

# Dargues Reef Gold Project

# NON-ABORIGINAL HERITAGE Assessment

Prepared by

Archaeological Surveys & Reports Pty Ltd

**JULY 2010** 

Specialist Consultant Studies Compendium Volume 2, Part 5b This page has intentionally been left blank



# NON-ABORIGINAL HERITAGE Assessment

Prepared for:	R.W. Corkery & Co. Pty Limited Suite 15, 256 Anson Street ORANGE NSW 2800	
	Tel: Fax: Email:	(02) 6362 5411 (02) 6361 3622 orange@rwcorkery.com
On behalf of:	Big Island Mining Pty Ltd Ground Floor 22 Oxford Close WEST LEEDERVILLE WA 6007	
	Tel: Fax: Email:	(08) 6380 1093 (08) 6380 1387 admin@cortonaresources.com.au
Prepared by:	Archaeological Surveys & Reports Pty Ltd 16 Curtis Street ARMIDALE NSW 2350	
	Tel: Fax: Email:	(02) 6772 6512 (02) 6772 4567 japples@northnet.com.au

# July 2010

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# 1. INTRODUCTION

## 1.1 BACKGROUND

This investigation was performed for R.W. Corkery & Co. Pty Limited (RWC) on behalf of Big Island Mining Pty Ltd ("the Proponent"). The Proponent engaged RWC to prepare an *Environmental Assessment* to support an application for project approval under Part 3A of the *Environmental Planning and Assessment Act 1979* for the proposed Dargues Reef Gold Project ("the Project"). All Project-related activities would be undertaken with the Project Site which is wholly owned by the Proponent.

The Project comprises an underground gold mine, processing plant, haul road, temporary waste rock emplacement and a tailings storage facility, as well as ancillary activities and associated infrastructure.

RWC engaged Archaeological Surveys & Reports Pty Ltd (ASR) to undertake a 'Non-Aboriginal' Heritage Assessment of the Project Site to identify any structures, features, items or relics of "Non-Aboriginal" heritage significance and to assess the anticipated Project-related impacts.

## 1.2 SCOPE, OBJECTIVES AND REPORT FORMAT

#### 1.2.1 Scope

The scope for the Non-Aboriginal heritage assessment is as follows.

- Identify any structures, features, items or relics of "Non-Aboriginal" heritage significance that might represent a potential constraint to the Project or may be impacted by it.
- Record any identified features, structures or relics and assess their heritage significance.
- Recommended management strategies to avoid or mitigate the damage to identified features, structures or relics as a result of direct or indirect disturbance associated with the Project.

### 1.2.2 Report Objectives

The objectives of this report are to record the investigative process; to identify which structures, features, items or relics warranted an assessment of their heritage significance; to assess their heritage significance and to recommend the appropriate management strategy with regard to those items, in accordance with the document "Assessing Significance for Historical Archaeological Sites and 'Relics'" published by the Heritage Branch of the NSW Department of Planning in 2009.

### 1.2.3 Report Format

The report is presented in the following format:

- 1. Introduction
- 2. The context
- 3. The history of Majors Creek Goldfield.
- 4. Survey methodology
- 5. The archaeological record
- 6. Registers of heritage places
- 7. Assessment of heritage significance
- 8. Conclusion

# 2. THE CONTEXT

#### 2.1 **PROJECT SITE**

The Project Site is located approximately 13km to the south of Braidwood in an area of gently rolling hills within the Southern Tablelands (**Figure 1**). The southern section of the Project Site is located in the upper sections of several tributaries of Majors Creek. Although Majors Creek in the vicinity of the Project Site flows west to east, it turns towards the southeast immediately downstream of the Project Site and joins Araluen Creek north of Araluen. Araluen Creek then flows into the Deua River which meets the ocean at Moruya. Immediately to the south of the Project Site is the small community of Majors Creek, a village established to service the Majors Creek goldfield.

The Project Site comprises an area of approximately 403ha made up of Lots 102 and 210/DP755934, Lot 104/DP1100849, Lots 1, 2, 3, 4 & 5/DP986483 and Lot 1021/DP1127185, in the Parish of Munro, in the Palerang local government area. It is bounded by Majors Creek Road to the southeast and by shared property boundaries elsewhere.

Figures on the following pages present the local setting of the Project Site. **Figure 1** places the Project Site in its regional context; **Figure 2** shows the Project Site in greater detail; **Figure 3** shows an aerial photograph of the site; and **Figure 4** presents the proposed Project Site layout.

#### 2.2 **PROJECT OVERVIEW**

The Project would include the following components (Figure 2).

• Extraction of waste rock and ore material from the Dargues Reef deposit using underground sublevel open stope mining methods with a suitable crown pillar to prevent surface subsidence.

- Construction and use of surface infrastructure required for the underground mine, including a box cut, portal and decline, magazines, fuel store, ventilation rise and power and water supply.
- Construction and use of a processing plant and office area which would include an integrated Run-of-Mine (ROM) pad/temporary waste rock emplacement, crushing and grinding, gravity separation and floatation circuits, Proponent and mining contractor site offices, workshop, laydown area, ablutions facilities, stores, car parking, and associated infrastructure.
- Construction and use of a tailings storage facility.
- Construction and use of a water management system, including construction and use of eight dams and associated water reticulation system, to enable the harvesting and supply of water for mining-related operations. It is noted that the proposed water harvesting operations would be consistent with the Proponent's harvestable right.
- Construction and use of a site access road and intersection to allow site access from Majors Creek Road.
- Transportation of sulphide concentrate from the Project Site to the Proponent's customers via public roads surrounding the Project Site using covered semi-trailers.
- Construction and use of ancillary infrastructure, including soil stockpiles, core yards, internal roads and tracks and surface water management structures.
- Construction and rehabilitation of a final landform that would be geotechnically stable and suitable for a final land use of nature conservation and/or agriculture.

It is noted that during the life of the Project the Proponent proposes to undertake additional exploration drilling to further define identified mineralisation and identify additional mineralisation. Extraction of those resources does not form a part of this application. As a result, a subsequent application for approval to extract any identified resources may be prepared once sufficient information is available to adequately identify the proposed activities.

# 2.3 GEOLOGICAL AND TOPOGRAPHIC SETTING

The Project Site is located in the most easterly section of the Lachlan Fold Belt, entirely within the Devonian Braidwood Granodiorite. The granodiorite intrudes the Early Devonian Long Flat Volcanics to the west and Ordovician sediments to the east (Cortona Resources, 2009).

The Project Site encompasses Spring Creek and two lesser unnamed drainages, all of which flow into Majors Creek at the southern end of the Project Site.

Soil materials were observed during the field investigation to include a shallow loamy material that overlays a highly weathered granitic material becoming clayey with depth – see **Plate 31**.

Elevations within the Project Site vary from 730m AHD along the ridge at the northern end of the Project Site and on the north-eastern boundary, descending down to 620m AHD in the south-eastern corner of the Project Site where Majors Creek flows out of the Project Site, a drop of approximately 110m over a distance of approximately 2 400m.

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#### SPECIALIST CONSULTANT STUDIES

Part 5b: Non-Aboriginal Heritage Assessment

Dargues Reef Gold Project Report No. 752/05



Note: A colour version of this Figure is available on the Project CD

#### **SPECIALIST CONSULTANT STUDIES** *Part 5b: Non-Aboriginal Heritage Assessment*

Dargues Reef Gold Project Report No. 752/05



#### SPECIALIST CONSULTANT STUDIES

Part 5b: Non-Aboriginal Heritage Assessment



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## 2.4 VEGETATION

As **Figure 3** shows most of the northern half of the Project Site has been cleared for pasture, the remnant natural vegetation being primarily in the creek lines, the only other trees being wind-breaks planted along the ridges and high ground at the northern end of the Project Site.

The central-section of the Project Site is moderately to densely vegetated, with a significant proportion of the vegetation consisting of broom and blackberry. The remainder of the vegetation within the central section of the Project Site consists of dry eucalypt woodland, most of which is regrowth, the old growth having been cleared.

Finally, the southern section of the Project Site has been largely disturbed by prior gold mining operations associated with the Majors Creek alluvial goldfields.

#### 2.5 WATER RESOURCES

There are several drainage lines within the Project Site. These include Majors Creek, Spring Creek, Spring Creek Tributary 1, Spring Creek Tributary 2, Spring Creek Tributary 3 and Shingle House Creek (**Figure 2**). Shingle House Creek collects the run-off from the hills immediately to the west of the Project Site and flows south-eastwards into Majors Creek just inside the western margin of the Project Site. However, as the historical record of gold mining at Majors Creek show, flow in all of the creeks is unreliable. In addition to the Project Site being in a low rainfall area, the steepness of the catchment means that any surface water is quickly discharged into Majors Creek and down the escarpment to Araluen.

### 2.6 PREVIOUS IMPACTS

The Project Site has been subjected to a number of impacts. The first was the clearing of woodland to create pasture, which would have entailed cutting down the trees, then chaindragging the stumps and roots out with bullock teams, followed by use of horse-drawn rake to remove the felling waste, followed by either the harrowing and/or the ploughing.

