

**ANNUAL REPORT 2019/20**  
**EL16/2015 DIAMOND HILL**  
**WESTERN TASMANIA**



**Exploration Licence held by:** **Australian Mineral Resources**  
**2/29 Waruda St**  
**Kirribilli NSW, 2061**

**Report compiled by:** **Dean Delaney, June 2020**

## EXECUTIVE SUMMARY

AMR has held Exploration Licence 16/2015 over the Diamond Hill area since 4 March 2016.

Exploration activities 2019/20:

- field mapping, chip sampling and stream sediment sampling
- geological model development
- research on orogenic gold deposit and structural analysis
- modification of exploration and development plans.

The Licence area remains prospective for gold in Devonian veins. Historically, gold and barite have been found in economic concentrations, but ore continuity and volume were found too unreliable for sustained mining. Gold exploration in the area previously has been sporadic and incidental.

Mapping and geochemical sampling by AMR in the report period targeted two of the ten prospects identified in last year's report as vein-hosted gold shoot locations. Siting of cored boreholes for maximum data recovery is pending completion of the stage 1 exploration program (quartz reef and country rock mapping, chip sampling and stream sediment sampling).

Costs in 2019/2020 were \$41,949.

Exploration activities in the upcoming Year 5 will include:

- Continuation of the successful stream sediment gold sampling program coupled with quartz vein mapping to locate and test near-surface gold concentrations on the EL
- Detailed mapping around known and new prospect areas to ground-truth draft models of deposits, and inform preliminary drilling decisions and mine plans
- Commence shallow drilling beneath identified deposits
- Assess the viability and feasibility of extracting implied resources.

Along with gold, the program will concurrently test for barite and metallic mineralisation.

Minimal estimated expenditure for exploration in Year 4 of the Licence is \$100 000.

AMR is investigating funding opportunities and if successful the activities are anticipated to be intensified and expenditure commensurately higher.

### **Acknowledgement:**

AMR remains grateful for continued assistance from former licence-holder and EL16/2015 resident Rory Wray-McCann for field and logistics assistance, local oversight and invaluable contributions of knowledge, support and philosophy that have helped achieve and inspire our efforts.

**Cover photo:** Outcrop of Devonian quartz vein in Yolande River Sequence siltstone / fine sandstone interbeds (378850 mE 5344140 mN). Such veins were the target of field mapping in the report year.

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# 1. INTRODUCTION

## Report Brief

Tasmanian Exploration Licence EL 16/2015 continued to be held in entirety by Australian Mineral Resources Pty Ltd (AMR) throughout the reporting period 4 March 2019 to 4 March 2020.

To satisfy Section 204A of the Mineral Resources Development Act, 1995 (MRDA), AMR submits this document to report on mineral exploration investigations and expenditure undertaken in the fourth year of EL16/2015, and to update the nature of work proposed under the licence in the next two years.

## Location

The area covered by Mineral Exploration Licence EL16/2015 Diamond Hill is a 13 km<sup>2</sup> block lying 3 km north west of Queenstown on Tasmania’s west coast (shown as the faintly shaded block surrounding the yellow star on Figure 1.1 below). The Licence area lies around 220 km from Hobart on a west north-westerly bearing – about 4 hours’ drive from Hobart along the Lyell Highway.

Queenstown Aerodrome is located immediately to the South, the Mount Lyell Mining Lease lies one to two kilometres to the East, and the Zeehan (Murchison) Highway bridge crossing of the Yolande River is immediately North. The yellow star on Figure 1.1 shows the location of Diamond Hill itself, for which the area has been named. In the south east of the block, the Lyell Highway proceeds south west onward towards Strahan from its intersection with the Murchison Highway, which tracks north to Burnie on the north coast.

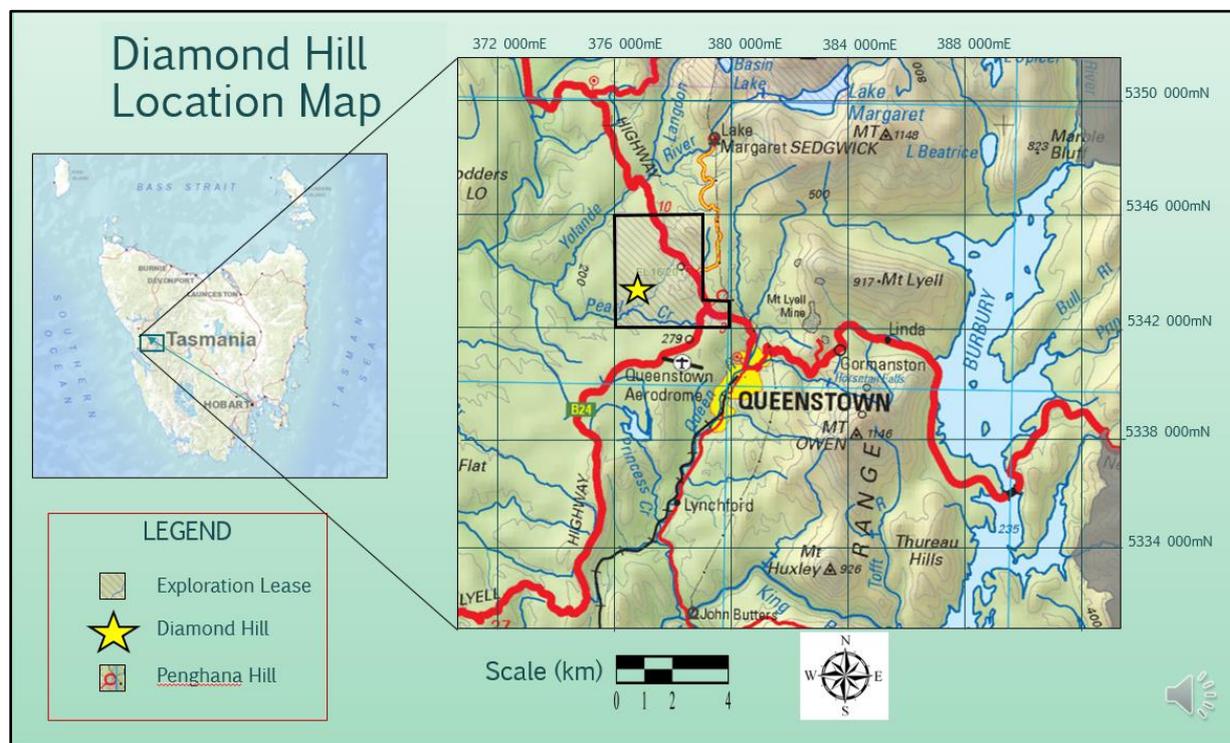


Figure 1.1: Location of EL16/2015 Diamond Hill

## Map Conventions

Coordinates in this report and in digital data associated with this report are recorded as GDA94: UTM Zone 55.

## Geographical setting

Compared to the nearby West Coast Range, the topographic relief of the Licence area is relatively flat, consisting of undulating hills with Diamond Hill standing out as a topographical landmark in the central south, and Davies Hill in the north east. Pearl Creek trends close to the full length of the eastern boundary of the Licence area and, to the south of Penghana Hill (AHD 300m) at the south-eastern corner, switches westward along the southern boundary. Diamond Creek runs diagonally across the block from Davies Hill (AHD 420m) in the north east to its intersection with Pearl Creek near the south-western corner. Topographically the catchments of these two creeks comprise the south eastern three-quarters of the block. The north-east quarter drains westward into the Yolande River. Topography is between AHD 250m and 300m, apart from at Davies Hill (AHD 420m), Diamond Hill (AHD 320m), and the Pearl Creek gully as it departs the area (AHD 120m).

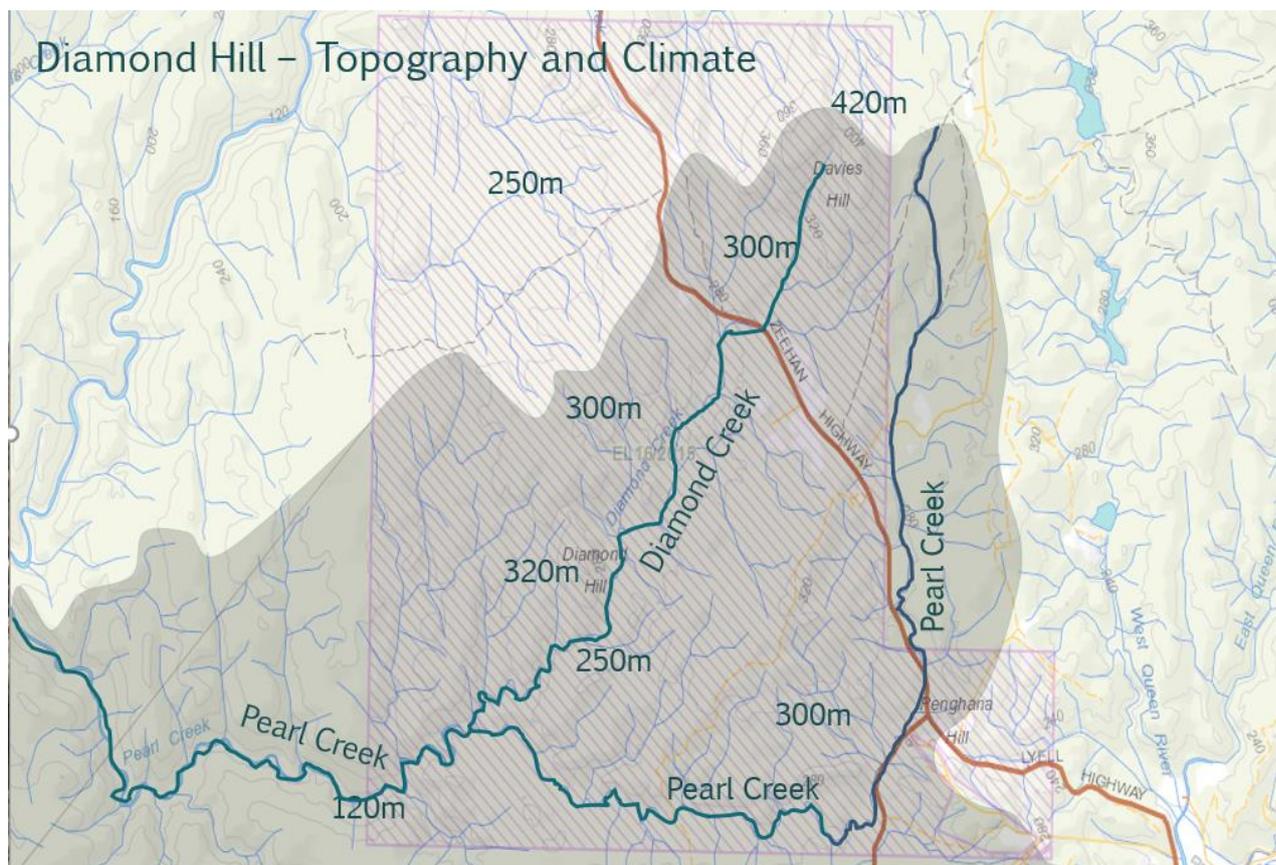


Figure 1.2: EL 16/2015 Topography and drainage pattern.

The vegetation in the area has been subject to regular wildfires over its history and was sourced for fuel wood in the early part of the last century. Most of the licence is now covered by heath, native grass swamps and dense tea-tree re-growth. The bedrock is siliceous, and topsoil is generally less than 50 cm deep and leached, but the area is also boggy and peaty in parts.

The Queenstown area has an annual average rainfall of about 2400 mm, with less than 30 days of clear skies annually, and a maximum daily temperature range of 12 to 20 degrees C.

## Access

The most southern 5 km of the Zeehan (Murchison) highway diagonally transects the eastern half of the block. This eastern half can be accessed off the Murchison and Lyell Highways albeit through thickly regrown scrub. A deteriorating fire trail (shown in orange on Figure 1.2) accesses the south-east quadrant. Access to the western part is limited to a walking trail route coming off the Murchison Highway a kilometre below the northern boundary, through the north of EL 16/2015. From this trail the Diamond Hill prospect has in the past been accessed overland, reportedly following the route of the Queenstown to Zeehan trail used at the beginning of the twentieth century. Apart from in the far west, Davies Hill and Stubbs Valley in the south eastern corner, the parts of EL 16/2015 not accessible by road are not steep or heavily forested but especially in creek gullies, access is becoming increasingly difficult following recent years of abundant tea-tree (manuka), sword grass and bauera regrowth.

## Historical setting and current land tenure

The Diamond Hill area was possibly ranged by hunters and collectors from the Peterndic band (Ryan, 1996 in Huys, 2010, see Appendix E) who could have passed seasonally through the Queen River Valley to the east (Corbett, 1980). The valley marks the easternmost limit of Peterndic / Toogee Country (Horton, AIATSI, 1996).

AMR acknowledges the ancestral first race inhabitants of the land and their descendants and undertakes exploration activities with due respect for Country.

The first European to explore the region on foot was Charles Gould who battled through the terrain in the 1860s. Gould named the relatively flat area consisting of Diamond Hill and the Queenstown Aerodrome area 'Honeysuckle Plains', although by the Twentieth Century the same area was known as Madam Howards Plains.

In 1881 Cornelius Lynch found alluvial gold in the Queen River valley and prospectors and miners migrated into the remote area. By the mid 1890's the alluvial deposits had been worked for over 40,000 ounces of gold. Source lodes generally had disappointed - 'did not live any depth' (Zeehan and Dundas Herald, 16th November 1891), yielding about 3,000 recorded ounces (The Mercury, 'West Coast Discoveries 1883'). Anecdotally, these yield figures are deemed minima, as miners achieved a better price for their gold by stowing it and cashing it in Victoria.

In 1893, the Mount Lyell Gold Mining Company was formed to mine copper. Interest and employment in gold, other than as a valuable accessory to copper, waned. In the 25 years from 1895, three million tonnes of timber were cut to fuel the smelter furnaces. The Queen River valley and hills were denuded by woodcutting and erosion, including the relatively accessible slopes and plains of the Diamond Hill area. It was a woodcutter who discovered the auriferous quartz reefs on Diamond Hill in 1914.

On the Diamond Hill Licence area, the creeks have been prospected for alluvial gold over the last 120 years. There is evidence of minor alluvial workings on Diamond Creek. In 1915 four adits were dug into Diamond Hill itself, to locate at depth and follow two gold-bearing quartz vein lodes, one that had been tracked on the surface for 300 metres and the other for 35 metres. Samples assayed in 1915 and 1916 at 1 to 3 oz/tonne (28 to 84 g/tonne), but such concentrations presumably did not persist underground as veins were only driven on for 15 metres either side of the exploration drives, at 15 and 25 metres depth.

