TASMANIA
DEVELOPMENT
AND RESOURCES

**Mineral Resources Tasmania**

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# A summary of the Beaconsfield, Lefroy, Back Creek and Gladstone goldfields

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## INTRODUCTION

This report is a literature review of gold deposits in four goldfields in northeast Tasmania and in part reproduces existing reports. It provides locations for gold occurrences in map and table form together with notes about mineralisation style, grade and past production.

## REGIONAL GEOLOGY

Northeast Tasmania is underlain by Ordovician to Middle Devonian turbiditic sedimentary rocks (Mathinna Group) which were subject to low-grade regional metamorphism during folding in the Middle Devonian in an event correlated with the Tabberabberan Orogeny of eastern Australia. Folding was tight and generally along NNW-trending axes with shallow plunges. The Mathinna Group were intruded by I- and S-type granitoids of the Scottsdale, Blue Tier and Eddystone batholiths in the Late Devonian. The granitoids intruded at high level and have narrow metamorphic aureoles. They include hornblende-biotite granodiorite, biotite granite/adamellite and alkali-feldspar granite, which have generally intruded in that order. The alkali-feldspar granite and other more fractionated granitoid bodies are associated with tin mineralisation. Gold mineralisation occurs in quartz veins usually associated with sulphides in a number of goldfields throughout northeast Tasmania (fig. 1). West of the River Tamar, near Beaconsfield, the host rocks are sandstone and quartzite of the Early Ordovician Cabbage Tree Formation, whereas east of the River Tamar the host rocks are sandstone, siltstone and mudstone of the Mathinna Group.

# BEACONSFIELD GOLDFIELD

## INTRODUCTION

The following account of the Beaconsfield goldfield is largely reproduced from Gee and Legge (1979) and the reader is referred to the geological map associated with that report (Gee and Legge, 1971). The locations of various prospects are shown on Figure 2.

## HISTORY AND PRODUCTION

Reef gold was first discovered high on the eastern flank of Cabbage Tree Hill in 1877. This find stimulated interest in the area, resulting in the tracing of the initial discovery downslope, and the location of other small occurrences along the crest of the ridge to the north and south.

Numerous mining companies sprang into existence, including the Tasmania Gold Mining Co. (on the original discovery), the Golden Gate Gold Mining Co., and the Florence Nightingale Gold Mining Co., on the line of the Tasmania reef and the Lefroy Gold Mining Co., exploring immediately to the east of the Florence holdings.

Along the crest of the ridge discoveries were made by the Moonlight and Little Wonder Gold Mining Companies to the north of the Tasmania find, the Garfield further north, and the Dundee and Excelsior (Brandy Creek mines) to the north of Brandy Creek. To the south, prospecting by the Phoenix, Leviathan, Cosmopolitan and Rising Sun companies disclosed further small gold-bearing quartz reefs.

The Tasmania and Golden Gate companies merged shortly after the commencement of operations, followed in 1888 by further amalgamation of these mines with the Florence Nightingale and Lefroy companies, with the object of a combined effort to control water intake into the mines. A later reorganisation of the group resulted in the formation of the Tasmania Gold Mining and Quartz Crushing Co., under which name the mine operated until its closure.

During this period surface prospecting and underground development of the Florence mine indicated the presence of a deep extensive channel, infilled with clay and gravel, to the east of the mines. The potential of this channel was recognised early and several efforts were made to explore and mine detrital gold contained in the sediments. The Ophir, Denmark and later the Ballarat companies were the main groups but extremely hazardous mining conditions and heavy water intake resulted in the failure of all attempts at deep mining.

Exploration and mining on the smaller properties continued sporadically but by 1891 virtually all operations were dormant, with the exception of the Moonlight-cum-Wonder amalgamation. The discovery in 1898 of the North Tasmania mine revived some interest but closure of these two mines came in 1903 and 1911 respectively.

The end of the mining industry at Beaconsfield came with the closure of the Tasmania mine in 1914. Re-treatment of battery sand and tailings from the Tasmania Gold Mining and Quartz Crushing Co. treatment plant continued for several years after the cessation of mining. This sand is currently

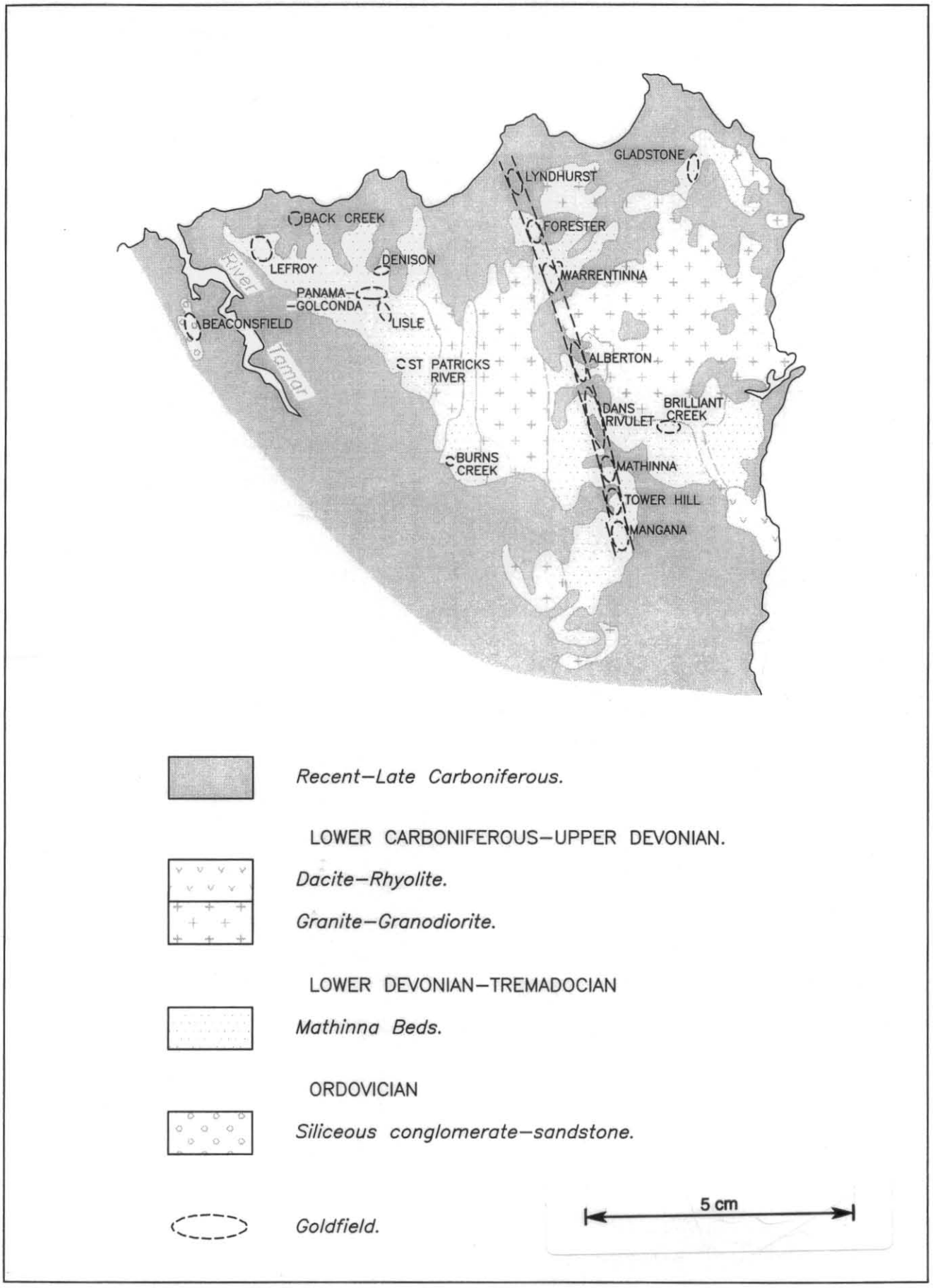



**Figure 1**
The geology and major goldfields of northeastern Tasmania

under investigation for potential economic extraction of gold residues.

Subsequent activities were restricted to prospecting of localised detrital deposits by individuals and small syndicates, with little attention paid to deeper exploration until 1962 at which time the Department of Mines commenced an investigation into the auriferous potential of the Beaconsfield district.

Surface investigations and extensive literature research failed to indicate any near-surface prospects but suggested that a potential economic orebody could exist below the bottom levels of the Tasmania mine, and a deep exploratory diamond-drilling programme was instigated in 1964 and completed in 1967.

Significant auriferous mineralisation was intersected but low gold prices deterred private company expenditure on the prospect. The area was later released to Allstate Explorations NL for further investigations. Two diamond-drilling programmes were completed, with the further intersection of significant mineralisation in the second programme. Investigation of the prospect is continuing.

Recorded gold production from the Beaconsfield area is summarised in Table 1.

**Table 1**
Gold production in the Beaconsfield goldfield

| *Reef or Lode Formation* | *Production of gold (kg)* | *Mining commenced* | *Mining ceased* |
|---|---|---|---|
| Tasmania | 26,580 | 1877 | 1914 |
| Moonlight-cum-Wonder | 32 | 1898 | 1903 |
| North Tasmania | 31 | 1898 | 1911 |

## GOLD MINERALISATION

### Primary

*Tasmania Mine*

Discovered in 1877, the Tasmania auriferous quartz reef remained in production until 1914, at which time the economics of mining forced closure of the underground workings. Subsequent operations were concentrated on the re-treatment of mine tailings dumps until the final plant shutdown in 1924. Overall production from the Tasmania reef, inclusive of tailings re-treatment, was 26 580 kg of gold from 1 084 690 t of ore, for an average gold recovery of 24.7 g/t. The gold won was valued at £3,613,000 of which £772,072 was distributed in dividends to shareholders. No dividends were paid after 1903 when the mine was taken over by a company based in England.

The underground workings are now inaccessible and the following information has been obtained from old literature. The main references are those by Thureau (1883*a*), Montgomery (1891), Anon. (1898), Twelvetrees (1903*a, b*), and Cundy and Fawcett (1914).

Closure of the mine was caused by a combination of factors involving fall in grade, economics associated with depth, increased metallurgical problems, excessive water intake, etc. It was reported (Hudson, 1923) that in 1913, the last year of normal mining and development, almost 86 400 kL of water was raised from the mine, and it was estimated that an additional 313 300 kL would be encountered for each metre of extra sinking undertaken.

In the latter stages of the life of the mine employer-employee relations deteriorated rapidly and, with closure of the mine in April 1914 by the management, the then Government of Tasmania assumed control of the mine in an endeavour to avoid a shutdown. On the employees' assurance that mismanagement was mainly responsible for the projected closure the Government then subsidised a tributing party of about 150 mine employees to continue mining activities. The mine was reopened in June 1914, but the venture proved unsuccessful and final closure occurred on 21 November 1914.

**The workings:** Underground mine plans, cross sections and longitudinal sections of the mine are available at Mineral Resources Tasmania and a full description of the underground workings is not considered warranted here. Briefly, the Tasmania reef was worked from the surface to about 145 m from the Golden Gate and Florence Nightingale shafts. Subsequent to the amalgamation of the original companies, mining activities were extended to 450 m by a succession of deeper shafts; namely the New Main Shaft (300 m), Hart's Shaft (420 m), and Grubb's Shaft (450 m). The last named shaft was sunk partly in the deep lead and, due to movement in this section, was later restricted to use as a general service shaft. All heavy haulage operations were directed through the more stable Hart's Shaft.

Stoping was consistent over the full 395 m of the orebody to a depth of 380 m but below that level the stoping limits, as indicated on the longitudinal sections, were progressively reduced on the 1375 foot (420 m) and 1500 foot (450 m) levels to a final stope length of 290 metres. This sharp reduction in stope length is due to the economics of mining at depth and does not represent an actual decrease in the size of the orebody (Cundy and Fawcett, 1914).

**The orebody:** The Tasmania reef is a fissure reef striking about N50°E, with the quartz emplaced on a pre-existing fault zone. The movement on the fault is shown on old plans as about 30 m north side east. The reef has been itself displaced by two major fault zones and numerous smaller movements. The major faults were termed the 'main cross course' (easternmost fault) with a strike of N30°W dipping steeply southwest and No. 2 fault striking N45°W and also dipping steeply south-west. East of the 'main cross course' the reef maintains a fairly constant strike of about N50°E with a slight swing to N45°E west of the fault. In these sections of the mine the reef transgresses and lies entirely within that succession. The overall dip of the reef here is about 50–55°SE, and the two sections are obviously dislocated portions of the same reef.

West of the No. 2 fault, however, the reef as mined shows a marked northward swing to about N55°W with a dip to the southwest. This section of the mine lies entirely within the massive conglomeratic quartzite underlying the above sandstone sequence of the Cabbage Tree Formation. The

sharp swing in strike, together with a marked change in the mineralisation pattern and strength, has raised strong doubts as to this section actually being the western continuation of the Tasmania reef. The orebody in this portion of the mine proved to be inconsistent and very 'bunchy', ranging in size from mere threads to lenses up to one metre in width. Mineralisation was weak, with values considerably lower than in the main Tasmania reef, and mining operations were only continued to about the 100 foot (30 m) level.

Movement on the 'main cross course' appears to be west side north with a displacement of about 70 m on the orebody. However, a simple lateral movement cannot fully explain the displacement, as the enclosing strata appear to have been displaced by some 300 m as distinct from the smaller movement in the orebody. It is apparent that a considerable west-side-up movement has occurred with a lateral component of about 150–180 metres. A similar type of movement appears to have occurred in the 'No. 2 fault' but the displacement here cannot be ascertained due to the doubtful identify of the reef mined west of this fault.

A comprehensive discussion of the effects of the faulting on the Tasmania reef, and an outline of the possible positions that the reef could have assumed west of the 'No. 2 fault', are given by Montgomery (1891).

The main Tasmania reef has an overall length of about 395 metres. The strike averages N50°E with a dip of 50–60° to the southeast. Stoping outlines as shown on the mine longitudinal sections and plans indicate an overall plunge of the orebody to the northeast but with shallower plunges ranging from 35° to 50°. With the overall plunge indicated, the 90 m of main reef lying to the west of the 'main cross course' at the surface thus becomes progressively shorter with depth, finally plunging away from the between faults block at about the 180 m level. Below this level the entire stope length of the orebody lies to the east of the 'main cross course'.

The reef varies in width from several centimetres to more than eight metres in some lenses, with an overall stoping average of about 2–2.5 metres. Gold values in the reef are reported to have been fairly consistent along the length of each individual level but varied considerably with depth. From the surface to about the 400 foot (120 m) level an average grade of 38 g/t was maintained but average grades over the next 90 m dropped to about 25 g/t. Still further reductions in grade occurred with greater depth, dropping to as low as 3.8 g/t at the 1370 foot (415 m) level. A considerable improvement to an average grade of up to 20 g/t over a stoping length of 285 m was reported from the bottom, 1500 foot (450 m) level.

Gold quality is also reported to have changed with depth, the gold obtained from the richer upper levels consisting mainly of free milling auriferous quartz, readily amalgamated. Changes in mineralisation below about the 400 foot (120 m) level showed the presence of pyrite, chalcopyrite, sphalerite, galena, etc., in increasing amounts with a considerable proportion of the gold intimately associated with the sulphides necessitating more specialised and expensive treatment methods.

Following studies and research by the Department of Mines in 1962–63 (Noldart, 1964) a departmental diamond-drilling programme was successful in three intersections (B4, B4A, B4B) of the orebody, some 75 to 90 m below the 1500 foot (450 m) level on the plane of the orebody. Details of this programme are given by Noldart (1968) and only the orebody is discussed here.

The orebody in each intersection was found to be composed of a quartz reef impregnated with sulphides in variable concentrations from very minor to dense, and containing visible gold in some sections. The sulphide mineralisation was predominantly pyrite with blebs of chalcopyrite and minor galena, sphalerite and arsenopyrite. Tetrahedrite has been recorded by previous workers but was not observed in the drill core. The main gangue was siderite and some country rock assimilation was evident.