The second impact is associated with gold mining. Initially this would have been minor and most of the impact would have been from panning the creek bed alluvium. However, but as mining intensified and more prospectors worked the field, more water was needed and water races were dug around the lower slopes to direct the run-off to where it was needed. This was followed by hydraulic sluices using water from dams constructed in creek beds and creek banks were sometimes randomly and sometimes methodically destroyed. Meanwhile, more men meant more feet travelling back and forth between their tents and the workings, and so trails became tracks. Mullock heaps and puddling depressions began to appear, and more dams were constructed along the creek beds. A desalination plant<sup>1</sup> was constructed at Dargues reef (c.1888?), and later a poppet head (c.1908). A second stamper-battery was built further east along Majors Creek (c.1879?), and a railway was built connecting Dargues Reef with Majors Creek where the stamper-head batteries crushed the ore (c.1889). At least one dredge reshaped the bed of Majors Creek leaving its tell-tale tailings dumps (post 1900?). The creeks were no longer creeks but broad gashes in the landscape. Once mining was complete, broom and blackberry took over to form an impregnable mass of weed.

<sup>&</sup>lt;sup>1</sup> McGowan referred to this structure as a "desalination plant." However, given that desalination did not become a viable technology until the late 20<sup>th</sup> Century, it is likely that McGowan was referring to the Chlorination Plant built to process refractory ore extracted from the hard rock mines.

More recently, as **Figure 3** shows, numerous tracks, most of which were originally directly associated with gold mining and/or agricultural operations, have been reopened or upgraded. In addition, mineral exploration has resulted in the construction of drilling-pads, vehicle parking areas, re-graded tracks, storage sheds, an amenities block, and sample lay-down areas.

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There are numerous dams on the upper slopes in the northern section of the Project Site. Some of these dams are associated with races that connect them to the creeks and were presumably constructed by the early miners. In addition, some have been constructed since to water stock.

Yet another impact has been the planting of windbreaks mostly along the ridges, but some in less exposed areas.

Finally, active natural erosion has eroded creek banks to create advancing deep gullys in the banks of Majors Creek and its tributaries, with only a very shallow rooted grass cover to repel their advance.

# 3. THE HISTORY OF MAJORS CREEK GOLDFIELD

# 3.1 BACKGROUND TO THE DISCOVERY OF GOLD

Edward Hammond Hargraves is credited with the first discovery of gold at Ophir on 7 April 1851, although there had been reports of convicts finding gold as early as 1814 when they were working on the road over the Blue Mountains. In 1823 Assistant Surveyor James McBrien noted in his field-book that he had found particles of gold in the Fish River between Rydal and Bathurst. Also in 1823, a convict working on roads near Bathurst is reputed to have found specks of gold in the road. In 1839, explorer and geologist, Paul Edmund Strzelecki notified the government that he had found alluvial gold near Hartley in the Blue Mountains and at Wellington. In 1841 the Reverend William Branwhite Clark, an Anglican clergyman, found gold specks in quartz at Hartley and Bathurst. Also in the early 1840s a shepherd, Hugh McGregor found a gold nugget at Mitchell's Creek. In 1848, William Tipple Smith the owner of a jewellery and lapidary shop in George Street, Sydney, wrote to the noted British geologist, Sir Roderick Murchison, enclosing samples of gold (but it is uncertain where the gold came from).

There were rumours of other gold discoveries elsewhere, however it wasn't until Hargraves returned to Australia from the Californian goldfields in 1851, intent on finding payable gold, that it was recognised that gold mining in Australia could profitable.

On February 1851, Hargraves accompanied by John Lister, found gold at the junction of Lewis Ponds Creek and Radigan's Gully to the east of the present location of Orange in central NSW and announced the discovery in the *Empire* newspaper. On April 4<sup>th</sup> 1851, Enoch Rudder, an old friend of Hargraves, wrote to the *Sydney Morning Herald* that "a goldfield has been discovered extending over a tract of country about 300 miles (*480km*) in length".

In the meantime Hargraves had described a cradle that he had seen in California, to James Tom who suggested that his brother, William Tom jr, could make such a cradle. While Hargraves went off to Sydney to see the Colonial Secretary to make his claim for the £500 reward that had been offered for the first discovery of payable gold, James Tom, William Tom and another brother Henry, tested the cradle and recovered payable gold at Ophir, to the northeast of the present location of Orange on 7<sup>th</sup> April 1851 (Cook & Garvey 1999).

The discovery of payable gold at Ophir was the first of a number of discoveries elsewhere before the year had closed. There were finds at Rocky River near present day Uralla, and at Majors Creek and Bells Creek near Braidwood. By the late 1850s there were more rushes at Adelong and Araluen (and Majors Creek), and by the early 1860s at Kiandra and Lambing Flat (Pearson & McGowan 2008?). 1870 saw another rush, this time to Gulgong (Maxwell 1998).

# 3.2 MAJORS CREEK GOLDFIELD.

Gold is said to have been discovered near Majors Creek in October 1851 by Mrs A. Baxter of "Irish Corner", now known as Reidsdale (Dunshea 1997). By the end of the year it was reported that there were between 400 and 500 people panning for gold at Majors Creek.

The "Majors Creek Goldfield" was the collective name for the area in which a number of gold miners worked over a period of over eighty years from 1851 to the late 1930s. As such there was no "Majors Creek Mine", rather a host of prospectors that came and went as the fortunes of the goldfields fluctuated according to the weather, the availability of water, the changes in gold extraction processes and techniques and the yield from mining. The village of Majors Creek was the community that evolved to meet the needs of the miners.

The following extract is from McGowan (2000).

"The Majors Creek goldfield is located on the tablelands, several hundred metres above the floor of the Araluen valley. With the exception of Long Flat, this goldfield is part of the Araluen catchment area, that is, the creek and its tributaries drain into the Araluen valley. Long Flat is regarded as part of the Majors Creek goldfield, for it lies only several hundred metres from the western perimeter. However, it drains into Back Creek, and from thence into the Shoalhaven River. The catchment area for the goldfield is very limited and the fall over the escarpment by way of waterfall, swift and precipitous. These features caused the Majors Creek goldfield to be very susceptible to dry weather conditions" (McGowan 2000, 9).

The Majors Creek Goldfield includes Long Flat and the 'upper creek' of Majors Creek, and its tributaries Shingle House Creek, and Spring Creek. However for the purposes of this report only that part of the goldfield that occurs within the Project Site is considered. **Figure 5** is taken from McGowan (2000), with minor alterations to make it more pertinent to this investigation, with the outline of the Project Site added.

Over the more than eighty years of fluctuating fortunes and resumptions and closures of the various mining operations, there are many miners who have been forgotten and for whom there is no record. Many hundreds if not thousands of Chinese miners worked on the goldfield during that time but as most never registered the gold they won there are no records of who they were or when and where they worked and then there are some miners for whom we have names but are uncertain as to where and when they worked.



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Some of the names directly associated with, or appearing to relate to the Project Site include Stuart and Mertons, and United Miners (both on minor tributaries on the northern bank of Majors Creek), Camages (on the south bank of Majors Creek), Heaton's party, Badgery's party, Martyr's party, Manning's party (on Spring Creek), Sheppard, and Alger (both near the falls on Majors Creek), Wallis's party, Chartered Gold Mining Company, Hill's party (alongside Sheppard and Alger), Davis's party, British Australian Gold Mining Company (Spring Creek), Eard's party, McCarty's party, Barrett's party, Rigley's party (both on Majors Creek), Hamilton's party (head of Spring Creek?), Robert's party, Barnett's party, Hogan's party, Hender's party, Dransfield and Fairhurst (on land purchased from Shappard and Alger), Dwyer's party, Armstrong's party, Captain How, Riley's party (on Majors Creek), Swinburn's party, Gallaway's party, Pott's party, Pillar Company (Red Hill), Welcome Stranger (near Dargues Reef), Wilson and Munro (United Miners), Hassall and Roberts, The Young Australians, Enterprise Company (on Spring Creek), Homeward Bound Cooperative Company (on Dargues Reef), Australian Pyrites Company (in Majors Creek), Warren Brothers and Davis (probably on Dargues Reef), Keyte & party (erected a 10-head battery on Spring Creek), Dargues Company (on Dargues Creek), Thompson (on Dargues Reef), Majors Creek Gold Mining Syndicate. These names have been gleaned from just one section of McGowan (2000).

With up to a thousand or more miners on the goldfields at peak times there were numerous parties working together, while all the time in the background the Chinese were also 'quietly' and anonymously winning unknown and unrecorded quantities of gold.

For this investigation and because of some uncertainty as to where many of the leases and claims were actually located, the assessment has been primarily confined to the 'known' goldfield features within the Project Site. McGowan's study did not attempt to define mining locations too closely primarily because he didn't have any detailed accurate records to work from, and so there is sometimes some uncertainty as to which archaeological feature was directly associated with a particular mine. In order for this study to address the heritage significance of features that might potentially be impacted upon by the Project, it has been assumed that McGowan's plan presented in **Figure 5** is accurate.

**Table 1** provides a chronological sequence of events for the historic mining activities within the Project Site. This information has been gleaned from McGowan (undated) and McGowan (2000), supplemented by Pearson and McGowan (undated.). The table has been placed within the text of this report rather than in the appendices for convenience as the photographic record refers to some of the features that have a particular relevance to the table. In several places there is an entry "No record of any activity" but that doesn't mean that no-one was working on the field, but only that the gold that was won was not declared.

The Chinese were notoriously secretive about what they were recovering from reworking old workings and puddling and fossicking generally. It was said that the Chinese could find gold in tailings and abandoned workings. When one considers how many Chinese were working on the goldfields, it seems probable that while there are no records of activity on the fields during the 'missing' years that the Chinese were still there free to chose where they worked, without harassment from other nationalities.

