0.02	0.08	0.27	0.03	1.61	99.7	20.9	41.8	0.05	4.4	16.6	1.7	< 0.1	0.5	1.7
A738338 Orig	37.6	1.0	16.2	5.93	5.6	0.4	17.8	0.972	< 0.02	0.22	1.87	0.35	0.07	13.8	0.9	2.28	0.06	0.4	1.96	0.6	1.7	0.3	1.0
A738338 Split PREP DUP	34.3	0.9	15.2	5.61	5.2	0.4	17.6	0.943	< 0.02	0.22	1.82	0.37	0.08	14.3	0.8	2.20	0.11	0.3	1.85	0.3	1.3	0.2	0.9
Method Blank	0.4	< 0.1	< 0.5	< 0.01	0.3	< 0.1	0.07	< 0.002	< 0.02	< 0.05	< 0.02	< 0.02	< 0.02	9.2	< 0.5	< 0.01	< 0.01	< 0.1	< 0.02	< 0.1	< 0.1	< 0.1	< 0.1

Analyte Symbol	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Re	Au	Tl	Pb	Th	U	Hg
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppb
Lower Limit	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.001	0.5	0.02	0.1	0.1	0.1	10
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
OREAS 45d (Aqua Regia) Meas												8.4		15.9	10.5	1.6	
OREAS 45d (Aqua Regia) Cert												21		17.00	11.3	1.64	
Oreas 621 (Aqua Regia) Meas	0.3					0.6	0.1	1.7		1.0		1270	0.92	> 5000	5.8	1.8	5080
Oreas 621 (Aqua Regia) Cert	0.330					0.520	0.0780	1.43		1.00		1230	0.770	13600	5.91	1.63	3930
A738192 Orig	0.2	0.8	0.1	0.4	< 0.1	0.3	< 0.1	0.2	< 0.05	3.5	< 0.001	< 0.5	0.12	2.0	4.8	1.1	< 10
A738192 Dup	0.1	0.8	0.1	0.4	< 0.1	0.3	< 0.1	< 0.1	< 0.05	3.2	< 0.001	< 0.5	0.12	2.0	4.7	1.1	< 10
A738338 Orig	0.2	1.1	0.3	0.7	< 0.1	0.7	0.1	0.2	< 0.05	1.0	0.006	14.9	< 0.02	3.0	< 0.1	< 0.1	< 10
A738338 Split PREP DUP	0.2	1.0	0.2	0.7	< 0.1	0.6	< 0.1	0.2	< 0.05	1.1	0.006	8.5	< 0.02	3.0	< 0.1	< 0.1	10
Method Blank	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.1	< 0.001	< 0.5	< 0.02	0.3	< 0.1	< 0.1	< 10



**Date Submitted:** 05-Oct-18  
**Invoice No.:** A18-14589-Au  
**Invoice Date:** 25-Oct-18  
**Your Reference:** DIS87695

**Goldcorp Canada Ltd.**  
**17 Mine Road**  
**Balmertown Ontario P0V 1C0**  
**Canada**

**ATTN: Jamie Kristoff**

## CERTIFICATE OF ANALYSIS

6 Core samples were submitted for analysis.

The following analytical package(s) were requested:

Code 1A2-Goldcorp(ppm) Au - Fire Assay AA

Code UT-1-0.5g Aqua Regia ICP/MS

REPORT **A18-14589-Au**

This report may be reproduced without our consent. If only selected portions of the report are reproduced, permission must be obtained. If no instructions were given at time of sample submittal regarding excess material, it will be discarded within 90 days of this report. Our liability is limited solely to the analytical cost of these analyses. Test results are representative only of material submitted for analysis.

Notes:

Assays are recommended for values above the upper limit. The Au from AR-MS is only semi-quantitative. For accurate Au data, fire assay is recommended.

If value exceeds upper limit we recommend reassay by fire assay gravimetric-Code 1A3.

CERTIFIED BY:

A handwritten signature in black ink, appearing to be "Emmanuel Esemé". The signature is written in a cursive style with a horizontal line underneath.

Emmanuel Esemé, Ph.D.  
Quality Control

**ACTIVATION LABORATORIES LTD.**  
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5  
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613  
E-MAIL Ancaster@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Analyte Symbol	Au
Unit Symbol	ppm
Lower Limit	0.005
Method Code	FA-AA
A738195	< 0.005
A738196	0.032
A738197	0.008
A738198	0.027
A738199	0.021
A738200	< 0.005

Analyte Symbol	Au
Unit Symbol	ppm
Lower Limit	0.005
Method Code	FA-AA
OREAS 218 Meas	0.529
OREAS 218 Cert	0.531
OREAS 220 (Fire Assay) Meas	0.853
OREAS 220 (Fire Assay) Cert	0.866
OREAS 224 Meas	2.094
OREAS 224 Cert	2.15
OREAS 209 (Fire Assay) Meas	1.537
OREAS 209 (Fire Assay) Cert	1.58
A738199 Orig	0.021
A738199 Dup	0.021
Method Blank	< 0.005
Method Blank	< 0.005
Method Blank	< 0.005
Method Blank	< 0.005



**Date Submitted:** 05-Oct-18  
**Invoice No.:** A18-14589-UT1  
**Invoice Date:** 31-Oct-18  
**Your Reference:** DIS87695

**Goldcorp Canada Ltd.**  
**17 Mine Road**  
**Balmertown Ontario P0V 1C0**  
**Canada**

**ATTN: Jamie Kristoff**

## CERTIFICATE OF ANALYSIS

6 Core samples were submitted for analysis.

The following analytical package(s) were requested:

Code UT-1-0.5g Aqua Regia ICP/MS

REPORT **A18-14589-UT1**

This report may be reproduced without our consent. If only selected portions of the report are reproduced, permission must be obtained. If no instructions were given at time of sample submittal regarding excess material, it will be discarded within 90 days of this report. Our liability is limited solely to the analytical cost of these analyses. Test results are representative only of material submitted for analysis.

Notes:

Assays are recommended for values above the upper limit. The Au from AR-MS is only semi-quantitative. For accurate Au data, fire assay is recommended.

CERTIFIED BY:

A handwritten signature in black ink, appearing to be "Emmanuel Esemé". The signature is stylized with loops and is positioned above a horizontal line.

Emmanuel Esemé, Ph.D.  
Quality Control

**ACTIVATION LABORATORIES LTD.**  
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5  
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613  
E-MAIL Ancaster@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Results

Activation Laboratories Ltd.

Report: A18-14589

Analyte Symbol	Ti	S	P	Li	Be	B	Na	Mg	Al	K	Bi	Ca	Sc	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge
Unit Symbol	%	%	%	ppm	ppm	ppm	%	%	%	%	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.001	1	0.001	0.1	0.1	1	0.001	0.01	0.01	0.01	0.02	0.01	0.1	1	1	1	0.01	0.1	0.1	0.2	0.1	0.02	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
A738195	0.209	< 1	0.021	13.9	< 0.1	1	0.082	1.46	2.31	0.07	0.07	2.44	10.7	118	97	644	3.96	21.6	42.5	27.9	39.5	6.21	< 0.1
A738196	0.205	< 1	0.023	15.9	< 0.1	2	0.038	2.54	3.57	0.07	0.21	1.42	26.8	231	162	1030	6.87	37.4	74.4	525	77.3	10.6	0.1
A738197	0.292	< 1	0.019	12.1	< 0.1	3	0.056	2.08	3.49	0.02	0.05	4.00	9.6	122	178	760	5.06	34.4	95.8	167	51.5	7.64	0.1
A738198	0.039	< 1	0.012	4.9	< 0.1	2	0.048	0.40	0.60	0.02	0.05	0.36	3.8	36	18	171	1.45	6.2	10.1	60.1	10.7	1.74	< 0.1
A738199	0.288	< 1	0.023	9.0	< 0.1	2	0.172	0.89	2.36	0.11	0.07	3.26	13.0	111	139	659	3.45	36.2	69.1	176	31.2	5.34	< 0.1
A738200	0.062	< 1	0.025	19.0	< 0.1	< 1	0.082	0.20	0.55	0.38	0.05	0.20	1.8	13	5	163	1.16	2.7	1.8	6.9	27.2	2.95	< 0.1



## Results

## Activation Laboratories Ltd.

## Report: A18-14589

Analyte Symbol	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Te	Cs	Ba	La	Ce	Cd	Pr	Nd	Sm	Se	Eu	Gd
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.1	0.1	0.5	0.01	0.1	0.1	0.01	0.002	0.02	0.05	0.02	0.02	0.02	0.5	0.5	0.01	0.01	0.1	0.02	0.1	0.1	0.1	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
A738195	4.7	4.1	12.5	5.63	1.5	< 0.1	0.29	0.053	< 0.02	0.16	0.07	0.04	0.55	25.6	1.4	3.61	0.10	0.5	2.20	0.6	0.2	0.2	0.7
A738196	1.6	5.9	5.9	10.5	2.2	< 0.1	0.26	0.883	0.08	0.24	0.08	0.15	0.69	25.7	1.9	4.46	0.52	0.6	3.31	0.6	0.3	0.2	1.0
A738197	6.6	0.8	25.6	7.92	3.4	< 0.1	0.24	0.066	< 0.02	0.22	0.07	< 0.02	0.16	10.9	1.2	2.88	0.13	0.4	2.39	0.7	0.6	0.2	1.0
A738198	1.9	1.8	1.6	1.74	0.2	< 0.1	0.56	0.080	< 0.02	0.08	0.03	0.06	0.24	12.6	< 0.5	0.76	0.06	< 0.1	0.52	< 0.1	< 0.1	< 0.1	0.2
A738199	2.8	3.7	42.3	6.36	3.1	0.2	0.32	0.174	< 0.02	0.30	0.60	0.08	1.30	27.9	0.7	2.04	0.07	0.3	1.83	0.6	0.5	0.2	0.8
A738200	< 0.1	27.0	11.0	2.94	28.5	0.3	0.24	0.026	< 0.02	0.67	< 0.02	< 0.02	1.12	44.6	49.0	90.8	0.07	8.6	29.5	3.6	< 0.1	0.2	3.2

Analyte Symbol	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Re	Au	Tl	Pb	Th	U	Hg
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppb
Lower Limit	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.001	0.5	0.02	0.1	0.1	0.1	10
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
A738195	0.2	1.1	0.2	0.6	< 0.1	0.6	< 0.1	< 0.1	< 0.05	0.4	< 0.001	2.4	< 0.02	0.9	0.2	< 0.1	< 10
A738196	0.2	1.7	0.4	1.1	0.2	1.2	0.2	< 0.1	< 0.05	0.3	< 0.001	13.6	0.03	1.5	0.2	< 0.1	< 10
A738197	0.2	1.4	0.3	0.9	0.1	0.9	0.1	0.1	< 0.05	0.1	0.001	2.7	< 0.02	0.7	0.1	< 0.1	< 10
A738198	< 0.1	0.3	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.05	2.9	< 0.001	23.5	< 0.02	0.6	< 0.1	< 0.1	10
A738199	0.2	1.2	0.3	0.7	0.1	0.8	0.1	0.1	< 0.05	1.0	< 0.001	12.2	0.03	2.1	< 0.1	< 0.1	< 10
A738200	0.2	0.8	0.1	0.2	< 0.1	0.2	< 0.1	0.8	< 0.05	1.0	< 0.001	< 0.5	0.24	9.6	33.8	2.0	< 10

Analyte Symbol	Ti	S	P	Li	Be	B	Na	Mg	Al	K	Bi	Ca	Sc	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge
Unit Symbol	%	%	%	ppm	ppm	ppm	%	%	%	%	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.001	1	0.001	0.1	0.1	1	0.001	0.01	0.01	0.01	0.02	0.01	0.1	1	1	1	0.01	0.1	0.1	0.2	0.1	0.02	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
GXR-4 Meas	0.134	2	0.120	10.1	1.4	4	0.149	1.44	3.19	1.86	18.8	0.89	6.5	84	61	132	2.95	14.5	39.7	6990	64.2	11.9	
GXR-4 Cert	0.29	1.77	0.120	11.1	1.90	4.50	0.564	1.66	7.20	4.01	19.0	1.01	7.70	87.0	64.0	155	3.09	14.6	42.0	6520	73.0	20.0	
GXR-6 Meas		< 1	0.037	26.9	1.0	6	0.076	0.36	> 8.00	1.32	0.20	0.16	24.0	185	91	1080	5.62	13.8	24.1	74.2	119	12.9	
GXR-6 Cert		0.0160	0.0350	32.0	1.40	9.80	0.104	0.609	17.7	1.87	0.290	0.180	27.6	186	96.0	1010	5.58	13.8	27.0	66.0	118	35.0	
Oreas 621 (Aqua Regia) Meas		4	0.034	7.6	0.7		0.205	0.37	2.18	0.40	3.94	1.61	2.6	12	31	512	3.31	29.3	26.0	3870	> 5000	11.3	
Oreas 621 (Aqua Regia) Cert		4.50	0.0335	8.17	0.530		0.160	0.436	1.60	0.333	3.85	1.65	2.20	10.9	31.3	520	3.43	27.9	25.8	3660	51700	9.29	
A738195 Orig	0.207	< 1	0.021	14.0	< 0.1	1	0.082	1.46	2.37	0.08	0.09	2.42	10.7	119	97	642	3.93	21.7	43.1	28.7	40.0	6.23	< 0.1
A738195 Dup	0.210	< 1	0.021	13.8	< 0.1	1	0.081	1.47	2.25	0.07	0.06	2.46	10.8	118	96	647	3.98	21.6	41.8	27.1	39.1	6.20	< 0.1
Method Blank	< 0.001	< 1	0.006	< 0.1	< 0.1	< 1	0.015	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.1	< 1	< 1	< 1	< 0.01	< 0.1	< 0.1	1.0	< 0.1	0.04	< 0.1
Method Blank	< 0.001	< 1	0.005	< 0.1	< 0.1	< 1	0.013	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.1	< 1	< 1	< 1	< 0.01	< 0.1	< 0.1	< 0.2	< 0.1	0.04	< 0.1

Analyte Symbol	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Te	Cs	Ba	La	Ce	Cd	Pr	Nd	Sm	Se	Eu	Gd
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.1	0.1	0.5	0.01	0.1	0.1	0.01	0.002	0.02	0.05	0.02	0.02	0.02	0.5	0.5	0.01	0.01	0.1	0.02	0.1	0.1	0.1	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
GXR-4 Meas	99.2	85.8	71.9	11.6	9.3	0.3	323	3.89	0.21	5.58	2.41	0.83	2.21	26.6	50.5	97.7	0.40		37.7	6.8	4.7	1.1	4.6
GXR-4 Cert	98.0	160	221	14.0	186	10.0	310	4.00	0.270	5.60	4.80	0.970	2.80	1640	64.5	102	0.860		45.0	6.60	5.60	1.63	5.25
GXR-6 Meas	250	60.9	30.2	6.53	12.6	< 0.1	1.92	0.354	0.06	1.06	1.44	0.06	3.48	838	11.4	32.5	0.12		11.7	2.5	0.4	0.5	2.0
GXR-6 Cert	330	90.0	35.0	14.0	110	7.50	2.40	1.30	0.260	1.70	3.60	0.0180	4.20	1300	13.9	36.0	1.00		13.0	2.67	0.940	0.760	2.97
Oreas 621 (Aqua Regia) Meas	76.1		18.5	7.60	68.5		13.2	72.0	1.67	2.78	88.7		1.06		20.3	44.0	263				7.8		
Oreas 621 (Aqua Regia) Cert	75.0		18.9	6.87	55.0		13.3	68.0	1.73	2.68	107		1.01		19.4	39.6	278				5.64		
A738195 Orig	4.6	4.1	12.7	5.53	1.4	< 0.1	0.30	0.054	< 0.02	0.18	0.08	0.04	0.57	25.3	1.4	3.57	0.10	0.5	2.21	0.8	0.1	0.2	0.7
A738195 Dup	4.8	4.2	12.3	5.73	1.6	0.1	0.27	0.052	< 0.02	0.15	0.06	0.04	0.54	25.8	1.3	3.65	0.10	0.4	2.18	0.5	0.2	0.2	0.7
Method Blank	< 0.1	< 0.1	< 0.5	< 0.01	< 0.1	< 0.1	0.08	0.006	< 0.02	0.10	< 0.02	< 0.02	< 0.02	7.3	< 0.5	< 0.01	0.11	< 0.1	< 0.02	< 0.1	0.2	< 0.1	< 0.1
Method Blank	< 0.1	< 0.1	< 0.5	< 0.01	< 0.1	< 0.1	0.12	< 0.002	< 0.02	< 0.05	< 0.02	< 0.02	< 0.02	6.6	< 0.5	0.02	0.06	< 0.1	< 0.02	< 0.1	0.2	< 0.1	< 0.1

Analyte Symbol	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Re	Au	Tl	Pb	Th	U	Hg
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppb
Lower Limit	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.001	0.5	0.02	0.1	0.1	0.1	10
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
GXR-4 Meas	0.5	2.4			0.1	0.9	< 0.1	0.3	< 0.05	11.2		621	2.79	45.9	17.7	5.1	130
GXR-4 Cert	0.360	2.60			0.210	1.60	0.170	6.30	0.790	30.8		470	3.20	52.0	22.5	6.20	110
GXR-6 Meas	0.3	1.5				0.8	0.1	0.4	< 0.05	< 0.1		91.0	1.96	104	4.2	0.8	80
GXR-6 Cert	0.415	2.80				2.40	0.330	4.30	0.485	1.90		95.0	2.20	101	5.30	1.54	68.0
Oreas 621 (Aqua Regia) Meas	0.3					0.6	< 0.1	1.6		1.0		1270	0.86	> 5000	5.4	1.8	3310
Oreas 621 (Aqua Regia) Cert	0.330					0.520	0.0780	1.43		1.00		1230	0.770	13600	5.91	1.63	3930
A738195 Orig	0.2	1.1	0.2	0.6	< 0.1	0.6	< 0.1	< 0.1	< 0.05	0.4	< 0.001	3.1	< 0.02	0.9	0.2	< 0.1	< 10
A738195 Dup	0.2	1.0	0.2	0.6	< 0.1	0.6	< 0.1	< 0.1	< 0.05	0.3	< 0.001	1.7	< 0.02	0.8	0.2	< 0.1	< 10
Method Blank	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.1	< 0.001	< 0.5	< 0.02	0.2	< 0.1	< 0.1	< 10
Method Blank	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.1	< 0.001	< 0.5	< 0.02	0.3	< 0.1	< 0.1	< 10



**Date Submitted:** 09-Oct-18  
**Invoice No.:** A18-14761-Lithores  
**Invoice Date:** 19-Dec-18  
**Your Reference:** DIS87640

**Goldcorp Canada Ltd.**  
**17 Mine Road**  
**Balmertown Ontario P0V 1C0**  
**Canada**

**ATTN: Jamie Kristoff**

## CERTIFICATE OF ANALYSIS

55 Core samples were submitted for analysis.

The following analytical package(s) were requested:

Code 4LITHORES (11+) Major Elements Fusion ICP(WRA)/Trace Elements Fusion ICP/MS(WRA4B2)

REPORT **A18-14761-Lithores**

This report may be reproduced without our consent. If only selected portions of the report are reproduced, permission must be obtained. If no instructions were given at time of sample submittal regarding excess material, it will be discarded within 90 days of this report. Our liability is limited solely to the analytical cost of these analyses. Test results are representative only of material submitted for analysis.

Notes:

We recommend using option 4B1 for accurate levels of the base metals Cu, Pb, Zn, Ni and Ag. Option 4B-INAA for As, Sb, high W >100ppm, Cr >1000ppm and Sn >50ppm by Code 5D. Values for these elements provided by Fusion ICP/MS, are order of magnitude only and are provided for general information. Mineralized samples should have the Quant option selected or request assays for values which exceed the range of option 4B1. Total includes all elements in % oxide to the left of total. Zr is now being reported from FUS-ICP instead of FUS-MS.

CERTIFIED BY:

A handwritten signature in black ink, appearing to read "Emmanuel Esemé". The signature is written over a horizontal line.

