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.

**PRINCIPAL AUSTRALIAN HISTORIC THEME(S)**

- 3.6 Establishing lines and networks of communication
- 5.1 Working in harsh conditions

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

- 112 Technology and technological change
- 201 River and sea transport
- 304 Timber industry

## 11. 1 AESTHETIC VALUE*

*Cape Leeuwin Waterwheel* is a popular tourist spot that is visited regularly by tourists from all over the world and Australia, and also by members of the local community. (Criterion 1.1)

The top of Cape Leeuwin lighthouse is just visible from the water wheel and the two introduce a strong industrial component to an area largely dominated by the natural environment. (Criterion 1.3)

*Cape Leeuwin Waterwheel* lies just above the high tide line in a rocky bay. The gradual calcification of the wheel and its stone supports create an unusual component in the natural environment as if nature is creating its own monument. (Criterion 1.3)

## 11. 2. HISTORIC VALUE

*Cape Leeuwin Waterwheel* provided a reliable water supply for lighthouse keepers at this isolated location. (Criterion 2.1)

*Cape Leeuwin Waterwheel* was an important component of the Cape Leeuwin Lighthouse precinct that played a significant role in coastal navigation which, in turn, assisted the survival of the timber industry in the region. (Criterion 2.2)

*Cape Leeuwin Waterwheel* is closely associated with M.C. Davies who was one of the early timber mill owners involved in the development of the timber

* 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.

industry, in the Augusta region, during the latter part of the nineteenth century. (Criterion 2.3)

*Cape Leeuwin Waterwheel* represents an innovative solution to the technical problem of transporting water efficiently from a distant site. (Criterion 2.4)

### 11. 3. SCIENTIFIC VALUE

The use of a water wheel to provide power to transport water from a natural spring to a site some distance away, displays an ingenious use of engineering principles. While the technology itself could not be considered complex, its application must be considered innovative. (Criterion 3.3)

### 11. 4. SOCIAL VALUE

The preservation of *Cape Leeuwin Waterwheel* is largely due to the ongoing efforts of various members of the local community. It was through their efforts that CALM was persuaded to reinstate a flow of water over the wheel to assist in its preservation. (Criterion 4.1)

*Cape Leeuwin Waterwheel* is highly valued as a tourist destination by both the local community and by tourists coming from intra and inter-state. The site is marked on the tourist maps of the area. (Criterion 4.2)

The local community has come to value *Cape Leeuwin Waterwheel* highly as it contributes to their sense of place and their community's role in the development of Western Australia. Members of the local community are regular visitors to the place. (Criterion 4.2)

## 12. DEGREE OF SIGNIFICANCE

### 12. 1. RARITY

Waterwheels were not commonly used in Western Australia to provide power to operate machinery. Historical sources cite some examples that were constructed but these examples are no longer extant. Many of these wheels appear to have been constructed during the 1850s to power simple flourmills. Robert Donald constructed a waterwheel on his Yallingup property in the 1920s, to power his sawmill and this wheel survives today. The waterwheel at Cape Leeuwin is thought to be the only waterwheel that was constructed to provide power to a pump, which then pumped fresh water to a location where it was required for human consumption. It is also highly likely that this is the only waterwheel that survives in a calcified state. (Criteria 5.1 & 5.2)

### 12. 2 REPRESENTATIVENESS

*Cape Leeuwin Waterwheel* is an excellent example of an overshot wheel. (Criterion 6.2)

### 12. 3 CONDITION

*Cape Leeuwin Waterwheel* is gradually undergoing a process of calcification due to water flowing over the wheel. This calcification has protected the timbers of the waterwheel, while at the same time preventing the actual turning of the wheel. The wheel itself and the limestone piers which support it are in poor to sound condition. The flume, which is a recent reconstruction, is in good condition.

## 12. 4 INTEGRITY

*Cape Leeuwin Waterwheel* was intended to supply water from a fresh water spring to the lighthouse keeper's quarters. Although water is no longer supplied to the quarters via the waterwheel, the operating apparatus is still intact and if the limestone deposits were removed it is possible that the wheel could be restored to working order. The wheel and the flume have high integrity.