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Table 1
Chronological Development of the Majors Creek Goldfield

	1		Page 1 of 5
YEAR	POPULATION	TECHNIQUE	EVENT
Oct 1851			Gold is found by Mrs Baxter
1851	50	Alluvial mining - pan	50 people flock to Majors Creek
late 1851	400-500	Pan & cradle	
Nov 1851	600-700 at Majors Creek	Pan & cradle	
Feb. 1853		Dry digging, cradling & (ground) sluicing	Dry diggings towards head of the creek. Several deep shafts and tunnelling. Cradling.
Jul. 1853	700	Clayey soils required: ground sluicing and puddling	Wet weather. 700 on the field. Good returns from Spring Creek.
Dec. 1853		Ground sluicing & puddling	Numbers on the field decreasing. Manning had large party working at Spring Creek. British Australian Company washing out gold in Spring Creek.
Early Feb. 1854	1,000	Ground sluicing & puddling	1,000 people working in the area with more arriving daily.
Apr. 1854		Ground sluicing, puddling and Californian Pumps	Heavy rain caused problems but some miners were using Californian pumps. Continuously wet & cold weather caused many to leave. Chartered Gold Ming Company and British Australian Gold Mining Company discharged all hands and sold off equipment.
May 1855	250	Ground sluicing, puddling and Californian Pumps	Fewer than 250 now working the creek.
Aug. 1856	123 (+ families)		Diggings at Majors Creek "subdued". Only 123 diggers on the field.
March 1857			Majors Creek described as having a steady population.
Jun/July 1857		False bottom sluices Long-Toms	Majors Creek showing signs of prosperity, but heavy rains interfered with sluicing. False bottom sluices and Long Toms being used.
Jan. 1858		Ground sluicing, puddling and Californian Pumps	Clyde Road was opened providing a route for the newly arriving Chinese (this was the Clyde Ridge Road that connected Woodstock Road west of Ulladulla, to Lyons Road in the Curwan State Forest)
March 1858			Concerns at lack of water. Nuggets found at Spring Creek.
July 1859		Cradles and Long-Toms	Cradles and Long-Toms being used by the Chinese on Majors Creek
Feb. 1860			Flooding took half-washed tailings into main creek providing fresh workings.
Early June 1860		Ground sluicing, puddling and Californian Pumps	Many new Chinese arrive. More flooding removed the soil that would otherwise have had to be removed by hand. Increasing use of puddlers by the Chinese.
Apr 1861		Ground sluicing, puddling and Californian Pumps	Massive flooding filled up claims and washed away dams, equipment and seven Chinese lost.
Mid 1861			Alluvial mining on the wane.
July 1862	200 (+ families)	Ground sluicing, puddling and Californian Pumps	Population of Majors Creek down to 200 miners. European numbers falling but Chinese numbers increasing.

		1	Page 2 of 5
YEAR	POPULATION	TECHNIQUE	EVENT
July 1865		Tramway	Pillar Company dug 30m tunnel into Red Hill, and constructed inclined tramway to take the wash down to the creek.
1866	200		Attention switched to Araluen and the
		NO RECORD OF ANY	(ACTIVITY
			Hassall & Roberts: Reef gold: Shafts to 12 2m
Sept. 1869		Reef gold	deep. Spring Creek, Red Hill, The Young Australians and Wilsons were still attracting attention.
Jan. 1870		Digging & crushing. Alluvial mining abandoned to Chinese	Ten-head crusher battery erected by Eisenstader at Welcome Stranger (near Dargues Reef). Wilson & Munro (United Miners) also had a ten-head battery. <u>Homeward Bound (at Dargues Reef)</u> was doing well. Road to crusher being metalled.
June 1870		Road to the crushers	Crushers at <u>Dargues Ree</u> f not operating because of the difficulty in transporting the stone to them. 366m road being built to the crushers
July 1870		Crushers	Crushers in use.
Sept/Oct 1870		Crushers	Excellent crushings from <u>Dargues Reef</u> .
Start 1871	1,074 (Majors Creek)		Enterprise Company's claim on Spring Creek regarded as second to <u>Dargue's</u> . Beginning concerns as to refractory nature of the ore.
Feb. 1871		Sluicing	Heavy rain slowed reefing operations but beneficial to sluicers.
Late 1871			Malaise appearing. Decrease in activity.
May 1872			Enterprise and <u>Dargues</u> floated to raise capital. Reefers had abandoned their shafts (deepest 30m) and prospecting ceased
		NO RECORD OF ANY	(ACTIVITY
1875	300	Ground sluicing	Mining consisted almost exclusively of ground sluicing. Ground not rich enough for puddling but ground sluicing would pay. About 300 working Long Flat and Majors Creek.
1877	171	Sluicing and digging	Dargues Reef being worked for 7 or 8 months by a party of 24 working shareholders, plus some 8 or 10 hired hands. There are now only 133 alluvial miners, 38 quartz miners on the field.
1878			Another dry year. <u>Homeward Bound</u> <u>Cooperative Company (Dargues Reef)</u> did not pay in the first 9 months of the year and was dissolved.
1879		Crushing Mill being constructed	The quartz claims of <u>Dargues Reef</u> had been acquired by a Victorian Company, Edwin Field manager and part owner. A ten-head battery was constructed. The mill was close to the reef and expected to employ 50 men.
1880		Ground sluicing, furnaces and arastras. Crushing mill in use	From February to September was dry, and then only wet enough to clean up or undertake ground sluicing. Australian Pyrites Company laying sluice boxes in main creek to recover pyrites. At <u>Dargues</u> dams were being constructed, and a crushing mill, furnaces and arastras, but it failed in the extraction of gold.

# Table 1 (Cont'd) Chronological Development of the Majors Creek Goldfield

			Page 3 of 5
YEAR	POPULATION	TECHNIQUE	EVENT
1881	105	Sluicing and puddling	Extremely dry. Only 3 months of sluicing and puddling. <u>Big Reef (probably Dargues)</u> was now owned by the Warren Brothers and Davis, had not been worked for three months.
1882		2 (5?) crushing plants on the field	Quartz mining described as thing of the past. Three crushing plants removed leaving only two on the field. At least 120 miners had left.
1883	66	Sluicing and digging	Fourth consecutive year in which there was insufficient water. Only 64 engaged in alluvial mining and two in quartz mining.
1884			Majors Creek all but abandoned
1885			Majors Creek all but abandoned
1886		Ten-head battery	Still insufficient water for ground sluicing. But Keyte and party had erected a ten-head battery at Spring Creek
1887			Wettest year for a long time but insufficient run- off for effective sluicing. <u>Dargues</u> was inoperative.
1888		Stone cracker, centrifugal roller, quartz mill, two concentrators (Frue vanners) and a steam engine -and a whim being constructed	600 tons from reef mining at <u>Dargues</u> . On the site of the old crushing mill the newly formed <u>Dargues Company</u> erected a stone cracker, centrifugal roller, quartz mill, two concentrators (Frue vanners) and a steam engine. A whim was being constructed at the United Miners' old claim.
1889		Construction continues. Truck line and chlorination plant being constructed	Insufficient water even for puddling, but miners were employed by Majors Creek Proprietary Gold Mining Company under the supervision of Mr Merton, on behalf of the <u>Dargue Company</u> to construct the plant described above, capable of treating 100 tons of concentrates per week, requiring 12,734 litres of water per hour. Truck line under construction. Chlorination works near <u>Dargues Reef</u> .
1890		Plant closed	Plant closed by the end of the year, because of impossibility of paying off company's debts. High costs incurred because chlorination plant was too far from crusher, and mill not suitable. Minor fossicking and sluicing.
		NO RECORD OF ANY	( ACTIVITY
1893		Chlorination plant back in use	Chlorination plant back in working order to process Snob's Reef ore. Wet weather restricted work on alluvial claims.
1893			Government created Fossickers Board with aim to encourage the unemployed to work on deserted or partially deserted goldfields.
1895			Gold still being recovered from old abandoned workings.
1896		Sluicing	Most gold recovered by sluicing when water was available.
1897			Work recommenced at Dargues
1898		Sluicing	Lack of rain reduced amount of alluvial workings.
1899 1900			132 tons crushed at the Majors Creek mill. Little mining took place.