The visible gold ranged in size from minute specks to flakes up to 2 mm scattered randomly in the core. The sporadic distribution is well demonstrated in intersection B4, where the gold content over regular 0.6 m assay intervals ranged from a low of 2.6 g/t to a high of 904.6 g/t. Most of the free gold sighted occurred in quartz carrying only minor to negligible sulphides, with some specks noted in moderate sulphide concentrations.

Mine plans and sections show frequent 'splits' in the orebody, as on the 1500 foot (450 m) level where a split has developed parallel reefs 12 to 15 m apart over a length of 100 metres. Examination of the ore intersections shows an 0.5 m inclusion of country rock in B4, and a 3.3 m section of massive carbonate gangue in B4B, suggesting the development of a strong hanging wall lode and a weaker footwall lode common to the orebody in the mine.

Composite assay values of the diamond-drill intersections are shown in Table 2.

### *Other Mines*

**Moonlight-cum-Wonder mine**: This mine comprises the old Moonlight, Little Wonder, Olive Branch and Amalgamated West Tasmania mines, all of which operated to some extent on the same line of lode.

**Table 2**

Composite assay values of the diamond-drill intersections

| *Hole No.* | *Depth (m)* | *Au (g/t)* | *Ag (g/t)* | *Cu (%)* | *As (%)* | *Pb (%)* | *Zn (%)* | *Mn (%)* | *S (%)* |
|---|---|---|---|---|---|---|---|---|---|
| B4 | 514.8–520.0 | 92.14 | 7.19 | 1.06 | 1.49 | 1.10 | 0.80 | 0.49 | 7.5 |
| B4A | 512.1–519.5 | 64.44 | 10.10 | 0.91 | 0.43 | 0.03 | 0.16 | 0.36 | 4.9 |
| B4B | 525.3–528.9 | 41.02 | 16.84 | 1.10 | 0.05 | 0.10 | 0.03 | 0.39 | 3.58 |

Situated near the crest of Cabbage Tree Hill, the mine was developed entirely in the massive conglomeratic black quartzite of the lower sections of the Cabbage Tree Formation. The overall strike of the orebody is N55–60°W. The general dip is to the southwest, although a reversal of dip is reported from the deeper levels in the northern section.

The auriferous quartz in these workings was not confined to one ore channel with occasional splitting of the reef, as was the case in the Tasmania reef, but was reported to have been distributed in a number of parallel or sub-parallel veins, often in broken ground and subject to rapid variation in size both along strike and down dip. In some areas, as in the 'Olive Branch' section, the veins were too small to be mined individually but were rich enough and numerous enough to encourage attempts at bulk open cut mining.

Generally good values were obtained in the older shallow workings to depths of about 75 m but values diminished rapidly below this depth. The orebody was tested to the 800 foot (245 m) level with exploration drives at the 400, 500, 600 and 800 foot (120, 150, 180, and 245 m) levels without success. The ore channels are reported as varying from threads up to 0.5 m in width with occasional lenses up to 2.75 m in thickness. Values did not improve with size of the reefs and were often reported as richer in the narrower zones. Thureau (1883*a*) recorded "very rich 'shoots' of gold in the reef dip as from a common centre both east and west ..." in the 130 foot (40 m) level of the Little Wonder mine. It is probable that these are small saddle reefs reflecting one of the minor flexures in the strata of Cabbage Tree Hill.

The mineralisation pattern in these reefs is almost identical with that in the western section of the Tasmania mine and it is probable that the two reef systems are located on the same fissure zone.

Tonnage and grades of ore from these reefs are not available but records at Mineral Resources Tasmania show a gross recovery of 32 kg of gold from these mines.

**Small mines**: Very little is known about the smaller mining operations in the district. Innumerable small shafts and costeans cover the eastern slopes of Cabbage Tree Hill but only a very small proportion of the smaller workings encountered payable reefs.

Travelling north along Cabbage Tree Hill from the Middle Arm Creek water gap, the more significant of these workings south of the Tasmania reef are the Rising Sun mine immediately above Middle Arm Creek, and the Cosmopolitan, Leviathan, Bonanza, Star, and Phoenix mines, all located on the eastern flank of the ridge. The Garfield mine is also located on the eastern flank of the ridge but is north of the Tasmania reef towards the northern spur of Cabbage Tree Hill.

All these mines were designed to test possible occurrences of the Moonlight-cum-Wonder type reef formations but with little success. Some minor copper/silver-type mineralisation was encountered in the Rising Sun mine, and small irregular auriferous reefs were encountered in the other mines. The gold values in each case were insufficient to encourage further exploration. The Phoenix mine, although originally worked on a reef similar to the other small mines, was ultimately deepened to intersect the Tasmania reef to become part of the main workings.

Immediately to the north of Brandy Creek, on a low ridge extension of Cabbage Tree Hill, moderately payable gold reefs of the Moonlight-cum-Wonder type were worked in the Brandy Creek mine (Dundee and Excelsior mines) but again values did not persist with depth. A similar type of mineralisation also occurred in the North Tasmania mine located some 395 m further north along the strike.

These two mines appear to have been the only ones other than the Tasmania and Moonlight-cum-Wonder mines where payable gold mineralisation was encountered. Full records of production are not available but the North Tasmania is recorded as having produced 31 kg of gold.

As far as can be determined the mineralisation in all of the smaller mines was similar in all respects to that of the Moonlight-cum-Wonder reefs; i.e. surface enrichment in narrow, irregular quartz veins, rapidly diminishing in value with depth.

## Placer gold deposits

*The Deep Lead*

The deep lead running along the eastern flank of Cabbage Tree Hill has been investigated by several shafts and drill holes. No records are available of any testing having been carried out on the true bottom of the lead although an attempt was, at last report, being made by the Ophir Gold Mining Company.

The last information available on this mine (Twelvetrees, 1903*a*), was that a shaft had been sunk to a depth of 123 m with the upper circa 84 m sunk through the material of the deep lead. Levels were driven eastwards into the lead at depths of 90 and 120 metres. From the 400 foot (120 m) level a winze was sunk in the west wall of the lead to a depth of 18 m (138 m from the surface). A level was then driven eastwards from the bottom of the winze through 56 m of sandstone followed by some broken ground and finally limestone. This drive appears to be below the bottom of the lead.

Plans to rise from this level into the bottom of the lead do not appear to have been put into effect.

All payable material obtained before 1903 appears to have come from the western wall of the lead, known locally as the 'high reef' zone, and from minor workings on false bottoms at intermediate levels. Both the western wall zone and a false bottom of 'black ligneous clay', at a depth of 34 m, were reported to be 'fairly payable'.

Two bores sunk to bedrock through the deep lead by the Ophir Company were reported to give good values. Montgomery (1891) quotes a report submitted to the Company by one of the Directors, where he stated that the first bore to a depth of 114 m on the western wall encountered "... gravel containing gold at two ounces to load, ..." at 73 m, and "...9 feet [2.7m] of wash with gold at the rate of 4 ounces to the load". In the second bore, to a depth of 87 m in the

eastern wall, there was "about 12 feet [3.7 m] wash, giving returns at 2 ounces to load". Montgomery then commented "If these results are reliable the richness of the lead would be phenomenal", but the term 'load' is not defined in the reports available.

Very little core was obtained in the course of the drilling and the above reported values can only be taken as indicative that the deep lead is auriferous in part, particularly in the lower levels.

Other portions of the lead were tested in the Tasmania mine adit (No. 2 level, 90 m of drive); the lower Cosmopolitan adit (125 m of drive); and from the No. 4 and 5 levels of the old Florence Nightingale workings at depths of 82 m and 100 m respectively. No payable values are reported from any of these workings but it is probable that any enrichment from south of the Tasmania workings would necessarily be weak, and that the level drives would be too far south to intersect any enrichment from the main Tasmania reef.

From the evidence available it appears that the main enrichment has been from the flanks of the Cabbage Tree Hill and north of the surface expression of the Tasmania reef. The deposits worked on the western wall required crushing, indicating that the bulk of this material is merely eluvial detritus shed from the auriferous quartz reefs. This would suggest a fairly localised concentration of this type of material, with finer alluvial gold dispersed throughout wash horizons.

*Other alluvial deposits*

Small deposits of alluvial gold have been worked along Brandy Creek downstream of the Brandy Creek mines and on the flats to the east of the town site but all occurrences are small and of little economic value.

Other deposits worked on the east flank of Cabbage Tree Hill north of the surface outcrop of the Tasmania reef occur as fillings in depressions and embayments in the hill slope and are probably perched remnants of a higher level of deep lead fill, most of which has since been removed by erosion.

## Ore Prospects

*Tasmania Reef*

Unfortunately no geological information is available on the Tasmania reef after 1903 so that nothing is known of the limiting factors controlling the extremities of the orebody at depths below about 210 metres. A summary of such information as is available to that depth is given below.

On the eastern end the Tasmania reef is reported to have feathered out into a series of thin stringers on entering brecciated zones in the previously titled Caroline Creek Sandstone close to the footwall of Gordon Limestone Correlate. Twelvetrees (1903*a*) discussing the 700 foot (210 m) level, wrote as follows:

"Behind the limestone, conformable with it and underlying it, the level passed through a bed of dense, tenacious clay... This clay band is known in the mine as 'the dyke'. Westwards it merges gradually into a zone of what can best be described by the term 'broken formation', or 'broken country'. This consists of sandy material showing lines of false deposition, and containing angular fragments of sandstone, giving place to the west to more solid shattering and disintegration in situ. Hard blocks of sandstone are met with, having the sandy material between them for a length of about 60 foot [18 m]. It is noteworthy that the reef in this section of the level became irregular, splitting and jumping up and down. The reef tails out just where the broken formation begins; its track goes into the broken [sic] for a little way and then disappears.

In the level above the 600 feet [180 m], the reef behaves in the same way when the broken country is entered".

And further with reference to the 700 foot (210 m) level, the deepest then being worked, Twelvetrees recorded the following:

"The actual appearance of the reef in the east end of the 700 foot [210 m] level is sufficient to cause anxiety. It features out when entering the broken country. It has no appearance of having been sheared off by a fault, and there is not rack or channel in the limestone".

The limiting factor on the eastern end of the orebody down to the 700 foot (210 m) level is evidently the lack of continuity of the reef through zones of brecciation, and it is probable that similar conditions restrict the orebody at depths below that level. Longitudinal sections of the mine do, in fact, show a marked steepening of the eastern stope limits between the 700 foot (210 m) and 1250 foot (810 m) levels, suggesting that the bounding control at this end of the orebody is structural and not lithological.

A different set of conditions exists on the western margin of the orebody. As mentioned previously the western extension of the Tasmania reef past the 'No. 2 fault' is questionable, but from the information available it is doubtful if the main Tasmania reef as such ever extended any distance into the up-faulted members of the conglomerate and black quartzite west of the fault. It is apparent from the longitudinal sections that the western limit of the Tasmania orebody fairly closely follows the attitude of the bedding planes of the country rocks. At no stage were the workings continued into the underlying conglomerate and black quartzite, the mineralisation dying out on all levels at a point where it could be expected to approach these beds.

It would appear that conglomerate and black quartzite are not in themselves very favourable to ore deposition and that they have acted as a bounding influence on the western limits of the orebody.

Montgomery (1891), with reference to the country rocks, made the following observations:

"The Tasmania reef has been auriferous throughout all the strata traversed by it. The richest stone is found in a number of distinct 'shoots' or 'chutes', ... Outside of the 'shoots' however, the quartz has been generally payable... The strata that have proved 'favourable country' for gold in the mine may be said to be all those between the lower beds of grits and conglomerates and the main limestone bed... In the mines on the Moonlight line of reef rich stone has been got in the upper levels of all, and as long as the quartz was found in the

light coloured grits and sandstone, but on getting down into the black country the stone has become unpayable in every case..."

The inconsistency of the reefs in the black quartzite and conglomerate is due in a large measure to the relative competencies of the beds involved, resulting in poorly-defined fissures in the harder beds with the development of multiple fracture patterns and consequent dispersal of mineralisation along a number of more or less poorly-defined channels. These rocks cannot be considered as offering good prospects for extensive gold mineralisation.

With regard to the Tasmania mine at depth, it is known that good values recurred on the bottom 1500 foot (460 m) level, over a stoping length of about 285 metres. Whether or not this represents the true length of the orebody at this depth or whether the orebody continues to maintain an overall length of about 400 m is questionable, but the possibility must be considered that the restriction indicated on the mine plans is due to economic limits rather than mineralisation limits. If so, a good gold prospect lies below the present known workings with good chances of permanency with further depth.

If, however, the bounding controls of lithology on the western limits and country fracturing on the eastern limits continue to control the orebody at depth, then the limits of the orebody below the 1500 foot (460 m) level could be expected to contract fairly quickly with depth. Any such contraction would greatly reduce the potential of the orebody, possibly to the extent of unpayability.

*Other mines*

The prospects of the smaller mines on the field are not promising. The Moonlight-cum-Wonder reef system was fairly extensively prospected during the life of the mine, particularly at depth, with no success. Too little is known about other mines, such as the North Tasmania and Brandy Creek mines, to be able to suggest any exploration programme, and the still smaller mines such as the Leviathan, Cosmopolitan, etc., are too small to warrant testing. Any mineralisation on this belt would be small and patchy, and restricted to near-surface depths. The best exploration for this type of mineralisation would be surface costeaning over large areas, a method commonly used by early prospectors in the district.

Two mines, not previously mentioned because of their position, are the East Tasmania mine and Dally's United mine. Neither of these mines were active producers but were sunk as prospecting ventures attempting to intersect any extension of the Tasmania reef east of the Gordon Limestone correlate. Should the line of fissure persist east of the Gordon Limestone correlate, then comparatively small 'shoots' of ore could occur in the sandstone members of the succession overlying the Gordon Limestone correlate, but any mineralisation found would be repetition on a small scale and not a continuation of the Tasmania orebody as such.

Some small quantities of 'alluvial' gold may still be won from the thin Tertiary gravel beds on the lower slopes of Cabbage Tree Hill, and on the plain east of the Beaconsfield township, but large accumulations cannot be expected.

## SALISBURY DISTRICT

The Salisbury goldfield is situated at the southern end of Salisbury Hill, six kilometres SSW of Beaconsfield, and is in effect an extension of the Beaconsfield goldfield. There is no information on the discovery of the field expect for the comments by Duff (1888, p.3) suggesting that very little time elapsed between the discovery of the Tasmania reef and the deposits at Salisbury.

By 1883 the Victoria workings had been completed after driving an adit 185 m into the east flank of the hill and a further 180 m north along a lode formation, and all mining had ceased. A short revival of interest occurred in 1893–96 with further work in the Victoria mine and on sluicing operations at the nose of the southern spur but the field again became dormant until the sinking of the Salisbury shaft in 1903.

The main workings were the Salisbury, also known as the Victoria, and the Duchess of York, also called the Gladstone and Santa Claus, mines. Both mines were explored by a combination of shafts and adits from the eastern flank of the ridge. The workings are roughly in the same position respective to the strata as the Cosmopolitan mine on the eastern flank of Cabbage Tree Hill. Some open cut, hydraulic sluicing workings are located in the nose of the southern spur of the ridge.

The mineralisation in these mines differs markedly from that of the Cabbage Tree Hill mines in that the majority of gold occurrences in the near-surface workings occurred as "coarse lumps of gold" and "patches of free gold met with in sugary quartz and soft seams of pug". In several cases the gold had a superficial coating of black manganiferous oxides giving rise to the so called 'black gold' of the locality.

In the deeper levels of the adits all the gold was reported to be intimately associated with sulphide mineralisation. Occurrences of nickel and chromium minerals are recorded from the main adits closely associated with an intrusive body of basic rock.

High grade concentrations or 'pockets' of eluvial/alluvial gold occurred in the talus on the crest of the south spur and in the talus/alluvium admixture at the foot of the spur. Gold values in these deposits were also reported to be extremely 'patchy', with high-grade pockets interspersed with large areas of almost barren material.

