

**BULGOBAC RIVER  
(LAKE MACKINTOSH GROUP)  
TASMANIA  
EL24/2004**

**ANNUAL PROGRESS REPORT  
30<sup>TH</sup> JULY 2010 TO 29<sup>TH</sup> JULY 2011**

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**Distribution:**

Mineral Resources Tasmania  
Bass Metals Ltd

**Note: All figures and grids are according to the GDA94, Zone 55 datum, unless otherwise stated**

**Disclaimer**

The conclusions and recommendations expressed in this report / table represent the opinions of the Authors based upon the data available and provided to them. The opinions and recommendations provided from this information are in response to a request from the client and no liability is accepted for commercial decisions or actions resulting from them.

**BULGOBAC RIVER PROJECT  
TASMANIA  
EL24/2004**

**ANNUAL PROGRESS REPORT  
30<sup>TH</sup> JUNE 2010 TO 29<sup>TH</sup> JUNE 2011**

**EXECUTIVE SUMMARY**

Bass Metals Ltd (BSM) commenced management of the Bulgobac River exploration licence (EL24/2004) on 30 July 2005. Exploration conducted on the licence during the 7<sup>th</sup> year of tenure year ended 29<sup>th</sup> June 2011 has included:

- Compilation of 9 targets identified from previous year using SWIR and multi element geochemistry.

**Expenditure –** Reporting period \$13,195.45  
Total to date \$358,935.49

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## **1. INTRODUCTION**

**This report is a summary of the exploration activities conducted on the Bulgobac River exploration licence EL24/2004, for the period of 30th June 2010 to 29th June 2011.**

### **1.1 Tenure**

Initially covering 20.6km<sup>2</sup> and situated on the western side of the Murchison Highway this tenement was granted to Pasminco during January 1995. A 50% statutory relinquishment was carried out on 6<sup>th</sup> January 2001 reducing the licence to 32km<sup>2</sup>.

The licence is located in Tasmania's northwest and was acquired as part of a package of tenements in the Hellyer-Que River area from Intec Ltd during March 2005. To date this tenement has remained at 32km<sup>2</sup>, and had had one 12 month extension approved (2009/2010).

The licence area excludes mining lease CML 103M/1987 held by Bass Metals Ltd. The Bulgobac River licence comprises:

- CAR Reserve System Informal Reserve
- Land vested to Hydro Electric Corporation Land
- Reynolds Falls Nature Recreation Area
- Private Property
- State/Multiple Use Forest

### **1.2 Location & Access**

The tenement is located 13 to 23 km's north-northeast of the township of Tullah, on the west coast of Tasmania (Figure 1). Access to the area is via the Murchison Highway or the Cradle Mountain Development road and tracks which access the 220kv transmission lines which traverse the area. Access within the tenement is via a limited number of 4wd tracks and ATV-only tracks.

The licence area can be found on the Charter (#3839) 1:25,000 map sheet and the Sophia (#8014) 1:100,000 map sheet.

