

# **Geological observations and prospectivity;**

## **Illogwa (Donald) prospect**

Summary of the geological field trip conducted  
between Monday, 8<sup>th</sup> to Monday, 15<sup>th</sup> April 2019

Prepared on behalf of Gempart NT

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## ***Introduction***

This report presents a summary of the geological field trip conducted between Monday, 8<sup>th</sup> to Monday, 15<sup>th</sup> April 2019 to explore for a range of commodities at potential targets in three different tenement groups, all located in the southern part of the Northern Territory on behalf of GemPART NT (Figure 1).

The program involved site reconnaissance to assess the prospectivity of the following targets;

**Table 1:** Summary of site visits conducted during the April 2019 field trip;

<b>Project area</b>	<b>Target</b>	<b>Tenements</b>	<b>Details</b>
Claude Hills north	Target 10 (Area 4),	31383 & 25566	Gravity anomaly
Kunapula	Target A&B	31383 & 25566	Radiometric anomaly
Docker River	Target 1	27581 & 31531	Track reconnaissance
Docker River	Target 2	EL31978	Potential Ni-Co targets
Docker River	Cu workings (West prospect)	27581	Map/sample historic workings
Docker River	Target 4;	EL31516	Radiometric target
Docker River	Target 4;	EL31516	Map/sample historic workings
Illogwa	Donald target	EL31251	Gravity anomaly

## ***Method***

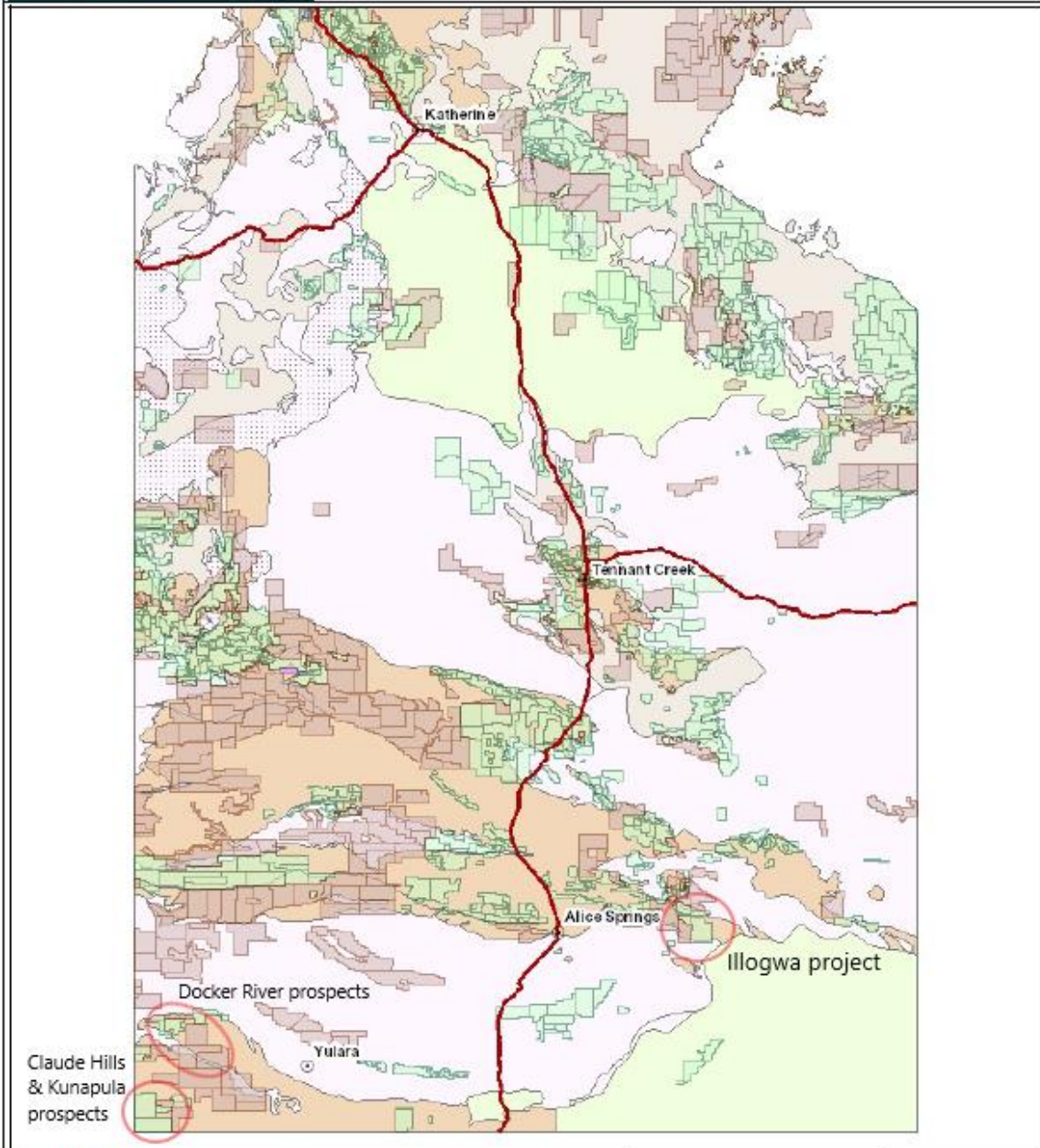
Field work conducted was preliminary by nature, and involved a site reconnaissance being conducted at each prospect area with geological mapping, and selective rock chip sampling and/or testing of the outcrop exposure by hand-held pXRF analysis. Surveys of radiometric target areas were conducted using a hand-held spectrometer