No production figures for the Salisbury district are available.

### Recent Mineral Exploration

Modern mineral exploration for gold in the area started in the 1960s following drilling by the Department of Mines beneath the Tasmania mine workings. The exploration involved Allstate Exploration NL in partnership with various other companies. Exploration was generally directed to finding similar reefs to the Tasmania Reef in the Cabbage Tree Formation. Bates (1979) concluded that the only significant hard-rock exploration targets in the Beaconsfield area were those areas where there were cross-cutting structures with a general northeasterly strike, as they might contain reefs. It

was considered that such structures would only contain productive veins where they cut the Transition Beds of the Cabbage Tree Formation. Pease (1984) carried out a geochemical survey in the Salisbury Hill area with two target types; low grade-large tonnage vein systems and 'Tasmania Reef'-style structures. Two arsenic anomalies were identified and drilled. Assaying of the drill core indicated that the first was a very strong arsenic-antimony-base metal anomaly associated with low density quartz veining. Only minor gold values were obtained. The structure responsible for the second anomaly was not identified.

It was concluded that the potential for a low grade-large tonnage vein system gold deposit was low but that further work was warranted looking for 'Tasmania Reef'-type structures because of the strong arsenic-antimony anomaly. Bishop (1988) reported on a detailed aeromagnetic survey which was flown in the region surrounding the Beaconsfield gold mines to help locate structures of potential interest and to map geology beneath the Tertiary cover. The results were dominated by the response from the Anderson Creek ultramafic body, but processing of the data revealed some subtle magnetic features trending northeast and cross-cutting the Cabbage Tree Formation. Drilling of the Tasmania Reef at various depths beneath the old workings in order to prove the resource is currently being carried out by Beaconsfield Gold Mines Ltd.

# LEFROY GOLDFIELD

## INTRODUCTION

This section is a literature review of gold deposits in the Lefroy area and relies heavily on four main reports; Broadhurst (1935), Groves (1965), Gee and Legge (1979), and McOnie (1983). The geology, mineralisation and mining history of the goldfield are summarised. Locations of prospects are shown on Figure 3.

The Lefroy goldfield is situated 40 km north of Launceston, and 15 km east of George Town. Some 30 auriferous formations occur in the field, the majority occurring *en echelon* in a NNW-trending zone 4 km long centred on the township of Lefroy. The goldfield is one of a number of gold-quartz vein type deposits that occur in northeast Tasmania (fig. 1), most of which are hosted by the turbiditic Mathinna Group which is of Ordovician to Devonian age.

All the workings are inaccessible and the only evidence of mining is the old dumps, remains of foundations and collapsed shafts.

## HISTORY AND PRODUCTION

Gold was known to occur in the Lefroy district prior to 1864 (Gould, 1864) and possibly as early as 1853. Reef gold was first discovered at Specimen Hill by S. Richards and party in 1869, resulting in the opening of the Reward mine. Further prospecting soon located the eastern extensions of the Land-O'-Cakes and Volunteer reef systems, and the township of Nine Mile Springs sprang up centred on these workings. Later prospecting to the west and north resulted in the discovery of the Golden Point and Native Youth orebodies, and the township of Lefroy grew around these mines.

**Table 3**

Production from the main reefs in the Lefroy goldfield. The production figures for the Tasmania and New Pinafore reefs include production from re-treatment of battery sands etc.

| *Reef or Lode Formation* | *Gold production (kg)* | *Mining commenced* | *Mining ceased* |
|---|---|---|---|
| Pinafore | 1712 | 1890 | 1896 |
| Chum | 1313 | 1881? | 1896 |
| Volunteer | 1277 | 1891 | 1904 |
| Native Youth | 749 | 1877? | 1888 |
| Golden Point and Crown | 60 | 1881? | 1903 |
| Morning Star | 37 | 1883 | 1903 |
| Other small reefs | 49 | - | - |

The field had a history of sporadic activity as the gold on each new discovery was exhausted. The early finds were soon worked out and the field lapsed until the discovery of the Chum, Golden Era and extensions of the Land-O'-Cakes orebodies in 1880. Again gold values declined sharply at about 120 m depth, and in 1884 the field again collapsed.

The discovery of the Pinafore and re-opening of the Volunteer mine in 1890–91 revived interest, and by 1895 some twenty companies were working in the Lefroy field, the main producers being the New Pinafore, Volunteer and later West Volunteer mines. A further slump in 1896 saw the New Pinafore and Volunteer mines engaged in deep sinking and exploration to depths of 380 m with little success, except for occasional isolated patches of pyritic ore carrying high gold values but too small to sustain mining operations.

Altogether about 50 mines operated in the area on some thirty lines of reef but in no case did payable values extend in depth; a general cut out occurred about the 120 m level or shallower on the smaller mines. Total production, from Department of Mines statistics, has been estimated at 5170 kg of gold, mostly prior to 1900, with only 230 kg recovered since that date. An estimated 155 kg has also been recovered from alluvial deposits.

## REGIONAL GEOLOGY

The basement rocks in the area are strongly cleaved siltstone, sandstone and slate of the Mathinna Group. The sequence trends northwest with strikes of 321–351° and with dips generally to the southwest at varying angles. Evidence for folding is limited by poor exposure. Secondary deformation is suggested by the occurrence of widespread crenulation cleavage (Rickard, 1961), particularly in thin slate horizons interbedded with cleaved siltstone. The gold deposits are virtually confined to a sequence of cleaved coarse siltstone and fine sandstone which is apparently overlain to the southwest by coarse sandstone and underlain to the northeast by slate and quartzite.

Basal conglomerate of Permian age unconformably overlies the Mathinna Group to the southwest of Lefroy, and Tertiary gravel, conglomerate and siltstone overlie the Mathinna

Group in the Lefroy area. This Tertiary sequence is covered by basalt flows which are themselves possibly overlain by further gravel, conglomerate, siltstone and clay, ascribed to the Tertiary–Quaternary.

## PREVIOUS INVESTIGATIONS

The area was first examined by Thureau (1882*b*, 1883*b*), who recommended deep drilling on the main lines of lode. Montgomery (1897), after an extensive study, also recommended prospecting at greater depths in the existing mines.

The deep development of the Volunteer mine was examined by Twelvetrees (1899) to the depth of 380 m and, although no payable lode was found below 140 m, he recommended still deeper prospecting. Twelvetrees (1908*a*) later drew attention to the possibility of gold occurring in the district between the Lefroy and Back Creek goldfields.

Nye (1925) examined the Golden Zone (New Chum) mine but no major work was carried out until Broadhurst (1935) undertook a general survey of the field. This investigation drew attention to the possible importance of the sub-basalt deep leads.

Hughes (1953) later summarised the known information on the area but again no work was carried out until Groves (1965) made a detailed study of the area to determine prospecting targets.

Diamond drilling was carried out by the Department of Mines on the deep leads in 1883, 1892 and later in 1935 (Blake, 1938), and a series of 23 holes was drilled in 1935–37 mainly on reef targets at depths ranging from 37 to 245 metres.

## GOLD MINERALISATION

### Primary

Gold mineralisation occurs in quartz veins or reefs (fig. 4). Most of the reefs lie along fault planes, are parallel, and trend at 80°. They mostly dip to the south though some smaller reefs dip north. Repeated movement along fault planes has given slickensiding, breccia and mylonitic pug. Signs of repeated opening are present with the introduction of more quartz. Fault shear zones may be up to 60 m wide and reefs may occur anywhere in the zone. The fractures can be traced on the surface for about 1.5 km and proved continually to a depth of 380 metres. The gold, however, is limited in economic quantities both laterally and at depth, although it is present in trace amounts throughout the fractures.

The gold is generally associated with vughy quartz on the footwall and/or hanging wall of the fractures. It is found in association with stibnite and cervantite, a mixed antimony oxide formed by oxidation of stibnite, and more rarely with pyrite, chalcopyrite and arsenopyrite. Vitreous white quartz is common, particularly in fault zones and small fractures, but is generally non-auriferous. The association of gold with sulphides was most clearly shown in the Clarence mine, where free gold was extremely rare but pyrite assayed up to 673 g/t of gold. A small pocket of pyritic ore at the 800 foot (240 m) level in the New Pinafore mine is reported to have assayed 50.5 g of gold per tonne, and represents the only concentration of gold found below 120 m in the mines.

The predominant feature of the mining field is the consistent decline in gold values below the 90–120 m levels and, in many of the smaller mines, the marked decrease at only 30 m, although quartz may fill the lode channel. The New Pinafore and Volunteer mines were extended to a depth of 370 m and 380 m respectively but yielded very little gold although the lode channel in each case was distinct. Gold values generally declined from about 30 g/t in the upper levels to less than 3 g/t at depth.

The decline in gold values was attributed to a process of surface enrichment by Broadhurst (1935), who quoted figures showing a marked decrease in fineness, i.e. increase in impurities, of the gold with depth. Broadhurst calculated that at least 600 m of the upper lode must have been eroded and much of the gold from this lode carried down in solution to attain the gold values encountered between the surface and 120 metres. This is dependent also on the relative rates of erosion and solution of the gold, the rate of the latter essentially being the greater. Broadhurst (1935) also suggested that the gold was precipitated from solution by the sulphides and that pyrite, which is fairly common in the lodes, formed ferric sulphate which was a solvent for gold. However both Krauskopf (1951) and Cloke and Kelly (1964) have since shown that the solubility of gold is negligible, except in acid chloride solution in the presence of a strong oxidising agent.

Surface enrichment of gold is poorly documented but examples given by Lindgren (1933, p.859) indicate that there is little enrichment of gold in oxidised zones or, as at Mt Morgan in Queensland, deposition of supergene gold occurs only in the lower part of the oxidised zone. Enrichment in gold values to the extent suggested at Lefroy does not appear to be supported by the literature. The presence of free sulphides and general absence of oxidised minerals other than cervantite in the upper levels is also unusual for an enriched zone, although the decrease in quality of the gold with depth is usually indicative of increase in sulphides, as at the Tasmania mine at Beaconsfield (Noldart, 1964). Gold enrichment is not recorded from the upper levels at Beaconsfield, although it is probable that surface oxidation has taken place. It would therefore appear that special conditions must have prevailed if surface enrichment has resulted in the recorded distribution of gold values at Lefroy.

Many of the lodes contained satisfactory gold values at the surface but were only worked at very shallow depths, presumably due to a rapid decline in gold values below 30 metres. These include the Old Comrades, Perpetual, Equilla, White Pinafore, Welcome, Nugget, Australasian and McIvor, Prince of Wales, Brisbane, Tablier, Monkland, Windermere, Rifleman and Lee Floyd Reefs. These were all described in some detail by Montgomery (1897) and Broadhurst (1935).

### Placer gold deposits

Diamond drilling in the Sludge Creek–Blanket Creek area indicated the presence of two main basalt flows separated by up to 15 m of sediments, with a thickness of up to 27 m of

sediments below the lower basalt flow (fig. 4, 5). The sediments consist of gravel, sandstone and clay containing fossilised tree stumps and lignite. Depths of more than 95 m were indicated in the main channel by the 1937 drilling programme.

An apparent stream bank slope of 1 in 2 and the presence of huge boulders of sandstone, described in mine workings by early investigators, suggest that steep river gradients and gorge-like conditions were a feature of the early history of the Lefroy deep lead.

*Tertiary leads*

Several leads have been traced on the surface to the point where they appear to pass beneath the basalt, at which point the workings have generally been discontinued. The leads of this type include the Pinafore, Golden Point and Native Youth Leads.

The Pinafore Lead has been worked from just east of the Pinafore main shaft to where it passes beneath the basalt near the Lefroy Deep Leads Company Shaft. Some coarse gold was obtained from the gravel. Broadhurst (1935) suggested that the gravel passes beneath one of the higher basalt flows, but with precipitous conditions existing it is possible that it passes steeply beneath the lowest basalt. A similar lead runs along the east side of Sludge Creek and again appears to pass beneath the basalt north of the Native Youth lode.

*Sub-basalt leads*

The basalt lead beneath the earliest basalt flow has been worked from several shafts, generally on the western branch of the pre-basalt stream. The East Pinafore workings intersected gravel and clay on the western bank of the old stream bed and fairly high gold values were obtained in the gravel. The old stream bed was intersected in the Golden Era workings, and very coarse gravel was found containing coarse gold and giving satisfactory pan prospects on the western bank. The stream bed was also investigated in the New Golden Heart workings where coarse gravel containing 20 g/t of alluvial gold was intersected, with subsidiary gold in vein-quartz pebbles and boulders. The Pinafore Company shaft, about 200 m north of the Morning Star Shaft, also intersected the old stream bed, which was filled by at least eight metres of boulder gravel containing samples of free gold up to 3.8 grams. Work in this mine proved unpayable because immense boulders hampered mining operations. Alluvial deposits were also investigated in the Morning Star mine by the King Prospecting Association but no gold was found.

Diamond drilling of the deep leads has been largely unsuccessful, expect in delineating the old stream beds. The No. 4 bore (1883) is reported to have intersected a basalt gravel some 2 m thick which contained some gold. A further bore (No. 4, 1892), was sunk 10 m southeast of the No. 4 (1883) bore but no gold was found. Two boreholes drilled in 1937 intersected gold-bearing gravel filling the old valley floor. Bore No. 14 intersected 760 mm of coarse gravel assaying 3.76 g/t gold at 80 m and Bore No. 16 a trace of gold at 90 metres. Blake (1938) indicated that all the sediments below the lowest basalt were assayed for gold in the 1937 boreholes, although the sediments between flows were not assayed.

The drilling results, although not very encouraging, indicated the presence of gold in the sub-basalt gravel. The prospects encountered in the workings where the alluvial sediments were investigated were far better than those reported from the boreholes, although mining conditions were difficult. This suggests that results from the old boreholes should not be taken as a true indication of the quantity of alluvial gold but rather as a guide to its presence.

*Post-basalt leads*

In some localities gold-bearing gravel occurs in present day streams and probably represents a certain amount of reworking of old Tertiary leads and Recent/Quaternary deposits.