Emmanuel Esemé, Ph.D.  
Quality Control

**ACTIVATION LABORATORIES LTD.**  
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5  
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613  
E-MAIL Ancaster@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

## Results

## Activation Laboratories Ltd.

## Report: A18-14761

Analyte Symbol	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	LOI	Total	Sc	Be	V	Cr	Co	Ni	Cu	Zn	Ga	Ge	As
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.001	0.01		0.01	1	1	5	20	1	20	10	30	1	0.5	5
Method Code	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
A738146	81.29	0.29	9.68	0.264	1.27	1.69	0.01	0.02	0.012	0.12	3.94	98.59	4	< 1	10	< 20	10	80	30	< 30	1	1.7	< 5
A738203	53.12	16.39	12.92	0.343	3.20	8.26	0.73	1.95	0.511	0.07	2.57	100.1	59	< 1	267	210	47	100	130	130	15	1.1	6
A738205	52.63	10.14	10.30	0.183	10.40	10.58	3.08	0.12	0.367	0.03	1.68	99.51	45	< 1	198	1100	51	270	50	80	9	1.5	< 5
A738351	57.51	15.59	9.80	0.213	1.68	3.41	2.11	2.84	1.690	0.17	5.29	100.3	37	< 1	416	110	53	100	100	70	20	1.0	38
A738352	53.83	14.53	11.68	0.226	2.25	4.01	1.61	2.66	1.462	0.18	6.00	98.46	34	< 1	364	90	50	100	100	70	19	0.9	46
A738353	42.99	10.32	11.62	0.581	3.93	23.30	0.15	0.08	0.619	0.07	4.83	98.48	38	< 1	282	460	36	140	< 10	120	15	2.5	7
A738354	48.23	10.94	11.38	0.263	7.05	9.14	0.97	1.85	0.568	0.07	8.55	99.02	35	< 1	251	300	43	100	60	90	12	2.2	< 5
A738355	44.46	11.03	11.99	0.300	6.89	11.16	0.03	0.73	0.610	0.05	11.20	98.45	36	< 1	263	340	47	120	80	90	14	1.4	< 5
A738356	59.21	14.64	9.68	0.278	3.26	8.96	0.42	0.80	0.432	0.05	1.94	99.67	49	< 1	233	190	48	70	50	130	12	1.7	< 5
A738357	51.52	3.54	9.95	0.224	18.72	11.19	0.26	0.49	0.296	0.03	2.41	98.62	33	< 1	134	2850	63	610	330	120	8	2.7	52
A738358	52.58	3.79	10.45	0.226	17.65	11.66	0.31	0.21	0.345	0.04	2.44	99.69	36	< 1	164	3120	64	510	240	140	9	2.7	61
A738359	49.33	8.80	11.59	0.220	12.14	11.93	1.08	0.07	0.290	0.08	2.77	98.28	39	< 1	182	1830	72	430	70	80	8	1.8	< 5
A738362	63.51	16.56	6.81	0.146	2.43	4.18	1.96	1.51	0.513	0.05	1.80	99.48	61	< 1	273	230	63	200	90	30	14	1.3	< 5
A738363	59.19	13.74	14.00	0.382	3.26	3.85	0.45	1.14	0.411	0.06	3.29	99.77	51	< 1	232	160	34	80	90	300	13	1.0	< 5
A738364	51.64	12.83	11.18	0.202	7.57	12.21	2.32	0.16	0.673	0.07	1.36	100.2	42	< 1	261	410	46	90	100	80	14	1.6	< 5
A738365	52.03	14.25	10.39	0.150	8.79	9.50	2.24	0.52	0.463	0.05	1.85	100.2	45	< 1	224	290	46	140	100	60	12	2.0	6
A738366	53.60	14.86	10.41	0.209	6.10	10.33	3.21	0.13	0.621	0.07	0.93	100.5	46	< 1	258	130	46	110	110	50	15	2.1	7
A738367	54.56	16.74	7.65	0.088	2.90	8.22	3.57	1.88	0.924	0.40	3.52	100.5	13	2	108	< 20	25	30	10	50	22	1.1	13
A738368	53.09	15.93	8.84	0.127	8.60	4.43	1.97	0.38	0.528	0.06	4.72	98.69	42	< 1	214	340	45	130	120	320	14	1.6	7
A738369	52.09	10.07	12.24	0.196	13.13	5.83	3.19	0.05	0.507	0.05	2.36	99.70	40	< 1	220	5550	66	370	90	90	10	1.7	< 5
A738371	50.83	13.22	13.43	0.218	5.45	9.52	2.52	0.19	1.159	0.12	2.22	98.87	42	< 1	333	130	44	60	100	80	20	2.5	< 5
A738372	49.13	14.56	9.14	0.126	6.92	7.70	2.16	2.57	1.063	0.19	6.56	100.1	21	1	177	110	40	110	90	80	19	1.3	27
A738373	44.69	8.69	13.16	0.163	19.40	2.67	0.68	0.31	0.913	0.10	7.52	98.31	26	< 1	217	1830	84	1020	30	80	11	1.2	33
A738374	39.29	3.11	11.73	0.171	32.67	1.78	0.10	0.04	0.230	0.05	9.97	99.14	14	< 1	85	3650	123	1910	50	70	4	1.2	13
A738375	48.53	16.66	7.51	0.130	9.78	13.07	1.78	0.24	0.349	0.06	2.32	100.4	35	< 1	153	980	40	120	60	60	12	1.8	7
A738376	59.04	15.21	10.22	0.146	2.82	3.05	0.99	3.05	1.133	0.14	2.75	98.55	30	< 1	318	180	39	80	60	40	18	1.3	< 5
A738377	67.92	21.80	1.42	0.086	0.20	0.17	0.87	4.65	0.312	0.08	2.89	100.4	5	1	45	30	8	< 20	< 10	< 30	25	0.9	28
A738378	48.26	15.29	14.75	0.178	4.79	5.55	2.12	0.28	1.036	0.12	6.14	98.52	42	< 1	311	210	44	80	180	120	19	1.4	69
A738379	55.86	17.35	9.17	0.155	1.93	2.94	0.23	4.57	1.262	0.07	5.67	99.22	38	< 1	366	210	75	170	160	70	21	1.6	260
A738380	60.39	17.86	5.41	0.071	2.37	4.67	1.16	3.23	0.521	0.24	4.92	100.8	6	1	75	< 20	12	< 20	10	40	19	1.5	12
A738381	57.84	15.00	7.12	0.151	7.02	7.68	2.59	1.18	0.366	0.10	1.51	100.6	20	< 1	123	430	31	230	170	70	15	1.3	< 5
A738382	55.08	15.13	12.72	0.144	4.55	3.52	1.75	1.21	1.079	0.11	4.23	99.53	43	< 1	321	200	56	90	150	90	19	1.5	14
A738383	52.23	13.81	12.87	0.179	7.09	5.47	3.74	0.20	1.008	0.10	3.19	99.89	41	< 1	284	180	46	80	220	90	17	1.3	< 5
A738384	55.59	10.29	17.13	0.401	2.09	4.86	1.96	0.28	1.204	0.24	5.01	99.06	25	< 1	42	< 20	27	30	10	120	21	1.3	13
A738385	60.00	2.42	8.91	0.220	5.72	8.43	0.02	0.02	0.230	0.03	12.59	98.57	28	< 1	92	3130	61	740	30	70	4	1.6	97
A738386	51.59	11.28	11.33	0.249	7.59	11.82	0.86	0.22	0.624	0.06	3.11	98.74	37	< 1	269	350	48	120	40	70	15	2.0	< 5
A738387	58.72	15.09	9.73	0.061	3.85	1.33	3.94	3.30	0.641	0.08	2.03	98.78	43	< 1	280	< 20	39	120	70	< 30	17	1.5	8
A738388	53.74	13.34	13.63	0.178	6.94	4.74	1.04	0.31	0.362	0.06	4.29	98.62	47	< 1	212	20	65	90	20	90	12	1.4	< 5
A738389	61.07	2.71	20.19	0.382	3.89	0.33	0.01	0.30	0.086	0.02	10.05	99.05	19	< 1	76	> 10000	191	3120	30	60	3	1.5	30
A738390	72.00	13.60	2.02	0.038	0.47	1.78	3.70	4.13	0.181	0.07	0.33	98.32	3	1	15	40	4	< 20	< 10	< 30	16	0.7	< 5
A738391	27.70	1.48	8.98	0.160	16.65	12.94	0.02	0.23	0.047	0.02	29.87	98.10	9	< 1	39	5450	82	1400	20	50	2	1.3	23

Analyte Symbol	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	LOI	Total	Sc	Be	V	Cr	Co	Ni	Cu	Zn	Ga	Ge	As
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.001	0.01		0.01	1	1	5	20	1	20	10	30	1	0.5	5
Method Code	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
A738392	69.63	9.08	9.80	0.151	3.11	0.47	0.15	1.79	0.306	0.03	3.59	98.11	43	< 1	219	> 10000	94	1350	40	90	10	2.8	< 5
A738393	55.11	15.79	6.20	0.166	2.95	6.97	2.29	1.17	0.471	0.30	8.75	100.2	11	1	103	50	17	20	60	40	17	1.1	7
A738394	49.18	15.18	16.49	0.458	3.22	6.00	1.43	0.54	0.926	0.12	4.90	98.44	41	< 1	322	290	49	190	90	120	19	1.0	< 5
A738395	54.50	17.32	7.16	0.176	2.63	5.71	2.02	2.18	0.527	0.33	7.50	100.1	13	1	119	40	20	< 20	20	40	20	0.9	18
A738396	48.59	19.35	13.45	0.369	2.70	5.19	2.51	0.80	1.233	0.17	4.50	98.86	46	< 1	384	380	44	140	110	90	23	0.8	< 5
A738397	38.61	1.81	10.91	0.151	35.33	0.28	0.02	< 0.01	0.115	0.04	10.98	98.25	11	< 1	57	3690	128	1990	40	80	3	1.4	41
A738398	52.27	5.36	26.06	0.519	3.53	0.76	< 0.01	0.78	0.158	0.03	8.87	98.33	24	< 1	123	> 10000	180	3740	20	100	6	1.4	399
A738399	92.63	0.88	3.19	0.066	0.36	0.26	0.03	0.14	0.026	0.01	0.95	98.53	3	< 1	20	2540	39	400	< 10	40	2	2.0	588
A738400	86.90	1.22	7.38	0.138	0.56	0.17	0.02	0.17	0.039	0.04	1.92	98.54	6	< 1	32	3540	29	690	< 10	40	2	2.0	1050
D6221529	56.77	15.33	12.89	0.213	4.21	4.99	0.20	0.83	1.612	0.19	2.16	99.40	49	< 1	421	150	72	110	130	70	20	2.0	13
A738147	69.86	14.20	3.95	0.052	0.82	1.98	3.21	4.97	0.653	0.29	0.31	100.3	6	1	41	< 20	5	< 20	< 10	80	19	0.6	< 5
A738360	70.90	14.13	2.38	0.035	0.52	1.55	3.58	4.95	0.174	0.09	0.35	98.65	3	< 1	17	< 20	1	< 20	< 10	30	17	1.0	< 5
A738361	69.91	14.67	3.39	0.041	0.72	1.72	3.36	5.44	0.514	0.22	0.34	100.3	5	1	32	< 20	2	< 20	< 10	60	19	1.0	< 5
A738370	71.54	14.33	2.04	0.038	0.54	2.03	4.36	3.40	0.184	0.06	0.43	98.94	2	2	17	< 20	1	< 20	< 10	40	17	1.0	< 5



## Results

## Activation Laboratories Ltd.

## Report: A18-14761

Analyte Symbol	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	1	2	0.5	1	0.2	2	0.5	0.1	1	0.2	0.1	2	0.05	0.05	0.01	0.05	0.01	0.005	0.01	0.01	0.01	0.01	0.01
Method Code	FUS-MS	FUS-ICP	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
A738146	1	23	6.3	6	< 0.2	< 2	< 0.5	< 0.1	< 1	0.3	0.1	10	1.42	2.60	0.38	1.47	0.48	0.222	0.65	0.13	0.86	0.18	0.53
A738203	47	129	14.8	30	0.7	< 2	0.7	< 0.1	< 1	< 0.2	3.0	259	4.83	8.31	1.26	5.62	1.57	0.616	2.12	0.41	2.63	0.55	1.64
A738205	2	81	9.4	18	0.2	< 2	< 0.5	< 0.1	2	0.3	0.2	70	1.38	3.34	0.47	2.60	0.90	0.403	1.28	0.24	1.56	0.34	1.05
A738351	61	84	32.2	101	3.1	< 2	< 0.5	0.1	1	0.9	7.3	226	7.49	17.5	2.35	10.6	3.40	1.12	4.69	0.84	5.34	1.14	3.55
A738352	52	70	28.1	88	2.8	< 2	< 0.5	0.1	1	1.9	6.2	247	6.25	15.6	2.06	10.9	3.07	1.02	3.85	0.74	4.76	0.97	2.97
A738353	2	119	12.3	34	0.8	< 2	< 0.5	0.1	< 1	2.9	0.3	35	1.17	3.42	0.51	2.97	1.29	0.560	1.75	0.34	2.07	0.42	1.23
A738354	65	110	11.6	32	0.2	2	< 0.5	0.1	< 1	1.8	12.6	431	1.48	3.70	0.54	3.04	1.14	0.479	1.52	0.30	1.96	0.43	1.29
A738355	20	27	14.7	37	0.4	< 2	< 0.5	< 0.1	< 1	1.9	0.8	269	1.89	4.60	0.67	3.58	1.31	0.392	2.02	0.40	2.54	0.50	1.42
A738356	26	84	11.1	26	0.5	< 2	< 0.5	0.1	< 1	0.2	2.6	87	2.71	5.76	0.72	3.25	1.00	0.401	1.36	0.28	1.92	0.41	1.25
A738357	30	41	5.6	13	< 0.2	6	0.5	< 0.1	1	0.8	3.5	23	1.46	3.18	0.47	2.45	0.74	0.459	1.09	0.17	1.03	0.21	0.58
A738358	10	65	6.5	15	< 0.2	10	< 0.5	0.1	2	0.3	1.2	31	1.87	4.04	0.58	3.27	0.93	0.634	1.22	0.21	1.28	0.24	0.68
A738359	1	56	6.9	14	< 0.2	< 2	< 0.5	< 0.1	< 1	1.7	0.1	24	0.54	1.62	0.28	1.51	0.43	0.335	0.97	0.19	1.31	0.25	0.79
A738362	32	146	12.4	29	0.5	< 2	< 0.5	< 0.1	< 1	< 0.2	3.2	164	2.36	5.59	0.74	3.30	1.10	0.439	1.49	0.31	2.05	0.46	1.40
A738363	36	101	10.2	32	0.4	< 2	< 0.5	< 0.1	< 1	< 0.2	2.1	151	2.25	5.14	0.71	2.97	1.05	0.283	1.27	0.24	1.56	0.37	1.20
A738364	1	121	15.1	34	0.9	< 2	< 0.5	< 0.1	< 1	0.2	0.1	66	2.32	6.10	0.85	4.31	1.56	0.600	2.09	0.38	2.59	0.53	1.61
A738365	11	118	11.8	27	0.7	< 2	< 0.5	< 0.1	< 1	3.4	1.3	177	2.77	6.30	0.86	3.90	1.29	0.485	1.74	0.32	1.91	0.40	1.24
A738366	1	74	15.1	38	1.1	< 2	< 0.5	0.1	< 1	0.6	< 0.1	42	2.77	6.77	0.88	4.24	1.49	0.616	2.03	0.38	2.68	0.57	1.67
A738367	38	949	49.9	154	9.7	< 2	< 0.5	< 0.1	1	4.7	2.8	669	62.3	144	18.4	79.1	17.1	3.47	13.8	1.99	9.81	1.72	4.43
A738368	9	113	10.6	32	1.0	< 2	< 0.5	< 0.1	< 1	3.7	1.8	93	3.18	6.90	0.86	3.71	1.07	0.478	1.37	0.29	2.02	0.39	1.18
A738369	1	97	11.1	27	1.0	< 2	< 0.5	< 0.1	< 1	0.7	0.1	15	2.30	5.81	0.90	3.79	1.33	0.468	1.80	0.31	1.92	0.39	1.16
A738371	2	131	23.7	64	2.6	< 2	< 0.5	0.1	1	1.6	0.3	82	5.60	13.5	1.78	9.63	3.00	1.03	3.62	0.64	3.98	0.83	2.48
A738372	68	335	20.3	91	4.7	< 2	< 0.5	0.1	1	2.7	7.0	528	16.9	40.0	5.20	22.9	5.10	1.24	4.63	0.74	3.99	0.73	2.07
A738373	7	25	14.2	53	2.1	< 2	< 0.5	< 0.1	< 1	5.2	0.7	82	3.54	9.62	1.34	6.70	2.09	0.499	2.56	0.41	2.58	0.55	1.78
A738374	1	7	4.1	11	< 0.2	< 2	< 0.5	< 0.1	< 1	5.1	0.1	13	0.92	2.13	0.29	1.43	0.56	0.188	0.79	0.13	0.77	0.15	0.47
A738375	6	119	8.9	19	0.3	< 2	< 0.5	< 0.1	< 1	5.3	0.7	52	2.08	4.95	0.67	2.78	1.11	0.408	1.48	0.25	1.51	0.31	0.98
A738376	52	29	20.4	57	1.8	< 2	< 0.5	0.1	< 1	0.6	3.2	406	3.04	8.05	1.18	5.78	2.07	0.752	3.05	0.57	3.61	0.77	2.39
A738377	114	82	4.1	91	0.3	< 2	< 0.5	< 0.1	1	0.9	7.0	225	2.42	5.53	0.71	3.11	0.80	0.354	0.75	0.12	0.69	0.14	0.42
A738378	7	71	17.6	67	3.3	< 2	< 0.5	< 0.1	< 1	3.1	1.6	66	6.11	14.9	2.02	9.10	2.57	0.785	2.94	0.55	3.39	0.69	2.00
A738379	85	42	15.0	65	3.4	< 2	< 0.5	0.1	1	4.0	5.5	273	4.66	11.1	1.62	7.46	1.99	0.688	2.25	0.40	2.54	0.54	1.68
A738380	75	130	9.3	128	5.3	< 2	< 0.5	< 0.1	< 1	6.4	5.2	557	29.1	58.7	6.67	26.8	4.31	1.16	2.50	0.35	1.76	0.31	0.85
A738381	32	314	21.2	80	6.7	4	< 0.5	< 0.1	1	0.6	1.0	372	16.4	33.3	3.70	15.1	3.33	0.699	3.29	0.57	3.43	0.74	2.33
A738382	24	73	17.7	67	3.3	< 2	< 0.5	< 0.1	1	1.0	1.5	166	4.56	11.4	1.55	7.34	2.11	0.707	2.65	0.50	3.26	0.68	2.08
A738383	4	116	22.2	67	3.2	< 2	< 0.5	< 0.1	< 1	0.2	2.3	103	5.24	13.2	1.77	8.17	2.53	0.883	3.41	0.61	3.73	0.79	2.42
A738384	10	101	49.3	147	6.6	< 2	< 0.5	< 0.1	1	0.5	1.5	51	8.12	21.5	3.17	14.9	5.30	1.85	7.00	1.33	8.63	1.82	5.53
A738385	1	42	2.9	10	< 0.2	< 2	< 0.5	< 0.1	< 1	1.2	0.2	26	0.57	1.36	0.22	1.28	0.35	0.131	0.45	0.09	0.59	0.11	0.31
A738386	9	85	14.1	31	0.5	< 2	< 0.5	< 0.1	< 1	< 0.2	1.3	57	1.76	4.57	0.68	3.19	1.50	0.548	1.91	0.40	2.58	0.50	1.50
A738387	154	250	7.3	48	2.1	< 2	< 0.5	0.1	< 1	0.6	86.8	1067	4.11	8.81	1.08	4.51	1.09	0.441	1.30	0.23	1.46	0.29	0.89
A738388	6	56	10.8	21	0.3	< 2	< 0.5	< 0.1	< 1	< 0.2	0.7	47	1.17	2.70	0.35	1.79	0.73	0.306	1.09	0.24	1.71	0.40	1.27
A738389	19	6	1.6	5	< 0.2	< 2	< 0.5	< 0.1	< 1	0.5	6.4	67	0.17	0.32	0.04	0.17	0.12	0.041	0.14	0.03	0.28	0.06	0.20
A738390	117	386	7.5	113	3.3	< 2	< 0.5	< 0.1	1	< 0.2	1.5	1043	43.4	80.6	7.94	26.7	4.30	0.620	2.56	0.30	1.50	0.25	0.67
A738391	10	106	1.2	7	< 0.2	< 2	< 0.5	< 0.1	< 1	1.6	4.4	61	0.31	0.71	0.10	0.34	0.04	0.049	0.16	0.03	0.18	0.04	0.15

Analyte Symbol	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
Lower Limit	1	2	0.5	1	0.2	2	0.5	0.1	1	0.2	0.1	2	0.05	0.05	0.01	0.05	0.01	0.005	0.01	0.01	0.01	0.01	0.01	
Method Code	FUS-MS	FUS-ICP	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	
A738392	63	20	2.4	10	< 0.2	< 2	< 0.5	< 0.1	< 1	< 1	1.0	6.9	489	0.53	1.11	0.15	0.83	0.28	0.067	0.40	0.08	0.45	0.10	0.31
A738393	40	302	14.2	114	4.0	3	< 0.5	0.1	1	1.0	8.6	440	42.8	85.2	9.45	36.6	6.45	1.68	4.06	0.54	2.66	0.49	1.40	
A738394	20	164	27.1	56	1.1	< 2	< 0.5	0.1	< 1	0.4	5.8	227	3.68	8.69	1.26	6.50	2.42	0.773	3.26	0.71	4.62	0.95	3.01	
A738395	72	177	15.4	127	4.5	< 2	< 0.5	< 0.1	1	0.3	11.4	401	44.2	89.1	10.3	38.4	6.64	1.70	4.25	0.54	2.96	0.56	1.57	
A738396	33	112	32.0	70	1.7	< 2	< 0.5	0.1	1	0.5	11.9	234	4.72	11.6	1.66	8.99	3.12	1.08	4.27	0.89	5.50	1.16	3.42	
A738397	1	< 2	1.6	4	< 0.2	< 2	< 0.5	< 0.1	< 1	11.9	0.2	15	0.22	0.63	0.08	0.36	0.12	0.081	0.21	0.05	0.32	0.06	0.18	
A738398	34	13	3.2	8	< 0.2	< 2	< 0.5	< 0.1	< 1	4.0	5.7	119	0.25	0.62	0.09	0.45	0.26	0.057	0.39	0.08	0.60	0.13	0.43	
A738399	4	4	< 0.5	3	1.0	< 2	< 0.5	< 0.1	< 1	2.9	0.5	41	0.19	0.17	0.02	< 0.05	< 0.01	< 0.005	0.04	0.01	< 0.01	0.02	0.06	
A738400	7	4	1.0	2	1.0	< 2	< 0.5	< 0.1	< 1	15.5	1.1	32	0.24	0.31	0.04	0.09	< 0.01	< 0.005	0.08	0.01	0.06	0.02	0.06	
D6221529	19	70	25.0	89	4.0	< 2	< 0.5	0.1	1	0.7	2.6	113	14.3	29.7	3.84	17.7	5.14	1.69	5.16	0.74	4.86	0.99	3.01	
A738147	164	230	12.7	475	15.2	< 2	1.2	0.1	< 1	< 0.2	0.7	1024	91.3	188	20.8	81.6	13.3	1.20	7.26	0.76	2.73	0.45	1.21	
A738360	134	261	5.0	192	2.0	< 2	0.8	< 0.1	1	< 0.2	1.9	862	79.6	144	13.9	45.4	6.37	0.557	3.28	0.30	1.30	0.20	0.49	
A738361	169	244	11.0	331	10.0	< 2	1.7	< 0.1	1	< 0.2	1.0	1045	117	234	25.2	90.0	12.8	1.04	6.95	0.60	2.33	0.37	0.98	
A738370	93	504	5.0	82	2.0	< 2	< 0.5	< 0.1	1	< 0.2	0.7	937	22.6	39.4	3.92	13.4	1.52	0.419	0.90	0.11	0.64	0.16	0.46	