A summary of maximum values at the Donald prospect determined by the pXRF analysis is presented in Table 2.

All geological mapping observations were uploaded onto an excel spreadsheet at the conclusion of the field program (Table 3). Selected rock chip samples were submitted to a commercial laboratory for analysis at the conclusion of the field program with results unavailable by the completion of this report.

All pXRF readings were conducted using a Bruker hand-held pXRF analyser (model S1 Titan-Tracer 5) with the instrument set to Soils mode, 60 second read time.

All spectrometer surveys were conducted using a hand-held Exploranium Mini-SPEC (model GR130) set to survey mode to monitor the total radiometric count which assisted with determining the extent of each radiometric anomaly.



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**Figure 1:** Location of GemPART NT tenements; Claude Hills north, Kunapula, Docker River and Illogwa projects, Northern Territory

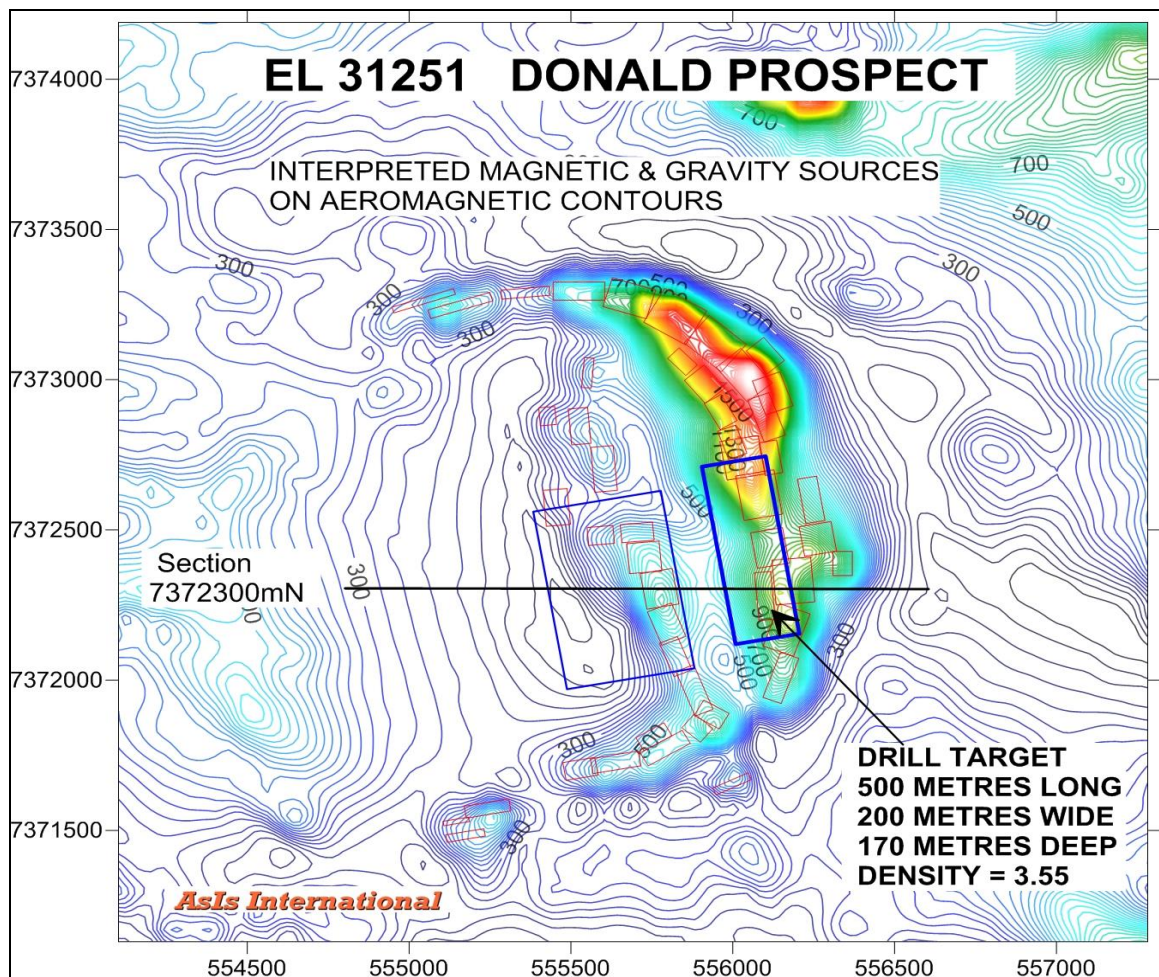
### Area#3: Illogwa project, Alice Springs area

The final reconnaissance for GemPART's April 2019 field program was conducted on Monday, 15<sup>th</sup> April 2019 to investigate the Donald geophysical prospect, which is located on Numery pastoral station.