## 12. 5 AUTHENTICITY

The waterwheel appears to have retained all of its original material and the limestone piers which support both the wheel and the flume are also considered to be original. However, the flume appears to represent a reconstruction which may date from 1998 when CALM assisted in re-establishing water flowing over the wheel. The main components of the waterwheel have high authenticity, while the actual flume has low authenticity.

## 13. SUPPORTING EVIDENCE

The documentary evidence and physical evidence has been compiled by Fiona Bush.

## 13. 1 DOCUMENTARY EVIDENCE

*Cape Leeuwin Waterwheel* comprises the waterwheel, situated near the high tide mark of Quarry Bay, and the timber flume that carries water from a nearby spring. Both the waterwheel and the flume were constructed in 1895 by Davies and Wishart the contractors for Cape Leeuwin Lighthouse and Quarters.

Augusta was first occupied by Europeans in May 1830 by settlers who arrived aboard the *Emily Taylor.*[1] By 1834, the majority of these settlers had moved north to Busselton where farming conditions were considered to be less harsh.[2] A second wave of settlers arrived in the Augusta region in the 1860s.[3]

The presence of tall stands of timber tempted some of the early settlers into trying to establish a timber industry however, Augusta's isolated location made this resource difficult to exploit.[4] It was not until Maurice Coleman Davies settled in Augusta in the 1880s, that the timber industry became a major employer in the district. M.C. Davies established a number of mills in the area and constructed a tramway between his mills. Jetties were established at Hamelin Bay (used in summer) and Flinders Bay (used in winter).[5] A number of small townships grew up around the timber mills including Karridale, Boranup, Hamelin and Jarrahdene.[6]

Maurice Davies grew up in the Victorian goldfields and became a building supplier and contractor. He moved to Adelaide where he went into

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1 Shire of Augusta-Margaret River Municipal Inventory of Heritage Places, compiled January 1995 – May 1996, p. 14.

2 Jennings, R., *Busselton:"...outstation on the Vasse"*, Shire of Busselton, Busselton, 1983.

3 Augusta-Margaret River Municipal Inventory, pp. 18 – 19.

4 Augusta-Margaret River Municipal Inventory, pp. 21.

5 Augusta-Margaret River Municipal Inventory, pp. 21.

6 Augusta-Margaret River Municipal Inventory, pp. 24.

partnership with John Wishart. In 1875, Davies moved to Western Australia where he established a large timber milling business.[7]

Following the European settlement of Australia in 1788, lighthouses had gradually been erected at strategic locations around the coast. The majority of these lights were erected in the eastern colonies, generally at the expense of the colony in which the light was located.[8] In 1873, at an inter-colonial conference, various colonial representatives met to discuss coastal lights and colonial responsibility. At this meeting it was agreed that the erection of any new lights was to be borne by the colony in which the light was located except in those locations where the lights benefited the shipping of another colony. At this conference it was noted that there was a need for two new lighthouses along the Western Australian coast, one on Cape Naturaliste and the other on Cape Hamelin.[9] It was agreed that as lights in these two locations would benefit shipping heading towards the eastern colonies, the cost of erecting lights in these locations should be borne by all the colonies and not just Western Australia.[10]

M.C. Davies also saw a need for a light near the south-west cape as his timber mills exported large quantities of timber from ports in this area. He began urging the construction of a light in 1881.[11] However, when Sir John Forrest sought monetary support from the eastern colonies, he found them unwilling to assist.[12] It was not until 1893 that the Western Australian Government was able to afford the cost of erecting a light with Cape Leeuwin being chosen as the most suitable site.[13]

Cape Leeuwin was a remote location in the 1890s and the only reliable water source was a fresh water spring located some miles to the north of the lighthouse site. One component of the contract stipulated the construction of a waterwheel which would provide water to the site.[14]

Maurice Davies and his partner John Wishart won the tender to erect a lighthouse, quarters and a waterwheel to supply water to the site, for the sum of £7,782.11s.6p. The contract period was to run from 2 April 1895 to 1 February 1896.[15] The cost of erecting the wheel was to be borne by the contractors. There appears to have been some dispute over this matter as a letter from the Inspector of Works, J.J. Harwood to Davies and Wishart notes that, 'You offered to provide this water supply – in letter dated 27/4/1895 – for £340.0.0. in lieu of various items in the schedule, amounting to £258.2.6. and this offer was accepted by letter dated 8/5/1895.'[16]

The waterwheel was completed by the time the lighthouse was officially dedicated on 10 December 1896 and after the opening of the lighthouse, the

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7 R. Watson, 'Cape Leeuwin Lighthouse.' Transcript read at meeting of Augusta Historical Society 18/5/1978, p. 61.

