

# **Pinafore Gold Mine Site Heritage Assessment, Lefroy, Tasmania.**

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**Report for  
Lefroy Resources Limited.**

***Biosis Research Project no. 5582***

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## **1.0 INTRODUCTION**

This assessment has been commissioned by Lefroy Resources Limited to determine the heritage values of sites for proposed exploratory drilling at the site of the former Pinafore Gold Mine, Lefroy, northern Tasmania. The report outlines a brief history of the site, describes the result of archaeological survey, assesses the potential heritage significance of archaeological features and makes recommendations for their management.

Gary Vines carried out the site inspection, report writing and project management. Cheryl Kift undertook additional background research and assisted with production of the report. Bretan Clifford prepared mapping figures.

### **1.1 Study Area**

The Lefroy Goldfield extends for at least 5 kilometres through the old gold-rush town of Lefroy, 45 kilometres north of Launceston, east of the Tamar River and about 16 km east of Georgetown. While there are numerous mine sites in the vicinity, the current assessment is confined to the area of proposed exploratory drilling at the site of the former Pinafore ref and mine about 80 m north of the township of Lefroy. The location of the study area is shown in Figure 1.

**Figure 1:** Location of the study area

## 2.0 BACKGROUND HISTORY

(N.B. Much of this section has been sourced from the Lefroy Resources *Lefroy Project Area Exploration Potential Report*, 2005 and Webster, 1998).

The first documented knowledge of gold mining in the Lefroy area began around 1864 (Gould, 1864). Mining is likely to have commenced much earlier, based on a report of a gold discovery at Lefroy in 1853 (McClenaghan, 1994). Initially alluvial mining predominated, with both surface and deep leads worked.

Reef gold was discovered in 1867 (according to van Moort & Russell 2003:1) or 1869 (according to Webster 1998:1, citing Broadhurst 1935), initially at Specimen Hill, 1.5 km southeast of Lefroy. This was by the party led by Samuel Richards. Production was mainly restricted to the Native Youth, Chum, Volunteer and New Pinafore Reefs. By 1870, the population of Nine Mile Springs (as Lefroy was then known) had grown to about 200.

The Lefroy Goldfield historically experienced two major mining booms, 1880 – 1885 and 1895 – 1898. The Pinafore Reef was discovered in late 1890 (or possibly 1992 depending on which sources are consulted), by S T Stubbs, prospecting and working alluvial sediment south of the New Chum Mine. The name of the reef was taken from the small Pinafore Mine that had been operating in the area for some time. The discovery reinvigorated the gold field following the decline of the Native Youth and Chum mines. A large quantity of machinery was erected, including electric lighting.

However, by 1897, work on the Pinafore Reef was suspended and the company was putting its efforts into the golden Point and Golden Crown claims that were adjacent to the Native Youth Mine and battery.

Early reports suggest that as mining in the old goldfield progressed to depth, the ore became sulphidic and without the benefit of appropriate metallurgical technology many mines were closed as mill recoveries decreased. This factor combined with water infiltration and increasing mining costs forced the eventual closure of the field. The Lefroy Goldfield contains many historic workings and shafts located on approximately 30 gold lodes, which were mined and subsequently abandoned in and early 1900's. Mining ceased in 1911 (van Moort & Russell 2003).

Webster (1998: 8-12 provides a summary of the history of the Lefroy mines, in particular noting the purchase by the New Pinafore Company of the Native Youth Battery (located on the north edge of Lefroy township). The battery and treatment site processed material from a number of mines, including re-treatment of tailings in the last period of operation. This suggests considerable reworking

may have occurred of the mullock heaps and other above ground features at the mines. In the 1890s mining revival, several new processes were introduced including smelting furnaces, concentration plant with a chlorination works, reverberatory furnaces for roasting ores, and later a cyanide plant (Webster 1998:9).

In all, some 50 shafts operated in the Lefroy area, mostly shallow workings (McClenaghan, 1994). Although mining was conducted in earnest from 1870, no government production records were produced until 1886, with most of those values obtained before 1900. Overall there is an uncertainty regarding the exact quantity of gold extracted from the field, but the values presented are at best a minimum. Actual production from the goldfield is generally regarded to be greater than 200,000 oz. The Launceston Examiner and Tasmanian Mail (newspapers) historically published weekly Mine Manager's reports on the progress of the mines and the ore crushed and gold "won".