# Table 1 (Cont'd) Chronological Development of the Majors Creek Goldfield

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YEAR	POPULATION	TECHNIQUE	EVENT
1901		Dewatering of shafts and deep mining	Numbers employed in alluvial mining had fallen sharply. Work begun on <u>Dargues</u> , United Miners and Thompson's Blow. Workings that had been waterlogged were drained. By April 3 or 4 shafts dewatered. By May ore from <u>Dargues</u> had been sent to Victoria. Good yields from the <u>Dargues</u> and United Miners was promising.
1902			Good returns continued. Alluvial mining at a standstill.
1904		Cyanide?	Concentrates from the United Miners mine being treated at <u>Dargues</u> .
1905	300	Hydraulic sluicing?	Population of Majors Creek - Mount Hope & United Miners still operating.
1907		Hydraulic sluicing?	Some mines still operating but production on the decline.
1908		Poppet Head, shaft retimbered and dewatered,	Dargues taken up by an English company. By June returns from Mt Hope were falling as were the yields from Stuart and Mertons, where a poppet head was being erected. At <u>Dargues</u> the shaft was being retimbered and the mine dewatered. There was very little alluvial mining because of the lack of water.
1909			High cost of transport and treatment resulted in lower profits.
1910			In September there was talk of a revival in mining, but the few paying mines were closing down because of the rising costs. <u>Dargues</u> and Stuarts were about to be reopened, but by the end of the year the plans for <u>Dargues</u> had fallen through. With the continued lack of water many miners moved on
1911			Further decline in returns.
1912		Hydraulic sluicing? Long Toms?	A further fall in yields. Only 11 men employed in quartz mining. Heavy rains brought an increase in alluvial mining 19 men being employed. Late in December it was reported that <u>Dargues</u> had struck a "good show" and was about to be reopened, - but the Inspector had not heard the report.
1913		Digging?	Dargues mine was being worked by the Majors Creek Gold Mining Syndicate, and six men cut a new shaft and cut drives. Because of good rainfall 12 men were engaged in alluvial mining.
1914			
1915		Digging and hydraulic sluicing	Dargues. The shaft had reached 45m and there were reported to be immense ore reserves. There were 17 men employed alluvial mining.
1916		Hydraulic sluicing?	Majors Creek Gold Mining Syndicate employed 8 men, but the mine was not payable and was abandoned. 14 men were engaged alluvial mining.
1917			Sluicing in the bed of the creek.
1918			Sluicing in the bed of the creek.
1919+			Some ground sluicing only

# Table 1 (Cont'd) Chronological Development of the Majors Creek Goldfield

			Page 5 of 5		
YEAR	POPULATION	TECHNIQUE	EVENT		
and by 1926			Only sluicing when there was enough water.		
	NO RECORD OF ANY ACTIVITY				
1930s		Crusher rebuilt	The Depression. Fossicking and reef mining renewed. The Government paid fossickers £1 a week and subsidised the rebuilding of a crusher at Majors Creek.		
by 1940s			Mining had ceased.		

# Table 1 (Cont'd) Chronological Development of the Majors Creek Goldfield

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With changing technologies activities were focussed on those goldfields where the technology was proving to be successful such as Alaruen where a dredge was operating. However, the Chinese tended to be excluded from, or ignored the new technologies, and carried on doing what they had always done so successfully, puddling, panning and cradling.

# 4. SURVEY METHODOLOGY

The initial survey for structures, items and places of potential heritage significance was undertaken at the same time as the investigation for sites of Aboriginal heritage significance, and notes taken of their location. Appleton later returned to those locations after the completion of the investigation for Aboriginal heritage sites to photograph and assess the structures, items and places for their heritage significance. As the photographic record shows there were few intact surviving in situ structural remains and the few items that were observed were discarded parts of structures of uncertain provenance.

# 5. THE ARCHAEOLOGICAL RECORD

# 5.1 INTRODUCTION

This section provides a description of the artefacts identified during the Non-Aboriginal heritage survey. However, in summary, with the exception of the following, the only items of heritage interest were three dredge shelves or buckets and the abandoned shaft of Dargues Reef mine.

- Water-races.
- Puddling depressions,
- A "paddock" (see glossary).
- Several dams, some of which may post-date mining activities.
- The footings of the chlorination plant at Dargues Reef.
- Traces of the railway from Dargues Reef to a crushing plant on Majors Creek.

As referred to elsewhere in this report there is no record of a dredge having been used on Majors Creek and so the presence of the dredge shelves on the creek bank cannot be linked directly to either gold extraction on Majors Creek or to a particular period in which they were used.

The abandoned Dargues Reef mineshaft is only evident as a temporarily capped hole in the ground. There are no remains of any headworks, such as poppets, whims, pumps, winding gear such as windlasses, or boilers, plant mountings, engines, or mullock heaps. A cage used to lower the miners and to lift ore and men up the shaft is the only material evidence as to how the mine-shaft was used.

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The only traces of the chlorination plant are the crumbling dry-stone footings, and while there is a brick mounting nearby there is no evidence to directly link the two.

The historic record show that there were five ore crushing plants or batteries in use on Majors Creek in the 1880s, but the only traces of them consist of two vertical bolt fixings associated with the crusher used by Dargues Reef mine on Majors Creek, and the foot of a stamper in the general location of a second battery below Spring Creek.

All that remains of the railway track between Dargues Reef mine and the crushing plant on Majors Creek are the earthworks consisting of a line of cuttings and banks along which the track ran and several lengths of twisted track in Majors Creek.

The only other material remains of over 80 years of gold mining that have survived the attention of scrap-metal merchants, bottle collectors and scavengers consist for the most part of useless rusting metal, fragments of china and a few fragments of brown and clear glass.

## 5.2 IDENTIFIED ARTEFACTS

The following presents a summary of artefacts observed during the survey. The locations of these items are described in relation to the workings shown on **Figure 5** that they were associated with.

Two pieces of ceramic were identified in the vicinity of Gamage's claim (**Plates 28** and **29**). These were a bowl base and blue-on-white fragment. Both found were found together with fragments of a case-gin bottle, a stone-wear emulsion jar and a number of fragments of blue and white transfer ceramic. There is, however, insufficient evidence on which to assume that the ceramics and glass were directly associated with Gamage. However, if all of the broken glass and ceramic had been collected it would not have filled a bucket – hardly representative of eighty years of mining involving thousands of miners, many of whom were accompanied by their families.

**Plates 11** to **18** present a sequence of photographs which includes views of the route of the railway from Dargues Reef down to Majors Creek. It is believed that there was a second line from Snobs Mine on Shingle House Creek down to Majors Creek, where it met the line from Dargues Creek and used the same siding to take the ore to the Majors Creek stamp-battery. The railway line now only consists of shallow soil and bramble filled cuttings, gentle but clearly excavated depressions, and eroding causeways. From the measurements taken from a rail-truck bogie identified in the vicinity of the railway line (Plate 9) the inner width of the track was 60cm. The dimensions of the bogie (which were not necessarily the dimensions of the hoppers or boxes that were attached to them) were 47cm wide by 156cm long. Two twisted lengths of track were observed in Majors Creek river bed protruding from rabbit warrens.

The 'shoe' (or die) from a stamp-battery shown in **Plates 23** and **24** was found near piles of uncrushed ore at the junction of Spring Creek and Majors Creek, and this was probably where the second stamp-battery was located.

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It is interesting to note that McGowan (un dated and 2000) makes no reference to the use of dredges in Majors Creek and yet there are three dredge shelves or buckets on the northern bank of Majors Creek midway between Spring Creek and Majors Road bridge (see **Plates 25** and **26**).

The nearest 'reported' use of dredges was at Alaruen which lies at the foot of a very steep and winding scarp road. Even more strange is that they are not opposite old dredge-workings but at the eastern end of Majors Creek. Considering how heavy they were and that the only means of transporting them was by bullock or horse-drawn wagons it is unlikely they were conveyed to this spot merely to be dumped. There is no apparent damage to them and yet they have been dumped on the top of a steep slope overlooking Majors Creek. It therefore seems highly improbable that someone would have brought these extremely heavy iron buckets all the way up the hill from Alaruen just to dump them on Majors Creek. Even if they had been salvaged from Alaruen it is unlikely that a purchaser of mining machinery at Alaruen would have gone to all the trouble to get them up the scarp just to dump them. It addition, it is unusual that there only three of them. As a result, it is likely that dredging did take place in Majors Creek and that whoever removed the other buckets couldn't take them with the others and had meant to return to Majors Creek to pick them up, but for some reason, never returned.

As McGowan states there is very little evidence of the early gold extraction techniques simply because later works obliterated any traces of the earlier phases, and as a consequence what is evident today is the result of the most recent and the most destructive episodes of mining of the goldfields. Unfortunately, so few records were kept of who did what and when, and in the case of data on the Chinese yields, there is no record other than that the Chinese were there throughout most of its history. However, it is reasonable to assume that most of the Chinese activities at the goldfield were initially pan and Long Tom sluicing, followed by puddling for gold. As a result, the numerous puddle-pits on the northern slopes above Majors Creek can probably be associated with the Chinese.

Published references to a puddling machine usually describe it as using a timber-lined circular vat into which the dirt and water were thrown and the contents were agitated by means of a separator attached to a beam pivoted on the centre of the tub. The beam was drawn around the tub by a horse. However, the Chinese are believed to have used a more basic method, described by Moore (2000) in citing G.C.Evans "*Stories Told Around the Campfire*", written in 1881. Evans wrote, "we dug a hole two feet deep in hard ground and puddled our stuff in it, instead of a tub".

Puddling in a hole still required water (probably brought to the pit in a bucket as there is no evidence of a race being used to provide the water) and the agitation would have been done with a shovel, after which the slurry was then panned to recover the gold (see **Plate 51**).



Plate 1– Dargues Reef: Dry-stone wall supports for the chlorination plant



Plate 2– Dargues Reef: The two rectangular stone supports for the chlorination plant.



Plate 3 – Dargues Reef: The two rectangular stone supports for the chlorination plant.



Plate 4 – Dargues Reef: The explosives store in the river bank (scale 1m).

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Plate 5 – Dargues Reef: Brick plinth – purpose unknown (scale 1m).



Plate 6 –. Dargues Reef: The wider face of the brick plinth (scale 1m).

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Plate 7 – Dargues Reef: Cage for lifting ore and water, or lifting and lowering miners into a mine shaft (scale 1m).