Analyte Symbol	Tm	Yb	Lu	Hf	Ta	W	Tl	Pb	Bi	Th	U
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.005	0.01	0.002	0.1	0.01	0.5	0.05	5	0.1	0.05	0.01
Method Code	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
A738146	0.079	0.51	0.073	0.1	0.02	< 0.5	< 0.05	< 5	< 0.1	0.06	0.09
A738203	0.254	1.79	0.295	0.8	0.06	7.1	0.20	5	0.1	0.41	0.12
A738205	0.166	1.12	0.176	0.4	0.01	< 0.5	< 0.05	< 5	0.1	0.19	0.06
A738351	0.543	3.60	0.554	2.4	0.21	< 0.5	0.47	< 5	< 0.1	0.93	0.23
A738352	0.448	3.00	0.456	2.1	0.16	2.5	0.38	< 5	< 0.1	0.74	0.16
A738353	0.166	1.04	0.163	1.0	0.06	< 0.5	< 0.05	< 5	< 0.1	0.18	0.08
A738354	0.196	1.20	0.187	1.0	0.03	< 0.5	0.39	< 5	< 0.1	0.24	0.07
A738355	0.216	1.47	0.227	1.1	0.07	0.7	0.09	< 5	< 0.1	0.25	0.09
A738356	0.196	1.33	0.203	0.7	0.07	1.6	0.09	< 5	0.2	0.33	0.11
A738357	0.086	0.54	0.081	0.3	< 0.01	0.8	0.24	< 5	0.3	0.12	0.42
A738358	0.097	0.63	0.095	0.4	0.02	1.7	0.08	< 5	0.2	0.13	0.53
A738359	0.132	0.83	0.105	0.3	< 0.01	< 0.5	< 0.05	< 5	< 0.1	0.08	0.03
A738362	0.233	1.65	0.239	0.8	0.05	0.8	0.09	8	< 0.1	0.36	0.10
A738363	0.200	1.33	0.216	0.6	0.03	2.5	0.07	6	< 0.1	0.27	0.12
A738364	0.242	1.58	0.240	0.9	0.06	< 0.5	< 0.05	< 5	< 0.1	0.23	0.06
A738365	0.198	1.39	0.208	0.8	0.06	0.6	< 0.05	< 5	< 0.1	0.35	0.10
A738366	0.259	1.70	0.261	1.0	0.09	1.7	< 0.05	< 5	< 0.1	0.46	0.14
A738367	0.618	3.64	0.534	4.0	0.55	1.3	0.13	< 5	< 0.1	7.71	1.69
A738368	0.181	1.10	0.160	0.8	0.09	0.6	< 0.05	< 5	< 0.1	0.74	0.16
A738369	0.182	1.22	0.175	0.7	0.06	5.3	< 0.05	< 5	< 0.1	0.25	0.07
A738371	0.387	2.49	0.362	1.7	0.18	< 0.5	< 0.05	< 5	< 0.1	0.53	0.11
A738372	0.288	1.83	0.275	2.5	0.25	0.7	0.70	5	< 0.1	1.55	0.42
A738373	0.270	1.74	0.234	1.5	0.14	6.0	< 0.05	< 5	< 0.1	0.46	0.12
A738374	0.068	0.40	0.053	0.3	0.01	2.6	< 0.05	< 5	< 0.1	0.07	0.02
A738375	0.148	0.89	0.129	0.5	0.03	0.8	< 0.05	< 5	< 0.1	0.14	0.04
A738376	0.354	2.25	0.332	1.6	0.13	4.4	0.08	< 5	< 0.1	0.48	0.12
A738377	0.063	0.38	0.049	2.3	0.03	1.2	1.80	< 5	< 0.1	0.29	0.22
A738378	0.301	2.02	0.304	1.8	0.18	8.5	0.06	< 5	< 0.1	0.69	0.16
A738379	0.263	1.71	0.246	1.6	0.22	21.1	0.32	< 5	< 0.1	0.57	0.16
A738380	0.121	0.77	0.108	2.9	0.29	2.5	0.63	< 5	< 0.1	4.78	1.16
A738381	0.352	2.28	0.346	2.4	0.39	2.5	0.21	10	0.1	4.48	1.46
A738382	0.318	2.10	0.315	1.9	0.22	6.7	< 0.05	< 5	< 0.1	0.67	0.17
A738383	0.383	2.48	0.362	1.7	0.18	0.9	< 0.05	< 5	< 0.1	0.64	0.17
A738384	0.821	5.32	0.819	3.7	0.35	2.3	< 0.05	< 5	< 0.1	0.97	0.27
A738385	0.056	0.38	0.050	0.2	0.05	< 0.5	< 0.05	< 5	< 0.1	0.06	0.02
A738386	0.215	1.31	0.186	0.9	0.04	< 0.5	< 0.05	< 5	< 0.1	0.21	0.07
A738387	0.148	0.98	0.139	1.3	0.17	< 0.5	0.76	< 5	< 0.1	1.31	0.38
A738388	0.192	1.15	0.158	0.6	0.03	< 0.5	< 0.05	< 5	< 0.1	0.34	0.09
A738389	0.032	0.21	0.030	0.1	< 0.01	< 0.5	0.19	< 5	< 0.1	< 0.05	0.02
A738390	0.094	0.65	0.101	3.0	0.54	2.0	0.68	21	< 0.1	20.0	1.99
A738391	0.025	0.15	0.023	0.1	0.01	< 0.5	< 0.05	< 5	< 0.1	0.11	0.02

Analyte Symbol	Tm	Yb	Lu	Hf	Ta	W	Tl	Pb	Bi	Th	U
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.005	0.01	0.002	0.1	0.01	0.5	0.05	5	0.1	0.05	0.01
Method Code	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
A738392	0.054	0.40	0.060	0.3	< 0.01	< 0.5	0.38	< 5	< 0.1	0.06	0.04
A738393	0.206	1.37	0.190	2.5	0.22	1.0	0.49	5	< 0.1	6.83	1.92
A738394	0.452	2.93	0.448	1.6	0.05	1.4	0.24	< 5	< 0.1	0.42	0.14
A738395	0.232	1.52	0.211	3.1	0.29	2.6	0.88	< 5	< 0.1	7.88	2.25
A738396	0.527	3.42	0.523	2.1	0.07	1.3	0.43	< 5	< 0.1	0.51	0.17
A738397	0.030	0.20	0.034	0.1	< 0.01	1.7	< 0.05	< 5	< 0.1	< 0.05	0.01
A738398	0.071	0.48	0.076	0.1	< 0.01	2.2	0.30	< 5	< 0.1	< 0.05	0.01
A738399	0.010	< 0.01	0.011	0.1	0.04	< 0.5	< 0.05	< 5	< 0.1	< 0.05	0.01
A738400	0.007	< 0.01	0.013	0.1	0.02	0.5	< 0.05	< 5	< 0.1	0.05	0.01
D6221529	0.501	3.28	0.528	2.8	0.22	11.9	0.82	< 5	< 0.1	0.86	0.31
A738147	0.169	1.14	0.164	12.8	0.28	< 0.5	0.82	29	< 0.1	89.7	2.14
A738360	0.051	0.26	0.038	5.8	0.24	0.7	0.80	28	< 0.1	41.1	3.11
A738361	0.143	0.91	0.139	8.3	0.31	1.7	0.96	28	< 0.1	73.1	2.28
A738370	0.069	0.45	0.080	2.1	0.41	1.0	0.63	21	< 0.1	10.4	0.90

Analyte Symbol	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	LOI	Total	Sc	Be	V	Cr	Co	Ni	Cu	Zn	Ga	Ge	As
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.001	0.01		0.01	1	1	5	20	1	20	10	30	1	0.5	5
Method Code	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
NIST 694 Meas	10.86	1.89	0.75	0.018	0.34	42.66	0.86	0.54	0.117	30.23					1572								
NIST 694 Cert	11.2	1.80	0.790	0.0116	0.330	43.6	0.860	0.510	0.110	30.2					1740								
NIST 694 Meas	11.14	1.89	0.75	0.020	0.34	42.93	0.88	0.54	0.120	30.17					1563								
NIST 694 Cert	11.2	1.80	0.790	0.0116	0.330	43.6	0.860	0.510	0.110	30.2					1740								
DNC-1 Meas	47.30	17.83	9.55	0.146	10.01	11.51	1.94	0.22	0.462	0.07			32		146	300	55	250	100	70	14		
DNC-1 Cert	47.15	18.34	9.97	0.150	10.13	11.49	1.890	0.234	0.480	0.070			31		148	270	57	247	100	70	15		
DNC-1 Meas	46.84	18.67	9.93	0.150	10.03	11.39	1.90	0.22	0.490	0.08			31		147								
DNC-1 Cert	47.15	18.34	9.97	0.150	10.13	11.49	1.890	0.234	0.480	0.070			31		148								
LKSD-3 Meas																80	29	50	30	160			30
LKSD-3 Cert																87.0	30.0	47.0	35.0	152			27.0
TDB-1 Meas																250		90	320	150			
TDB-1 Cert																251		92	323	155			
W-2a Meas	52.51	15.51	10.68	0.164	6.14	11.08	2.22	0.62	1.059	0.12			36	< 1	260	90	43	70	110	80	18	1.5	
W-2a Cert	52.4	15.4	10.7	0.163	6.37	10.9	2.14	0.626	1.06	0.140			36.0	1.30	262	92.0	43.0	70.0	110	80.0	17.0	1.00	
W-2a Meas	52.60	15.25	10.88	0.160	6.22	10.98	2.22	0.61	1.080	0.14			35	< 1	260								
W-2a Cert	52.4	15.4	10.7	0.163	6.37	10.9	2.14	0.626	1.06	0.140			36.0	1.30	262								
SY-4 Meas	49.90	20.29	6.16	0.107	0.49	8.14	6.89	1.66	0.281	0.13			< 1	3	5								
SY-4 Cert	49.9	20.69	6.21	0.108	0.54	8.05	7.10	1.66	0.287	0.131			1.1	2.6	8.0								
SY-4 Meas	50.38	20.84	6.22	0.110	0.50	8.18	6.91	1.67	0.290	0.13			1	3	6								
SY-4 Cert	49.9	20.69	6.21	0.108	0.54	8.05	7.10	1.66	0.287	0.131			1.1	2.6	8.0								
CTA-AC-1 Meas																			50	40			
CTA-AC-1 Cert																			54.0	38.0			
BIR-1a Meas	47.99	15.83	11.50	0.170	9.50	13.59	1.84	0.02	0.985	0.02			44	< 1	320	380		170	120	70	15		< 5
BIR-1a Cert	47.96	15.50	11.30	0.175	9.700	13.30	1.82	0.030	0.96	0.021			44	0.58	310	370		170	125	70	16		0.44
BIR-1a Meas	48.05	15.24	11.33	0.170	9.50	13.52	1.82	0.02	0.960	0.02			43	< 1	320								
BIR-1a Cert	47.96	15.50	11.30	0.175	9.700	13.30	1.82	0.030	0.96	0.021			44	0.58	310								
NCS DC86312 Meas																							
NCS DC86312 Cert																							
NCS DC70009 (GBW07241) Meas																	3	< 20	1050	90	16	10.3	67
NCS DC70009 (GBW07241) Cert																	3.7	2.8	960	100	16.5	11.2	69.9
OREAS 100a (Fusion) Meas																	17		160				
OREAS 100a (Fusion) Cert																	18.1		169				
OREAS 101a (Fusion) Meas																	47		430				
OREAS 101a (Fusion) Cert																	48.8		430				

Analyte Symbol	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	LOI	Total	Sc	Be	V	Cr	Co	Ni	Cu	Zn	Ga	Ge	As
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.001	0.01		0.01	1	1	5	20	1	20	10	30	1	0.5	5
Method Code	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
OREAS 101b (Fusion) Meas																	45	< 20	410				
OREAS 101b (Fusion) Cert																	47	9	420				
JR-1 Meas																	1	< 20			15	2.1	15
JR-1 Cert																	0.83	1.67			16.1	1.88	16.3
A738364 Orig	51.85	12.83	11.30	0.204	7.61	12.48	2.28	0.16	0.681	0.07	1.36	100.8	42	< 1	264	400	45	80	100	70	13	1.6	< 5
A738364 Dup	51.42	12.83	11.06	0.200	7.53	11.95	2.36	0.16	0.664	0.06	1.36	99.60	42	< 1	258	420	46	90	100	80	14	1.6	< 5
A738382 Orig	54.84	15.06	12.68	0.144	4.51	3.50	1.74	1.21	1.072	0.11	4.23	99.08	43	< 1	318	200	57	100	160	80	19	1.5	12
A738382 Dup	55.32	15.19	12.76	0.144	4.60	3.55	1.76	1.22	1.087	0.11	4.23	99.97	43	< 1	323	200	55	90	150	90	18	1.4	15
D6221529 Orig	56.77	15.33	12.89	0.213	4.21	4.99	0.20	0.83	1.612	0.19	2.16	99.40	49	< 1	421	150	72	110	130	70	20	2.0	13
D6221529 Split PREP DUP	57.48	15.11	12.66	0.208	4.26	4.95	0.22	0.83	1.598	0.18	1.90	99.41	49	< 1	415	150	61	100	100	70	20	2.0	5
Method Blank	< 0.01	< 0.01	< 0.01	0.001	< 0.01	0.01	< 0.01	< 0.01	< 0.001	0.01			< 1	< 1	< 5	< 20	< 1	< 20	< 10	< 30	< 1	< 0.5	< 5
Method Blank	< 0.01	< 0.01	< 0.01	0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01			< 1	< 1	< 5								
Method Blank	< 0.01	< 0.01	< 0.01	0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.001	0.01			< 1	< 1	< 5								
Method Blank	< 0.01	< 0.01	< 0.01	0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01	0.02		< 1	< 1	< 5								
Method Blank	< 0.01	< 0.01	0.01	0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01			< 1	< 1	< 5								

Analyte Symbol	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	1	2	0.5	1	0.2	2	0.5	0.1	1	0.2	0.1	2	0.05	0.05	0.01	0.05	0.01	0.005	0.01	0.01	0.01	0.01	0.01
Method Code	FUS-MS	FUS-ICP	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
NIST 694 Meas																							
NIST 694 Cert																							
NIST 694 Meas																							
NIST 694 Cert																							
DNC-1 Meas	4	147	18.8	33						1.0		106	3.90			5.60		0.620					
DNC-1 Cert	5	144.0	18.0	38						0.96		118	3.6			5.20		0.59					
DNC-1 Meas		142		33								107											
DNC-1 Cert		144.0		38								118											
LKSD-3 Meas	75		28.9			< 2	2.8				2.3		47.3	89.7		45.9	8.70	1.50			5.20		
LKSD-3 Cert	78.0		30.0			2.00	2.70				2.30		52.0	90.0		44.0	8.00	1.50			4.90		
TDB-1 Meas			32.6										16.1	37.8		24.3		2.10					
TDB-1 Cert			36										17	41		23		2.1					
W-2a Meas	19	194	25.0	82	7.5	< 2				0.9		173	10.7	22.9		13.3	3.40	1.10		0.60	3.80	0.78	
W-2a Cert	21.0	190	24.0	94.0	7.90	0.600				0.790		182	10.0	23.0		13.0	3.30	1.00		0.630	3.60	0.760	
W-2a Meas		193		84								175											
W-2a Cert		190		94.0								182											
SY-4 Meas		1199		532								345											
SY-4 Cert		1191		517								340											
SY-4 Meas		1204		530								343											
SY-4 Cert		1191		517								340											
CTA-AC-1 Meas			268										> 2000	> 3000		1130	161	43.1	116				
CTA-AC-1 Cert			272										2176	3326		1087	162	46.7	124				
BIR-1a Meas		109	15.8	13								7		1.80		2.30			2.00				
BIR-1a Cert		110	16	18								6		1.9		2.5			2.0				
BIR-1a Meas		107		13								11											
BIR-1a Cert		110		18								6											
NCS DC86312 Meas			955										> 2000	172		1580			234		189	35.8	101
NCS DC86312 Cert			976										2360	190		1600			225.0		183	36	96.2
NCS DC70009 (GBW07241) Meas	507		129				1.4	1.0	> 1000	3.0	41.0		24.0	61.0	8.10	34.0	13.0		16.0	3.60	22.0	5.00	14.0
NCS DC70009 (GBW07241) Cert	500		128				1.8	1.3	1700	3.1	41		23.7	60.3	7.9	32.9	12.5		14.8	3.3	20.7	4.5	13.4
OREAS 100a (Fusion) Meas			131			25							270	493	47.8	165	25.9	3.73	22.7	3.64	25.4	4.75	14.9
OREAS 100a (Fusion) Cert			142			24.1							260	463	47.1	152	23.6	3.71	23.6	3.80	23.2	4.81	14.9
OREAS 101a (Fusion) Meas			175			23							828	1400	132	404	49.9	8.22	40.3		33.9	6.85	20.6
OREAS 101a (Fusion) Cert			183			21.9							816	1396	134	403	48.8	8.06	43.4		33.3	6.46	19.5

Analyte Symbol	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	1	2	0.5	1	0.2	2	0.5	0.1	1	0.2	0.1	2	0.05	0.05	0.01	0.05	0.01	0.005	0.01	0.01	0.01	0.01	0.01
Method Code	FUS-MS	FUS-ICP	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
OREAS 101b (Fusion) Meas			171			20							801	1410	123	387	50.0	8.08		4.98	31.3	6.32	19.2
OREAS 101b (Fusion) Cert			178			21							789	1331	127	378	48	7.77		5.37	32.1	6.34	18.7
JR-1 Meas	260		42.4		16.2			< 0.1	3	1.2	20.3		19.9	48.2	5.40	25.0	6.59	0.310		0.92	5.66		3.79
JR-1 Cert	257		45.1		15.2			0.028	2.86	1.19	20.8		19.7	47.2	5.58	23.3	6.03	0.30		1.01	5.69		3.61
A738364 Orig	1	121	15.0	34	0.9	< 2	< 0.5	< 0.1	< 1	0.2	0.1	65	2.38	6.00	0.85	4.48	1.52	0.592	1.99	0.38	2.68	0.55	1.57
A738364 Dup	1	121	15.2	33	1.0	< 2	< 0.5	< 0.1	< 1	0.2	0.1	66	2.25	6.20	0.85	4.13	1.59	0.609	2.18	0.39	2.49	0.52	1.65
A738382 Orig	24	73	17.7	68	3.4	< 2	< 0.5	< 0.1	1	1.2	1.5	165	4.69	11.6	1.61	6.97	2.05	0.711	2.64	0.50	3.23	0.69	2.11
A738382 Dup	24	73	17.6	67	3.3	< 2	< 0.5	0.1	1	0.9	1.4	168	4.42	11.1	1.49	7.71	2.16	0.704	2.66	0.51	3.30	0.67	2.05
D6221529 Orig	19	70	25.0	89	4.0	< 2	< 0.5	0.1	1	0.7	2.6	113	14.3	29.7	3.84	17.7	5.14	1.69	5.16	0.74	4.86	0.99	3.01
D6221529 Split PREP DUP	19	68	26.0	95	3.0	< 2	0.5	0.1	1	0.8	2.7	119	11.6	25.2	3.26	15.5	4.46	1.52	5.36	0.72	4.93	1.04	3.18
Method Blank	< 1	< 2	< 0.5	< 1	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1	< 2	< 0.05	< 0.05	< 0.01	< 0.05	< 0.01	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Method Blank		< 2		< 1								< 2											
Method Blank		< 2		< 1								< 2											
Method Blank		< 2		< 1								< 2											
Method Blank		< 2		2								2											



Analyte Symbol	Tm	Yb	Lu	Hf	Ta	W	Tl	Pb	Bi	Th	U
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.005	0.01	0.002	0.1	0.01	0.5	0.05	5	0.1	0.05	0.01
Method Code	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
NIST 694 Meas											
NIST 694 Cert											
NIST 694 Meas											
NIST 694 Cert											
DNC-1 Meas		2.10						6			
DNC-1 Cert		2.0						6.3			
DNC-1 Meas											
DNC-1 Cert											
LKSD-3 Meas		3.00		4.5	0.80					11.0	4.50
LKSD-3 Cert		2.70		4.80	0.700					11.4	4.60
TDB-1 Meas		3.30								2.60	
TDB-1 Cert		3.4								2.7	
W-2a Meas		2.10	0.320		0.47	< 0.5	0.06	10	< 0.1		0.52
W-2a Cert		2.10	0.330		0.500	0.300	0.200	9.30	0.0300		0.530
W-2a Meas											
W-2a Cert											
SY-4 Meas											
SY-4 Cert											
SY-4 Meas											
SY-4 Cert											
CTA-AC-1 Meas		10.6	1.06	1.2	2.41					21.3	4.10
CTA-AC-1 Cert		11.4	1.08	1.13	2.65					21.8	4.4
BIR-1a Meas		1.80		0.5				< 5			
BIR-1a Cert		1.7		0.60				3			
BIR-1a Meas											
BIR-1a Cert											
NCS DC86312 Meas	13.9	89.7	12.5							24.9	
NCS DC86312 Cert	15.1	87.79	11.96							23.6	
NCS DC70009 (GBW07241) Meas	2.00		2.00			2410	1.93				
NCS DC70009 (GBW07241) Cert	2.2		2.4			2200	1.8				
OREAS 100a (Fusion) Meas	2.29	15.2	2.33							48.4	131
OREAS 100a (Fusion) Cert	2.31	14.9	2.26							51.6	135
OREAS 101a (Fusion) Meas	3.00	18.0	2.64							35.9	445
OREAS 101a (Fusion) Cert	2.90	17.5	2.66							36.6	422

Analyte Symbol	Tm	Yb	Lu	Hf	Ta	W	Tl	Pb	Bi	Th	U
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.005	0.01	0.002	0.1	0.01	0.5	0.05	5	0.1	0.05	0.01
Method Code	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
OREAS 101b (Fusion) Meas	2.79	18.4	2.67							35.8	415
OREAS 101b (Fusion) Cert	2.66	17.6	2.58							37.1	396
JR-1 Meas	0.680	4.78		4.4	1.96	1.9		19	0.6	28.1	9.10
JR-1 Cert	0.67	4.55		4.51	1.86	1.59		19.3	0.56	26.7	8.88
A738364 Orig	0.234	1.58	0.239	1.0	0.07	0.5	< 0.05	< 5	< 0.1	0.24	0.06
A738364 Dup	0.250	1.57	0.241	0.9	0.06	< 0.5	< 0.05	< 5	< 0.1	0.23	0.06
A738382 Orig	0.310	2.02	0.308	1.9	0.23	6.9	< 0.05	< 5	< 0.1	0.69	0.17
A738382 Dup	0.326	2.17	0.322	1.9	0.20	6.4	0.05	< 5	< 0.1	0.65	0.17
D6221529 Orig	0.501	3.28	0.528	2.8	0.22	11.9	0.82	< 5	< 0.1	0.86	0.31
D6221529 Split PREP DUP	0.472	3.48	0.604	2.7	0.22	13.7	0.96	< 5	< 0.1	0.88	0.31
Method Blank	< 0.005	< 0.01	< 0.002	< 0.1	< 0.01	< 0.5	< 0.05	< 5	< 0.1	< 0.05	< 0.01
Method Blank											
Method Blank											
Method Blank											
Method Blank											



**Date Submitted:** 09-Oct-18  
**Invoice No.:** A18-14763-Au  
**Invoice Date:** 11-Dec-18  
**Your Reference:** DIS87639

**Goldcorp Canada Ltd.**  
**17 Mine Road**  
**Balmertown Ontario P0V 1C0**  
**Canada**

**ATTN: Jamie Kristoff**

## CERTIFICATE OF ANALYSIS

65 Core samples were submitted for analysis.

The following analytical package(s) were requested:

Code 1A2-ICPMS Au-Fire Assay ICPMS

REPORT **A18-14763-Au**

This report may be reproduced without our consent. If only selected portions of the report are reproduced, permission must be obtained. If no instructions were given at time of sample submittal regarding excess material, it will be discarded within 90 days of this report. Our liability is limited solely to the analytical cost of these analyses. Test results are representative only of material submitted for analysis.

