

**EL20/1996 – “Elliott Bay”  
Annual Report on Exploration  
June 2016 to January 2017**

## **Abstract**

Moina Gold Pty Ltd purchased EL20/1996 "Elliott Bay" in early 2016 from Torque Mining Ltd/Exploration and Management Consultants Pty Ltd.

In June 2016 the licence was extended for 6 months to January 14<sup>th</sup> 2017. This report covers that 6 month period.

Work in the 6 months has focused on planning for a drilling programme to be undertaken in the 2017/18 summer season with an indicative quote on drilling received from a major drilling contractor. This work has justified the extension of the licence for a longer period.

Previous work has defined a resource for the Wart Hill massive sulphide deposit of

**665,400t @ 0.45g/t Au, 37g/t Ag, 0.09% Cu, 1.7% Pb and 3.38% Zn** in two lenses

with a contained higher grade zone of

**46,500t @ 1.45g/t Au, 70g/t Ag, 0.27% Cu, 4.1% Pb and 8.03% Zn** in the **South Lens**.

The resource lies open ended at depth and is the principal focus of exploration by Moina Gold Pty Ltd.

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## **1.0 Introduction**

### **1.1 Exploration Rationale**

Moina Gold Pty Ltd is exploring for base and/or precious metals. Mineralisation styles targeted are VHMS (Volcanogenic Hosted Massive Sulphides) either as seafloor precipitates or shallow subseafloor replacement, and/or hybrid VHMS/epithermal precious metal rich vein and/or replacement deposits.

Moina Gold is aware of developments in the use of Short Wavelength Infra-Red and trace element analyses of hydrothermal alteration in defining vectors to mineralization. Moina Gold is aware that the massive sulphide mineralization is not necessarily conductive but sees downhole EM as a valid tool to screen for those bodies which may be conductive.

### **1.2 Geology**

EL 20/1996 covers a highly significant portion of the southernmost land extent of the Mt Read Volcanics.

The reader is referred to (almost all) previous reporting for high quality geological descriptions and fieldwork for details (see fairly comprehensive list of references at end).

Essentially, the prospective Mt Read Volcanic rocks in the Wart Hill area consist of felsic volcanoclastic mass flows, commonly pumiceous, with lesser finer sediments, coherent, brecciated felsic lavas/intrusives, minor basalt intrusives and occasional shale, limestone and chert. The volcanics include both dacitic i.e. feldspar phyric volcanoclastics and lavas and more rhyolitic quartz+feldspar phyric volcanoclastics and lavas, the latter reportedly more common in the upper part of the sequence near the overlying Waterloo Creek Group shales and volcanoclastics.

Previous descriptions of the geology of the Elliott Bay region have correlated the quartz phyric rocks with the Eastern Quartz-Phyric Sequence from the base of the Mt Read sequence. Whilst the contact between the volcanics and overlying Waterloo Creek group rocks is considered to be unconformable in some accounts, a possible alternative interdigitating relationship with the overlying Waterloo Creek Group rocks would be consistent with the volcanics being correlated with the Tyndall Group from the uppermost Mt Read Volcanics.

Of great importance is the question of facing of the host volcanic sequence at Wart Hill which has been variably considered to be either westerly or easterly on an overturned limb. The amount of facing data evidence seen by Frontier geologists surpasses that seen by earlier geologists and strongly argues for an east facing, i.e. steeply overturned sequence.

The Wart Hill massive sulphide deposit consists of disseminated sulphides, allochthonous clasts and in-situ pods of high grade massive sulphide of Volcanic Hosted Massive Sulphide (VHMS) style hosted within a largely volcanoclastic sequence.

The mineralised zone consists of two separate zones, offset at around 5,251,520mN, with the southern end of the Central Zone between 30m-60m west of the northern end of the South Zone.

The Central Zone outcrops over a short strike length and has dimensions of 170m vertically x 155m horizontally, dips -70 degrees to the west and ranges in thickness from a few metres to about 10m in thickness.

The South Zone also outcrops over a short strike. It has dimensions of 260m vertical x 165m horizontal and ranges in thickness from less than 0.5m up to 7m in thickness. It too dips at around -70 degrees to the west.

(Wholly) within the South Zone a discrete lens of massive sulphide can be recognised which is named the South Lens. The South Lens is 90m x 90m and varies in thickness from less than 0.2m up to 5m.

### **1.3 Location and access**

EL 20/96 is located very near to the remote southwestern coast of Tasmania (see Figure 1.1) around 40 kilometres west of Strathgordon and 80 kilometres south of Strahan.

Access to the area is difficult with no continuous road access to the rest of the state. The only vehicular track to the area, a rough 4WD track known as the Low Rocky Point Track, commences at the southern end of Birch's Inlet off the southeastern corner of Macquarie Harbour and thus requires boat transport.

Various modes of access have been utilized by various exploration companies in the past. Frontier initially mobilized its drilling gear, crawler, excavator and larger camping gear in 2005 by sea barging gear from Hobart into the mouth of the Lewis River from where it was driven to the Wart Hill camp over the open heath country. Demobilisation in June 2011 used this same methodology.

Access within the licence is by 4wd bikes or by foot. Frontier has also utilized a rubber tracked crawler for access which has proven to have minimal impact.

### **1.4 Land status and usage**

The Elliott Bay area is crown land and is classified as part of the South West Conservation Area. As such it is open to mineral exploration.

The Tasmanian Government proclaimed the prospective rocks south of Macquarie Harbour to be within the Sorell Peninsula Prospectivity Zone, recognition of the mineral potential of the area. Under this act any change in the status of the land within the zone requires the approval of both houses of the Tasmanian parliament with any affected party entitled to compensation (this does not cover any decisions of the Federal government).

The country is quite flat, being part of the coastal plain, though with some excising creeks. The significant exception in the licence area is Wart Hill.

The majority of the licence is covered with low standing, open coastal heath and button grass. Creek gullies and some of the areas in the western and easternmost parts have wet sclerophyll vegetation.

### **1.5 Tenure**

EL 20/1996, was first granted to EMC Consultants (EMC) in June 1996. EMC vended 90% into new listing Tasex. Tasex, subsequently changed its name to Tasgold and then again to Frontier. The licence was renewed, on an annual basis, until June 2012. On 4<sup>th</sup> May 2012 Frontier's 90% share in the tenement was transferred to Torque Mining Ltd.

In early 2016 Moina Gold Pty Ltd purchased the tenement from Torque Mining Ltd/EMC.

Application is being made to renew the licence for a further year to June 2016.