8 G. Reid, *From Dusk Till Dawn: a history of Australian lighthouses*, MacMillian, Sydney, 1988.

9 G. Reid, p.116.

10 G. Reid, p.116

11 R. Watson, p. 4.

12 R. Watson, p. 7.

13 R. Watson, p. 14.

14 The details of the contract are not actually known. It is possible that the concept of the water wheel came from the contractors themselves.

15 Research Note number 619, Battye Library. Cape Leeuwin Lighthouse and Waterwheel.

16 R. Watson, p. 23.

official party visited the waterwheel for an inspection of the apparatus.[17] Water was drawn from a freshwater spring lying to the east, located slightly above sea level and carried via a wooden flume to the waterwheel. The wheel supplied power to a hydraulic ram which then pumped water up to the lighthouse keepers quarters.[18] A line drawing held in the files by the Heritage Council shows how the wheel operated.[19] However, it should be noted that the 'pump' shown in the diagram actually represents a positive displacement water pump, rather than a hydraulic ram.[20]

An historic photograph supplied by Cyril Ayris shows a pipe leading off the southern side of the flume, which then runs to the hydraulic ram. An additional pipe runs out from the ram, presumably the pipe that carried water to the quarters.[21]

In the mid 1920s, an oil engine was used to assist in pumping water up to the lighthouse quarters and in later years the wheel was completely bypassed by a pump that led directly to the hydraulic ram. In 1978, the lighthouse and quarters were connected to the Augusta town water supply, which also took its water from the same spring.

The Department of Conservation and Land management (CALM) began rudimentary maintenance operations in the late eighties in a bid to halt the deterioration of the waterwheel due to the decline in the amount of water available from Leeuwin Spring. The use of the spring water for the town water supply and the increasing draw down on the water resource led to the drying out of the timber flume and the waterwheel.[22] This caused some of the lime deposit to flake off, exposing the timber to weathering.[23] The local business association and CALM staff replaced the timber sections of the flume and extended its length in an attempt to obtain additional water flow over the wheel.[24]

Following this, CALM installed a pipeline from a toilet block to the east of the site and erected a trickle irrigation sprinkler system, which was designed to prevent the flume timbers from splitting. This proved ineffective due to the insufficient volume of water available through the water supply system from the toilet block. In 1999, the Water Corporation and CALM staff erected a separate pipeline directly from Leeuwin Spring to the flume in a bid to ensure the flume and waterwheel were kept moist at all times.[25]

Cape Leeuwin Lighthouse was automated in 1982 and the keepers were withdrawn.[26] *Cape Leeuwin Waterwheel* has become a popular tourist spot that is visited regularly by national and international tourists and also members of the local community.[27]

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17 R. Watson, p. 23.

18 R. Watson, p. 23.

19 Heritage Council Files No. 0106. The source of these diagrams is not known.

20 Information related to Fiona Bush by Charles Sapsford and Mark Bush, engineers, 27/9/00.

21 Cyril Ayris, Leeuwin Lighthouse: a brief history, Cyril Ayris Freelance, Perth, 1996.

22 Letter from CALM to HCWA dated 11 December 2000.

23 Information held in Heritage Council files, no. 0106, submission to HCWA.

24 Letter from CALM to HCWA dated 11 December 2000.

25 Letter from CALM to HCWA dated 11 December 2000.

26 Tourist information pamphlet

27 Heritage Council files, no. 0106.

## 13. 2 PHYSICAL EVIDENCE

The water wheel sits just above the high tide line in a small cove approximately one kilometre to the north of the Cape Leeuwin Lighthouse Quarters. This area lies within the Leeuwin–Naturaliste National Park. The lighthouse can just be seen when looking south from the water wheel. The timber flume, which carried the water to the wheel, extends out eastward from the wheel and disappears in the low brush which is found throughout this area.

