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)

- 3.5 Developing primary production
- 3.8 Moving goods and people
- 3.8.4 Making economic use of inland waterways
- 3.11.5 Establishing water supplies
- 3.14.1 Using Australian materials in construction
- 8.10.5 Advancing knowledge in science and technology

HERITAGE COUNCIL OF WESTERN AUSTRALIA THEME(S)

- 112 Technology and technological change
- 201 River and sea transport
- 203 Road transport
- 302 Rural industry & market gardening
- 304 Timber industry
- 404 Community services & utilities
- 405 Sport, recreation and entertainment

11.1 AESTHETIC VALUE*

Lower Kalgan River Bridge (1958) is a utilitarian structure that exhibits the characteristics and construction techniques of substantial timber road bridges built between c.1900 and the 1950s that has been changed by the addition of a concrete road deck. (Criterion 1.1)

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* For consistency, all references to architectural style are taken from Apperly, R., Irving, R., Reynolds, P. *A Pictorial Guide to Identifying Australian Architecture. Styles and Terms from 1788 to the Present,* Angus and 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Canberra, 1991, with additional reference to Richards, O. *Theoretical Framework for Designed Landscapes in WA*, unpublished report, 1997.

Lower Kalgan River Jetty is a utilitarian structure that exhibits the characteristics and construction techniques of timber jetties and small road and rail bridges built between c.1900 and the 1950s. (Criterion 1.1)

Lower Kalgan Bridge and Jetty Group contributes to the aesthetic values of the landscape as a significant man-made landmark in a rural estuarine setting. (Criterion 1.3)

11.2 HISTORIC VALUE

The construction of the Old Lower Kalgan River Bridge in 1905 and the Lower Kalgan River Jetty in 1912 were undertaken specifically to facilitate the agricultural development of the Lower Kalgan district in the Albany hinterland. (Criteria 2.1 & 2.2)

The Lower Kalgan River Bridge (1958) was constructed to service increased transport loads as population increased, and to maintain access between the Albany townsite and hinterland on the west side of the Kalgan River and the agricultural district and town water supply catchment and pumping station on the east side. (Criterion 2.2)

The Lower Kalgan River bridges have carried the Albany town water supply pipeline across the Kalgan River since 1914, while the Lower Kalgan River Jetty provided an offloading place for the pipes during construction of the scheme. (Criterion 2.2)

The Old Lower Kalgan River Bridge Navigation Trusses were built to a design by Public Works Department Chief Engineer, C. Y. O'Connor. (Criterion 2.3)

The Lower Kalgan River Bridge (1958) demonstrates the continued use of timber in bridge building in Western Australia, where its cost was relatively low and its qualities well understood. (Criterion 2.4)

11.3 SCIENTIFIC VALUE

Refurbishment of the Lower Kalgan River Bridge (1958) decking and structure in the 1980s, including concrete overlay and the introduction of concrete to the abutments, demonstrate innovative maintenance of timber bridges developed by the Main Roads Department. (Criterion 3.3)

11.4 SOCIAL VALUE

Lower Kalgan River Bridge & Jetty Group has strong social value for the Lower Kalgan and wider community for its historical associations with the settlement of the district in the 1890s and early 1900s, and for the transport and recreational use of the Kalgan River during and since that time, demonstrated by the preservation and display of the Navigation Trusses by the Lower Kalgan-Nanarup Progress Association and community efforts to save the Jetty. (Criterion 4.1)

Lower Kalgan River Bridge & Jetty Group provides a strong sense of place for its historical associations and its landmark presence in a natural bush and estuarine setting. (Criterion 4.2)

12. DEGREE OF SIGNIFICANCE

12.1 RARITY

The Old Lower Kalgan River Bridge Navigation Trusses (1905) are the only remaining of their type in Western Australia. (Criterion 5.1)

The Lower Kalgan River Bridge (1958) is the longest timber road bridge in the State outside the metropolitan area. (Criterion 5.1)

The Lower Kalgan River Bridge (1958) is an uncommon example outside the metropolitan area of a road bridge with a navigation span for small craft. (Criterion 5.1)

Lower Kalgan River Bridge & Jetty Group is rare as a group of timber structures associated with transport, exhibiting the navigation trusses of an earlier (1905) bridge, a 1958 replacement bridge which shows similar features in its navigation trusses and the ruin of a 1912 timber jetty built for the transport of farm produce. (Criterion 5.2)

12.2 REPRESENTATIVENESS

The Lower Kalgan River Bridge (1958) is fine representative example of a large timber road bridge with a navigation span for small craft. (Criterion 6.1)

The bridge demonstrates the techniques of bridge maintenance that were developed by the Main Roads Department from the 1980s. (Criterion 6.1)

Lower Kalgan River Bridge and Jetty Group contains a road bridge, jetty and offsite navigation trusses, which are utilitarian structures that exhibit the characteristics and construction techniques of substantial timber transport infrastructure built between c.1900 and the 1950s. (Criterion 6.2)

12.3 CONDITION

Generally the structure of the Lower Kalgan River Bridge (1958) is in good condition and has benefited from a programme of regular maintenance. Areas where timbers are alternately wet and dry show greater signs of deterioration than timbers that have been continuously either wet or dry. Some timbers have been encased in concrete, probably because they were structurally unsound.

The Lower Kalgan River Jetty is in poor condition. Piers 14 and 15 have disappeared and piers 9 to 13 are distorted and in danger of collapse. The loss of decking timbers between piers 1 to 5 is also weakening the integrity of the structure.

The Old Lower Kalgan River Bridge Navigation Trusses were in poor condition prior to their removal in 2006 for conservation. As the trusses were unavailable for inspection at the time of assessment, their current condition is unknown. The trusses will be returned to the site in the future.

12.4 INTEGRITY

The Lower Kalgan River Bridge (1958) has a high level of integrity as it continues to fulfil its original intended function as a traffic bridge on an important local road serving the outlying districts of Albany.

The Lower Kalgan River Jetty has low to moderate integrity, not operating since it was declared structurally unsafe in the 1980s. The integrity of the Jetty could be restored to a high level if it were conserved and made safe for public use.

The Old Lower Kalgan River Bridge Navigation Trusses have low integrity, as they are not used for their original purpose. The Trusses will not be returned to their original location or used for their original purpose but will be returned to the site as objects for display.