Notes:

We recommend reanalysis by fire assay Code 8 if values exceed upper limit.

CERTIFIED BY:

A handwritten signature in black ink, appearing to be "Emmanuel Esemé". The signature is written over a horizontal line.

Emmanuel Esemé , Ph.D.  
Quality Control

**ACTIVATION LABORATORIES LTD.**  
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5  
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613  
E-MAIL Ancaster@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Analyte Symbol	Au
Unit Symbol	ppb
Lower Limit	0.5
Method Code	FA-MS
A738201	34.3
A738202	2.5
A738206	1.8
A738207	38.9
A738208	1.3
A738281	2.6
A738282	15.6
A738283	14.1
A738284	2.7
A738285	1160
A738286	16.4
A738287	3.8
A738288	27.1
A738289	17.5
A738291	13.5
A738292	8.2
A738293	48.7
A738294	29.2
A738295	1.0
A738296	7.1
A738297	1890
A738298	20.6
A738299	28.3
A738300	27.2
A738341	14.2
A738342	7.4
A738343	7.4
A738345	9.6
A738346	6.6
A738347	6.4
A738348	7.6
A738349	41.0
A738401	736
A738402	2030
A738403	30.4
A738404	2.8
A738405	30.0
A738406	10.7
A738407	19.3
A738408	34.9
A738409	50.7
A738410	1.3

Analyte Symbol	Au
Unit Symbol	ppb
Lower Limit	0.5
Method Code	FA-MS
A738411	17.3
A738412	27.1
A738413	107
A738414	8.3
A738415	15.1
A738416	2.0
A738417	7.5
A738418	4.2
A738419	2.9
A738420	1.1
A738421	6.7
A738422	2.9
A738423	4.0
A738424	3.6
A738425	3.7
A738426	3.6
A738427	12.3
A738428	4.4
A738429	7.6
A738290	1.1
A738344	633
A738350	2.3
A738430	640

Analyte Symbol	Au
Unit Symbol	ppb
Lower Limit	0.5
Method Code	FA-MS
OREAS 218 Meas	494
OREAS 218 Cert	531
OREAS 218 Meas	511
OREAS 218 Cert	531
OREAS 220 (Fire Assay) Meas	828
OREAS 220 (Fire Assay) Cert	866
A738284 Orig	2.2
A738284 Dup	3.1
A738295 Orig	0.7
A738295 Dup	1.3
A738346 Orig	5.8
A738346 Dup	7.3
A738404 Orig	2.1
A738404 Dup	3.5
A738412 Orig	26.1
A738412 Dup	28.1
A738416 Orig	1.7
A738416 Dup	2.3
A738420 Split Orig PREP DUP	1.1
A738420 Split PREP DUP	1.1
Method Blank	1.5
Method Blank	1.4
Method Blank	1.8
Method Blank	1.5
Method Blank	1.4



**Date Submitted:** 09-Oct-18  
**Invoice No.:** A18-14763-UT1  
**Invoice Date:** 23-Nov-18  
**Your Reference:** DIS87639

**Goldcorp Canada Ltd.**  
**17 Mine Road**  
**Balmertown Ontario P0V 1C0**  
**Canada**

**ATTN: Jamie Kristoff**

## CERTIFICATE OF ANALYSIS

65 Core samples were submitted for analysis.

The following analytical package(s) were requested:

Code UT-1-0.5g Aqua Regia ICP/MS

REPORT **A18-14763-UT1**

This report may be reproduced without our consent. If only selected portions of the report are reproduced, permission must be obtained. If no instructions were given at time of sample submittal regarding excess material, it will be discarded within 90 days of this report. Our liability is limited solely to the analytical cost of these analyses. Test results are representative only of material submitted for analysis.

Notes:

Assays are recommended for values above the upper limit. The Au from AR-MS is only semi-quantitative. For accurate Au data, fire assay is recommended.

CERTIFIED BY:

A handwritten signature in black ink, appearing to be "Emmanuel Esemé". The signature is stylized and somewhat abstract, with several loops and a long horizontal stroke at the end.

Emmanuel Esemé, Ph.D.  
Quality Control

**ACTIVATION LABORATORIES LTD.**  
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5  
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613  
E-MAIL [Ancaster@actlabs.com](mailto:Ancaster@actlabs.com) ACTLABS GROUP WEBSITE [www.actlabs.com](http://www.actlabs.com)

## Results

## Activation Laboratories Ltd.

## Report: A18-14763

Analyte Symbol	Ti	S	P	Li	Be	B	Na	Mg	Al	K	Bi	Ca	Sc	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge
Unit Symbol	%	%	%	ppm	ppm	ppm	%	%	%	%	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.001	1	0.001	0.1	0.1	1	0.001	0.01	0.01	0.01	0.02	0.01	0.1	1	1	1	0.01	0.1	0.1	0.2	0.1	0.02	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
A738201	0.005	< 1	0.063	2.1	< 0.1	2	0.019	4.76	0.62	< 0.01	0.05	1.10	7.3	6	794	3110	9.22	132	1840	25.3	7.2	1.13	< 0.1
A738202	0.004	< 1	0.106	30.5	0.2	3	0.059	1.26	2.17	0.16	0.11	4.30	3.2	42	5	1090	5.11	18.5	9.5	36.8	85.6	7.61	< 0.1
A738206	0.073	< 1	0.007	9.3	< 0.1	3	0.020	0.98	0.98	< 0.01	5.23	0.72	3.1	42	90	345	1.86	9.3	28.5	14.6	20.6	2.46	< 0.1
A738207	0.268	< 1	0.019	34.4	< 0.1	4	0.027	4.12	3.82	0.02	0.08	10.1	30.3	227	236	1720	7.05	43.7	101	54.4	60.9	10.6	< 0.1
A738208	0.043	< 1	0.015	6.0	< 0.1	6	0.068	0.30	0.60	0.17	0.06	0.19	0.8	10	9	169	1.07	2.0	4.1	3.1	8.3	1.94	< 0.1
A738281	0.131	< 1	0.093	16.4	0.2	3	0.119	1.40	1.73	0.11	0.13	1.73	5.1	75	12	532	3.95	15.0	10.1	35.3	62.0	9.84	< 0.1
A738282	0.001	< 1	0.006	1.0	0.2	2	0.020	2.48	< 0.01	< 0.01	0.04	7.46	0.5	2	3	1360	4.89	3.1	12.9	8.0	23.1	0.28	< 0.1
A738283	0.001	3	0.067	1.4	0.1	3	0.022	0.99	0.10	< 0.01	0.38	6.95	0.7	5	4	2710	12.1	24.4	57.0	151	10.2	0.16	< 0.1
A738284	0.043	< 1	0.012	23.4	0.1	2	0.020	6.85	3.24	0.04	0.04	6.20	26.2	127	717	845	8.54	46.9	195	55.1	53.8	5.99	0.1
A738285	0.021	< 1	0.021	11.3	0.1	4	0.043	0.42	1.35	0.07	25.6	0.15	1.1	9	15	958	5.42	1.8	6.7	4.9	43.5	4.62	< 0.1
A738286	0.158	1	0.087	15.6	0.2	4	0.071	1.32	1.57	0.48	0.46	0.84	2.2	42	75	328	3.67	14.7	28.0	614	44.5	5.97	< 0.1
A738287	0.088	< 1	0.011	3.7	< 0.1	3	0.040	2.53	1.11	0.02	0.54	0.95	3.0	21	1090	385	3.51	42.1	430	297	20.5	3.43	< 0.1
A738288	0.009	1	0.036	17.2	0.3	2	0.019	5.99	2.49	< 0.01	0.96	7.08	25.7	174	1180	1820	7.78	41.5	310	1130	117	8.56	< 0.1
A738289	0.004	< 1	0.079	7.0	0.1	4	0.050	0.60	0.83	0.26	3.18	1.03	1.2	11	22	247	2.50	9.5	13.6	218	30.8	2.46	< 0.1
A738291	0.018	< 1	0.020	25.9	0.2	3	0.020	5.88	2.90	0.02	0.78	6.66	31.5	170	1180	2010	8.77	56.9	288	321	116	9.51	0.2
A738292	0.026	1	0.077	10.7	0.2	5	0.060	0.68	1.02	0.24	0.22	1.36	1.6	17	13	449	2.69	9.0	9.4	119	42.5	3.70	< 0.1
A738293	0.168	< 1	0.060	9.4	0.2	5	0.054	0.76	1.79	0.49	1.36	0.32	2.1	34	19	545	6.45	5.6	11.9	1070	40.4	5.91	< 0.1
A738294	0.009	< 1	0.017	2.1	< 0.1	3	0.032	0.05	0.20	0.09	0.17	0.12	0.4	4	5	170	1.10	3.2	4.6	38.0	8.6	0.66	< 0.1
A738295	< 0.001	< 1	0.003	0.4	< 0.1	3	0.020	0.10	0.09	< 0.01	0.04	1.05	0.4	4	5	173	0.79	2.2	2.5	518	14.9	0.35	< 0.1
A738296	0.001	< 1	0.003	0.8	< 0.1	5	0.020	> 10.0	0.44	< 0.01	0.10	0.12	6.6	2	1300	1100	5.36	111	1250	114	17.9	0.90	< 0.1
A738297	0.001	< 1	0.006	4.5	< 0.1	6	0.022	0.50	0.40	< 0.01	0.10	0.99	0.4	4	5	1110	3.03	1.8	4.0	231	147	1.35	< 0.1
A738298	0.002	1	0.020	0.2	0.2	2	0.020	0.18	0.09	< 0.01	0.10	0.31	0.2	5	14	2160	8.80	5.3	16.4	474	51.6	1.13	< 0.1
A738299	< 0.001	2	0.061	0.1	0.2	2	0.020	0.10	0.05	< 0.01	0.13	0.49	< 0.1	5	4	1120	7.02	3.1	12.8	538	42.8	1.25	< 0.1
A738300	0.027	8	0.044	0.5	0.4	2	0.016	0.78	1.78	< 0.01	1.08	0.03	6.5	60	69	759	27.1	70.7	45.5	545	114	11.2	0.4
A738341	0.034	< 1	0.024	0.8	< 0.1	2	0.024	0.67	0.75	0.09	0.25	0.25	1.2	20	279	151	8.49	14.4	53.1	242	19.6	3.16	< 0.1
A738342	0.012	3	0.051	0.8	< 0.1	3	0.032	0.84	0.56	0.05	0.40	0.50	0.6	10	138	126	6.64	40.7	151	1030	15.2	3.68	< 0.1
A738343	0.004	2	0.047	0.5	< 0.1	3	0.033	0.46	0.06	0.06	0.28	0.45	0.3	3	24	86	5.42	18.5	72.5	369	6.5	0.53	< 0.1
A738345	0.002	6	0.066	0.2	< 0.1	3	0.031	0.36	0.10	0.11	0.42	0.53	0.2	3	15	128	9.00	53.9	203	227	3.2	0.74	< 0.1
A738346	0.083	< 1	0.009	5.6	< 0.1	7	0.055	0.53	0.76	0.05	0.03	0.48	3.7	38	34	305	1.41	9.8	26.9	113	13.7	2.11	< 0.1
A738347	0.071	6	0.036	43.8	0.4	28	0.028	1.67	2.18	0.29	0.23	0.15	5.7	47	74	879	9.17	43.3	66.4	72.8	21.2	7.32	< 0.1
A738348	0.004	1	0.060	0.3	< 0.1	2	0.018	0.24	0.11	0.04	0.42	0.07	0.2	6	2	85	9.20	23.1	42.6	1060	2.4	0.31	< 0.1
A738349	0.022	< 1	0.005	4.7	< 0.1	3	0.048	0.52	0.48	0.03	0.07	1.62	2.9	29	28	337	1.38	6.9	12.0	118	12.2	1.60	< 0.1
A738401	< 0.001	2	0.026	22.9	0.2	3	0.037	3.19	0.73	0.17	1.13	7.91	0.7	3	2	2960	5.55	6.3	7.0	96.8	120	1.72	< 0.1
A738402	0.002	1	0.007	12.3	0.1	3	0.021	5.08	0.89	0.15	0.05	10.8	7.5	41	281	2050	6.21	50.3	368	42.8	26.2	1.66	< 0.1
A738403	0.012	2	0.033	1.4	0.1	2	0.021	0.15	0.47	0.02	0.12	0.07	3.1	15	129	873	17.2	33.1	311	102	12.3	1.72	< 0.1
A738404	< 0.001	< 1	0.004	0.4	< 0.1	3	0.025	0.36	0.01	< 0.01	0.02	0.81	0.3	< 1	8	195	0.76	2.1	22.0	2.2	1.0	0.12	< 0.1
A738405	< 0.001	< 1	0.017	6.9	0.2	4	0.027	5.23	0.42	0.17	0.05	11.6	3.1	13	16	3130	4.02	9.4	50.4	7.6	33.9	0.28	< 0.1
A738406	< 0.001	< 1	0.010	3.8	0.2	4	0.029	7.53	< 0.01	0.06	0.04	17.3	3.2	16	26	3740	4.72	16.0	84.3	5.2	39.0	0.16	< 0.1
A738407	0.001	< 1	0.009	3.8	0.1	6	0.022	5.06	< 0.01	0.01	< 0.02	11.8	3.5	17	36	2870	3.32	13.6	43.7	1.5	20.8	0.27	< 0.1
A738408	0.098	< 1	0.005	32.6	0.6	< 1	0.018	3.09	2.93	0.50	< 0.02	0.45	19.5	70	2350	5530	20.1	204	5010	20.4	24.3	4.70	0.2
A738409	0.015	< 1	0.007	3.7	< 0.1	2	0.023	1.47	0.58	0.06	0.03	1.81	8.5	7	588	1790	6.42	78.6	1230	12.7	9.9	1.25	< 0.1
A738410	0.053	< 1	0.020	13.5	< 0.1	2	0.069	0.19	0.39	0.29	0.04	0.14	1.6	9	6	165	1.05	2.3	7.1	4.0	20.9	2.05	< 0.1



## Results

## Activation Laboratories Ltd.

## Report: A18-14763

Analyte Symbol	Ti	S	P	Li	Be	B	Na	Mg	Al	K	Bi	Ca	Sc	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge
Unit Symbol	%	%	%	ppm	ppm	ppm	%	%	%	%	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.001	1	0.001	0.1	0.1	1	0.001	0.01	0.01	0.01	0.02	0.01	0.1	1	1	1	0.01	0.1	0.1	0.2	0.1	0.02	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
A738411	0.014	< 1	0.007	3.1	< 0.1	2	0.017	1.11	0.52	0.06	0.03	0.27	5.7	5	539	1000	4.87	75.2	1270	21.1	4.5	1.02	< 0.1
A738412	0.005	< 1	0.010	2.6	< 0.1	2	0.025	0.43	0.43	0.02	0.08	0.46	3.1	< 1	370	792	2.71	66.6	701	7.7	4.6	0.95	< 0.1
A738413	0.010	< 1	0.005	2.6	< 0.1	2	0.018	0.60	0.43	0.05	0.03	0.07	5.7	5	401	2000	7.33	123	1360	85.0	12.8	0.88	< 0.1
A738414	0.069	< 1	0.057	7.5	< 0.1	2	0.029	0.46	1.13	0.23	0.18	0.09	3.6	33	25	907	6.90	10.5	33.3	36.4	49.6	3.50	< 0.1
A738415	0.175	< 1	0.015	52.2	0.2	3	0.151	2.09	4.68	0.67	0.03	1.62	30.3	185	136	2560	9.11	59.6	119	168	561	8.28	< 0.1
A738416	0.136	< 1	0.031	17.3	< 0.1	3	0.023	5.56	1.50	0.10	0.03	12.0	20.9	221	8	3990	7.51	23.1	22.4	54.5	62.4	6.57	< 0.1
A738417	0.063	< 1	0.089	24.3	0.2	14	0.041	1.39	1.69	0.68	0.05	2.29	7.8	119	18	558	2.25	31.4	23.6	8.0	29.1	5.06	< 0.1
A738418	0.008	< 1	0.032	52.7	< 0.1	2	0.043	2.44	3.13	0.02	0.03	5.45	25.5	242	270	2800	8.24	49.4	121	138	75.0	12.0	< 0.1
A738419	0.001	< 1	0.010	9.0	0.2	4	0.053	0.29	0.86	0.23	0.09	0.84	0.7	2	6	452	1.69	4.6	13.8	5.1	40.0	1.95	< 0.1
A738420	0.073	< 1	0.031	18.0	< 0.1	2	0.097	0.27	0.56	0.39	0.04	0.12	2.3	14	8	209	1.43	3.7	2.7	6.0	30.4	2.99	< 0.1
A738421	0.004	1	0.047	44.1	0.3	4	0.057	1.94	2.86	0.19	0.39	3.29	4.7	51	66	775	6.81	35.0	115	128	116	7.92	< 0.1
A738422	0.002	< 1	0.032	10.8	0.2	5	0.036	1.60	0.92	0.17	0.10	4.18	2.4	12	28	2010	4.22	12.7	44.6	28.5	38.5	2.00	< 0.1
A738423	0.176	< 1	0.010	7.2	0.1	1	0.019	2.36	3.26	0.01	0.02	1.99	25.3	191	1840	1630	14.1	115	948	302	143	10.2	0.1
A738424	0.035	< 1	0.008	14.9	< 0.1	2	0.019	3.54	1.25	0.05	0.03	3.69	16.7	63	2220	991	5.73	26.7	192	44.2	25.7	3.65	< 0.1
A738425	0.227	< 1	0.049	14.9	< 0.1	4	0.039	0.86	1.64	0.27	0.04	4.11	4.7	71	81	1130	3.54	43.0	94.2	156	33.8	4.74	< 0.1
A738426	0.081	7	0.050	11.3	< 0.1	3	0.038	0.17	0.93	0.30	0.03	0.12	2.7	28	18	410	7.31	104	142	167	93.2	2.34	< 0.1
A738427	0.012	5	0.005	2.4	< 0.1	3	0.020	0.35	0.31	< 0.01	0.21	0.07	2.9	15	14	4500	11.3	22.7	66.2	45.7	195	1.07	< 0.1
A738428	0.065	< 1	0.045	84.4	< 0.1	2	0.067	3.31	5.27	0.03	0.02	2.70	31.3	268	181	1130	11.8	45.0	94.2	191	147	16.2	< 0.1
A738429	0.014	< 1	0.016	8.1	< 0.1	2	0.026	1.33	0.74	0.04	0.03	0.52	10.8	31	429	5510	14.1	47.9	955	50.7	12.5	1.31	< 0.1
A738290	0.122	< 1	0.028	20.2	0.1	2	0.104	0.33	0.58	0.35	0.03	0.35	1.7	15	14	302	1.49	3.9	10.4	3.2	33.5	3.06	< 0.1
A738344	0.129	< 1	0.038	7.6	0.2	4	0.452	1.66	3.16	0.18	0.16	2.58	4.1	71	125	536	2.73	15.9	144	160	42.4	6.19	< 0.1
A738350	0.094	< 1	0.021	15.8	< 0.1	1	0.108	0.25	0.52	0.28	0.03	0.28	1.1	12	9	222	1.14	3.1	5.0	3.2	26.5	2.56	< 0.1
A738430	0.137	< 1	0.039	7.9	0.2	4	0.471	1.72	3.31	0.19	0.17	2.71	4.4	74	131	559	2.86	16.6	153	165	46.6	6.37	< 0.1

Results

Activation Laboratories Ltd.