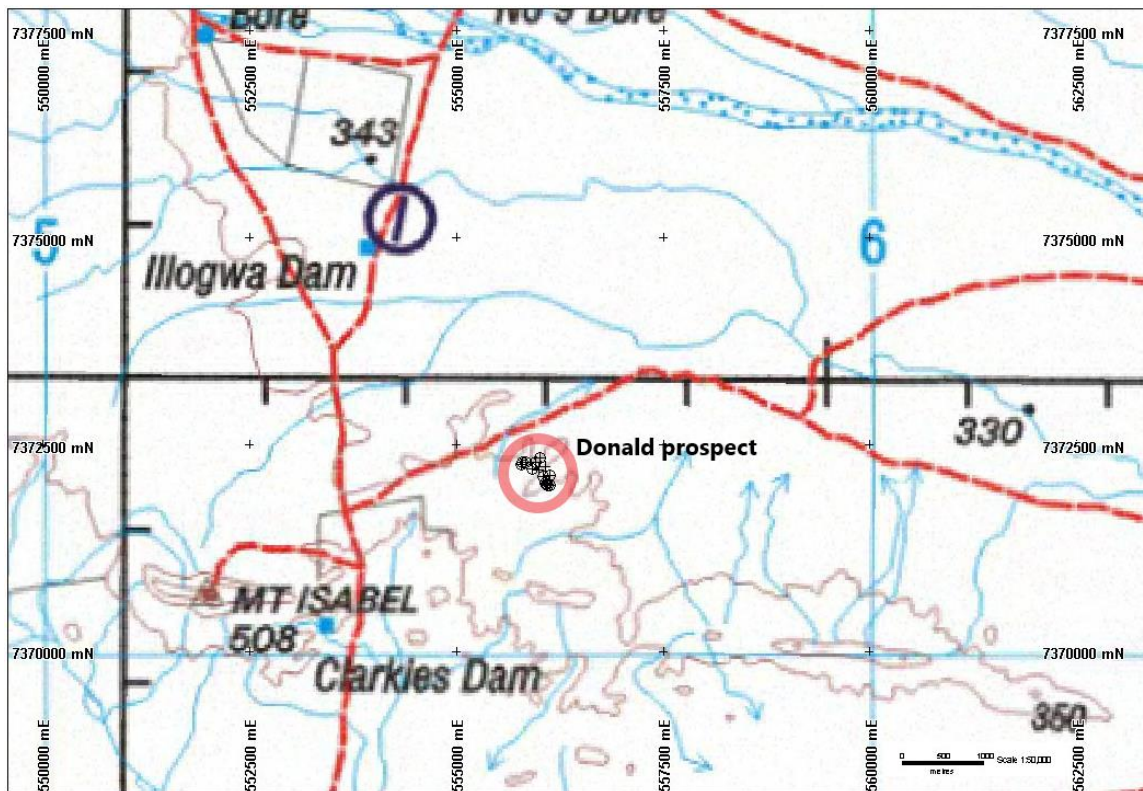
#### **Donald target, Illogwa project (EL31251)**

The Illogwa project is located on Numery pastoral station approximately 100km east, south-east of Alice Springs and was subject to an earlier site visit during the previous field program conducted in April 2018. The same access route was followed which ran adjacent to the Donald prospect, a large (+ve) gravity anomaly located