



**HERITAGE  
COUNCIL**  
OF WESTERN AUSTRALIA

## **REGISTER OF HERITAGE PLACES – ASSESSMENT DOCUMENTATION**

### **11. ASSESSMENT OF CULTURAL HERITAGE SIGNIFICANCE**

The criteria adopted by the Heritage Council in November 1996 have been used to determine the cultural heritage significance of the place.

The wording of this document has been adapted from, 'Old Armadale Brickworks Factory Site, Dale Cottages Retirement Village Armadale, Western Australia: Conservation Plan' by Palassis Architects for The Armadale Brickworks Preservation Group in association with Dale Cottages Inc., June 2000. Further documentary information was provided in 2003 by Ian Boersma, the Armadale Brickworks Preservation Society, and Heritage Council of WA staff. Physical evidence for *Armadale Brickworks Quarry (fmr)* has been prepared by Fiona Bush, heritage consultant and Karen Gilgallon, geophysicist. Amendments and/or additions have been undertaken by HCWA staff and the Register Committee.

#### **PRINCIPAL AUSTRALIAN HISTORIC THEME(S)**

- 1.4 Appreciating the natural wonders of Australia
- 3.3 Exploiting natural resources
- 3.5 Recruiting labour
- 3.13.2 Using Australian materials in construction
- 5.1.3 Organising workers and work places
- 6.3 Training people for the workplace

#### **HERITAGE COUNCIL OF WESTERN AUSTRALIA THEME(S)**

- 106 Workers
- 303 Mining
- 309 Technology and technological change
- 310 Manufacturing and processing
- 605 Famous and infamous people

#### **11.1 AESTHETIC VALUE\***

The quarry is a landmark cultural feature in the Darling Scarp, visible from the western approaches to Armadale. (Criterion 1.3)

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\* For consistency, all references to architectural style are taken from Apperly, Richard; Irving, Robert and Reynolds, Peter *A Pictorial Guide to Identifying Australian Architecture: Styles and Terms from 1788 to the Present*, Angus & Robertson, North Ryde, 1989.

For consistency, all references to garden and landscape types and styles are taken from Ramsay, J. *Parks, Gardens and Special Trees: A Classification and Assessment Method for the Register of the National Estate*, Australian Government Publishing Service, Canberra, 1991, with additional reference to Richards, O. *Theoretical Framework for Designed Landscapes in WA*, unpublished report, 1997.

## 11. 2. HISTORIC VALUE

The quarry provides tangible evidence of an historically important industrial activity that occurred on the associated brickworks factory site between 1901 and 1929. Armadale Brickworks is believed to have been the first brickworks in Western Australia to use shale for the manufacture of bricks, and established a precedent for this specialisation. (Criterion 2.1)

Bricks produced at the associated brickworks factory using shale from *Armadale Brickworks Quarry (fmr)* have played a significant part in determining the character of Perth's suburbs. Output from the brickworks factory was greater than from any other brickworks in Western Australia in the early years of the twentieth century, and consequently a substantial proportion of the characteristic red brick houses constructed in Perth's western and southern suburbs during this period were built of bricks originating from this factory. (Criterion 2.1)

The original owner of the place was Frederick Saw, who had the first shop in Armadale and was the first secretary of the local Roads Board. The founder of the business, Thomas Coombe, was a land and financial agent in Perth and was later knighted. The longest owner of the works, Robert Oswald Law, was a contractor and businessman of great prominence in Western Australia during the earlier part of the 20<sup>th</sup> century. (Criterion 2.3)

## 11. 3. SCIENTIFIC VALUE

The place has value as a research and teaching site with the potential to yield information relating to the history of brickmaking processes in Western Australia, particularly showing the beginning processes relating to the manufacture of pressed shale-blend bricks as occurred at the Armadale, Byford and Cardup brickworks. This value is enhanced by virtue of the fact that the shale quarry has been preserved with part of the tunnel through which the haulage tramline extended. (Criterion 3.1)

*Armadale Brickworks Quarry (fmr)* is of geological interest as it is one of the few sites where an outcrop of Armadale Shale (Cardup series of shale) can be examined. It is also an important geological teaching site that has been used as an educational site for more than 60 years as it displays a range of geological features that are not commonly seen in the Perth metropolitan area. These features include the exposure of metamorphic and sedimentary rock which show deformation features, cross cutting relationships as well as a clear regolith profile. (Criterion 3.1)