Two small open cut barite mines operated in the area between 1910 and 1920, winning 1300 tonnes (300 m<sup>3</sup>) of high-grade (99.8%) barite.

Within the Diamond Hill exploration Licence area today there are six residential blocks under private freehold along the Zeehan Highway, but most of the area remains under the Crown. Roughly the western half of the Licence Area (see Figure 1.3) is DPIPWE Future Potential

Production Forest Area (Lot 192 on the Central Plan Register). This is publicly managed land and remains available under the MRDA 1995. There are small stockpile and gravel quarry reserves, opposite the Lake Margaret road and at the beginning of the Strahan road.

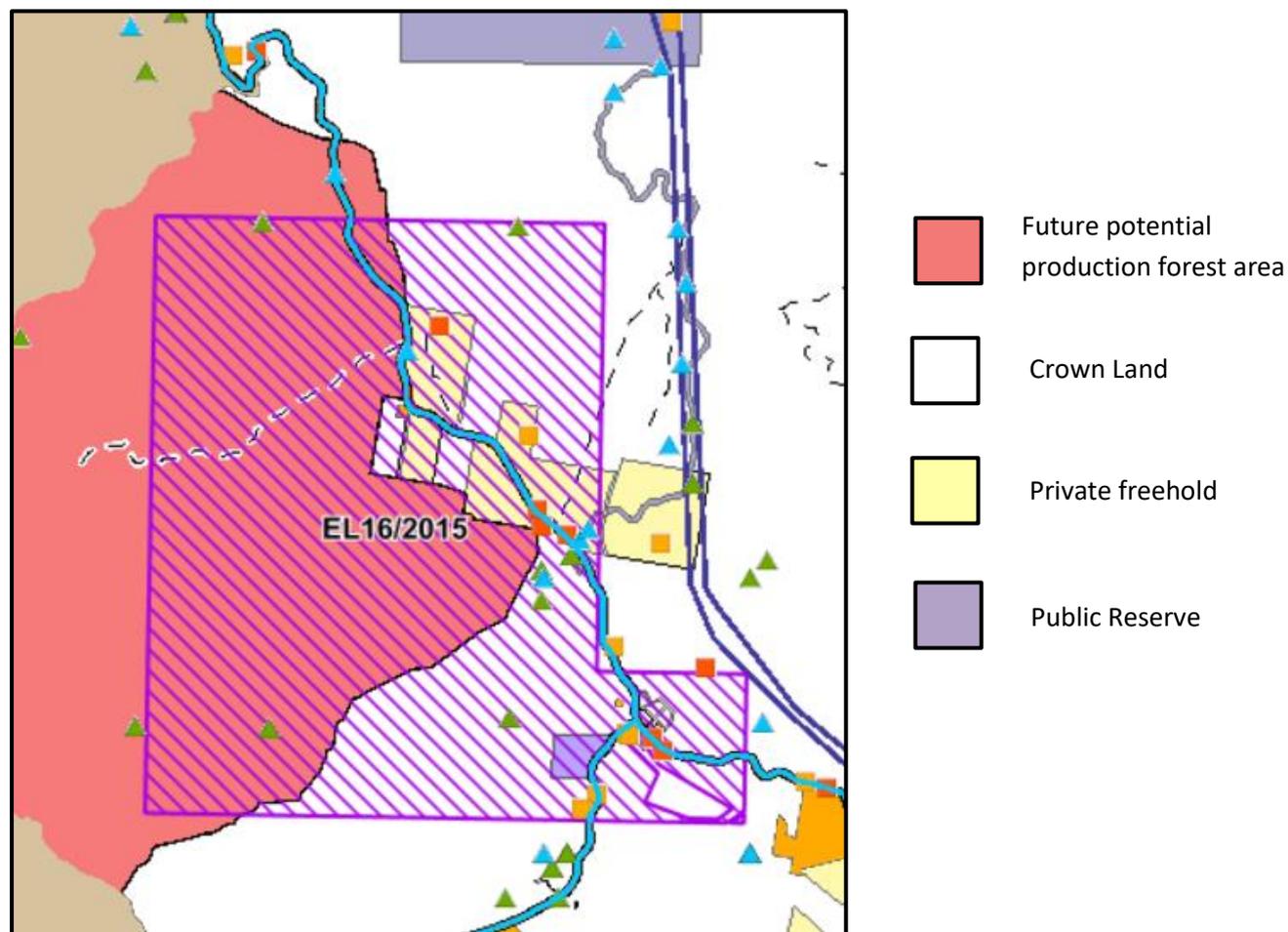


Figure 1.3: EL16/2015 Land tenure (Source MapList)

## Regional Geological setting

The following notes can be referenced to the 1:250 000 South West Tasmania sheet (Brown et al, 2005) and the 1:25 000 Professor sheet (Vicary, M.J. 2004) compiled by Mineral Resources Tasmania MRT (see Figure 1.4).

EL 16/2015 covers the south eastern third of a discernible geological wedge, herein termed the 'Yolande wedge', located:

- to the west of the Mt. Read Central Volcanics Complex (CVC) that outcrops at Mounts Lyell and Sedgwick;
- south east of the South Henty Fault; and
- north of the Firewood Siding Fault.

Rock units that daylight in the wedge are part of Mount Read Volcanics (MRV) series deposited in the Dundas Trough in the middle Cambrian (Corbett & Turner, 1989, and others). The MRV series is dominated by rhyolitic, dacitic and andesitic volcanics and volcano-sedimentary equivalents (Corbett and Solomon, 1989).

The surface rocks on EL 16/2015 are predominantly equivalents of the Western Volcano-Sedimentary Sequence (WVSS - Corbett et al, 2014) lithological association of the MRV, here known as the Yolande River Sequence, bookended by Central Volcanics Complex (CVC) sequences to the east and, probably, Tyndall Group rocks (McPhie & Allen, 1992;

Corbett, 1992) to the west. The highly prospective VHMS horizon where the Tyndall Group overlies CVC rocks has not been shown to outcrop on the Licence area. Shallow marine sedimentary units of the Devonian Bell Shale and Florence Quartzite stages of the Eldon Group are present south of the Firewood Siding Fault in the far south of EL16/2015.

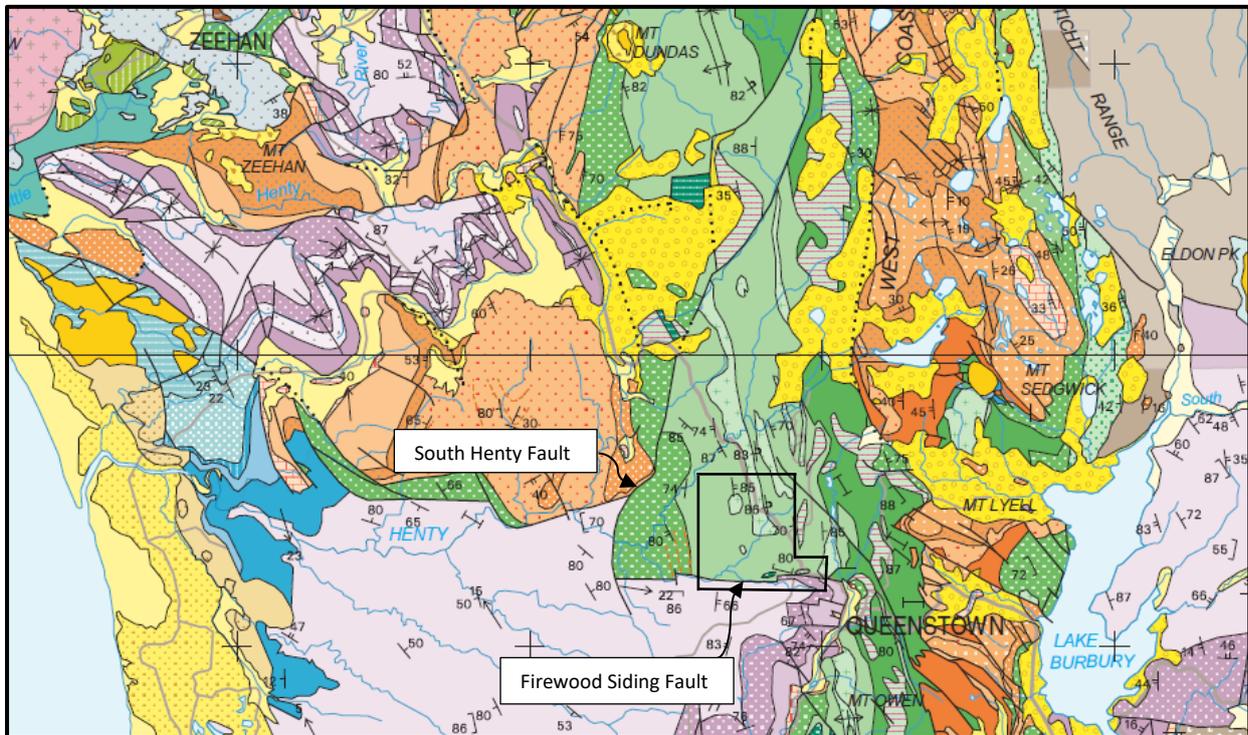
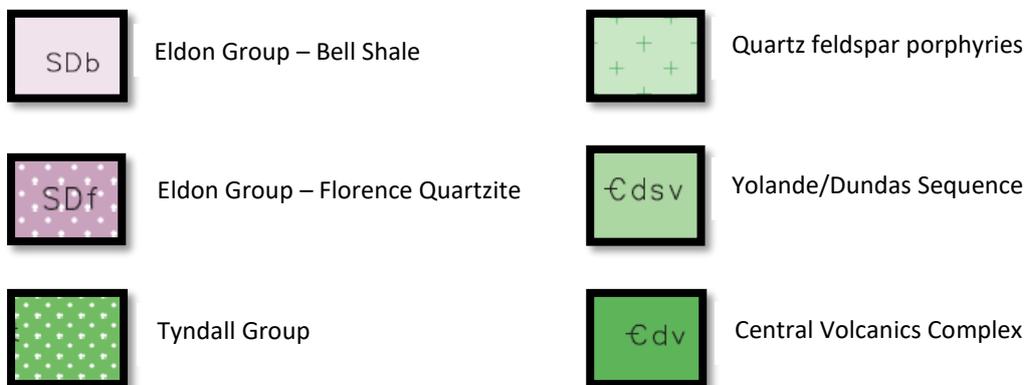


Figure 1.4: Regional Geology of EL 16/2015 (Excerpt from Brown et al, 2005)



### Local Geology

The following notes have been summarised from an investigation of source literature undertaken in the initial Licence year. Figure 1.5 shows the distribution of rock types and broad stratigraphy on EL 16/2015, sourced from TheList on the MRT website.

The pastel aqua colour (tinted blue in the Licence area) represents the undifferentiated felsic volcano-sedimentary silts, ash falls and mass flow deposits of the Yolande River sequence. Stratigraphic relationships in the Yolande rocks are assumed complex because of lateral facies changes, repetitious deposition, autochthonous debris flows, intrusion, past tectonics and structural disturbance. One undifferentiated sedimentary unit (cdsv: interbedded siltstone, sandstone mudstone), has been defined on the sheet, shown in light blue and trending NW along the Murchison Highway. Field observation has identified within it dark shales and siltstones striking north-south with a 75-degree dip to the west.

The NNW-trending dark yellow shapes represent quartz-feldspar-phyric porphyries - 'rhyolitic' (white hatching – MRV igneous suite I) and 'dacitic' (grey hatching – MRV igneous suite II) (Morrison and Griffiths 1998; Corbett et al, 2014) – that intruded the volcanoclastic sequence in the area. The work of Griffiths (1998) suggests convincingly that these lavas intruded wet, weakly-consolidated sediments several million years after those host sediments were deposited. The two lava types were probably intruded at different times from different magma sources, or different differentiates, forming sill-like flows parallel to the host bedding. The southernmost mapped outcrop of the rhyolitic porphyry hosts the Diamond Hill auriferous quartz veins. Griffiths (1998) mapped the Diamond Hill rhyolite to be a north west trending fault-bound block, unlike the pipe-shaped circle shown in Figure 1.5.

Two outcrops of Cambrian basalt occur in the south, adjacent to the Firewood Siding Fault within or abutting the Yolande volcanics. These have been reported as MRV suite III or suite 2b by petrology (both in Corbett, 2014, p175, p179) possibly correlated with the Lynch Creek and Que-Hellyer basalts.

In the remaining 5% of the area, the Devonian Eldon Group rocks crop out along the southern rim of the area, faulted against the Yolande River beds along the Firewood Siding Fault.