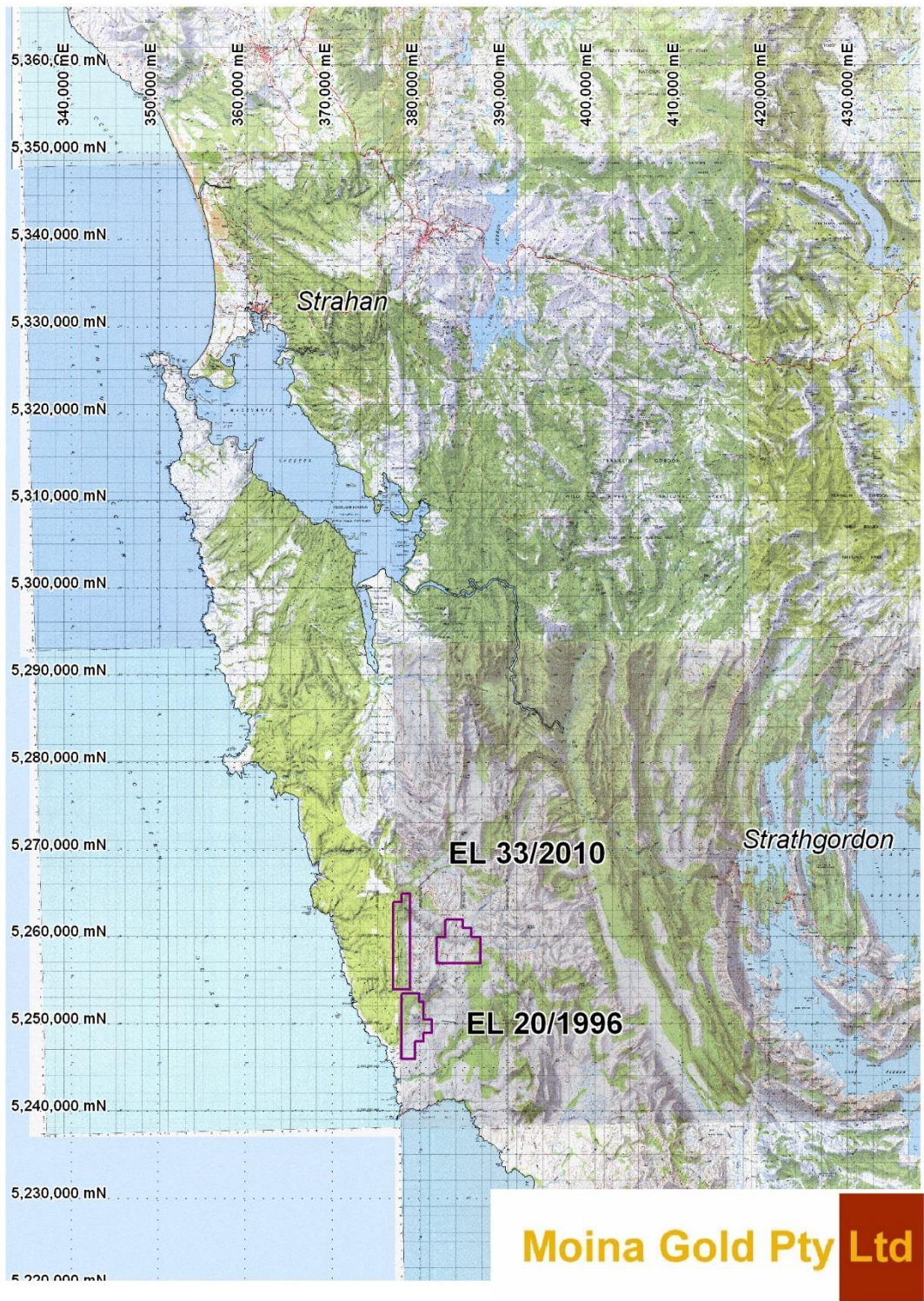


Figure 1.1: Location of EL 20/1996 Elliott Bay on Tasmania's southwest coast.

## **2.0 Review of Previous Work (after MacDonald, 2015)**

### **2.1 Prior to current tenement**

The southern Mt Read Volcanics saw relatively little of the prospecting activity which characterized the rest of the west coast of Tasmania. Prospector T.B. Moore spent his summers prospecting in the area in the latter part of the 19<sup>th</sup> century.

Modern exploration commenced in the Elliott Bay area in the mid 1950's.

#### **2.1.1 Lyell-EZ Explorations (LEE), 1956-62**

The first modern exploration of the area was carried out in a joint venture operation by Lyell-EZ Explorations (LEE) on the vast 'Gordon Concession' covering much of SW Tasmania. Airborne magnetics, EM and scintillometer surveys were flown and a variety of ground geophysics utilised. The LEE JV bulldozed the road from Birch Inlet to Moore's Valley which was later extended to Low Rocky Point to service the lighthouse. Ground follow up was completed on the V1, V3 and Lewis River (V2, V12) Prospects.

#### **2.1.2 BHP, 1964-1972**

BHP conducted a major exploration campaign in SW Tasmania between 1964 and 1972 on EL13/65. They constructed the Moore's Valley airstrip, established a major base camp at Birch Inlet and reused the LEE camp at Moore's Valley. Much of the work consisted of reconnaissance mapping, stream sediment sampling and minor soil sampling. Further airborne magnetics, EM and scintillometer surveys were flown. Most of their work focused elsewhere with little work completed on the Mt Read Volcanics at Elliott Bay (MacGregor, 1969).

#### **2.1.3 Geopeko, 1976-1984**

The most comprehensive and well-organised exploration of the Mt Read Volcanics in the Elliott Bay region was carried by Geopeko on EL 27/76. A major base camp was established south of Wart Hill and tracked bombardiers used for exploration in the largely open countryside. Regional and local mapping resulted in much of the current understanding of the area and delineation of many alteration zones and prospects which were given the Voyager prefix.

Mapping, stream sediment sampling and airborne magnetics were used for reconnaissance work resulting in the delineation of 34 Prospects (termed Voyager 1 to 34). Seventeen of these were followed up with detailed gridding, mapping, soil sampling and various geophysical methods. The Mt Osmund syncline area was subject to the most intensive work with systematic mapping, C-horizon soil sampling, gradient array IP and dipole-dipole IP surveys (Herrmann, 1984). Seven prospects were drill tested.

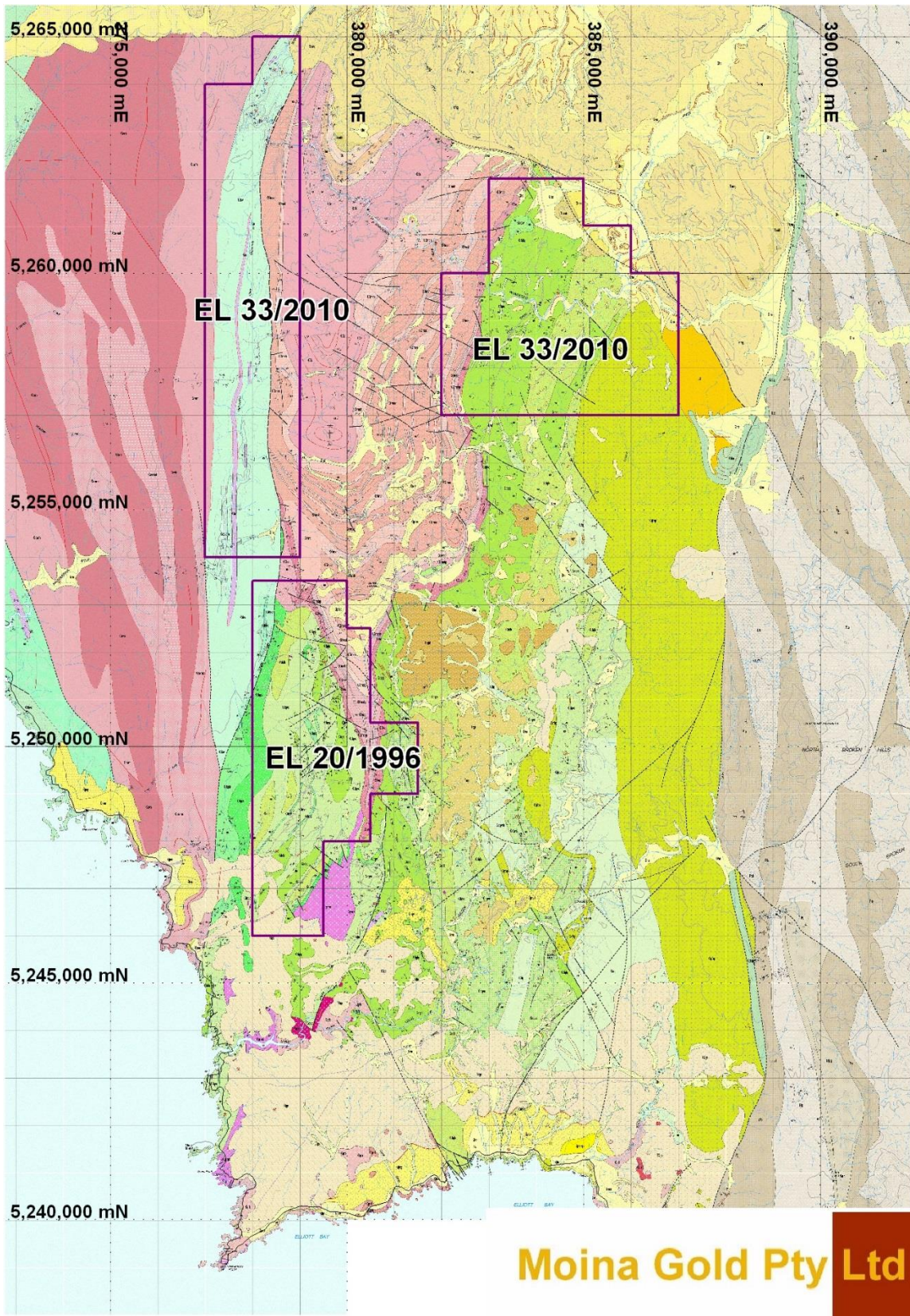
Mineralisation styles identified include:

- VHMS type Pb-Zn rich sulphides in mass-flow breccias (Wart Hill (V19))
- Strata-bound disseminated gold in felsic volcanoclastics (Sassy Creek (V24), Pleiades (V30))
- Magnetite-chlorite altered volcanics (V9, V16)
- Disseminated Pb-Zn-Ag at volcanoclastic-epiclastic boundaries (V2, V3, V10)
- Au-Ag gossanous veins on intrusive margins (V12).
- Stratiform magnetite-pyrite-chalcopyrite 'exhalites' (Pender's, V21).