12.5 AUTHENTICITY

The Lower Kalgan River Bridge (1958) has a high to moderate level of authenticity. A new wider two-lane concrete deck has been constructed in the 1980s on top of the original two-lane timber deck and the timber handrails have been replaced with steel handrails with ARMCO guards. Some original structural timbers such as the outer stringers and corbels under the deck have been replaced with steel, as have the stringers to the wide navigable span.

The Lower Kalgan River Jetty has a high to moderate level of authenticity because some original fabric is missing. The remaining fabric has a high level of authenticity with only minor alterations such as the addition of buttressing posts to the outer faces of the piles.

13. SUPPORTING EVIDENCE

The documentation for this place is based on the heritage assessment completed by Irene Sauman, Historian and Gena Binet and Alan Kelsall, Kelsall Binet Architects, in July 2006, with amendments and/or additions by HCWA staff and the Register Committee.

13.1 DOCUMENTARY EVIDENCE

Lower Kalgan River Bridge and Jetty Group consists of the Old Lower Kalgan River Bridge Navigation Trusses (1905), which are the remnants of a demolished bridge; the Lower Kalgan River Jetty (1912), the ruins of a 'T' shaped timber finger Jetty; and, the two-lane timber Lower Kalgan River Bridge (1958).

River transport provided the main method of access for people, goods and stock along the King and Kalgan Rivers. Both Rivers fed into the northern (top) end of Oyster Harbour about three miles apart. Land in the Lower Kalgan River area, which was known as Candyup for the first hundred years of European settlement, was taken up in the 1830s, but only a few early landowners developed their holdings. In the 1880s, more farm blocks were surveyed but while bridges had been built on the Upper Kalgan and Upper King rivers in 1854, and on the Lower King River in 1896, there was no crossing on the Lower Kalgan River.[1]

A few people took up land on the east side of the River in the 1890s, in an area known as Nanarup. John Affleck established a ferry to access his own property and this service was used by the other few settlers. In September 1898, a report of a visit to the Kalgan River district was published in the *Albany Advertiser*.

> It is proposed to build a bridge on the Lower Kalgan and connect with the Lower King Bridge by means of a road. This Lower Kalgan Bridge is needed for until it is built the good land on the eastern side of the water will be practically locked up. The only settlers on that side of the river at present are Mr Affleck, Mr N. W. McKail, Mr Leishman, Mr Stewart and a Chinaman who rents the old farm at Candyup.[2]

It was claimed that there was some 200 square miles of farm land on the east side of the Kalgan River, with various areas suitable for gardening and fruit growing, potatoes and onions, and wheat, cattle and sheep.[3]

The Old Lower Kalgan River Bridge was built 1904-05, by Davis, Hankinson & Co, with C. R. Barry as the engineer and J. A. Brown acting as supervisor for the PWD.[4]

> Deck length 909 feet; 2 spans of 18 feet, 41 spans of 20 feet, 2 spans of 5 feet and 1 span (navigation opening) of 40 feet with 13 feet clearance at high water; width of deck 12 feet. Approaches 3 chains in length, metalled for a width of 15 feet, and fenced on both sides.[5]

The 1896 Lower King River Bridge did not have a navigation truss and its construction effectively blocked that river to all but the smallest of boats. The addition of a navigation truss in the Old Lower Kalgan River Bridge is considered

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1 Piggott, Richard, *Fishtraps and Floods, Apples and Spuds: a history of the Lower Kalgan District*, A. R. & B. H. Little, Albany, 2nd ed, 2004, p. 38.

2 *Albany Advertiser*, 8 September 1898, p. 3.

3 *Albany Advertiser*, 25 March 1905, p. 4.

4 *Albany Advertiser*, 25 March 1905, p. 4.

5 Public Works Department, *Annual Report*, 1904, p. 44.

to be a direct result of the problems caused by that omission.[6] The navigation truss in the Old Lower Kalgan River Bridge was built to a design by C. Y. O'Connor, PWD Chief Engineer.[7]

The Old Lower Kalgan River Bridge was located below the site of the Candyup ferry, near the river mouth. Construction required 149 piles in rows of three, and although the water was only six feet deep, the riverbed was soft, made up of many years of silt deposit. Piles had to be driven in up to 30 feet before reaching solid sand, and most of them had to be spliced. All the timber used was jarrah, which was cut on the banks of the Kalgan River. The extra work required in erecting the piles increased the cost of the construction to around £3,500. The bridge took seven months to build and was completed in late March 1905.[8]

During construction of the Old Lower Kalgan River Bridge, an inspection was made at the mouth of the River 'in regard to opening up the bar blocking the mouth of that fine stream, which carries free water to a depth of about six feet for several miles inland'.[9] Use of water transport was important because, even with the number of bridges, there was still a lack of good roads connecting them to Albany. When the Old Lower Kalgan River Bridge was completed it was described as 'virtually isolated', being five miles from the nearest main road.[10]

Another twenty land titles were issued for the east side of the River within the decade following the completion of the Old Lower Kalgan River Bridge. The farmers planted fruit orchards and grew vegetables for the Albany market, including potatoes. The Kalgan River was a popular venue for day-trippers, who made the journey up the river on pleasure boats. Powell's Strawberry Garden and Hopson's Tea Room operated at various times, providing afternoon tea with apple rolls and strawberries and cream for the tourists, shaded by bush shelters beside the river. The produce for the tea rooms was locally grown and the places were run by local families to supplement their farming income.[11]

In 1912, the Public Works Department constructed the 'Government Jetty' on the west bank of the Kalgan River, immediately downstream of the Old Lower Kalgan River Bridge. The Jetty was intended to be used by Lower Kalgan farmers in connection with the lightering service that was operating on the River, and which farmers at Upper Kalgan were using to transport their produce – mostly apples and pears – to the Albany Harbour for export.

The Lower Kalgan River Jetty was a finger jetty with a 'T' head. It had fourteen pair of piers along the 200 feet long, five feet wide neck and three pair supporting the head, which was 20 feet in length.[12] The construction was reported in the PWD *Annual Report* of 1912-13:

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6 Piggott, Richard, op cit, p. 51.

7 Margetts, Lloyd, 'Western Australia's Old Timber Bridges', *Western Roads*, October 1988, pp. 8-12. Lloyd Margetts was engineer of the Main Roads Bridge Section.

8 *Albany Advertiser*, 25 March 1905, p. 4.

9 Public Works Department, *Annual Report*, 1904, p. 25

10 *Albany Advertiser*, 25 March 1905, p. 4; Piggott, Richard, op cit, pp. 3-42.