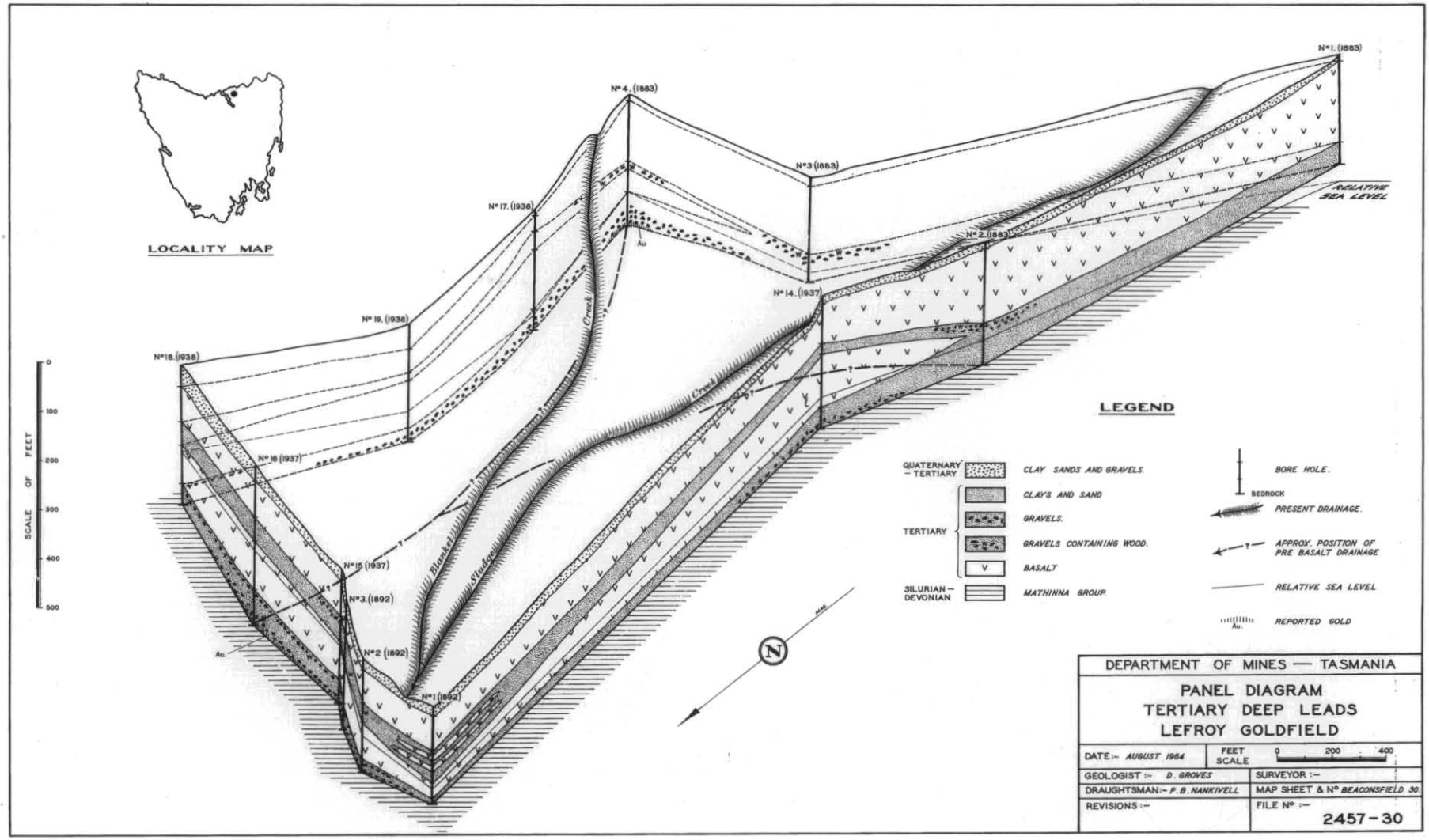
## RECENT MINERAL EXPLORATION

Planet Mining Company (Tassell, 1969) investigated the possible bulking potential of the vein system at Lefroy. A number of costeans were placed across the Pinafore, Golden Era, North Clarence, Reward, Land O'Cakes and Volunteer reefs, producing gold assays ranging from a trace only and silver assays to a maximum of 4.6 g/t over widths varying up to 1.2 m, from 35 costean samples.

As part of an investigation of the potential for alluvial gold Anthony, McKenna and Partners recommended that drilling should take place in the Blanket and Sludge Creek areas to locate deep leads below basaltic cover and to follow up early Mines Department drilling (Jannik, 1970).

Comalco investigated the concept of obtaining a bulk tonnage of stratabound gold (size 10 million tonnes at 4–5 g/t) (Askins, 1977). The work essentially consisted of the re-assaying of sections from three Department of Mines drill holes but it was found that no more than trace amounts of gold occurred in these. It was considered, however, that these amounts may have been sufficient to account for the gold concentrated into quartz veins after remobilisation.

More recent exploration in the Lefroy and Back Creek areas has concentrated on the alluvial gold potential. CRA Exploration Pty Ltd carried out an investigation into the Lefroy deep lead and concluded that a combination of gravity and ground magnetics is a useful means of predicting sub-surface basalt geometry (Broadbent, 1983). Drilling was recommended to test the gold content of the sub-basalt gravel and to refine the geophysical interpretation. Between 1983 and 1986 Epoch Minerals Exploration NL carried out alluvial gold exploration in the Lefroy and Back Creek areas. The resource in the area near Lefroy was estimated at 200 000 $m^3$ of alluvium at a grade of 0.5 grams of gold/$m^3$ (Murdoch, 1985). An appraisal of this work and suggestions for further work was given by Tregaskis and Rampe (1987).


LOCALITY MAP
SCALE OF FEET
0
100
200
300
400
500
N°1. (1883)
N°4. (1883)
N°3 (1883)
N°17. (1936)
N°19. (1936)
N°18. (1936)
N°16 (1937)
N°15 (1937)
N°14. (1937)
N°2. (1883)
N°3. (1892)
N°2 (1892)
N°1 (1892)
RELATIVE SEA LEVEL
Blanket
Studge
Creek
LEGEND
QUATERNARY – TERTIARY
CLAY SANDS AND GRAVELS.
TERTIARY
CLAYS AND SAND
GRAVELS.
GRAVELS CONTAINING WOOD.
BASALT
SILURIAN – DEVONIAN
MATHINNA GROUP.
BORE HOLE.
BEDROCK
PRESENT DRAINAGE.
APPROX. POSITION OF PRE BASALT DRAINAGE
RELATIVE SEA LEVEL
REPORTED GOLD
N
DEPARTMENT OF MINES — TASMANIA
PANEL DIAGRAM
TERTIARY DEEP LEADS
LEFROY GOLDFIELD
DATE:– AUGUST 1964
FEET SCALE
0 200 400
GEOLOGIST :– D. GROVES
SURVEYOR :–
DRAUGHTSMAN:– P. B. NANKIVELL
MAP SHEET & N° BEACONSFIELD 30.
REVISIONS :–
FILE N° :–
2457–30

5 cm

**Figure 5**

# BACK CREEK GOLDFIELD

## INTRODUCTION

Information on this goldfield is largely drawn from Broadhurst (1935), Marshall (1969) and McOnie (1983). The goldfield lies a relatively short distance to the northeast of the Lefroy goldfield and shows many of the same characteristics.

## HISTORY AND PRODUCTION

The goldfield was probably discovered in 1869 and it went through a number of rapid changes in fortune, the last production occurring in 1920. Most of the gold was recovered from alluvial deposits, with the total production until 1907 being in the range of 280 to 311 kilograms.

## REGIONAL GEOLOGY

The geological setting of the Back Creek goldfield is very similar to that at Lefroy, with the basement rocks consisting of strongly cleaved siltstone, sandstone and slate of the Mathinna Group. The strike of the beds, as for Lefroy, is northwest but dips are to the northeast rather than to the southwest. The Mathinna Group are overlain by Tertiary conglomerate, gravel and sandstone. This sequence is overlain by Tertiary basalt which is in turn overlain by Quaternary sand.

## GOLD MINERALISATION

### Primary

Quartz veins occur in more-or-less parallel fissures and comprise a number of narrow, irregular and discontinuous gold-bearing quartz veins in the Mathinna Group sandstone and shale. Broadhurst (1935) considered that the reefs had a similar trend to those at Lefroy (slightly north of E-W) but that they were a little more to the northeast than those at Lefroy. The maximum width of individual veins is in the order of 0.8 metres. The western group of reefs lie along a NNW-trending zone which is the same as the trend of the bedding of the Mathinna Group in the area.

Some clay-rich sandstone, which hosts zones of closely developed mineralised quartz stringers over about 3.5 m widths, may represent zones of hydrothermal alteration and probably constitutes the only potential for possible bulking in the area (e.g. Union mine and the Sir John Franklin mine where grades of 9 g/t were bulked from a 3.6 m wide zone which carried 13 veins, the largest being 0.6 m wide).

### Placer Deposits

The main workings were the White Lead, the Red Lead, Blackman's Lead, and the Cardigan Lead (fig. 3). A detailed description of the gold-bearing gravels and their relationship to basalt flows in the area is given by Marshall (1969) (fig. 6).

The White Lead is the most northerly of the leads and was worked from a succession of shafts throughout the upper reaches with a small amount of sluicing towards the lower end. The gold-bearing wash was reported by Montgomery (1894) to be composed largely of angular quartz. The contained gold was also angular and often attached to quartz fragments, suggesting a nearby source.

The Red (Albion) Lead lies to the southwest of the White Lead and is the longest in the area. It is parallel in trend to the White Lead and its gold and wash occurrences are similar to those of the White Lead.

The Blackman's (Old or Back Creek) Lead lies a short distance to the southwest of the White Lead and is shorter, broader and deeper than the previous two leads. It differs from the White and Red Leads in that the gold-bearing wash consists of about 1–2 m of heavily water-worn pebbles and boulders of quartz, slate and sandstone. The contained gold is also markedly water worn.

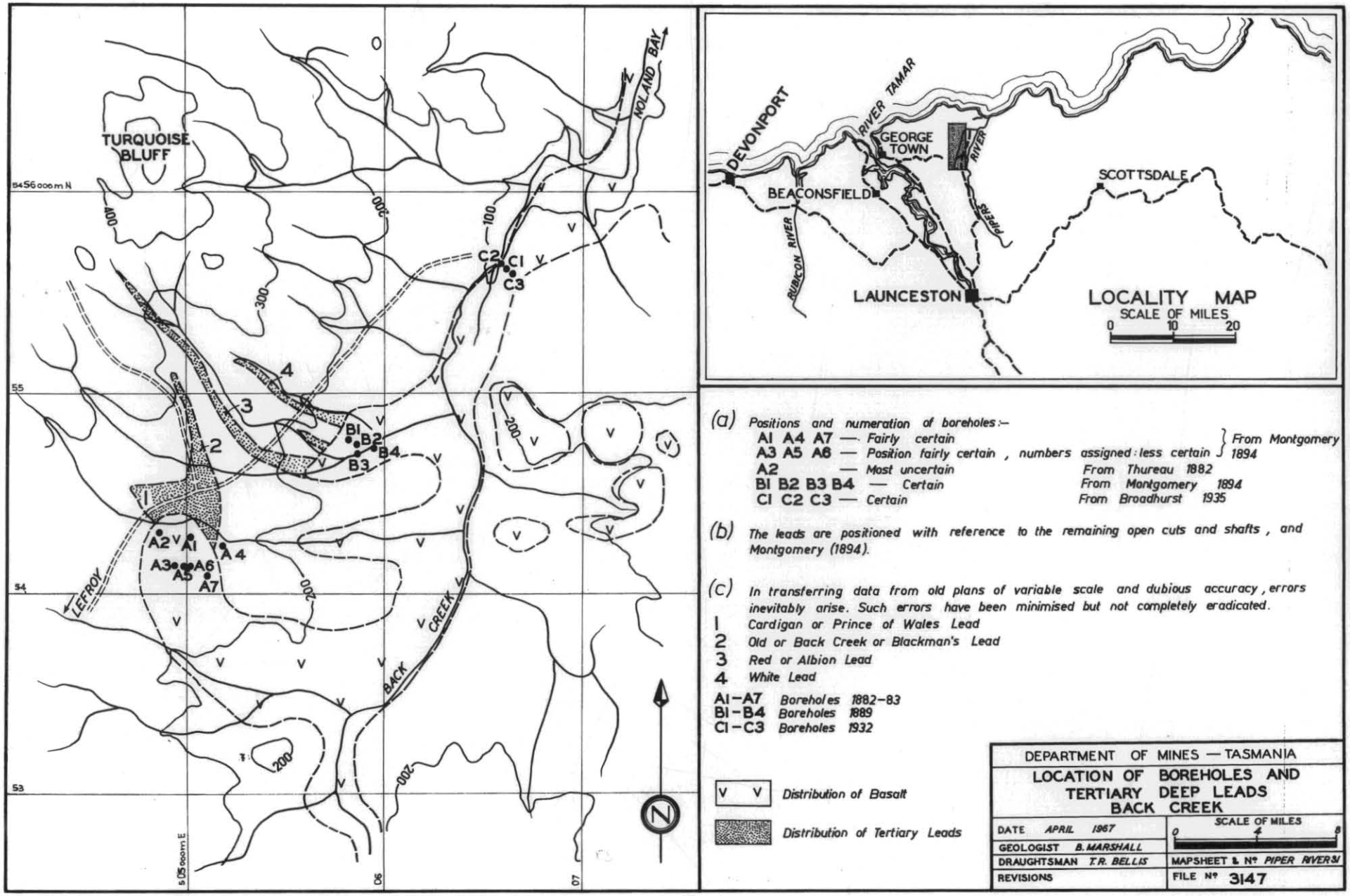
The Cardigan (Prince of Wales) Lead, the smallest of the leads, trends southeast and joins Blackman's Lead. The lead is comparatively shallow until close to its junction with Blackman's Lead, where it rapidly deepens. The gold was reported as 'very shotty and rounded' and occurred in a water-worn wash composed largely of rounded sandstone boulders usually cemented with iron oxides. This lead carried only small concentrations of gold and was not much worked.

The source of the gold is probably the gold-bearing quartz veins found locally, although the water-worn gold may have come from a secondary deposit which had been reworked.

The distribution of the gold was similar in all leads. It was concentrated in the lower horizons of wash overlying bedrock except where the leads deepened to pass under basalt cover. At this point gold was found in two distinct wash horizons. One horizon of gold-bearing wash was found to follow the steepening floors of the leads, however the gold content in this horizon was reported to be comparatively low. A second, younger, gold-bearing wash carrying good values occurred on a 'false bottom' representing the top of an older channel fill. All deposits above this false 'bottom' would be of the same age as the material contained in the leads up channel from the basalt.

## RECENT EXPLORATION

Between 1983 and 1986 Epoch Minerals Exploration NL carried out alluvial gold exploration in the Lefroy and Back Creek areas (Murdoch, 1985). An appraisal of this work and suggestions for further work was given by Tregaskis and Rampe (1987).


TURQUOISE BLUFF
NOLAND BAY
5456000m N
5505000m E
LEFROY
BACK CREEK
A1 A2 A3 A4 A5 A6 A7
B1 B2 B3 B4
C1 C2 C3
1 2 3 4
100 200 300 400
DEVONPORT
RIVER TAMAR
GEORGE TOWN
BEACONSFIELD
SCOTTSDALE
RUBICON RIVER
PIPERS RIVER
LAUNCESTON
LOCALITY MAP
SCALE OF MILES
0 10 20
(a) Positions and numeration of boreholes:–
A1 A4 A7 — Fairly certain
A3 A5 A6 — Position fairly certain, numbers assigned less certain } From Montgomery 1894
A2 — Most uncertain From Thureau 1882
B1 B2 B3 B4 — Certain From Montgomery 1894
C1 C2 C3 — Certain From Broadhurst 1935
(b) The leads are positioned with reference to the remaining open cuts and shafts, and Montgomery (1894).
(c) In transferring data from old plans of variable scale and dubious accuracy, errors inevitably arise. Such errors have been minimised but not completely eradicated.
1 Cardigan or Prince of Wales Lead
2 Old or Back Creek or Blackman's Lead
3 Red or Albion Lead
4 White Lead
A1–A7 Boreholes 1882–83
B1–B4 Boreholes 1889
C1–C3 Boreholes 1932
V V Distribution of Basalt
Distribution of Tertiary Leads
DEPARTMENT OF MINES — TASMANIA
LOCATION OF BOREHOLES AND TERTIARY DEEP LEADS BACK CREEK
DATE APRIL 1967
GEOLOGIST B. MARSHALL
DRAUGHTSMAN T.R. BELLIS
REVISIONS
SCALE OF MILES 0 4 8
MAPSHEET & Nº PIPER RIVER/1
FILE Nº 3147

5 cm

**Figure 6**

# GLADSTONE GOLDFIELD

## HISTORY AND PRODUCTION

Gold mining started with the discovery of the Blue Bell reef in 1870, with most of the mining and prospecting activity occurring between 1880 and 1883. Further prospecting work occurred in 1909, 1916 and 1931 but failed to revive the goldfield. Total production from the field was small, being 57.91 kg of gold from the lode deposits and a further 103.06 kg of gold from placer deposits. Production from the field is summarised in Table 4. Locations of gold occurrences are shown on Figure 8.

## GEOLOGY OF THE GOLDFIELD

The oldest rocks in the Gladstone area are the Mathinna Group which are generally poorly exposed. Limited structural data indicates that the dominant fold trend is northerly, with a gentle plunge to the north (Baillie, 1986). In addition to the dominant $S_1$ cleavage associated with the folding, a crenulation cleavage is developed in many outcrops and the principal direction strikes at approximately 155°.