## 11. 4. SOCIAL VALUE

*Armadale Brickworks Quarry (fmr)* is an important part of the communal memory of local residents, having played a significant role in the social and economic development of the area as a major employer, with its associated brickworks factory, from c.1900 to 1930. (Criterion 4.1)

The quarry makes an important contribution to the community's sense of place as physical evidence of the early history of the site, and of the district. (Criterion 4.2)

## **12. DEGREE OF SIGNIFICANCE**

### **12. 1. RARITY**

*Armadale Brickworks Quarry (fmr)* provided shale for the first brickworks in Western Australia to make pressed shale blend bricks, which was one of few in the State to specialise in this form of brickmaking. (Criterion 5.2)

### **12. 2 REPRESENTATIVENESS**

*Armadale Brickworks Quarry (fmr)* is representative of the co-location of quarry and brickworks to exploit the deposits of shale found in the Darling escarpment east and southeast of Perth, and set a precedent for brickmaking in the area (Criteria 6.1 & 6.2)

### **12. 3 CONDITION**

Sections of the shale quarry are known to be unstable and susceptible to collapse, and the tunnel is flooded and presently considered unsafe. The quarry is fenced to prevent casual access.

The stromatolites have been damaged over time and are not easily discernible.

### **12. 4 INTEGRITY**

The shale quarry and its fringe of natural vegetation has seen little change since it was abandoned circa 1930. Several schemes for development and filling of the quarry have been considered in recent decades, but no proposal has been followed through. The site remains fenced and visited by small numbers of people.

The shale quarry has a high degree of integrity..

### **12. 5 AUTHENTICITY**

The shale quarry has seen little change since its abandonment circa 1930. However, most evidence of the tramline connecting the quarry to the factory site has been obliterated. The quarry has a high degree of authenticity.

### 13. SUPPORTING EVIDENCE

Attached are key sections of the Supporting Evidence prepared by Palassis Architects, 'Old Armadale Brickworks Factory Site, Dale Cottages Retirement Village Armadale, Western Australia: Conservation Plan', for The Armadale Brickworks Preservation Group in association with Dale Cottages Inc., June 2000.

Further documentary information was provided in 2003 by Ian Boersma, the Armadale Brickworks Preservation Society, and Heritage Council of WA staff.

Physical evidence for *Armadale Brickworks Quarry (fmr)* has been prepared by Fiona Bush, heritage consultant and Karen Gilgallon, geophysicist.

#### 13.1 DOCUMENTARY EVIDENCE

For a discussion of Documentary Evidence for the place during the period it was associated with Armadale Brickworks' operations, refer to Palassis Architects, 'Old Armadale Brickworks Factory Site, Dale Cottages Retirement Village Armadale, Western Australia: Conservation Plan', prepared for The Armadale Brickworks Preservation Group in association with Dale Cottages Inc., June 2000.<sup>1</sup>

Robert Oswald Law, the part owner and eventually sole owner of the brickworks, was born in Victoria in 1867. Arriving in Western Australia in 1881, he became a prominent West Australian businessman, successfully trading as a builder and contractor. He was responsible for significant projects including Fremantle Jetty, Perth Mint, Perth Boys' School, and Boans Brothers' store in Wellington St, large sewerage contracts for the metropolitan area, several South West railways, and numerous jetties. Law was one of the founders, and the first president, of the Master Builders and Contractors' Association.<sup>2</sup> In 1911, the prominent *Lexbourne House* in West Perth was built as his residence. Law owned several brickworks in the Perth area, from which he supplied his building projects, and in May 1922, these were consolidated as the Metropolitan Brick Company (Metro Brick).<sup>3</sup> He owned the quarry and associated brickworks until its closure in 1930.<sup>4</sup>

Prior to the establishment of the *Armadale Brickworks Quarry (fmr)* bricks in the Perth district were made of clay from pits located along the Swan River. It was discovered in the early 1900s that when shale was ground and mixed with plastic alluvial clay a good quality face brick was produced of greater strength and more consistent colour than bricks previously manufactured. Bricks produced using the shale from *Armadale Brickworks Quarry (fmr)* were valued by builders and resulted in other shale quarries being established. The Cardup and Byford brickworks were established on the southern extension of the massive shale deposit used by *Armadale Brickworks Quarry (fmr)*.<sup>5</sup> Introducing this new raw material also placed less demand on the clay supplies in Perth.

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1 Note: this Conservation Plan is written specifically in relation to the Armadale Brickworks Factory site. It includes an account of the parallel development of the quarry, but does not make this its focus.