Report: A18-14763

Analyte Symbol	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Te	Cs	Ba	La	Ce	Cd	Pr	Nd	Sm	Se	Eu	Gd
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.1	0.1	0.5	0.01	0.1	0.1	0.01	0.002	0.02	0.05	0.02	0.02	0.02	0.5	0.5	0.01	0.01	0.1	0.02	0.1	0.1	0.1	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
A738201	771	0.3	15.5	1.23	1.4	< 0.1	0.58	0.033	< 0.02	0.33	2.89	0.13	0.12	18.5	< 0.5	0.85	< 0.01	0.1	0.64	< 0.1	< 0.1	< 0.1	0.2
A738202	2.8	5.2	119	6.55	1.4	< 0.1	0.46	0.033	< 0.02	0.35	0.41	< 0.02	0.37	64.2	18.8	37.4	0.07	4.3	17.9	2.2	< 0.1	0.8	2.3
A738206	1.9	0.4	6.7	2.42	0.5	< 0.1	0.60	0.023	< 0.02	0.37	0.12	2.95	0.07	15.5	< 0.5	0.95	< 0.01	0.1	0.68	< 0.1	< 0.1	0.1	0.4
A738207	10.3	0.9	33.5	10.0	1.1	< 0.1	0.46	0.059	0.04	0.44	0.07	0.05	0.17	20.5	0.6	1.90	0.04	0.3	2.00	0.6	< 0.1	0.3	1.2
A738208	0.9	7.1	4.6	2.34	21.4	0.6	0.33	0.015	< 0.02	0.35	0.13	< 0.02	0.54	50.3	3.6	6.98	0.02	0.7	2.54	0.7	< 0.1	0.1	0.5
A738281	3.3	8.1	51.6	3.70	6.5	0.1	0.43	0.035	< 0.02	0.57	0.23	0.02	1.83	57.4	21.4	43.6	0.12	5.0	21.0	1.5	< 0.1	0.6	1.6
A738282	2.4	0.3	65.4	2.99	0.8	< 0.1	0.34	0.009	< 0.02	0.25	0.15	0.11	0.06	16.0	1.8	2.80	0.17	0.3	1.19	0.2	< 0.1	0.2	0.4
A738283	2.8	0.2	58.2	5.25	1.1	< 0.1	0.71	0.156	0.03	0.27	0.85	0.79	0.08	22.5	1.4	3.21	0.13	0.4	2.13	0.5	5.4	0.4	0.7
A738284	3.2	4.4	223	2.11	3.5	< 0.1	0.23	0.024	0.03	0.29	0.50	0.03	3.62	39.5	1.1	2.67	0.16	0.4	1.99	0.6	< 0.1	0.2	0.6
A738285	10.1	6.9	5.8	2.55	21.6	0.1	3.09	52.1	0.04	0.31	0.20	9.30	0.27	26.8	22.0	41.5	< 0.01	4.2	14.7	1.3	< 0.1	0.5	1.1
A738286	12.9	23.0	20.8	5.23	8.3	0.2	10.7	4.65	< 0.02	0.58	0.19	0.23	1.76	88.2	24.1	46.8	0.24	5.2	20.1	2.0	0.5	0.6	1.7
A738287	3.4	1.6	9.3	1.87	3.4	< 0.1	10.1	0.448	< 0.02	0.46	0.43	0.28	0.26	27.0	0.7	1.57	0.02	0.2	1.26	0.2	< 0.1	0.1	0.4
A738288	94.5	0.3	161	3.36	6.7	< 0.1	1.14	6.49	0.07	0.38	0.33	0.15	0.12	50.2	5.6	11.4	0.65	1.3	5.98	0.9	1.5	0.3	1.2
A738289	10.1	8.7	23.4	4.80	2.4	< 0.1	0.79	1.70	< 0.02	0.37	0.17	1.36	0.30	100	32.9	64.4	0.06	7.1	27.7	3.3	< 0.1	0.8	2.2
A738291	33.4	2.0	127	4.36	7.8	< 0.1	6.65	1.99	0.06	0.34	0.47	0.17	0.62	40.8	4.8	9.05	0.42	1.1	5.09	1.1	0.4	0.4	1.3
A738292	14.1	7.7	36.9	4.42	4.5	< 0.1	5.81	0.627	< 0.02	0.33	0.39	0.09	0.31	105	35.1	69.6	0.10	7.8	29.3	3.5	< 0.1	0.7	2.3
A738293	0.7	24.7	41.6	2.74	20.3	0.1	24.5	4.70	0.04	0.62	0.56	0.27	2.07	101	8.0	13.9	0.04	1.3	4.61	0.8	0.6	0.3	0.6
A738294	6.1	4.1	4.5	1.29	11.1	0.1	1.08	0.309	< 0.02	0.27	0.16	0.06	0.18	40.9	5.2	10.6	< 0.01	1.1	4.82	0.4	< 0.1	0.2	0.5
A738295	1.2	0.2	4.0	0.20	0.2	< 0.1	0.39	0.496	0.02	0.20	0.06	< 0.02	0.03	10.0	< 0.5	0.30	0.25	< 0.1	0.16	< 0.1	< 0.1	< 0.1	< 0.1
A738296	9.3	0.3	1.2	0.86	0.4	< 0.1	0.28	0.072	0.03	0.20	0.43	0.10	0.05	12.9	0.6	0.98	< 0.01	0.1	0.61	< 0.1	0.2	< 0.1	0.1
A738297	38.7	0.3	19.2	1.57	2.2	< 0.1	0.76	1.54	< 0.02	0.21	0.82	0.11	0.05	15.3	2.9	4.97	1.08	0.5	2.08	0.3	< 0.1	0.3	0.3
A738298	11.1	0.2	5.4	2.35	0.7	< 0.1	1.64	1.90	0.04	0.34	1.07	0.12	0.03	25.7	1.8	4.17	0.09	0.3	1.34	0.2	0.3	0.2	0.3
A738299	157	0.1	6.2	2.46	0.5	< 0.1	1.15	0.623	0.03	0.27	0.59	0.20	0.03	14.8	3.7	6.21	0.05	0.6	2.32	0.4	0.3	0.2	0.4
A738300	59.1	0.2	1.1	2.86	21.0	< 0.1	20.1	2.18	0.10	0.98	1.23	0.93	0.07	7.7	1.6	3.21	0.02	0.4	1.82	0.2	9.1	0.2	0.4
A738341	3.1	6.4	4.8	1.09	4.2	< 0.1	1.38	1.78	0.03	0.48	0.26	0.63	0.32	42.7	1.0	2.10	0.03	0.3	1.13	< 0.1	5.8	< 0.1	0.2
A738342	3.1	2.9	3.4	2.30	13.0	< 0.1	0.97	1.00	0.02	0.36	0.31	1.77	0.13	27.6	2.0	3.91	< 0.01	0.5	2.18	0.2	7.4	0.1	0.4
A738343	3.6	3.2	6.6	1.22	1.4	< 0.1	1.05	1.07	0.03	0.29	0.35	1.42	0.06	25.3	2.1	3.91	0.01	0.4	2.00	0.2	9.2	< 0.1	0.3
A738345	2.8	2.7	5.8	1.54	0.7	< 0.1	0.78	0.187	0.04	0.30	0.13	1.20	0.13	21.2	1.3	2.93	0.03	0.4	1.68	0.3	9.2	< 0.1	0.3
A738346	0.9	2.6	4.9	1.75	0.6	< 0.1	0.35	0.046	< 0.02	0.25	0.05	< 0.02	0.24	24.9	< 0.5	0.58	< 0.01	< 0.1	0.51	0.1	< 0.1	< 0.1	0.2
A738347	20.2	9.9	1.7	9.02	30.7	< 0.1	2.15	0.142	0.03	0.54	3.66	0.15	0.51	18.6	4.9	11.3	0.03	1.4	6.12	1.3	0.5	0.4	1.4
A738348	0.7	3.5	4.1	2.40	1.4	< 0.1	0.28	0.349	< 0.02	0.20	2.12	0.42	0.35	20.7	2.6	4.98	< 0.01	0.6	2.72	0.3	2.4	0.2	0.5
A738349	0.9	1.7	10.0	1.70	0.5	< 0.1	0.37	0.380	< 0.02	0.18	0.11	0.05	0.25	22.2	< 0.5	0.61	< 0.01	< 0.1	0.38	0.2	< 0.1	< 0.1	0.2
A738401	35.8	6.6	128	2.12	17.3	< 0.1	0.57	7.16	< 0.02	0.18	0.38	3.45	0.30	37.4	5.4	7.83	0.40	0.7	3.00	0.1	< 0.1	0.4	0.5
A738402	5040	3.9	192	4.99	4.0	< 0.1	0.20	1.62	0.03	0.14	3.89	0.31	0.22	113	1.0	2.69	0.24	0.4	2.54	0.7	< 0.1	0.5	1.0
A738403	46.1	0.7	2.3	1.38	3.3	< 0.1	0.67	0.283	< 0.02	0.17	1.16	0.21	0.10	12.1	3.6	7.00	< 0.01	0.8	3.40	0.3	0.9	0.2	0.5
A738404	5.0	0.2	7.1	0.11	0.3	< 0.1	0.29	0.008	< 0.02	0.16	0.14	< 0.02	0.05	14.5	< 0.5	0.16	< 0.01	< 0.1	0.09	< 0.1	< 0.1	< 0.1	< 0.1
A738405	83.6	4.9	96.3	4.75	12.9	< 0.1	0.33	0.157	< 0.02	0.14	0.67	0.03	0.32	89.5	3.6	7.01	0.21	0.8	3.74	0.6	< 0.1	0.4	0.8
A738406	113	1.5	103	4.21	2.9	< 0.1	0.24	0.389	< 0.02	0.13	0.73	0.02	0.07	29.1	1.9	3.48	0.22	0.4	2.00	0.6	< 0.1	0.3	0.7
A738407	6.4	0.4	37.0	2.59	0.7	< 0.1	0.19	0.155	< 0.02	0.11	0.91	< 0.02	0.04	32.1	0.7	1.91	0.20	0.2	1.22	0.2	< 0.1	0.3	0.4
A738408	497	29.0	3.8	0.75	0.7	< 0.1	0.67	0.090	0.06	< 0.05	2.81	0.07	5.49	55.8	< 0.5	0.67	0.04	< 0.1	0.14	0.4	2.7	< 0.1	0.5
A738409	1020	4.3	29.2	0.55	1.2	< 0.1	0.42	0.035	< 0.02	0.18	9.10	< 0.02	0.97	32.4	< 0.5	0.38	< 0.01	< 0.1	0.30	0.2	< 0.1	< 0.1	< 0.1
A738410	5.6	23.7	9.2	2.33	27.0	0.3	0.26	0.014	< 0.02	0.55	0.06	< 0.02	0.91	46.0	32.9	62.5	< 0.01	6.3	21.8	2.4	< 0.1	0.2	2.0

Analyte Symbol	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Te	Cs	Ba	La	Ce	Cd	Pr	Nd	Sm	Se	Eu	Gd
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.1	0.1	0.5	0.01	0.1	0.1	0.01	0.002	0.02	0.05	0.02	0.02	0.02	0.5	0.5	0.01	0.01	0.1	0.02	0.1	0.1	0.1	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
A738411	1120	3.7	4.7	0.23	1.3	< 0.1	0.37	0.036	< 0.02	0.15	18.6	< 0.02	0.88	25.3	< 0.5	0.35	< 0.01	< 0.1	0.18	< 0.1	< 0.1	< 0.1	< 0.1
A738412	1010	1.3	6.5	0.27	1.1	< 0.1	0.37	0.019	< 0.02	0.16	5.49	0.16	0.15	31.8	< 0.5	0.29	< 0.01	< 0.1	0.17	< 0.1	< 0.1	< 0.1	< 0.1
A738413	1230	2.8	1.0	0.24	1.5	< 0.1	0.47	0.536	< 0.02	0.16	10.6	0.05	0.58	20.0	< 0.5	0.26	< 0.01	< 0.1	0.13	< 0.1	< 0.1	< 0.1	< 0.1
A738414	17.1	20.2	6.5	3.11	5.5	0.2	7.48	0.243	< 0.02	0.32	0.16	0.07	2.48	60.6	9.0	16.8	0.03	1.8	6.92	0.7	< 0.1	0.3	1.0
A738415	13.4	30.2	39.0	5.99	6.1	< 0.1	0.50	1.26	0.06	0.26	0.09	0.02	4.04	106	1.7	3.98	2.63	0.5	2.97	0.6	< 0.1	0.2	1.1
A738416	< 0.1	3.8	27.2	28.4	1.8	< 0.1	0.23	0.033	0.04	0.46	1.50	0.04	0.57	64.5	14.0	37.0	0.16	5.1	26.7	7.0	< 0.1	3.5	9.4
A738417	255	21.8	13.5	8.42	6.3	< 0.1	0.44	0.020	< 0.02	0.26	1.58	< 0.02	0.96	91.9	6.7	16.9	0.04	2.3	12.1	2.6	< 0.1	0.8	2.9
A738418	5.9	1.0	32.7	2.88	2.7	< 0.1	0.19	0.098	0.04	0.13	0.51	0.03	0.19	37.4	1.9	4.65	0.10	0.7	3.98	1.1	0.6	0.4	1.2
A738419	7.5	7.5	21.4	4.91	30.2	< 0.1	0.85	0.100	< 0.02	0.18	0.44	0.02	0.57	97.7	40.9	71.6	0.27	6.9	23.9	2.2	< 0.1	0.6	1.7
A738420	0.5	32.6	10.8	3.52	28.1	0.3	0.55	0.037	< 0.02	0.71	0.02	0.03	0.97	56.3	58.6	106	< 0.01	10.7	36.0	4.6	< 0.1	0.2	3.1
A738421	0.5	6.5	71.9	6.19	8.0	< 0.1	0.94	0.170	< 0.02	0.18	1.70	0.18	0.48	78.1	16.4	33.6	0.05	3.9	15.8	2.1	0.6	0.6	2.2
A738422	10.7	5.9	111	4.12	8.1	< 0.1	0.65	0.038	0.02	0.15	0.74	< 0.02	0.37	62.2	11.0	21.7	0.11	2.4	9.40	1.6	< 0.1	0.8	1.4
A738423	54.8	1.2	24.7	1.33	7.8	< 0.1	0.47	0.073	0.08	0.56	0.46	0.07	0.30	18.6	4.1	12.6	0.03	1.8	8.87	1.5	0.4	0.4	1.2
A738424	4.0	4.4	61.9	1.34	1.2	< 0.1	0.22	0.011	< 0.02	0.18	1.11	< 0.02	3.39	30.1	0.9	1.87	< 0.01	0.2	1.31	< 0.1	< 0.1	0.1	0.3
A738425	3.2	6.1	51.0	14.7	4.1	< 0.1	0.61	0.046	< 0.02	0.18	0.34	< 0.02	0.84	120	4.7	11.3	0.06	1.6	7.81	1.6	< 0.1	0.5	2.3
A738426	145	4.8	2.5	4.86	25.9	< 0.1	2.11	0.081	0.05	0.17	2.33	0.05	0.69	10.6	3.4	9.32	0.08	1.3	7.53	1.3	0.4	0.6	1.5
A738427	76.3	0.2	0.8	1.18	2.9	< 0.1	0.96	0.130	0.03	0.21	6.53	0.41	0.09	8.8	2.3	4.48	0.40	0.5	2.45	0.2	1.4	0.2	0.4
A738428	50.7	1.3	13.9	3.13	7.8	< 0.1	0.26	0.062	0.08	0.12	1.82	< 0.02	0.85	22.6	5.0	12.3	0.09	1.8	8.55	2.0	< 0.1	0.5	1.8
A738429	8.0	3.0	24.7	1.23	1.6	< 0.1	0.33	0.028	< 0.02	0.11	0.39	< 0.02	0.59	59.7	0.7	1.41	< 0.01	0.2	1.10	0.1	< 0.1	< 0.1	0.3
A738290	0.6	30.7	33.9	7.91	10.9	1.2	0.69	0.046	< 0.02	1.19	< 0.02	< 0.02	0.54	63.6	20.9	41.6	< 0.01	4.7	18.2	2.8	< 0.1	0.4	2.3
A738344	2.7	8.6	117	8.69	4.4	0.3	2.97	0.201	< 0.02	0.77	0.75	0.03	0.62	116	9.8	19.9	0.06	2.2	8.62	0.9	< 0.1	0.3	1.5
A738350	< 0.1	23.5	31.7	5.17	9.7	1.1	0.55	0.055	< 0.02	0.90	0.03	< 0.02	0.44	63.8	16.0	29.6	< 0.01	3.2	12.4	1.8	< 0.1	0.3	1.3
A738430	3.2	8.8	122	9.22	4.8	0.2	3.02	0.210	< 0.02	0.79	0.80	0.04	0.61	121	10.3	20.6	0.09	2.2	8.85	1.5	< 0.1	0.3	1.5

Analyte Symbol	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Re	Au	Tl	Pb	Th	U	Hg
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppb
Lower Limit	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.001	0.5	0.02	0.1	0.1	0.1	10
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
A738201	< 0.1	0.2	< 0.1	0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.05	0.3	< 0.001	4.5	< 0.02	1.8	0.1	< 0.1	50
A738202	0.2	1.4	0.2	0.6	< 0.1	0.6	< 0.1	< 0.1	< 0.05	< 0.1	< 0.001	< 0.5	0.04	7.3	2.8	0.5	70
A738206	< 0.1	0.4	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.05	12.3	< 0.001	< 0.5	< 0.02	2.7	< 0.1	< 0.1	60
A738207	0.2	1.8	0.4	1.0	0.1	1.0	0.1	< 0.1	< 0.05	2.4	< 0.001	3.3	< 0.02	1.8	< 0.1	< 0.1	30
A738208	< 0.1	0.4	< 0.1	0.2	< 0.1	0.3	< 0.1	0.4	< 0.05	0.4	< 0.001	< 0.5	0.04	2.4	4.5	1.1	40
A738281	0.1	0.8	0.1	0.4	< 0.1	0.3	< 0.1	< 0.1	< 0.05	0.3	< 0.001	1.3	0.05	2.8	2.5	0.4	30
A738282	< 0.1	0.3	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.05	0.2	< 0.001	10.6	< 0.02	1.9	< 0.1	< 0.1	50
A738283	0.1	0.7	0.2	0.5	< 0.1	0.5	< 0.1	< 0.1	< 0.05	0.4	< 0.001	13.9	0.06	3.1	< 0.1	< 0.1	50
A738284	< 0.1	0.5	< 0.1	0.2	< 0.1	0.3	< 0.1	< 0.1	< 0.05	< 0.1	< 0.001	< 0.5	0.08	2.2	0.1	< 0.1	40
A738285	0.1	0.5	< 0.1	0.2	< 0.1	0.2	< 0.1	0.5	< 0.05	1.0	< 0.001	> 10000	0.03	3.6	7.4	1.2	50
A738286	0.2	1.0	0.2	0.6	< 0.1	0.5	< 0.1	< 0.1	< 0.05	3.8	< 0.001	34.3	0.16	15.4	6.8	1.3	40
A738287	< 0.1	0.4	< 0.1	0.3	< 0.1	0.2	< 0.1	< 0.1	< 0.05	0.2	< 0.001	7.1	0.02	3.1	< 0.1	< 0.1	10
A738288	0.2	0.9	0.1	0.4	< 0.1	0.3	< 0.1	0.2	< 0.05	0.4	< 0.001	34.2	< 0.02	3.6	0.3	0.1	40
A738289	0.2	1.1	0.2	0.5	< 0.1	0.4	< 0.1	< 0.1	< 0.05	35.6	< 0.001	8.8	0.05	9.8	7.2	1.1	50
A738291	0.2	1.0	0.2	0.6	< 0.1	0.4	< 0.1	0.2	< 0.05	1.2	< 0.001	15.2	< 0.02	5.9	0.2	0.1	40
A738292	0.2	1.0	0.2	0.4	< 0.1	0.4	< 0.1	< 0.1	< 0.05	4.6	< 0.001	4.5	0.04	5.9	7.2	1.2	50
A738293	< 0.1	0.5	0.1	0.3	< 0.1	0.3	< 0.1	0.3	< 0.05	10.1	0.009	64.5	0.26	7.4	5.4	1.0	50
A738294	< 0.1	0.3	< 0.1	< 0.1	< 0.1	0.1	< 0.1	0.3	< 0.05	0.4	< 0.001	20.9	0.02	2.5	2.1	0.6	30
A738295	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	0.2	< 0.001	3.1	< 0.02	0.9	< 0.1	< 0.1	50
A738296	< 0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	0.1	< 0.001	4.7	< 0.02	1.1	< 0.1	< 0.1	20
A738297	< 0.1	0.2	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	0.5	< 0.001	1500	< 0.02	55.0	0.2	< 0.1	20
A738298	< 0.1	0.2	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.05	0.3	< 0.001	17.3	< 0.02	3.0	0.1	< 0.1	20
A738299	< 0.1	0.3	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.05	9.8	< 0.001	15.4	< 0.02	2.7	< 0.1	0.1	40
A738300	< 0.1	0.5	0.1	0.3	< 0.1	0.4	< 0.1	0.5	< 0.05	1.0	0.004	33.1	< 0.02	9.9	1.4	0.5	10
A738341	< 0.1	0.3	< 0.1	0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.05	0.7	< 0.001	1.9	0.05	75.3	0.4	< 0.1	40
A738342	< 0.1	0.4	< 0.1	0.3	< 0.1	0.2	< 0.1	0.3	< 0.05	0.6	< 0.001	2.1	0.09	36.4	1.1	0.2	30
A738343	< 0.1	0.2	< 0.1	0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.05	0.5	< 0.001	2.4	0.05	37.8	0.2	< 0.1	30
A738345	< 0.1	0.2	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.05	0.4	< 0.001	5.1	0.14	16.9	< 0.1	0.1	40
A738346	< 0.1	0.3	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.05	< 0.1	< 0.001	6.1	< 0.02	1.2	< 0.1	< 0.1	30
A738347	0.3	1.7	0.4	1.1	0.1	0.9	0.1	0.8	< 0.05	0.2	0.002	3.3	0.08	22.3	4.2	1.0	30
A738348	< 0.1	0.4	< 0.1	0.2	< 0.1	0.3	< 0.1	< 0.1	< 0.05	0.1	< 0.001	4.1	0.04	2.7	0.1	< 0.1	30
A738349	< 0.1	0.3	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.05	2.2	< 0.001	88.3	< 0.02	1.2	< 0.1	< 0.1	40
A738401	< 0.1	0.4	< 0.1	0.2	< 0.1	0.1	< 0.1	0.3	< 0.05	0.6	< 0.001	663	0.03	65.6	3.1	1.6	50
A738402	0.1	1.0	0.2	0.5	< 0.1	0.4	< 0.1	< 0.1	< 0.05	0.4	< 0.001	2370	< 0.02	15.7	< 0.1	< 0.1	30
A738403	< 0.1	0.3	< 0.1	0.2	< 0.1	0.1	< 0.1	< 0.1	< 0.05	0.8	< 0.001	36.3	< 0.02	4.1	0.5	< 0.1	80
A738404	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.1	< 0.001	5.0	< 0.02	0.9	< 0.1	< 0.1	50
A738405	0.1	0.8	0.1	0.5	< 0.1	0.4	< 0.1	0.2	< 0.05	0.6	< 0.001	17.0	< 0.02	6.7	1.7	0.3	20
A738406	0.1	0.7	0.1	0.4	< 0.1	0.3	< 0.1	< 0.1	< 0.05	0.8	< 0.001	12.3	< 0.02	3.9	< 0.1	< 0.1	20
A738407	< 0.1	0.5	0.1	0.3	< 0.1	0.2	< 0.1	< 0.1	< 0.05	0.2	< 0.001	< 0.5	< 0.02	3.9	< 0.1	< 0.1	< 10
A738408	< 0.1	0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1	< 0.1	< 0.05	0.6	0.005	22.5	0.32	0.6	< 0.1	< 0.1	30
A738409	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	0.3	< 0.001	37.4	0.04	2.0	< 0.1	< 0.1	30
A738410	0.2	0.7	< 0.1	0.2	< 0.1	0.1	< 0.1	0.7	< 0.05	0.2	< 0.001	< 0.5	0.18	7.4	26.4	1.6	20