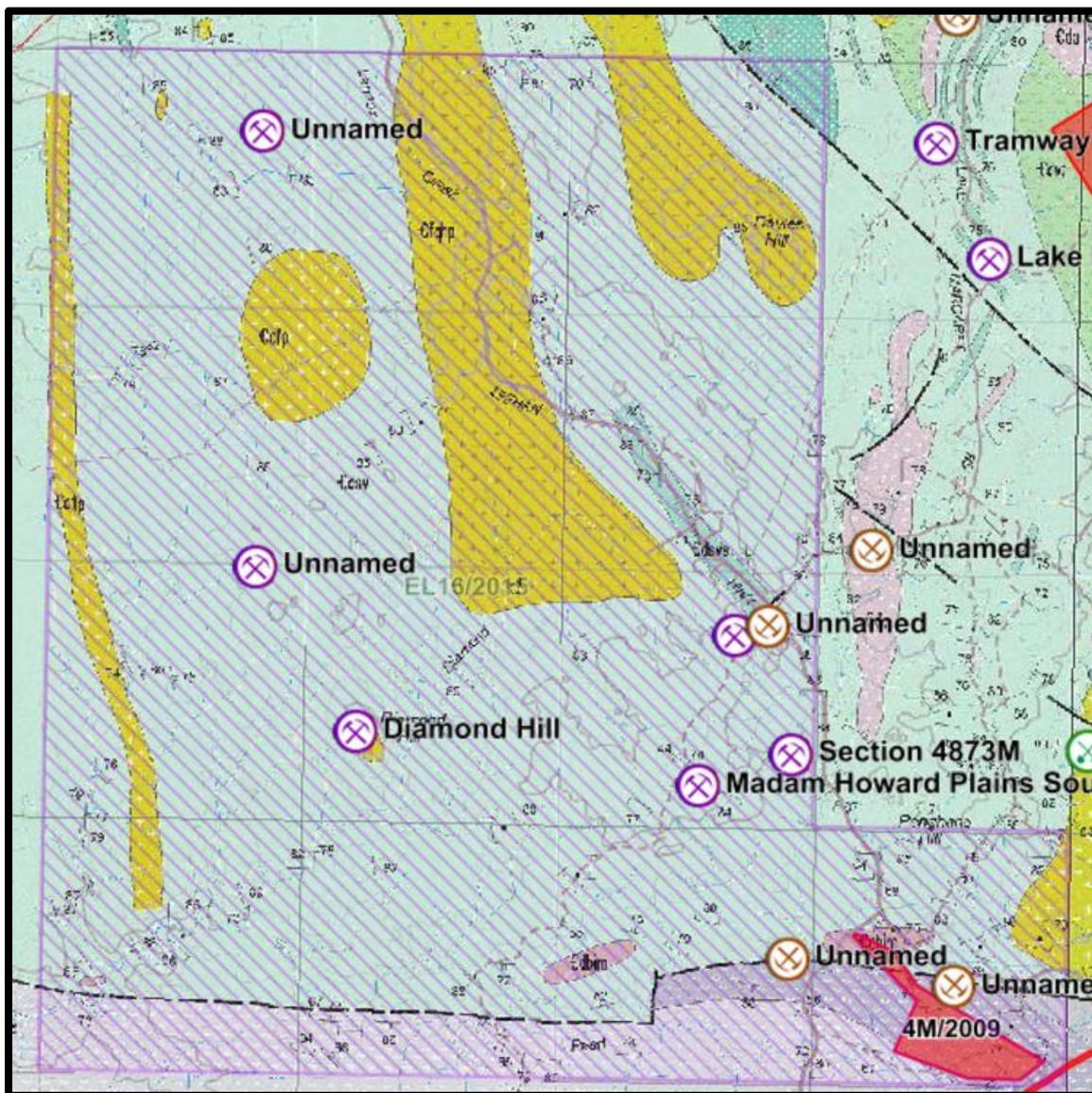


Figure 1.5 - 1: 25,000 mapped geology (Vicary, 2004. Sourced TheList – MRT)

Structurally, EL16/2015 lies in the north-south trending Dundas Trough that is generally expressed by northerly trending sub-vertical beds of Mount Read Volcanics either side of a subsurface Cambrian granite spine and centred 5 kilometres west of the Tyennan Block stratotectonic element. In EL16/2015, the sub-vertical stacks of Yolande River beds lie to the west of the CVC and granite spine, and are generally westerly-facing. The western 'shoulders' of the Cambrian granite body might be present at 2 km depth (Leaman, 1993). The extrapolation of the northwest trending Owen Fault transects the far north-eastern corner of the area, and the enigmatic east-west Firewood Siding Fault is in the south. Other faults inferred by previous explorers include:

- the NNE-trending Yolande River fault immediately outside the NW corner of the Licence;
- northeast or NNE trending faults inferred by Wells (1976): i) Davies Hill Fault trending along Diamond Creek and immediately south of the Diamond Hill mineralisation; and ii) Lightning Ridge Fault parallel and 500m to the south east, terminating the dacitic porphyry north of the Madam Howard Barite mineralisation;
- an ESE trending fault between the northerly and southerly adits at Diamond Hill inferred by Mt Lyell MRC in 1983; and
- a north-south fault tracing Pearl Creek inferred by the geophysical analysis of Leaman (1993).

## 2. PREVIOUS EXPLORATION

### Gold from Devonian quartz veins

During the late 19th and early 20th Centuries, Diamond and Pearl creeks and adjacent tributaries of the Queen and Yolande Rivers were prospected for alluvial gold. Hard rock excavation commenced after the Diamond Hill reef was discovered in 1914 and was abandoned in (probably) 1917. The Madam Howards Plains barite mines operated from 1917 to 1919.

Between 1971 and 2005, regional rock chip and sparse stream sediment surveys by mid-tier explorers (see Table 2.1) determined the gold and barite-bearing quartz veins to be beneath the threshold of economic interest. Modern explorers could not replicate the concentrations of gold reported by pioneering prospectors.

It should be expected that more than a century of corporate and amateur gold prospecting and panning has scoured the surface effectively for obvious visible surface concentrations. None has been officially reported; but there is evidence of alluvial workings in Diamond Creek, and anecdotal reports of panning success at the Lake Margaret road intersection and along the old tramway route that runs parallel to it, Madam Howards Plains South, Lennox Creek and Pearl Creek. Raggedy Ann Creek 1 km to the south of the Licence has rewarded local panning for a century.

The Diamond Hill area has been demonstrated to hold hard rock gold sources, present in the dual quartz vein lodes at Diamond Hill purported to contain native gold concentrations of 1 to 3 ounces per ton in hand-selected samples (Trove reference in Delaney, 2018). There are also two unrecorded excavations on veins 700m and 1500m north of Diamond Hill. Nearby, the McCusicks prospect 1 km to the east and Madam Howards Plains Gold Mine 1 km to the south were both worked for hard rock gold for two and ten years respectively.

## VHMS

The mid-tier mining companies that held several licences over the greater Yolande block between 1971 and 2005 were primarily exploring for metallic sulphides, given the area's proximity to the Mt Lyell copper-silver-gold deposit. Explorers held the concept that splays off the bordering major faults might form fault-bound blocks of Central Volcanics Complex (CVC) rocks with volcanic hosted massive sulphide (VHMS) potential. Several programs (see Table 2.1) of mapping, aerial and ground-based geophysics surveys, and stream sediment and rock chip sampling failed to locate prospective VHMS drilling targets. No CVC volcanic fault blocks were discovered, and it became progressively apparent that massive sulphides are unlikely to have been emplaced during deposition of the Yolande Sequence, because these volcano-sedimentary, mass flow and shelf deposit rocks were deposited under open-basin deeper marine conditions distal from the flanks of the VHMS-rich central belt of Mount Read CVC volcanics (Purvis, 1983). Additionally, throughout the MRV footprint, VHMS ore deposits occur only within about a 1 km band westward of the crustal scale Great Lyell Fault system that lies 2 km west of easternmost EL16/2015.

In 2007, drill hole MH04 intersected a metre of galena-rich veinlets assaying 7.9% lead and 5 ppm silver, in siltstone / fine-grained sandstone at less than 128m depth.

### Metallic sulphides in rhyolitic and dacitic porphyries

Quartz feldspar porphyry intrusions in the Yolande sequence were sampled between 1971 and 2005, including core from the Department of Mines boreholes (Groves, 1964) at the Madam Howards South mine. The sampling found no economic concentrations of metallic sulphides or precious metals in the porphyries, and only sporadic low-grade albitic, chloritic, sericitic and sideritic alteration – often adjacent to Devonian quartz veins.

### Remobilised VHMS gold (Henty-style)

The Licence holder over the Yolande block between 2003 and 2006, Glengarry Resources (Richards, 2005), explored for a Henty-style remobilised VHMS gold deposit. Surface sampling indicated that if such a deposit exists it would be deeply buried and not economically recoverable.

### Recent exploration

The most recent Licence holder over the area (LIDDS, 2006 – 2013) completed five boreholes with renewed interest in the potential for gold, sulphides and barite associated with structural features near the eastern boundary. Evidence of low-level anomalous gold in veins, broad albite/sericite alteration in one of the porphyry types, in MH DDH04 a metre @ 7.9% Pb and 5.0 g/t Ag at 128m and 3 metres @ 0.65%, zinc in veined siltstones, trace base metals and several shear zones were considered encouraging (De Vries, 2010; Callaghan 2012). LIDDS was unable to continue exploration due to personal circumstances.

There was no recorded exploration between 2013 and when AMR acquired the Licence area in March 2016. The following table summarises the recorded exploration activities relevant to the Diamond Hill area up until 2020, including the AMR program.

## Summary of Exploration prior to 2018/2019

Period	Company	Tenement	Activity and result
1915-1917	Diamond Creek Prospecting Association	Mining Licence	Adits were developed to explore two ESE trending gold-bearing quartz veins 40m apart at a depth of 25m. No further record of Company after March 1917. Possibly failure to raise capital to proceed further or deterioration of ore laterally and /or with depth.
1910-1920	Colonial Barite Company	Mining Licence	Trenched an ENE trending 600m-long quartz and barite vein up to 3m wide, developing 60m of it to 5m depth. 500m further to the NE, three adits were developed on a discontinuous 400m-long NNE trending vein. 1336 t of 99% BaSO <sub>4</sub> were recovered altogether.
1962	Mines Department		3 shallow inclined cored drill holes in 'keratophyre' at Madam Howards Plains South barite mine targeted vertical extension of the barite lode. The lode, if vertical did not persist at 50m depth more than a thinly quartz-veined keratophyre interval 1-2m thick averaging 13-26% Ba.
1971-1983	Mt Lyell Mining & Railway Co.	EL47171 & EL 9/66 (Yolande area)	<p>Rock chip geochemistry (ironstone gossans).          1973-1975 stream sediment geochemistry failed to deliver economic results but did not test for gold.</p> <p>6 line km of gridding &amp; IP survey over Madam Howards Plain (Howland Rose, 1984); 7 weak and 1 moderate IP anomalies; strongest anomalies coincided with mapped black shale units. The gridlines did not intersect the main barite lodes. Follow-up soil geochemistry yielded one 200 ppm Pb anomaly. Quartz keratophyre host rocks intensely altered/weathered? to clay.</p> <p>Rock chip assays - Diamond Hill (max 2 ppm Au).</p> <p>1981-1983: <u>Regional</u> stream sediment (379 samples) and rock chip (72) geochemistry survey (only few sampling for Au): South of Madam Howards Barite 1.2 ppm Au; Pearl Ck (1050 ppm Cu, minor Pb, Zn); Gold Ck (1km north of EL 16/2015) 1.6 ppm in sediment but no significant Au from country rock.</p> <p>1980 regional airborne EM (Dighem) survey - low confidence in inconsistent results (Morrison, 1998).</p> <p>A 1983 Yolande area review found small gold workings were centred on east-west quartz veins, in rocks varying from Cambrian acid-intermediate porphyries to Siluro-Devonian sandstones, the unifying feature being the ability of the host lithology to form open fractures. Alteration of the host rocks is generally absent, apart from moderate sericitization at Diamond Hill, adjacent to hydrothermal veins.</p>

1984	Gold Fields Exploration Ltd	EL 9/66	Supplementary stream sediment and rock chip geochemistry confirmed anomalies at Pearl Ck (Cu), Madam Howards South (Au), Gold Ck (Au, Zn) sources undiscovered.
1985-90	Cyprus Minerals	EL 11/85	No work on Diamond Hill area.
1991-95	Pasminco & minor partners Hudspeth/ Norgold/Arimco	EL 25/91	Exploration for Tyndall / CVC - 'Holy Host' horizon. 1993 Geoterrex Helimag/radiometrics survey - regional structural geology interpretation. Results interpreted by Leaman (1993) revealed a major syncline, to the west of present EL 16/2016, shaped by NE, NW and subordinate E-W structures; structurally and magnetically distinctive volcanic units to the east with N-S trends.
1996 – 2002  Work ceased in 1998 and ground relinq'd in 2002.	Copper Mines of Tasmania (CMT)	EL 27/1995	Continued exploration for VHMS mineralisation associated with Tyndall group contact with Yolande sequence, east and west limbs of Leaman's syncline. Surface quartz and barite veins chip-sampled and assayed in the area around the Madam Howards Barite prospects - only one record of gold above 0.005 ppm (0.013). The quartz, carbonate, barite veins and felsic volcanic host rocks from the 1962 drill holes at Madam Howards were assayed for gold. Results only marginally higher than surface samples with best results 1m interval at 0.12 ppm and 2.5m at 0.11 ppm. At Diamond Hill prospect, 10 of 51 surface rock chip samples assayed >1ppm Au - maximum of 18.3 ppm. B/C horizon soil geochemistry traverse inconclusive. Pan concentrate drainage survey recorded gold anomalies around Diamond Hill and Madam Howards, in marked contrast to the earlier -80# survey. This contrast may reflect gold particle size distribution (Morrison and Griffiths, 1998). BSc Honours project on the Diamond Hill area included surface and adit mapping, ground magnetics and soil samples (Griffiths, 1998). A-horizon soil samples gave a stronger gold response than B/C-horizon samples.
2002-2005	Glengarry Resources		Mapping and soil sampling of 3 east-west lines traversing the westernmost 1.5 km of the central Diamond Hill area. 30 rock chip samples at Madam Howards Barite (highest 0.4 ppm Au in vein quartz); Diamond Hill (highest 1.4 ppm in quartz vein) and north and south Yolande tracks (0.008 and 0.010 ppm). Defined a NNW trending 'Au-prospective' corridor 250m wide.
2008	Wray McCann, Stringer	EL28/1995	Field investigations in Davies Hill area including Diamond Creek tributary sluicing sample (~5ppm Au in sediments). Drillhole Davies Hill DDH 1 (length 150m, inclination 50° to 255) intersected interbedded

			tuffaceous sandstones and dark grey shales consistent with the Cdsvs sequence.
2006 - 2012	LIDDS / Stebbo's Diamond Drilling	EL1/2006	<p>LIDDS aimed to drill geophysical anomalies.</p> <p>MH04 (208.2m deep) 70° inclination to 200° grid azimuth: intersected 180m interbedded light grey vitric and dark grey volcanoclastic siltstones, and 28m 'pink' siltstone (no veins, slight bleaching). 3m interval of Qz veining @ 15m depth, 1m Qz vein @ 36m. 128-165m moderate stockwork quartz-carbonate-chlorite-sericite veining with minor base metals. Peak assay of 1.0 metre @ 7.9% Pb and 5.0 g/t Ag from 128.20m. No anomalous gold in alteration zone (&lt;0.01 ppm). Veins not sampled.</p> <p>MH05 (200.2m) 55° inclination to 280 grid azimuth: intersected 38m quartzite-sandstone, 33m rhyolitic porphyry/lava, 14m black shale, 5m sandstone, 66m fawn sericitic (vitric?) siltstone, 44m interbedded pale green siltstone/black shale. Quartz/siliceous veins throughout, shear zones, faults - spacing ~10m, and low-level sericitic alteration. 1.2m@2.5ppm Au at 90m depth in siltstone(?), 1m@1 ppm Au in Qz/carbonate vein at 159m. 0.5 ppm @ 135.7m. All other individual metre samples including veins &lt;0.1 ppm.</p> <p>MH06 (140m deep, 55° at 105 azimuth) targeted a sub-cropping quartz vein in porphyry 200m along strike NNE of the northern Madam Howard barite. Borehole intersected a broken 2.5m Qz-rich fault zone @ 25m depth (unsampled), above a 7.5m sericite/siderite-altered cream-brown porphyry with trace disseminated euhedral pyrite, 13m of Yolande sequence volcanoclastic mass flows and vitric siltstones, and a 94m pale-red albite-altered porphyry tending pale grey-green in phases, with fine disseminated pyrite to 0.5%, zones of weak sericite-chlorite alteration containing gold above detection (&lt;0.6ppm) in small 2-10cm Qz-carbonate-pyrite stockworks. One 0.9m thick Qz-carbonate vein in porphyry at 119m assayed 1.4 ppm Au.</p> <p>MH07 (length 99m, inclination 50° to 105) drilled 20m across bedding strike from MH06 and 50m south. Although thinned – probably by faulting – the two porphyries were present, surrounded by siliceous volcanoclastic silts and mass flows.</p> <p>MH08 (44m, 50° at 105 azimuth), 68 m long, 25m across strike and 28m north of MH06; intersected tuffaceous silts, sandstones and mass flows but no evidence of either porphyry. No significant alteration, faulting or quartz veining.</p>