2 Battye, J. S. (ed), *The Cyclopaedia of Western Australia*, vol. 1., 1912, Facsimile Edition, Hesperian Press, 1985, p.655.

3 Jacqui Sherriff and Philip Griffiths, Heritage Assessment for *Lexbourne House*, January 2004, p.6-7.

4 Palassis Architects, 'Old Armadale Brickworks Factory Site, Dale Cottages Retirement Village Armadale, Western Australia: Conservation Plan', prepared for The Armadale Brickworks Preservation Group in association with Dale Cottages Inc., June 2000,

5 Moore, Bryce *From the Ground Up Bristile Whittakers and Metro Brick in Western Australian History* UWA Press, 1987, pp 40-43.

In the mid-1970s, the quarry was purchased from Metro Brick Company by building designer Eddie Munsel, of Thornlie, who intended to redevelop the site as housing. However, the place was subsequently assessed as being of geological and educational importance, and zoned as special-use geological. The Geological Society of Australia was reported as mentioning the quarry as 'one of the most important geological monuments in the country'.<sup>6</sup> A 1979 report of the Geological Society of Australia WA Division recommended that Armadale Shale Quarry be nominated as a Geological Monument.<sup>7</sup>

The quarry was the first geological site in Australia to be zoned as a 'Reserve for Organised Geological Study and Tuition' by a local government authority.<sup>8</sup> The quarry has been used as a teaching site for geology students since at least 1939. A proposed change of use to the quarry in 1982 was protested by The University of Western Australia, Western Australian Institute of Technology (WAIT, now Curtin University of Technology), the board of Secondary Education, and Armadale Senior High School. The quarry walls provide examples of apparent and true dipping of sedimentary rocks and are considered the best example of ancient rock readily accessible in proximity to Perth's tertiary institutions. It contains exposures of the Archaean granitic complex that makes up the Darling Range, and displays good evidence of the complex geological process of migmatisation. The slate and shale in evidence in the quarry are somewhat peculiar in geological studies, and it is possible that primitive fossils remain in the sediments. Stromatolites at the site have been damaged over time and are not easily discernible. The place has also been used in the training of high school teachers in geology, geography and geomorphology, and has been a destination for student excursions.<sup>9</sup>

There was some local controversy regarding the place in the late 1980s, when owner Eddie Munsel proposed developing the quarry into a bird park, including a museum and restaurant complex. Despite initial approval of the development by the City of Armadale, public opposition to the project eventually saw it scrapped. While there was some public interest in the place as an important historical and geological site, it was also described as an eyesore, a danger to local children, and a scar on the natural landscape. Most opposition to the development appears to have related to the potential for it to significantly increase traffic in nearby residential areas.<sup>10</sup>

In 1995, the Federal Government funded a project to protect the heritage value of the quarry through a provision of pathways, secure fencing and shelter. From the following year, a community group, 'Friends of the Armadale Shale Quarry', took on maintenance of the quarry, with some funding from Alcoa to manage vegetation in the quarry. School art classes have visited the place, The State Emergency Services have used it to conduct training exercises for volunteers, and at least one contemporary Aboriginal dancer, Prassic, has used ochre collected at the quarry in stage make-up.<sup>11</sup>

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6 Unsourced, undated newspaper article in HCWA file P15743.

7 T.C. Lemmon et.al., *Important Geological Sites in the Perth and Southwestern Areas of Western Australia*, Geological Society of Australia WA Division, Perth, 1979, p.128. on HCWA file PD15743.

8 T.C. Lemmon, p.128. It is not known when this zoning was made.

9 Ibid.; Kim Fletcher, letter to the Heritage Council, 16 June 2003, on HCWA place file P15743, citing conversations with Dr Joseph John Glover, former head of Geology and Geophysics at University of Western Australia, and Timothy Ewart Kocher, Lecturer in Mining & Geology, Leederville TAFE; documents supplied to HCWA by Dr Simon Wilde, School of Geology, Curtin University of Technology, in July 2003, on HCWA file P15743.

10 Five unsourced newspaper articles in HCWA file P15743, the first of which is dated 26 April 1988.

11 *Swan Newsletter*, May 2001, p.2.

In 2003, the place was a managed landscape used for educational and recreational purposes.

In February 2004, all remnants of the associated brickworks factory, at the Dale Cottage Retirement Village, were removed. The headframe tower structure and other elements removed from the factory site have been stored and may be used for interpretation at a later date.

### 13.2 PHYSICAL EVIDENCE

For an overview of the geological significance of the place, refer to T.C. Lemmon, 'Important Geological Sites in the Perth and Southwestern Area of Western Australia', Geological Society of Australia WA Division, Perth, 1979, pp.128-131.