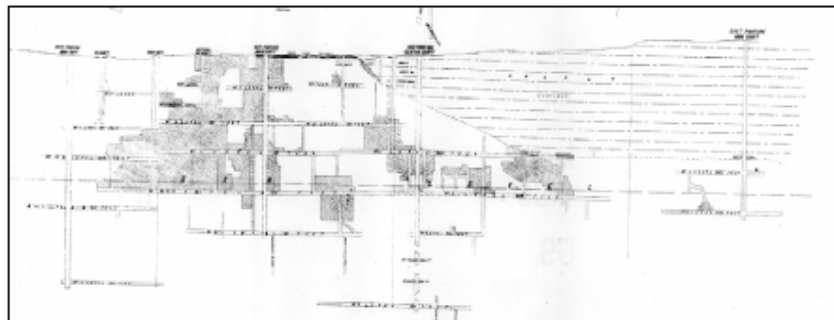
It is likely that periodic exploration and prospecting has been conducted in the Lefroy goldfield during the later twentieth century. The field remained largely dormant from the time historical mining ceased (1914) until the late 1930's when the Tasmanian Department of Minerals and Energy completed a survey of the field and conducted some drilling. Most of the above ground infrastructure had been removed or destroyed in this period.

Further explorations are known to have occurred in the 1980's and 90's using soil-sampling programs with around 500 pits and costeans dug along drainage systems. From 1995 to 2002 Lefroy Gold Mines undertook exploration and sampling using trenching and drilling.

As a consequence of this activity, the gold field has been extensively altered and disturbed, with many layers of earth features obscuring the evidence of the historical mining period.



**Plate 1:** 'Holden Crest' poppet head, Lefroy. (Tasmanian State Library)



**Figure 2:** Historic Long Section of Pinafore Mine (1897)



### **3.0 DESCRIPTION**

Site survey involved inspection of existing and proposed drill pad sites near the Pinafore mine, and inspection of known historical mining features by Biosis Research PL archaeologist Gary Vines, in the company of Lefroy Resources geologist Russell Fulton on 29 March 2006.

While the scrub makes identification of features difficult, it was possible to identify a number of features relating to the Pinafore mine. The most obvious are the shafts and remains of mullock heaps. However, there are also remains of a boiler setting - generally the lower courses of the brick foundations, metal (fire bar and boiler tubes) and scattered bricks in the vicinity, a possible fallen chimney, drains, footings, former building sites and some so-far unidentified earth features that may be related to something like a stamper battery, trestle for elevated spoil tramway, head frame, or the like.

Locations of identified historical features are shown in

Figure 3.

**Figure 3:** Locations of historical features

### **3.1.1 Pinafore mine tailings and shaft site**

This site is an extensive area of earth features and structural remains located immediately west of the Lefroy – Beechford Road, about 1km north of Lefroy.

The partially collapsed Pinafore Main shaft is evident by a depression approximately 5 metres diameter and 2-3 metres deep, where timber shoring from the square shaft is evident. The shaft itself is about .8 m square.

Tailings/mullock is evident to the east and north east of the shaft, with the remaining materials standing up to 6 metres high in at least two areas. The bulk of the tailings have been removed (probably for road making or reprocessing) but the extent is evident by remains around the outer edge where the original surface and slopes are evident.

South east of the shaft, under heavy regenerated scrub, are extensive areas of scattered bricks, including one location, which is clearly the site of the steam boilers. This has remains including a fire bar and sections of boiler tube, as well as numerous sand-stock bricks, including an area of about 3 m square where bricks are still mortared in place. A less clearly defined scatter of bricks appears to extend for several metres to the north west of the boiler, and may represent the remains of the chimney, it having been toppled or purposely pushed over, so that the bricks extend in a linear feature representing where the chimney fell.

North west of the shaft and immediately west of the mullock heap, is an earth feature that appears as parallel trenches about 1 m wide, separated by a raised platform about 1.5 m wide. Parts of the sides of the raised platform are bordered by stacked stones, which are possibly remains of dry stone retaining walls. This is interpreted as the possibly the location of winding gear, initially thought to be a horse whim, and later replaced with a steam engine.



**Plate 2:** Brick scatter at site of New Pinafore Mine boiler, note metal pipe and fire bar.

### 3.1.2 Shafts and mullock

At least three other shafts are located immediately to the west of the Pinafore Main mine within the study area. These are assumed to have been ventilation shafts or other accesses to the Pinafore reef. Single, double and triple compartment shafts are represented, with the three compartment shaft, near the western part of the study area, is particularly well preserved, with full timbering surviving to the open top of the shaft about 2 metres below natural ground level. A very large and mostly intact mullock heap is located north of the shaft, and extending from the south side of the shaft is a trench with bearer logs, possibly part of the winding or pumping gear.

These three shafts were not recorded in Purvis' map, but are assumed to relate either to the New Pinafore mine workings, or possible earlier sinkings as part of the one of the earlier mines. Interestingly, a three compartment shaft (which is a generally rare type of shaft) is recorded as having been sunk in 1882 as the Main Shaft for the New Native Youth mine to a depth of over 800 feet (Webster 1998:5, citing Thureau 1882: 1883 & Broadhurst 1935).