Plate 8 – Dargues Reef: The cage from the side (scale 1m).

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Plate 9 – Dargues Reef: Rail-truck bogie (scale 1m).



Plate 10 – Dargues Reef: Buffer assembly from a rail truck bogie (scale 1m).



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Plate 11 – Dargues Reef: Blackberry-filled railway cutting down-line of Dargues Reef.



Plate 12 – Dargues Reef: The tree-filled railway cutting beside the roadway.



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Plate 13 – Dargues Reef: The green swale is part of the railway cutting.



Plate 14 – Dargues Reef: The hump crossing diagonally from lower right was a railway causeway.



Plate 15 – Dargues Reef: The railway cutting.



Plate 16 – The hump along the ridge supported the railway line.

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Plate 17 – Dargues Reef: Looking back up the line.



Plate 18 – Dargues Reef: The end of the line at Majors Creek. Note the branch to the left which is interpreted as being the 'siding' to the stamp-battery.



Plate 19 – Stamp-battery on Majors Creek. Note the vertical bolts that would have been part of the mounting for the stamp-battery.



Plate 20 – Discarded pieces of the stamp-battery.



Plate 21 – One of the parts of a boiler (?) at the stamp-battery site.



Plate 22 – Another piece from a boiler?



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Plate 23 – The "foot" of a stamp from a second stamp-battery (scale 25cm)



Plate 24 – The sole of the foot from the second stamp-battery (scale 25cm).



Plate 25 – Shelves or scoops from a dredger on the northern bank above Majors Creek.



Plate 26 – Different aspect to Plate 25.



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Plate 27 – Water-tanks (?) mid-streambed of Majors Creek.



Plate 28 – Fragment from a blue and white transfer bowl in the vicinity of the 'Camages' claim on the south bank of Majors Creek (manufacturer and date not traced).



Plate 29 – Fragment of blue and white transfer ceramic from a plate in the vicinity of the 'Camages' claim on the south bank of Majors Creek (manufacturer and date not traced).



Plate 30 – Tractor tragedy in Spring Creek Tributary 2! (Manufacturer and date not identified).



Plate 31 – Remains of a water tank dumped in a gully off Shingle House Creek.

### 5.3 WATER RACES.

The Chinese were also known for their neat and highly efficient water races. Water races occur on every hill slope adjacent to Spring Creek, its tributaries and Majors Creek. Which of them were dug by the Chinese and which by others cannot be determined. It should not be overlooked just how many water races there were, some of which have been lost to hydraulic sluicing and some to erosion. The few depicted below are just a very few of many. They are shown in the sequence Spring Creek, Spring Creek Tributary 2, Spring Creek Tributary 3, and Majors Creek (see **Figure 5**). The photographs have been selected for their clarity, as many races while very easy to identify in the field don't necessarily photograph well.

The water races are found around the lower slopes of every hill and spur in the Project Area. Some lead into actively eroding gullies where the water that was once directed to where the miners were sluicing, continues to be concentrated onto the erodible soils. The result is massive and active erosion which is particularly visible along the southern bank of Majors Creek. While the races on the banks of Majors Creek are stark and clearly visible many of the races on the slopes upslope of Spring Creek and its tributaries are almost concealed beneath dense agricultural grasses, but are visible as "crop marks". In the same way as contour banking retains ground moisture, the races retain sufficient ground moisture to keep the grass in the race green, in contrast to the drier browner grasses to either side.

The following plates are presented in the following sequence; from the western bank of Spring Creek from the lower to the upper course; the eastern bank of Spring Creek from the lower to the upper course; the banks of Spring Creek Tributary 2 from the lower to upper course; Spring Creek Tributary 3; and the southern bank of Majors Creek. The races on the northern bank of

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Majors Creek have been omitted, those in the western section not being very clear, and the ones in the eastern section being completely screened by Broom. The sequence is followed by two views of the races that were dug to capture the run-off from the catchment to the north, to bring the water over the saddle to supplement the run-off in Spring Creek; a view of some puddling pits – perhaps from the Chinese workings; and a fossickers dam probably dating from the later period of operations at Majors Creek, perhaps in the 1930s.

In the following plates there are just a few of the many races that skirt the slopes, some of which are hundreds of metres long. The races on the southern bank of Majors Creek were probably less effective than those on the slopes simply because the banks were less steep and the water would have had more opportunity to soak into the race and so less would have reached the sluicing point.





Plate 32 – Western bank of Spring Creek.



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Plate 34 – Western bank Spring Creek.



Plate 35 – Western bank of Spring Creek.

















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Plate 40 – "Paddock" on Spring Creek Tributary 2



Plate 41 – East bank of Spring Creek Tributary 2.







Plate 43 – Southern bank of Majors Creek.



Plate 44 – Southern bank of Majors Creek.



Plate 45 – Southern bank of Majors Creek.

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Plate 46 – Southern bank of Majors Creek.

Plate 47 – Southern bank of Majors Creek



Plate 48 – Southern bank of Majors Creek.



Plate 49 – Race connecting the Shoalhaven catchment and Deua River catchment.



Plate 50 – And taking water over the saddle into Spring Creek.



Plate 51 – Pot-hole tailings and puddling pits on the ridge south of Dargues Reef.





# 6. **REGISTERS OF HERITAGE PLACES**

Searches were made on 26 June 2010 to establish whether or not the Majors Creek goldfield, or Dargues Reef, were listed on heritage registers or the *Tallaganda Local Environment Plan 1991*. The results of those searched are as follows.

- *Tallaganda Local Environment Plan 1991* Schedule 1 , neither Majors Creek nor Dargues Reef was listed in the LEP.
- NSW Heritage Branch State Heritage Inventory listing of places of heritage significance Neither Majors Creek nor Dargues Reef was listed in the inventory.
- National Trust listing of places of heritage interest neither Majors Creek nor Dargues Reef was listed in the database.

# 7. ASSESSMENT OF HERITAGE SIGNIFICANCE

### 7.1 INTRODUCTION

The document "Assessing Significance for Historical Archaeological Sites and Relics" (Heritage Branch 2009) defines "significance' as "an expression of the cultural value afforded a place, site or item". The definition is in accord with the *Burra Charter* (the 'Australia ICOMOS Charter for the Conservation of Places of Significance') that defines 'cultural significance' as,

"aesthetic, historic, scientific and social value for past, present and future generations".

# 7.2 CRITERIA FOR ASSESSING HERITAGE SIGNIFICANCE.

The NSW Heritage Council has adopted specific criteria for heritage assessment. These are;

- Criterion (a) an item is important in the course, or pattern, of NSW's Cultural or natural history (or the local area);
- Criterion (b) an item has strong or special association with the life or works of a
  person, or group of persons, of importance in NSW's cultural or natural history (or
  the local area);
- Criterion (c) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area);
- Criterion (d) an item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons (or the local area);
- Criterion (e) an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the local area);
- Criterion (f) an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the local area; and
- Criterion (g) an item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments (or the local area).

The guidelines for *Assessing Heritage Significance* published by the Heritage Branch of the Department of Planning in 2009 provide the criteria presented in **Table 2** for establishing the grading of significance of items of heritage significance.

Grading	Justification	Status
Exceptional	Rare or outstanding item of local or State significance. High degree of intactness. Item can be interpreted relatively easily.	Fulfils criteria for local or State listing
High	High degree of original fabric. Demonstrates a key element of the item's significance. Alterations do not detract from significance.	Fulfils criteria for local or State listing
Moderate	Altered or modified elements. Elements with little heritage value but which contribute to the overall significance of the item.	Fulfils criteria for local or State listing
Little	Alterations detract from significance. Difficult to interpret	Does not fulfil criteria for local or State listing.
Intrusive	Damaging to the item's heritage significance	Does not fulfil criteria for local or State listing.

 Table 2

 Criteria for Assessing Heritage Significance

## 7.3 ATTRIBUTES OF GOLD MINES WARRANTING HERITAGE ASSESSMENT

Pearson and McGowan (undated) identified certain attributes of different gold mining sites that are likely to make a site a good example of its type. Such attributes include the following.

#### Alluvial mining site:

- Clear evidence of mine workings.
- Clear evidence of machinery and equipment.
- Clear evidence of settlement.
- Evidence of ethnicity.

Attributes or combination of attributes of an alluvial mining site that is likely to make it rare, uncommon or of particular interest include the following.

- Largely intact workings.
- Size and scale of the workings, their historical significance, if that can be determined, and the evidence for settlement and ethnicity.

#### Deep lead site:

- Clear evidence of mine workings.
- Clear evidence of a processing site with substantial evidence.
- Clear evidence of habitation.

Attributes or combination of attributes of a deep lead mining site that are likely to make it rare, uncommon or of particular interest include the following.

- Intact or unusually substantial surviving head equipment.
- Intact or unusually substantial evidence of processing plants.
- Intact or unusually substantial evidence of habitation sites.

#### Reef mining:

- Clear evidence of mine workings.
- Clear evidence of a processing site with substantial evidence.
- Clear evidence of habitation.

Attributes or combination of attributes of a reef mining site that are likely to make it rare, uncommon or of particular interest include the following.

- Intact or unusually substantial surviving mine head equipment.
- Intact or unusually substantial evidence of processing plants.
- Intact or unusually substantial evidence of habitation sites.