*Armadale Brickworks Quarry (fmr)* is located on Marsh Road, near the corner with Harrison Road in a residential area. The quarry is an elongated lozenge shape which runs in a north south direction. The east west dimensions being the shortest.

A high chain mesh fence runs around the whole of the quarry, with a secondary lower chain mesh fence running around the southern sections of the quarry. Modern concrete block pavers have been used to create a path down into the quarry. The path peters out at the bottom of the quarry. Two small pools of water have developed near the centre of the quarry and at the southern end. The central pool is comparatively shallow and various aquatic plants have become naturalised around its edge. The southern margin of the southern pool is edged by the steep face of the quarry. A fence has been placed across the northern end of this pool.

The floor of the quarry is gradually becoming covered with various types of vegetation. At this stage it is largely seasonal grasses with some species of wattle (*acacia longifolia* and *acacia podalyriifolia*), invasive weed species such as pampas grass (*cortaderia selloana*), bamboo (*arundo donax*) and a few fruiting figs (*ficus sp.*). Along the upper margins, between the gravel soils and the rock, eucalypts (probably *eucalyptus calophylla*<sup>12</sup>) are starting to return.

Evidence of quarrying activity is restricted to the large hole in the ground, the remains of the tram track to the northern eastern face of the quarry and the entry point into the quarry (which is the current day access route). No evidence remains in the area above the quarry of the headframe which once supported the trolley system.

The chain fence and the pathways do appear to be maintained at present and there is a general air of dilapidation about the site. The path across the floor of the quarry has become overgrown with grasses, while access to the southern face is difficult due to overgrown plants.

The Armadale Shale and the other rocks exposed in the quarry all belong to the Cardup Group of rocks. This group is a sequence of rocks that is divided into shale, sandstone and siltstone with dolerite intrusives (Low,1972). The sedimentary rocks of the quarry have not been accurately dated as yet, but it has been inferred that they must be younger than the dolerite sill which has intruded through the sequence, and radiometric testing of dolerite intrusions in the region have been used to estimate the age of the sequence to between 1800 and 300 million years old. However, the age range suggested for the Cardup Group

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<sup>12</sup> It was not possible to get close to these eucalypts while inspecting the site, and therefore a definite identification could not be made.

through other regional correlation has been narrowed to between 1500 and 700 million years old.<sup>13</sup>

Slate is exposed along the north eastern edge of the quarry and is an example of low grade metamorphism indicating that the rocks have been subjected to low levels of pressure and or temperature during the burial and or deformation process. This slate can be seen as the broad band of grey coloured rock. Deformation features can be seen at sites five and six on the site plan). Site five shows well developed cleavage planes that are perpendicular to the bedding plane. Small faults and folds can be closely examined at site 6 and are shown in the detailed view of the north face (photo 2). The faults can be seen to be controlling the displacement of the layers in photo 2.

The fine grained shale and siltstone with pale cream layers and the medium grey to dark grey layers can be investigated at the southern end of the quarry (see photo 4). The layered bedding of the sedimentary siltstone can be seen at the southern edge of the quarry at site four (photo 5). A fault at site three can be seen to displace the siltstone at the south eastern edge of the quarry. The detailed photograph of the southern face of the quarry shows fold structures controlled by the minor faults in the shale.

The relationship between the dolerite sill which is sub parallel to the bedding of the siltstone can be investigated on the eastern side of the quarry, and is seen as the smooth looking rock face on the southern view of the quarry in photo 4. Though not obvious from the photo the dolerite sill can be noted to be younger than the sedimentary and metamorphic rocks below it as the sill cuts through the layering of these rocks. This is an important relationship and the dolerite sill is described as cross cutting the sedimentary rocks.

The regolith or weathered profile is exposed at the top of the quarry. The depth and degree of weathering around the quarry differs in relationship to rock type and faulting. The depth of weathering is greatest in the faulted areas with the faults acting as conduits for the movement of water. The siltstone at the south of the quarry has weathered more deeply than the shale as it is less consolidated. The hard basalt has the smallest depth of weathering.

### 13.3 COMPARATIVE INFORMATION

For a discussion of the Comparative Information refer to Palassis Architects, 'Old Armadale Brickworks Factory Site, Dale Cottages Retirement Village Armadale, Western Australia: Conservation Plan', prepared for The Armadale Brickworks Preservation Group in association with Dale Cottages Inc., June 2000.