- Vein style Pb-Zn-As associated with faulting (V33).
- Disseminated chalcopyrite in mafic volcanics (V18, V21).

Much of their work has been summarised in the relinquishment report by Wally Herrmann (1985) and summarised and published by Large *et al.* (1987). The following summaries are drawn from this work (amongst others). Prospects from the whole Elliott Bay area are included.. The following plan shows the location of prospects discussed.





**Moina Gold Pty Ltd**

**Figure 2.1: Mineral Resources Tasmania geology of Elliott Bay showing tenement location.**

### **1976-77 (Ref?)**

- Reconnaissance mapping, rock sampling and -80# stream sediments over much of the area of Mt. Read volcanics.
- Detailed work conducted over V1 to V6).

### **1977-78 (Strickland, 1978a)**

- Gridding, soil sampling dipole-dipole IP, VLF-EM and SP of V1, 2, 3 and 9.
- Recognition of V3, V2, V10 area for V.H.M.S. style mineralisation with anomalous streams, soils and IP responses.
- Recognition of V1 for V.H.M.S. style mineralisation with anomalous streams, soils and IP responses.

### **1978-79 (Strickland, 1979)**

- Regional mapping, rock sampling and -80# steam sediment sampling.
- Discovery of gold anomalous gossan at V12 (North Lewis).
- Gridding, soil sampling magnetics, IP, SP, TURAM and VLF-EM of V1-V5, V10 and V12.
- 5 short Jacro AQ holes at V2 (Lewis River). Geochemical and geophysical anomalies attributed to minor "erratic" lenses of mineralisation.
- 2 short holes at V3. Geochemical and geophysical anomalies unexplained although occurrence of Pb-Zn-Cu sulphides in fine sediments was considered encouraging.
- 4 holes at Voyager 12. Drilling partly inconclusive due to poor recovery, however, no assays approached the highly anomalous results obtained from the gossans (numerous samples >20g/t Au).

### **1979-80 (Large, 1981)**

- Regional reconnaissance work was extended with -80# stream sediment sampling and mapping.
- 26 Voyager Prospects defined.
- Detailed gridding, magnetics, VLF-EM and TURAM at V1.
- 200.35 metre Jacro AQ DDH at V2. V2/6 intersected 9 metres @ 1.61% Pb, 0.24% Zn and 21.2 g/t Ag in veinlets. Considered to be remobilised from syngenetic disseminated mineralisation encountered throughout the hole.
- Detailed gridding, mapping, soils, magnetics and VLF-EM at V6. Magnetics defined a magnetite bearing dyke associated with the Low Rock Point Granite (later shown by Cyprus to be associated with anomalous gold).
- Detailed gridding, mapping, soils, magnetics, VLF-EM and a single 60 metre Jacro AQ DDH at V9 (V9/1). Widespread chlorite-magnetite and pyrite-sericite alteration with anomalous base-metals recognised.

- Drilling of DDH V12/5 to 163.65 metres at V12. Disappointing with the best assay 0.4g/t Au.
- Detailed rock sampling and mapping of V20. Hematite-chloritic altered volcanics with potential for lead-zinc mineralisation identified.

**1980-81 (Heithersay et al, 1981).**

- Mapping, limited IP and drilling of a single DDH (V3/3) at V3 which intersected disseminated pyrite and minor local zinc mineralisation (8 metres @ 0.37% Zn).
- Soil sampling, gradient array IP, dipole-dipole IP and drilling of V9/2 under a copper soil anomaly at V9. No significant intersections.
- Gridding, mapping, soil sampling, gradient array IP, dipole-dipole IP, magnetics, limited gravity, SP, MST-EM and trenching at Wart Hill (V19). Significant discovery of a small (4 metre wide) body of high-grade polymetallic massive sulphide averaging 10.2% Pb, 17.9% Zn, 138 g/t Ag and 0.6 g/t Au).



**Figure 2.2: Lens A outcropping massive sulphide assaying 10.2% Pb, 17.9% Zn, 138 g/t Ag and 0.6 g/t Au**

- Gridding, mapping, rock and soil sampling at V22
- Gridding, mapping, soil sampling and gradient array IP at V29.
- Panned concentrate sampling at Sassy Creek (V24)/Pleiades (V30).

- Gridding, soil sampling, reconnaissance dipole-dipole IP, gradient array IP, SP and magnetics and drilling of Sassy Creek (V24)/1 at Sassy Creek (V24).
- Ag-Au-As anomalous pyrite-galena-sphalerite veins along the Copper Creek Fault (V31).
- Low order gold stream anomalies defined in Mainwaring River volcanics.

**1981-82 (Wilson et al. 1982).**

- V9 - Extensions to grid, infill soil sampling, gravity, magnetics and the drilling of V9/3 to test a dipole-dipole IP anomaly. Black shales intersected in V9/3.
- Wart Hill (V19) - Detailed gravity, infill gridding and soil sampling, selected dipole-dipole IP, VLF-EM, trenching and drilling of 5 DDH's. Trenching identified a second body of massive sulphide averaging 0.2% Cu, 13.9% Pb, 21.9% Zn, 680 g/t Ag and 0.83 g/t Au over 3 metres. Gravity failed to locate a large body of massive sulphide near surface. DDH's failed to intersect significant mineralisation. Sulphide lenses considered to identify a favourable stratigraphic horizon. Fixed loop EM survey recommended to detect sulphides to 200m depth.
- V22 - Infill gridding, mapping, magnetics and soil sampling.
- V29 - Soil sampling, magnetics, VLF-EM, gravity, SP and dipole-dipole IP.
- V29W - Gridding, mapping, magnetics and VLF-EM.
- Pleiades (V30) - Gridding, mapping, soil sampling, magnetics, trenching, reconnaissance dipole-dipole-IP, SP and gravity.
- V31 – Gridding, mapping, soil sampling, magnetics and VLF-EM.
- V33 - Gridding, mapping, soil sampling and magnetics.
- V34 - Gridding, mapping, soil sampling and magnetics.
- V16 - Gridding, soil sampling, stream sediment sampling, VLF-EM and magnetics.
- V20 - Gridding, soil sampling, stream sediment sampling, VLF-EM and magnetics.
- Pleiades (V30)/Sassy Creek (V24) - Detailed steam sediment sampling, trenching of a base metal soil anomaly and a black shale, study of the morphology and geochemistry of alluvial gold and extending Sassy Creek (V24)/1 to 281.5 metres.

**1982-83 (Herrmann, 1983).**

- Aquitaine Australia Minerals Ltd JV'd into the project in 1982 but withdrew in 1983.
- Extensive dipole-dipole IP survey over the volcanics on either side of the Mt. Osmund syncline from V33 on the western side to V34 on the eastern.
- Systematic C-horizon soil sampling and detailed was completed over the same area.
- Infill soil sampling and IP conducted in areas where anomalous responses were recorded.
- Panned concentrate stream sampling on the eastern side of the Stony Creek Microgranite
- Lead isotope study of occurrences of lead mineralisation.
- Three priority targets selected for drilling, eight recommended for further infill IP or geochemical sampling.