at 556000mE, 7372200mN based on the interpretation of a recent gravity survey program conducted in the area by Atlas Geophysical on behalf of GemPART NT (Figure 15).

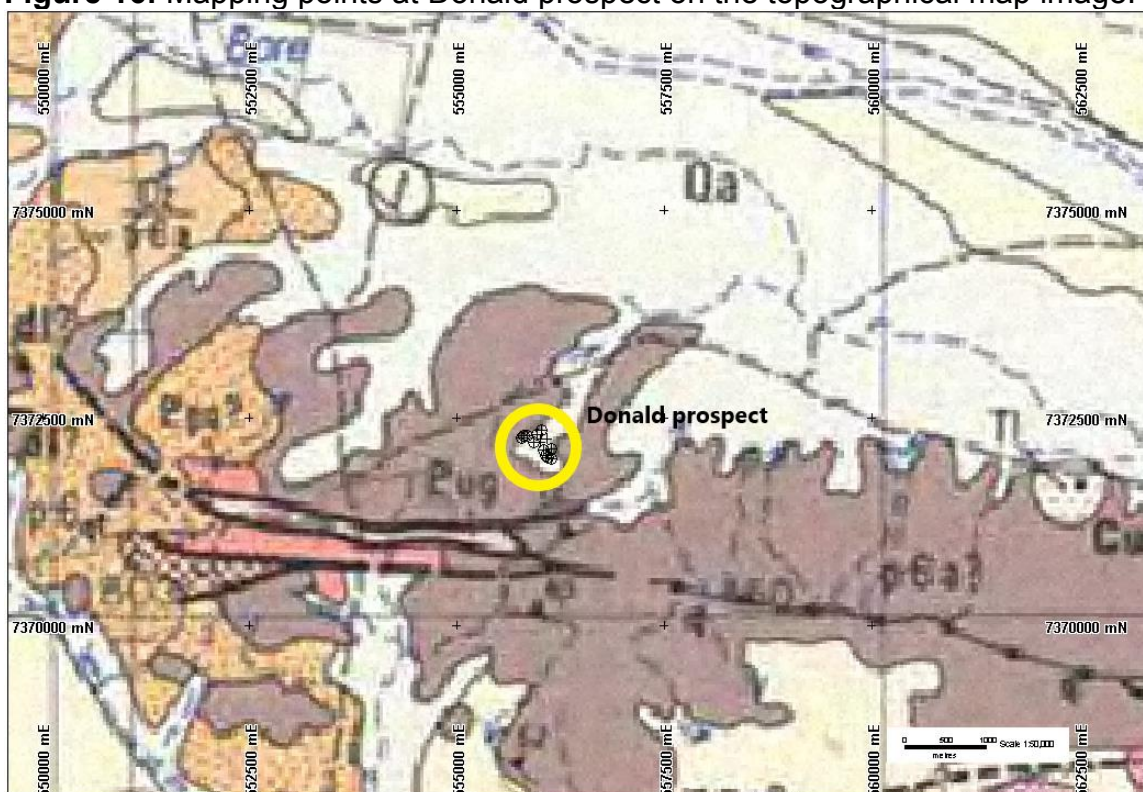
The Donald prospect was interpreted to be an intrusion of either mafic or ultramafic lithology which has the potential to host nickel/cobalt along with base-metals based on the interpretation by Bubner (2018).