The Mathinna Group have been intruded by granitoids in three main phases. The oldest granitoid is a hornblende-biotite granodiorite forming the northern part of The Gardens pluton. This has been intruded by adamellite of the Poimena pluton, which in turn has been intruded in the immediate Gladstone area by granitoid described as granite/adamellite (fig. 7). This body contains cassiterite-bearing greisen, and its composition probably approaches alkali-feldspar granite. The Mathinna Group were thermally metamorphosed by granitoid emplacement, with aureoles ranging from 500 m to 2 km wide. During mapping the aureoles were delineated by the presence of spotting in the pelites (Baillie, 1986). The aureole associated with the granodiorite, at 1.5–2.0 km, appears to be slightly wider than the aureole associated the other granite types which are usually 0.7–1.5 km wide. This may be related to the temperature of the intruded magma.

The gold-bearing quartz veins occur in a zone trending NNE from Gladstone (fig. 7). This zone is about 2 km wide and 3 km from the boundary of The Gardens pluton, suggesting that there might be a relationship with the granodiorite. There is no apparent spatial relationship with the later adamellite and granite/adamellite bodies, as at Gladstone the gold-bearing quartz veins lie close to them, whereas to the northeast they are quite distant. Most of the quartz veins in the immediate Gladstone area have a NW–SE trend which is approximately at right angles to the granodiorite boundary. Further north at the Big Musselroe mine the quartz reef trends north-south, again approximately at right angles to the granodiorite boundary. This pattern is not, however, supported by the trends of the reefs at the Grand Flaneur and Blue Bell mines in the same approximate area, which are reported to trend east-west (Nye, 1933).

A small amount of cassiterite is present in all the reefs in the Gladstone area. The fine-grained texture of these reefs and their close proximity to a granite/adamellite body suggests that they may have been recrystallised and had cassiterite introduced by metasomatic fluids emanating from the tin-bearing granitoids. Cassiterite is generally not present in the reefs lying further from the tin-bearing granitoids.

A recent fluid inclusion and isotopic study of gold-bearing vein quartz from the Portland mine (Davidson, 1988) indicated that the quartz had fluid and isotopic characteristics of a dominantly magmatic origin. The possible spatial relationship to the granodiorite suggested above may mean that it was the source of the magmatic fluid rather than the later granitoids.

If the gold-bearing quartz veins are related to The Gardens granodiorite and are to be found in a 2 km wide zone starting approximately 3 km from the granodiorite margin, as has been tentatively suggested above, then more quartz veins might be expected to be found to the northeast of the granodiorite in the poorly-exposed Mathinna Group country between EQ920750 and EQ980720.

Gee and Groves (1971) have suggested that The Gardens, on the eastern side of the Blue Tier batholith, and the Pyengana pluton, on the western side, may have originally been part of the same body and that they were rafted apart during the emplacement of the later Poimena pluton. A pre-Poimena reconstruction would bring the Gladstone gold occurrences into line with the main northeast Tasmanian gold lineament stretching from Mangana to Lyndhurst. This theory is supported by matching granitic boundaries, by foliation trends in the granite, by buckling of fold trends in the Mathinna Group, and the similarity in the gold fineness (in part of the Gladstone and in the Warrentinna goldfields the silver content was frequently higher than the gold content).

**Table 4**

Gold production from the main reefs in the Gladstone area

| *Mine or reef* | *Recorded gold production (kg)* | *Ore mined (t)* | *Average grade (g/t Au)* | *Max. strike length (m)* | *Max. depth worked (m)* | *Average width (m)* |
|---|---|---|---|---|---|---|
| Coarse Gold Creek | 0.373 | 8 | 30 | 0.9 | | |
| Flemings | 2.301 | 235 | 9.6 | 7 | 0.6 | |
| Lease 1091M | 0.995 | | | | 10 | 0.2 |
| Portland | 2.924 | 90 | 32.5 | 30 | 64 | 0.3 |
| Royal Tasmanian | 51.318 | 2958 | 17.3 | 73 | 22 | 0.6 |
| Dorset Flats | 103.061 | | | | | |
| **Total** | 160.97 | | | | | |

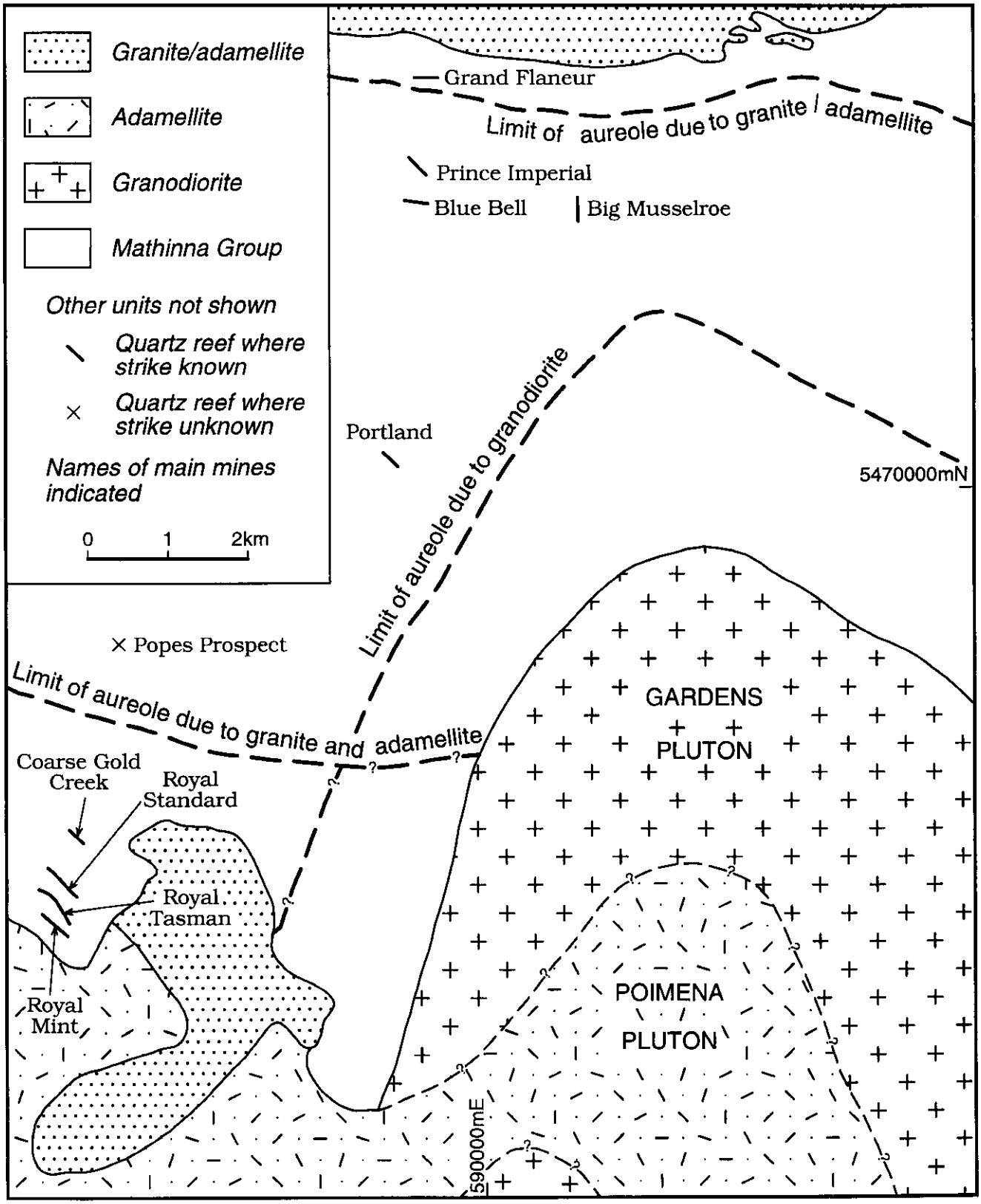



**Figure 7**
Geological sketch map of the Gladstone goldfield

5 cm

This interpretation would support a pre-Poimena age for the formation of the gold deposits and would be consistent with gold mineralisation being associated with the granodiorite intrusion.

## GOLD MINERALISATION

### Primary

The main gold-bearing veins in the Gladstone area are the Royal Standard, the North Tasman (or Royal Tasman No. 2), the Royal Tasman (No. 1), Fleming's Reef, and the Royal Mint. The quartz is white and often has a fine-grained marble-like appearance. Free gold is present but is not visible to the naked eye, and is also associated with sulphide minerals. At depth, gold was only found in sulphide minerals and it was considered that the surface gold had been liberated from weathered sulphides. Arsenopyrite is present in all veins and is more abundant than other sulphides. Chalcopyrite occurs in several of the reefs in the Gladstone area, and galena and sphalerite are present in the Portland mine to the northeast of Gladstone. Nye (1932) reported that a small amount of cassiterite was present in all reefs in the Gladstone area. Thureau (1881) considered that the gold-bearing quartz veins predated the tin greisen mineralisation. The proportion of gold and silver in the quartz veins has a considerable range but with gold generally much in excess of silver except in the Portland mine where the silver content was found to be three times that of gold.

### Placer gold deposits

Alluvial tin deposits have been important in the Gladstone area, coming from deep leads associated with the Ringarooma River system. Small amounts of gold occur with the cassiterite and the Dorset Dredge recorded gold as well as tin production. The average grade of return from the dredge was 0.015 g/m$^3$ Au with a ratio $SnO_2$:Au of 625:1 (McOnie, 1983).

## RECENT MINERAL EXPLORATION

In 1982 Santos Ltd carried out exploration in the area immediately south of Gladstone with hardrock tin as the chief target. A programme of gridding, geological mapping and geochemical sampling produced anomalous gold-in-soil geochemistry immediately south of the old Gladstone gold workings, and so indicated the potential of the area for gold as well as for tin. Of 208 geochemical samples assayed, taken at 50 m intervals, sixteen returned significant gold values with six samples in the range 2.5–5.6 g/t Au. Consequently, effort was directed towards exploration for gold.

In early 1983 Santos carried out a programme of gridding, geochemical sampling, geological mapping and trenching across the old Gladstone gold workings (Whitehouse, 1983). The results of this programme indicated that the gold was associated with structurally-controlled narrow (0.05–0.25 m wide) quartz fissure veins. The highest assay received from the trench samples was only 0.85 g/t Au, and no further exploration for gold was carried out.

In 1987 a trial survey was carried out around the Portland mine northeast of Gladstone (Leaman, 1987), on behalf of Placeco Australia Ltd, using magnetic, self potential and resistivity methods. The results suggested that all three techniques respond to changes in lithology and perhaps quartz-related mineralisation. The magnetic survey, supported by susceptibility measurements, demonstrated that the Mathinna Group are slightly and variably magnetic. The variation was considered sufficient to map gross unit or structural changes. Spike anomalies appeared to be related to localised iron oxide concentrations in the soil or upper weathered zone, and it was suggested that they reflected significant fracture circulation. A direct relationship between such zones and the quartz veins was considered likely.

Shortly after the trial survey Placeco had a detailed regional magnetic survey flown over an area northeast of Gladstone as part of their exploration programme, with a target of open-cuttable gold and silver mineralisation in quartz veins, stockwork and in the Mathinna Group country rock (Morrison and Davidson, 1987). It was thought that such mineralisation might exist as blind virgin deposits beneath surficial cover as well as near known, previously mined areas. The survey resolved some structural trends within the Mathinna Group and the Devonian granitoids and defined boundaries of some of the rock units in the survey area. Significant variation in the magnetic properties of the Mathinna Group was demonstrated.

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[8 April 1994]

# APPENDIX 1

## Description of the main reefs, Lefroy area

**Prospect:** CHUM REEF

**Location:** 497 640 mE, 5 451 110 mN to 498 750 mE, 5 451 330 mN

**Style of mineralisation:**

Quartz vein, gold associated with pyrite and stibnite.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves, 1965.

**Summary:**

The Chum Reef is one of the longest and most continuous reefs in the Lefroy field and consists largely of gold-bearing quartz with minor pyrite and stibnite. It has been worked to a maximum depth of 150 m, and from the mine plans appears to have been stoped out almost continually over the explored length and depth. Gold grades of 202 g/t near the surface but dying out with depth. Three boreholes were drilled by the Department of Mines in 1935 to intersect the lode along its proved length at a depth of 240 m and 275 m with very little success; 2.4 m of core at 250 m in No. 1 bore assayed 0.6 g/t Au and 0.4 g/t Ag, while No. 3 and 4 bores intersected only a trace of gold.

**Prospect:** PINAFORE REEF

**Location:** 498 210 mE, 5 451 060 mN to 498 830 mE, 5 451 150 mN

**Style of mineralisation:**

Gold in quartz veins with associated pyrite.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves, 1965.

**Summary:**

The Pinafore Reef comprises a series of quartz veins in a wide fault zone, and is generally obscured by overlying Tertiary gravel and basalt. It has been worked extensively to a depth of 90 m with fair success. The reef was tested in depth by underground mining to 370 m, small pockets of fairly rich ore occurring at 240 and 330 metres. Extensive driving and cross cutting was carried out at 370 m and five lodes were intersected, all proving unpayable. Small amounts of gold were found in the Pinafore lode at this level but were uneconomic. Grade of about 31 g/t Au.

**Prospect:** GOLDEN ERA REEF

**Location:** 498 590 mE, 5 450 540 mN

**Style of mineralisation:**

Gold in quartz vein.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves 1965.

**Summary:**

This reef has been worked to a maximum depth of 73 m where gold values were high in the east drive on the main lode. The auriferous quartz extended underfoot but the mine was closed due to water problems and lack of capital. Four boreholes were drilled by the Department of Mines in 1936–37 to intersect this lode at depths ranging from 53 to 106 metres, generally with poor results. Borehole No. 11, however, intersected one metre of pyritic material at 101 m assaying 11.2 g/t Au and 10.4 g/t Ag.

**Prospect:** **CLARENCE REEF**

**Location:** 498 510 mE, 5 450 520 mN and 498 630 mE, 5 450 440 mN

**Style of mineralisation:**

Gold in quartz veins with auriferous pyrite. The mineralisation is patchy.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves 1965.

**Summary:**

Broadhurst (1935) suggested that the Clarence Reef has been faulted to form two main branches, the North Clarence and South Clarence Reefs. The North Clarence Reef has been worked from the Clarence Shaft to a depth of 64 m and two small patches of ore stoped out to the east of the shaft. The gold was associated with pyrite which assayed up to 685 g/t. The South Clarence Reef has been worked from the East Clarence and Golden Heart Shafts to a maximum depth of 67 metres. In the East Clarence mine the main ore shoot pitches shallowly to the west and several good crushings have been taken from this shoot. The lode is of variable width, but generally from 0.9 to 1.2 metres.

**Prospect:** **MORNING STAR REEF**

**Location:** 498 360 mE, 5 450 280 mN to 498 780 mE, 5 450 290 mN

**Style of mineralisation:**

Gold in fissure quartz vein.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves, 1965.

**Summary:**

This reef has been worked to a depth of 130 m in the Morning Star mine. Satisfactory gold values were obtained to the east of the shaft in the upper levels and to the west in the lower levels. The available information suggests a west-plunging orebody which became unpayable at the 420 foot (130 m) level. The reef in the Morning Star mine was 0.6–3.0 m wide. Four boreholes were drilled by the Department of Mines to intersect the orebody along the probable extension of the westerly plunge. Results of the drilling were not encouraging, borehole No.4A intersecting the only gold recorded, which occurred in a zone 10 m wide averaging 0.75 g/t Au and 0.26 g/t Ag at a depth of 171 metres.

**Prospect:** **NEW NATIVE YOUTH REEF**

**Location:** 498 550 mE, 5 450 050 mN to 499 080 mE, 5 449 990 mN

**Style of mineralisation:**

Gold in quartz veins with associated Cu, Pb, Zn and Fe sulphides.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves, 1965.

**Summary:**

The New Native Youth Reef was one of the richest in the field and included the City of Launceston, New Native Youth and Excelsior mines. The reef, a hard quartz lode, was investigated to a depth of 240 metres. Stoping was carried out along its length to a depth of 120–150 m but below this the lode proved uneconomic. A few small patches of gold are recorded from the 800 foot (240 m) level.