11 Piggott, Richard, op cit, pp. 38-45.

12 Public Works Department file, 'Lower Kalgan River jetty requirements', SROWA, WAS 2357 CONS 1066, Item 1913/218; Public Works Department Plan 16372, Lower Kalgan River Proposed Landing, SROWA, WAS 82 CONS 5981 Item 0423. Plan show that the Jetty neck was to be fitted with steel rails and a trolley for moving goods but these were not fitted.

> At Kalgan River a boat jetty has been built at the head of the navigable water and has been placed under the control of the Albany Road Board. Beacons have also been erected in the river to mark shallows and obstructions.[13]

On 7 May 1913, responsibility for the Lower Kalgan River Jetty was transferred to the Albany District Road Board, which was required to maintain it. It was stated that 'the jetty is a small one and mainly used by settlers with respect to the shipping of local produce etc'.[14] Also at this time, the work of 'opening up' the River was being carried out to facilitate navigation and transport.[15]

When first built, the Jetty also featured in the construction of Albany's water supply scheme. A dam was constructed on the Angove River at Two Peoples Bay and the twenty-plus miles of wood stave and cast iron pipes that carried the water between the storage tanks was off-loaded at the Jetty and transported by horse power over the Old Lower Kalgan River Bridge to the construction site.[16] The pipeline that carried the water from the storage tanks to the town was supported across the River attached to the Old Bridge.[17]

The Jetty was also useful for the tourist trade, as the pleasure steamer *Silver Star* would tie up there and two motor launches would convey the passengers several miles further up the River. The steamer's funnel would not fit under the Old Bridge, despite its navigational span. Repairs to the Jetty were required in 1915, when the head was damaged. It was believed that *Silver Star* caused the damage, the Harbour Master believing it the only vessel using the Jetty at that time.[18] During the years of World War I there was little if any produce being shipped to the harbour for export. One of the lighters used in the River transport service had been damaged during a flood and was not replaced. After the War, roads were improved and there was an increasing use of motor vehicles, which soon ended the use of water transport.[19] The Jetty continued to be used by the *Silver Star* for many years until the vessel was fitted with a telescopic funnel, which allowed it to pass under the Old Bridge.[20]

The single lane construction of the Old Lower Kalgan River Bridge caused problems with traffic from an early time, exacerbated during the construction of the Albany water supply system, when there was a considerable increase in use. Because of the humped shape, it was not possible to see a vehicle crossing the Old Bridge from the opposite end until one of the vehicles reached the highest point in the centre, at which time one of them had to back off. The Albany Road Board requested that the two central bays of the Bridge be widened to allow vehicles to pass at that point. In April 1913, the Department made an inspection of the Bridge for the proposed widening, and although later photographs indicate that the work was carried out, it has not been ascertained when this was done.[21]

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13 Public Works Department, *Annual Report*, 1912-13, p. 10.

14 Public Works Department file, Item 1913/218, op cit.

15 Albany Road Board minutes, published in the *Albany Advertiser*, 3 April, 1913, p. 3.

16 Webb, Edith, 'A History of Two Peoples Bay', *Albany Advertiser*, 3 September 1963.

17 Piggott, Richard, op cit, p. 69.

18 Piggott, Richard, op cit, p. 69; Public Works Department file, Correspondence March 1915, 'Lower Kalgan River jetty requirements', SROWA, WAS 2357 CONS 1066, Item 1913/218.

19 Piggott, Richard, op cit, pp. 68-69.

20 Piggott, Richard, op cit, p. 69 & photograph showing the *Silver Star* at the Jetty in 1934, p. 67.

21 Albany Road Board minutes, published in the *Albany Advertiser*, 7 February 1912, & 3 April, 1913, p. 3; photograph of the Bridges, *Albany Advertiser*, 28 March 1958, p. 1.

In January 1939, a flood swept the Upper Kalgan River Bridge six miles downstream to come to rest against the Old Lower Kalgan River Bridge, which was not damaged to any extent.[22] On 2 October 1946 when Prince Henry,[23] Duke of Gloucester, and Governor General of Australia, visited the Albany region with the Duchess. At that time, Lower Kalgan residents gathered on the Old Bridge to welcome the Royal couple beneath an arch of greenery and an Australian flag.[24]

By the 1950s the Old Lower Kalgan River Bridge was deteriorating rapidly due to river bream eating barnacles off the piles, thereby pulling off small pieces of the piles until they got thinner and thinner.[25] In 1926, the Main Roads Board had been formed with the task of designing, building and maintaining roads and bridges across the state. The first head of the Main Roads' Bridge Section was Ernie Godfrey, previously an engineer with Victorian Railways. He was responsible for the introduction of concrete and steel bridges instead of the usual timber, which had been the standard bridge material in WA for the previous hundred years.[26] In the 1950s, timber bridges were still less expensive to build, however, and for a bridge not on a main road and with suitable timber readily available, it was still the chosen material. The Bridge on the Lower Kalgan River provided access to the farming area and the town water supply catchment and pumping station on the eastern side, but the main route of what is now the South Coast Highway from Albany through Ravensthorpe to Esperance and beyond, crossed the River at the Upper Kalgan River Bridge.

On 28 March 1958, the new Bridge was well under construction:

> Work is proceeding steadily on construction of the new two lane bridge at the Lower Kalgan. It will replace the 50-year old and decrepit single lane bridge which has been closed to all traffic for several months. Of an overall length of 580ft. the new bridge is being built on the downstream side of the old one. It will have 27 spans of 20ft each, built in timber and one 40ft span built of steel to allow the passage of river craft. The width will be 22ft clear and the bridge will be connected to each bank with earth filling about 100ft at the west end, 250ft at the east bank. The bridge is being built by the Main Roads at an estimated cost of 40,000 pounds and is expected to be ready by the end of December this year. It is understood the bridge will probably be the biggest in the state outside those in the metropolitan area.[27]

The Lower Kalgan River Bridge (1958) was specifically designed to carry the Albany water supply pipeline and had a walkway and landing constructed beneath it. Photos of the construction show that the deck was laid with timber, which would have then been overlaid with a pavement of bound gravel, as was standard practice. One difference in the construction of the Old Lower Kalgan River Bridge and the Lower Kalgan River Bridge (1958) was the shape of the

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22 Piggott, Richard, op cit, pp. 84-86, with photos.

23 Conversation between HCWA staff and Tom Saggers, Historian on 4/01/07.

24 Piggott, Richard, op cit, photograph; *The Australian Encyclopaedia*, Sydney, Grolier Society, 4th ed 1983, Vol. 12, p. 9.