**Figure 15:** Donald prospect, based on the interpretation of gravity survey data by Bubner (2018).



**Figure 16:** Mapping points at Donald prospect on the topographical map image.



**Figure 17:** Location of Donald prospect overlain on geological map image

From the station track, a traverse was conducted cross-country towards the east for several kilometres through undulating landscape, comprising open gravel-covered plains and more heavily vegetated gravel-capped outcrop rises for about 2kilometres to the crest of a prominent gravel-capped hill on the western flank of the target area at 555779mE, 7372761mN.

Geological mapping and pXRF testing of sub-crop were first conducted in the immediate area prior to starting a broader field traverse on-foot (Plates 40&42).

Here, dolerite sub-crop was mapped (Plate 41), adjacent to granite with aplite and pegmatite textures and scattered epidote-altered gravels with testing by pXRF confirming a maximum of; 73ppm Cu, 52ppm Zn, 138ppm V, 44ppm Cr, 35ppm Co and 756ppm S. No nickel values >detection limit where confirmed however. Further east, granite was mapped at 555923mE, 7372209mN with a high K-feldspar content (2.12% K) determined from pXRF testing of this outcrop.

The traverse crossed a NNE/SSW-trending creek-line which was interpreted as an underlying fault that truncated the broader Donald target area. Geological mapping identified dolerite sub-crop, with strong epidote alteration and quartz veining at 556044mE, 7372110mN on the eastern edge of the next rise with testing by pXRF identifying a maximum of; 44ppm Cu, 4ppm Pb, 62ppm Zn, 183ppm V, 41ppm Cr and 9ppm Co with no nickel values >detection limit confirmed.

The traverse continued to the crest and identified a small dolerite outcrop in contact with a quartz pegmatite at 556074mE, 7372043mN with visible sulphide being identified by hand lens within some of the rock chip samples examined. Testing by pXRF identified a maximum of; 193ppm Cu, 42ppm Zn, 116ppm V, 206ppm Cr, 97ppm Ni, 87ppm Co with a rock chip sample being collected for geochemical analysis.

Further east, dolerite or gabbro was mapped at 556092mE, 7372018mN and at 556099mE, 7372014mN and follow-up testing by pXRF confirmed a maximum of; 46ppm Zn, 108ppm V, 36ppm Ni, 19ppm Co, but no copper or lead values >detection where confirmed.

The traverse then headed towards the north, with dolerite sub-crop mapped at 556135mE, 7372008mN, and at 556130mE, 7372132mN. Testing by pXRF identified a maximum of; 23ppm Cu, 21ppm Pb, 53ppm Zn, 156ppm V, 24ppm Cr, 21ppm Co and 276ppm S, but no nickel values >detection were confirmed.