*Armadale Brickworks Quarry (fmr)* is a valuable geological site as it has a variety of features of interest for study that are uncommon in quarries of the Perth Area. These sedimentary, metamorphic features and deformation features are clearly visible at the site making it a useful site for geological studies. Hence the preservation of this site is important for geological teaching purposes. The quarry is also important, as it is one of the few localities where Armadale Shale rock unit is exposed at the surface and can be studied.<sup>14</sup>

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<sup>13</sup> Moss, S.J., Freeman, M.J., George, A.D., Marshall, A., Dunphy, J.M., *The Prider Field Trip – the rock cycle and geology of the Perth metropolitan area. A Professional Development Day for High School Geology and Science Teachers*, Geological Society of Australia (WA Division), Excursion Guidebook No. 10, 1998, p.p 23 – 24.

<sup>14</sup> T.C. Lemmon op. cit. p.128.; Kim Fletcher, op. cit. citing conversations with Dr Joseph John Glover and Timothy Ewart Koclher; documents supplied to HCWA by Dr Simon Wilde, School of Geology, Curtin University of Technology, in July 2003; all on HCWA file P15743.

There are 31 quarries or former quarry sites listed in the HCWA database, of which 15 are in the metropolitan area. Of these 31 places, only *Government Quarries* (fmr), Boya is registered.

Government Quarries (fmr) (1901) is a granite and diorite quarry comprising six quarry faces, the remains of two concrete crushing plants and associated concrete engine beds, the remains of a concrete and stone compressor building together with associated concrete engine beds, a short stretch of railway track and the formation for the main spur line which served the quarries. Stone from the quarry was used in the construction of the north mole at Fremantle harbour. The place was the only quarry established under the Government Trading Concerns Acts of 1912, a state government initiative to improve Western Australia's manufacturing industry and economy prior to and after World War I. It is rare as it has retained the physical remains of two separate stone crushing buildings (a pre 1912 crusher and the later 1912 crusher) and the remains of the compressor building, which was constructed in several phases. It is associated with the development of the quarrying industry, in the Shire of Mundaring, which was first established in the 1870s.<sup>15</sup>

P10570 Stratham's Quarry, Gooseberry Hill, (c.1894) has been recommended for registration. It is a granite and diorite quarry, comprising a quarry face, the remains of a concrete and brick crushing plant, concrete floors and tanks, the archaeological remains of the primary crushing plant, a concrete magazine and evidence of the spur line formation which served the quarry. It is a rare example of a stone quarry which has retained physical evidence of the stone crushing plant and the powder magazine. Stone from the quarry was used to pave the streets of Perth during the first quarter of the twentieth century.<sup>16</sup>

P16618 Mahogany Creek Quarry, Mahogany Creek, (1904) was considered for the Register and deemed below threshold in June 2004. It comprises two granite quarries. Large blocks of stone, which have been partially cut from the western most quarry face, indicate that the quarry is still being used. All physical evidence on this site relates to current activities rather than any that date from the early to mid twentieth century.<sup>17</sup>

P9191 Clifton Quarry, Parkerville, a former quarry site mined for blue-metal by the Perth City Council from 1898 to 1925, retains the former quarry face (approximately 20 to 25 feet high and 65 feet wide), the floor of the quarry, evidence of old workings, tailings dumps, the footings for the steam engine and the old railway formation which was a spur line from the former Eastern Railway. It was assessed by the Heritage Council in November 2001 as being Below Threshold.

#### 13.4 REFERENCES

Palassis Architects, 'Old Armadale Brickworks Factory Site, Dale Cottages Retirement Village Armadale, Western Australia: Conservation Plan', prepared for The Armadale Brickworks Preservation Group in association with Dale Cottages Inc., June 2000.

#### 13.5 FURTHER RESEARCH

For a discussion of subjects of future research refer to Palassis Architects, 'Old Armadale Brickworks Factory Site, Dale Cottages Retirement Village Armadale,

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<sup>15</sup> Register Documentation for *Government Quarries* (fmr), 23/9/05

<sup>16</sup> HCWA Assessment documentation, August 2005

<sup>17</sup> HCWA database search, 2 November 2005.

Western Australia: Conservation Plan', prepared for The Armadale Brickworks Preservation Group in association with Dale Cottages Inc., June 2000.

For a detailed discussion of the geological make-up of the Quarry, refer to 'The contact between the granitic rocks and the Cardup Series at Armadale', in *Journal of the Royal Society of Western Australian* 1941, v.27. pp.27-55.