# 7.4 MAJORS CREEK AND DARGUES REEF

While the Majors Creek/Dargues Reef goldfield has witnessed over eighty years of mining, varying from simple pan and cradle sluicing, Long Toms, puddling, hydraulic sluicing, reef mining, dredging (?) and fossicking, very little remains of any one clearly identifiable discrete mining activity or of datable layers of mining activities or temporal markers. As a consequence while there is extraordinary visual evidence of the combined activities and impacts from mining on a fragile landscape, there are very few relics, or items of plant that might be temporally placed in the chequered history of success and failure of mining operations within the Project Site.

The photographic record presented in this report shows images of all the items that remain; a few blue and white shards of crockery; a couple of twisted track rails; a rail-truck bogie; a brick plinth of unknown purpose; dry stone walls believed to be associated with a chlorination plant; an item of cast iron (stamp battery foot or die) believed to be from a stamp battery; a cage; two corrugated water tanks (?); an explosives store; and several scraps of rusting boiler (?) parts – not much to show for eighty years of gold mining. There was no evidence of a Whim (1888 see **Table 1** above), and no or very little evidence of a stamp battery, windlasses, furnaces or arastras – see **Plate 19**. Perhaps the only 'manufactured' feature of note was the railway line, but that is only recognisable as a series of eroding causeways and weed and slope-wash filled cuttings.

Many mining sites either have a detailed history or an impressive physical presence of abandoned items of processing plant, and many have a number of items of plant identifiable with a particular process or with a particular event. Unfortunately the Majors Creek/Dargues Reef Project has neither. Its history is poorly recorded and in some instances, years during which thousands of miners were known to be working the field are represented by a simple reference to whether or not it was a dry year!

In terms of addressing the criteria that are likely to make a site a good example of its type the <u>Project Site does not have;</u>

- clear evidence of a processing site with substantial evidence; or
- clear evidence of habitation.

But it does have clear evidence of mine workings.

However, it does not have;

- intact or unusually substantial surviving head equipment;
- intact or unusually substantial evidence of processing plants; or
- intact or unusually substantial evidence of habitation sites.

With reference to the "clear evidence of mine workings", while there has been massive impact from mining, it is unclear as to which process or extraction technique has caused the most recent impact and which techniques preceded it. In many places, the workings have been completely obscured from view by blackberry and broom. In other areas there are anomalies such as the dredge buckets that place a question mark on to what extent the dredged sediments and tailings were reworked and then reworked again by fossickers.

There are a number of references to multiple shafts at Dargues Reef, however there is evidence of only a single shaft that has filled with water. There is no evidence of a whim referred to **Table 1** for 1888, nor were there any remains of the two stamp batteries other than perhaps for the two bolts in the ground – see **Plate 19**, or the poppet head.

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For these reasons the qualifier that there is, "clear evidence of mine workings" is not considered to have been met, simply by saying that there is clearly visual evidence of the massive impact of eighty years of mining as the massive scarring of the creek lines and an intriguing lacework of water races. What we see is the effect of many mining techniques superimposed on previous workings, and not the evidence for what extraction techniques caused it.

Heritage significance is assessed in terms of why a place, item or site is of heritage significance, and not of why it is not of significance. In this instance the Project Site does not have the attributes that warrant its assessment as being of heritage significance.

Not withstanding the fact that the items identified have no heritage significance, none would be disturbed, with the exception of a number of races within the footprint of the Tailings Storage Facility and the Processing Plant.

# 8. CONCLUSION

As a consequence of this investigation the Project Site is assessed to contain no structures, relics or items of heritage significance. As a result, the Project would not result in any significant adverse impacts on items of Non-Aboriginal heritage significance.

# 9. GLOSSARY

The definitions that follow are for terms used in this and other reports written by the author, and do not necessarily apply to their use in different contexts.

#### SOIL SCIENCE TERMS (taken from Banks, 1995, and others as referenced).

BEDROCK : Outcrop of *in situ* rock material below the soil profile.

BENCH : A strip of relatively level earth or rock breaking the continuity of a slope.

BLOWOUT : A closed depression formed in the land surface by wind eroding sands and depositing them on adjacent land.

CHERT: A very fine-grained amorphous silicate sedimentary rock, commonly a layer of chemical precipitate or micro-organism skeletal remains (Milford 1999).

CLAY: Soil material composed of very fine particles less than 0.002 mm size. When used to describe a soil texture group, such a material contains more than 35% clay (Milford 1999).

CLAYPAN : A depression caused by the aeolian deflation of sediments, or by the presence of a prior lake.

CONGLOMERATE: A poorly-sorted detrital sedimentary rock composed of rounded gravels, stones or cobbles in a matrix of much finer material (Milford 1999).

DUNE : A ridge built up by wind action composed of sands, silts, or sand-sized aggregates of clay.

FLOODPLAIN: A large flat area, adjacent to a watercourse, characterised by frequent active erosion and aggradation by channelled and overbank stream flow.

GIBBER : A level surface covered by a thick deposit of gravel or broken siliceous pebbles, occurring in the more arid parts of the continent, thought to have been formed from the break-up of a siliceous (silcrete) surface crust, and termed gibber plains (Whittow, 1984) – see also silcrete.

GILGAI : Surface microrelief associated with soils containing shrink-swell clays. Gilgai consists of mounds and depressions, or irregularly distributed small mounds and subcircular depressions varying in size and spacing. Vertical interval usually <0.3m; horizontal interval usually 3-10m, and surface almost level. Sometimes called 'crabhole' soils.

GREYWACKE: A tough, well-indurated type of sandstone distinguished by detrital quartz crystals and rock fragments set in a finer-grained matrix (Milford 1999).

GULLY: An open incised channel in the landscape generally greater than 30cm deep and characterised by moderately to very gently inclined floors and steep walls (Milford 1999).

HUMMOCK : A small raised feature above the general ground surface.

LANDFORM ELEMENTS :

Crest : Landform element standing above all points in the adjacent terrain.

Flat : Neither a crest or a depression <3% slope.

Upper slope : Adjacent to and below a crest or flat but not a depression.

Midslope : Not adjacent to a crest, a flat or a depression.

Lower slope : Adjacent to and above a flat or a depression but not a crest.

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LITHOSOLS : Shallow soils showing minimal profile development and dominated by the presence of weathering rock and rock fragments.

METAMORPHIC: Rocks whose composition, texture and/or structure have been altered through tectonic pressure and/or heat (Milford 1999).

METASEDIMENTARY: Partially-metamorphosed sedimentary rock (Milford 1999).

MUDSTONE: A fine-grained dark-coloured sedimentary rock, formed from lithified mud; similar to shale but more massive (Milford 1999).

pH A measure of the acidity or alkalinity of a soil. A pH of 7.0 denotes neutrality, higher values indicate alkalinity, and lower values indicate acidity. The pH scale is logarithmic, i.e., a pH of 4.0 is ten times as acid as a pH of 5.0, and one hundred times as acid as a pH of 6.0. (DLWC 1999).

RILL: A small channel cut by concentrated runoff through which water flows during and immediately after rain.

A small ephemeral channel, generally no more than 30 cm deep, created by concentrated runoff (Milford 1999).

RUNOFF : That portion of precipitation not immediately absorbed into or detained upon the soil and which thus becomes surface flow.

SCARP/CLIFF : A steep slope terminating a plateau or any level upland surface.

SCRUB : vegetation structure consisting of shrubs 2-8m tall.

SHEET EROSION : The removal of the upper layers of soil by raindrop splash and/or runoff.

SOIL PROFILE :

"A HORIZON": The top layer of mineral soil. This may consist of two parts:

A<sub>1</sub> HORIZON: Surface soil and generally referred to as the topsoil.

A<sub>2</sub> HORIZON: similar in texture, but paler in colour, poorer in structure, and less fertile.

"B HORIZON": The layer below the A Horizon. This consists of 2 parts:

B<sub>1</sub> HORIZON: A transitional horizon dominated by properties characteristic of the underlying B<sub>2</sub> horizon.

 $B_2$  HORIZON: typically contains concentrations of silicate clay and/or iron, and/or aluminium and/or translocated organic material.

"C HORIZON": The parent rock. Recognised by its lack of pedological development, and by the presence of remnants of geologic organization.

"R HORIZON": Hard rock that is continuous (Charman & Murphy, 1993; 350-1).

SPUR : A ridge which projects downwards from the crest of a mountain as a water-parting (Whittow, 1984).

SUBSOIL : Sub-surface material comprising the B and C Horizons of soil with distinct profiles; often having brighter colours and higher clay contrasts.

SURFACE CONDITION :

Gravelly : Over 60% of the surface consists of gravel (2-69mm).

Hardsetting : Soil is compact and hard.

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Loose : Soil that is not cohesive.

Friable : Easily crumbled or cultivated.

Self-mulching : A loose surface mulch of very small peds forms when the soil dries out.

SWALE: A linear level-floored open depression excavated by wind or formed by the build-up of two adjacent ridges.

SWAMP : Watertable at or above the ground surface for most of the year.

TOPSOIL: The surficial layers of the soil profile, typically the A Horizon, which is usually darker, more fertile, better structured and contains more organic matter than underlying soil materials (Milford 1999).

TERRACE : A flat or gently inclined surface bounded by a steeper ascending slope on its inner margin and a steeper descending slope on its outer margin (Whittow, 1984).

TOPSOIL : A part of the soil profile, typically the  $A_1$  horizon, containing material that is usually darker, more fertile and better structured than the underlying layers.