Analyte Symbol	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Re	Au	Tl	Pb	Th	U	Hg
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppb
Lower Limit	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.001	0.5	0.02	0.1	0.1	0.1	10
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
A738411	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	0.3	< 0.001	43.7	0.04	1.1	< 0.1	< 0.1	20
A738412	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	0.2	< 0.001	20.6	< 0.02	1.3	< 0.1	< 0.1	10
A738413	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	0.5	< 0.001	1140	0.04	1.3	< 0.1	< 0.1	40
A738414	0.1	0.6	0.1	0.4	< 0.1	0.3	< 0.1	< 0.1	< 0.05	6.6	< 0.001	3.1	0.19	1.8	2.0	0.9	20
A738415	0.2	1.2	0.3	0.8	0.1	0.9	0.1	0.1	< 0.05	0.3	< 0.001	13.5	0.14	27.5	0.3	< 0.1	10
A738416	1.5	8.7	1.6	4.1	0.5	3.4	0.5	< 0.1	< 0.05	3.5	< 0.001	< 0.5	0.03	1.8	0.3	< 0.1	60
A738417	0.4	2.1	0.4	1.0	0.1	0.8	0.1	< 0.1	< 0.05	0.5	< 0.001	5.9	0.18	1.6	0.7	< 0.1	40
A738418	0.2	0.8	0.1	0.3	< 0.1	0.3	< 0.1	< 0.1	< 0.05	< 0.1	< 0.001	3.1	< 0.02	1.1	0.1	< 0.1	40
A738419	0.2	1.0	0.2	0.6	< 0.1	0.5	< 0.1	0.6	< 0.05	0.2	< 0.001	< 0.5	0.05	41.9	11.0	1.5	30
A738420	0.2	1.0	0.2	0.4	< 0.1	0.2	< 0.1	0.6	< 0.05	0.7	< 0.001	< 0.5	0.26	10.2	41.0	2.0	20
A738421	0.2	1.3	0.2	0.7	< 0.1	0.7	< 0.1	< 0.1	< 0.05	< 0.1	0.002	< 0.5	0.05	11.6	4.0	0.8	30
A738422	0.2	0.9	0.2	0.4	< 0.1	0.3	< 0.1	0.2	< 0.05	0.3	< 0.001	< 0.5	0.04	8.5	2.1	0.3	10
A738423	0.1	0.5	< 0.1	0.2	< 0.1	0.1	< 0.1	0.2	< 0.05	0.4	< 0.001	1.0	< 0.02	1.4	0.4	< 0.1	80
A738424	< 0.1	0.2	< 0.1	0.2	< 0.1	0.1	< 0.1	< 0.1	< 0.05	0.1	< 0.001	< 0.5	0.02	1.9	< 0.1	< 0.1	20
A738425	0.4	2.8	0.6	1.7	0.2	1.3	0.2	0.1	< 0.05	7.3	< 0.001	< 0.5	< 0.02	1.3	0.6	< 0.1	10
A738426	0.2	1.0	0.2	0.6	< 0.1	0.5	< 0.1	0.7	< 0.05	0.3	0.004	< 0.5	0.05	3.2	0.3	0.2	210
A738427	< 0.1	0.2	< 0.1	0.1	< 0.1	0.2	< 0.1	< 0.1	< 0.05	1.8	0.002	< 0.5	0.03	8.0	0.2	0.1	460
A738428	0.2	1.1	0.2	0.4	< 0.1	0.4	< 0.1	0.2	< 0.05	0.2	< 0.001	2.0	< 0.02	1.0	0.5	< 0.1	20
A738429	< 0.1	0.3	< 0.1	0.2	< 0.1	0.3	< 0.1	< 0.1	< 0.05	< 0.1	< 0.001	< 0.5	0.03	1.1	< 0.1	< 0.1	30
A738290	0.3	1.6	0.3	0.8	0.1	0.8	< 0.1	0.4	< 0.05	1.3	< 0.001	< 0.5	0.25	7.1	17.7	0.9	20
A738344	0.2	1.6	0.3	1.0	0.1	1.0	0.1	0.2	< 0.05	1.5	< 0.001	730	0.09	11.1	4.2	1.2	50
A738350	0.2	1.0	0.2	0.5	< 0.1	0.5	< 0.1	0.3	< 0.05	1.6	< 0.001	< 0.5	0.18	6.3	11.7	0.7	40
A738430	0.2	1.6	0.4	1.1	0.1	1.0	0.1	0.2	< 0.05	1.6	< 0.001	1050	0.10	11.6	4.3	1.2	50

Analyte Symbol	Ti	S	P	Li	Be	B	Na	Mg	Al	K	Bi	Ca	Sc	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge
Unit Symbol	%	%	%	ppm	ppm	ppm	%	%	%	%	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.001	1	0.001	0.1	0.1	1	0.001	0.01	0.01	0.01	0.02	0.01	0.1	1	1	1	0.01	0.1	0.1	0.2	0.1	0.02	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
GXR-4 Meas	0.150	2	0.126	10.2	1.4	5	0.155	1.67	2.75	1.73	19.7	0.90	6.3	80	54	152	3.07	14.3	39.1	6340	65.1	11.0	
GXR-4 Cert	0.29	1.77	0.120	11.1	1.90	4.50	0.564	1.66	7.20	4.01	19.0	1.01	7.70	87.0	64.0	155	3.09	14.6	42.0	6520	73.0	20.0	
GXR-6 Meas		< 1	0.035	23.6	0.9	6	0.064	0.39	6.67	1.13	0.18	0.12	21.6	166	76	1030	5.48	12.7	23.3	73.8	114	12.1	
GXR-6 Cert		0.0160	0.0350	32.0	1.40	9.80	0.104	0.609	17.7	1.87	0.290	0.180	27.6	186	96.0	1010	5.58	13.8	27.0	66.0	118	35.0	
OREAS 45d (Aqua Regia) Meas		< 1	0.035	16.8			0.045	0.17	5.70	0.12	0.27	0.12	37.7	184	442	407	13.7	27.1	211	356	33.5	17.1	
OREAS 45d (Aqua Regia) Cert		0.045	0.035	11.9			0.031	0.144	4.860	0.097	0.30	0.089	41.50	201.0	467	400.000	13.650	26.2	176.0	345.0	30.6	17.9	
Oreas 621 (Aqua Regia) Meas		5	0.036	7.1	0.5		0.188	0.36	1.72	0.37	3.88	1.66	2.2	12	31	534	3.48	29.5	26.3	3540	> 5000	9.67	
Oreas 621 (Aqua Regia) Cert		4.50	0.0335	8.17	0.530		0.160	0.436	1.60	0.333	3.85	1.65	2.20	10.9	31.3	520	3.43	27.9	25.8	3660	51700	9.29	
A738202 Orig	0.005	< 1	0.109	31.0	0.2	3	0.061	1.28	2.21	0.16	0.11	4.38	3.5	43	5	1110	5.22	19.0	9.9	38.8	88.1	7.74	< 0.1
A738202 Dup	0.004	< 1	0.103	30.0	0.2	3	0.057	1.24	2.14	0.15	0.11	4.22	2.9	41	5	1060	5.00	18.0	9.2	34.8	83.2	7.49	< 0.1
A738348 Orig	0.003	1	0.060	0.3	< 0.1	2	0.019	0.25	0.11	0.05	0.43	0.07	0.2	6	2	80	9.22	23.6	42.8	1050	2.0	0.32	< 0.1
A738348 Dup	0.004	1	0.060	0.3	< 0.1	2	0.017	0.24	0.10	0.04	0.41	0.07	0.2	6	2	89	9.18	22.6	42.5	1060	2.7	0.30	< 0.1
A738349 Orig	0.023	< 1	0.005	4.7	< 0.1	2	0.049	0.52	0.49	0.03	0.07	1.61	2.8	29	29	340	1.39	6.9	12.1	121	12.3	1.58	< 0.1
A738349 Dup	0.022	< 1	0.005	4.7	< 0.1	3	0.048	0.52	0.47	0.04	0.07	1.63	3.0	29	28	333	1.37	6.8	11.9	115	12.0	1.62	< 0.1
A738411 Orig	0.013	< 1	0.007	3.1	< 0.1	2	0.017	1.09	0.52	0.06	0.03	0.26	5.5	5	533	993	4.80	75.3	1250	20.7	4.0	1.00	< 0.1
A738411 Dup	0.014	< 1	0.008	3.2	< 0.1	2	0.017	1.13	0.53	0.06	0.02	0.28	5.8	4	546	1010	4.95	75.0	1280	21.5	5.1	1.03	< 0.1
A738420 Orig	0.073	< 1	0.031	18.0	< 0.1	2	0.097	0.27	0.56	0.39	0.04	0.12	2.3	14	8	209	1.43	3.7	2.7	6.0	30.4	2.99	< 0.1
A738420 Split PREP DUP	0.069	< 1	0.033	17.7	< 0.1	2	0.091	0.26	0.54	0.38	0.04	0.11	1.9	13	7	212	1.49	3.6	2.9	8.1	29.4	3.02	< 0.1
A738421 Orig	0.004	1	0.048	44.5	0.3	4	0.058	1.94	2.91	0.19	0.40	3.30	4.9	52	67	783	6.90	34.9	114	131	115	7.95	< 0.1
A738421 Dup	0.003	1	0.047	43.7	0.3	4	0.057	1.94	2.80	0.19	0.39	3.27	4.5	51	65	766	6.72	35.2	116	126	117	7.89	< 0.1
A738430 Orig	0.136	< 1	0.038	7.8	0.2	4	0.464	1.69	3.22	0.19	0.16	2.65	4.3	72	128	552	2.81	16.3	148	164	45.8	6.28	< 0.1
A738430 Dup	0.139	< 1	0.040	8.1	0.2	4	0.479	1.76	3.39	0.19	0.17	2.77	4.5	75	133	566	2.91	16.9	157	167	47.4	6.46	< 0.1
Method Blank	< 0.001	< 1	0.001	< 0.1	< 0.1	1	0.012	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.1	< 1	< 1	< 1	< 0.01	< 0.1	0.1	< 0.2	< 0.1	0.02	< 0.1

Analyte Symbol	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Te	Cs	Ba	La	Ce	Cd	Pr	Nd	Sm	Se	Eu	Gd
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.1	0.1	0.5	0.01	0.1	0.1	0.01	0.002	0.02	0.05	0.02	0.02	0.02	0.5	0.5	0.01	0.01	0.1	0.02	0.1	0.1	0.1	0.1
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
GXR-4 Meas	92.6	89.8	81.8	11.5	11.9	< 0.1	308	3.64	0.22	5.59	2.88	0.76	2.29	25.9	47.6	90.2	0.25		38.6	4.5	4.9	1.3	4.3
GXR-4 Cert	98.0	160	221	14.0	186	10.0	310	4.00	0.270	5.60	4.80	0.970	2.80	1640	64.5	102	0.860		45.0	6.60	5.60	1.63	5.25
GXR-6 Meas	227	61.6	28.4	6.11	13.8	< 0.1	1.43	0.310	0.05	1.06	1.51	0.04	3.22	862	10.2	28.6	0.02		11.2	2.0	< 0.1	0.5	1.9
GXR-6 Cert	330	90.0	35.0	14.0	110	7.50	2.40	1.30	0.260	1.70	3.60	0.0180	4.20	1300	13.9	36.0	1.00		13.0	2.67	0.940	0.760	2.97
OREAS 45d (Aqua Regia) Meas	5.5	23.8	13.8	4.61					0.07	1.96				103	11.2	25.3							
OREAS 45d (Aqua Regia) Cert	6.50	20.9	11.0	5.08					0.085	1.950				80	9.960	24.8							
Oreas 621 (Aqua Regia) Meas	70.5		18.5	7.79	76.8		13.4	68.2	1.77	2.74	115		0.95		19.0	38.6	265				4.5		
Oreas 621 (Aqua Regia) Cert	75.0		18.9	6.87	55.0		13.3	68.0	1.73	2.68	107		1.01		19.4	39.6	278				5.64		
A738202 Orig	3.3	5.4	125	6.75	1.5	< 0.1	0.48	0.033	< 0.02	0.37	0.41	< 0.02	0.36	66.6	19.3	38.2	0.09	4.4	18.7	2.0	0.2	0.8	2.3
A738202 Dup	2.3	5.0	113	6.34	1.3	< 0.1	0.45	0.034	< 0.02	0.32	0.40	< 0.02	0.37	61.9	18.4	36.6	0.05	4.2	17.1	2.4	< 0.1	0.8	2.2
A738348 Orig	0.7	3.5	3.9	2.37	1.6	< 0.1	0.27	0.350	< 0.02	0.19	2.13	0.44	0.35	21.1	2.6	4.95	0.02	0.6	2.70	0.4	2.3	0.2	0.5
A738348 Dup	0.7	3.5	4.3	2.42	1.3	< 0.1	0.29	0.348	< 0.02	0.21	2.10	0.41	0.35	20.2	2.6	5.02	< 0.01	0.6	2.73	0.3	2.4	0.2	0.5
A738349 Orig	0.9	1.7	10.1	1.75	0.6	< 0.1	0.34	0.359	< 0.02	0.19	0.11	0.03	0.27	24.6	< 0.5	0.61	< 0.01	< 0.1	0.37	0.2	< 0.1	< 0.1	0.3
A738349 Dup	0.8	1.7	9.9	1.66	0.5	< 0.1	0.40	0.401	< 0.02	0.18	0.10	0.06	0.23	19.9	< 0.5	0.60	0.03	< 0.1	0.39	0.2	< 0.1	< 0.1	0.2
A738411 Orig	1100	3.7	4.8	0.24	1.2	< 0.1	0.38	0.034	< 0.02	0.14	18.2	0.04	0.89	24.2	< 0.5	0.38	< 0.01	< 0.1	0.16	0.1	< 0.1	< 0.1	< 0.1
A738411 Dup	1130	3.7	4.5	0.22	1.3	< 0.1	0.37	0.037	< 0.02	0.16	18.9	< 0.02	0.88	26.4	< 0.5	0.32	< 0.01	< 0.1	0.19	< 0.1	< 0.1	< 0.1	< 0.1
A738420 Orig	0.5	32.6	10.8	3.52	28.1	0.3	0.55	0.037	< 0.02	0.71	0.02	0.03	0.97	56.3	58.6	106	< 0.01	10.7	36.0	4.6	< 0.1	0.2	3.1
A738420 Split PREP DUP	0.3	32.4	10.8	3.65	23.7	0.4	0.27	0.069	< 0.02	0.84	0.02	< 0.02	0.99	56.9	61.6	110	< 0.01	11.2	39.6	3.7	< 0.1	0.2	3.1
A738421 Orig	0.8	6.6	72.4	6.23	8.5	< 0.1	0.94	0.172	0.03	0.18	1.74	0.17	0.50	78.1	16.3	33.4	0.04	3.9	15.6	2.3	0.6	0.6	2.1
A738421 Dup	0.3	6.5	71.3	6.15	7.4	< 0.1	0.93	0.168	< 0.02	0.19	1.67	0.20	0.46	78.1	16.5	33.8	0.05	3.9	16.0	1.8	0.6	0.6	2.2
A738430 Orig	3.0	8.7	120	8.98	4.4	0.2	2.95	0.166	< 0.02	0.77	0.80	0.05	0.58	119	10.0	20.2	0.08	2.1	8.79	1.5	< 0.1	0.3	1.5
A738430 Dup	3.4	8.9	125	9.47	5.2	0.2	3.09	0.254	0.02	0.82	0.80	0.04	0.64	123	10.6	21.1	0.09	2.3	8.91	1.6	< 0.1	0.3	1.6
Method Blank	< 0.1	< 0.1	< 0.5	< 0.01	< 0.1	< 0.1	0.10	< 0.002	< 0.02	0.09	< 0.02	0.02	< 0.02	7.1	< 0.5	< 0.01	< 0.01	< 0.1	< 0.02	< 0.1	< 0.1	< 0.1	< 0.1

Analyte Symbol	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Re	Au	Tl	Pb	Th	U	Hg
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppb
Lower Limit	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.001	0.5	0.02	0.1	0.1	0.1	10
Method Code	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS	AR-MS
GXR-4 Meas	0.5	2.5			0.1	0.9	< 0.1	0.3	< 0.05	13.7		572	2.72	46.7	20.0	4.9	160
GXR-4 Cert	0.360	2.60			0.210	1.60	0.170	6.30	0.790	30.8		470	3.20	52.0	22.5	6.20	110
GXR-6 Meas	0.2	1.5				0.7	0.1	0.4	< 0.05	0.2		98.4	1.72	98.4	4.1	0.8	80
GXR-6 Cert	0.415	2.80				2.40	0.330	4.30	0.485	1.90		95.0	2.20	101	5.30	1.54	68.0
OREAS 45d (Aqua Regia) Meas												14.3		17.8	11.5	1.6	
OREAS 45d (Aqua Regia) Cert												21		17.00	11.3	1.64	
Oreas 621 (Aqua Regia) Meas	0.3					0.6	< 0.1	1.8		1.1		1450	0.82	> 5000	5.8	1.7	3750
Oreas 621 (Aqua Regia) Cert	0.330					0.520	0.0780	1.43		1.00		1230	0.770	13600	5.91	1.63	3930
A738202 Orig	0.2	1.5	0.2	0.6	< 0.1	0.6	< 0.1	< 0.1	< 0.05	0.1	< 0.001	< 0.5	0.04	7.5	2.9	0.5	80
A738202 Dup	0.2	1.4	0.2	0.6	< 0.1	0.6	< 0.1	< 0.1	< 0.05	< 0.1	< 0.001	1.2	0.03	7.1	2.7	0.5	60
A738348 Orig	< 0.1	0.4	< 0.1	0.2	< 0.1	0.3	< 0.1	< 0.1	< 0.05	0.2	< 0.001	3.3	0.04	2.7	0.1	< 0.1	20
A738348 Dup	< 0.1	0.4	< 0.1	0.2	< 0.1	0.3	< 0.1	< 0.1	< 0.05	0.1	< 0.001	4.9	0.04	2.7	0.1	< 0.1	30
A738349 Orig	< 0.1	0.3	< 0.1	0.1	< 0.1	0.2	< 0.1	< 0.1	< 0.05	2.4	< 0.001	32.7	< 0.02	1.2	< 0.1	< 0.1	40
A738349 Dup	< 0.1	0.3	< 0.1	0.2	< 0.1	0.2	< 0.1	< 0.1	< 0.05	2.1	< 0.001	144	< 0.02	1.2	< 0.1	< 0.1	50
A738411 Orig	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	0.4	< 0.001	30.5	0.04	1.1	< 0.1	< 0.1	30
A738411 Dup	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	0.2	< 0.001	56.9	0.04	1.1	< 0.1	< 0.1	20
A738420 Orig	0.2	1.0	0.2	0.4	< 0.1	0.2	< 0.1	0.6	< 0.05	0.7	< 0.001	< 0.5	0.26	10.2	41.0	2.0	20
A738420 Split PREP DUP	0.2	1.0	0.2	0.3	< 0.1	0.2	< 0.1	0.4	< 0.05	1.3	< 0.001	< 0.5	0.26	10.4	43.8	2.0	20
A738421 Orig	0.2	1.2	0.2	0.7	< 0.1	0.7	< 0.1	0.1	< 0.05	< 0.1	0.001	< 0.5	0.05	11.6	4.0	0.8	20
A738421 Dup	0.3	1.3	0.3	0.7	0.1	0.7	0.1	< 0.1	< 0.05	< 0.1	0.002	< 0.5	0.05	11.6	4.0	0.8	40
A738430 Orig	0.2	1.6	0.3	1.0	0.1	0.9	0.1	0.2	< 0.05	1.6	< 0.001	633	0.09	11.4	4.1	1.2	40
A738430 Dup	0.2	1.6	0.4	1.1	0.1	1.0	0.2	0.2	< 0.05	1.6	< 0.001	1480	0.11	11.7	4.4	1.2	50
Method Blank	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.1	< 0.001	< 0.5	< 0.02	0.5	< 0.1	< 0.1	50





**Date Submitted:** 29-Oct-18  
**Invoice No.:** A18-16098-4Lithores  
**Invoice Date:** 27-Dec-18  
**Your Reference:** DIS87996

**Goldcorp Canada Ltd.**  
**17 Mine Road**  
**Balmertown Ontario P0V 1C0**  
**Canada**

**ATTN: Jamie Kristoff**

## CERTIFICATE OF ANALYSIS

21 Core samples were submitted for analysis.

The following analytical package(s) were requested:

Code 4LITHORES (11+) Major Elements Fusion ICP(WRA)/Trace Elements Fusion ICP/MS(WRA4B2)

REPORT **A18-16098-4Lithores**

This report may be reproduced without our consent. If only selected portions of the report are reproduced, permission must be obtained. If no instructions were given at time of sample submittal regarding excess material, it will be discarded within 90 days of this report. Our liability is limited solely to the analytical cost of these analyses. Test results are representative only of material submitted for analysis.

Notes:

We recommend using option 4B1 for accurate levels of the base metals Cu, Pb, Zn, Ni and Ag. Option 4B-INAA for As, Sb, high W >100ppm, Cr >1000ppm and Sn >50ppm by Code 5D. Values for these elements provided by Fusion ICP/MS, are order of magnitude only and are provided for general information. Mineralized samples should have the Quant option selected or request assays for values which exceed the range of option 4B1. Total includes all elements in % oxide to the left of total. Zr is now being reported from FUS-ICP instead of FUS-MS.

CERTIFIED BY:

A handwritten signature in black ink, appearing to be "Elitsa Hrischeva".