2016-2019	Australian Mineral Resources	EL16/2015	<ol style="list-style-type: none"> <li>1. Compilation and summary of exploration reports and historical records of mining, and prospecting to date</li> <li>2. Model development: Research and application of regional structural geology; interpretation of electromagnetic, gravity and radiometric reports; licence-wide structural geological and stratigraphic model; models of known in-Licence deposits.</li> <li>3. Research into orogenic vein-hosted gold deposits</li> <li>4. Purchase of equipment in anticipation of exploration program (including 2 drill rigs)</li> <li>5. Geological mapping and chip sampling to validate existing maps and ground truth draft models</li> <li>6. Commencement of a mini-catchment based stream sediment gold sampling program</li> <li>7. Conception and initiation of a gravel provenance study to overcome lack of outcrop and accessibility for normal mapping</li> <li>8. Lithological re-log and photographing of Madam Howards Plains MH DDH 05 to DDH 08</li> <li>9. Sampling and assay of MH06 – MH08 core.</li> </ol>
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### 3. EXPLORATION RATIONALE

#### Philosophy

The objective of mineral exploration is to enable estimation of the quantity, quality and spatial dimensions of a resource to a defined level of confidence, prior to consideration for extraction. AMR believes that the most rigorous way to economically explore for mineral resources at regional, local and deposit/prospect scales is a scientific approach to mitigate uncertainty around the investment decision. There are three steps.

1. Integrate all accessible existing information and relevant evidence into a hypothesis and a preferred geological model.
2. Design and implement the exploration program itself, to test the premises of the hypothesis and fill information gaps in the draft geological model. The results of the exploration program prove, reinforce, adjust or disprove the hypothesis and model.
3. If the premises can be assumed to be sufficiently true, then the hypothesis is supported, and the third stage is to apply the preferred model to the specific deposit(s) to reach a quantitative estimate of overall resources and economics (which entails further proof by drilling).

## Exploration objectives for EL 16/2015 Diamond Hill

**To locate all places in and around the licence block where the conditions for ore deposition have occurred.**

1. Define surface lithologies
2. Locate stream sediment gold and other concentrations in mini-catchments
3. Determine fault/vein orientations and geometry
4. Differentiate auriferous veins from barren veins
5. Adapt model
6. Sample and assay surface occurrences
7. Drill intersections.

AMR is exploring primarily for orogenic vein-hosted gold on the Diamond Hill block. The presence of high-grade barite in the same vein type offers synergistic value in exploring concurrently for barite. The potential for volcanogenic iron oxide copper gold ore and metallic sulphides in the east of, and at depth in the area will be concurrently assessed.

Regional geophysics and broad surface sampling for gold and metallics over the past fifty years has not led to the definition of prospective minerals targets other than Diamond Hill itself, but there is evidence of multiple small rich concentrations of gold on the Licence and to the north, south and east of it. AMR is undertaking a methodical exploration program to locate the sources of alluvial gold in creek catchments; and investigate the geometry, spatial persistence and gold concentrations of the veins.

The incentive for AMR to invest in such a program is the proliferation between about 1885 and 1915 of quartz reef prospects throughout the Queen River valley. During this West Coast gold rush, prospectors tracked alluvial shows upstream to locate source 'lodes'. Once the lode was pegged, tracked, trenched and assayed, money was sought to fund teams of usually less than five miners to chase the metre-scale reefs and gold shoots underground using hand tools, and to set up water-driven separation plants ('stampers'). Few mines persisted below the water table, and not one lode lived up to expectations. The gold 'shoots', initially discovered at the surface at concentrations often exceeding an ounce of gold per ton (28 ppm) were found to 'peter out' laterally and with depth within their quartz reefs.

Today, technology, accessibility, ore treatment, and geological and mining knowledge have advanced, exploration and logistical costs have decreased significantly, and gold price increased significantly in real terms over the 100 years during which the prospects have lain dormant. A reconsideration is due of the nature of these deposits - their extent, quality, the method of potential extraction, and their economics. The Diamond Hill block alone might not hold the resources to be cost-effectively developed, but if the area under Licence can be expanded to include other reefs in the area, then economies of scale could make development viable.

## 4. EXPLORATION RESULTS – Work completed in EL16/2015 for Year 4 (2019/20)

Field exploration during the fourth year of the Licence to 4 March 2020 consisted of:

1. Continuation of the mini-catchment based stream sediment gold sampling and AAS assay program (Davies Hill / Diamond Creek / Whipsnake Creek catchments)
2. Ground-truth mapping and chip sampling, including quartz vein orientations.

2019/21 plan	2019/20 status
Stream sediment sampling field program (200 sites = 80 man-days): Priorities are Madam Howards South, Davies Hill West and a trend-line NNW from Diamond Hill. This completes coverage of mini-catchments draining the known rhyolitic porphyry outcrops in the tenement.	Sampled Davies Hill, Stubbs Valley and Peevor's Lode catchments (40 sites = 30 man-days). Site access time-consuming.  40m-spaced sampling of 'Fettlers Creek' – 2 tributaries of Diamond Creek headwaters at base of Davies Hill.
Surface mapping for possible source lodes, vein outcrops, faults, lithological boundaries, and rock samples.	Veins mapped where observed in sampled areas and road cuttings, veins across creeks noted, rock samples taken for mapping purposes. Work ongoing.
Map Diamond Hill and Davies Hill prospects in detail.	To be completed 2021
Trench and assay prospective vein outcrops.	Postponed
Complete structural logging of MH06 – MH08	To be completed 2021
Augment existing structural interpretation to identify potential significant fault intersections.	Structural interpretation augmented and potential significant fault intersections identified.
Locate assay samples and core from previous drilling.	MH05 assay results located. Supplementary sampling required. Chip samples from Davies Hill RDH1 located, assay withheld.
Cost, fund and arrange shallow drilling program for Davies Hill and if possible, Diamond Hill or Madam Howards South.	Shallow drilling program for Davies Hill planned (500m in 2-3 holes). Contingency program designed for Diamond Hill (360m in six cored holes) and Madam Howards South Barite (200m in four cored holes).
Prepare a justifiable resource assessment.	Still insufficient data.
Investigate vectors for high-sulphide gold deposits, including As.	Multi-element sediment sample results showed no correlation of Au with As, Bi, Fe or Ba. Geochemical vectors not indicative for the native orogenic vein gold typical of EL16/2015.
Conduct preliminary research into gold ore concentration and deterioration.	Completed (10 days)
Check borehole locations with GPS	To be completed 2020 program.
Submission of data and reports to MRT	All stream sediment assay results and core photographs to 2019/20 provided in database-compatible format.
Draft a model in freeware packages and populate with preliminary data.	Current modelling and data being input and prepared digitally in Excel for future conversion into commercial package (as 2018/19)

## Lithology and Stratigraphy

### Outcomes:

Interpreted and observation geological maps of EL16/2015 have been updated again in 2019/2020 (see Figures 4.1 and Appendix E). Patterns have been detected in the Yolande Sequence rocks enabling interpretation of a theoretical 'test' stratigraphy, despite and accounting for, the complexity of lateral facies changes, repetitious deposition, intrusion, past tectonics and structural disturbance.

- The igneous rocks on EL16/2015 could represent a classic BADR crustal melt differentiation sequence (Basalt-Andesite-Dacite-Rhyolite; Solomon, 1965). The composition of volcanoclastics is predominantly acid/intermediate felsic.
- The distribution and configuration of the rhyolitic and dacitic porphyries, following structural interpretation, supports the observation of Morrison and Griffiths (1998) that they are generally conformable with host bedding. If the porphyries are part of the same BADR sequence as the Penghana and Crown Hill andesites to the east, then they are several million years younger than the Yolande volcano-sedimentary sequence in which they occur (Andesites Crown Hill 474 Ma – Baillie and Green, 1984; Penghana 494 Ma Vicary (2017 pers. comm.)) and thus must have intruded or burrowed as sills into lightly consolidated Yolande volcanoclastics as part of a volcanic event that occurred several million years after CVC/Yolande deposition (so Tyndall age or early Ordovician). Despite their intrusive nature, the porphyry sills appear to be consistent in their stratigraphic position within the Yolande host rocks in the area.
- The 'enigmatic' Cambrian basalts outcropping immediately north of the Firewood Siding Fault, being coarse-grained and almost andesitic could be fault emplaced sills younger than the host Yolande River Sequence rocks. These basalts have not been dated, however, and they could alternatively be contemporary with the Lynch Creek basalts that occur at the base of the Yolande / Western Volcanic sequence.
- A 'straw-man' stratigraphic column for rocks found on EL16/2015 is presented at Figure 4.2. This model stratigraphy is to be tested by mapping, drilling and researching stratigraphic information from neighbouring areas. It was developed using MRT mapping records (mostly Everard, 1982, unpublished data) and AMR's mapping.
- Quartz veins have proved to be more difficult to map than anticipated. Road cuttings and rare creek exposures sometimes offer orientations and thickness estimates, but most evidence of veins consists of concentrations of quartz float on the regolith and, deceptively, in eluvium. When observing quartz float, a location and vague trend might be recorded along with a relative idea of width, but dip and dip direction are not measurable. The unreliability of trend and width of exposures is demonstrated at several sites where measurements change within 1-2 metres. The pattern of veining appears to be as a series of lensoidal pods of undetermined depth, bound by depositional (bedding) and structural changes in rheology. The spatial extents of gold concentrations within veins has been modelled but not yet verified by assay. Due to the abundance of quartz fragments on the Licence, rock chip samples have not yet been selected for assay. Gold in surface quartz will be assayed as the stream sediment results better define targets.
- Gravel provenance. As noted in prior reports (Delaney, 2018), outcrops are rare due to mechanical and chemical weathering, and made obscure and inaccessible by vegetation, regolith, colluvium, alluvium and humic accumulation. Detailed mapping is not achievable without clearing and/or excavation. During 2018/2019, AMR realised that with little extra time, gravel samples can be collected from stream sediment sites for later clast identification and sorting – resulting in empirical evidence of rock types that must occur within each mini-catchment. Results can be incorporated into observed mapping, and correlation of dominant rock type and quartz components with gold assays should prove valuable. Consequently, gravel samples have been retained

from all stream sediment sampling sites. Sorting and identification is under way but has yet to be completed and compared with mapping.

**Implications for exploration:**

Stratigraphy and lithology in the area remain of importance for achieving AMR's exploration objectives:

- The rheology of adjacent rock types is an indication of vein and alteration zone ore potential, so stratigraphic relationships (e.g. porphyry/shale) are a guide to prospect locations.
- The consistent conformable nature of the porphyries along with distinctive magnetic signatures (where present) makes them useful marker horizons for mapping and structural interpretation.
- Where adjacent rock types don't have a direct stratigraphic relationship, there is faulting, with potential vein infilling or alteration pathways. Sharp linear lithological discontinuities/boundaries in outcrop indicate faulting or bedding changes, both of which could have accommodated hydrothermal venting.
- Theoretically, the BADR magmatic differentiation sequence would provide evidence for interpreting the stratigraphic facing of the vertically stacked strata, due to the density and viscosity differences between the magmatic fractions. These physical characteristics generally result in the earlier, denser mafic magma intruding lower and further into the sediment pile and the final, rhyolitic sills ending up stratigraphically higher. (Telford in Hine, 1994 in Griffiths 1998, McPhie and Allen, 1992). Once uprising magma reached rocks or sediments less dense than itself, it would have ceased to rise further. If the magma did not encounter sediments of lower density, then it continued upward until it extruded to the surface.
- The basalts are unlikely to have been emplaced by the Firewood Siding Fault and are more likely to have been intruded as sills into the Yolande sediments during the Tyndall volcanic event towards the end of deposition of the Mount Read Volcanics. Alternatively, these occurrences could be similar to the Lynch Creek Basalts to the south of Queenstown, representing a lowermost stratigraphic element of the WVSS.
- In some areas (Victorian goldfields, Carolina Slate Belt) carbonaceous lithologies (eg graphitic shales) are thought to chemically catalyse gold deposition. Black shales are present in the Yolande Sequence.

More needs to be known about surface and sub-surface geology. Despite paucity of outcrop and drill holes, AMR should continue to refine geological maps through mapping and evidence-based reinterpretation.