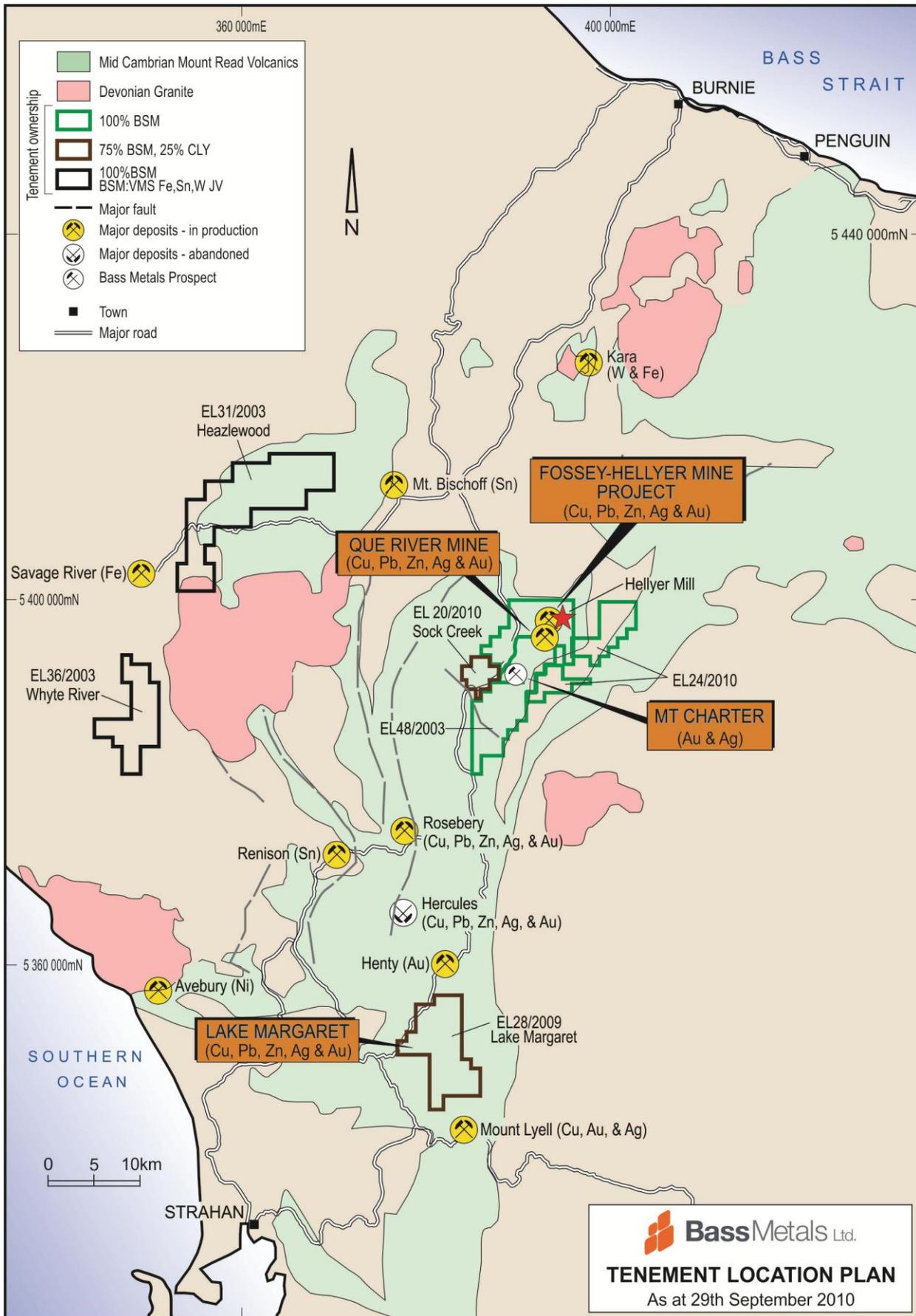


Figure 1. Bulgobac River Exploration Licence (EL24/2004) location map

### **1.3 Geology Overview**

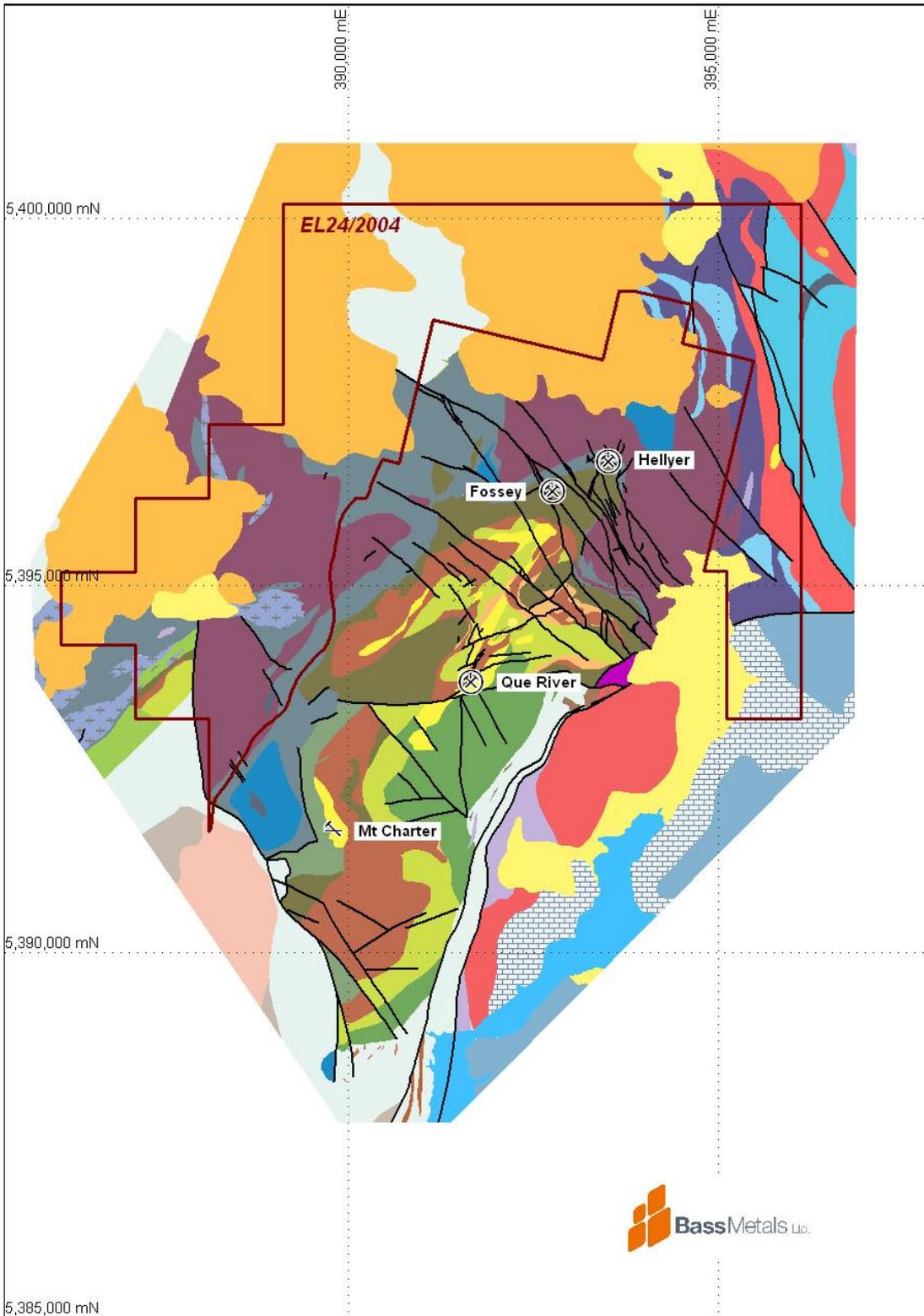
The prospective rocks in EL 24/2004 are from the Que-Hellyer Volcanics, a package of dominantly mafic to intermediate volcanic, near the top of the Middle Cambrian Mt Read Volcanics (see figures 2, 3, 5 and 6).

The Mt Read Volcanics are a belt of calc-alkaline volcanics which extend from Elliott Bay on Tasmania's west coast around to Deloraine in the central north (see figure 1) and host a number of volcanic hosted massive sulphide and precious metal deposits including the world class Rosebery, Mt Lyell and Hellyer deposits (figure 1).

The Bulgobac River area is prospective for similar deposits and it is this style of mineralisation which has been the target for exploration within the area.

In the northern and westernmost parts of the licence the Mt Read Volcanics are unconformably overlain by a relatively thin veneer of Tertiary basalt and gravels. There are also some minor areas overlain by Quaternary alluvium. The other (approximately) half of the licence covers outcropping Mt Read Volcanics from units (predominantly Southwell Sub-Group and Que River Shale) stratigraphically higher than the prospective Que-Hellyer Volcanics..

The exception to this is ~1km<sup>2</sup> area on the western part of the licence on the western side of the Mt Charter Fault where a relatively thinned sequence of Que-Hellyer Volcanics outcrop.



**Figure 2. Regional Geology Map (legend is in figure 3 on following page)**



## **1.4 Exploration Philosophy**

Bass Metals Ltd is targeting polymetallic VMS or hybrid associated precious metal deposits in the Que-Hellyer Volcanics.

The prospective Que-Hellyer Volcanics underlie younger cover rocks to varying depths over the whole of the licence area. In areas where the cover rocks are Que River Shale the depth to prospective stratigraphy is a few hundred metres at most. In areas where the Southwell Sub-Group is the outcropping cover rocks this depth can exceed 1km.

Exploration on the tenement to date has been driven by EM or conceptual deep drilling at combined structural and/or geophysical (gravity/magnetic) targets.

Bass Metals Ltd has recently completed a systematic lithogeochemical and Short Wavelength Infra-Red study of the "footwall" part (see discussion in section 3.2.1) of the Que-Hellyer Volcanics stratigraphy in order to determine whether drilling to date has been proximal, medial or distal to VMS and/or hybrid forming hydrothermal systems.

Subsequent exploration will require deep diamond drilling and will probably also incorporate the use of structural and/or geophysical concepts.

## **2. EXPLORATION HISTORY**

Previous exploration over EL 24/2004 has been summarised by Bates (2009), McNeill et al. (1997) and Anon (1986) and will not be repeated here.

## **3.WORK DONE/RESULTS DURING PREVIOUS REPORTING PERIOD**

**(30<sup>th</sup> June 2009 to 29<sup>th</sup> June 2010) Bass Metals Ltd.**

### **3.1 Introduction**

EL 24/2004 Bulgobac River is one licence of a series of contiguous exploration licences and mining leases containing Bass's Que River/Hellyer/Fossey active mining operations. Exploration over this landholding was largely carried out in conjunction with work on the whole project which is referred to as the Lake Mackintosh Group.

In 2009/2010 Bass carried out a number of systematic programmes over the tenements in the area under the banner of the HMCC (Hellyer-Mt Charter) project.

In particular this work consisted of:

1. Trace element lithogeochemical and Short Wavelength Infra-Red spectral analysis of existing diamond drillcore from rocks from the "footwall" part of the host sequence. Existing soil data (not in EL24/2004) was also interpreted on the basis of the results from the drill core.
2. Compilation and appraisal of existing geophysical (Ground EM, magnetic, gravity) datasets with further processing (inversion) of existing IP data.
3. 88.3 line kilometre helicopter-borne VTEM survey, processing and interpretation.