The traverse crossed the same creek line (NNE/SSW-trending fault) at 556079mE, 7372242mN. The traverse then heading west back towards the field vehicles with the first outcrop exposure, comprising of dolerite within a broader pegmatitic zone being mapped at 556010mE, 7372345mN and also 50metres further west at 555955mE, 7372293mN. Testing of both outcrops by pXRF



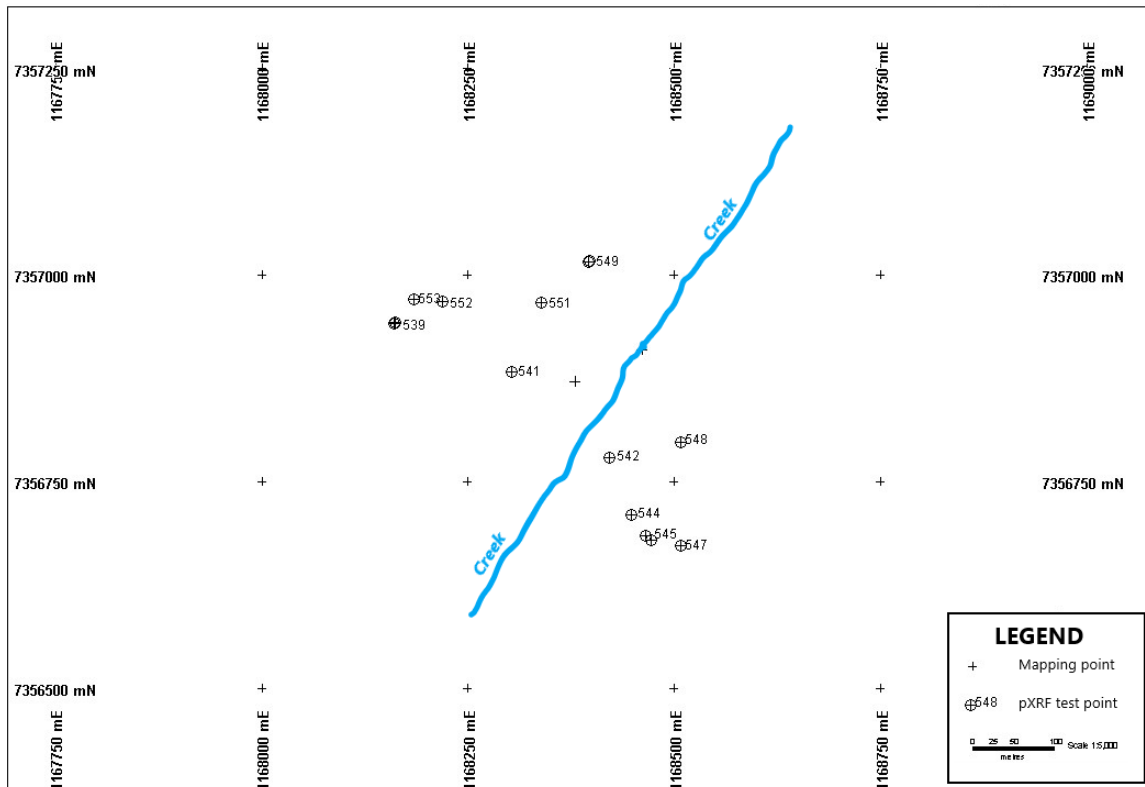
**Plates 40&41:** Start of site traverse, Donald prospect (left); outcrop of mafic intrusive at 555777mE, 7372262mN (right).



**Plate 42:** Testing of mafic outcrop at Donald prospect using the Bruker pXRF.

identifying a maximum of; 42ppm Pb, 140ppm Zn, 73ppm V, 33ppm Cr and 43ppm Co with no copper or nickel values >detection limit confirmed.