### **1983-84 (Herrmann, W and Sumpton, J. 1984)**

- The recommended drilling was not carried out.
- Wart Hill (V19), fixed loop UTEM III survey - no conducting bodies, dipole-dipole IP
- V9, fixed loop UTEM III survey - no conducting bodies
- V29 fixed loop UTEM III survey - no conducting bodies,
- V29W fixed loop UTEM III survey – no conducting bodies, dipole-dipole IP
- V33 two DDH's, narrow structurally controlled mineralisation.
- Sassy Creek (V24) Further soil sampling and re-assaying of previously collected soils. 3DDH's Sassy Creek (V24)/2, Sassy Creek (V24)/3 and Sassy Creek (V24)/4 drilled under the best gold soil anomalies, broad zones of low grade gold mineralisation (e.g. 85 metres @ 0.052 g/t Au). Best assay of 3 metres @ 17.5 g/t Au.

### **1984-85 (Herrmann, 1985)**

Geopeko decided to withdraw from exploration in Tasmania in early 1984, however, a J.V. partner could not be found and the ground was dropped in mid 1985.

#### **2.1.4 Cyprus (Arimco)-Poseidon (1985-1990)**

Cyprus (Arimco) held EL 40/85 from 1985 until late 1994 when the ground was compulsorily relinquished. Cyprus and Poseidon maintained a 50:50 J.V. until Aberfoyle farmed in 1990. Cyprus managed the property until 1989. In 1990 Aberfoyle began farming into and managing the EL, pulling out in 1993.

### **1985-1986 (Hartley et al, 1987).**

- Dighem-magnetic survey 500 line km on 150 metre lines.
- Ground follow-up of ten anomalous areas max-min EM survey and magnetics, C horizon soil samples, rock chip samples reconnaissance geological mapping and minor petrology. Minor Pb-Zn soil anomalies on lines 2,5 and 8. Gold soil anomalies on lines 6 and 8.

### **1986-1987 (Hartley et al, 1987)**

Regional:

- Review of all previous geophysical work by Mitre Geophysics (Bishop, 1987).
- Compilation of 1:10000 Prospect mapping at 1:25000
- Regional Stream geochemical sampling (-80# and panned concentrates)
- Rock chip sampling
- Air photo interpretation of structures.

Prospects:

- Wanderer South (Dighem anomaly). Gridding, ground EM, stream geochemistry, soil geochemistry, rock chip geochemistry. No anomalies detected.

- Python Pit (Dighem anomaly). Gridding, ground EM, stream geochemistry, soil geochemistry, rock chip geochemistry. Moderate Cu-As-Au soil anomalies associated with siltstones shales and basic volcanics.
- Mt Osmund West (Dighem anomaly, V33). Gridding, stream geochemistry, soil geochemistry, rock chip geochemistry, ground EM and groundmagnetics. Abundant visible gold in panned concentrates. Anomalous metals in rock chips and soils. Weak EM response.
- Mainwaring River (Dighem anomaly). Reconnaissance rock chip and stream geochemistry. No anomalies detected.
- Woolloomooloo Creek (Dighem anomaly). Gridding, stream geochemistry, soil geochemistry, rock chip geochemistry, ground mag and ground EM. Anomalous gold in streams, no soil anomalies detected, weak EM conductor associated with shales.
- Mt Osmond East (Dighem anomaly). Gridding, stream geochemistry, soil geochemistry, rock chip geochemistry, ground mag and ground EM. Weak EM responses. Anomalous soils associated with chlorite-quartz alteration.
- North Waterloo Creek (Dighem anomaly). Gridding, stream geochemistry, soil geochemistry, rock chip geochemistry, ground mag and ground EM. Weak soil anomalies detected, weak EM conductors.
- North Lewis (V12). Gridding, mapping, stream geochemistry, soil geochemistry, rock chip and channel sample geochemistry, ground mag and ground EM, petrography and relogging of DDH. Very anomalous rock chip and channel samples. No EM response, strong soil anomalies and surprisingly low Au in stream sediments.
- Wart Hill (Wart Hill (V19)). Gridding, mapping, soil geochemistry, ground mag and ground EM, petrophysics.
- Penders Prospect (V1). Stream and rock chip geochemistry. Both anomalous.
- Sassy Creek (Sassy Creek (V24)). Minor orientation stream and rock chip geochemistry. Petrology.
- V18-23 (Coastal Section). Reconnaissance mapping, rock chip geochemistry.
- V6. Reconnaissance mapping, rock chip geochemistry, stream geochemistry. Rock-chips up to 7.25 ppm Au.
- Porphyry-Dolerite Contact (Air Magnetic Anomaly). Gridding, soil geochemistry, stream geochemistry. No further work was recommended.
- Magnetic Anomaly 1. Ground mag, soil geochemistry. No further follow-up recommended.
- Magnetic Anomaly 2. Ground mag, soil geochemistry. No further follow-up recommended.
- Magnetic Anomaly 3. Ground mag, soil geochemistry. Anomalous soils and ground mag on granite/volcanics contact. Further work recommended.
- Magnetic Anomaly 4. Ground mag, soil geochemistry. Anomalous Cu in soils. No further work was recommended.

- Magnetic Anomaly 5. Ground mag, soil and rock chip geochemistry. No soil anomalies detected. No further work was recommended.
- North Porphyry Contact. Gridding, stream geochemistry, soil geochemistry, rock chip geochemistry, ground mag and ground EM. Mag anomalies identified as chlorite-magnetite zones on porphyry contact. Considered to be adequately tested.
- Lewis River (V2). Gridding, stream geochemistry, soil geochemistry, rock chip geochemistry, ground mag, petrography. Further stream geochemistry recommended.
- Waterloo Creek. Gridding, stream geochemistry, soil geochemistry, rock chip geochemistry. Moderate soil and stream Au anomalies detected.

**1987-88 (Poltock et al, 1988).**

- Wart Hill (Wart Hill (V19). Soil geochemistry, rock chip geochemistry, diamond drilling (7 DDH for 758.1m), DHEM survey.
- East Camp (V29). Gridding, soil geochemistry, costeaning – anomalous soils and costean samples.
- Sassy Creek (Sassy Creek (V24). Gridding, soil geochemistry - no anomalous results.
- North Lewis (V12). 5 DDH's totalling 349.6 m. Generally disappointing results.
- Low Rocky Point Granite Contact. Gridding, stream geochemistry, soil geochemistry, rock chip geochemistry. Minor anomalous soils and rock chips.
- Compilation of all previous geophysics (Bishop, 1988).

**1988-1989 (Poltock, 1989).**

- 6 DDH's totalling 1793.6 metres at Wart Hill and East Camp, DHEM surveys.
- Excavating, sampling and mapping 1655 metres of trenches at wart Hill and East Camp.

**2.1.5 Aberfoyle-Arimco (Cyprus)-Poseidon (1990-1993)**

No work was completed in the 1989-90 season. Aberfoyle Ltd entered a JV with Arimco (Cyprus) and Poseidon to become managers of the EL.

**1991-92 (Wallace, 1991 & Richardson, 1992)**

A QUESTEM airborne EM survey was flown over the prospective rocks. Nine anomalies were recognised from the survey.

**1992-93 (Richardson, 1993)**

- Ground follow-up was carried out at all nine anomalies. This involved ground EM and soil surveys over some of the anomalies.
- Two DDH were designed to test the EB-1 anomaly. Both holes failed to reach the target. DHEM did not detect any significant conductors.

### **2.1.6 Plutonic (1995-96)**

Plutonic successfully tendered for the Elliott Bay EL in late 1994 with the licence granted in 1995. Plutonic only explored the Elliott Bay area for one year before dropping the ground.

