CONSERVATION MANAGEMENT PLAN for the former

CARRINGTON HYDRAULIC ENGINE HOUSE

Prepared by:

NSW Department of Commerce

October, 2005
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Plate 1.1: Pediment over Entry (J. Carr)
1.0 EXECUTIVE SUMMARY

The historical significance of the Carrington Hydraulic Engine House has been recognised by its listing as an item of State heritage significance on the Newcastle LEP 2003. Although now an empty shell, the building is of high heritage significance because it draws together two of the most important themes in Newcastle's history, coal and the harbour.

The hydraulic engine house is a tangible reminder of the importance placed on the coal trade by the New South Wales Government, which was prepared to invest so heavily to provide an efficient coal loading system in Newcastle. When installed in 1877, the cranes and associated equipment were recognised as the first of their kind in New South Wales and research suggests that there were no subsequent installations of such equipment in Australia.

While the electric cranes which operated on the western side of the basin were identified as historically significant by the Institution of Engineers Australia, this assessment did not include the still unfinished substation and adjoining workshop, which has since been reduced in length to accommodate roadwork around the building. The substation building does, however, have local significance for its links to the coal industry and the provision of power for use in specific local applications.

Potential exists for additional knowledge about the site to be gained through the study of archaeological remains in the form of the surviving foundations of the demolished chimney stacks, remnant hydraulic pipework, crane bases and possible remnants of the boat dock which existed to the east of the hydraulic engine house.

The significance of the buildings on the site has been graded to reflect their importance to the state and Newcastle. The Carrington Hydraulic Engine House when constructed in 1877 used state of the art technology developed through the Armstrong Factory for the use of hydraulic water under pressure to power fixed and later moving cranes. The association with this technology, Sir William Armstrong and E. O. Moriarty together with the unique aesthetic qualities of the building satisfy the requirements for listing as an item of State heritage significance. The change in technology to electric power was slow, resulting in a series of alterations and additions to the Engine House. The only purpose built new structure was never completed due to the construction and dominance of the Zaara Street Power Station in Newcastle. Subsequently the structures associated with electricity production have been assessed as having Local heritage significance.

The overall dilapidation of the buildings on the site potentially will dictate their survival, with the State and high Local heritage listed sections taking priority over the remaining structures. It is recommended that the State listed structures be restored and the dilapidated Local listed structures be demolished to allow for redevelopment of the site to fund an adaptive re-use of the remaining former Engine House.

The remnant masonry crane bases surviving along The Dyke should be preserved as relics, accepting the fact that they will deteriorate over time due to the harsh environment of the harbour. Deterioration can be minimised by maintenance of the mortar joints and masonry elements.

Plate 1.2: Aerial view of the site. (Source NPC)
Plate 1.3: Plan of the Existing Buildings.
2.0 INTRODUCTION

2.1 BACKGROUND & OBJECTIVES OF THE STUDY

The former Carrington Hydraulic Engine House has occupied the present site since 1877, initially providing hydraulic power to static cranes located on the Dyke wharves and later converted to electric power. The building has been used as a storage facility over the last forty years. The Newcastle Port Corporation has recently called expressions of interest for the buildings re-use and commissioned an upgrade to the previously prepared Conservation Plan by the Hunter Design Office of the Public Works Department in the early 1990’s.

This Conservation Management Plan has been prepared prior to planning of an adaptive re-use option for the buildings, and in conjunction with a Scope of Works for preservation restoration and reconstruction of the building’s significant fabric.

The Conservation Management Plan has been extended to include the remnant crane bases still extant on the Dyke Point.

Plate 2.1: Aerial photograph of Newcastle East with the site in the lower left hand corner. (Source Land & Property Information NSW)
2.2 METHODOLOGY

The following diagram illustrates the sequence of work adopted:

![Diagram showing the sequence of work](image)

2.3 DEFINITIONS
The following definitions taken from the Burra Charter have been used in this report.

*Fabric* means all the physical material of the place.

*Conservation* means all the processes of looking after a place so as to retain its cultural significance. It includes maintenance and may, according to circumstance, include...
preservation, restoration and adaptation and will be commonly a combination of more than one of these.

**Maintenance** means the continuous protective care of the fabric, contents and setting of a place, and is to be distinguished from repair. Repair involves restoration or reconstruction and should be treated accordingly.