The final two dolerite exposures examined for this reconnaissance were mapped near to the start point of the survey near to where the field vehicles were parked at 555836mE, 7372290mN and 555801mE, 7372291mN with testing by pXRF identifying a maximum of; 28ppm Pb, 68ppm Zn, 73ppm V, 58ppm Cr, 27ppm Ni and 23ppm Co with no copper values >detection limit confirmed.

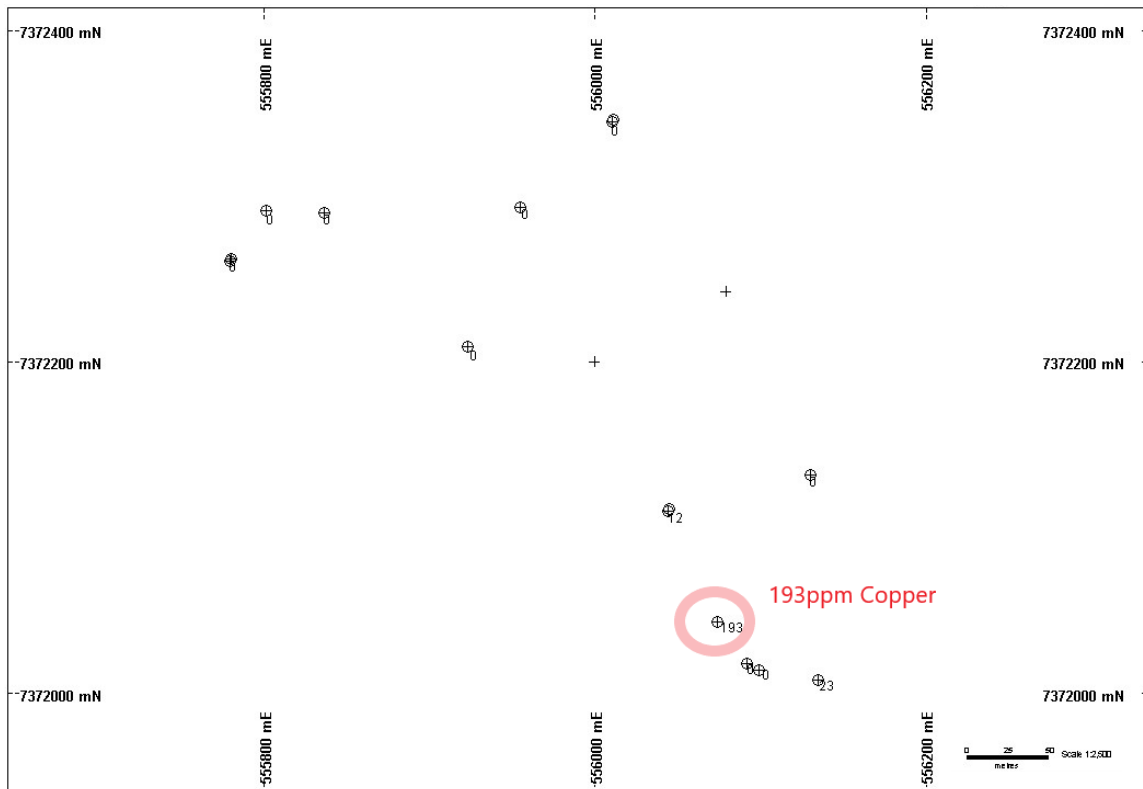


**Figure 18:** Mapping and pXRF test locations at Donald prospect.

### **Discussion**

The field traverse conducted at the Donald prospect identified dolerite and lesser gabbro in subcrop, which was in contact with granite with pegmatitic and aplitic textures. Testing of sub-crop samples using the pXRF identified potentially anomalous values for copper (maximum of 193ppm), lead (42ppm) and zinc (maximum of 140ppm) and sulphur (maximum of 756ppm), along with a range of other elements including; phosphorus, vanadium, chromium, nickel and cobalt.