#### ***1995-96 (Herrmann, 1996)***

Plutonic's field work involved

- re-logging and re-mapping of core and outcrop at V3, Wart Hill (V19) and V29.
- Moving loop SIROTEM, ground magnetic surveys, reconnaissance mapping and geochemistry at Wart Hill and East Camp prospects.
- Re-logging existing diamond drill core in an attempt at re-interpreting Wart Hill volcanic facies relationships and alteration zonation to infer direction to the source of re-sedimented clasts and lenses of VHMS type massive sulphide in volcanoclastic breccias.
- Evaluation of the Voyager 3 prospect - QUESTEM anomaly EB-1 to determine if it has been adequately tested.
- a review of previous EM, IP and gravity in the Wart Hill/East Camp area as well as various geophysical surveys in the V3 area,
- moving loop SIROTEM (9.7 kilometres) and ground magnetics over the Wart Hill/East Camp area.
- Limited soil sampling over selected parts of the Wart Hill and East Camp Prospects.
- Consultant geologist Wally Herrmann completed detailed re-logging of the drill core from Wart Hill with the aim of defining vectors towards mineralisation. He tentatively concluded that the source of the re-sedimented massive sulphide clasts/rafts may have been up dip and to the north and thus unfavourable for exploration potential.
- All of this work had largely been done by previous explorers.

## **2.2 During Life of Current Tenement**

### **2.2.1 Exploration & Management Consultants Pty Ltd (EMC)/Fimiston**

Exploration & Management Consultants Pty Ltd picked up the vacant Elliott Bay area as the current EL20/96. Their initial work consisted of a data review and work recommendations. The EL was Joint Ventured to Fimiston Mining Ltd in 1998.

#### ***1998-1999 (Fehlberg and Coxhell, 1999)***

Fimiston Mining completed a data review and partial digital compilation of previous work. Two diamond drill holes (SHD1 and SHD2) were completed in the Wart Hill (renamed Silver Hill by Fimiston on account of high silver grades in drillcore and trenching) area but no significant results were returned (Fehlberg and Coxhell, 1998).

The EL reverted to EMC after Fimiston withdrew from the JV in 1999.

No fieldwork had been completed on the EL since Fimiston's withdrawal. Work completed in the intervening period consisted of processing and interpretation of MRT aeromagnetics along with further data compilation (McNeil, 2000).



### **2.2.2 Tasgold/Macmin/Frontier Resources NL/EMC**

Since 1999 exploration has been conducted by the current Frontier personnel under a number of company names and structures. Work has been conducted over a number of summer campaigns i.e. 2003/04, 2004/05, 2005/06, 2007/08 and 2010/11

#### ***2000/2001 (McNeil, 2000)***

- Continued data review with some compilation was undertaken by Exploration & Management Consultants Pty Ltd during the term.
- Attempts to obtain a JV partner.
- Billiton Exploration Australia undertook a limited review of the geological / geochemical data.
- Billiton contracted Southern Geoscience Consultants reprocessed the existing geophysical coverage (except AEM) to search for and enhance any deep or subtle anomalies.

#### ***2003/2004 (Callaghan, 2004)***

A total of 12 drill holes for 1770m were completed on three prospects during the 2004 summer field season.

##### Sassy Creek gold zone (V24 and V30)

- The Sassy Creek Gold Zone was the focus of most of the work completed to date with eight holes drilled on the V24 prospect and four on the V30 prospect.
- The V24 prospect is a zoned volcanogenic gold deposit of probable fumarolic origin. Mineralisation consists of extensive low level sphalerite-galena-pyrite with the gold occurring at a discrete stratabound horizon within the system.
- A reassessment of historic dipole-dipole IP data and a geochemical study aimed at defining vectors towards high grade mineralisation was recommended. Three drill holes of the existing program were yet to be completed
- V30 is possibly the most promising gold prospect of the Sassy Creek Gold Zone.
- Drill hole SC006 intersected Henty style sericite-silica (MV) alteration adjacent to a major fault zone.
- The alteration contained similar low grade gold (2m @ 1.4 g/t Au) and basemetal mineralisation as the MV alteration at Henty.
- A further three holes were proposed to test this prospect on both sides of the fault.

##### North Wart (V33)

- One hole was drilled on the North Wart (V33) prospect.
- The hole was designed to test a strong magnetic anomaly under the Waterloo Creek Group unconformity in what was thought to be the northerly extension of the V19 host horizon.
- The hole intersected quartz-hornblende and feldspar hornblende porphyries with hematite-magnetite veining. No further work was recommended for this prospect.

A soil sampling program on EL20/96 and EL21/99 was initiated and was ongoing at the time of reporting. So far no significant Au anomalies had been generated.

#### **2004-2005 (Reid, 2005)**

A total of 13 drill holes for ~1875m were completed on the Wart Hill (V19) and West Wart Prospects during the 2005 summer field season.

##### **Wart Hill (V19)**

- High-grade massive sulphides were intersected in 6 of the 13 holes drilled at Wart Hill (V19) this year, normally in relatively narrow intervals.
- The best assays (excluding WD002 and coming to hand at the time of writing) included 7m @55.6g/t Ag, 6.16% Zn, 3.33% Pb, 0.22% Cu & 1.81g/t Au from 197m in WD009.
- Moderate and lower grade semi-massive and disseminated sulphides were noted in a total of 10 of the 13 holes, with intersection widths up to 13.4m.
- Drilling focused upon evaluating the resource potential of the V19 prospect and defined an extensive base / precious metal mineralised horizon with locally high grades.
- Continuity of base/ precious metal mineralisation had been documented 245m distance down the plunge on the host horizon, effectively from surface (Figure 1).
- Mineralisation apparently plunges moderately to the south, on an overturned east facing and west dipping fold limb.
- Mapping indicated that the alteration over Wart Hill itself is located up dip and peripheral to the indicated mineralisation plunge.

##### **Pleiades (V30)**

- A further 3 drill holes the Pleiades (V30) Prospect were also completed during the 2004 field season, subsequent to submission of last years annual report.

#### **2005-2006 (Allen et al, 2006a)**

- A total of 2 drill holes for 762m, targeted utilising new 3D IP data, were completed on the V19 and West Wart Prospects during the 2006 summer field season.
- Drill logs and details on a further 6 drill holes completed during the 2005 field season, subsequent to submission of last years annual report are also included.
- 38.4 line km 3D IP survey in the Wart Hill area.
- Interpreted host horizon coincides with a zone of resistivity high coincident with three discrete chargeability highs. A principal area of interest highlighted by the 3D\_IP survey extends north – south at depth (partly coincident the) along the western margin of the V19 grid. This
- Two peak resistive areas are located proximal to the south west and north west of the drilled V19 basemetal mineralisation and are coincident with a chargeability anomaly. This was tested by WD016, intersecting disseminated sulphides and weakly mineralized host horizon
- Further south, a significant chargeability high coincident with the host horizon in the Silver Trench area was tested by drill hole WWD003 which showed that the peak chargeability anomaly at the Silver Trench corresponds to the polymict host horizon, bearing variable sulphide clasts and disseminations to 10% locally.
- An inferred resource for the V19 mineralisation was calculated utilising a simple block model. Two inferred resource outcomes were generated; being a conservative 460,000tonnes @ 41.5g/t Ag, 0.72g/t Au, 1.81% Pb and 3.41% Zn and optimistic 600,000tonnes @ 40.5g/t Ag, 0.67g/t Au, 1.74% Pb and 3.30% Zn.

### **2006-2007 (Allen et al 2007a)**

No fieldwork in the 2006/07 season.

### **2007-2008 (Reid, 2008)**

- 9 drill holes totalling 2900.5m at the Wart Hill (V19) prospect.
- WD017 intersected extensive zone of elevated basemetal (130m @ 0.2% Zn equivalent, with minor intervals of up to 3.2% Zn equivalent).
- WD018 (best interval 1.4m @ 17.6% Zn equivalent).
- In WD019 the host horizon was found to be faulted off, with two narrow mineralised intervals of up to 0.4m @ 11.3% Zn equivalent being returned; the latter from the massive base metal sulphide on the host horizon directly overlying significant carbonate-sericite and chlorite alteration.

Subsequent drilling focused upon relocating massive sulphide on the south side of the fault offset at the southern end of the V19 resource.