## **3.2 Trace element lithogeochemistry/SWIR**

### **3.2.1 Methodologies**

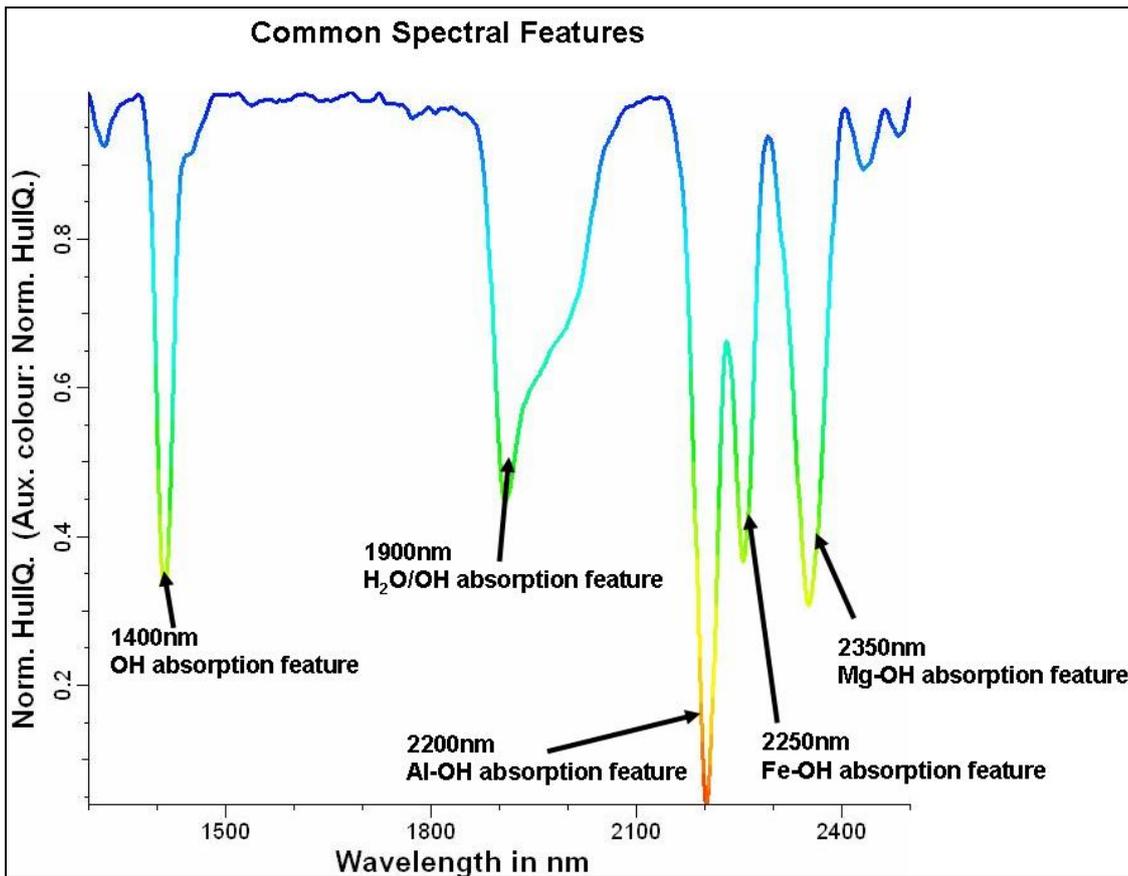
The Mt Block exploration licence is included in the Hellyer-Mt Charter Corridor (HMCC) project which also covers EL24/2004 Bulgobac River, RL11//1997 Mt Charter, EL24/2007 Southwell River, CML103M/1987 Hellyer Mining Lease and ML68M/1984 Que River Mining Lease.

Recent developments in understanding hydrothermally generated ore deposits and in particular the hydrothermal alteration spatially associated with these deposits has shown that there is considerably greater variation, and in particular spatial distribution (zonation), of alteration mineralogies than that recognisable by even the well trained geological eye.

One feature which allows the differentiation of these variations is the short wavelength infra-red spectra generated by bombarding particular bonds in the alteration minerals. These spectra are diagnostic for a range of important common alteration minerals, and particular the phyllosilicates.

The ASD (A Spectral Device) used in the SWIR spectral sampling measures reflected light in the short wavelength infrared region of the light spectrum between 350 and 2500 nanometres. In this range, a number of chemical bonds in minerals absorb energy corresponding to particular wavelengths of light, giving rise to reflectance profiles with sharp dips at those particular wavelengths. In the SWIR range, the absorption features are due to water, hydroxyl bonds, carbonates and sulphates. Sericite has an Al-OH absorption feature at about 2200nm, a broad asymmetric H<sub>2</sub>O/OH feature at 1900nm, and an OH feature at 1400nm (Figure 1). Chlorite has a Fe-OH absorption feature at about 2250nm, an Mg-OH absorption feature at about 2350nm, a broad asymmetric H<sub>2</sub>O/OH feature at 2000nm, and an OH feature at 1400nm.

These variations in the Fe, Mg and Al content of alteration minerals such as sericite and chlorite (and other elements in other alteration minerals) reflect subtle differences in the physiochemical conditions (factors such as pH and fO<sub>2</sub>) at the time and place of formation of the mineral which may define spatial patterns in hydrothermal alteration zones.



**Figure 4. Example of a short wavelength infra-red spectra with the diagnostic peaks illustrated**

Another feature which may be diagnostic is the levels of certain trace elements contained within alteration minerals/assemblages. The determination of trace elements requires low level detection analysis which has been made affordable by developments in ICPMS and ICPOES methodologies.

Whilst there are generally commonly recognisable themes in terms of alteration mineralogies and their spatial distribution between ore deposits, particularly those of a certain style, there are also commonly differences. For this reason Bass chose an empirical approach by initially applying the chosen methodologies to the rocks spatially associated with the known ore deposits of Que River, Hellyer and Fossey as well as the currently marginally sub-economic mineralisation at Mt Charter. The results from this work allowed Bass to “fingerprint” the alteration associated with these four deposits before applying the same methodologies elsewhere. The northern half of EL 48/2003 was a significant focus of this latter work.