25 Conversation between HCWA staff and Tom Saggers, Historian, 11/12/06.

26 Leigh Edmonds, *The Vital Link: A History of Main Roads Western Australia 1925-1996*, UWA Press, Nedlands, 1996, p. 27; OH 2599/46, John Gilbert Marsh, Engineer at Main Roads Department, interviewed by Leigh Edmonds, 1994.

27 *Albany Advertiser*, 28 March 1958, p. 1; Piggott, Richard, op cit, photographs showing both bridges during construction, pp. 53 & 104. No plan for the 1958 Bridge has been located.

timber stringers, a change made standard in the late 1920s; square for the Old Bridge and round for the latter.[28]

The Lower Kalgan River Bridge (1958) was officially opened on 26 July 1958. The opening ceremony was not held at the Bridge but in the Lower Kalgan Hall due to rain. Prior to the ceremony, a luncheon in the Hall was hosted by Ossie Thorne, Albany Road Board representative for the Lower Kalgan Ward, and attended by: the Minister for Lands and Agriculture, L. F. Kelly; the Under Secretary for Works, G. Cook; Member for Albany, Jack Hall MLA; Resident Magistrate, H. G Smith; Albany Mayor, J. A. Barnesby; Main Roads Department Assistant Engineer, J. Punch and District Engineer, R. Mofflin; Chairman of the Albany Harbour Board, C. E. Bolt; President of the Albany Chamber of Commerce, D. G. Robinson; Chairman of the Albany Road Board, B. Lange; a number of Board members and others associated with the building of the bridge. For the opening ceremony, the white ribbon that had spanned the bridge was stretched across the Hall stage, where it was cut by the Minister for Lands and Agriculture as he declared the Bridge open. An afternoon tea was served to several hundred people who attended the event, and in the evening the Albany Road Board held a dinner at the Premier Hotel for the official party.[29]

When the Old Lower Kalgan River Bridge was demolished following the opening of the new Lower Kalgan River Bridge (1958), the Navigation Trusses were kept for preservation. Some years later, the Lower Kalgan-Nanarup Progress Association raised a loan to meet the costs of transport, crane hire, renovation, painting and erection, and in 1968 the trusses were placed on concrete foundations at the entrance to the Lower Kalgan Recreation Reserve (Reserve 16871), which was located on the west side of the River beside the Nanarup Road.[30]

In 1970, amateur fishermen were using the Jetty and the decking was reported as being in a dangerous state. The Albany Tourist Development Authority wanted the Jetty repaired so it could continue to be used, so the PWD commissioned an engineering assessment to determine necessary repairs. The report noted the Jetty to be in generally poor condition, with any work dependent on its potential use. Spending $3,000 on new beams and decking would extend its life as a fishing jetty by about five years. The PWD had no interest in the structure unless the local community could demonstrate a use, and recommended removal.[31]

There the matter stood until 1980, when Albany City Council took the decision to demolish the Jetty. There was an unfavourable reaction to this decision from residents and letters were written outlining the historical significance of the structure, including a reference to the place as the 'Fruit' jetty, and it's continuing use by fishermen and pleasure craft. The Council then offered to provide $1,500 towards the cost of restoration, which was estimated at $4,500. Residents

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28 Leigh Edmonds, *The Vital Link*, op cit, pp. 87-88; photograph, *Albany Advertiser*, 29 July 1958, p. 1.

29 *Albany Advertiser*, 29 July 1958, p. 1.

30 *Large timber structures in Western Australia*, Institution of Engineers, WA Division, Perth, 1998, Vol. 1, entry 1301; Correspondence, 6 February 2004, from David Giles, Lower Kalgan Progress Association, HCWA File P00089; Lower Kalgan Progress Association website, www.albanygateway.com.au/Town/Albany/Lower_Kalgan_Progress_Association.

31 Public Works Department file, 'Kalgan River: Lower Kalgan jetty', SROWA, WAS 82 CONS 5981 Item 0243, 1969-1981.

believed they could raise another $1,000 towards the work, and on 29 September 1980, Tom Knight MLC for the South Province, wrote to Andrew Mensaros, the Minister for Public Works and Water Supply, with a request for financial assistance to meet the rest of the cost.[32]

In order to establish what this restoration would entail, the Minister had the Senior Engineer of the Harbours and Rivers Branch carry out an inspection. In February 1981, he reported that 'there is no possibility that any part of this jetty could be reused in its original position in a restored structure'. Timbers that were not already rotted or eaten through were heavily infested with marine borer, while most of the decking was missing and bolts were corroded.[33] A complete reconstruction was estimated at $60,000, but would give little functional benefit owing to difficulty of access from the main road and limited parking. As the Lower Kalgan River Bridge (1958) had a landing facility beneath it extending into deep water, a Jetty was not required to provide that function.[34]

As a result of the Engineer's report, Council resolved, on 30 March 1981, to call tenders for demolition of the Jetty.[35] This work was not carried through and the Jetty remained, but with no works done.

Prior to the mid-1980s, the policy of the Main Roads Department had been to replace timber bridges when their condition deteriorated, but this approach could not be sustained as bridges were falling apart faster than they could be replaced. This led to the concept of 'engineered refurbishment', which could include the addition of a concrete road deck, strengthening of abutments with concrete, replacement of stringers and other timber elements where needed – sometimes with steel, as the longer lengths of timber were no longer available – and the treatment of timbers with wood preservatives, fungicides and waterproofing where appropriate. In this way, the life of timber bridges can be extended almost indefinitely.[36]

Lower Kalgan River Road Bridge (1958) was the subject of such a refurbishment. The deck was widened and a concrete pavement laid, with the replacement of outer timber beams with steel to provide additional support. The timber planking beneath the original pavement overlay was removed in the process. Concrete has been used to strengthen the abutments.[37]

In 1998, the Old Lower Kalgan River Bridge Navigation Trusses and the Lower Kalgan River Bridge (1958) were entered in the survey of Large Timber Structures in Western Australia. The Trusses (1905) were given a ranking of 5, which was the highest ranking and recommended 'to register and maintain as an important industrial heritage structure... but urgent assessment is required as bridge is subject to alteration, demolition or various types of damage or destruction'. The Bridge (1958) was given a ranking of 3, this being a middle ranking indicating that the structure was historically important as a timber bridge

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32 Public Works Department file, Item 0243, op cit.

33 The marine borer is also referred to as 'teredo'; the genus for the species of marine bivalve mollusc, also called the shipworm, that burrows into wood and eats wood particles.