- WD020 intersected a strong chlorite-carbonate-magnetite +/- minor basemetal zone from what is now recognised as the "Upper Host Horizon".
- WD021 drilled the projected southern plunge of the V19 mineralisation on the eastern side of the offsetting fault, but failed to reach the host horizon.
- WD022 further targeted both the "Lower" and the "Upper Host Horizon", the former being faulted off and the latter setting found to be relatively distal to massive sulphide. These holes completed a fence perpendicular to the host horizon, some 150m south of the known V19 mineralisation extent. No strong analysis were returned, but geological advances were significant.

Drilling moved further south chasing the host horizon.

- SWD002 tested coincident electromagnetic (SIROTEM) and 3D IP chargeability anomalies of similar character to that at V19 in an extensive area of elevated lead +/- zinc in soils, flanked by a magnetic high. at the South Wart Prospect. The hole intersected 88m of low grade disseminated and stringer veinlet style base metal mineralisation (98.3m @ 0.3% Zn equivalent).
- SWD003 intersected the "Lower Host Horizon", on section 175m west of SWD002. Footwall alteration comprised very promising moderate to strong chlorite followed by a strong grey pervasive silica overprinted by moderate sericite alteration; the alteration appearing stronger than that evident in the V19 footwall. A dark grey volcaniclastic siltstone / shale with a silicified top. being a marker for the lower host horizon, returned 1m @ 2.24% Zn Equiv. Other significant intervals included a relatively extensive low grade 25m @ 0.16% Zn Equiv from 177m.
- SWD004 targeted a promising coincident gravity high and electromagnetic (UTEM) anomaly in the West Wart area. This anomaly targeted was apparently sourced down dip from the surface mapped "Lower Host Horizon" and lay adjacent to a recently characterised NNE aligned fault with interpreted dextral wrench offset of mineralisation from V19. SWD004 was temporarily terminated at 297.1m, largely due to logistical timing reasons with the end of hole still in promising mineralisation, as evidenced by two near end of hole extensive low grade intervals of 13.5m @ 0.2% Zn equiv from 265m and 10m of 0.1% Zn to 297.1m (EOH) from disseminated sulphide zones.
- Ground magnetics cover was improved over the Wart hill area with a small test area surveyed at V24.

- A study of the economics of the V19 resource was undertaken by a consultant, Swain and Associates. Swain comments “The financial results are not encouraging in that a positive cash flow is not achieved from the current mineralised resource found at Wart Hill. However, if further exploration adjacent to Wart Hill demonstrates an increase of the size of the mineralised resource available for mining, then the project should be reconsidered for investment”.

**2008/2009 (Reid, 2009)**

No fieldwork

**2009/2010**

No fieldwork – no report.

**2010/2011 (MacDonald, 2011)**

- Exploration of EL 20/1996 Elliott Bay in the 2010/2011 reporting year focused on the Wart Hill (old Voyager 19) prospect.
- A SWIR (short wavelength infra-red) survey was carried out on existing drillcore to map out alteration. This work shows white mica alteration to be domainal with white micas in the rocks to the west of the exhalative horizons at Wart Hill more phengitic than white micas to the east of this horizon and to the south.
- Previous hole SWD004 was extended 90.3m to 387.4m and new hole WWD004 drilled to 328.1m into Wart Hill itself to test the upper target horizon south of the Wart Hill lenses.
- DHEM (Outer Rim using Crone system) was read on these two holes (SWD004 and WWD004) and WD022 with no anomalous responses read by the Z-probe.
- The enigmatic coincident chargeability (3D IP), conductivity (UTEM) and unexplained gravity anomaly over the Waterloo Creek shales just east of the Wart Hill prospect was drilled with WD024 (278.9m) with shales intersected and the gravity anomaly perhaps due to more siliceous shales(?)
- Three holes, WD023 (148.5m), WD025 (294.8.0m), WD026 (115.4m) were drilled in the area of the Wart Hill massive sulphide lenses in order to further define the distribution of mineralization for resource calculation.
- No massive sulphide mineralization was intersected in WD023 and WD026.
- WD023’s intersection of blebby and disseminated sulphide at the interpreted lower horizon returned (49.3m to 49.7m) 0.4m @ 0.4% Pb and 0.76% Zn. The upper horizon in this hole is zone of finer grained sediments between 117.75m and 126.7m.
- In WD026 the upper horizon is defined by bedded chert between 78.15m and 78.75m whilst the lower horizon is uncertain.
- WD025 intersected Zn+Pb rich base metal massive sulphides from 157.1m to 157.85m (0.75m dh = 0.6m hori), 159.85m to 160.6 (0.75m dh = 0.6m hori) and 163.9m to 171.0m (7.1m downhole = 5.6m horizontal) on the upper horizon.
  - **157.1m to 171.0m, 13.9m @ 0.311% Cu, 4.47% Pb, 8.97% Zn, 37g/t Ag & 1.11g/t Au**

- Inc. 157.1m to 157.85m, 0.75m @ 0.87% Cu, 14.6% Pb, 28.6% Zn, 48g/t Ag & 1.04g/t Au
- 159.85m to 160.6m, 0.75m @ 1.39% Cu, 12.8% Pb, 27.4% Zn, 75g/t Ag & 4.9g/t Au
- and 163.9m to 171.0m, 7.1m @ 0.348% Cu, 5.58% Pb, 11.18% Zn, 58g/t Ag & 1.48g/t Au



**Figure 2.3: WD025 drillcore showing high grade base metal massive sulphides from 157.1m to 157.85m, 159.85m to 160.6m and 163.9m to 171.0m.**