**Prospect:** **HIT OR MISS REEF**

**Location:** 498 700 mE, 5 449 850 mN

**Style of mineralisation:**

Gold in quartz reef.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves, 1965.

**Summary:**

Worked to a depth of 82 m with levels at 56 m and 80 m containing a fair amount of development but little stoping. Only recorded production is that one crushing of 33.5 t gave 0.264 kg of gold. Similar strike and dip to the New Native Youth Reef. Reef is 0.3 m wide.

**Prospect:** **GOLDEN POINT and CROWN REEF**

**Location:** 498 660 mE, 5 449 620 mN

**Style of mineralisation:**

Gold in quartz vein.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves 1965.

**Summary:**

This reef is unusual as it trends northeast. It is a short reef and occurs in strongly fractured siltstone and slate, with numerous irregular quartz veins. The longitudinal section of the reef indicates two near-vertical shoots of ore to a maximum depth of about 100 metres. It is not recorded whether the reef was investigated at a greater depth. Grade of about 31 g/t Au.

**Prospect:** **AUSTRALASIAN and McIVOR REEF**

**Location:** 498 780 mE, 5 449 530 mN to 499 330 mE, 5 449 430 mN

**Style of mineralisation:**

Gold in capping on quartz-pyrite vein.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves, 1965.

**Summary:**

Three mines and numerous trenches. The McIvor mine had a shaft 30 m deep and a cross-cut to the reef where there was a drive of 21 metres. The Australasian mine was to the east where the shaft was 33 m deep and there was some driving on the reef. Very narrow (0.05–0.5 m) reefs dip north and locally carry a large amount of pyrite. Gold values restricted to a capping on the lode in all three mines. The reef runs below the alluvial flats to the west.

**Prospect:** **PRINCE OF WALES REEF**

**Location:** 499 860 mE, 5 449 430 mN

**Style of mineralisation:**

Gold in quartz veins.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves, 1965.

**Summary:**

Mine opened in 1881 and a shaft was sunk to 30 m with levels at 15 m, 22 m and 30 m. Production of about 3.11 kg Au at a grade of 31 g/t. Grade at 15 m level of 29 g/t Au where the reef was 1.5 m wide.

**Prospect:** **TABLIER REEF**

**Location:** 498 890 mE, 5 449 200 mN to 499 200 mE, 5 449 210 mN

**Style of mineralisation:**

Quartz vein.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves, 1965.

**Summary:**

Tablier and Princess Alice mines on the reef with shafts to 30 metres. Both mines unsuccessful.

**Prospect:** **LEE FLOYD REEF**

**Location:** 499 530 mE, 5 448 880 mN

**Style of mineralisation:**

Gold in quartz vein.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves 1965.

**Summary:**

Discovered in 1931 with several shafts sunk to at least 22 metres. A south-dipping reef up to 0.45 m wide but diminishes along strike and down dip to zero. Gold at the surface and down to 15 m level only. Gold grade of 31 g/t at the 15 m level.

**Prospect:** **SPECIMEN HILLS REEFS**

**Location:** 499 720 mE, 5 448 630 mN to 499 800 mE, 5 448 690 mN

**Style of mineralisation:**

Gold in quartz veins.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves 1965.

**Summary:**

Numerous small reefs 0.05–0.3 m wide that carry variable gold values that die out with depth. Worked as the Golden Crest, Reward and Gift mines. Gift mine yielded 0.155 kg of gold from 11.1 t of quartz.

**Prospect:** **LAND O'CAKES REEF**

**Location:** 498 510 mE, 5 448 370 mN to 499 330 mE, 5 448 390 mN

**Style of mineralisation:**

Gold in quartz vein in a fault zone.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves, 1965.

**Summary:**

This line of lode has been traced for nearly 1.5 km on the surface but was only worked to any extent in the Land-O'-Cakes mine. It was stoped to a depth of about 60 m, exploration down to the 400 foot (120 m) level indicating a rapid decline in gold values. Four boreholes were drilled by the Department of Mines in 1938, three to test the lode at depth and one to test the western extension of the lode. A trace of gold was found in most of the boreholes but the results were not encouraging. A gold grade of 15–61 g/t was recorded for the Caledonian mine.

**Prospect:** **VOLUNTEER REEF**

**Location:** 499 320 mE, 5 448 210 mN to 500 090 mE, 5 448 200 mN

**Style of mineralisation:**

Gold in quartz vein in possible shear zone.

**References:**

Montgomery, 1897; Broadhurst, 1935; Groves, 1965.

**Summary:**

The Volunteer Reef has been worked over a length of about 1220 m and lodes probably continuous with the reef have been cut over a greater distance. The main workings were the Volunteer, West Volunteer and East Volunteer mines which worked the lode to a depth of about 190 m, although the better gold values occurred above 140 m, with the richest ore between 70 and 90 metres. The lode was explored at depth by underground mining to 380 m but only very small quantities of gold were found at this depth. The longitudinal section of the reef indicates a fairly shallow westerly plunge. A possible extension of the ore along this plunge was drilled by the Department of Mines in 1936–37, two boreholes failing to intersect any gold-bearing lode. Reported gold grades of 81.1 g/t for the Volunteer and 122.4 g/t for the West Volunteer mines.

# APPENDIX 2

## Description of the main reefs, Back Creek area

**Prospect:** LADY EMILY, ALL NATIONS and MOONLIGHT

**Location:** 504 940 mE, 5 455 080 mN, 505 050 mE, 5 454 800 mN and 505 200 mE, 5 455 000 mN

**Style of mineralisation:**

Fissure quartz vein.

**References:**

Montgomery, 1894; Broadhurst, 1935.

**Summary:**

A number of old shafts sunk in white sandstone and soft micaceous shale as at the Union and Hidden Treasure prospects. Reef is 0.45–0.6 m wide with 'unpayable' gold values traced over 24 m length. A number of nearby small irregular reefs contain trace amounts of gold. The Moonlight Reef, which crosses the Lady Emily Reef with 150 mm of fault displacement, has been traced over 60 m and is reported to carry gold values up to 10 g/t over its 0.45 m width.

**Prospect:** MAJOR or LEURA MINE

**Location:** 507 500 mE, 5 454 000 mN to 507 800 mE, 5 455 100 mN

**Style of mineralisation:**

Fissure quartz vein.

**References:**

Montgomery, 1894; Broadhurst, 1935; Marshall, 1969.

**Summary:**

Main quartz vein strikes ENE with a steep northerly dip and was traced over 365 m and to depths of 30 metres. A vein to the south strikes E-W and appears to merge with the main vein towards its western end. The vein is narrow, its width varies to 0.76 m, and it is referred to as laminated and striated. Mineralisation is variable, with a maximum gold grade recorded of 289 g/t. The possibility of parallel structures and reefs along a NW-SE trend parallel to the strike of the country rocks was mentioned by Broadhurst (1935).

**Prospect:** NEVER MIND or ALBION REEF

**Location:** 504 450 mE, 5 455 670 mN

**Style of mineralisation:**

Fissure quartz vein.

**References:**

Montgomery, 1894; Broadhurst, 1935.

**Summary:**

A number of shafts were driven to 30 metres. The quartz vein is 0.3–0.6 m wide and strikes southeast. It was affected by minor faulting and had irregularly developed high gold values. The vein is broken and irregular. There are also other sets of east-trending quartz veins.

**Prospect:** **NEW HIDDEN TREASURE or NEW TREASURE MINE**

**Location:** 504 900 mE, 5 455 200 mN

**Style of mineralisation:**

Quartz veinlets.

**References:**

Montgomery, 1894.

**Summary:**

There are two sets of reefs. The first is approximately one metre thick, strikes E-W and dips north, and contains a short shoot averaging 150 mm wide from which seven tonnes of ore returned 0.899 kg Au. The second reef, 40 m to the east, was 0.45 m wide and was stoped to 4.5 m depth over a distance of 40 metres. Ten tonnes of ore returned 0.777 kg of Au. The average grade for the mine was 98.6 g/t. The grade for both sets of veins dropped off with depth.

**Prospect:** **SIR JOHN FRANKLIN MINE**

**Location:** 504 600 mE, 5 455 800 mN to 504 300 mE, 5 456 000 mN

**Style of mineralisation:**

Pyritic quartz veins.

**References:**

Montgomery, 1894; Marshall, 1969.

**Summary:**

The mine consists of a number of shafts. A 71 m long tunnel connected to the main shaft (52 m depth) at the 30 m level. Situated at the head of the Red Lead channel. Sandstone in the tunnel carries a series of generally small (<70 mm) quartz veinlets over a distance of 28 metres. These veinlets are iron stained and carry up to 9 g/t Au. A veining density of 13 veins over a 3.6 m interval has been recorded, with the zone giving a bulk return of 9 g/t Au from 30 t of mixed quartz and sandstone. Maximum width of an individual quartz vein was 0.6 metres. Winze between 30 m and 52 m levels returned 0.684 kg Au from 30 t quartz, i.e. ore at a grade of 22.8 g/t.

**Prospect:** **UNION MINE**

**Location:** 505 140 mE, 5 455 400 mN

**Style of mineralisation:**

Quartz veinlets.

**References:**

Montgomery, 1894; Broadhurst, 1935; Blake, 1937; Marshall, 1969.

**Summary:**

The mine was worked about 1894 and there was a shaft at least 24 m deep. The mine is at the head of the White Lead which is the probable source for the gold. The gold occurs throughout a finely quartz-veined white sandstone and is associated with a 0.6 m wide quartz vein. Total width of the gold-bearing zone is 3–4.5 m and it extends to a depth of 27 metres. Clay alteration was considered to be present. At depth it was considered possible that there was a second set of rather narrow and irregular quartz veins. Sampling on the 24 m level of the mine (Blake, 1937) recorded several poorly-defined zones of quartz veinlets in sandstone with no detectable gold.

# APPENDIX 3

## Description of the main reefs, Gladstone area

**Prospect:** NORTH ROYAL TASMAN (ROYAL TASMAN No. 2)

**Location:** 584 700 mE, 5 464 450 mN

**Style of mineralisation:**

Quartz veining, striking 310–335° and dipping 70–90° SW.

**References:**

Nye, 1932; Twelvetrees, 1916.

**Summary:**

This reef runs parallel to the Royal Tasman Reef and starts about 67 m to the northwest, cropping out for 40 m with a width of 1.2 to 1.8 metres. At a depth of 30 m the reef is suddenly cut off, presumably by faulting. The truncated portion has been thrown to the north by 3.6 m and has a dip of 60–70° west. This has an apparent depth of at least 19 m (from surface) and a width of 1.8 metres. It has been suggested that the North Tasman Reef is the faulted extension of the Royal Tasman, but Nye (1932) felt this to be unlikely. The reef is white quartz with occasional flakes of muscovite, is vuggy and greisenised, and may contain wolfram. The Royal Tasman Company worked a vertical section of the reef to 33 m, with levels at the 11, 20 and 33 metres (the latter being an adit level). Stoping occurred along lengths of 18–24 m down to the 20 m level. Reported gold grades vary. Twelvetrees (1916) obtained 15.3 g/t over 1.5 m vertically from the drive face; more recent dump sampling gave traces only.

**Prospect:** POPES PROSPECT, LOCHABER AREA

**Location:** 585 300 mE, 5 468 000 mN

**Style of mineralisation:**

Quartz veining?

**References:**

Nye, 1933.

**Summary:**

Numerous shallow surface workings exist along a line bearing 055°. The only evidence of reefs is the presence of some quartz in dumps. Grab sampling returned 10.4 g/t Au and 3.9 g/t Ag. No dimensions of reefs or workings are known.

**Prospect:** PORTLAND MINE

**Location:** 588 820 mE, 5 470 330 mN

**Style of mineralisation:**

Quartz fissure reef striking at 320° with a steep dip to the southwest, free gold near the surface with increasing amounts of arsenopyrite, galena and sphalerite at depth. Silver much more abundant than gold.

**References:**

Nye, 1932; Scott, 1930; Twelvetrees, 1916; Thureau, 1881.

**Summary:**

Depth is at least 60 m, length greater than 30 m with average width 0.3 metres. Shafts sunk to 64 m with levels at 24, 45 and 60 metres. Surface workings and prospecting shafts to a maximum depth of 13 metres. Indications are that down to the 45 m level free gold was in fair abundance (30.6–61.2 g/t) with associated galena and sphalerite. Below this values were patchy and at the 60 m level the vein ran 6 g/t Au and was heavily sulphide enriched. Silver was greater than gold by 3 to 5 times.

**Prospect:** **PRINCE IMPERIAL MINE**

**Location:** 589 100 mE, 5 474 000 mN

**Style of mineralisation:**

Quartz fissure vein with associated arsenopyrite, galena, pyrite and cassiterite. Reef strikes northwest across slate and sandstone of the Mathinna Beds, which strike north.

**References:**

Nye, 1933; Twelvetrees, 1916.

**Summary:**

Reefs discovered in 1870 with various operations carried out until 1907, when it was known as the New Imperial. Other activities continued until at least 1933. The mines in the area occupy a narrow belt trending SSW-NNE. At a depth of 6 m the reef consists of many gold-bearing veins which are heavily mineralised with arsenopyrite, galena and pyrite. The sandstone between these veins is also mineralised. The reef is 0.15–1 m wide, and a 0.15 m wide quartz vein is situated nearby which carried irregular values up to 20 g/t. Nye (1933) did not consider the reef's prospects as being favourable. Trial crushing in the 1930s returned 3 g/t with some values in excess of 31 g/t. Twelvetrees (1916) noted a body of indurated sandstone veined with quartz veins which appeared to be irregular silicification of the sandstone and assayed at 2 g/t Au and 1.2 g/t Ag.

**Prospect:** **ROYAL MINT REEF**

**Location:** 584 680 mE, 5 464 580 mN

**Style of mineralisation:**

Quartz veining striking at 320°.

**References:**

Nye, 1932.

**Summary:**

Reef worked or prospected by the Royal Mint Gold Mining Company from 1881 to 1883, the Dreadnought Gold Mining Company in 1909, and the Victory Gold Mining Company in 1931. Averages 1.2 m wide in places and 0.15–0.3 m in others. Two cross veins 27 m apart traverse this reef, one being 0.45 m thick and almost vertical. The length extent of the workings cannot be determined but workings appear to have extended to depths in excess of 20 metres.

**Prospect:** **ROYAL STANDARD REEF**

**Location:** 584 750 mE, 5 464 900 mN

**Style of mineralisation:**

Fissure quartz reef, striking NW-SE, with associated arsenopyrite, chalcopyrite and accessory cassiterite.

**References:**

Nye, 1932.

**Summary:**

Main activity was in 1880–81, but work stopped due to poor returns. No further work done until 1931 when leases were taken up by the Victory Gold Mining Company. In 1933 the work was carried on by the Gladstone Gold Mining Company. The reef occurs in Mathinna Group slate and sandstone and consists of massive quartz extending for 300 metres. At the surface the width is 3–4.5 m, 6.7 m at the 15 m level, and 0.9 m at the 30 m level. At the north of the reef, at 18 m depth, it is 4.2 m wide and plunges to the north. Twelvetrees (1916) reported that the reef faults across the Flemings Wolfram lode. Visible gold is present with accessory cassiterite, arsenopyrite and chalcopyrite.

**Prospect:** **ROYAL TASMAN REEF**

**Location:** 584 750 mE, 5 464 680 mN

**Style of mineralisation:**

Quartz fissure reef. The quartz is white and often has a peculiar fine-grained marble-like appearance. Gold associated with sulphides (up to 3.5% pyrite). Trace amount of platinum present.

**References:**

Nye, 1932; Twelvetrees, 1916; Thureau, 1881.