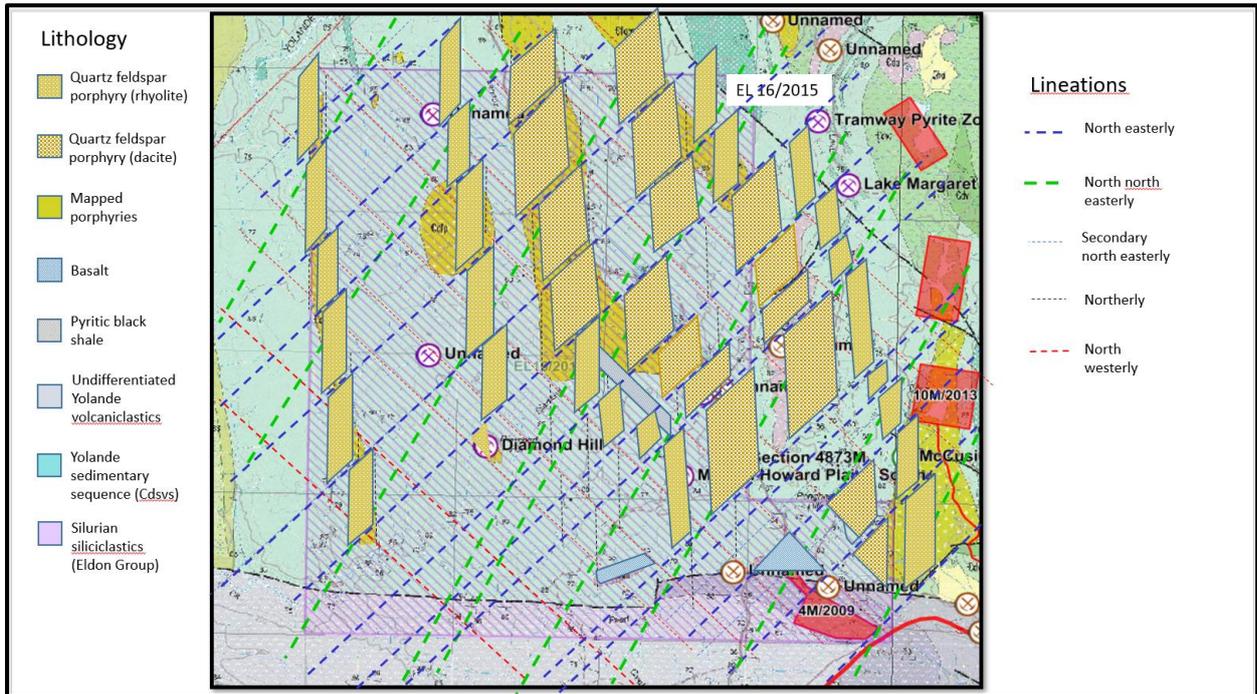


Figure 4.1: New interpretative geological map

Figure 4.1 shows AMR’s interpreted distribution of lithologies based on field observations, previous mapping and geophysical interpretation. Ongoing field work will include truth-testing of this as part of the Licence-wide model, including the conjectured existence of the porphyry blocks in the fault-bound bands north east of Diamond Hill, which do not exhibit the typical magnetic signature of the dacite porphyries.

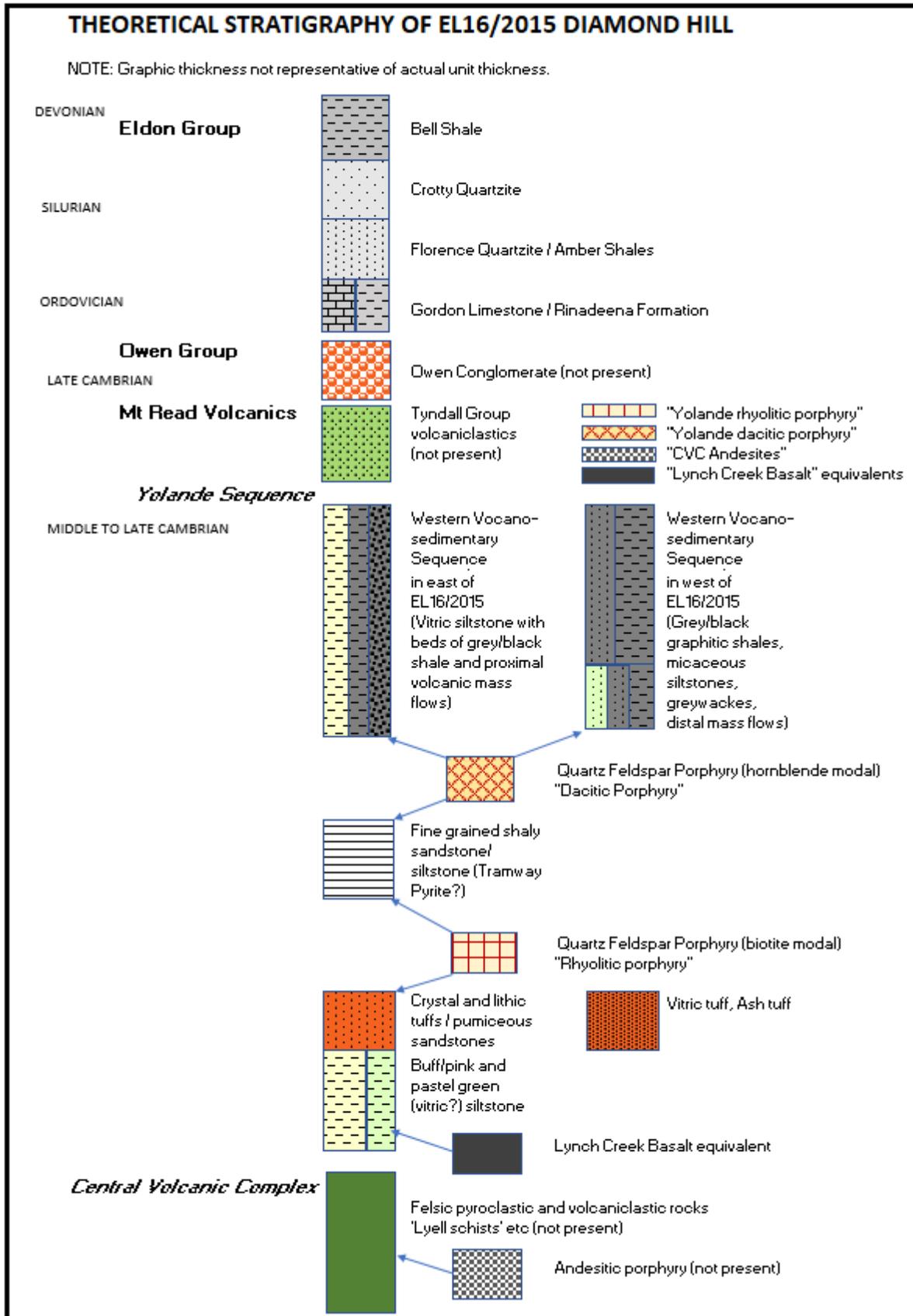


Figure 4.2 Interpreted stratigraphic column

## Tectonics and Structure

### Outcomes: (Structural model)

AMR's regional structural assumptions are:

Cambrian pyroclastic and volcanoclastic MRV sediments were laid down on the eastern margin of a subsiding back arc basin, accommodated by basin subsidence along northerly trending en echelon normal faults in the basement. One of these northerly crustal structures was the Great Lyell Fault. The basement features resulted in the overlying sediment stack being gently folded along sub-horizontal north-south hinge lines.

In the Late Cambrian, subcrustal tectonism associated with the continuing Tyennan / Delamerian Orogeny started to elevate the Tyennan Block massif. The Tyndall volcanism event occurred nearby, possibly exploiting the Great Lyell Fault, and the unconsolidated sediments were intruded by burrowing lavas that formed porphyry sills generally conformable with bedding planes. The rising Tyennan Block caused the more proximal crustal faults to reverse, steepening the Cambrian strata.

By middle Devonian time, a generally ENE vergent compressional tectonic event (D1) imposed steeper northerly folding and NNW thrusting on the rocks and probably further reversal of the northerly crustal faults. The outcome in the rocks now underlying EL16/2015 was a block of mostly sub-vertical north-south trending beds of Cambrian volcanoclastic rocks, dislocated and duplicated by NNW thrusts. The steep bedding could be the limbs of tight fault-bound anticlines and synclines or snapped thrust sheets of competent siliceous strata, and it still reflects the larger-scale crustal features beneath.

In the Late Devonian (D2), closely-spaced north-east directed sinistral wrench shearing resulted in an apparent NNW regional trend to bodies of rock that internally retained north-south striking bedding.

The apparent WNW Linda trend that encompasses the Mt Lyell mineralisation along the Great Lyell Fault extends through EL16/2015. If the Linda trend pre-dates the D2 shearing, then like the bedding, its traces will have been distorted to WNW from an original north west trajectory by the north-easterly shears. Similarly, the enigmatic east-west strike of the Firewood Siding Fault (FSF) bounding the south of EL16/2015 is probably in fact WNW. Note that the FSF now presents as a normal fault of several hundred metres' vertical displacement, indicating post Bell-Shale-time extension to the SSW (Teepookana Basin / Dubbill Barrel Synclinorium).

Figure 4.1, the interpretive map, was derived by unravelling the north-easterly D2 shears, that are apparent on geophysical maps and show as dislocations of the mapped northerly strike of bedding on geological maps. A major D1 thrust could also be theoretically reversed to achieve the configuration of an almost horizontal northerly-trending fold (anticline?) imposed on the broader GLF anticline by D1 compression (see Figure 4.3). Note that the truncation of the western occurrences of both porphyries currently remains unexplained. The complex structural history has imparted no less than eight lineation orientations upon the area that may represent shears, thrusts, bedding, wrench faulting or combinations of these. There are almost certainly more faults than those already mapped or postulated.

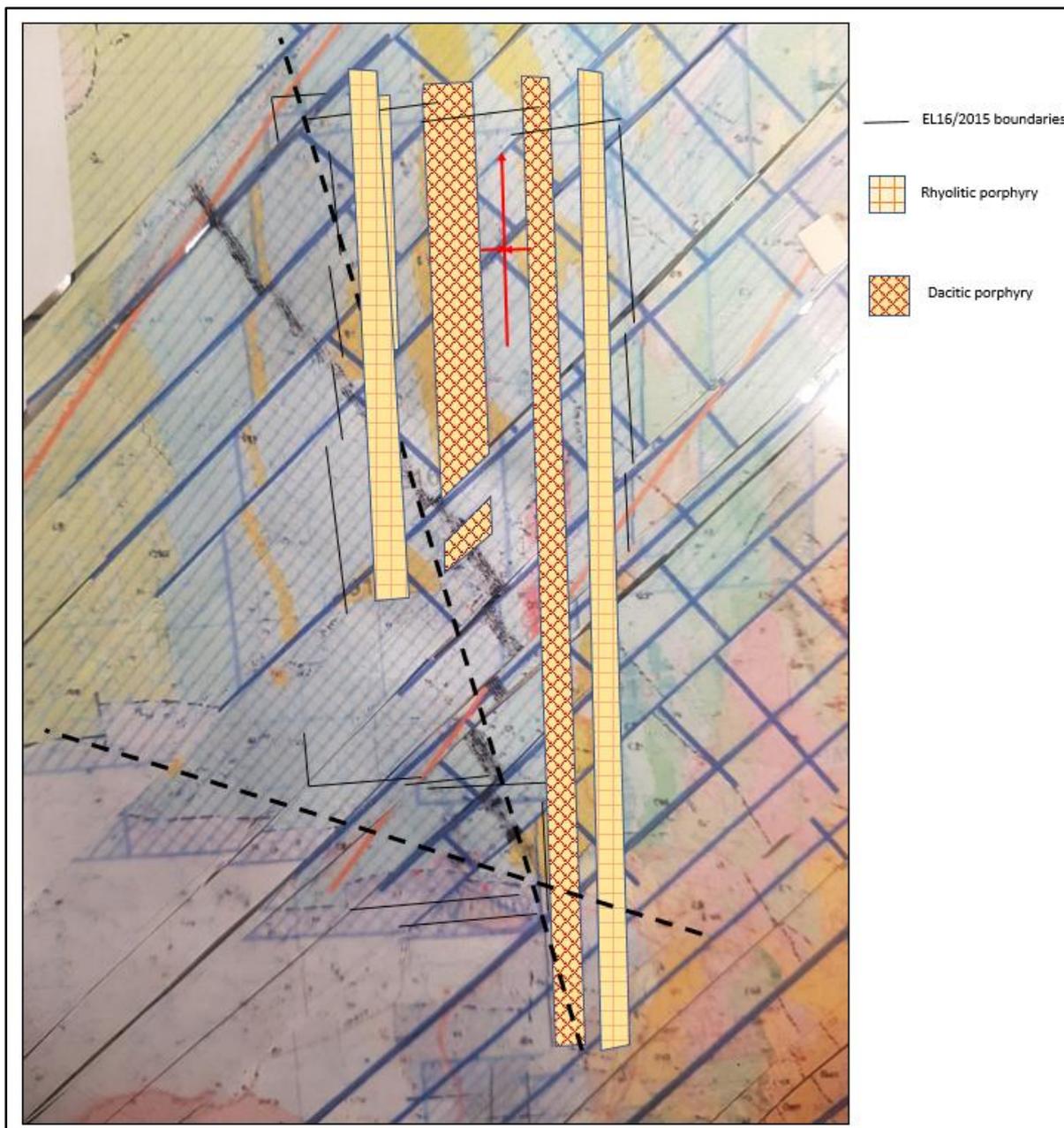


Figure 4.3 'Unravelled' plan interpretation showing porphyry bands pre D1 thrusting.

#### Implications for exploration:

- Bedding is north-south, consistent with recorded and remeasured field observations and core intersections. The consistent strike enables some distinction in the field between bedding / bedding faults and differently-oriented structurally-imposed discontinuities (joints, cleavages and faults).
- In combination with new lithological and stratigraphic understanding, the structural analysis has enabled AMR to identify sites for targeted exploration on the block.
- If the surface expression of the model is supported by further exploration, then maps and cross-sections will be valuable for locating buried ore traps and concentrations.
- Mapped curvilinear faults were probably caused by major tectonic vectors that exploited various pre-existing planes of weakness (e.g. NNW regional trend probably exploited a combination of pre-existing northerly and north-westerly trending faults).

- The next steps in modelling are:
  1. to apply information on the other structural trends identified in geophysical, topographical and geological lineations
  2. allocate likely dip and plunge declinations and trends to the surface features; and
  3. determine whether any vein (lode) geometry is displaced by the faulting (are there more than one episode of auriferous hydrothermal injection?)