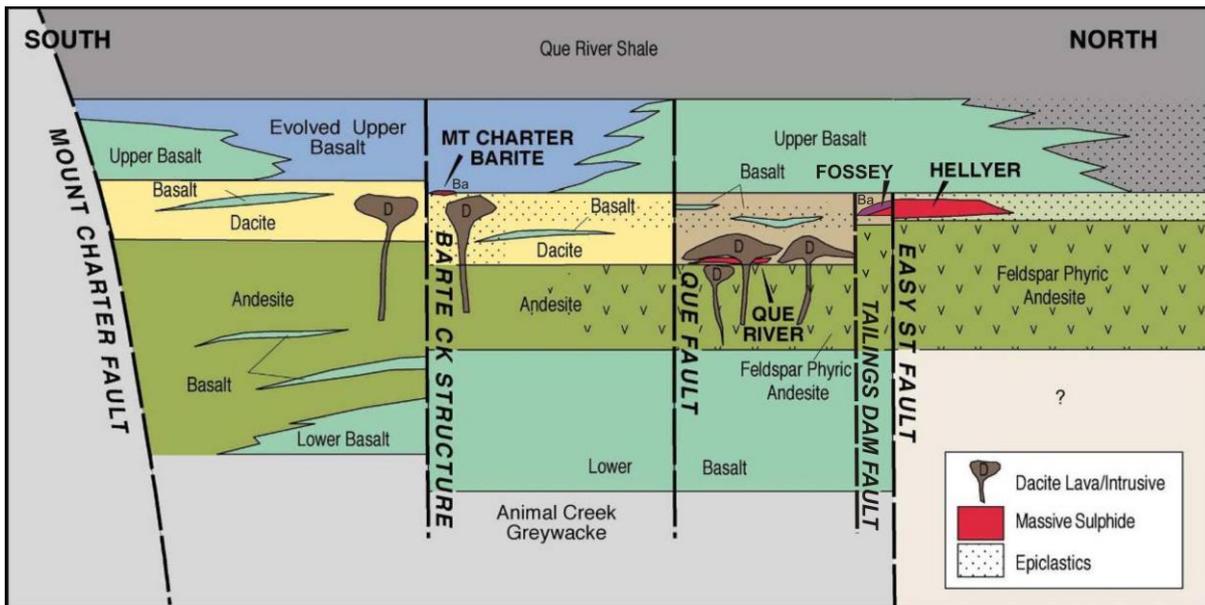
The ore deposits listed above are all considered to be of VMS style with Mt Charter mineralisation considered to be spatially and genetically associated with VMS style mineralisation. Such deposits form on or beneath the seafloor (shallowly i.e. generally some 10’s of metres though arguably up to some 100’s of metres) by ascending hydrothermally fluids. For this reason hydrothermal alteration most commonly occurs in the rocks below or around the ore deposit (referred to as the “footwall”) and more commonly not in the overlying (younger) rocks (referred to as the “hangingwall”). The exceptions to this are in those deposits where the hydrothermal fluid activity continued after the deposition of the ore.

Both the definitions of the hangingwall and footwall, and the presence and/or significance of alteration in the hangingwall rocks in parts of the HMCC, are somewhat problematic for the application of trace element and SWIR sampling away from the known ore deposits.

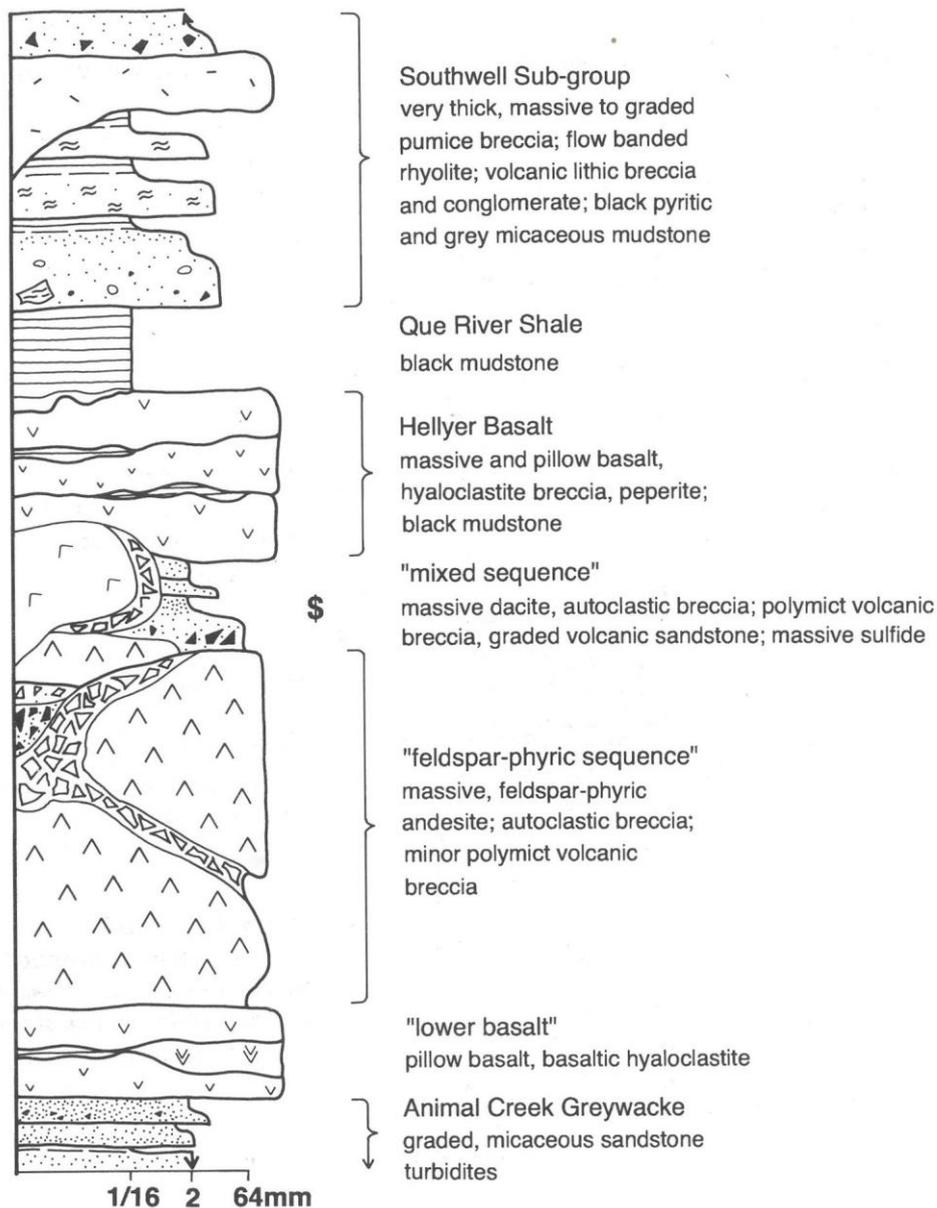
Firstly, the known ore deposits do not all occur on the same easily recognisable stratigraphic horizon (see summaries in figures 5 and 6). The Hellyer orebody is commonly described as

immediately underlying a thin unit of polymict volcanoclastic rocks (Hellyer Volcanoclastic Sequence) which itself underlies the Hellyer (also referred to as Upper) Basalt in the Hellyer area. The polymict clastic and Hellyer orebodies overlie rocks commonly referred to as Feldspar Phyrlic Andesite. However, during the “fingerprinting” phase of the sampling it became clear that the hangingwall basalt unit also includes rocks best described as andesites and the Feldspar Phyrlic Andesite unit in the footwall also contains basalts. The Fossey deposit is considered to occupy the same stratigraphic position as Hellyer.

In contrast the Que River ore deposit is overlain by a relatively thick (some 100’s of metres) of polymict volcanoclastics and coherent and clastic dacites referred to as the Mixed Sequence which is overlain by the Hellyer (Upper) Basalt.



**Figure 5. Schematic south-north long section showing relative stratigraphic settings of Mt Charter, Que River, Fossey and Hellyer**



**Figure 6. Stratigraphic column in Hellyer-Mt Charter area. Note that in the Que River and Mt Charter areas the 'mixed sequence' is markedly thicker than at Hellyer (after McPhie *et al.* 1993).**

Mt Charter mineralisation is in the form of barite+sulphide stringer style veins cross-cutting outcropping altered Mixed Sequence rocks with the hangingwall Basalt unit removed by erosion.

The sampling protocol chosen was to sample all drillcore which intersected rocks from the footwall and/or Mixed Sequence and to extend sampling ~50m (uphole distance) into the hangingwall Hellyer Basalt unit. Data from this sampling was grouped into the three categories, Hangingwall, Mixed Sequence and Footwall though really the only clear distinction was between Hangingwall and the other two categories.