A review of the pXRF results for copper identified a localised anomaly (193ppm Cu) in the south-east of the survey area which corresponded to the outcrop where traces of sulphide (chalcopyrite?) were identified within a single rock chip sample of dolerite in contact with a quartz pegmatite (near to the centre of the geophysical anomaly at 556074mE, 7372043mN). Lead and zinc (>detection values) were more widespread by comparison. Nickel and cobalt concentrations



**Figure 19:** Plot of copper values (ppm) from pXRF testing. Lead and zinc values exhibit a broader distribution across the prospect area.

were all <100ppm with cobalt being detected to be more widespread.

A fault was interpreted to underlie a creek-line, mapped along a NNW/SSE-strike trend that truncated the target area and was also interpreted to correlate with disruptions in the gravity anomaly which suggests a dislocation of the underlying geology.

Field work completed at the Donald prospect has identified prospectivity for copper, base-metals as well as other elements. Further exploration is recommended to confirm the source of the geophysical anomaly and to investigate potential for economic mineralisation to occur at depth in association with the geophysical anomaly.

**Table 2:** Summary of maximum pXRF results (Donald target)

Element	Donald target 15 pXRF readings	
	No reads >detn	Max value
Magnesium	11	2.33%
Aluminium	15	14.5%
Silicon	15	38.0%
Phosphorus	5	0.15%
Sulphur	3	756ppm
Potassium	15	2.12%
Calcium	15	3.75%
Titanium	15	0.56%
Vanadium	14	183ppm
Chromium	11	206ppm
Manganese	14	1.04%
Iron	15	13.5%
Cobalt	14	87ppm
Nickel	3	97ppm
Copper	5	193ppm
Zinc	14	140ppm
Gallium	2	29ppm
Arsenic	10	9ppm
Selenium	1	1ppm
Rubidium	9	161ppm
Strontium	15	410ppm
Yttrium	2	25ppm
Zirconium	4	204ppm
Niobium	9	14ppm
Molybdenum	2	16ppm
Silver	0	< detn
Cadmium	0	< detn
Tin	0	< detn
Antimony	0	< detn
Caesium	0	< detn
Barium	10	551ppm
Cerium	14	146ppm
Ta2O5	2	54ppm
Lead	7	42ppm
Bismuth	0	< detn
Thorium	11	9ppm
Uranium	2	4ppm

**Table 3: Mapping points, Numery project**

Pt	Easting	Northing	pXRF read	Description	Date
1	556000	7372200		Dolerite, granite. Centre of gravity anomaly	15/04/2019
2	555779	7372261	539	Dolerite (epidote altered), granite/aplite, scattered gravels	15/04/2019
3	555780	7372262	540	Dolerite, coarse-grained with haematite matrix	15/04/2019
4	555923	7372209	541	Granite	15/04/2019
5	556044	7372110	542	Dolerite (epidote altered), thin quartz veining. Crest of outcrop rise, pegmatite and scattered quartz gravels	15/04/2019
6	556074	7372043	544	Dolerite, coarse-grained, with visible coarse sulphides (cpy?). Small dolerite outcrop on edge of deflation surface (quartz pegmatite gravels)	15/04/2019
7	556092	7372018	545	Dolerite, coarse-grained	15/04/2019
8	556099	7372014	546	Dolerite	15/04/2019
9	556135	7372008	547	Dolerite	15/04/2019
10	556130	7372132	548	Dolerite	15/04/2019
11	556079	7372242		Creek line (sandy) passing through target area. Fault zone? strikes NNE/SSW	15/04/2019
12	556010	7372345	549	Dolerite sub-crop with pegmatite	15/04/2019
13	555955	7372293	551	Dolerite sub-crop with pegmatite	15/04/2019
14	555836	7372290	552	Dolerite sub-crop with pegmatite	15/04/2019
15	555801	7372291	553	Dolerite sub-crop with pegmatite	15/04/2019