**Plate 3:** Three compartment mine shaft in western portion of study area.



**Plate 4:** Two compartment mine shaft located immediately west of Pinafore Mine





**Plate 5:** Single compartment mine shaft.



**Plate 6:** Remains of Mullock heap immediately north west of Pinafore mine.

### **3.1.3 Dam and concrete structure**

North west of the Pinafore Main is a former dam, evident by a low breached earth wall across a shallow gully. Melaleuca scrub has taken over the swampy ground created by this dam. On the east side of the dam is a small concrete

footing, probably from a building foundation. This comprises concrete strip footings about 300mm wide and up to 200mm above the surrounding soil on a raised earth platform. A shallow concrete drain or channel can be discerned running south east from this structure, which is most likely to have been a water channel either for collecting water for storage in the dam, or conveying to another part of the mine. If so, then the feature might be interpreted as a pump site. The use of concrete (un-reinforced and with uneven exposed aggregate) dates the feature to the 1890s or early 1900s.



**Plate 7:** concrete structure near small mine dam.

#### **3.1.4 Other Features**

Scattered widely over the study area are various forms of trenches, small earth and gravel mounds, tracks and ridges. These may be interpreted variously as old prospecting trenches and pits, “Costeans”, remnants of tailings and mullock, and the result of excavation and removal of larger tailings. The uneven ground is also a consequence of modern exploration, site clearance, bulldozing and other disturbance. As a result, any historical significance of the landscape in such areas has been seriously compromised or destroyed. A few minor features survive that can be interpreted such as a concrete channel to the south west of the study area, possibly related to a similar feature near the mine dam described above.

Also remains of collapsed timber and corrugated iron buildings were noted in a number of locations south of the study area. This area is generally level and cleared, and appears to have been farmed in the past. The site is consistent with



an area of former houses or workshops associated with the mines, rather than a mined landscape. However, it was not clear whether these were in situ, or the material, including partial walls and sections of roof, had been dumped in the area.



**Plate 8:** Building remains south of the study area.

## 4.0 SIGNIFICANCE ASSESSMENT

The Volunteer Gold Mine is identified on the Register of the National Estate No. 103330 as "...a good and relatively intact example of a nineteenth century, deep lead gold mine, [with] a combination of mine-top machinery foundations, mullock tip and associated administrative/domestic areas. The mine is considered to be the best preserved in the Lefroy Field." Therefore, in comparison, the remains of the Pinafore Mine, it may not be considered to of the same degree of significance.

Webster in his report on the North East Tasmanian goldfields for Minerals and Energy Tasmania (1998:11) assessed the New Native Youth Mine/New Pinafore Battery sites (south of the current study area) as being of state archaeological and historical significance, while the New Pinafore Mine was assessed as being of local significance "...because it was one of two mines at Lefroy that persisted with deep shaft sinking in the hope of intersecting rich gold at depth. As such, it was one of the few significant employers at Lefroy during later stages of it (sic) mining history. The mine was also the focus of much of the mill feed for the New Native Youth/New Pinafore battery and it is therefore of historical significance for this reason.

Webster's investigation does not appear to have identified the structural remains at the Pinafore Mine, such as the winding engine sites or brick boiler settings, which explains why he does not mention archaeological significance, and suggests that the Pinafore Mine site may be of greater significance than he has ascribed

### 4.1 Impacts and recommendations

Mineral Resources Tasmania guidelines for works at historic goldmines, recommends the avoidance of the more significant physical evidence of historical mining, such as large machinery and plant, footings and samples of the more important mullock, tailings, while features such as shafts, adits and other minor structures are recommended for recording prior to disturbance (Bacon 1996).

The three drill pad sites (P103, P104 & P105) appeared to have little archaeological or heritage issues, being either in areas of former mullock heaps, or heavily disturbed ground. Some of the proposed access routes to these sites, taking a line from the nearest existing drill site, looked like they could impact on some of the historic features, in particular on the easternmost site, where bricks and earth features are evident to the south of the proposed drill pad P103.

Alternative options for access tracks, with possible routes that would not impact on archaeological or heritage features area as follows

- from the existing LFC045 due north to P105
- from LFC046 north to P104, but keeping a bit to the east to avoid one of the shaft locations
- from P104 east to P103 across the former Mullock heap site.

Prior to clearance, the areas identified in

Figure 3 should be marked on the ground with suitable identification such as flagging tape or para-webbing, to ensure they are not inadvertently disturbed. These areas should then be avoided during any vegetation clearance, track construction of drilling works.