The flume consists of three timber planks that have been screwed together to form a base and two sides. Cross-ties have been screwed to the top of the flume at regular intervals. The wheel assembly is located just above the high water mark. The flume rests on the ground, except close to the wheel where it is supported on limestone piers, as the land falls down towards sea level.

At the base of the water wheel, on the southern side, there is evidence of the remains of the hydraulic ram. The air chamber is still in situ. Beyond the waterwheel, to the south, a small portion of concrete remains on the shoreline, displaying a long impression which was probably made by a pipe. This evidence indicates the line that the water pipe took from the waterwheel to the lighthouse keeper's quarters.

The waterwheel's shaft rests between two limestone walls. Both the wheel and the walls have become heavily encrusted with lime which has been deposited over the years by the water which flows over the wheel. This accumulation has led to the wheel gradually becoming inoperable. Seepage along the wooden flume has also encrusted the limestone piers.

The limestone coating affords the timber wheel some protection. It is considered to be in a stable condition at present. The flume appears to be a recent reconstruction, possibly dating from 1998 when CALM carried out work to allow water to flow over the wheel again. The timber flume extends some 60 metres into the scrub at which point it is replaced by a fibreglass trough. It is not known how far this trough extends into the scrub.

## 13. 3 COMPARATIVE INFORMATION

In Western Australia's history there has been limited use of the water wheel due to the comparatively arid nature of the country. At this stage there has been limited research on water wheel technology in Western Australia. It is unclear whether those mills that were constructed were found to be ineffectual after a period of time, or whether they ceased to be used due to the presence of a more reliable source of power, steam. What does appear to be clear is that waterwheel technology was generally restricted to the South West region of Western Australia and was generally used to power flourmills.

One of the earliest water wheels was built by Henry Reveley on his St. George's Terrace property in Perth. The wheel powered a flourmill although the water supply proved to be insufficient and Reveley was forced to abandon his milling.[28] William Cruse constructed a waterwheel on George Leake's property at Ellen's Brook in 1837. This wheel was also used

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28 J.S.H. Le Page, *Building a State: the story of the public works department of Western Australia 1829 – 1985*, Leederville, 1986, p. 28. A water colour of Reveley's mill appears in this book facing page 188. The date of the mill is shown as 1833.

to power a flourmill.[29] Cruse's mill burnt down in the 1890s but has since been reconstructed.[30]

Further to the north of Perth, a waterwheel was constructed in 1852 to power a flourmill at Cowalla on the Moore River.[31] Waterwheels were also constructed by early settlers in the Serpentine region to power flourmills. Two examples were built for John Giblett on his Serpentine blocks during the 1850s. One was located on the Gooralong Brook and the other on the Carralong Brook.[32]

Once steam power became readily available in the colony (sometime after the 1860s), the use of water as a power source appears to have declined. An exception to this was the construction of a waterwheel near Yallingup in the 1920s. The waterwheel at Millbrook, on Millbrook Road, was constructed by Robert Donald to provide power for his saw mill.[33]

## 13. 4 KEY REFERENCES

No key references.

## 13. 5 FURTHER RESEARCH

The actual use of the term 'hydraulic ram' needs to be investigated to determine whether Rose Watson used this term herself or whether it was used by the journalist who described the visit made to the wheel by the official party. Unfortunately the reference given by Rose Watson (to a description in the West Australian) appears to be incorrect and a search will need to be made to find the correct description.

The original contract documents need to be searched to determine whether the water wheel formed part of the original contract or whether it was an innovative idea of Davies and Wishart. The question certainly needs to be asked, why weren't the quarters supplied with galvanised iron storage tanks which would then collect rainwater?

The extent of the work carried out by CALM in 1998 needs to be investigated and the documentation of the work placed in the HCWA files.

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29 M.J. Bourke, *On the Swan: a history of the Swan District, Western Australia*, Middle Swan, 1987, 108.

30 M.J. Bourke, p. 112 and conversation between F. Bush and I. Elliot on 09/10/00.

31 W.J. de Burgh, *Neeergabby*, Gingin, 1976, p.18.

32 Neil Coy, *The Serpentine: a history of the Shire of Serpentine-Jarrahdale*, Mundijong, 1984, pp. 70 - 71.

33 Heritage Council Assessment, number 0429.