**Summary:**

Reef occurs in Mathinna Group slate and sandstone and crops out for 73 m over widths ranging from 0.2–2.4 m, with actual quartz vein material occupying up to 0.6 m of this. Reef trends at 320° and is vertical. At one place the reef has been displaced by 3.6 m by a fault which trends 064°, is up to 1.8 m wide and filled with brecciated material. There is also a suggestion that the reef is faulted at both ends. The reef has been stoped for 76 m to the 9 m level and for 45 m above the 22 m level. Gold grades recorded during mining at the surface were 612 g/t, falling to 4.5 g/t at depth. One initial sample carried 4469 g/t. Sulphides increased with depth and as the returns did not include the gold content of the sulphides the fall off of gold content may have not been so great. Thureau (1881) suggested that the old workings may not have located offset portions of the reef.

**Prospect:** **WOLFRAM REEF**

**Location:** 584 700 mE, 5 464 950 mN

**Style of mineralisation:**

Quartz vein carrying W, Sn and Au mineralisation.

**References:**

Twelvetrees, 1916.

**Summary:**

A 0.2–0.3 m wide vein which crosses the Royal Standard Reef with patch mineralisation. About 0.3 t of Sn and W concentrate produced.

**Prospect:** **BIG MUSSELROE REEF**

**Location:** 591 300 mE, 5 473 500 mN

**Style of mineralisation:**

Very wide quartz reef incorporating much country rock, strikes N–S.

**References:**

Nye, 1932; Twelvetrees, 1916.

**Summary:**

Quartz veins through sandstone across widths of up to 15 metres. Twelvetrees (1916) reported values of 3 g/t Au and 4.2 g/t Ag from a prominent cliff face, and 5 g/t Au and 7.2 g/t Ag from a reef to the north. The reef contains gold-bearing sulphides and in places is heavily charged with pyrite, arsenopyrite and galena. A great number of small reefs and outcrops are reported in the general area but these are generally poor in gold.

**Prospect:** **BLUE BELL MINE**

**Location:** 589 060 mE, 5 473 720 mN

**Style of mineralisation:**

Quartz fissure reef striking approximately east-west and dipping south at 87°. Gold associated with arsenopyrite and galena.

**References:**

Nye, 1932; Twelvetrees, 1916.

**Summary:**

Two parallel reefs 39 m apart which strike east-west in Mathinna Group slate and sandstone. The south reef is 0.6 m wide at the 4.8 m level and carried 38.3 g/t Au. At the 9.7 m level it is 0.76 m wide. At the 30 m level the two reefs are 24 m apart.

**Prospect:** **COARSE GOLD CREEK**

**Location:** 584 800 mE, 5 465 500 mN

**Style of mineralisation:**

Quartz veins in Mathinna Group slate.

**References:**

Nye, 1932; Twelvetrees, 1916.

**Summary:**

Coarse-grained gold recovered with alluvial tin. Sluicing exposed gold-bearing quartz veins in bedrock where small vertical veins were 0.05–0.15 m wide and trending at 300°. Shallow shafts sunk to 10 m discovered a larger body of quartz trending north-south and dipping 48° west with a width of 0.9 m, and carrying coarse gold but no sulphides. Eight metres of the larger reef was worked but the full extent of the reef was not uncovered. Some quartz veining of quartzite and silicification of slate close to quartz veins in the country rocks. Nye (1933) reported progress on the shaft then being sunk on the larger quartz vein but no later results exist. Recorded production of approximately 0.373 kg Au with an average grade of 91.8 g/t.

**Prospect:** **DESKFORD REEF**

**Location:** 584 770 mE, 5 464 550 mN

**Style of mineralisation:**

Quartz veins in Mathinna Group rocks.

**References:**

Nye, 1932.

**Summary:**

Reef consists of quartz veins 0.15–0.6 m wide interspersed with the hard country rock. Driving was carried out along 30 m across the reef, rather than along it, at a depth of 16 metres. A considerable amount of chalcopyrite found in quartz in the surface dumps.

**Prospect:** **FLEMINGS REEF**

**Location:** 584 750 mE, 5 464 600 mN

**Style of mineralisation:**

Quartz fissure reef, gold associated with fine arsenopyrite and pyrite.

**References:**

Nye, 1932.

**Summary:**

Reef strikes 320° at its southern end and 340° at the northern end, with dips varying from 70° SW to 80° E. Production of 2.30 kg Au at a grade of 9.2 g/t. A grab sample of sulphide concentrate yielded 1837 g/t. Reef width varies from 0.2 to 0.6 m and is quite flexured. Sampling of the reef showed great variability in gold content, with patches of 184–306 g/t whereas others were less than 1 g/t.

**Prospect:** **GRAND FLANEUR MINE**

**Location:** 589 300 mE, 5 475 300 mN

**Style of mineralisation:**

Fissure quartz reef with gold associated with pyrite and arsenopyrite.

**References:**

Nye, 1932; Twelvetrees, 1916.

**Summary:**

Discovered about 1870 with most work from 1881 to 1883. Main shaft sunk to 19 metres. Reef strikes east-west and dips 30° S and is irregular, being 0.6–0.9 m wide with vertical veins rising from it. No visible gold in semi-vitreous quartz but abundant arsenopyrite and some pyrite. Some samples carry 46 g/t Au but are generally low grade, e.g. 6 g/t. Samples containing high sulphide content carry 7.6 g/t Au and 1.2 g/t Ag.

**Prospect:** **LEASE 10919M**

**Location:** 584 000 mE, 5 465 000 mN

**Style of mineralisation:**

Quartz reef in Mathinna Group rocks. Reef trends at 045° and is vertical.

**References:**

Nye, 1933.

**Summary:**

Quartz veins 0.05–0.2 m wide exposed at the surface which are followed by shallow shafts to 10 m with grades to 9 g/t Au which diminished with depth. A total of 890 kg of alluvial gold was obtained from tin workings. Bedrock contains irregular quartz veinlets in slate which generally lie along the line of the reef.

# APPENDIX 4

## MIRLOCH listing of gold mines and occurrences, Beaconsfield area

| *Ref. No.* | *AMG co-ordinates* | *Commodity* | *Co-ord error* | *Map Sheet* | *Status* | *Size* | *Host rock* | *Mineral. age* | *Form* | *Strike (°)* | *Explor.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30141 | 483 000 mE, 5440500 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30081 | 483 000 mE, 5440250 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30080 | 483 150 mE, 5439900 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30083 | 483 275 mE, 5439860 mN | Au | 1 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30082 | 483 240 mE, 5439790 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30208 | 483 440 mE, 5439760 mN | Au | 1 | 82151 | 7 | | 4 | 5 | 2 | ND | 1 |
| 30137 | 482 800 mE, 5439700 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30085 | 483 150 mE, 5439700 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30079 | 483 200 mE, 5439700 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30113 | 483 215 mE, 5439700 mN | Au | 1 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30078 | 483 300 mE, 5439700 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30181 | 483 350 mE, 5439670 mN | Au | 2 | 82151 | 8 | | 9 | | 7 | ND | 1 |
| 30084 | 483 200 mE, 5439650 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30209 | 483 450 mE, 5439605 mN | Au | 1 | 82151 | 7 | | 4 | 5 | 2 | ND | 1 |
| 30197 | 484 900 mE, 5439600 mN | Au | 2 | 82154 | 8 | | 9 | | 7 | ND | 1 |
| 30210 | 483 490 mE, 5439540 mN | Au | 1 | 82151 | 7 | | 4 | 5 | 2 | ND | 1 |
| 30206 | 483 290 mE, 5439520 mN | Au | 1 | 82151 | 7 | | 4 | 5 | 2 | ND | 1 |
| 30207 | 483 320 mE, 5439495 mN | Au | 1 | 82151 | 7 | | 4 | 5 | 2 | ND | 1 |
| 30147 | 480 500 mE, 5439200 mN | Os, Ir, Au | 5 | 82151 | 9 | | 9 | 9 | 7 | ND | 1 |
| 30118 | 483 400 mE, 5439200 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30092 | 484 800 mE, 5439200 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30119 | 483 380 mE, 5439185 mN | Au | 1 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30200 | 483 250 mE, 5439100 mN | Au | 2 | 82154 | 6 | | 9 | | 7 | ND | 1 |
| 30139 | 484 300 mE, 5439100 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30090 | 484 450 mE, 5439100 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30116 | 483 550 mE, 5439050 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30114 | 483 950 mE, 5439050 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30117 | 483 550 mE, 5439000 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30115 | 483 600 mE, 5439000 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30138 | 483 700 mE, 5439000 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30140 | 484 000 mE, 5439000 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30098 | 484 100 mE, 5439000 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30099 | 484 200 mE, 5439000 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30100 | 484 250 mE, 5439000 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30134 | 484 500 mE, 5439000 mN | Au | 2 | 82151 | 4 | 0 | 9 | 8 | 7 | ND | 1 |
| 30144 | 484 180 mE, 5438970 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30086 | 484 620 mE, 5438960 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30142 | 483 800 mE, 5438900 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30101 | 484 250 mE, 5438900 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30102 | 484 300 mE, 5438900 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30103 | 484 300 mE, 5438900 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30201 | 483 300 mE, 5438800 mN | Au | 2 | 82154 | 6 | | 9 | | 7 | ND | 1 |
| 30112 | 483 700 mE, 5438800 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30104 | 484 250 mE, 5438800 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |

| *Ref. No.* | *AMG co-ordinates* | *Commodity* | *Co-ord error* | *Map Sheet* | *Status* | *Size* | *Host rock* | *Mineral. age* | *Form* | *Strike (°)* | *Explor.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30105 | 484 250 mE, 5438750 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30202 | 483 200 mE, 5438700 mN | Au | 2 | 82154 | 6 | | 9 | | 7 | ND | 1 |
| 30106 | 484 200 mE, 5438700 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30087 | 484 620 mE, 5438700 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30194 | 484 300 mE, 5438650 mN | Au | 2 | 82154 | 4 | | 9 | | 2 | ND | 1 |
| 30136 | 484 400 mE, 5438600 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30097 | 484 450 mE, 5438600 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30135 | 484 480 mE, 5438600 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30107 | 484 200 mE, 5438550 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30195 | 484 500 mE, 5438550 mN | Au | 2 | 82154 | 4 | | 9 | | 2 | ND | 1 |
| 30108 | 483 800 mE, 5438500 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30088 | 484 100 mE, 5438500 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30094 | 484 300 mE, 5438450 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30093 | 484 400 mE, 5438350 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30198 | 484 560 mE, 5438270 mN | Au | 2 | 82154 | 8 | | 9 | | 7 | ND | 1 |
| 30095 | 484 550 mE, 5438200 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30199 | 484 740 mE, 5438150 mN | Au | 2 | 82154 | 6 | | 4 | 5 | 2 | ND | 1 |
| 30089 | 484 430 mE, 5438130 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30091 | 484 350 mE, 5438000 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30203 | 484 520 mE, 5437850 mN | Au | 2 | 82154 | 6 | | 4 | 5 | 2 | ND | 1 |
| 30204 | 484 380 mE, 5437660 mN | Au | 2 | 82154 | 6 | | 4 | 5 | 2 | ND | 1 |
| 30121 | 485 000 mE, 5437600 mN | Au, Cu, Ag | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30109 | 483 550 mE, 5437100 mN | Au | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30146 | 485 500 mE, 5436500 mN | Au | 4 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30120 | 487 000 mE, 5433900 mN | Au, Ni | 2 | 82151 | 4 | 0 | 42 | 5 | 2 | ND | 1 |
| 30111 | 487 000 mE, 5433800 mN | Au, Ni | 2 | 82151 | 4 | 0 | 4 | 5 | 2 | ND | 1 |
| 30110 | 487 000 mE, 5433700 mN | Au, Ni, Cr | 2 | 82151 | 4 | 0 | 42 | 5 | 2 | ND | 1 |
| 38001 | 486 500 mE, 5433500 mN | Au | 2 | 82152 | 8 | 0 | 9 | 0 | 78 | ND | 1 |
| 30196 | 484 750 mE, 5431700 mN | Au | 2 | 82154 | 8 | | 9 | | 7 | ND | 1 |

# Key to MIRLOCH listing abbreviations

## CO-ORDINATE ERROR

1 <50 m
2 <100 m
3 <500 m
4 < 1 km
5 >1 km

## STATUS

0 Operating mine
1 Non-operating mine — reserves known
2 Non-operating mine — reserves unknown
3 Abandoned mine — reserves known
4 Abandoned mine — reserves unknown
5 Abandoned — mined out
6 Prospect — explored
7 Prospect — unexplored
8 Mineralised area
9 Mineral occurrence

## AGE OF MINERALISATION

0 Not determined
1 Precambrian
2 Eocambrian–Early Cambrian
3 Middle–Late Cambrian
4 Ordovician–Early Devonian
5 Late Devonian (granite associated)
6 Permo-Triassic
7 Jurassic–Cretaceous
8 Tertiary
9 Quaternary

## EXPLORATION OF DEPOSIT

0 Nil or no known exploration
1 Prospecting
2 Geological mapping
3 Geochemical surveys
4 Geophysical surveys
5 Drilling

## SIZE OF DEPOSIT

0 Not determined
1 Very small: < 100 tonnes (or cubic metres)
2 Small: 100 t – 10 000 t
3 Medium: 10 000 t – 1 000 000 t
4 Large: 1 000 000 t – 10 000 000 t
5 Very large: > 10 000 000 t

## HOST ROCK

0 Precambrian sequences
1 Cambrian sedimentary sequences
2 Cambrian igneous sequences
3 Mount Read Volcanics and correlates
4 Owen Conglomerate/Moina Sandstone and correlates
5 Gordon Limestone/Eldon Group and correlates
6 Mathinna Beds
7 Devonian granitoid
8 Parmeener Supergroup
9 Jurassic–Cenozoic sequences

## FORM OF DEPOSIT

0 Volcanic massive sulphide
1 Stratiform
2 Vein (single, sheet, saddle)
3 Stockwork
4 Disseminated
5 Replacement
6 Pipe
7 Placer
8 Residual
9 Other (noted in references)