## Mineralisation mechanisms and patterns

### Outcomes:

- There is gold on the Diamond Hill Licence area, probably in modest extent but possibly rich concentrations.
- In the Queenstown area, gold occurs in NNW-trending belts that can be related to trends in deep crustal gravity differentials ('gravity worms' of Murphy et al, 2004). At least one of these belts transects the Diamond Hill Licence, as does the WNW Linda Trend that controlled Mt Lyell ore deposition. Also, regionally, the gold mineralisation rarely occurs beyond 5 km laterally from the northerly trending Great Lyell Fault.
- Similar Devonian vein gold prospects with historically recorded economic concentrations exist within 1 km of the Licence area (Madam Howards Gold Mine, McCusicks Creek, Raggedy Ann prospect) and regionally. These are closer to the southeast quadrant of EL16/2015.
- Narrow sub-vertical blocks of brittle rocks bound by faults may have acted as conduits for hydrothermal ore deposition. All known and likely Devonian vein gold prospects on EL16/2015 and in the MRV generally appear to be hosted by rhyolitic porphyry. Vein quartz deposits dilate in competent sandy units in the interbedded Yolande River 'undifferentiated volcano-sedimentary rocks, compared to the siltier layers.
- Continuing to map quartz vein geometry will expose the permeability architecture (faults and lithologies) that existed at the time of hydrothermal activity. The regional paleo-stress field presumably influenced crystallization/solidification in traps after powerful surface-directed orogenic pulses dissipated. The preferential concentration of gold in the quartz into ore shoots depended on a combination of localised pressure release (primarily) and temperature conditions, adjacent unit rheology and to a lesser extent, fluid chemistry.
- Previous explorers have sampled intersections of the quartz-feldspar-phyric porphyries, finding only low-grade alteration and gold registering, at best, barely above detection. Where gold is detected in the country rocks it appears to be associated with quartz or quartz-carbonate veins or stockworks and alteration.
- Barite exists in scattered high concentrations, possibly along a NNE trend.
- Borehole MH04 intersected anomalous concentrations of lead (1 metre @ 7.9% and 1.5 metres @ 1%) in galena and zinc (3.2 m @ 0.65%) as sphalerite at less than 152 m vertical depth. No sulphides of interest were recorded in the 45 metres below.
- Existence of VHMS deposits in economic quantities or depths in Yolande Sequence rocks is highly improbable.

### Implications for exploration:

- The prospective potential in EL16/2015 is gold or barite in the Devonian veins. Note: 'Devonian' is an assumption based on penetration of local Ordovician-Devonian

rocks. The Licence area satisfies all conditions (e.g. mineralisation trends) for auriferous vein shoot deposition.

- There is enough evidence to justify targeting of quartz reefs in rhyolitic porphyry host rocks.
- Exploration targets on the Licence have been expanded beyond Diamond Hill, and Madam Howards South barite, with identification of prospects at Davies Hill and Madam Howards South gold creek. Peevor's Creek / Stubbs Valley has been discarded as a surface prospect area, based on stream sediment sampling results. AMR will continue to search for other near-surface prospects on the Licence and modelled blind ore concentrations and thereby also define likely barren zones.
- Further quartz vein occurrences should be mapped.
- The eastern part of the Licence area probably holds the best potential for economic gold mineralisation.
- The anomalous sulphides intersection in MH04 might represent 'leakage' from a deeper ore body – possibly in CVC-type strata that were exposed to a source of alteration other than the Great Lyell Fault.

## Historical records of mining, prospecting and exploration

### Outcomes:

- Extensive searches of the Trove database reveal records of gold exploration from the 'West Coast Gold rush' of 1893-1917. Up to 1895, 3,000 ounces of hard rock gold and 40,000 ounces of alluvial gold from the west coast area were reported in Tasmania (Delaney, 2018, Appendix A).
- The historical Diamond Hill venture ceased operation after two years, the implication being that the gold concentrations deteriorated laterally and with depth. Similar deteriorations were recorded throughout the State (e.g. Princess, May, Lefroy, Davie PA). Discontinuation of these ventures was most often because of ore shoots 'petering out', a lack of development capital, extraction, transport and treatment costs, water ingress, lack of labour availability, and poor reputation of the field.
- Veins varied in orientation and, where auriferous averaged 0.7 metres wide.
- The obvious surface prospects in the region were discovered by searching creeks or chipping outcropping quartz veins.
- Subsequent exploration has not uncovered further economic mineralisation.
- It should be expected that more than a century of corporate and amateur gold prospecting and panning has scoured the surface effectively for obvious surface concentrations. None have been officially reported; but there is evidence of old alluvial workings in Diamond Creek, and anecdotal reports of panning success at the Lake Margaret road intersection, Madam Howards Plains South, Lennox Creek and Pearl Creek. Raggedy Ann Creek 1 km to the south of the Licence has rewarded local panning for a century.
- EL16/2015 has been demonstrated to hold hard rock gold sources, present in the multiple quartz vein lodes at Diamond Hill purported to contain native gold concentrations of 1 to 3 ounces per ton in hand-selected samples (Trove reference). There are two unrecorded excavations on veins 700m and 1500m north of Diamond Hill. Nearby, the McCusicks prospect 1 km to the east and Madam Howards Plains Gold Mine 1 km to the south were both worked for hard rock gold.

### Implications for exploration:

- AMR's exploration target is to exceed 50,000 ounces of resource. To achieve this, AMR's exploration would need to demonstrate the same quantum of gold as recorded mined for the entire west coast goldfield in a decade.
- Proving more than 50,000 ounces of gold resources from veins will require:
  - resolution of the spatial deterioration of auriferous ore concentrations in orogenic veins (coined here as 'the petering-out principle') to establish the potential for extensions of identified shoots, or further ore bodies; and/or
  - exploitation of economies of scale through securing further ground prospective for gold; and/or
  - evidence of larger Beaconsfield or Henty-style deposits. AMR considers a million-ounce deposit beneath EL16/2015 as unlikely. Although the structural conditions probably do exist on the Licence, there is no evidence of the intensity of silicification/alteration necessary to form a Beaconsfield or Henty-style deposit.
- AMR will need to consider all advantages offered by improvements in exploration and transport technology, local and regional infrastructure, geological knowledge, and geophysical and geochemical techniques in pursuing a rigorous, methodical but inexpensive exploration program because of the limitations imposed by the modest resource.
- A net-based literature study was undertaken in 2019/2020 by AMR into the reasons for apparent deterioration of surface concentrations of auriferous veins with depth and laterally (petering-out principle). The resulting interpretation is that the gold ore concentrations occur at intersections of (1) lath-shaped alteration zones (NNW to NNE orientations) that run through 'chimneys' of brittle host rocks, with (2) transverse pressure release quartz vein 'blows'. Faults and narrow bedding truncate/displace both these trap conditions resulting in pod-like point concentrations rather than extended ore channels. Average size of the pod shoots regionally is estimated at no more than 100m x 15m x 0.7m. Economic prospects require that repetitions of these conditions are predictable and closely-spaced and/or that inter-vein alteration zones also offer complementary modest concentrations of gold (or other ore minerals).

### Catchment-based stream sediment pan-concentrate sampling program

#### Outcomes:

- During the reporting period, AMR continued the micro-catchment stream sediment sampling program (Appendix A), this year targeting watercourses draining Davies Hill south-east, and Pearl Creek headwaters. The fire assay/AAS 50g (ALS Burnie, 2018) results of another 47 samples were received and added on to the 1:5000 topographic map (refer 2016/17 report).
- Additionally, selected sediment samples have been assayed for multi-element analysis down to trace level with interest in anomalous barite, lead, copper, silver, iron and arsenic and other elements representative of gold vectors in other areas (Bi, Sb, Se, and Te).
- The creeks draining the southern slopes of Davies Hill are anomalous for gold. This is consistent with 2017-19 results. Rhyolitic porphyry outcrops along the crest of the southern hump of Davies Hill.

- Pearl Creek trends just outside the eastern boundary of EL16/2015 in AMR's neighbouring tenement EL1/2013 'Lake Margaret Road'. Its headwater catchments are also strongly anomalous and likely to be sourced from a lode other than Davies Hill.
- The catchments that enter Pearl Creek from the east, inside EL16/2015 (south eastern square kilometre) appear to be barren of gold.
- Results are scattered for the streams that enter Pearl Creek from the western side (all in EL16/2015) with four strong anomalies, four moderate and seven very low-grade anomalies. There is no pattern evident, with the high results each in separate mini-catchments occurring among poorer results.
- The 2018/19 results for Stubbs Valley tributaries south of the Lyell Highway barely show trace gold.
- No visible gold has been detected in pan concentrates to date. This outcome was expected.
- AMR continued to collect gravel samples to support a Gravel Provenance sampling (see 'Lithology and Stratigraphy'). Samples have been identified, bagged, marked-up, and delivered to Hobart for the analysis. Sorting and documentation of results will commence in the next report period.

#### **Implications for exploration:**

- About 40% of the area has been sampled, some by only one sample per mini-catchment. AMR estimates that it would need another 400 samples to complete the map. At a rate of 5 samples per day = >80 field-days. The optimal level of detail for the map is being reassessed on progressive receipt of assay results. Current strategy is to prioritise catchments identified using the draft geological model.
- The above outcomes strengthen the case for the existence of a gold deposit in rhyolite on Davies Hill.
- The barren south east tributaries of Pearl Creek fit the draft model in that the dacitic porphyries do not appear to host significant gold concentrations.
- The apparently random results in the mid-east require follow-up. The draft model would predict that assays from this area, overlying dacitic porphyry, would be background only.
- Stubbs Valley results were barren of gold, despite this being the prospective south east corner of the Lease, and allegedly containing the historical Peavor's gold lode and Stubbs Valley metals prospect.
- The results are enough to encourage continuation of the program, which will provide a clearer picture of whether spaced sampling along streams is sufficient to reveal patterns leading to hard rock gold discoveries.
- Multi-element assays show no correlation of gold with other elements assayed. The slightly elevated metals in Stubbs Valley SV03 sample have been noted.
- Stream sediment sampling is an inexact analysis and values are relative only, not quantitatively comparable with other programs or even between sites (see Appendix A). These samples can only determine that gold concentrations exist in a catchment and will assist in locating such, but should not be used to infer economic value.
- Exploration should target the information necessary to close the information gaps for computer-modelling prospects based on the geological model.
- Further model validation has and will ensure cost-effective optimisation of drilling.
- Alternative models should not yet be discounted.

## 5. PROPOSED WORK PROGRAM YEAR 5

1. Continue area-wide stream sediment sampling field program (100 sites = 40 man-days):
  - Priorities are Madam Howards South, Davies Hill West, north of Davies Hill and a trend-line NNW from Diamond Hill. This completes coverage of mini-catchments draining the known rhyolitic porphyry outcrops in the tenement.
  - Integrate with search for possible source lodes, vein outcrop mapping, lithological ground-proofing and rock samples.
2. Trench and assay prospective vein outcrops
3. Map Diamond Hill and Davies Hill prospects in detail (14 days), carry out infill detailed stream sediment sampling.
4. Cost, fund and arrange shallow drilling program for Davies Hill.
5. Continue to refine structural interpretation to identify potential significant fault intersections.
6. Assay samples from MH05, and from 1998 Davies Hill 1.
7. Structural logging of core from MH05 – MH08.
8. Prepare a justifiable resource assessment.

Estimated exploration costs Year 4:	
Stream sediments	\$ 45,000
Mapping	\$ 10,000
Geology	\$ 35,000
Supplementary	\$ 7,000
Tenement Admin	\$ 3,000
<b>Total Program</b>	<b>\$ 100,000</b>

Note that AMR is investigating funding opportunities and if successful the listed activities are anticipated to be intensified and expenditure commensurately higher.

A draft drilling program is outlined at Appendix B.

## 6. ENVIRONMENTAL, CULTURAL HERITAGE

No works as specified by the *Mineral Exploration Code of Practice* (Bacon & Pemberton, 2012) or 'controlled actions' (EPBCA, 1999) were undertaken during the period.

Field work on public land consisted of outcrop recording and chip sampling, and stream sediment panning only (process description in Appendix A).

Access was by two persons by foot during Summer months only from roadside or fire trails, with minimal damage to regrown common native species (predominantly manuka, bauera and cutting grass). No track cutting, or gridding was undertaken.

Both the geologist and field assistant have researched and viewed images of plants of conservational significance (Appendix C) for familiarity prior to the program. Movement through scrub and swampy areas was undertaken to alert fauna including frogs, lizards and snakes (none sighted).

The nearest record of aboriginal relics is from the Queen River valley (Corbett, 1980) 2 km to the east of the Licence area (West Queen). Aboriginal inhabitation of the slopes and exposed plains of Diamond Hill is unlikely (Appendix D). Apart from excavation depressions, trenching, six historical exploration tunnels and two known shafts, there is no evidence of white cultural heritage elements of historical value on EL16/2015.

## 7. EXPLORATION EXPENDITURE 2016 - 2020

Expenditure EL16/2015	April to March 2016/2017	April to March 2017/2018	April to March 2018/2019	April to March 2019/2020	TOTAL 2016-2020
Field	\$15,160	\$14,881	\$18,231	\$7,448	\$55,720
Geology	\$13,077	\$21,085	\$28,050	\$28,050	\$90,262
Equipment	\$7,723	\$21,555	\$1,422	\$1,370	\$32,070
Administration	\$3,579	\$2,152	\$2,354	\$2,715	\$10,800
Services	\$432	0	\$1,654	\$2,365	\$4,451
<b>TOTAL</b>	<b>\$39,971</b>	<b>\$59,674</b>	<b>\$51,711</b>	<b>\$41,949</b>	<b>\$193,305</b>

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## 9. APPENDICES

### Appendix A1: Catchment based stream sediment gold sampling program

#### Pan concentrate drainage survey for gold

At each site two litres of -5 mm sediment is sieved into a pan, then panned to a concentrate of approximately 60 g of wet sand. The concentrate is bagged and sent to ALS Burnie where it is assayed, unpulped, by Fire Assay/AAS so that a total concentration (ppb) of gold in the sample is determined. The concentration values in Table B are derived by relating the ppb (micrograms) of gold in the 50g pan concentrate sample to the original field sample weight of about 2 kg.

Note that the concentrates were not sieved to -#80 as in other programs so that larger particles would not be excluded.

Values of gold concentrations are relative only, not precise or quantitatively comparable to other programs.

Stream sediment analysis is an inexact science due to variation between samples:

- Impacts of historical human disturbance of alluvium and removal of gold (including roads, drainage alteration and quarries) (especially 30 years of onsite prospecting)
- Alluvial gold concentration varies naturally across any one location (e.g. leads, paleochannels, bars, bedrock fissures)
- Accessibility of sites (creek gullies are thickly overgrown, streams go 'underground' beneath organic-rich bog)
- Accessibility to comparable alluvial gold trap 'qualities'
- Sample depths (some deeper or closer to bedrock)
- Fens organics and muds act as filters to colluvial gold
- Impacts of some root systems thought to selectively absorb gold
- Organic mud content - 2 kg including mud in a sieve is not the same as 2 kg of sand/gravel
- Different sampling techniques
- Gold concentrations in source veins might be distal or proximal to the creek.