Trace element lithogeochemical sample were collected on nominal 15 to 20 metre spacings though in recognisably altered sections sample spacing were closed up to nominal 10 metres spacings. SWIR spectral data was collected every 1 metre with the trace element lithogeochemical samples also analysed by SWIR.

All samples were analysed by AMDEL's laboratory in Adelaide using ICPMS and ICPOES for a suite of 46 elements (listed in table 1). A number of elements were analysed using both methodologies but only that methodology with the better detection limit was reported.

**Table 1 Trace elements analysed, analytical method and detection limits**

Method	Element	Lower d.l. (ppm)	Upper d.l. (ppm)
ICPMS	Ag	0.1	20
(AMDEL's IC3M)	Cd	0.1	1000
	Cs	0.1	1000
	In	0.5	1000
	Ta	0.5	
	U	0.1	1000
	Zr	0.5	1000
	La	0.5	1000
	Se	0.5	1000
	Te	0.2	1000
	Y	0.1	1000
	Be	0.5	
	Ce	0.5	1000
	Ga	0.1	1000
	Mo	0.1	2000
	Rb	0.1	1000
	Th	0.1	1000
	W	0.5	100
	Bi	0.1	500
	Co	0.2	2000
	Hf	1	10000
	Nb	0.5	1000
	Sb	0.5	2000
	Sn	0.1	99999
	Tl	0.1	1000
ICPOES	Fe	100	
(AMDEL's IC3E)	Mn	5	
	Ni	2	10000
	V	2	10000
	Al	10	100000
	K	10	20000
	P	10	20000
	Sc	2	100000
	As	3	10000
	Ca	10	
	Cr	2	
	Li	2	10000
	Na	10	100000
	Pb	5	5000
	Sr	2	10000
	Zn	2	10000
	Ba	10	10000
	Cu	2	20000
	Mg	10	100000
	S	50	
	Ti	10	10000

### 3.2.2 Results

Firstly, the “fingerprinting” study of alteration beneath and around Hellyer, Que River, Fossey and Mt Charter (all outside of EL48/2003) showed coherent patterns in a number of trace elements. In particular proximal alteration is characterised by

- elevated As, Sb and TI (with As defining a broader halo, Sb and TI tighter),
- sodium depleted sericite +/- chlorite alteration,
- K feldspar’s presence in alteration assemblages
- elevated sulphur (pyrite).

Therefore the aim of subsequent sampling away from these deposits (and including EL48/2003) was to locate other areas with these indicators in footwall or host sequence rocks.

A total of 122 lithogeochemical samples and 2291 SWIR spectra were collected in EL 24/2004.

The full data set is from the SWIR spectral and trace element lithogeochemical sampling work was included as a spreadsheet in appendix A in the reporting period ending 29 June 2010.

These results are illustrated only graphically in figures 7 (“*Alteration*”), 8 (“*Sericite\_Composition*”) and 9 (“*As*”).

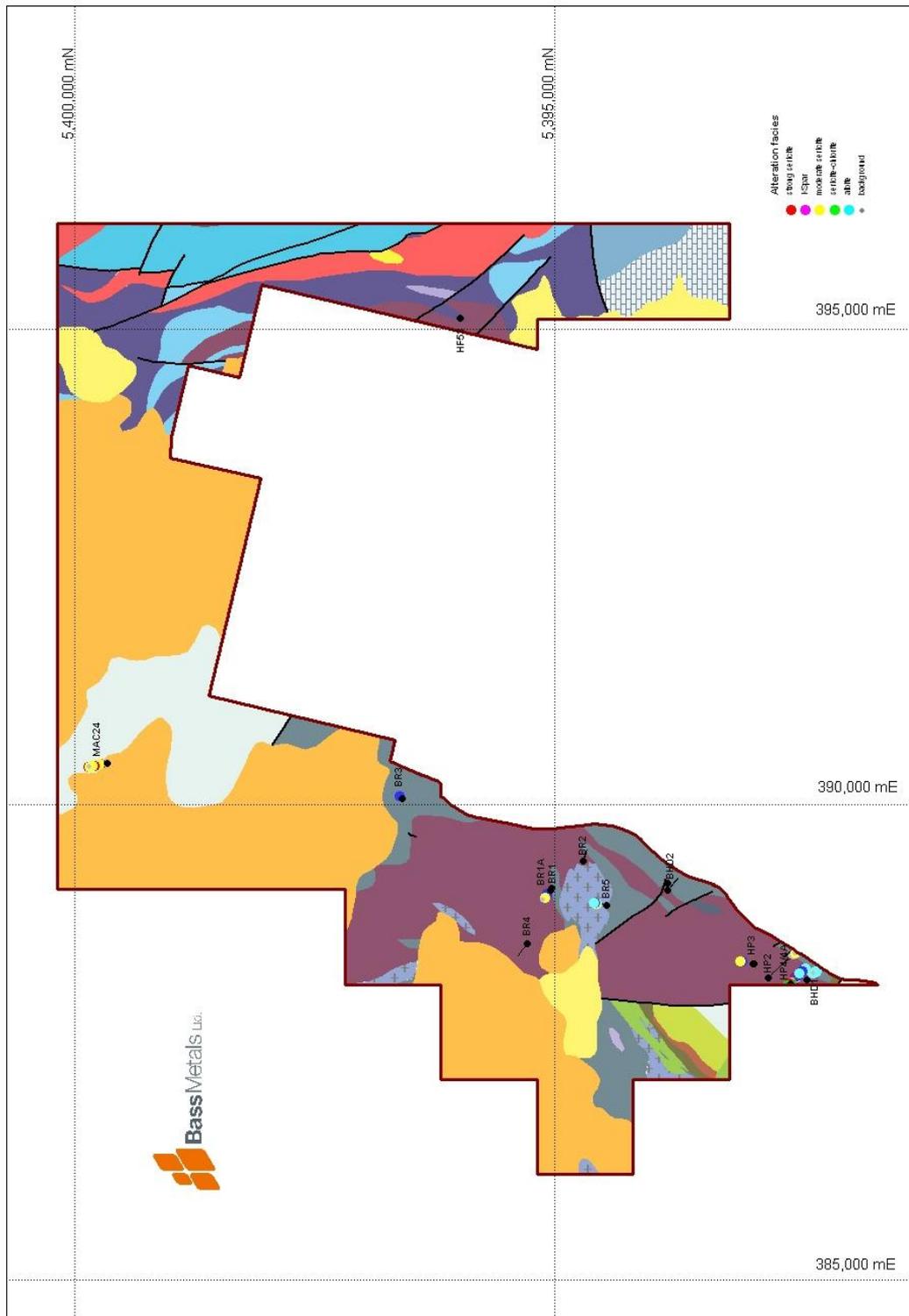
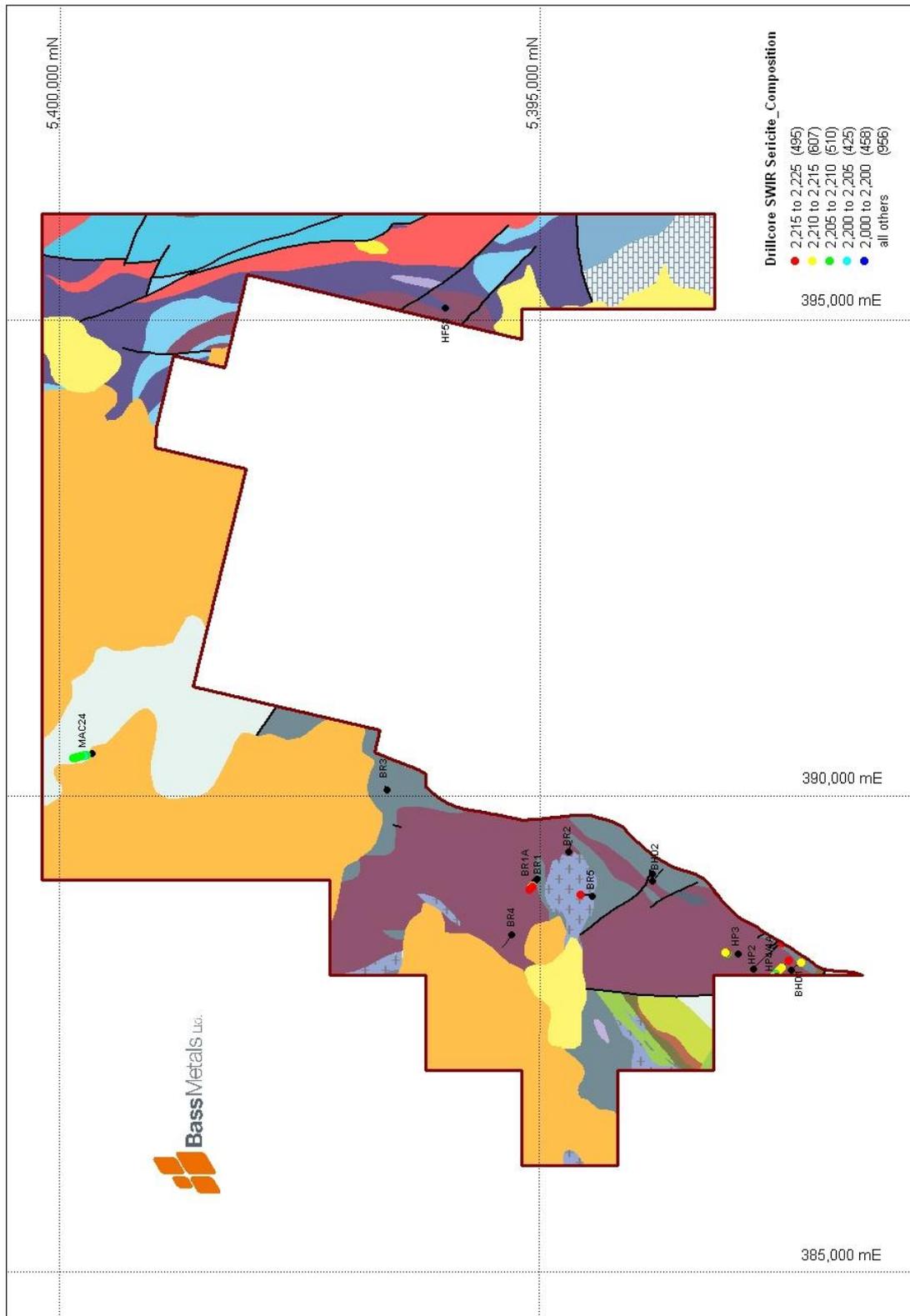