# APPENDIX 5

## MIRLOCH listing of gold mines and occurrences, Lefroy and Back Creek area

| *Ref. No.* | *AMG co-ordinates* | *Commodity* | *Co-ord error* | *Map Sheet* | *Status* | *Size* | *Host rock* | *Mineral. age* | *Form* | *Strike (°)* | *Explor.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 31082 | 504 300 mE, 5 456 200 mN | Slate, Ph, Cu, Au | 2 | 83154 | 4 | | 6 | | 12 | ND | 1 |
| 31050 | 504 300 mE, 5 456 000 mN | Au, Cu | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31017 | 504 600 mE, 5 455 800 mN | Au | 2 | 83154 | | 0 | 6 | 5 | 2 | ND | 1 |
| 31042 | 504 450 mE, 5 455 670 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31056 | 505 140 mE, 5 455 400 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31023 | 504 900 mE, 5 455 200 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31049 | 505 000 mE, 5 455 200 mN | Au, Cu | 2 | 83154 | 4 | 0 | 9 | 8 | 7 | ND | 1 |
| 31096 | 507 800 mE, 5 455 100 mN | Au | 2 | 83154 | 6 | | 6 | 5 | 2 | 100 | 1 |
| 31028 | 504 940 mE, 5 455 080 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31003 | 505 000 mE, 5 455 000 mN | Au | 2 | 83154 | 8 | 0 | 69 | 5 | 27 | ND | 1 |
| 31041 | 505 200 mE, 5 455 000 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31097 | 507 800 mE, 5 455 000 mN | Au | 2 | 83154 | 6 | | 9 | | 7 | ND | 1 |
| 31032 | 507 700 mE, 5 454 900 mN | Au | 2 | 83154 | 4 | 0 | 6 | 9 | 2 | ND | 1 |
| 31098 | 507 900 mE, 5 454 900 mN | Au | 2 | 83154 | 6 | | 6 | 5 | 2 | 100 | 1 |
| 31002 | 505 050 mE, 5 454 800 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31005 | 505 100 mE, 5 454 800 mN | Au | 2 | 83154 | 4 | 0 | 9 | 8 | 7 | ND | 1 |
| 31008 | 505 000 mE, 5 454 700 mN | Au | 2 | 83154 | 4 | 0 | 9 | 8 | 7 | ND | 1 |
| 31062 | 505 500 mE, 5 454 700 mN | Au | 2 | 83154 | 8 | 0 | 9 | 9 | 7 | ND | 1 |
| 31095 | 507 700 mE, 5 454 600 mN | Au | 2 | 83154 | 6 | | 6 | 5 | 2 | 100 | 1 |
| 31075 | 503 500 mE, 5 454 500 mN | Au, Cu | 2 | 83154 | 7 | 0 | 6 | 5 | 2 | ND | 1 |
| 31027 | 505 400 mE, 5 454 050 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31038 | 507 500 mE, 5 454 000 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30033 | 496 800 mE, 5 452 500 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30034 | 497 000 mE, 5 452 500 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30050 | 497 300 mE, 5 452 100 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30125 | 499 200 mE, 5 452 000 mN | Au | 2 | 82151 | 8 | 0 | 9 | 8 | 27 | ND | 1 |
| 30052 | 498 500 mE, 5 451 900 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30025 | 498 400 mE, 5 451 700 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30060 | 496 500 mE, 5 451 500 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30061 | 496 600 mE, 5 451 500 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30128 | 498 700 mE, 5 451 500 mN | Au | 2 | 82151 | 8 | 0 | 9 | 9 | 7 | ND | 1 |
| 30075 | 498 850 mE, 5 451 470 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30017 | 498 750 mE, 5 451 330 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30205 | 496 500 mE, 5 451 300 mN | Au | 2 | 82151 | 6 | | 4 | 5 | 2 | ND | 1 |
| 30047 | 498 800 mE, 5 451 300 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30037 | 498 090 mE, 5 451 240 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30013 | 498 470 mE, 5 451 240 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30016 | 498 160 mE, 5 451 210 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30014 | 498 300 mE, 5 451 200 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 15 |
| 30054 | 498 830 mE, 5 451 150 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30015 | 497 960 mE, 5 451 130 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30068 | 497 640 mE, 5 451 110 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |

| Ref. No. | AMG co-ordinates | Commodity | Co-ord error | Map Sheet | Status | Size | Host rock | Mineral. age | Form | Strike (°) | Explor. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30077 | 497 400 mE, 5 451 100 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30055 | 498 210 mE, 5 451 060 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31059 | 500 450 mE, 5 450 950 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30056 | 497 900 mE, 5 450 900 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30053 | 498 600 mE, 5 450 900 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30129 | 498 600 mE, 5 450 900 mN | Au | 2 | 82151 | 8 | 0 | 9 | 8 | 7 | ND | 1 |
| 30132 | 497 800 mE, 5 450 700 mN | Au | 2 | 82151 | 8 | 0 | 9 | 8 | 7 | ND | 1 |
| 30126 | 499 000 mE, 5 450 700 mN | Au | 2 | 82151 | 8 | 0 | 9 | 9 | 7 | ND | 1 |
| 30067 | 499 900 mE, 5 450 600 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30030 | 498 590 mE, 5 450 540 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30021 | 498 510 mE, 5 450 520 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30020 | 498 640 mE, 5 450 450 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30022 | 498 630 mE, 5 450 440 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30031 | 498 760 mE, 5 450 430 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30044 | 498 600 mE, 5 450 300 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30005 | 498 360 mE, 5 450 280 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30123 | 499 000 mE, 5 450 200 mN | Au | 2 | 82151 | 8 | 0 | 9 | 9 | 7 | ND | 1 |
| 30049 | 499 180 mE, 5 450 190 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30036 | 498 780 mE, 5 450 140 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30026 | 498 550 mE, 5 450 050 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30018 | 498 830 mE, 5 450 010 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30127 | 498 800 mE, 5 450 000 mN | Au | 2 | 82151 | 8 | 0 | 9 | 8 | 7 | ND | 1 |
| 30133 | 499 500 mE, 5 450 000 mN | Au | 2 | 82151 | 8 | 0 | 9 | 9 | 7 | ND | 1 |
| 30046 | 498 830 mE, 5 449 960 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30035 | 498 700 mE, 5 449 850 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30178 | 498 800 mE, 5 449 700 mN | Au | 4 | 82151 | 6 | | 6 | 5 | 2 | ND | 1 |
| 30003 | 498 680 mE, 5 449 690 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30124 | 498 900 mE, 5 449 600 mN | Au | 2 | 82151 | 8 | 0 | 9 | 8 | 7 | ND | 1 |
| 30032 | 498 900 mE, 5 449 600 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30002 | 498 780 mE, 5 449 530 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30131 | 499 600 mE, 5 449 500 mN | Au | 2 | 82151 | 8 | 0 | 9 | 9 | 7 | ND | 1 |
| 30130 | 499 900 mE, 5 449 500 mN | Au | 2 | 82151 | 8 | 0 | 9 | 9 | 7 | ND | 1 |
| 30041 | 499 030 mE, 5 449 460 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30073 | 499 240 mE, 5 449 440 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30058 | 499 860 mE, 5 449 430 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30057 | 500 000 mE, 5 449 400 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30122 | 501 000 mE, 5 449 400 mN | Au | 2 | 82151 | 8 | 0 | 9 | 9 | 7 | ND | 1 |
| 30006 | 499 250 mE, 5 449 330 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30066 | 499 200 mE, 5 449 210 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30059 | 498 890 mE, 5 449 200 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30063 | 497 100 mE, 5 449 100 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31040 | 501 100 mE, 5 449 100 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30076 | 499 400 mE, 5 449 000 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30007 | 499 000 mE, 5 448 900 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30065 | 499 800 mE, 5 448 900 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30039 | 499 530 mE, 5 448 880 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30028 | 499 700 mE, 5 448 700 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31077 | 500 800 mE, 5 448 700 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |

| *Ref. No.* | *AMG co-ordinates* | *Commodity* | *Co-ord error* | *Map Sheet* | *Status* | *Size* | *Host rock* | *Mineral. age* | *Form* | *Strike (°)* | *Explor.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30062 | 499 740 mE, 5 448 660 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30048 | 499 460 mE, 5 448 620 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30042 | 498 000 mE, 5 448 500 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30001 | 498 200 mE, 5 448 500 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30019 | 498 500 mE, 5 448 400 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30038 | 499 100 mE, 5 448 400 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31092 | 500 000 mE, 5 448 400 mN | Au | 4 | 83154 | 6 | | 6 | 5 | 2 | ND | 1 |
| 30023 | 500 000 mE, 5 448 400 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30064 | 499 130 mE, 5 448 390 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30004 | 499 330 mE, 5 448 390 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30008 | 498 510 mE, 5 448 370 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30027 | 498 000 mE, 5 448 300 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30074 | 498 900 mE, 5 448 300 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30179 | 499 900 mE, 5 448 300 mN | Au | 4 | 82151 | 6 | | 6 | 5 | 2 | ND | 1 |
| 30029 | 500 000 mE, 5 448 300 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31057 | 500 100 mE, 5 448 300 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30012 | 499 320 mE, 5 448 210 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30011 | 498 800 mE, 5 448 200 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30009 | 499 200 mE, 5 448 200 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30070 | 500 090 mE, 5 448 200 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31076 | 500 200 mE, 5 448 200 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31078 | 500 400 mE, 5 448 200 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31081 | 501 000 mE, 5 448 200 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30071 | 499 950 mE, 5 448 190 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30069 | 499 640 mE, 5 448 180 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30072 | 499 550 mE, 5 448 170 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31079 | 500 500 mE, 5 448 000 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30043 | 499 580 mE, 5 447 510 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30051 | 499 500 mE, 5 447 500 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30024 | 499 700 mE, 5 447 400 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30040 | 499 200 mE, 5 447 200 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31080 | 502 800 mE, 5 446 500 mN | Au | 2 | 83154 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 30045 | 502 900 mE, 5 446 500 mN | Au | 2 | 82151 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 31119 | 502 200 mE, 5 443 900 mN | Au | 3 | 83151 | 6 | | | | | ND | 1 |
| 31054 | 504 700 mE, 5 442 800 mN | Au | 2 | 83154 | 8 | 0 | 9 | 9 | 7 | ND | 1 |

For key to MIRLOCH abbreviations see Appendix 4.

# APPENDIX 6

## MIRLOCH listing of gold mines and occurrences, Gladstone area

| *Ref. No.* | *AMG co-ordinates* | *Commodity* | *Co-ord error* | *Map Sheet* | *Status* | *Size* | *Host rock* | *Mineral. age* | *Form* | *Strike (°)* | *Explor.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25008 | 589 300 mE, 5 475 300 mN | Au, Ag, As | 2 | 85163 | 4 | 0 | 6 | 5 | 2 | 75 | 1 |
| 25020 | 589 100 mE, 5 474 000 mN | Au | 2 | 85163 | 4 | 0 | 6 | 5 | 2 | 10 | 1 |
| 25001 | 589 060 mE, 5 473 720 mN | Au, As, Pb, Zn | 2 | 85163 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 25002 | 591 200 mE, 5 473 700 mN | Au | 2 | 85163 | 6 | 0 | 6 | 5 | 2 | ND | 1 |
| 25009 | 591 300 mE, 5 473 500 mN | Au, Ag, Pb, As | 2 | 85163 | 4 | 0 | 6 | 5 | 2 | 180 | 1 |
| 25035 | 591 300 mE, 5 472 900 mN | Au, Pb, Zn, As, Ag | 3 | 85163 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 25073 | 591 100 mE, 5 472 700 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25010 | 586 200 mE, 5 472 600 mN | Au?, Ag? | 2 | 85163 | 6 | 0 | 6 | 5 | 2 | ND | 1 |
| 25019 | 588 820 mE, 5 470 330 mN | Au, As, Pb, Zn | 2 | 85163 | 4 | 0 | 6 | 5 | 2 | 40 | 1 |
| 24002 | 583 600 mE, 5 468 000 mN | Sn, Au | 2 | 84161 | 6 | 0 | 9 | 8 | 7 | ND | 1 |
| 25018 | 585 300 mE, 5 468 000 mN | Au, Ag | 2 | 85163 | 6 | 0 | 6 | 5 | 2 | 40 | 1 |
| 25075 | 589 300 mE, 5 467 500 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25074 | 589 200 mE, 5 467 200 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25012 | 588 500 mE, 5 466 600 mN | Au | 2 | 85163 | 6 | 0 | 6 | 5 | 2 | ND | 1 |
| 25025 | 585 000 mE, 5 466 500 mN | Sn, Au | 2 | 85163 | 6 | 0 | 9 | 8 | 7 | ND | 1 |
| 25090 | 584 600 mE, 5 465 500 mN | Au | 3 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25003 | 584 800 mE, 5 465 500 mN | Au, Ag, Sn | 2 | 85163 | 6 | 0 | 9 | 5 | 27 | 300 | 1 |
| 25065 | 584 400 mE, 5 465 250 mN | Sn, Au | 1 | 85163 | 6 | | 9 | | 7 | ND | 1 |
| 25071 | 584 200 mE, 5 465 200 mN | Sn, Au | 1 | 85163 | 6 | 0 | 9 | | 7 | ND | 1 |
| 25070 | 584 420 mE, 5 465 150 mN | Au | 1 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25066 | 584 450 mE, 5 465 150 mN | Au | 1 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25029 | 584 700 mE, 5 465 100 mN | Au, Sn, W, As, Cu | 3 | 85163 | 4 | 0 | 9 | 5 | 7 | 150 | 1 |
| 25088 | 584 000 mE, 5 465 000 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25089 | 584 000 mE, 5 465 000 mN | Sn, Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25063 | 584 250 mE, 5 464 950 mN | Sn, Au | 1 | 85163 | 6 | | 9 | | 7 | ND | 1 |
| 25030 | 584 700 mE, 5 464 950 mN | W, Au, Sn, Cu, As | 3 | 85163 | 4 | 0 | 6 | 5 | 2 | 126 | 1 |
| 25067 | 584 300 mE, 5 464 900 mN | Au | 1 | 85163 | 6 | | 7 | 5 | 4 | ND | 1 |
| 25015 | 584 550 mE, 5 464 900 mN | Au, Sn, Cu, As | 2 | 85163 | 4 | 0 | 6 | 5 | 2 | 135 | 1 |
| 25022 | 584 750 mE, 5 464 900 mN | Au, Sn, Cu, As, W | 2 | 85163 | 6 | 0 | 6 | 5 | 2 | 135 | 1 |
| 25081 | 584 780 mE, 5 464 880 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25080 | 584 600 mE, 5 464 860 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25068 | 584 430 mE, 5 464 850 mN | Au | 1 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25082 | 584 820 mE, 5 464 840 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25076 | 584 850 mE, 5 464 800 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25007 | 584 870 mE, 5 464 770 mN | Au | 4 | 85163 | 4 | 0 | 6 | 5 | 2 | 135 | 1 |
| 25024 | 584 750 mE, 5 464 750 mN | Au | 4 | 85163 | 4 | 0 | 6 | 5 | 2 | 135 | 1 |
| 25078 | 584 850 mE, 5 464 740 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25031 | 584 550 mE, 5 464 700 mN | Au | 3 | 85163 | 4 | 0 | 6 | 5 | 2 | 170 | 1 |

| *Ref. No.* | *AMG co-ordinates* | *Commodity* | *Co-ord error* | *Map Sheet* | *Status* | *Size* | *Host rock* | *Mineral. age* | *Form* | *Strike (°)* | *Explor.* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25027 | 584 730 mE, 5 464 700 mN | Au | 3 | 85163 | 4 | 0 | 6 | 5 | 2 | 10 | 1 |
| 25036 | 584 750 mE, 5 464 700 mN | Au | 2 | 85163 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 25069 | 584 780 mE, 5 464 700 mN | Au | 1 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25079 | 584 950 mE, 5 464 700 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25023 | 584 750 mE, 5 464 680 mN | Au, Pt, Sn, W | 2 | 85163 | 4 | 0 | 6 | 5 | 2 | 135 | 1 |
| 25077 | 584 820 mE, 5 464 670 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25005 | 584 750 mE, 5 464 600 mN | Au | 2 | 85163 | 6 | 0 | 6 | 5 | 2 | 125 | 1 |
| 25021 | 584 680 mE, 5 464 580 mN | Au, Sn | 2 | 85163 | 4 | 0 | 6 | 5 | 2 | 135 | 1 |
| 25064 | 584 750 mE, 5 464 550 mN | Sn, Au | 1 | 85163 | 6 | | 9 | | 7 | ND | 1 |
| 25004 | 584 770 mE, 5 464 550 mN | Au, Sn | 2 | 85163 | 4 | 0 | 6 | 5 | 2 | 150 | 1 |
| 25013 | 584 950 mE, 5 464 550 mN | Au | 4 | 85163 | 6 | 0 | 6 | 5 | 2 | ND | 1 |
| 25084 | 584 650 mE, 5 464 500 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25014 | 584 700 mE, 5 464 450 mN | Au, Sn | 3 | 85163 | 6 | 0 | 6 | 5 | 2 | 135 | 1 |
| 25083 | 584 700 mE, 5 464 450 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25086 | 584 650 mE, 5 464 400 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25085 | 584 700 mE, 5 464 400 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25017 | 585 100 mE, 5 464 400 mN | Au | 2 | 85163 | 6 | 1 | 6 | 5 | 2 | ND | 1 |
| 25087 | 584 500 mE, 5 464 350 mN | Au | 2 | 85163 | 6 | | 6 | 5 | 2 | ND | 1 |
| 25033 | 584 800 mE, 5 464 200 mN | Au, Sn | 3 | 85163 | 4 | 0 | 6 | 5 | 2 | 150 | 1 |
| 25011 | 584 880 mE, 5 464 150 mN | Au, Sn | 2 | 85163 | 4 | 0 | 6 | 5 | 2 | ND | 1 |
| 25006 | 585 050 mE, 5 464 050 mN | Sn, Au, Mi | 2 | 85163 | 8 | 0 | 79 | 5 | 74 | ND | 15 |

For key to MIRLOCH abbreviations see Appendix 4.