With these precautions there should be no heritage impediment to the clearance of the drilling pads.

# APPENDIX 1

## Statutory Regulations

### i) Tasmanian cultural heritage legislation

The Heritage Act 1995, regulates the protection and conservation of places of cultural heritage significance to the state of Tasmania.

The Tasmanian Heritage Council may enter a place of historic cultural heritage significance in the Heritage Register if, in its opinion, it meets one or more of the following criteria:

- (a) it is important in demonstrating the evolution or pattern of Tasmania's history;
- (b) it demonstrates rare, uncommon or endangered aspects of Tasmania's heritage;
- (c) it has potential to yield information that will contribute to an understanding of Tasmania's history;
- (d) it is important as a representative in demonstrating the characteristics of a broader class of cultural places;
- (e) it is important in demonstrating a high degree of creative or technical achievement;
- (f) it has strong or special meaning for any group or community because of social, cultural or spiritual associations;
- (g) it has a special association with the life or work of a person, a group or an organisation that was important in Tasmania's history.

### ii.) Commonwealth legislation

- *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)*

The Commonwealth Australian Heritage Commission Act was recently repealed and in its place amendments to the EPBC Act and the provision of an Australian Heritage Council have also been made in new legislation.

Under the EPBC Act Amendments (No 88, 2003) two mechanisms have been created for protection of heritage places of Commonwealth or National significance. Initially places in Commonwealth ownership may be placed on the Commonwealth list with similar protection measures as under the previous AHC act. In addition the National list provides protection to places of cultural significance to Australia. By law, no one can take any action that has, will have, or is likely to have, a significant impact on any places of national heritage value, without approval. Such actions must be referred to the Australian Government Minister for the Environment and Heritage.

## REFERENCES

- Australia ICOMOS 1999, The Illustrated Burra Charter, The Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (the Burra Charter), revised edition.
- Bacon C A 1996, Mining Heritage Guidelines for use by MRT staff: Re-opening, reworking or exploring a previously worked deposit. Tasmania Geological Survey Record 1996/02.
- Broadhurst, E. 1935. Lefroy and Back Creek Goldfields, *Bulletin Geological Survey Tasmania* 42.
- Gould C 1864, Geological Surveyor's Report on part of County of Dorset, Tasmanian Legislative Council, Hobart.
- Groves, D., (1965). Geology of the Lefroy Goldfield. In: Economic and General Geology.
- John Canaris, Colwin Lloyd, Kate Bradley & John Baxter, 2005. *Lefroy Project Area Exploration Potential Report*. Lefroy Resources Limited.
- McClenaghan, M P 1994, A summary of the Beaconsfield, Lefroy, Back Creek and Gladstone Goldfields, report Mineral Resources Tasmania 1994/03
- Marquis-Kyle, P. and Walker, M. 1992 *The Illustrated Burra Charter: Making Good Decisions about the Care of Important Places*, Australia ICOMOS, Brisbane.
- Mining Heritage Places Assessment Manual* AHC.
- Montgomery, A., 1896. *Geological Survey of the Lefroy Goldfield, Progress Report*. Department of Mines, Tasmania, Hobart.
- Montgomery, A., 1897. *Lefroy Goldfield Tasmania, Report on the Geological Structure and Mining Development*. Department of Mines, Tasmania, Hobart.
- Pearson, M. and Sullivan, S. 1995, Looking After Heritage Places, Melbourne University Press.
- Purvis, J., 1999. Lefroy EL 1/95; *Annual Report 1998-99*. Allstate Explorations NL.
- Stubs, J. T., 1899. Description of the Treatment of Tailings by the New Pinafore Gold Mine. *Report Secretary for Mines Tasmania*, 1899-1900:99-104, Department of Mines, Tasmania, Hobart.
- Thureau, G. 1882, *Report on the mineral resources and permanency of the Lefroy gold field*, Tasmania. House of Assembly Paper Tasmania 1882/118.
- Thureau, G. 1883. *Report on the recently discovered gold field at Mt Victoria, county of Dorset*, Tasmania. House of Assembly Paper Tasmania 1883/50.
- Twelvetreets, W., (1899). *Volunteer Gold Mining Company, Report by the Government Geologist*. Mineral Resources Tasmania Hobart.
- Van Moort J C 7 Russell D W, 2003, *Lefroy and Beaconsfield Gold Mines*, Tamar Region Tasmania, University of Tasmania.
- Webster, A E, 1998, A preliminary cultural heritage assessment of the historic gold mines of North East Tasmanian, part 10 Lefroy Goldfield (Nine Mile Springs), Mineral Resources Tasmania report for Minerals and Energy Tasmania "Register Hard Copy Lefroy Sheet 8 (Pinafore)"