Elitsa Hrischeva, Ph.D.  
Quality Control

**ACTIVATION LABORATORIES LTD.**  
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5  
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613  
E-MAIL Ancaster@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Analyte Symbol	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	LOI	Total	Sc	Be	V	Cr	Co	Ni	Cu	Zn	Ga	Ge	As
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.001	0.01		0.01		1	5	20	1	20	10	30	1	0.5	5
Method Code	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
A738204	51.37	13.87	12.32	0.158	8.09	3.56	2.79	0.62	0.737	0.05	7.12	100.7	44	< 1	277	90	40	70	120	80	14	1.1	5
A738255	53.77	13.36	16.16	0.290	2.99	3.61	0.52	2.74	1.672	0.14	3.31	98.56	46	2	460	40	58	30	140	120	20	1.4	> 2000
A738511	52.51	14.99	9.82	0.231	6.04	10.81	3.69	0.09	0.922	0.10	1.15	100.4	42	< 1	301	200	43	80	120	80	16	1.6	5
A738512	69.62	15.12	2.28	0.030	0.77	2.99	4.79	1.39	0.238	0.08	1.76	99.07	3	1	23	30	4	< 20	< 10	< 30	18	0.9	< 5
A738513	65.73	14.85	5.68	0.150	2.53	5.28	1.50	1.37	1.253	0.02	1.43	99.77	5	< 1	50	50	6	30	20	< 30	16	1.8	26
A738514	51.74	16.67	7.54	0.091	3.83	8.07	3.16	1.78	0.995	0.39	4.84	99.10	14	2	131	30	24	40	< 10	70	20	1.2	15
A738515	48.67	15.54	14.18	0.182	5.93	4.29	3.90	0.25	1.346	0.15	6.27	100.7	39	< 1	338	130	39	60	50	120	14	1.5	5
A738516	85.56	8.33	1.63	0.026	0.51	0.05	0.12	2.23	0.606	< 0.01	1.46	100.5	16	< 1	157	1820	6	50	50	40	12	2.5	81
A738517	50.44	12.20	8.23	0.189	5.03	7.24	3.56	0.88	0.518	0.06	10.80	99.15	38	< 1	185	100	38	80	110	60	10	1.6	13
A738518	63.67	12.74	12.17	0.148	3.21	0.26	0.17	1.99	1.531	0.19	3.43	99.49	35	< 1	364	30	28	110	690	40	20	1.8	108
A738519	49.06	14.23	11.31	0.182	5.93	12.70	3.16	0.15	0.708	0.08	2.97	100.5	34	< 1	226	230	44	90	110	70	14	1.3	< 5
A738520	55.48	14.75	7.13	0.153	7.27	7.84	2.50	1.13	0.368	0.09	1.64	98.37	20	< 1	122	410	31	240	160	70	14	1.5	< 5
A738521	49.03	14.01	11.45	0.193	8.81	11.48	2.28	0.18	0.608	0.06	2.26	100.3	45	< 1	267	460	46	130	120	80	13	1.7	< 5
A738522	47.62	14.82	13.49	0.194	8.34	10.65	1.98	0.25	0.704	0.06	2.57	100.7	41	< 1	256	320	53	160	180	110	13	1.5	< 5
A738523	57.69	17.19	7.09	0.123	2.58	5.66	3.54	2.22	0.607	0.33	1.92	98.94	10	1	93	< 20	13	< 20	50	80	19	1.3	< 5
A738524	71.59	14.88	1.44	0.028	0.98	0.97	2.14	3.78	0.116	0.04	2.90	98.87	1	1	6	30	1	< 20	< 10	< 30	18	1.0	5
A738525	50.29	14.81	10.95	0.144	10.21	7.16	2.50	0.10	0.417	0.05	3.13	99.75	52	< 1	235	190	47	110	60	70	12	1.5	< 5
A738526	42.84	5.07	10.66	0.139	27.38	6.23	0.14	0.02	0.317	0.03	7.61	100.4	25	< 1	135	2350	95	1540	< 10	40	6	1.3	< 5
A738527	51.70	12.24	11.49	0.202	8.70	11.73	2.19	0.15	0.610	0.05	1.67	100.7	43	< 1	282	360	48	120	100	70	14	1.7	< 5
A738528	63.31	16.16	3.11	0.061	1.20	4.35	4.44	1.80	0.343	0.13	4.59	99.50	3	1	39	20	6	< 20	50	30	17	0.9	7
A738510	72.85	14.10	2.07	0.040	0.47	1.64	3.58	4.71	0.157	0.08	0.46	100.2	3	< 1	15	< 20	2	< 20	< 10	< 30	17	1.1	15

Analyte Symbol	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	1	2	0.5	1	0.2	2	0.5	0.1	1	0.2	0.1	2	0.05	0.05	0.01	0.05	0.01	0.005	0.01	0.01	0.01	0.01	0.01
Method Code	FUS-MS	FUS-ICP	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
A738204	36	113	18.0	46	2.2	< 2	< 0.5	< 0.1	< 1	< 0.2	10.9	304	2.49	6.33	0.92	4.61	1.57	0.436	2.30	0.45	2.99	0.65	1.99
A738255	61	61	31.9	84	3.0	< 2	0.5	0.1	1	10.1	8.5	181	4.20	11.6	1.83	10.3	3.50	1.26	4.43	0.81	5.32	1.11	3.28
A738511	< 1	81	20.4	47	2.3	< 2	< 0.5	0.1	< 1	< 0.2	< 0.1	68	4.05	9.65	1.41	7.12	2.29	0.841	2.91	0.53	3.46	0.71	2.12
A738512	35	289	6.2	80	3.0	< 2	< 0.5	< 0.1	< 1	< 0.2	0.9	334	13.9	25.7	2.76	10.3	1.83	0.542	1.43	0.20	1.05	0.20	0.61
A738513	39	117	9.8	303	8.3	< 2	1.2	< 0.1	1	1.5	13.0	171	18.1	33.2	3.51	13.8	2.51	0.967	2.00	0.29	1.74	0.34	0.99
A738514	27	1017	26.5	126	7.9	< 2	0.6	< 0.1	1	4.4	2.6	930	36.8	85.7	11.2	49.3	10.3	2.26	7.90	1.02	5.13	0.91	2.53
A738515	9	26	23.8	66	3.6	< 2	< 0.5	0.1	< 1	11.3	2.3	104	4.61	12.6	1.87	9.34	2.88	0.965	3.65	0.62	4.06	0.88	2.68
A738516	44	12	4.0	27	0.9	2	< 0.5	< 0.1	< 1	13.3	1.6	88	0.60	1.83	0.25	1.48	0.52	0.143	0.60	0.10	0.68	0.18	0.55
A738517	21	63	14.4	27	1.4	< 2	< 0.5	< 0.1	< 1	12.5	2.2	117	3.08	6.95	0.94	4.69	1.48	0.439	1.92	0.35	2.34	0.49	1.57
A738518	27	23	41.0	79	2.4	3	0.5	0.2	1	23.5	1.6	96	5.37	13.0	1.90	10.1	3.38	1.34	5.46	1.04	6.96	1.42	4.21
A738519	1	238	14.9	43	2.6	< 2	< 0.5	< 0.1	< 1	0.9	0.1	79	4.69	11.1	1.46	6.84	1.97	0.727	2.32	0.41	2.72	0.55	1.65
A738520	31	320	20.3	73	6.3	< 2	< 0.5	< 0.1	1	0.9	1.0	369	15.4	31.2	3.63	14.6	3.17	0.700	3.03	0.52	3.38	0.69	2.17
A738521	1	101	13.5	28	1.3	< 2	< 0.5	< 0.1	< 1	0.3	0.1	26	1.72	4.61	0.72	3.64	1.29	0.580	1.85	0.35	2.29	0.50	1.54
A738522	6	81	15.9	30	1.5	< 2	< 0.5	< 0.1	< 1	< 0.2	0.2	27	2.06	5.45	0.85	4.56	1.63	0.598	2.17	0.41	2.67	0.56	1.72
A738523	55	717	18.8	142	5.5	< 2	0.8	< 0.1	1	0.2	3.4	501	30.9	61.2	6.88	28.0	4.84	1.43	3.93	0.55	3.24	0.63	1.85
A738524	87	36	4.4	58	2.8	< 2	< 0.5	< 0.1	< 1	0.3	1.9	371	39.2	53.5	5.93	19.1	2.49	0.543	1.58	0.18	0.88	0.15	0.38
A738525	1	133	11.7	24	1.1	< 2	< 0.5	< 0.1	< 1	0.2	0.1	30	2.09	4.76	0.67	3.19	0.97	0.336	1.34	0.27	1.92	0.42	1.33
A738526	1	9	8.9	13	0.5	< 2	< 0.5	< 0.1	< 1	< 0.2	0.7	55	0.82	2.34	0.36	2.04	0.79	0.301	1.19	0.23	1.49	0.32	0.89
A738527	2	102	13.6	25	0.9	< 2	< 0.5	< 0.1	< 1	0.2	0.1	52	1.25	3.30	0.53	2.97	1.11	0.516	1.82	0.35	2.25	0.48	1.43
A738528	55	553	5.1	81	3.5	< 2	0.5	< 0.1	< 1	0.4	1.7	551	22.3	44.1	4.94	19.2	3.18	0.820	1.85	0.21	1.00	0.17	0.47
A738510	131	265	4.8	196	3.1	2	0.8	< 0.1	1	0.4	1.3	856	68.6	124	12.5	40.7	5.57	0.606	3.09	0.29	1.25	0.19	0.46

Analyte Symbol	Tm	Yb	Lu	Hf	Ta	W	Tl	Pb	Bi	Th	U
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.005	0.01	0.002	0.1	0.01	0.5	0.05	5	0.1	0.05	0.01
Method Code	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
A738204	0.291	1.90	0.304	1.1	0.12	< 0.5	0.19	< 5	0.3	0.57	0.18
A738255	0.491	3.28	0.505	2.3	0.15	90.9	0.82	< 5	< 0.1	0.34	0.09
A738511	0.313	2.06	0.308	1.3	0.11	< 0.5	< 0.05	< 5	< 0.1	0.38	0.12
A738512	0.085	0.54	0.080	2.1	0.39	< 0.5	0.08	< 5	< 0.1	3.03	0.68
A738513	0.142	0.94	0.145	6.2	0.69	1.3	0.16	< 5	0.2	4.11	1.34
A738514	0.340	2.03	0.301	3.3	0.44	< 0.5	0.12	5	< 0.1	4.39	1.10
A738515	0.387	2.58	0.413	1.7	0.17	< 0.5	0.07	< 5	< 0.1	0.42	0.13
A738516	0.074	0.48	0.076	0.7	0.09	11.5	0.20	< 5	< 0.1	0.15	0.07
A738517	0.233	1.48	0.243	0.8	0.08	5.7	0.17	< 5	< 0.1	0.42	0.15
A738518	0.596	3.86	0.595	2.4	0.15	30.4	< 0.05	< 5	< 0.1	0.37	0.13
A738519	0.243	1.53	0.239	1.2	0.13	< 0.5	< 0.05	< 5	< 0.1	0.52	0.14
A738520	0.340	2.33	0.367	2.1	0.45	2.2	0.17	12	0.1	4.18	1.47
A738521	0.235	1.55	0.245	0.8	0.04	< 0.5	< 0.05	< 5	< 0.1	0.21	0.07
A738522	0.257	1.68	0.273	0.8	0.06	< 0.5	< 0.05	< 5	< 0.1	0.19	0.06
A738523	0.275	1.83	0.285	3.4	0.32	6.6	0.25	20	0.1	4.67	1.01
A738524	0.053	0.30	0.038	1.7	0.52	2.1	0.31	5	< 0.1	9.38	2.30
A738525	0.214	1.45	0.232	0.6	0.03	< 0.5	< 0.05	< 5	2.4	0.33	0.09
A738526	0.122	0.71	0.103	0.3	< 0.01	< 0.5	< 0.05	< 5	< 0.1	0.05	0.01
A738527	0.208	1.38	0.206	0.8	0.01	< 0.5	< 0.05	< 5	< 0.1	0.11	0.04
A738528	0.064	0.37	0.052	2.0	0.30	4.4	0.28	9	0.1	4.57	1.92
A738510	0.060	0.40	0.062	5.6	0.24	1.5	0.55	26	< 0.1	43.4	2.80

Analyte Symbol	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	LOI	Total	Sc	Be	V	Cr	Co	Ni	Cu	Zn	Ga	Ge	As
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.001	0.01		0.01	1	1	5	20	1	20	10	30	1	0.5	5
Method Code	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
NIST 694 Meas	11.26	1.91	0.75	0.018	0.34	42.62	0.88	0.55	0.117	30.18					1584								
NIST 694 Cert	11.2	1.80	0.790	0.0116	0.330	43.6	0.860	0.510	0.110	30.2					1740								
DNC-1 Meas	47.41	18.46	9.75	0.145	9.98	11.51	1.91	0.22	0.479	0.08			31		146	300	55	250	100	70	14		
DNC-1 Cert	47.15	18.34	9.97	0.150	10.13	11.49	1.890	0.234	0.480	0.070			31		148	270	57	247	100	70	15		
CHR-BKG Meas	15.12	12.66	14.01	0.162	22.93	0.06			0.123														
CHR-BKG Cert	15.27	12.91	13.87	0.14	23.47	0.07			0.14														
CHR-PT+ Meas	21.24	7.06	12.92	0.167	26.58	0.25			0.057														
CHR-PT+ Cert	21.75	7.43	13.41	0.15	27.97	0.23			0.07														
LKSD-3 Meas																80	29	50	30	160			30
LKSD-3 Cert																87.0	30.0	47.0	35.0	152			27.0
TDB-1 Meas																250		90	320	150			
TDB-1 Cert																251		92	323	155			
W-2a Meas	52.68	15.14	10.63	0.164	6.13	11.06	2.22	0.62	1.083	0.12			35	< 1	259	90	43	70	110	80	18	1.5	
W-2a Cert	52.4	15.4	10.7	0.163	6.37	10.9	2.14	0.626	1.06	0.140			36.0	1.30	262	92.0	43.0	70.0	110	80.0	17.0	1.00	
SY-4 Meas	50.02	20.03	6.21	0.109	0.49	8.16	6.87	1.65	0.279	0.13			1	3	< 5								
SY-4 Cert	49.9	20.69	6.21	0.108	0.54	8.05	7.10	1.66	0.287	0.131			1.1	2.6	8.0								
CTA-AC-1 Meas																			50	40			
CTA-AC-1 Cert																			54.0	38.0			
BIR-1a Meas	48.15	16.01	11.36	0.170	9.60	13.58	1.84	0.02	0.985	0.02			44	< 1	320	380		170	120	70	15		< 5
BIR-1a Cert	47.96	15.50	11.30	0.175	9.700	13.30	1.82	0.030	0.96	0.021			44	0.58	310	370		170	125	70	16		0.44
NCS DC86312 Meas																							
NCS DC86312 Cert																							
NCS DC70009 (GBW07241) Meas																	3	< 20	1050	90	16	10.3	67
NCS DC70009 (GBW07241) Cert																	3.7	2.8	960	100	16.5	11.2	69.9
OREAS 100a (Fusion) Meas																	17		160				
OREAS 100a (Fusion) Cert																	18.1		169				
OREAS 101a (Fusion) Meas																	47		430				
OREAS 101a (Fusion) Cert																	48.8		430				
OREAS 101b (Fusion) Meas																	45	< 20	410				
OREAS 101b (Fusion) Cert																	47	9	420				
JR-1 Meas																	1	< 20			15	2.1	15
JR-1 Cert																	0.83	1.67			16.1	1.88	16.3

Analyte Symbol	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	LOI	Total	Sc	Be	V	Cr	Co	Ni	Cu	Zn	Ga	Ge	As
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.001	0.01		0.01	1	1	5	20	1	20	10	30	1	0.5	5
Method Code	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
A738524 Orig	71.33	14.87	1.46	0.029	0.98	0.97	2.15	3.78	0.116	0.04	2.90	98.62	1	1	6	30	1	< 20	< 10	< 30	18	0.9	5
A738524 Dup	71.85	14.90	1.43	0.027	0.98	0.97	2.14	3.77	0.115	0.04	2.90	99.11	1	1	6	30	1	< 20	< 10	< 30	18	1.1	5
A738528 Orig	63.31	16.16	3.11	0.061	1.20	4.35	4.44	1.80	0.343	0.13	4.59	99.50	3	1	39	20	6	< 20	50	30	17	0.9	7
A738528 Split PREP DUP	63.76	16.20	3.11	0.061	1.21	4.38	4.37	1.81	0.349	0.13	4.65	100.1	3	1	42	20	7	< 20	60	40	18	0.7	7
Method Blank	< 0.01	< 0.01	< 0.01	0.001	< 0.01	0.01	< 0.01	< 0.01	< 0.001	0.01			< 1	< 1	< 5	< 20	< 1	< 20	< 10	< 30	< 1	< 0.5	< 5
Method Blank	< 0.01	< 0.01	< 0.01	0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01			< 1	< 1	< 5								

Analyte Symbol	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	1	2	0.5	1	0.2	2	0.5	0.1	1	0.2	0.1	2	0.05	0.05	0.01	0.05	0.01	0.005	0.01	0.01	0.01	0.01	0.01
Method Code	FUS-MS	FUS-ICP	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
NIST 694 Meas																							
NIST 694 Cert																							
DNC-1 Meas	4	142	18.8	31						1.0		108	3.90			5.60		0.620					
DNC-1 Cert	5	144.0	18.0	38						0.96		118	3.6			5.20		0.59					
CHR-BKG Meas																							
CHR-BKG Cert																							
CHR-PT+ Meas																							
CHR-PT+ Cert																							
LKSD-3 Meas	75		28.9			< 2	2.8				2.3		47.3	89.7		45.9	8.70	1.50			5.20		
LKSD-3 Cert	78.0		30.0			2.00	2.70				2.30		52.0	90.0		44.0	8.00	1.50			4.90		
TDB-1 Meas			32.6										16.1	37.8		24.3		2.10					
TDB-1 Cert			36										17	41		23		2.1					
W-2a Meas	19	195	25.0	82	7.5	< 2				0.9		177	10.7	22.9		13.3	3.40	1.10		0.60	3.80	0.78	
W-2a Cert	21.0	190	24.0	94.0	7.90	0.600				0.790		182	10.0	23.0		13.0	3.30	1.00		0.630	3.60	0.760	
SY-4 Meas		1205		532								344											
SY-4 Cert		1191		517								340											
CTA-AC-1 Meas			268										> 2000	> 3000		1130	161	43.1	116				
CTA-AC-1 Cert			272										2176	3326		1087	162	46.7	124				
BIR-1a Meas		108	15.8	13								12		1.80		2.30			2.00				
BIR-1a Cert		110	16	18								6		1.9		2.5			2.0				
NCS DC86312 Meas			955										> 2000	172		1580			234		189	35.8	101
NCS DC86312 Cert			976										2360	190		1600			225.0		183	36	96.2
NCS DC70009 (GBW07241) Meas	507		129				1.4	1.0	> 1000	3.0	41.0		24.0	61.0	8.10	34.0	13.0		16.0	3.60	22.0	5.00	14.0
NCS DC70009 (GBW07241) Cert	500		128				1.8	1.3	1700	3.1	41		23.7	60.3	7.9	32.9	12.5		14.8	3.3	20.7	4.5	13.4
OREAS 100a (Fusion) Meas			131			25							270	493	47.8	165	25.9	3.73	22.7	3.64	25.4	4.75	14.9
OREAS 100a (Fusion) Cert			142			24.1							260	463	47.1	152	23.6	3.71	23.6	3.80	23.2	4.81	14.9
OREAS 101a (Fusion) Meas			175			23							828	1400	132	404	49.9	8.22	40.3		33.9	6.85	20.6
OREAS 101a (Fusion) Cert			183			21.9							816	1396	134	403	48.8	8.06	43.4		33.3	6.46	19.5
OREAS 101b (Fusion) Meas			171			20							801	1410	123	387	50.0	8.08		4.98	31.3	6.32	19.2
OREAS 101b (Fusion) Cert			178			21							789	1331	127	378	48	7.77		5.37	32.1	6.34	18.7
JR-1 Meas	260		42.4		16.2			< 0.1	3	1.2	20.3		19.9	48.2	5.40	25.0	6.59	0.310		0.92	5.66		3.79
JR-1 Cert	257		45.1		15.2			0.028	2.86	1.19	20.8		19.7	47.2	5.58	23.3	6.03	0.30		1.01	5.69		3.61
A738524 Orig	86	36	4.4	56	2.7	< 2	< 0.5	< 0.1	< 1	0.3	1.9	371	38.6	52.3	5.82	18.8	2.51	0.525	1.49	0.18	0.88	0.15	0.38

Analyte Symbol	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	1	2	0.5	1	0.2	2	0.5	0.1	1	0.2	0.1	2	0.05	0.05	0.01	0.05	0.01	0.005	0.01	0.01	0.01	0.01	0.01
Method Code	FUS-MS	FUS-ICP	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
A738524 Dup	87	36	4.5	60	2.9	< 2	0.5	< 0.1	1	0.3	1.9	370	39.9	54.7	6.03	19.5	2.48	0.560	1.66	0.18	0.87	0.14	0.38
A738528 Orig	55	553	5.1	81	3.5	< 2	0.5	< 0.1	< 1	0.4	1.7	551	22.3	44.1	4.94	19.2	3.18	0.820	1.85	0.21	1.00	0.17	0.47
A738528 Split PREP DUP	56	550	5.4	80	3.6	< 2	0.5	< 0.1	< 1	0.4	1.8	553	23.0	45.8	5.22	19.8	3.21	0.832	2.05	0.23	1.06	0.18	0.50
Method Blank	< 1	< 2	< 0.5	< 1	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1	< 2	< 0.05	< 0.05	< 0.01	< 0.05	< 0.01	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Method Blank		< 2		< 1								< 2											