34 Public Works Department file, Item 0243, op cit.

35 Public Works Department file, Item 0243, op cit.

36 *Western Roads*, October 1988, pp. 8-12 & August 1990, pp. 6-7.

37 Physical evidence.

site.[38] In June 2001, the place was entered on the Shire of Albany Municipal Heritage Inventory. The Lower Kalgan River Bridge (1958) and the Lower Kalgan River Jetty were given a management category C, to retain and conserve if possible, while the Old Lower Kalgan River Bridge Navigation Trusses were given a management category B, recommending a high level of protection.[39]

In 2003, the Lower Kalgan Progress Association were endeavouring to have work done on the refurbishing of the Old Lower Kalgan River Bridge Navigation Trusses, which were showing considerable wet rot and fungus growth. Some earlier efforts had been made to fill rotted areas with cement. A report on possible refurbishment was obtained from TimberED Services Pty Ltd and in 2006 the Trusses were removed for restoration work.[40]

Over the years, the land in the vicinity of the Lower Kalgan River has been cleared for sheep, beef cattle and some dairy farming, with a fringe of natural vegetation remaining along the River. There has also been some residential development clustered around the River and the Bridge, which is only 15 kilometres from the centre of Albany. The Kalgan River Golf Course is located on Reserve 16871, and there is a private school to the east off Nanarup Road, between the Lower Kalgan and King river bridges.[41]

In 2006, the Old Lower Kalgan River Bridge Navigation Trusses are undergoing restoration off-site; the Lower Kalgan River Jetty is a ruin, which cannot be accessed due to its dangerous condition; and, the Lower Kalgan River Bridge (1958) continues to perform its intended function. Fishermen use the walkway and landing beneath the Bridge.

13.2 PHYSICAL EVIDENCE

Lower Kalgan River Bridge and Jetty Group consists of the 1905 Old Lower Kalgan River Bridge Navigation Trusses, which are the remnants of a demolished bridge; the Lower Kalgan River Jetty (1912), a 'T' shaped timber finger jetty; and, the 1958 two-lane timber Lower Kalgan River Bridge.

Lower Kalgan River Bridge and Jetty Group is located approximately 15 km to the north-east of the Albany town centre at the north end of Oyster Harbour. Oyster Harbour is the large, roughly oval shaped estuary for the Kalgan and King Rivers. The long axis of the estuary runs north to south. The mouth of the Kalgan River is located on the north-east of the estuary and the King River on the north-west. At the southern end of the estuary a narrow but permanently open and navigable channel empties into Middleton Bay beside Emu Point. Middleton Bay is a part of King George Sound, which is sheltered from the Southern Ocean by a string of small islands. It is approximately a 5 km boat trip across King George Sound from the mouth of Oyster Harbour to the mouth of Princess Royal Harbour.

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38 *Large timber structures in Western Australia*, Institution of Engineers, WA Division, Perth, 1998, Vol. 1, p. 6 & entry 1301.

39 Heritage TODAY, *City of Albany Municipal Heritage Inventory*, 1999.

40 Boughton, Assoc Prof Geoffrey N., *Refurbishment of Original Lower Kalgan Bridge Trusses*, TimberED Services Pty Ltd, [November 2003]; Correspondence, 6 February 2004, from David Giles, Lower Kalgan Progress Association, HCWA File P00089.

41 Pen, Dr Luke, *The condition of the Kalgan River foreshores 1992/93*, Report prepared for the Albany Waterways Management Authority, Oyster Harbour Catchment Group and the Department of Agriculture of WA, Waterways Commission, Perth, November 1994, p. 2.

Lower Kalgan River Bridge and Jetty Group is located near the mouth of the Kalgan River on Nanarup Road, which leads eastwards away from Albany to Nanarup and Two Peoples Bay. Nanarup Road is a continuation of King River Road. The road name changes at the Lower King River Bridge, which crosses the King River near the mouth into the estuary. The Lower King River Bridge is west of the *Lower Kalgan River Bridge and Jetty Group*.

The area around *Lower Kalgan River Bridge and Jetty Group* is largely rural in character with recreational and tourism facilities located around the estuary and the rivers.

Lower Kalgan River Bridge (1958) runs east to west across the Kalgan River, which at this point is running from north to south and into the estuary. The western half of the river is deeper and contains the permanently navigable channel. The eastern side of the river is very shallow and an earth causeway has been constructed across it to reduce the span of the timber bridge.

On the west bank upstream of the bridge there is a precinct of recreational facilities, which includes the Lower Kalgan Reserve, the Kalgan River Golf Course, a public boat ramp and a caravan park. The Old Lower Kalgan River Bridge Navigation Trusses form part of the entrance to the Lower Kalgan Reserve, which is adjacent to the road. The entrance leads to a large gravel car park planted with mature native Australian Eucalypt species. To the north of the car park is a large grassed sports ground, which is surrounded by a linear planting of native Australian Eucalypt species and Monterey Pines (*Pinus radiata*). There is a metal clad shed with a low-pitched skillion roof standing beside the sports ground.

On the west side of the car park there is a mud brick toilet block with a low pitched corrugated zincalume gable roof and galvanised iron metal gates. On the north-east side of the car park near the river is the Albany Rowing Club storage shed. This large rectangular Colorbond metal shed has a low-pitched gable roof and is located near a launch area on the river. The launch area is an open sandy beach. A path at the south-east side of the car park leads to the landing/fishing area under the Bridge.

The original bridge was located immediately upstream of the existing Lower Kalgan River Bridge (1958) but no on site evidence of this earlier bridge could be found. There were no timbers in the water or any mounds suggesting the abutments of this earlier bridge.

The Lower Kalgan Reserve is also the site of the early Candyup School but no evidence of this building was visible to suggest an archaeological site.

The Kalgan River Golf Course is located to the north of the Lower Kalgan Reserve. The course is not reticulated and is vegetated mainly with indigenous plants reinforced with plantings of Australian native plants.

Downstream of the bridge on the west bank of the river is the Lower Kalgan River Jetty. A fence prevents public access to the Jetty and the access path has been overgrown with indigenous vegetation. A shell-grit road, which services several residential properties on large blocks, runs parallel to the riverbank behind the strip of vegetation lining the bank. There is also a low-density rural development with shell-grit access roads on the eastern riverbank.