UNDERSTOREY : A layer of vegetation below the main canopy layer.

WEATHERING: The physical and chemical disintegration, alteration and decomposition of rocks and minerals at or near the earth's surface by atmospheric and biologic agents (Milford 1999).

#### GOLD MINING TERMS

#### The following definitions are taken from various sources as indicated below:

ADIT: An essentially horizontal access into a mine by means of a tunnel driven in to the hillside (Woodland 2001). A horizontal gallery or drive. Opening out either from some part of the slope or from the base of a hill or range into a mine, either for the purpose of drainage, or ventilation, or for ordinary mining purposes (Stone 1974).

ALLUVIAL: Of or pertaining to gold-bearing alluvium, a sedimentary deposit of earth, sand etc., found on flood plains and in river beds (Moore 2000).

ALLUVIAL MINING: Pan and cradle – the most basic form of alluvial mining - also known as "shallow surfacing" (McGowan 2000).

AURIFEROUS: Gold-bearing (Woodland 2001).

BATTERY: A set of stamps used for crushing quartz (Moore 2000). A group or set of stampers, or the whole of the stamp-heads collectively attached to one engine (Stone 1974).

BATTERY HOUSE: Quartz was crushed by stampers, and the crushed rock ran across Wilfrey Tables which vibrated, separating fine gold-bearing material from waste rock (Sovereign Hill Museum 1998)

BUDDLE: A shallow inclined vat in which ore is washed in both alluvial and quartz mining (Moore 2000). The concave buddle (known as Munday's or Old Cornish), later developed into a convex buddle patented by Mr Lewis. The improved buddle did not require manually cleaning out (Stone 1974).

CAGE: A structure of iron and wood in which tram-wagons are placed, to be raised or lowered in shafts (Stone 1974).

CALIFORNIAN PUMP: A pump used to drain water from a claim, or to channel water from its source to a device such as a puddling machine (Moore 2000). A rectangular box, about ten inches by three inches inside measurements, and from ten to thirty feet in length. Trough it passes an endless band or belt, on one side of which are fastened discs or floats of wood, nearly as large as the inside of the tube or box. This pump is worked by water, horse-power, or by manual labour, with the box placed in a diagonal position. Used in shallow alluvial ground (Stone 1974). It was introduced into the Araluen goldfields by the Chinese (Ellis 1997).

CHILEAN MILL: A mill for crushing quartz (Moore 2000).

CHINESE: Of a total of 24,732 Chinese in Victoria in 1861, 24,544 were on the goldfields. Of a total of 12,988 Chinese in NSW in the same year, 11,838 were on the goldfields (Moore 2000).

CHINESE PUMP: A wooden pump consisting of buckets on a continuous belt, used to remove water from a mine (Moore 2000).

CRADLE: A box-like apparatus mounted on rockers, and agitated by hand, to separate the gold from sand, gravel etc. A "gold-washing machine" (Moore 2000). The common cradle is a wooden box from three to four foot in length, and one foot to one foot eight inches in width. It has a movable hopper and slide, and is fixed on two rockers. When it is in work it is placed on an inclined plane (Stone 1974).

CYANIDE: Cyanide was applied to tailings, that is, the crushed ore that had already passed over the amalgamating and concentration tables, and to assist in the collection of very fine gold, often unseen to the naked eye. The tailings were placed in large vats and treated with solutions of Potassium or Sodium Cyanide of varying strengths". (McGowan 2000, 8).

CYANIDE PLANT: The crushed ore that had already passed over the amalgamating and concentration tables, and to assist in the collection of very fine gold, often unseen to the eye. The tailings were placed in large vats and treated with solutions of Potassium or Sodium Cyanide of varying strengths. These solutions dissolved the gold, which was eventually precipitated by zinc shavings or other precipitants. Came into use in Australia in the late 1890s. Used at Majors Creek (McGowan 2000).

DAM : Dams were often constructed near the head of a race (Pearson & McGowan n.d.).

DEEP LEAD: An alluvial deposit of gold in the (now subterranean) bed of an ancient river (Moore 2000). Underground auriferous levels that are far below the surface, necessitating deep shafts and a windlass (Ryan et al, 2010). Ancient riverbeds where loose gold was trapped in layers of wet sand, rock and clay (Smithers 2005).

DIRT: The alluvial soil or gravel from which gold is being separated by washing (Moore 2000).

DREDGING: Was performed by bucket and centrifugal dredges, and involved the removal of wash from rivers and stream beds, with the aim of exploiting those lower stream gravels which could not be extracted by any other means. A very capital intensive process. Pontoons were built on site using imported timber and would take several months to build. Most dredge ponds are broadly rectangular in shape and are usually surrounded on either side by tailing mounds deposited by the elevators (McGowan 2000).

Centrifugal dredging was used at Majors Creek. It involved the use of hydraulic sluicing to break down the earth, which was then hosed into a sump hole and pumped by suction pumps into vertical pipes to sluice boxes mounted on scaffolding above the dredge (McGowan 2000).

Bucket dredges were not introduced on most fields until the early 1900s (McGowan 2001).

DRIFT: A drive, level or gallery. Loose sand or a very friable alluvial deposit met with in some places close to the wash-dirt; and when so situated, very dangerous, requiring close timbering and great care in working (Stone 1974). A deposit of sand, gravel etc., as left by (flood/other) water (Ryan et al, 2010).

DRIVE: A level or gallery driven horizontally in the reef (Stone 1974).

DRY RACE : When races relied upon seasonal weather and run-off they were known as dry races (Pearson & McGowan n.d.).

FACE: The end of a drive. A perpendicular cutting of ground anywhere. The wall, cheek or side of a reef (Stone 1974).

FLUME: The more artificial portion of a race or tail-race, consisting of piping, hose, or wooden boxes let into each other (Stone 1974).

GROUND-SLUICE: A channel cur in the bottom or bed-rock, into which the earth is conveyed by a stream of water, sometimes lined with sawn planks. Employed where the bottom is sufficiently high to afford the necessary fall for the stuff passed through the sluice (Stone 1974).

HEADFRAME: Timber structure over a shaft to allow men, ore and materials to be raised or lowered (Woodland 2001).

HUMMOCKS OF WASH DIRT, OR POT-HOLE TAILINGS: Closely grouped shallow shafts or rounded piles of wash dirt and soil (Pearson & McGowan n.d.).

HYDRAULIC SLUICING: Used when the drift and overburden were too deep and often too poor to be worked by any other method. Water conveyed under pressure to a hose, which would then be turned against the face of the workings, with the aim of washing the drift down to bedrock, and thence into sluice boxes (McGowan 2000). Only where the fall is considerable, and water abundant, can hydraulic mining be profitably pursued (Stone 1974).

LODE: A quartz reef. A mineral vein (Stone 1974).

LONG-TOM: A gold washing machine or table twenty-four feet in length, two feet in width, with sides twelve inches high. The bottom is lined with sheet-iron one-eighth of an inch thick. The table rests on logs of wood laid on the ground, which give it a slight fall. The wash-dirt is thrown into the table at its head (near the mouth of the pump) which supplies it with water, and it is mixed with the water by forks and gradually washed down to the hopper, through which the finer portion passes on to the ripple-board, where the gold is caught by the ripples and blankets; the coarser gravel which will not pass through the hopper is cast away (Stone 1974).

MILL: A general term which might mean a crushing machine, a puddling machine, or a Chilean mill (Stone 1974).

MILL BATTERY: A crushing machine with Chilean Mills attached to it (Stone 1974).

MULLOCK: Mining refuse (Moore 2000). Waste rock raised from a mine (Woodland 2001).

ORE: Rock containing mineral(s) that can be mined and treated at a profit (Woodland 2001).

OREBODY: A well defined mass of ore that can be profitably mined (Woodland 2001).

PADDOCK: In mining – an area marked out and systematically excavate for wash dirt – especially associated with the Chinese who worked in gangs (Moore 2000). Paddocks were rectangular and open at one end (McGowan 2000). An excavation made for procuring wash-dirt in shallow ground Stone 1974). Resemble large pits or quarries, square or rectangular and open at one end (Pearson & McGowan n.d.).

PAN: A circular dish, often made of tin, in which gold is separated from gravel, crushed quartz, etc, by agitation and washing (Moore 2000). A large shallow enamelled iron basin used in panning-off (Stone 1974).

POPPET HEADS: Cross-pieces of timber above the mouth of a shaft, on which rest the axles of the pulleys pr sheaves which guide the ropes attached to the cages or tubs in the shaft. Term commonly applied to the whole structure (Stone 1974).

PUDDLE: To work gold-bearing material with water in a tub so as to separate out the gold from the other material (Moore 2000). (*The Chinese used to puddle for gold by excavating a pit of 5-10m diameter, which they filled with water, and then used a shovel to agitate the material, which they then panned for gold*).

PUDDLING MACHINE: Consists of a circular space, the sides and bottoms of which are lined with iron or laths of hardwood, with a perpendicular shaft moved by steam or horse-power working in the centre of a circle (Stone 1974).

PUDDLERS: Used to wash dirt that was heavily impregnated with clay. Large circular holes about 15m to 20m in circumference into which the dirt and water were mixed with perhaps a small race conveying water into the puddler (McGowan 2000).

PUDDLING: Breaking down clayey material with water to release its contained gold (Woodland 2001).