**Preservation** means maintaining the fabric of a place in its existing state and retarding deterioration.

**Restoration** means returning the existing fabric of a place to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material.

**Reconstruction** means returning a place as nearly as possible to a known earlier state and is distinguished by the introduction of materials (new or old) into the fabric. This is not to be confused with either re-creation or conjectural reconstruction, which are outside the scope of the charter.

**Adaptation** means modifying a place to suit proposed compatible uses.

**Compatible use** means a use involving no change to the culturally significant fabric, changes, which are substantially reversible, or changes requiring minimal impact.

### 2.4 ABBREVIATIONS

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<td>Australian Heritage Commission</td>
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<td>CMP</td>
<td>Conservation Management Plan</td>
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<td>DUAP</td>
<td>Department of Urban Affairs &amp; Planning</td>
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<td>DIPNR</td>
<td>Department of Infrastructure Planning &amp; Natural Resources</td>
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<td>HO</td>
<td>Heritage Office.</td>
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<td>ICOMOS</td>
<td>International Council of Monuments and Sites</td>
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<td>NT</td>
<td>National Trust of Australia (NSW)</td>
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<td>LEP</td>
<td>Local Environmental Plan</td>
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### 2.5 ACKNOWLEDGEMENTS

The team responsible for this study consisted of:

- **Bruce Pettman**
  - **Principal Architect**
  - NSW Department of Commerce

- **John Carr**, **Heritage Architect**
  - NSW Department of Commerce

- **Rosemary Melville**
  - Hunter History Consultants

- **Anne Dunne**
  - Hunter History Consultants

- **Historian**

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Carrington Hydraulic Engine House  
**Final Draft Conservation Management Plan**
The authors of this report acknowledge the assistance of the following individuals and organisations that helped with their time and other resources during the preparation of this report.

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2.6 LIMITATIONS
This Conservation Management Plan has been prepared and the policy formulated based on information researched within the time frame and budget for preparing this report. The information contained in this document was complete at the time of preparation of this report. Such searches, however, are never exhaustive and it should be expected that further information would come to light over the time. It is, therefore, recommended that the Conservation Plan be updated after a period of time (say, ten years) or as new evidence comes to light. Due to major filling to form the entire site area neither Aboriginal Heritage nor Natural Heritage has been assessed on this site. Moveable Heritage has been initially examined, however requires further assessment during any decontamination work associated with sub-floor area or prior to any demolition works.

2.7 STUDY AREA
The study area is the site presently occupied by the Carrington Hydraulic Engine House located toward the northern extremity of The Basin in Newcastle Harbour. The site is bounded by Newcastle Port Corporation land to the north, east and south, and Bourke Street to the west. The site is limited by development of port and railway activities under current use.

Plate 2.2: Locality Map (Source UBD).
Plate 2.3: The Carrington hydraulic Engine House site showing the relocated main entrance to the port. (Source: NPC)
3.0 DOCUMENTARY EVIDENCE

Acknowledgments

3.1 INTRODUCTION
The establishment and subsequent development of the Newcastle region is inextricably linked to its coal resources and harbour. Two years before the government had sent the first settlers to the area, enterprising traders had visited the area then known as "Coal River". When the Hunter sailed for Bengal on 7 October 1799, it carried Australia’s first load of export coal, which had been gathered from the seashore and cliffs around Newcastle Harbour. Since that time, the shipment of coal through the port of Newcastle has continued to play a significant role in the region's economy. As the coal trade developed in the mid-nineteenth century, the government took steps to provide more efficient coal loading equipment and move coal loading activities to the northern side of the harbour. This was achieved with the purchase of hydraulic cranes, which were erected along a man-made dyke extending south from Bullock Island. An impressive engine house, built of brick and stone, was constructed to provide the hydraulic power required by the cranes.

Known by the Aboriginal people as "Onebygamba" meaning large mound, Bullock Island was so named because cattle were walked across from the mainland at low tide to graze on the low lying island. Isolated and swampy, it was overlooked for residential or industrial purposes for many years. The prospect of reclamation work and the construction of a bridge led to increased interest in the island's potential and in 1874 about sixty houses were either occupied or in the course of erection. Industries included ship and boat building and a large foundry established by John Howden but then operated by Morrison and Bearby. In 1887, Bullock Island became known as Carrington when the area was constituted as a municipality named after Lord Carrington, then Governor of New South Wales.