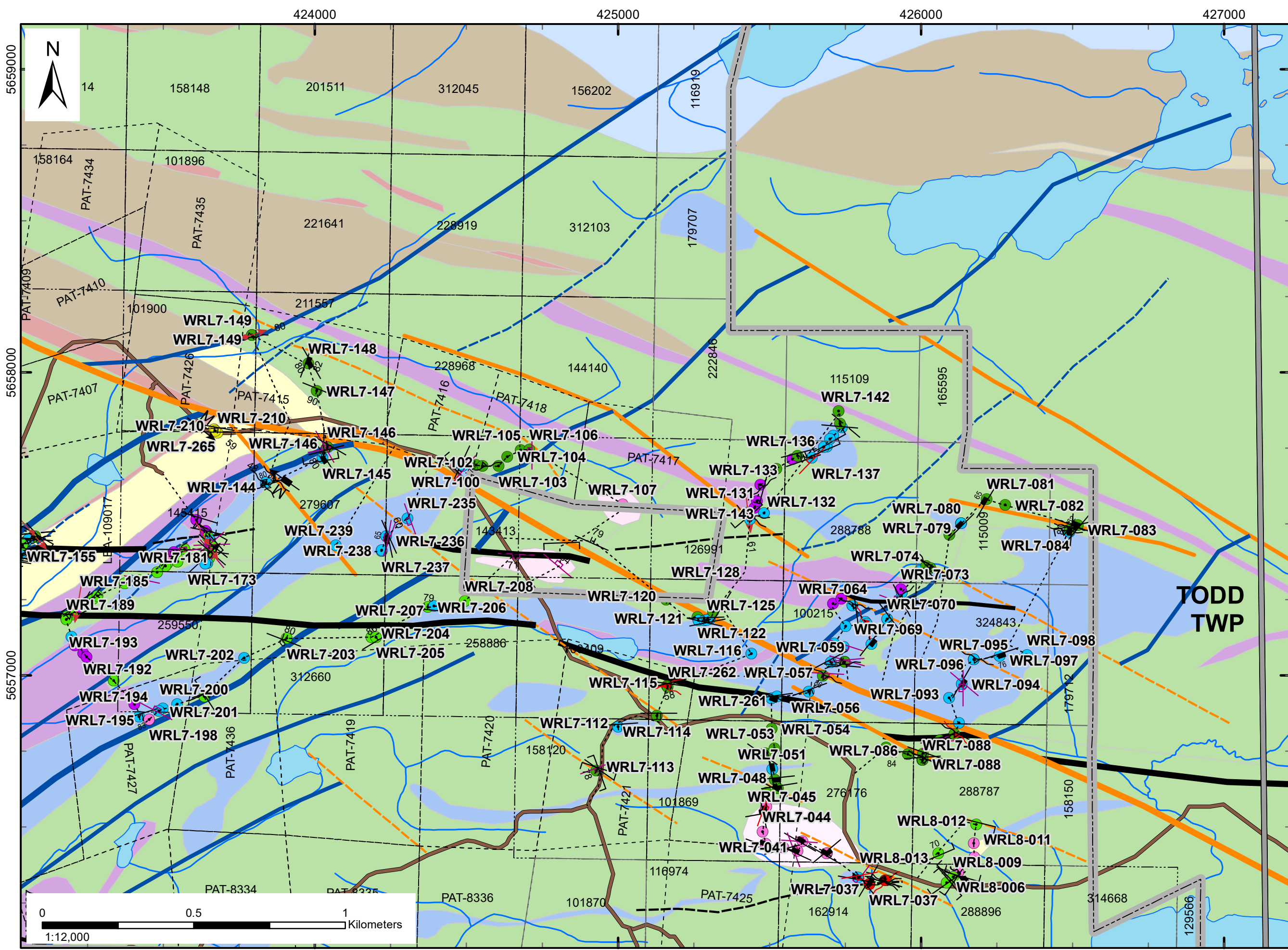


Analyte Symbol	Tm	Yb	Lu	Hf	Ta	W	Tl	Pb	Bi	Th	U
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.005	0.01	0.002	0.1	0.01	0.5	0.05	5	0.1	0.05	0.01
Method Code	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
NIST 694 Meas											
NIST 694 Cert											
DNC-1 Meas		2.10						6			
DNC-1 Cert		2.0						6.3			
CHR-BKG Meas											
CHR-BKG Cert											
CHR-PT+ Meas											
CHR-PT+ Cert											
LKSD-3 Meas		3.00		4.5	0.80					11.0	4.50
LKSD-3 Cert		2.70		4.80	0.700					11.4	4.60
TDB-1 Meas		3.30								2.60	
TDB-1 Cert		3.4								2.7	
W-2a Meas		2.10	0.320		0.47	< 0.5	0.06	10	< 0.1		0.52
W-2a Cert		2.10	0.330		0.500	0.300	0.200	9.30	0.0300		0.530
SY-4 Meas											
SY-4 Cert											
CTA-AC-1 Meas		10.6	1.06	1.2	2.41					21.3	4.10
CTA-AC-1 Cert		11.4	1.08	1.13	2.65					21.8	4.4
BIR-1a Meas		1.80		0.5				< 5			
BIR-1a Cert		1.7		0.60				3			
NCS DC86312 Meas	13.9	89.7	12.5							24.9	
NCS DC86312 Cert	15.1	87.79	11.96							23.6	
NCS DC70009 (GBW07241) Meas	2.00		2.00			2410	1.93				
NCS DC70009 (GBW07241) Cert	2.2		2.4			2200	1.8				
OREAS 100a (Fusion) Meas	2.29	15.2	2.33							48.4	131
OREAS 100a (Fusion) Cert	2.31	14.9	2.26							51.6	135
OREAS 101a (Fusion) Meas	3.00	18.0	2.64							35.9	445
OREAS 101a (Fusion) Cert	2.90	17.5	2.66							36.6	422
OREAS 101b (Fusion) Meas	2.79	18.4	2.67							35.8	415
OREAS 101b (Fusion) Cert	2.66	17.6	2.58							37.1	396
JR-1 Meas	0.680	4.78		4.4	1.96	1.9		19	0.6	28.1	9.10
JR-1 Cert	0.67	4.55		4.51	1.86	1.59		19.3	0.56	26.7	8.88
A738524 Orig	0.054	0.31	0.038	1.6	0.52	2.2	0.30	5	< 0.1	9.28	2.27

Analyte Symbol	Tm	Yb	Lu	Hf	Ta	W	Tl	Pb	Bi	Th	U
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.005	0.01	0.002	0.1	0.01	0.5	0.05	5	0.1	0.05	0.01
Method Code	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
A738524 Dup	0.051	0.28	0.039	1.8	0.53	2.0	0.32	5	< 0.1	9.48	2.33
A738528 Orig	0.064	0.37	0.052	2.0	0.30	4.4	0.28	9	0.1	4.57	1.92
A738528 Split PREP DUP	0.068	0.40	0.052	2.1	0.29	5.7	0.28	10	0.1	4.81	1.99
Method Blank	< 0.005	< 0.01	< 0.002	< 0.1	< 0.01	< 0.5	< 0.05	< 5	< 0.1	< 0.05	< 0.01
Method Blank											

## **APPENDIX IV**

### **Geologic Mapping**



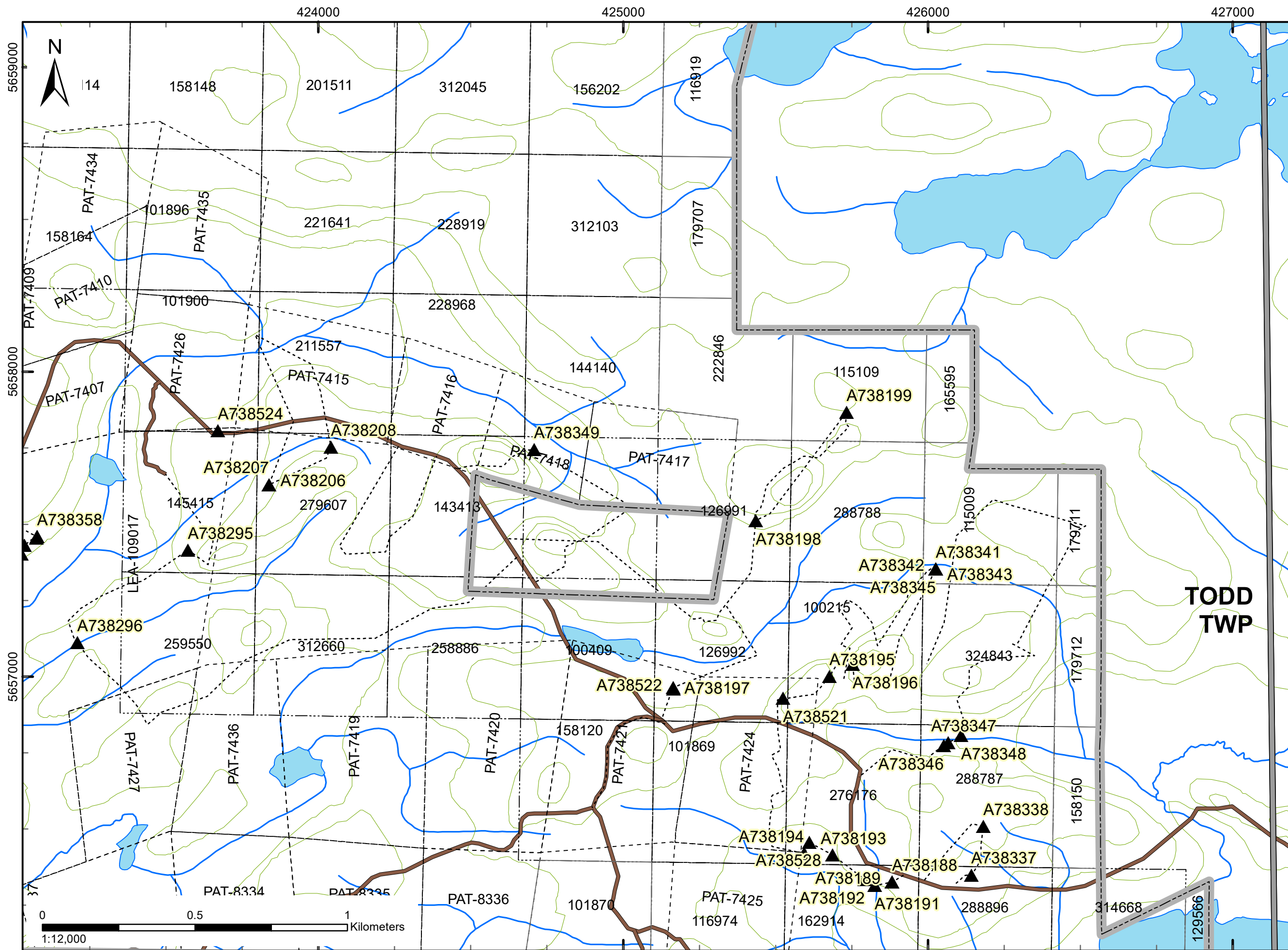
- Legend**
- Townships
  - WRL\_Boundary
  - WRL\_BoundaryCells
  - WRL\_Operational Cells
  - WRL\_Patent
  - Road
  - Traverses
  - Watercourse
  - Waterbody
- Structure, Order, Generation**
- Fault, 1, Pipestone
  - Fault, 2, Pipestone
  - Fault, 3, Pipestone
  - Fault, 1, Golden Arm
  - Fault, 2, Golden Arm
  - Fault, 3, Golden Arm
  - Fault, 1, D2
  - Fault, 2, D2
  - Fault, 3, D2
- Structure, Linear**
- Fold Axis
  - Liation
  - Mineral
  - Slickenside
- Structure, Planar**
- Axial Plane
  - Banding
  - Bedding
  - Cleavage
  - Contact
  - Dyke
  - Fault
  - Foliation
  - Joint
  - Shear
  - Vein
- Lithology**
- Basalt
  - Intermediate Volcanics
  - Felsic Volcanics
  - Marble
  - Banded Iron Formation
  - Argillite
  - Conglomerate
  - Peridotite
  - Gabbro
  - Diorite
  - Granite
  - Granodiorite
  - Tonalite
  - QFP Dykes
  - Station

Drawn by: Lydia Calhoun  
January 2020

## West Red Lake

Geologic Map: Eastern Half of Field Area

Township: Todd, Fairlie  
NAD 1983 UTM Zone 15N



- Legend**
- Townships
  - WRL\_Boundary
  - WRL\_BoundaryCells
  - WRL\_Operational Cell
  - WRL\_Patent
  - Road
  - Elevation Contours
  - Watercourse
  - Waterbody
  - Traverses
  - Samples

**TODD  
TWP**

Drawn by: Lydia Calhoun  
January 2020

**West Red Lake**  
Sample Locations: Eastern Half of Field Area

Township: Todd, Fairlie  
NAD 1983 UTM Zone 15N

420000

421000

422000

423000

5659000

5658000

5657000



**Legend**

- Townships
- WRL\_Boundary
- WRL\_BoundaryCells
- WRL\_Operational Cells
- WRL\_Patent
- Road
- Traverses
- Watercourse
- Waterbody

**Structure, Order, Generation**

- Fault, 1, Pipestone
- Fault, 2, Pipestone
- Fault, 3, Pipestone
- Fault, 1, Golden Arm
- Fault, 2, Golden Arm
- Fault, 3, Golden Arm
- Fault, 1, D2
- Fault, 2, D2
- Fault, 3, D2

**Structure, Linear**

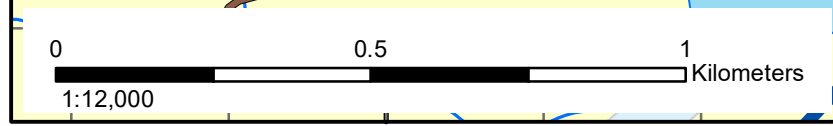
- Fold Axis
- Liation
- Mineral
- Slickenside

**Structure, Planar**

- Axial Plane
- Banding
- Bedding
- Cleavage
- Contact
- Dyke
- Fault
- Foliation
- Joint
- Shear
- Vein

**Lithology**

- Basalt
- Intermediate Volcanics
- Felsic Volcanics
- Marble
- Banded Iron Formation
- Argillite
- Conglomerate
- Peridotite
- Gabbro
- Diorite
- Granite
- Granodiorite
- Tonalite
- QFP Dykes
- Station

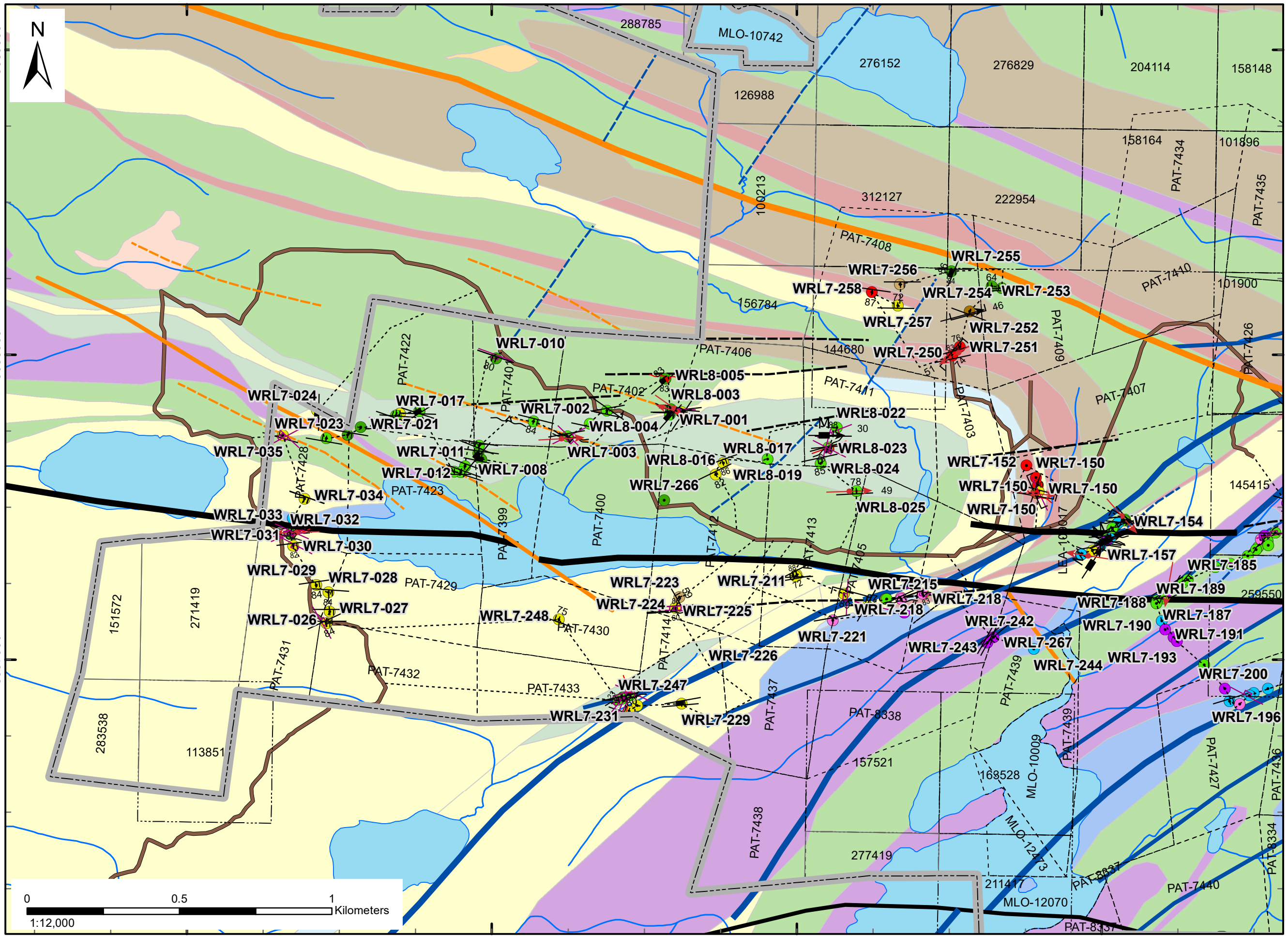


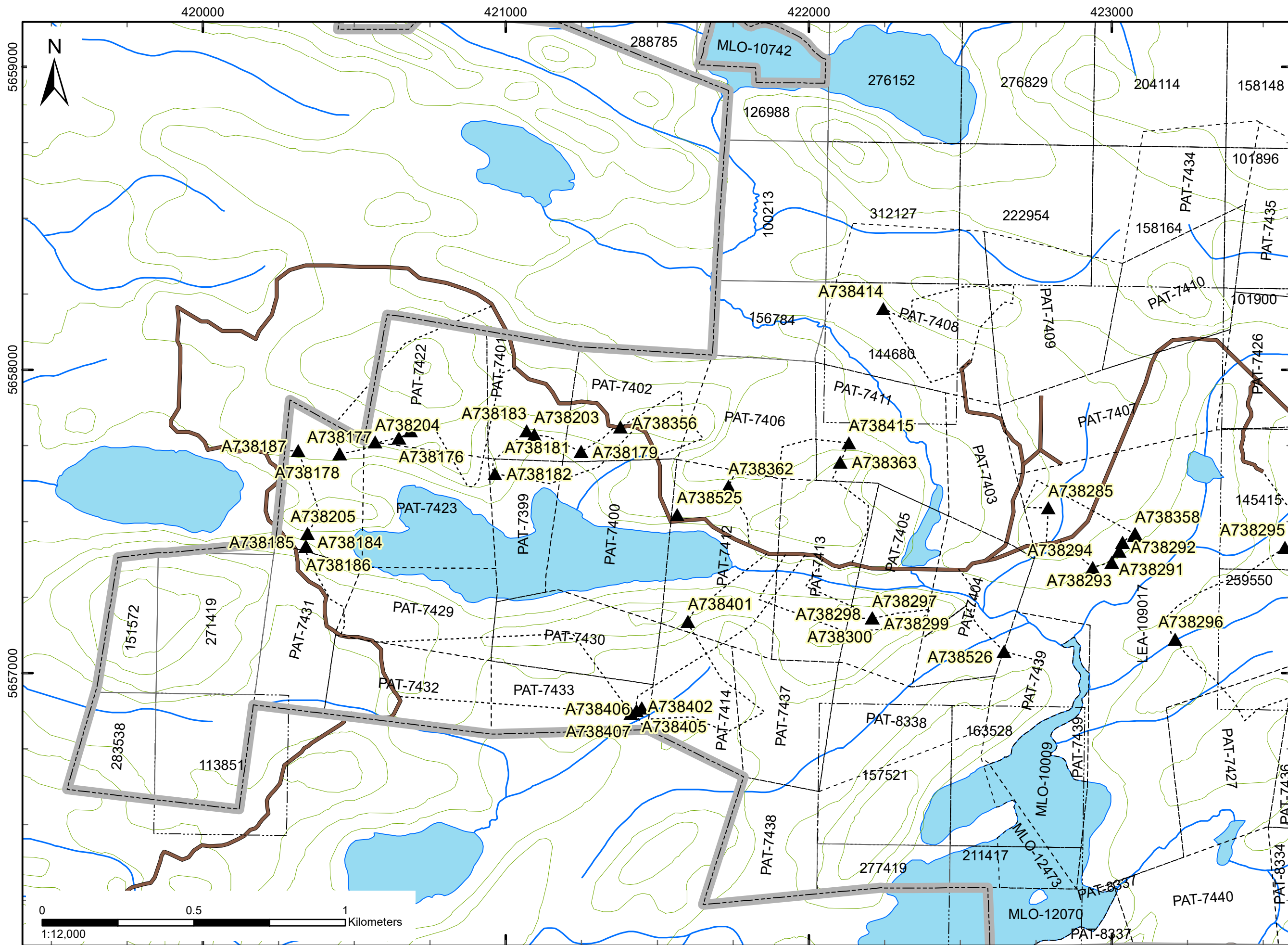
Drawn by: Lydia Calhoun  
January 2020

# West Red Lake

Geologic Map: Western Half of Field Area

Township: Todd, Fairlie  
NAD 1983 UTM Zone 15N





- Legend**
- Townships
  - WRL\_Boundary
  - WRL\_BoundaryCells
  - WRL\_Operational Cell
  - WRL\_Patent
  - Road
  - Elevation Contours
  - Watercourse
  - Waterbody
  - Traverses
  - Samples



Drawn by: Lydia Calhoun  
January 2020

**West Red Lake**  
Sample Locations: Western Half of Field Area

Township: Todd, Fairlie  
NAD 1983 UTM Zone 15N

## **APPENDIX V**

### **Cost Report**



West Red Lake 2018 Expenditure Report

Program	Program Component	Expenditure (CAD)	
1. 2018 Reconnaissance Mapping	Assay Samples	\$	2,217
	Geochem Samples	\$	1,278
	Truck Rentals	\$	2,425
	Fieldwork Time	\$	13,130
	<b>2018 Reconnaissance Mapping Total</b>	\$	<b>19,049</b>
<b>Total West Red Lake Expenditure 2018</b>		\$	<b>19,049</b>