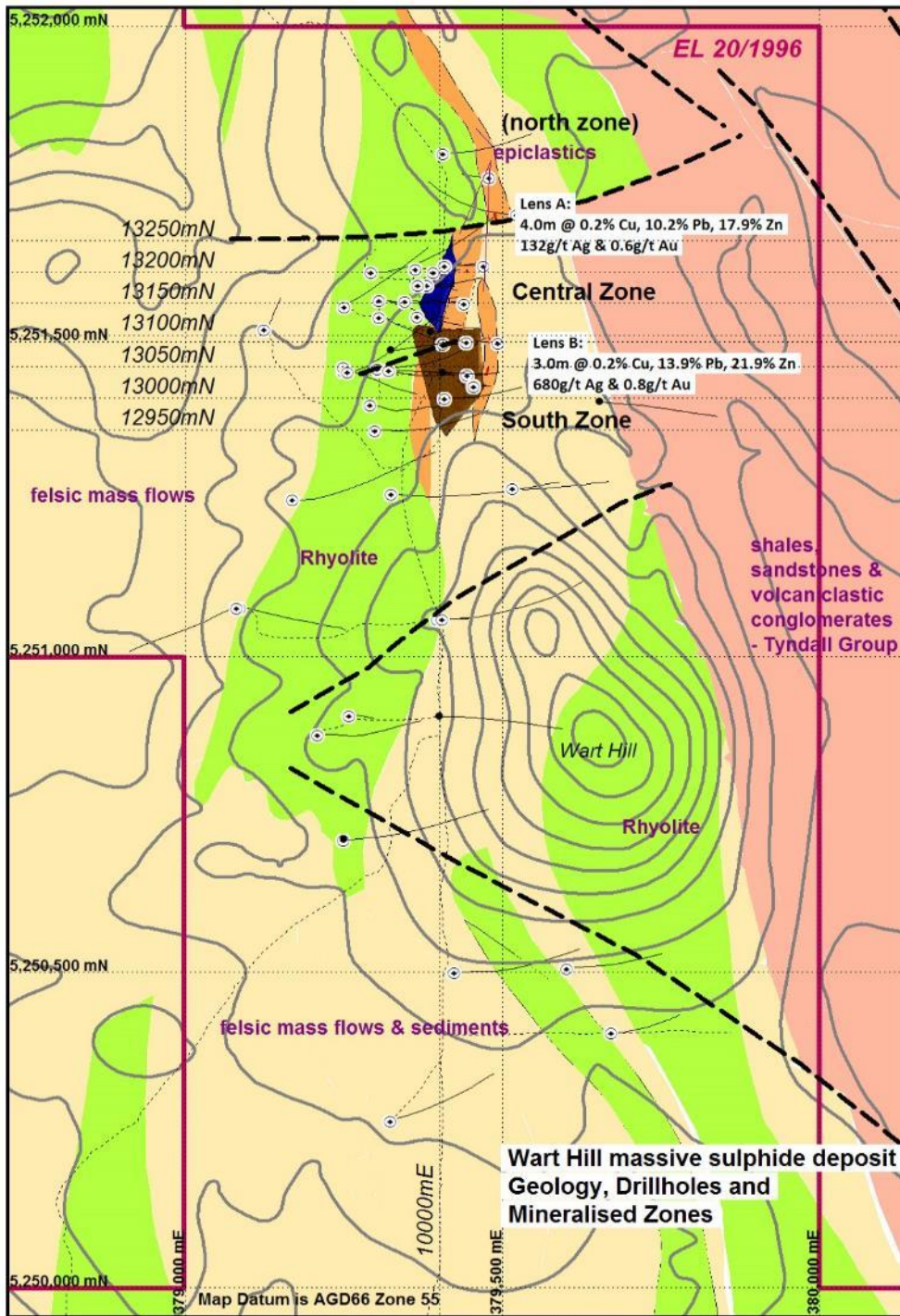


Figure 2.4: Wart Hill (Voyager 19) prospect showing the South and Central Zones resource shapes projected to surface.

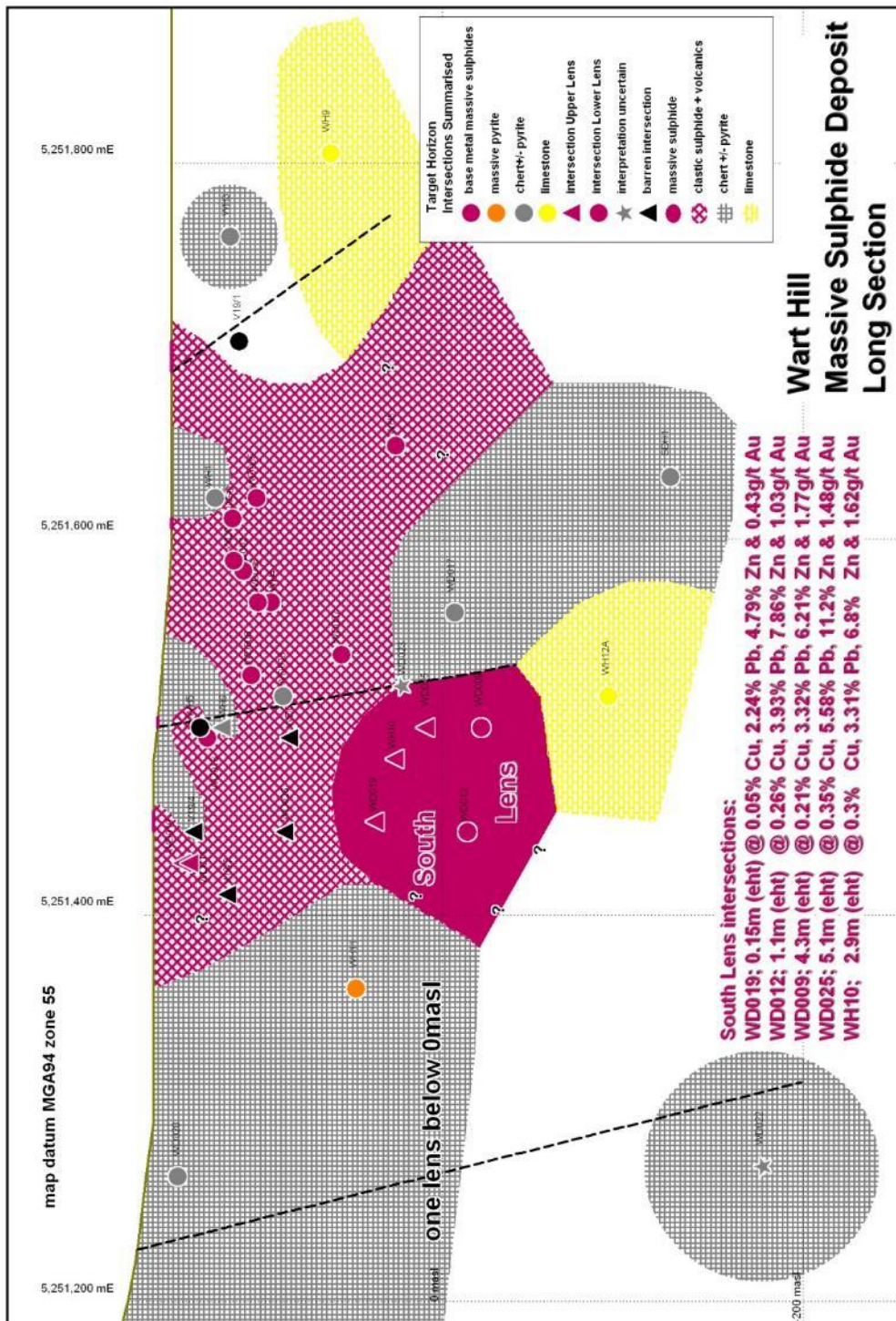


Figure 2.5: Long section (looking west) of Wart Hill (Voyager 19) prospect showing pierce points of the exhalative horizons. Note distinction between upper and lower horizons above 0m a.s.l., below this only one horizon has been intersected.

- Thorough rehabilitation of tracks and drill pads was completed.
- Future work needs to consolidate the results of this year and previous years work, in particular in resolving some significant geological questions. Further SWIR coupled with trace element is warranted in better defining vectors in hydrothermal alteration. Calculation of a resource at Wart Hill is justified with the current density of drilling.

### **2011/2012 (MacDonald, 2012)**

Field exploration of EL 20/1996 Elliott Bay in the 2011/2012 reporting year focused on;

- The flying of a new generation helicopter borne EM survey over all of the prospective Mt Read Volcanics in both the EL 20/1996 "Elliott Bay" and newly granted EL 33/2010 "Wanderer River" tenements.
  - Whilst the survey did not locate any first order conductors in the area of EL 20/1996, it did recognize and define a broader zone of very subtly elevated conductivity over a strike length of 1km and 300-500m depth. Whilst the anomalous zone appears lithological and corresponds with the Waterloo Creek Group shales on the surface, the shales are not conductive to the north and south along strike. Further, the west dipping anomaly lies physically beneath but stratigraphically above the South Wart zone of highly anomalous Zn and Pb in soils (which would correspond to the footwall alteration zone).
- A JORC compliant Inferred Resource has been estimated for the Wart Hill massive sulphide deposit.
  - An overall model incorporating clastic and disseminated sulphide as well as in-situ massive sulphide mineralization has been generated with two discrete zones – **Central Zone** and **South Zone** estimated. In addition the arguably coherent massive sulphide lens **South Lens** (lying wholly within and near the top of the deeper South Zone) defined by intersections in DDH's WH10, WD009, WD012, WD019 and WD025 was modelled and estimated as a discrete resource.
  - At a 0g/t Au equivalent cut-off (i.e. including all material within wireframes) stands at:
    - **Central Zone 309,200t @ 0.12g/t Au, 25g/t Ag, 0.03% Cu, 1.03% Pb and 2.16% Zn (= 1.8g/t Au equivalent)**
    - **South Zone 356,200t @ 0.74g/t Au, 48g/t Ag, 0.14% Cu, 2.29% Pb and 4.44% Zn (= 4.33g/t Au equivalent)**
    - **Total Resource 665,400t @ 0.45g/t Au, 37g/t Ag, 0.09% Cu, 1.7% Pb and 3.38% Zn (= 3.15g/t Au equivalent)**
    - **At a 5g/t Au equivalent cutoff the total resource is 167,300t @ 1.14g/t Au, 74g/t Ag, 0.22% Cu, 3.9% Pb and 7.7% Zn (= 7.1g/t Au equivalent).**
  - The South Lens resource is wholly contained within the South Zone. At a 0g/t Au equivalent cutoff the resource in the South Lens (wholly contained within South Zone) is:



- **South Lens 46,500t @ 1.45g/t Au, 70g/t Ag, 0.27% Cu, 4.1% Pb and 8.03% Zn (= 3.15g/t Au equivalent)**
- The third body of work completed was a reappraisal of the 3D IP data over the Wart Hill area. That work, carried out by geophysicist Peter Swiriduk, defined 5 near surface targets for drilling on the western and northern flanks of Wart Hill.