On both banks of the Kalgan River the indigenous vegetation has been left intact. The vegetation is typical of coastal river and estuary environments and contains Marri (*Corymbia calophylla*), Sheoak (*Melaleuca preissiana*), Swamp Sheoak (*Casuarina obesa*), Sheoak (*Allocasuarina fraseriana*), Peppermint Trees (*Agonis flexuosa*), Christmas Trees (*Nuytsia floribunda*) and Wattles (*Acacia patagiata*) growing on the banks, with some Coast Sword Sedge (*Lepidosperma gladiatum*), Saltwater Paperbark (*Melaleuca cuticutaris*), Coast Saw Sedge (*Gahnia trifida*), Knotted Club Rush (*Isolepis nodosa*) and Samphire (*Halosarcia halocnemoides*) growing on the tidal river flats below.

Old Lower Kalgan River Bridge Navigation Trusses (1905)

The Old Lower Kalgan River Bridge Navigation Trusses are part of the original structure of the Old Lower Kalgan River Bridge. The Trusses were located over the navigable channel in the centre of the bridge. They were salvaged when the old bridge was demolished in 1959 and re-erected on either side of the entrance to the Lower Kalgan Reserve. Either end of each truss was supported on concrete plinths set in the ground. At the time of assessment of this structure the Trusses had been removed for conservation and could not be inspected. The concrete plinths are in situ and show the location of the Trusses beyond the timber guardrails lining the drainage culvert beside the road.

Lower Kalgan River Bridge (1958)

The Lower Kalgan River Bridge (1958) is a timber structure measuring 560 ft (170.2m) from the western abutment to the eastern causeway. The bridge consists of 27 spans of approximately 20 ft (6m) with a deck about 13 ft (4m) above the low water level. The width of the bridge between the kerbs is 22 ft (6.8m). The existing structure is largely as the original except for the addition of some steel structure to take a new wider two-lane concrete deck.

The bridge connects to the two-lane bitumen Nanarup Road. The causeway that crosses the shallows on the east side of the river is constructed from mass gravel fill with battered banks and laterite boulder pitching.

The bridge was constructed by the Public Works Department and illustrates the standard practice for timber bridge construction, which was followed from the early 20th century up until the 1950s. The terminology used in describing the components of this bridge is taken from the Glossary of Road Bridge Terms set out in Volume 2 of 'Large Timber Structures'.[42]

The bridge consists of 27 piled timber piers and at each abutment structures at the end spans to support the bridge and retain the earth embankments. Each of the 27 piers consists of four bush timber piles of approximately 16" (400mm) diameter driven into the bed of the river. Half caps consisting of 16" (400mm) by 6" (150mm) sawn timbers bolted into recesses at the top of the piles connect the top of the piles of each pier. On the upstream side of the bridge the half cap cantilevered out to carry the Albany water supply pipe from Two Peoples Bay. The piles at each pier are also tied together just above normal water level by a pair of horizontal walers of 12" x 4" (300mm x 100mm) sawn timbers bolted to the piles. The section of the piers between the upper half caps and the lower walers

42 *Large timber structures in Western Australia*, op cit, Vol. 2.

are also cross-braced with 9” x 3” (250mm x 75mm) sawn timbers bolted to the piles. The cross bracing spans the full width of the piers except where the walkway runs under the deck.

The walkway is primarily used for fishing and it spans from the west bank to the edge of the navigable span near the centre of the bridge. The deck of the walkway is laid with 6” x 12” (150mm x 300mm) transverse sawn timber boards whose top surface is set at the same height as the top edge of the walers. The deck has a timber kerb of 6” x 12” (150mm x 300mm) boards bolted through the structure at the outer edge. The deck is supported by 16” x 4” (400mm x 100mm) sawn timbers bolted to the piles. The walkway spans the distance between the outer pier on the upstream side and the adjacent pier. At the end of the walkway it expands to extend for the full width of the bridge. A timber boardwalk on the upstream side of the west bank provides access from the Lower Kalgan Reserve to the walkway under the bridge.

The concrete deck to the Lower Kalgan River Bridge (1958) bears on 8” x 3” (200mm x 75mm) transverse sawn timber decking which is supported on four 16” (400mm) bush timber longitudinal stringers bearing on 400mm diameter bush timber corbels, which are 5’ 3” (1600mm) in length and bolted to the half caps. It would appear that there were originally six longitudinal stringers but the outer stringers have since been replaced with 16” (400mm) steel ‘I’ beams which bear on to 16” (400mm) deep steel ‘I’ section corbels, which are also bolted to the timber half cap.

There are no transverse decking timbers between the timber longitudinal stringers and the replacement steel beams so that the underside of the concrete deck is visible. The bridge deck has been widened and now the concrete deck cantilevers beyond the outer steel stringers.

As the deck has been widened the steel water supply pipe on the upstream side of the bridge has been relocated. Originally the water supply pipe sat in a semi-circular recess cut in the top edge of the cantilevered section of the half caps. This recess is still visible near the west abutment. The water pipe now sits in a timber cradle supported by a pair of steel channels that are bolted to the timber half cap and the newer steel corbels. The steel channels cantilever approximately 20” (500mm) beyond the end of the timber half cap. The steel water pipe has a diameter of approximately 30” (750mm). Conduit cables are run beside the water pipe. Overhead power cables are run above the bridge from timber posts located on the sides of the bridge abutments.

Near the centre of the Bridge there is a navigable section suitable for small pleasure boats and ferries. The span of this section is double the normal span between the timber piers. All the structure supporting the deck in this wide bay is of steel. The concrete deck sits on 2 ft (600mm) deep ‘I’ beams which bear on to a 12” (300mm) deep beam bolted on top of the original timber half caps at the tops of the timber piers.

The two-lane concrete deck has an integral concrete kerb at the outer edge and drainage outlets. ‘C’ section posts bolted to the fascia of the concrete deck support the galvanised steel balustrades. The top rail is also a ‘C’ section. A galvanised steel ARMCO guardrail is fixed to the inner face of the balustrade.

The east and west abutments to the bridge are different. The west abutment is largely original. It has five piles tied at the top with 16" x 6" (400mm x 150mm) half caps on which the ends of the stringers bear. As elsewhere the two outer stringers are steel 'I' beams and the four inner stringers are 400mm diameter bush poles. These piles also support 8" x 3" (200mm x 75mm) horizontal timbers retaining soil, together with diagonal wing walls consisting of 8" x 3" (200mm x 75mm) timbers behind vertical piles. An insitu concrete wall has been constructed in front of the base of the timber board retaining wall. This concrete wall is approximately 3'3" (1000mm) high and is fitted between the timber piles. The top edge of the northern wing wall has also been reinforced with a concrete beam, which would appear to have been laid in situ over the top of the timbers. The abutments behind the wing walls are covered with gravel and there is some laterite boulder pitching at the base. The abutments are concealed largely by a thicket of Peppermint Trees and Casuarinas.