Figure 7. Alteration facies for drillcore samples (= “Alteration” column in appendix A)



**Figure 8. Sericite composition for drillcore samples**

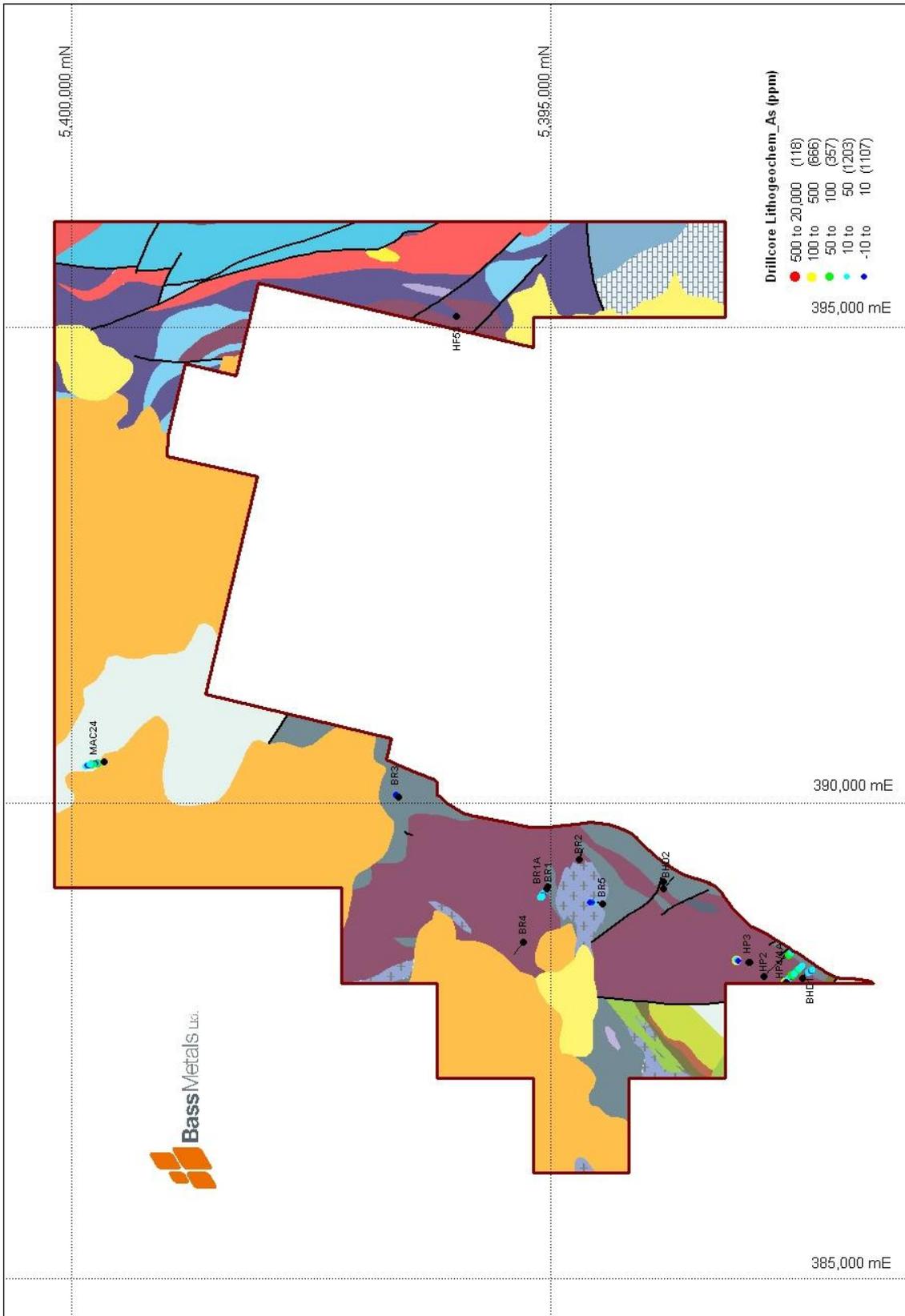
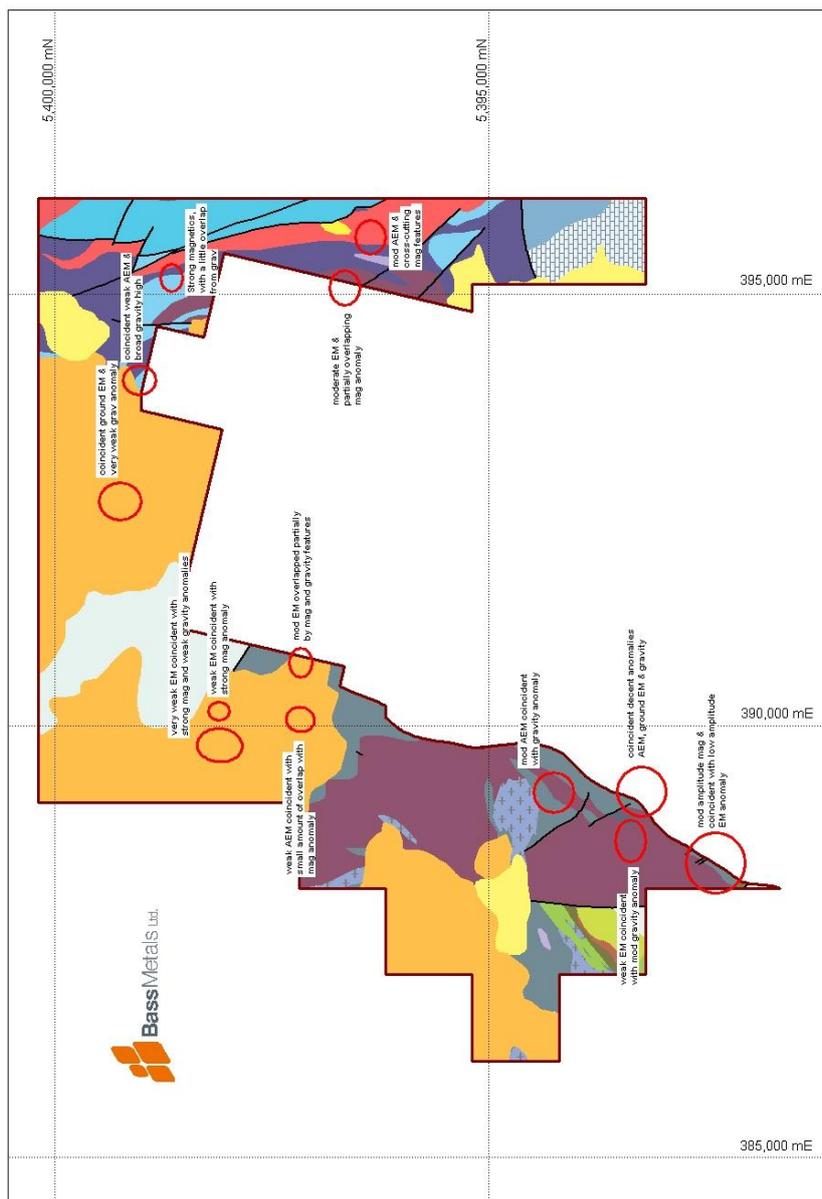