**2012/2013 (MacDonald, 2013)**

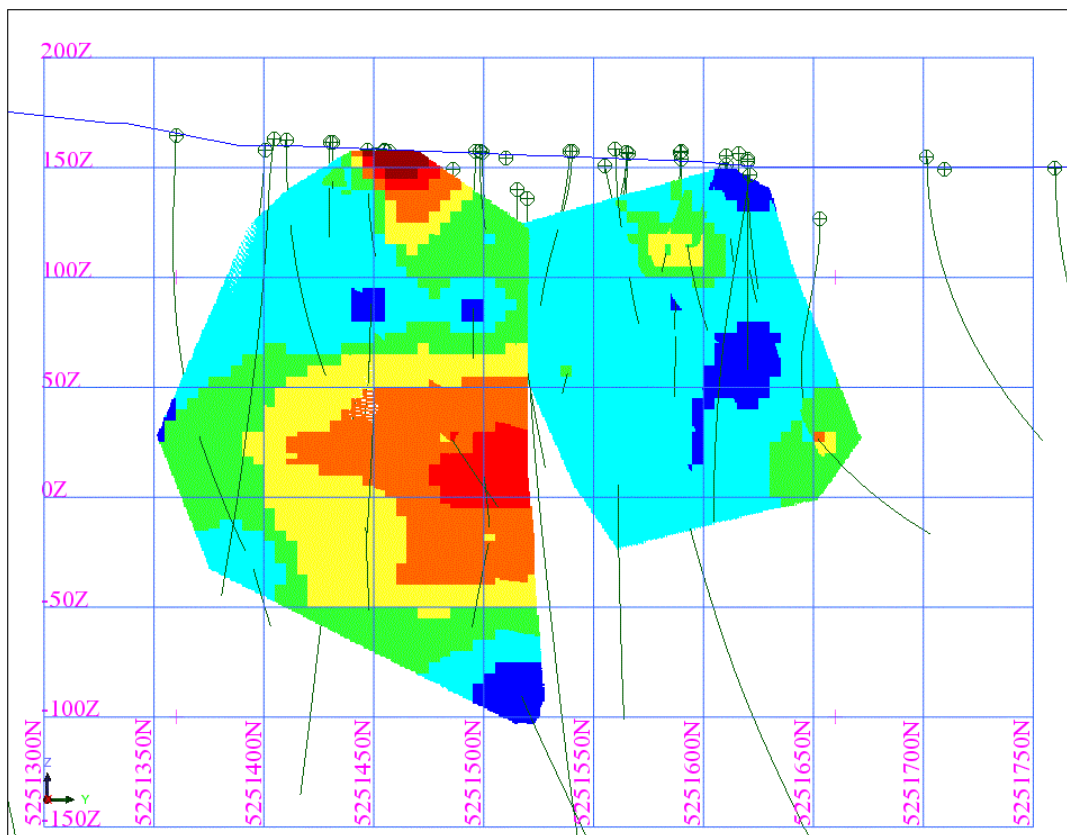
No field work was carried out in the year as Torque was focused on bringing its Stormont mine into production.

**2013/2014 & 2014/15 (MacDonald, 2014 and MacDonald, 2015)**

No field work was carried out in the year as cash flow from the Stormont mine had not eventuated.

**2015/16 (MacDonald, 2016)**

During this period the tenement was sold by Torque Mining Ltd. to Moina Gold Pty. Ltd. No fieldwork and limited desktop work (appraisal) was carried out in this period.



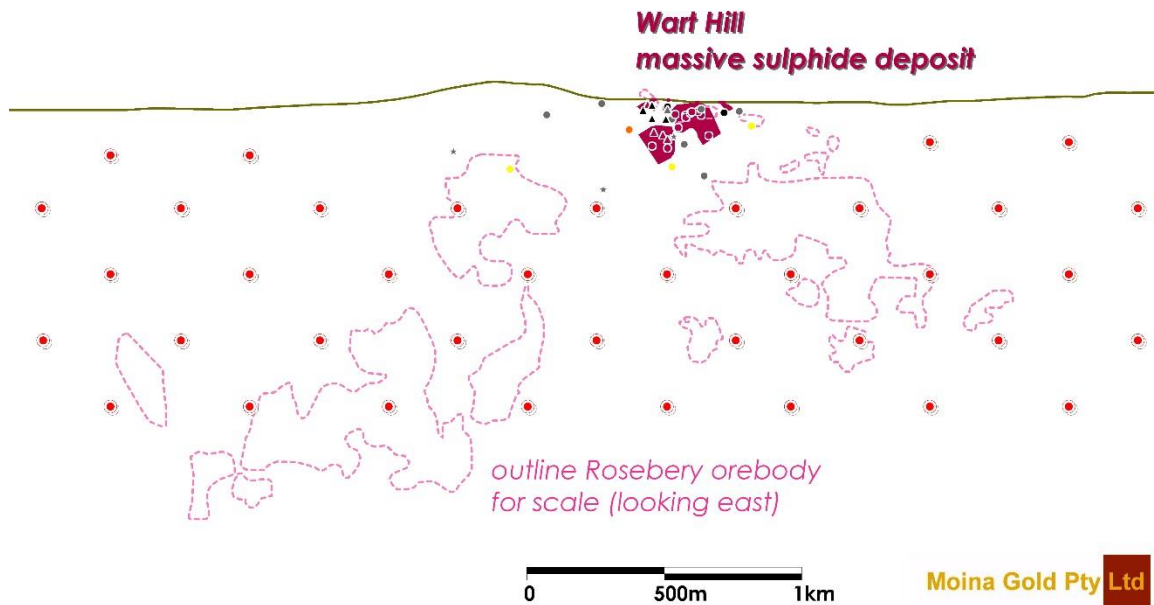
**Figure 2.6: Wart Hill massive sulphide deposit long section view showing gold equivalent grade looking west. Grid is AGD66.**

### 3.0 Exploration completed during the report period

The work undertaken during the reporting period consisted of planning for a drilling programme in the 2016/17 with an indicative quote received from a major drilling contractor.

The intention is to drill deep holes beneath the current drilling at Wart Hill with consideration of drilling at East Camp and Sassy Creek (Voyager 24).

⊙ = planned drill hole intercept



**Figure 2.7: Wart Hill massive sulphide deposit conceptual drilling programme showing outline of Rosebery orebody (reversed) for indicative scale.**

## 4.0 Discussion of Results

## 5.0 Conclusions

EL 20/1996 "Elliott Bay" has excellent potential for a large, high grade polymetallic massive sulphide deposit of Rosebery-type.

The current small resource calculated for the Wart Hill massive sulphide deposit of **665,400t @ 0.45g/t Au, 37g/t Ag, 0.09% Cu, 1.7% Pb and 3.38% Zn** consists of a mixture of both exotic clastic and arguably massive in-situ material and includes the massive **South Lens** resource of **46,500t @ 1.45g/t Au, 70g/t Ag, 0.27% Cu, 4.1% Pb and 8.03% Zn**.

The juxtaposition of clastic material and arguably in-situ massive material is unsurprising and is consistent with an active submarine environment. A Rosebery model of discrete lenses is suggested.

Deeper drilling is required to test the target horizon below the current level of drilling and beyond the penetration of geophysical surveys, however, the high calcite component and low iron sphalerite make EM less effective a tool and the resource is considered essentially unexplored beneath the range of current drilling.

High grade clasts e.g. **1.39% Cu, 12.8% Pb, 27.4% Zn, 75g/t Ag & 4.9g/t Au** point to the potentially very high grade of the primary source of the clasts.

## **6.0 Environment**

No fieldwork so no rehabilitation required.

**7.0 Expenditure**

**Total costs (est.)**

**\$3,000**

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