The east abutment is located at the end of the causeway that crosses the shallows beside the east bank. The outer face of the timber retaining wall and the diagonal wing walls have been completely concealed by later insitu concrete retaining walls. The piers in front of the timber retaining wall are still partly visible. Behind the wing walls the abutments are covered with gravel with laterite boulder pitching to the base. The bank is covered with grasses and weeds but no trees or shrubs.

Lower Kalgan River Jetty (1912)

The Lower Kalgan River Jetty is located approximately 20 metres downstream from the Lower Kalgan River Bridge (1958) on the west bank of the Kalgan River. The Jetty is a timber structure approximately 67 metres (220') in length from abutment to head. The Jetty consists of a 'neck' of fourteen 4.5m (15') spans and a wider head, which has one 3 metre (10') span. The timber decking is 2.7 metres (7') above low water level. The width of the Jetty is ~1320mm (4' 4") between the kerbs. Apart from the loss of some fabric due to deterioration, the existing structure is largely as the original design shown on the construction drawings.

The abutment to the Jetty blends into the riverbank. The access path that originally connected to the Jetty is overgrown with small trees and a fence has been erected across the beginning of the Jetty to prevent public access.

The Jetty was constructed by the Public Works Department and illustrates the common practice followed for the construction of small jetties and narrow bridges. For this reason the terminology used in describing this structure is in accord with that included in Volume 2 of 'Large Timber Structures' by the Institution of Engineers.[43]

The Jetty consists of 13 piled timber piers (piers 2-14) which make up the 'neck', an abutment support structure to the west end span (pier 1) and two wider piled timber piers which make up the 'head' of the Jetty (piers 15-16).

Each of the 13 piers to the neck of the Jetty consists of a pair of bush timber piles of approximately 10" (250mm) diameter driven into the riverbed at an angle of 7º off the vertical (1 in 8) so that the piles taper in towards each other at the top. The

43 *Large timber structures in Western Australia*, op cit, Vol. 2.

tops of the piles to each pier are connected by half caps of 9” x 4” (225 x 100mm) sawn timber bolted into a recess approximately 300mm below the top of the pile. Some time after construction each pile has been reinforced with a 9” x 5” (225mm x 125mm) sawn timber bolted to the outer face and extending from between the half caps down into the riverbed.

Piers 10 to 14 are tied together just above low water level by two horizontal walers of 6” x 4” (150mm x 100mm) sawn timbers bolted to the piles. The piles are also diagonally braced with 6” x 4” (150mm x 100mm) sawn timbers bolted to the piles.

The 6” x 2½” (150mm x 60mm) sawn timber transverse decking is supported on 12” x 6” (300mm x 150mm) sawn timber stringers 9m in length, bearing on 9” x 6” (230mm x 150mm) sawn timber corbels, which are 4 ft (1220mm) in length. The corbels bear upon the half caps and are bolted to both the half caps and to the top of the piles. There is a 4” x 3” (100mm x 75mm) sawn timber kerb to the outer edge of the deck and it is bolted through the deck to a 3” x 3” (75mm x 75mm) timber rail below. There is no handrail. The timber deck has been removed between pier 1 (abutment) and pier 5. The structure of piers 9-13 are distorting and coming apart and pier 14 is missing.

The head of the Jetty consisted of two piled timber piers, which supported the main landing area. This landing area was approximately six metres long by three metres wide and was set perpendicular to the neck of the Jetty. Tucked into the corner formed by the north edge of the neck of the Jetty and the west edge of the head was the Boat Landing. The deck of this area was set approximately 2 ft (600mm) above the low water level and was reached from the head by a small flight of timber stairs; now only the outermost pier, pier 16, remains. Had the boat landing still been intact it would have been concealed by the height of the river water during our assessment, but documentary evidence indicates it has not survived.

Pier 16 consists of three bush timber piles driven straight down into the riverbed and not inclined as elsewhere. The piles are set at three metre centres The tops of the piles are connected by half caps consisting of 10” x 5” (250mm x 125mm) sawn timbers bolted into the recesses at the tops of the piles. The piles are also connected just above the low water line with two horizontal walers of 9” x 6” (230mm x 150mm) sawn timber bolted to the piles. Between each pile there is also diagonal cross bracing of 8” x 6” (200mm x 150mm) sawn timbers. A timber spacer has been placed at the intersection of the cross bracing and the bracing is bolted together at this point. Timber chafers of 8” x 8” (200mm x 200mm) sawn timber are bolted to the outer (east) face of pier 16. These chafers ran from just under the deck to the top of the waler and were there to protect boats from the Jetty structure and its many bolt heads.

The deck of the Jetty head was similar to that of the neck. It was constructed from 150mm x 60mm sawn timbers that ran from north to south across the structure. These timbers were supported by 10” x 4” (250mm x 100mm) sawn timber stringers bearing on the half caps. The Jetty head structure was also reinforced by diagonal cross bracing between piers 15 and 16. At the north and south ends of the outer face (east) of the Jetty head were iron capstans to tie up boats. These capstans are labelled ‘bitts’ on the drawing and were specially

reinforced with stringers that ran between piers 15 and 16 in addition to those that supported the deck. None of this fabric has survived intact.

At the abutment are four 10" (250mm) diameter piles: the centre two align with the piles to the neck of the Jetty. The piles are all plumb. The piles are connected at the top by a 9" x 4" (225mm x 100mm) half cap bolted into a recess on the west (bank) side of the pile. The stringers to the neck of the Jetty bear on the half cap. The piles and half cap support fourteen 9" x 3" (230mm x 70mm) vertical sawn timber boards, which have been driven into the ground to retain the soil of the bank. There are no wing walls or abutments as the deck to the Jetty is roughly at the height of the top of the riverbank.

The construction of the abutment is different from the detail shown on the drawings which show only two piers and the face of the vertical boarding being retained with stone pitching.

Several attempts have been made to prevent access to the Jetty. A timber frame supporting iron mesh has been erected at the abutments and a similar screen has been constructed at Pier 2. It is also possible that the missing deck boards between piers 1 and 5 were removed to discourage people from using the Jetty.

The original drawings indicate that a set of 6.3kg (14 lb) iron railway lines ran down the centre of the Jetty. A 35 ft (10.6m) section of rails on timber sleepers ran down the river bank to the Jetty and continued to a 9" x 8" (225mm x 200mm) timber stop block at the far end of the Jetty head. The rails were set 2 ft (600mm) apart.