Figure 9. Arsenic analyses for drillcore samples

### 3.3 Geophysical Review

Dan Core, of Fathom Geophysics, was asked to compile and give a preliminary appraisal of the large historical geophysical dataset of EM, gravity and magnetic data over the Hellyer-Mt Charter area. He was also asked to digitise, invert and model the historical IP data.

Dan completed a series of reports as well as generating a large amount of digital data including .tif images. Dan compiled a summary figure showing significant coincident geophysical anomalies. That figure is shown herein as figure 10.



**Figure 10. Summary geophysical anomalies recognised from review of existing geophysical data by Dan Core, Fathom Geophysics**

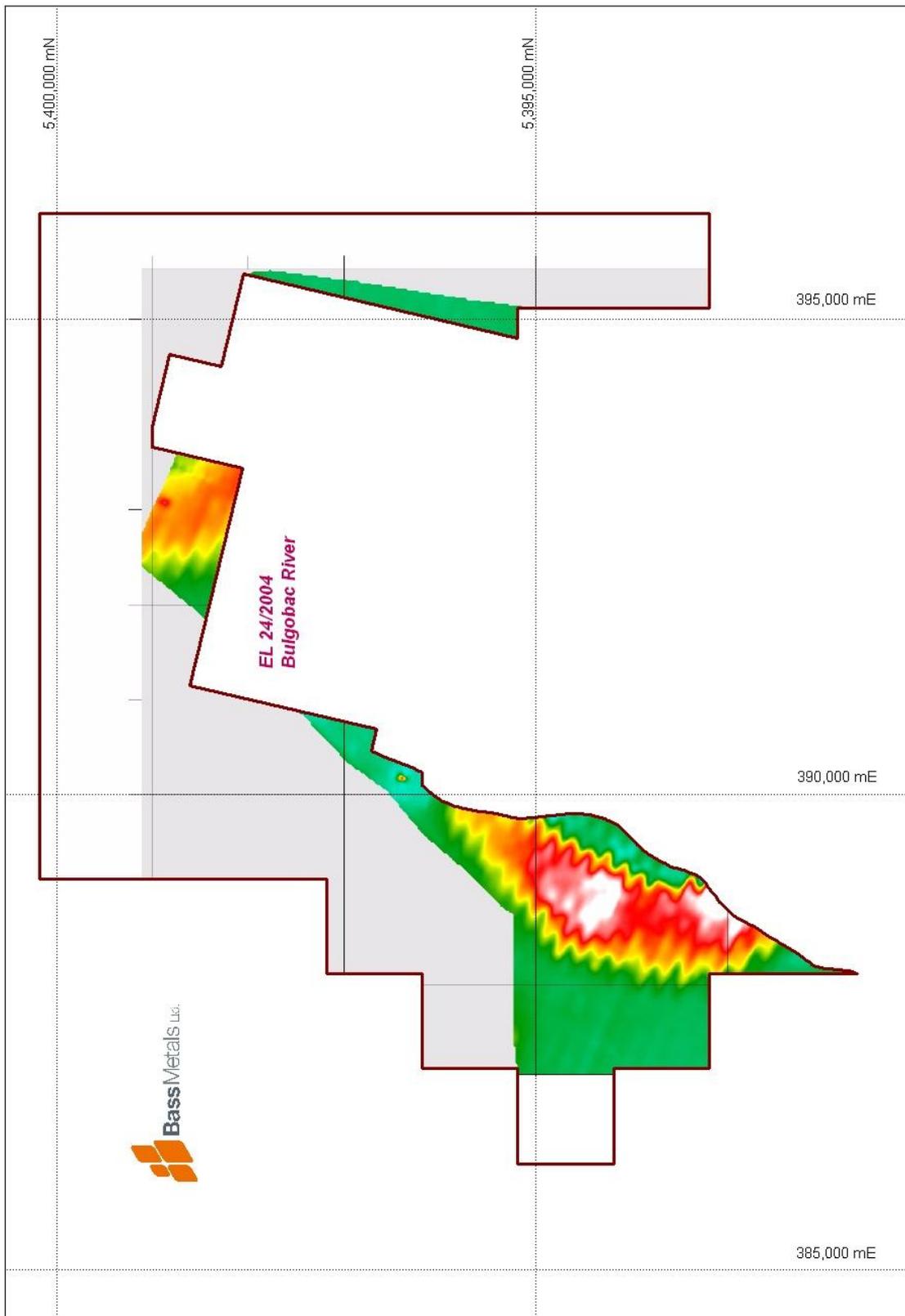
### **3.4 Airborne EM Survey**

In late March/early April the area of prospective Que-Hellyer Volcanics in the Hellyer-Mt Charter area was covered with a helicopter borne electromagnetic survey by Geotech Airborne Limited (of St Michael, Barbados). Approximately 595 line kilometres were flown with 88.3 kilometres of this within EL 24/2004.