**Table A1: Pan concentrate results (Gold) – Summer 2018 and Summer 2019**

**NOTE: Table B2 2019/20 results include 30 samples taken in AMR's neighbouring Lake Margaret Road Exploration Licence Area (EL1/2012)**

Sample ID	Easting GDA94	Northing GDA94	Concentrate Au (ppm)	Sediment Au (ppb)
DC01	378582	5344347	0.008	
DC01A	378653	5344552	0.069	<b>3</b>
DC02	378762	5344610	6.850	<b>343</b>
DC02A	378970	5344743	0.561	<b>28</b>
DC02B	378957	5344850	0.446	<b>22</b>
DC02C	378937	5344875	8.000	<b>400</b>
DC03	378600	5344745	0.052	<b>3</b>
DC03A	378750	5345025	0.002	<b>0</b>
PC01	378754	5343639	0.049	<b>2</b>

PC02	378789	5343537	0.004	
PC03	378774	5343441	0.011	<b>1</b>
PC07	379080	5343504	0.380	<b>19</b>
PC09	378871	5343542	2.600	<b>130</b>
PC10	378998	5343281	0.001	
PC10A	378934	5343338	0.002	
PC12	378934	5343293	0.013	<b>1</b>
PC12A	378908	5343279	120.000	<b>6000</b>
PC13	378867	5343237	0.003	
PC14	379029	5343207	0.173	<b>9</b>
PC19	378918	5343933	0.057	<b>3</b>
PC20	378885	5343974	7.900	<b>395</b>
PC21	378972	5344111	0.001	
PC22	379002	5344042	3.180	<b>159</b>
PC23	379049	5344222	0.783	<b>39</b>
PC24	379036	5344178	2.240	<b>112</b>
PC25	379005	5344062	0.002	
PC26	378820	5343820	0.002	
PC27	379262	5342940	0.001	
PC28	379288	5342961	0.001	
PC29	379288	5342957	0.001	
PC30	379414	5342957	0.001	
PC31	379439	5343075	0.001	
PC32	379380	5343080	0.002	
PC33	379214	5343007	0.001	
PC35	379313	5342706	0.001	
PC36	378985	5342467	0.747	<b>37</b>
PC37	379017	5342263	0.001	
PC38	379036	5342442	0.001	
SV01	379815	5342403	0.001	
SV02	380015	5342239	0.002	
SV03	379535	5342431	0.004	

Table A1/1: Results of 2018/19 sediment sampling

Sample ID	Easting GDA94	Northing GDA94	Concentrate Au (ppm)	Sediment Au (ppb)
DC2a1	379004	5344829	0.000	
DC2a3	378962	5344747	0.009	
DC2a4	378950	5344715	0.003	
DC2a5	378932	5344703	0.777	<b>39</b>
DC2a6	378910	5344669	0.295	<b>15</b>
DC2a7	378892	5344641	0.515	<b>26</b>
DC2a8	378831	5344622	0.316	<b>16</b>
DC2a9	378789	5344618	3.030	<b>152</b>

DC2x	-	-	0.086	<b>4</b>
DC2b1	379055	5344994	0.071	<b>4</b>
DC2b2	379019	534499949	0.157	<b>8</b>
DC2b3	379007	5344917	6.530	<b>327</b>
DC2b4	378969	5344895	0.981	<b>49</b>
DC2b5	378919	53448643	0.405	<b>20</b>
DC2b6	378888	5344834	0.144	<b>7</b>
DC2b8	378828	5344780	0.050	<b>3</b>
DC2b9	378795	5344729	0.082	<b>4</b>
DC2b10	378777	5344700	0.006	
DC2b11	378761	5344640	0.073	<b>4</b>
DC204	378972	5344741	0.005	
PC001	379209	5344605	0.006	
PC1a1	379526	5344809	0.000	
PC1a2	379456	5344670	0.003	
PC1a3	379288	5344593	0.001	
PC2a4	379227	5344622	0.440	<b>22</b>
PC3a1	379077	5344820	0.003	
PC3a2	379078	5344762	0.003	
PC3a3	379100	5344708	0.003	
PC3a4	379177	5344702	0.000	
PC3a5	379168	5344596	0.003	
PC4a1	379521	5344484	0.359	<b>18</b>
PC4a2	379397	5344460	0.001	
PC4a3	379319	5344495	0.090	<b>5</b>
PC4a4e	379209	5344554	0.270	<b>14</b>
PC4a4w	379207	5344555	0.529	<b>26</b>
SV04	379599	5342513	0.002	
SV04A	379525	5342486	0.005	
SV05	379809	5342501	0.003	
SV06	379910	5342515	0.001	
SV06A	379945	5342545	0.005	
SV07	379930	5342603	0.005	
SV08	379993	5342654	0.005	
SV08U	379831	5342566	0.005	
SV09	379780	5342593	0.002	
SV10	379706	5342635	0.005	
SV11	379611	5342679	0.005	
SV12	379778	5342634	0.005	
SV13	379749	5342667	0.005	
SV14	379771	5342851	0.005	
SV15	379777	5342774	0.001	
SV16	379733	5342943	0.005	
SV17	379826	5342695	0.001	
SV18	379872	5342827	0.005	
SV20	379624	5342761	0.005	

SV22	379786	5342667	0.005	
SV23	379776	5342662	0.005	
SV24	379834	5342466	0.010	<b>1</b>
SV25	380128	5343201	0.080	<b>4</b>
WC01	379273	5346002	0.003	
WC1a1	379393	5345727	0.009	
WC1a2	379365	5345732	0.081	<b>4</b>
WC1a3	379336	5345881	0.003	
WC1b1	379393	5345727	0.003	
WC1b2	379365	5345732	1.715	<b>86</b>
WC1b3	379336	5345881	0.015	<b>1</b>
WC2a1	379419	5346372	0.001	
WC2a2	379313	5346380	0.003	
WC2a3	379316	5346187	0.003	
WC2b1	379534	5346168	0.003	
WC2b2	379475	5346138	0.003	
WC2b3	379364	5346151	0.001	
WC3a1	379124	5346340	0.003	
WC3a2	379006	5346260	0.003	
WC3a3	379001	5346204	0.001	
WC4a1	379054	5346036	0.003	
WC4a2	378978	5346113	0.003	
WC4r1	378980	5345809	0.003	
WC4r2	379348	5345844	0.001	
WC5A1	379124	5345740	0.194	<b>10</b>
WC5A2	379038	5345745	0.010	<b>1</b>
WC5A3	378963	5345809	0.003	
WC5A4	378894	5345832	0.054	<b>3</b>
WC5A5	378826	5345919	0.003	
WC5A6	378719	5345983	0.022	<b>1</b>
WC5b3	378915	5345718	5.940	<b>297</b>
WC5b5	378787	5345892	0.021	<b>1</b>
Site K			0.003	
WQ1a1	379640	5346036	0.003	
WQ1a2	379811	5345988	0.001	
WQ2a2	379870	5345732	0.003	
WQ1/2a1	379804	5345931	0.003	

Table A1/2: Results of 2019/20 sediment sampling

**NOTE: Table B2 2019/20 results include 41 samples shaded in the table that were taken in AMR's neighbouring Lake Margaret Road Exploration Licence Area (EL1/2012)**

## Appendix A2:

### Catchment based stream sediment multi-element sampling results

	Au-TL44	ME-ICP61																		
SAMPLE	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga						
	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm						
DC01A	0.069	<0.5	1.73	<5	190	0.5	<2	0.03	<0.5	<1	20	3	0.5	<10						
DC02	6.85	<0.5	1.19	<5	150	<0.5	<2	0.03	<0.5	<1	25	3	0.42	<10						
DC03	0.052	<0.5	3.66	6	500	0.8	<2	0.03	<0.5	<1	10	5	1.31	10						
PC09	2.6	<0.5	0.52	<5	120	<0.5	<2	0.01	<0.5	1	49	2	0.56	<10						
PC10	0.001	<0.5	0.36	<5	110	<0.5	3	0.01	<0.5	<1	83	10	0.65	<10						
PC12	0.013	<0.5	0.29	<5	90	<0.5	<2	0.01	<0.5	<1	41	3	0.6	<10						
PC27	0.001	<0.5	1.41	<5	130	0.6	<2	0.01	<0.5	1	51	6	0.75	<10						
PC31	0.001	<0.5	4.37	<5	360	1.7	2	0.02	<0.5	<1	23	5	1.4	10						
SV01	0.001	<0.5	2.13	<5	250	0.7	<2	0.01	<0.5	<1	171	9	0.6	10						
SV03	0.004	0.7	0.89	5	3720	<0.5	<2	0.49	<0.5	51	414	650	5.17	<10						

SAMPLE	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Sr	Th	Ti	Tl	U	V	W	Zn
	%	ppm	%	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
DC01A	0.7	20	0.06	43	<1	0.33	<1	50	6	0.01	<5	3	18	<20	0.42	<10	<10	8	10	19
DC02	0.5	20	0.05	41	<1	0.15	1	40	5	0.01	<5	3	10	<20	0.42	<10	<10	6	10	8
DC03	1.57	30	0.13	103	<1	0.53	2	90	8	0.01	<5	6	30	<20	0.51	<10	<10	14	<10	15
PC09	0.23	70	0.03	61	<1	0.03	3	100	11	0.01	<5	1	10	<20	0.3	<10	<10	5	<10	2
PC10	0.17	60	0.02	64	1	0.02	4	80	29	0.01	<5	2	9	<20	0.65	<10	<10	11	10	176
PC12	0.12	50	0.02	57	<1	0.03	1	80	7	0.01	<5	1	9	<20	0.38	<10	<10	5	<10	<2
PC27	0.68	10	0.1	60	<1	0.06	1	30	7	0.01	<5	3	7	<20	0.59	<10	<10	10	10	3
PC31	2.32	30	0.24	57	<1	0.12	1	70	8	0.01	5	8	12	20	1.04	<10	<10	11	10	7
SV01	1.07	20	0.17	35	<1	0.02	6	110	59	0.01	<5	3	9	<20	0.19	<10	<10	29	<10	14
SV03	0.3	20	0.08	55	11	0.02	6	160	430	0.14	13	2	212	<20	0.11	<10	<10	13	10	2280

AuME-TL4	Au	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge
SAMPLE	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm
SV04	0.002	0.36	0.17	1.8	<10	90	0.08	0.19	0.01	0.08	22.3	0.2	3	0.21	12.5	0.22	0.69	<0.05
SV05	0.003	0.14	0.24	6.1	<10	720	0.1	0.18	0.01	0.07	35.2	0.5	4	0.26	17.5	0.49	0.92	0.05
SV06	0.001	0.12	0.4	8.4	<10	840	0.16	0.16	0.03	0.04	39.7	1.7	5	0.39	33.9	0.79	1.25	0.05
SV09	0.002	0.09	0.35	10.3	<10	40	0.16	0.24	0.01	0.12	33.8	3.4	13	0.41	15.1	0.98	1.51	0.05
SV15	0.001	0.06	0.14	1.7	<10	30	0.08	0.15	0.01	0.02	21.6	1.2	2	0.27	6.1	0.26	0.62	<0.05
SV17	0.001	0.06	0.17	6.1	<10	10	0.06	0.1	0.01	0.04	10.75	0.7	8	0.16	8.8	0.89	1.54	<0.05

AuME-TL4	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Rb	Re	S	Sb
SAMPLE	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm
SV04	0.09	0.01	<0.005	0.12	11	0.4	0.01	20	0.12	0.03	0.06	0.2	10	164	6.3	<0.001	0.04	1
SV05	0.12	0.02	0.006	0.11	17	0.7	0.02	33	0.49	0.03	0.06	1.5	40	44.7	5.8	<0.001	0.05	0.87
SV06	0.13	0.02	0.036	0.14	18.9	0.9	0.03	39	0.44	0.05	<0.05	1.7	70	49.3	7.8	<0.001	0.07	0.98
SV09	0.11	0.01	0.008	0.13	16	1.3	0.07	192	0.59	0.04	0.06	5.1	60	58.7	7.1	<0.001	0.03	0.91
SV15	0.07	0.01	<0.005	0.11	10.7	0.5	0.01	76	0.11	0.03	0.08	0.2	20	27.1	5.6	<0.001	0.03	0.2
SV17	0.05	0.01	<0.005	0.02	5.1	0.7	0.03	61	0.64	0.03	0.06	2.5	20	52.6	1.8	<0.001	0.03	0.45

AuME-TL4	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
SAMPLE	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
SV04	0.2	<0.2	0.3	1.6	<0.01	0.01	2.3	<0.005	0.06	0.25	1	0.38	1.83	24	3.7
SV05	0.4	<0.2	0.4	12	<0.01	0.04	3.9	<0.005	0.05	0.33	2	0.25	3.56	23	5.2
SV06	0.8	<0.2	0.4	22.1	<0.01	0.03	4.6	<0.005	0.07	0.38	4	0.32	3.56	58	5.3
SV09	0.9	<0.2	0.5	1.8	<0.01	0.07	3.5	<0.005	0.06	0.43	8	0.19	3.19	41	4.5
SV15	0.2	<0.2	0.3	1	<0.01	0.02	2.1	<0.005	0.04	0.19	1	0.25	1.79	5	2.8
SV17	0.4	<0.2	0.2	1	<0.01	0.02	1	<0.005	0.02	0.16	14	0.3	1.07	17	2.2