There is no surviving evidence either of these rails or the timber sleepers leading down to the Jetty.

Generally the structure of the Lower Kalgan River Bridge (1958) is in good condition and has benefited from regular maintenance. As is characteristic of timber structures in water, the zone that alternates between being continually wet and then dried out shows greater signs of deterioration than timbers that have been continuously either wet or dry. Some timbers have been encased in concrete probably because they were structurally unsound.

The Lower Kalgan River Jetty is in poor condition and is in danger of being lost forever. Piers 14 and 15 have disappeared and piers 9-13 are distorted and in danger of collapse. The loss of decking timbers between piers 1 to 5 is also weakening the integrity of the structure.

The Old Lower Kalgan River Bridge Navigation Trusses were in poor condition prior to their removal in 2006 for conservation. Timbers were suffering from years of exposure and were becoming degraded. They have also further deteriorated from well meaning but inappropriate conservation techniques such as filling areas where timbers had rotted away with concrete. As the trusses were unavailable for inspection at the time of this assessment, the current condition of these timbers is unknown.

Although there are several potential archaeological sites within the study area, the nature of timber construction and the lack of any visible evidence of earlier structures would mean these sites are in poor condition and would reveal little. There are no mounds or remnants of earlier building materials.

13.3 COMPARATIVE INFORMATION

There are 151 road bridges identified on the HCWA database. Of these, 77 are of timber construction. Sixteen are located within the Great Southern region and only *Carrolup Bridge* (17170) is registered as part of *Carrolup Native Settlement Precinct* (10592). Of these places, twelve are comparable to *Lower Kalgan River Bridge & Jetty Group.*

The following bridges were constructed at a similar time to Old Kalgan River Bridge (1905). Coblinine River Road Bridge (04650) in Katanning was built in 1910 over the Coblinine River. Coorinyup Bridge over Wadjenganup River (06193) in Broomehill was built in 1907. Hamilton Road Bridge (fmr), Denmark, over Denmark River (11468) was constructed in 1905 and has been upgraded with steel and a bitumen surface. Balgarup River Road Bridge (13075) was built in 1900 and is located in the town of Kojonup.

Bridges built later in the 20th century are comparable to the Lower Kalgan River Bridge (1958). These include the Denmark River Traffic Bridge (14307) built in 1968 in the town of Denmark and Jam Creek (South) Bridge (12249) located in the town of Tambellup was constructed in 1950.

Of more direct comparison are those bridges associated with the Kalgan River. Woogenilup Bridge (11001, MRWA 4324) over the Upper Kalgan River on North Woogenilup Road, was built in 1907. It is a 36-metre long single-lane bridge with timber planking. The squared stringers are mostly of wandoo. It is considered to be in good condition for its age.[44] The place is listed on the Shire of Plantagenet Municipal Inventory, and in *Large Timber Structures of Western Australia* with high heritage value.

Old Kalgan River Road Bridge (16090) was built in 1940 on the Upper Kalgan to replace the one washed downstream by the flood of 1939. This bridge is on the old alignment of what is now the South Coast Hwy. It was superseded in 1966, by the New Kalgan River Road Bridge (11721) when the alignment of the South Coast Hwy was changed, necessitating a new bridge. Another bridge over the Kalgan River is Kalgan River Road Bridge (16106), which was built in 1953 on Chesterpass Road (former Albany-Lake Grace Road). None of these are recorded in *Large Timber Structures in Western Australia*. The Upper King River Road Bridge (P15401, MRWA 890) was built in 1959. It is listed in *Large Timber Structures in Western Australia* as having high heritage value because of the evidence at the site of an earlier convict built bridge.[45]

None of the existing bridges listed in the Albany-Plantagenet districts have a navigation span except for the Lower Kalgan River Bridge (1958). Navigation spans were only provided in particular locations, such as the mouth of a navigable river, and if there was a perceived use of the waterway for other than just pleasure craft. Garratt Road Bridge (upstream) (11342, MRWA 950) (1935) and *Fremantle Traffic Bridge* (04027) (1938) both have steel navigation spans. The Garratt Road Bridge, at 237.89m, is the longest of the existing timber road bridges in the State, followed by the Fremantle Traffic Bridge (205.49m). The Lower Kalgan River Bridge (1958), at 170.2 metres, is the third longest in the State and the longest outside the metropolitan area. There are timber railway

44 HCWA database; *Western Roads*, October 1988, op cit, pp. 8-12.

45 *Large Timber Structures in Western Australia*, op cit, Vol. 1.

bridges longer than any of the road bridges, including the first Bunbury Railway Bridge (03345) (550m) built in 1893 with two 12.2m Howe Trusses.

The Howe Truss was a United States invention dating from the 1840s. It comprised a rectangular trussed frame of wooden diagonals and vertical iron tie rods and was the standard for railroad bridges for many years. It was considered to provide a particularly strong structure over long spans. The Old Lower Kalgan River Navigation Trusses were built to a design of C. Y. O'Connor, which was almost certainly based on the Howe Truss.[46]

All the existing major timber road bridges have had work done, including replacement of timber decking with concrete, and all are well maintained.

There are 60 jetties listed on the HCWA database, 23 being of timber construction. Two jetties are listed as being in the Great Southern Region. 00367 Albany Town Jetty built in 1862, which is not comparable due to age of construction, and size and function as the jetty for the Port of Albany. 15477 Ellen Cove Jetty & Norfolk Island Pines (1899) is located at Middleton Beach. It is a T-head finger jetty with side railings and a flared access to the beach. It is in good condition and appears to have been renewed at some recent time. It is used for recreational purposes. The Lower Kalgan River Jetty (ruins) bears some comparison in scale and condition to 04222, Eucla Jetty (ruins), Abutment & Beach Landing (remains), which is on the interim register. Eucla Jetty was constructed in 1887 to serve the Eucla Telegraph station.

The Old Lower Kalgan River Bridge Navigation Trusses are the only ones remaining of their type. Lower Kalgan River Bridge (1958) is a fine representative example of a large timber road bridge, uncommon for its navigation span, and the longest in the State outside the metropolitan area. Lower Kalgan River Jetty is a representative example of a small jetty ruin.

13.4 KEY REFERENCES

No key references.

13.5 FURTHER RESEARCH

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46 *Western Roads*, October 1988, pp. 8-12; Roads and Traffic Authority of NSW, *Timber Bridge Management*, January 2002; www.past-inc.org/historic-bridges/image-howetruss.html.