Airborne EM data was collected using the VTEM electromagnetic and magnetic system, with a base operating frequency of 25 Hz. Real time differential GPS was used for navigation and the data was collected at nominal 100 meter line spacing by a 26m diameter loop at a nominal 40m ground clearance.

The VTEM survey did not identify any responses in EL 48/2003 that could be reconciled with the EM effects from a bedrock VMS style conductor source. Detailed appendices are contained in the report ending 29 June 2010.





**Figure 12. VTEM Survey – Z Channel 30 (0.88 ms)**

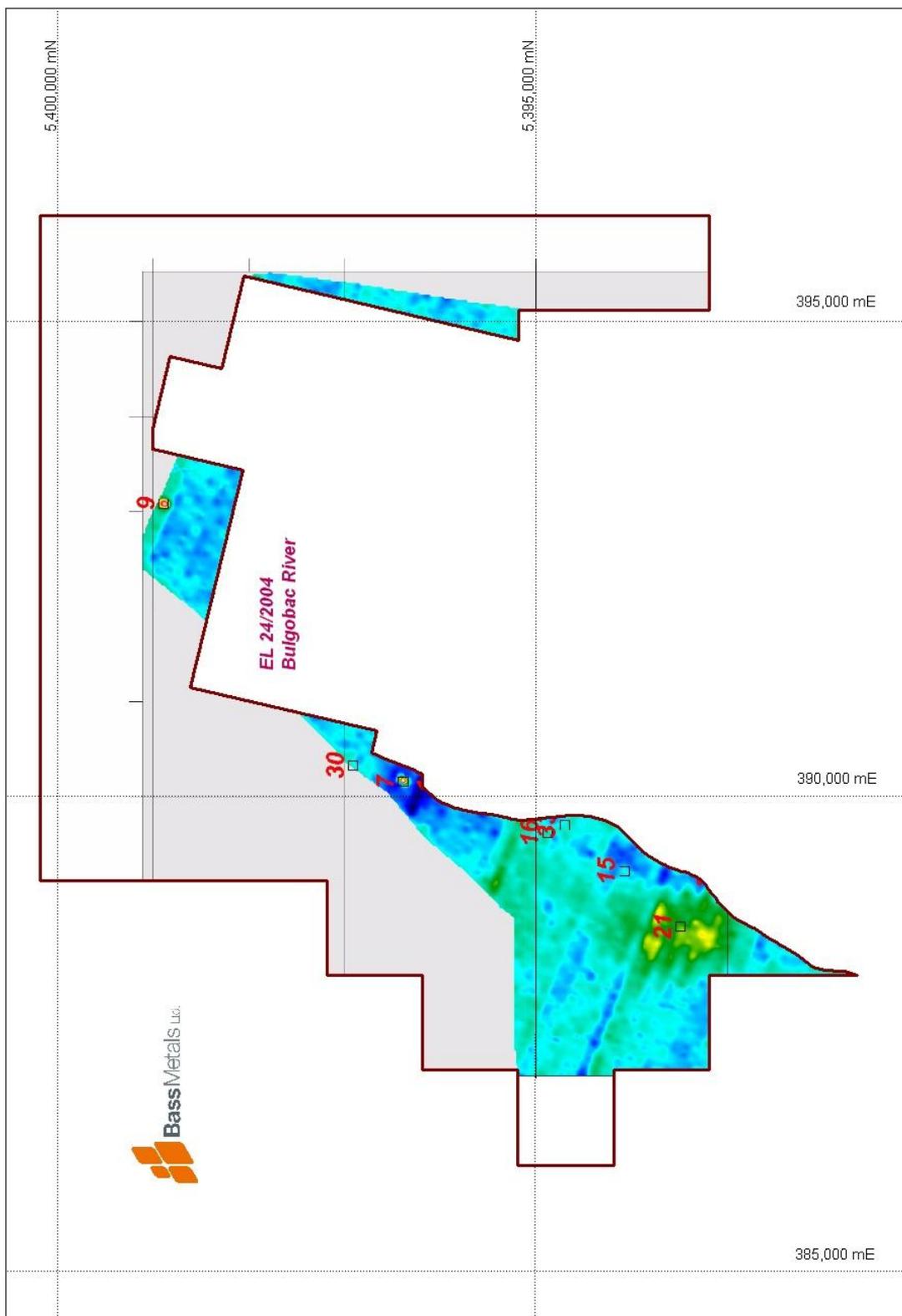


Figure 13. VTEM Survey – Z Channel 42 (4.64 ms) with areas studied in detail

#### **4. WORK COMPLETED DURING THE CURRENT REPORTING PERIOD (30 June 2010 – 29 June 2011)**

As no immediate high priority drill targets were generated on the Bulgobac River licence from exploration completed last reporting period, focus has remained on the 9 targets generated. Many of these targets have been drilled, with a second pass appraisal of the results currently underway and results and potential on this tenement will be incorporated.

#### **5. PROPOSED EXPLORATION**

Exploration in the coming year will initially consist of the following:

- Further assessment of geophysical anomalies in particular Maverick and Mayday prospects.
- ICP soil sampling over the 1km<sup>2</sup> of outcropping Que-Hellyer Volcanics at the western edge of the tenement

Drilling will be contingent on the above work.

#### **6. ENVIRONMENT**

No work has been carried out on the tenement which has had any environmental impact.

## 7. EXPENDITURE

June 2010 - June 2011		
Geoscientific Costs	Geology	6,832.95
	Geochemistry	5,650.00
	Geophysics	712.50
	Remote Sensing	
Drilling & Gridding Costs	Gridding	
	Drilling	
	Land Access Costs	
	Rehabilitation Costs	
	Feasibility Study Costs	
	Other Costs	
	Admin Costs	
	<b>Total - eligible</b>	<b>13,196.45</b>

**Table 2. Expenditure 30th June 2010 to 29th June 2011**

*\*Expenditure reported is up to and including 31<sup>st</sup> May 2011*

The Bulgobac tenement is part of the Lake Mackintosh Group; the total expenditure up to the 31<sup>st</sup> May 2010 for this group is \$1,365,912 against a required group expenditure of \$384,400

**Expenditure –** Reporting period \$13,195.45

Total to date \$358,935.49

## 8. REFERENCES:

**Bates. 2009.** Annual Progress Report EL24/2004 Bulgobac River.

**McPhie *et. al.* 1993.** Volcanic Textures, a guide to interpretation of textures in volcanic rocks.