QUARTZ MILL: Also called a quartz-crusher. Arranged in batteries of four, five, six and ten heads, driven by steam, the stamps being lifted by means of discs on a cam, so arranged as to make the stamps revolve (Moore 2000).

RACE: An artificial channel constructed to divert water from a river or creek for mining processes (Moore 2000). (*Also to divert slope-wash and to direct water from a dam to where it was used to wash or sluice the dirt*). Sometimes lined with sawn planks and boards and sometimes paved with stones or wooden blocks (McGowan 2000). An aqueduct, a canal, or artificial watercourse (Stone 1974).

REFRACTORY: stubborn or unmanageable, not yielding to treatment (Fowler & Fowler 1964). "Where the gold was in a very fine state and in combination with sulphides of various metals, it was known as mundic or refractory ore" (McGowan 2000, 8).

"- the refractory nature of the ore, which contained a large amount of silver, and neither it nor the gold could be saved with the current treatment methods" (McGowan 2000, 85). "A chlorination plant was erected at Dargue's Reef in 1888 but it was not successful. This process involved the smelting of the ore and its infusion with chlorine gas, which reacted with other minerals, which were then skimmed off" (McGowan 2000, 8).

ROCKER: Another name for a cradle (Moore 2000).

SHAFT: A rectangular or square pit sunk on a reef or on a gutter (Stone 1974).

SLUICE: An artificial channel, usually consisting of a long sloping trough, or series of troughs, fitted with riffles, or grooves into which a current of water is directed to separate the particles of gold from the gold-bearing earth (Moore 2000).

SLUICE BOX: One of the long troughs of which a gold-washing sluice is composed (Moore 2000). A flume with ripples or false bottoms, having holes bored in them for catching gold (Stone 1974).

SMITHERS, H. 2005. Sovereign Hill: Ballarat Australia. Official Souvenir booklet, The Sovereign Hill Museum Association.

STAMP BATTERY (or stamper battery): Machine for crushing ore by dropping a series of heavy metal-shod shafts or 'stamps' (Woodland 2001).

STAMPER: Each of several pestles forming the battery of a stamping mill (Moore 2000).

STAMP-HEAD: A cast-iron weight or head fixed on to a shank or lifter, and used for stamping or reducing quartz to a fine sand (Stone 1974).

STOPE: A step-like working in the side of an excavation (Moore 2000). An underground excavation formed by the extraction of ore (Woodland 2001).

STOPING: Working out the reef upwards between two levels by steps or stopes carried forward one after the other. It continues until eventually the whole height of the reef between the two levels is in work. Stoping in alluvial mining is levelling the bottom of the drive (Stone 1974).

TAILINGS: Residue left after the economic minerals have been extracted from the ore (Woodland 2001).

TAILINGS MOUNDS: Frequently placed to dam water or direct water (Moore 2000). Elongated piles of river-worn stone ... arranged to facilitate drainage (Pearson & McGowan n.d.).

TAIL-RACE: An artificial channel which drains a claim, or which conveys water from a claim, or a mill, or a puddling machine after it has been used (Stone 1974).

WHIM: A machine used for raising ore or water from a mine (Moore 2000).

WHIP: A simple kind of tackle or pulley for hoisting material from a mine (Moore 2000). A contrivance consisting essentially of a rope and pulley for hoisting wash-dirt or refuse from a mine (Baldwin & Boyd-Davis 2001). Hand-whips or lever-whips are employed in shallow alluvial mining for raising the stuff to the surface – trees are frequently used as the upright (Stone 1974).

WINDLASS: A mechanical contrivance consisting of a roller or beam, resting on supports, round which a rope or chain is wound, used for raising material from a shaft (Moore 2000).

# 10. **BIBLIOGRAPHY**

Baldwin, B. And Boyd-Davis, R. 2001. *Diary of a Goldfield*. Published by Ruth Boyd-Davis and Barry Baldwin, Gulgong.

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- Banks, R.G. 1995. Soil landscapes of the Curlewis 1:100,000 sheet. Department of Conservation and Land Management.
- Bartlett, R. 1999. *First Gold, Ophir NSW: A history of Australia's First Goldfield*. Published by Robert Bartlett, Orange.
- Bates, R.L., and J.A. Jackson (Eds). 1980. *Glossary of Geology.* Second Edition. American Geological Institute, Virginia.
- Charman, P.E.V., & B.W. Murphy. 1993. Soil: Their Properties and Management. Sydney University Press.
- Clark, I.F., and B.J. Cook. 1986. *Geological Science: Perspectives of the Earth*. Australian Academy of Science, Canberra.
- Cook, D., and W. Kirk. 1991. *Field Guide to the Rocks and Minerals of the World*. Kingfisher Books, London.
- Cook, K & Garvey, D. 1999. The Glint of Gold: A History and Tourist Guide of the Goldfields of the Central West of New South Wales, Genlin Investments, Pymble.
- Cortona Resources Limited. 2009. "Dargues Reef Gold Project", Conceptual Project Development Plan.
- Department of Mineral Resources. 1972. Sydney, Metallogenic Map. 1: 250,000.
- Department of Mineral Resources. n.d. Information Sheet : Sedimentary Rocks.
- Department of Mines. 1973. *Minerals and their Characteristics*. Geological Survey of New South Wales, Number 141.
- Desen, J.L., and J. Peterson. 1992. Mapping the Australian Duricrusts: can Distribution be derived from Terrain Maps. *Australian Geographical Studies*, 30(1): 87-94.
- Dortch, C. 1984. Devil's Lair: a study in prehistory. Western Australian Museum.
- Dunnell, R.C. 1971. Systematics in prehistory. Free Press, New York.
- Dunshea, N. 1997. Majors Creek Memories. Printed by Majors Creek Progress Association.
- Ellis, N. 1997. *Braidwood, Dear Braidwood: A history of Braidwood and District*. National Capital Printing, Canberra.
- Fairbridge, R.W. 1968. Induration. *Encyclopaedia of Geomorphology, Encyclopaedia of Earth Science Series,* Vol. III, pp.554-55. Reinbold Book Corporation, New York.

Flenniken, J.L., and L.P. White. 1985. Australian flaked stone tools: a technological perspective. *Records of the Australian Museum*, 36: 131-51.

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- Fowler, H.W., & Fowler, F.G. 1964. *The Concise Oxford Dictionary of Current English*. Clarendon Press, Oxford.
- Gentilli, J. 1968. Duricrust. In R.W. Fairbridge (Ed.), *The Encyclopaedia of Geomorphology, Encyclopaedia of Earth Science Series,* Vol. III, pp.296-7. Reinbold Book Corporation, New York.
- Geography Dictionary. 1985. Longman Group, Harlow.
- Heritage Branch, 2009. Assessing Significance for Historical Archaeological Sites and 'Relics'", Heritage Branch, NSW Department of Planning.
- Maxwell, E. 1998. Written in Gold: The story of Gulgong, Country View Graphics.
- McGowan, B. n.d. Conservation and Heritage Overview of the Araluen Catchment Area, Incorporating the Araluen, Bell's Creek and Majors Creek Goldfields. Unpublished report to Upper DEUA Catchment Landcare Group Inc.
- McGowan, B. 2000. The Golden South: A History of the Araluen, Bell's Creek and Majors Creek Goldfields. Capital Fine Print, Canberra.
- McGowan, B. 2001. "Mullock Heaps and Tailing Mounds: Environmental effects of Alluvial Goldmining". In, I. McCalman, A. Cook and A. Reeves (Eds), Gold: Forgotten Histories and Lost Objects of Australia.pp.85-100, Cambridge University Press, Cambridge, UK.
- Meehan, B. 1982. *Shell bed to shell midden*. Australian Institute of Aboriginal Studies, Canberra.
- Menzies, I.A. 1974. Sydney-Bowen Basin. In N.L. Markham & H. Basden (Eds), *The Mineral Deposits of New South Wales*, pp.453-504, Department of Mines, NSW.
- Moore, B. 2000. *Gold! Gold! The language of the Nineteenth-Century Australian Gold Rushes*, Oxford University Press.
- Pearson, M. & McGowan, B. n.d. *Mining Sites in NSW: History and Heritage*. NSW Dept. of Industry & Investment.
- Ryan, J.S., Goode, A., Haworth, R., and O'Donohue, P. 2010. *Golden Words and a Golden Landscape.* Arts New England Publications, UNE, Armidale, and Uralla Shire Council, Uralla.
- Simpson, B. 1966. Rocks and Minerals. Pergamon Press, Oxford.
- Smithers, H. 1998. *Sovereign Hill, Ballarat, Australia*. Official Souvenir Booklet. Published by Sovereign Hill Museums Association.
- Stone, D.I. 1974. Gold *Diggers and Diggings: A photographic study of gold in Australia, 1854-1920.* Lansdowne Press.

- Triggs, B. 1985. *Mammal tracks and signs: a field guide for southeastern Australia*. Oxford University Press, Melbourne.
- Walker J. & M.S. Hopkins. 1990. Vegetation. In R.C. McDonald, R.F. Isbell, J.G. Speight, J. Walker & M.S. Hopkins (Eds), *Australian Soil and Land Survey*, pp. 58-86. Inkata Press, Sydney.
- Whittow, J. 1984. Dictionary of Physical Geography. Penguin, London.
- Woodland, J. 2001. Sixteen Tons of Clunes Gold: A history of the Port Phillip and Colonial Gold Mining Company. Clunes Museum, Clunes Victoria.