Results of 2018/19 sediment sampling: Multi-element Analysis

AuME-ST4																			
SAMPLE	Au	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	Ge	
DESCRIP	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	
DC2a1	0.0003	0.01	0.19	0.7	10	32.8	0.13	0.046	0.02	0.004	19.4	0.155	1.57	0.194	1.42	0.193	0.465	0.028	
DC2a7	0.515	0.093	0.08	0.43	<10	18.4	0.04	0.04	0.02	0.005	17.85	0.177	2.02	0.172	2.41	0.171	0.275	0.024	
DC2x	0.0856	0.023	0.13	1.22	<10	24.5	0.06	0.039	0.02	0.007	23.7	0.133	1.85	0.219	2.89	0.211	0.425	0.033	
DC2b5	0.405	0.033	0.37	3.82	<10	25.3	0.13	0.078	0.01	0.007	44.7	0.548	3.14	0.373	5.16	0.55	1.185	0.062	
DC2b9	0.0818	0.024	0.3	3.47	<10	24.5	0.11	0.071	0.01	0.009	49.2	0.34	2.5	0.394	3.73	0.52	1.01	0.065	
PC001	0.0063	0.025	0.23	1.18	<10	23.8	0.09	0.055	0.02	0.007	38.4	0.494	2.32	0.247	2.47	0.38	0.496	0.048	
PC1a1	0.0002	0.294	0.35	2.52	<10	31.6	0.14	0.066	0.01	0.048	53.6	2.13	2.87	0.202	9.06	0.51	1.13	0.07	
PC1a3	0.0009	0.048	0.4	4.88	<10	42.8	0.19	0.132	0.02	0.016	55.2	1.715	4.84	0.444	6.85	0.57	0.922	0.072	
PC3a4	0.0001	0.023	0.06	0.41	<10	11.2	0.04	0.052	0.01	0.005	14.8	0.22	2.9	0.092	1.82	0.231	0.188	0.023	
PC4a2	0.0006	0.047	0.2	1.33	<10	22.8	0.11	0.077	0.02	0.007	27.1	0.723	7.3	0.259	3.91	0.34	0.78	0.036	
PC4a3	0.0901	0.037	0.34	2.87	<10	31.1	0.1	0.095	0.03	0.011	32	1.07	8.23	0.258	5.39	0.61	1.1	0.044	
PC4a4e	0.27	0.056	0.34	3.96	<10	45.4	0.19	0.083	0.02	0.019	53.3	1.845	5.1	0.371	6.62	0.76	0.878	0.067	
WSC2a1	0.0008	0.049	1.69	11.55	<10	84.9	0.7	0.164	0.06	0.127	33.1	11.4	20.7	0.599	19.1	2.65	3.79	0.064	
WSC2b3	0.0005	0.055	1.89	12.2	<10	108	0.79	0.141	0.03	0.289	49.3	19	22.8	0.425	42.5	3.8	5.14	0.073	
WSC3a3	0.0009	0.064	0.97	6.98	<10	80	0.35	0.109	0.04	0.051	47.8	3.65	15.15	0.399	12	1.51	2.16	0.07	
WSC4r2	0.0006	0.034	0.7	12.15	<10	61.7	0.24	0.11	0.01	0.014	29.3	1.45	8.71	0.235	13.45	1.33	1.795	0.042	
WSC5A4	0.0543	0.046	0.17	1.22	<10	23.5	0.08	0.068	0.01	0.028	11.65	0.381	3.62	0.281	2.66	0.28	0.529	0.021	
WSC5b5	0.0214	0.028	0.14	2.46	<10	13.8	0.07	0.047	0.01	0.01	18.15	0.594	3.59	0.143	1.75	0.34	0.455	0.026	
WSC1a2	0.0812	0.054	0.45	11	<10	71	0.14	0.098	0.01	0.012	40.1	1.165	6.48	0.268	8.23	0.74	1.17	0.051	
WQ1a2	0.0005	0.056	0.42	5.59	<10	134.5	0.1	0.087	0.02	0.015	28.7	2.03	7.79	0.211	24.7	0.85	1.165	0.038	
AuME-ST4																			
SAMPLE	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Pd	Pt	Rb	Re	S
DESCRIP	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
DC2a1	0.121	<0.004	0.005	0.16	9.33	0.6	0.01	14.8	0.29	0.004	0.052	0.53	0.001	3.26	0.001	<0.001	7.71	<0.001	<0.01
DC2a7	0.062	0.008	<0.005	0.06	8.8	0.3	0.01	16.9	0.27	0.004	0.054	0.77	0.002	2.25	<0.001	<0.001	3.35	<0.001	<0.01
DC2x	0.067	0.006	0.006	0.08	11.35	0.3	0.01	19.1	0.12	0.01	0.056	0.19	0.002	3.17	<0.001	<0.001	4.21	<0.001	<0.01
DC2b5	0.11	0.011	0.007	0.11	22	1.2	0.03	35.1	0.45	0.015	0.068	1.59	0.005	6.38	<0.001	<0.001	6.16	<0.001	0.01
DC2b9	0.1	0.009	0.008	0.11	23.9	1	0.02	24.7	0.33	0.013	0.07	0.7	0.007	5.62	<0.001	<0.001	5.74	<0.001	<0.01
PC001	0.069	<0.004	<0.005	0.08	18.9	1.1	0.03	30.6	0.11	0.005	0.039	0.56	0.004	9.98	<0.001	<0.001	4.37	<0.001	<0.01
PC1a1	0.079	0.012	0.007	0.08	26.2	0.9	0.03	160.5	0.28	0.01	0.056	0.65	0.004	26.3	0.001	<0.001	5.31	<0.001	<0.01
PC1a3	0.12	0.007	<0.005	0.14	27	1.6	0.05	68.2	0.2	0.009	0.079	1.49	0.007	16.6	<0.001	0.001	8.66	<0.001	0.01
PC3a4	0.076	<0.004	<0.005	0.04	7.34	0.3	<0.01	19.9	0.32	0.003	0.106	1.06	0.001	5.65	<0.001	0.001	2.07	<0.001	<0.01
PC4a2	0.091	0.005	0.005	0.05	13.85	0.8	0.05	36.9	0.14	0.007	0.17	1.3	0.004	12.9	<0.001	0.001	4.02	<0.001	<0.01
PC4a3	0.098	0.004	0.007	0.07	15.95	1.7	0.08	54.5	0.42	0.006	0.121	2.76	0.005	11.25	<0.001	0.008	5.46	<0.001	<0.01
PC4a4e	0.093	0.006	0.007	0.1	26.6	1.4	0.04	78.5	0.17	0.007	0.084	1.4	0.012	15.15	<0.001	<0.001	6.55	<0.001	<0.01
WSC2a1	0.071	0.024	0.02	0.11	21.7	5.3	0.16	160	0.78	0.008	0.301	8.23	0.026	24.2	<0.001	0.001	7.77	<0.001	0.01
WSC2b3	0.082	0.021	0.022	0.06	24.7	5.5	0.18	474	0.74	0.005	0.173	9.27	0.038	32	0.001	0.001	4.47	<0.001	0.01
WSC3a3	0.106	0.015	0.014	0.11	26.7	3.8	0.14	115	0.49	0.008	0.164	5.91	0.016	29.3	<0.001	0.002	6.69	<0.001	0.01
WSC4r2	0.048	0.008	0.01	0.08	15.55	1.5	0.08	58.8	0.42	0.008	0.099	2.72	0.017	23.4	<0.001	<0.001	4.62	<0.001	0.01
WSC5A4	0.073	0.006	0.005	0.09	5.39	0.6	0.01	38	0.27	0.006	0.049	1.29	0.002	10.75	<0.001	<0.001	6.14	<0.001	<0.01
WSC5b5	0.087	0.004	<0.005	0.07	8.62	0.5	0.02	32.9	0.3	0.004	0.077	1.43	0.002	4.98	0.001	<0.001	4.73	<0.001	<0.01
WSC1a2	0.037	0.009	0.008	0.07	22.1	1.1	0.06	45.1	0.35	0.007	0.059	2.06	0.018	24.8	0.001	<0.001	4.17	<0.001	0.01
WQ1a2	0.059	0.01	0.036	0.07	15.65	1.8	0.07	31.6	0.41	0.006	0.052	1.73	0.007	37.1	0.001	0.001	3.45	<0.001	0.01
AuME-ST4																			
SAMPLE	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr			
DESCRIP	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm			
DC2a1	0.091	0.31	<0.1	0.17	1.26	<0.005	<0.01	1.92	0.001	0.042	0.266	0.8	3.3	2.27	1.7	5.47			
DC2a7	0.068	0.141	<0.1	0.15	1.05	<0.005	<0.01	1.12	0.001	0.016	0.163	0.4	1.885	1.27	1.4	3.04			
DC2x	0.07	0.177	0.1	0.2	1.29	<0.005	<0.01	1.41	0.001	0.02	0.217	0.6	0.821	1.545	1.9	3.2			
DC2b5	0.174	0.488	0.1	0.24	2.27	<0.005	<0.01	2.77	0.001	0.034	0.377	3.7	0.477	2.84	6.8	5.16			
DC2b9	0.154	0.44	<0.1	0.28	1.84	<0.005	<0.01	2.7	0.001	0.031	0.365	2.8	0.172	2.77	4.9	4.74			
PC001	0.091	0.336	<0.1	0.15	1.71	<0.005	0.01	2.64	0.001	0.024	0.245	2.4	0.208	2.15	4.9	4.02			
PC1a1	0.149	0.548	<0.1	0.23	1.53	<0.005	0.01	1.82	0.002	0.045	0.195	3.2	0.159	2.61	13.3	4.23			
PC1a3	0.555	0.761	<0.1	16.8	4.08	<0.005	0.01	3.93	0.002	0.048	0.455	6.8	0.114	3.87	9.8	6.1			
PC3a4	0.132	0.107	<0.1	0.23	0.9	<0.005	<0.01	1.665	0.003	0.011	0.179	0.7	0.114	0.996	1.7	3.44			
PC4a2	0.134	0.985	<0.1	0.21	5.51	<0.005	0.01	2.39	0.014	0.023	0.402	7.5	0.07	2.02	6.2	4.56			
PC4a3	0.171	0.904	<0.1	0.26	11.25	<0.005	0.01	2.15	0.007	0.032	0.356	11.3	0.127	2	9.3	5.11			
PC4a4e	0.261	0.921	<0.1	1.1	3.99	<0.005	0.01	3.8	0.002	0.039	0.531	11.4	0.07	3.76	12.3	4.65			
WSC2a1	0.845	2.93	0.3	0.57	15.5	<0.005	0.02	5.42	0.013	0.133	1.285	53.9	0.047	3.71	49.7	4.1			
WSC2b3	0.611	5.51	0.3	0.65	16.65	<0.005	0.04	7.16	0.012	0.094	1.63	75.9	0.013	4.24	61	5			
WSC3a3	0.391	1.5	0.1	0.27	11.6	<0.005	0.02	3.93	0.007	0.061	0.729	23.7	0.061	4.13	32.7	5.33			
WSC4r2	0.379	1.475	0.1	0.99	6.94	<0.005	0.03	2.88	0.003	0.047	0.55	19.9	0.027	2.9	16.3	2.91			
WSC5A4	0.198	0.26	<0.1	0.19	1.74	<0.005	<0.01	1.36	0.001	0.047	0.212	1.9	0.14	1.395	9.9	3.54			
WSC5b5	0.134	0.156	<0.1	0.15	1.16	<0.005	<0.01	1.88	0.001	0.027	0.219	2.1	0.136	1.405	4.5	3.51			
WSC1a2	0.338	1.27	0.1	0.23	8.14	<0.005	0.03	2.43	0.002	0.043	0.439	11.3	0.064	3.1	10.3	2.43			
WQ1a2	0.307	0.739	0.1	0.19	9.37	<0.005	0.01	2.6	0.001	0.04	0.369	11.2	0.195	1.83	67.6	3.23			

## Appendix B: Draft drilling outline

### Madam Howards Plains South barite occurrence:

Four to six 50-metre holes should be drilled to determine the nature of the barite deposit:

Sites A and B are on the southern side to test southerly dip of the barite lode. Remaining holes to test continuation and quality of a vertical lode.

### Diamond Hill gold

Four to six 50-100 metre inclined holes to be drilled from south of the lodes to determine vein geometry and test for the presence of economic gold concentrations (shoots) laterally and at depth.

Drilling sites pending assessment and assay of veins and detailed lithological and where possible structural mapping.

### Davies Hill gold:

Site A 378990 5345055 – Drilling a quartz reef near faulted (NNE feeder trend) in rhyolitic porphyry near contact with crystal tuff (?).

Site B 378865 5345085 - Drilling the same quartz reef in rhyolitic porphyry.

Site C 378720 5345080 – Drilling the quartz reef in rhyolitic porphyry near conformable contact with crystal tuff / siltstone(?).

Site D 378790 5344750 – Drilling a north westerly faulted contact between rhyolitic porphyry and volcanoclastics.

Site E 378900 5345390 - Drilling a north westerly faulted contact between rhyolitic porphyry and volcanoclastics.

Site F 379047 5345240 – Drilling a NW trending structure separating rhyolitic porphyry and volcanoclastics at its intersection with NNE feeder trend.

Holes proposed to be 50-100 metres in length at 45 degrees inclination, sited 25m south and 15 metres west of the intersection of the vein with the rhyolite contact. The holes would be drilled with a northerly azimuth to intersect the probable southerly dipping vein transecting the porphyry body.

The purpose of the program is to determine vein geometry and test for the presence of economic gold concentrations.

Appendix C: Plants of conservation significance – Queenstown area



Western cushion-bristlewort;



Slender heath myrtle



Roundhead yellow eye - 'Tasmanian' yellow eye pictured.



short purpleflag;



Tasmanian rice grass;



graceful wallaby grass)

## Appendix D: Excerpt from a heritage assessment of the Arthur Pieman Conservation Area

**Source:** Huys, Stuart. (2010). *An Aboriginal Cultural Heritage Assessment of Designated Vehicle Tracks Within the Arthur Pieman Conservation Area*. Cultural Heritage Management Australia. Sourced from <http://www.parks.tas.gov.au/file.aspx?id=25109>

“Dense vegetation, rugged terrain and huge annual rainfalls are believed to have restricted the movement of the North West tribe to the coastal fringes....Within the Queen River Valley, Corbett (1980) documented 30 sites, the majority of which represent a few artefacts scattered over a small area. Artefact scatters were found to typically occur on small flats close to water, low flat ridges and saddles, while on the upper valley slopes and low-lying button grass plains, cultural material was rarely encountered.... Within the King River valley region the largest and most numerous scatters are located on low ridges or rises on the buttongrass plains. In contrast to previous assessments of Holocene land use of the region, which depict fleeting visits using the rivers as highways, the evidence from the King River valley indicates more regular use of the area by Aboriginal people who used the sedgelands as highways as opposed to the rivers (Freslov 1993). ... the general pattern of Aboriginal occupation of forests throughout Tasmania indicates limited occupation of the forest zone, with small artefact scatters resulting from transient camping by small mobile groups (Cosgrove 1990)”.