The original fixed hydraulic cranes were later supplemented with the addition of travelling hydraulic cranes and electric cranes, located around a basin constructed on the western side of the dyke. In association with these developments, progressive additions and alterations were made to the hydraulic engine house, including the construction of a substation to provide power for the electric cranes. The first of the fixed hydraulic cranes was removed in 1908 with others being removed during the 1930s and 1960s. The use of cranes for coal loading ceased in 1967 with the commissioning of the Basin Coal Loader and removal of the last travelling hydraulic crane. It was 1986 before the last two electric cranes were demolished, leaving the hydraulic engine house, together with a large number of the bases of the fixed hydraulic cranes, as the last physical evidence of a system of coal loading which operated in Newcastle for almost 100 years.

This document traces the physical development of the site, but research into other facets of its history (i.e. labour, economic and social) is beyond the scope of this study.

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1 Prepared by Hunter History Consultants Pty. Ltd. for NSW Dept. of Commerce, July 2005. Not to be reproduced without written permission of the authors
2 The Newcastle Chronicle 19 September 1874
3.2 EARLY COAL LOADING FACILITIES IN NEWCASTLE

In the earliest days of coal mining in Newcastle, convicts transported coal to waiting vessels in a process which involved up to five stages – "from baskets to bullock carts, from bullock carts to the wharf, from wharf to the pier, from pier to lighter, and from lighter to ship". It was an inefficient method, which often meant that by the time the coal arrived in Sydney for sale, it was "nothing but dust".4 In 1831, following the entry of the Australian Agricultural Company (A.A. Co.) into the mining industry, coal loading entered a new phase with the construction of an inclined plane which carried loaded wagons from the company's mine on the hill above the town to a wharf on the harbour front.5 By the 1850s coal was transported by rail to the harbour front where it was loaded primarily via stalithes located on the foreshore towards the west of the town. A significant number of smaller vessels, however, continued to be loaded by wheelbarrows, direct from the jetty. In the late 1850s, larger vessels were moored in deep water where boxes of coal were transferred from lighters into the ships' holds.6

![Plate 3.1: Loading coal from the A.A. Company's mine on the hill above Newcastle into the Sophia Jane, 1833](image)

Reproduced in J.W. Turner, Coal Mining in Newcastle 1801-1900

Between 1858 and 1860 Queens Wharf (later King's Wharf) was constructed along the southern foreshore at the eastern end of the harbour, in the area west of Watt Street. An application was successfully made by the Newcastle Wallsend Coal Company to erect three steam cranes on the wharf, primarily for loading their own coal and for government use. It was agreed that other companies could use the cranes if they were free, but it was in essence a monopolistic arrangement, which gave rise to considerable tensions resulting in court action and a ruling that the government take over all cranes. As the cranes had performed badly they did not remain in service and were replaced by eight government owned steam cranes, the largest with a capacity of 15 tons.7 Additional stalithes were built to the west of the cranes in 1869 but facilities in the port continued to be inadequate.8 Plans were in hand, however, to provide a large stretch of additional wharfage on the northern side of the harbour, along a man-made dyke, which would be constructed along a sandbank extending south from Bullock Island.

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4 T. Callen, Bar Dangerous, Newcastle, 1986, p.31
5 J.T. Turner, Coal Mining in Newcastle 1801-1900, Newcastle, 1982, p.32
6 E. Coulin, "Evolution of Coal Loading Plant and Newcastle" in Port of Sydney, March 1959, p.158
7 T. Callen, Bar Dangerous, p.210
8 E. Coulin, "Evolution of Coal Loading Plant and Newcastle"... p.159
3.3 CONSTRUCTION OF “THE DYKE”

The area now known as “The Dyke” was formed as part of a plan of harbour improvement proposed by civil engineer J. Woolston Ellis in 1854 and developed and implemented by the Engineer in Chief for Harbours and River Navigation of the Department of Works, E.O. Moriarty. 9 The plan was created in an attempt to deepen the coal channel and preserve deep-water access in front of the town. Moriarty suggested that the most efficient way of achieving this result was to remove a rock ledge which extended across the harbour, but he was unprepared to undertake such a costly and time consuming exercise at that time. The alternative, which he outlined in a report to the Legislative Assembly in April 1858, was to:

...trust to the effect of the ebb currents to keep this channel open, which can only be done by bringing in wharfs to a fair curve, and by setting as much of the ebb water against them as possible. To accomplish these objects, the first step will be to fill in the indentations in the wharf line with ballast, and bring it to one uniform sweep. The next will be to lay a border of ballast along the face of the bank, extending from Bullock Island to opposite the A.A. Company’s coal stahls, in the manner shown in the accompanying plan. By these means a commencement would be made for an extensive line of wharfs, and the wide space between it and Honeysuckle Point, as well as back of Bullock Island, would become a large sluicing reservoir, and all the water received into it, or discharged from it, would be made to pass up and down the coal channel, the effect of which would soon be to widen and deepen it. 10

Work on this ambitious project began in 1861 under the supervision of Moriarty. 11 Progress was initially very slow, prompting the local newspaper to bitterly complain in 1863 that although the formation of The Dyke in front of Bullock Island was “proceeding with as rapidly as the quantity of ballast arriving in the harbour will admit, ... in sea walls there is but little doing”. Voicing what was to become a recurrent theme over subsequent decades, the newspaper pointed to the government’s neglect of Newcastle – on this occasion in favour of Wollongong where “harbour works were being carried on with a spirit similar to that which caused the erection of Fonthill to be the wonder of its day.” 12

A chart of the harbour prepared in 1866 by Messrs. Gowland and Boulton, R.N., shows only “ballast heaps in line of proposed embankment” and at that time it was necessary to go out 600 or 700 ft. before reaching deep water. 13 In September of that year, a contract was let for the construction of two ballast jetties, which by 1868, were being used to discharge stone. 14

Highlighting the varied nature of the ballast being deposited, a local journalist anticipated the puzzle, which might challenge archaeologists of the future attempting to study the “artificial island”:

Here we have geological specimens from every part of the world. The whole expanse of ground has been built up of ballast from the ships that come to our harbour. In one place we tread upon a layer of London flint, next a collection of stones from the shores of the sunny Mediterranean. These are succeeded by a rocky mound from Scandinavian coasts, and these in turn give place to blue stone from Melbourne, green trap from New Zealand, limestone from Singapore and even the sun burnt bricks and blazed uncouth carvings from a dismantled village in far off China. 15

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10 “Breakwater at Stockton (Report of Mr. Moriarty upon advisability of)”, NSW Legislative Assembly Votes and Proceedings (NSW LAV&P) 27 April 1858
11 The Newcastle Chronicle, 24 August 1861
12 ibid., 26 June 1863. NB “Fonthill Abbey” was a mansion built by William Beckford in Wiltshire
13 Newcastle Harbour, surveyed by Messrs. Gowland and Boulton, R.N. under the direction of Commander F.W. Sidney, R.N., 1866. Newcastle Port Corporation records.
14 Sydney Morning Herald, 22 September 1866
15 Newcastle Morning Herald, 7 November 1877
Plate 3.2: Engraving of Newcastle showing coal staities and the Dykes. Samuel Calvert, 1874. Note the Dyke on the right hand side of the engraving.
By 1870, the depth of water along the edge of The Dyke had increased considerably, and was expected to reach 20ft. within a few years.\textsuperscript{16}

3.4 CALLS FOR IMPROVED COAL LOADING FACILITIES

By 1870, various parties involved in the coal industry were expressing dissatisfaction with the coal-loading situation at Newcastle. The steam cranes were unreliable and there were complaints about the efficiency and location of the staithes. In response, the government appointed a Select Committee in January 1871 to investigate the "efficiency or otherwise" of the staithes which were located at the western extremity of the city. It was concluded that they were "faithfully built and well adapted for the purpose intended" and, together with the existing steam cranes, were capable of meeting present loading requirements. However, it was agreed that the staithes were in the wrong place and were occupying harbour frontage, which was increasingly in demand for mercantile purposes. Moreover, when the wind was blowing from certain directions it spread coal dust over the city. The Committee agreed that a more suitable location for the staithes would have been Bullock Island, on the northern side of the harbour:

The only reason for not placing [the staithes] on Bullock Island is that they were much required when commenced, and at that time there was no depth of water at Bullock Island, and that would have entailed an expenditure of at least £100,000. The dyke since formed there by the discharge of ballast is making the channel deeper every day by the natural scour, and it is greatly to be regretted that so eligible a site for Coal Staithes should not have been adopted\textsuperscript{17}

It was further noted that future plans for The Dyke involved the erection of wharves and coal staithes, followed by construction of a coal basin inside Bullock Island when demands of the coal trade increased.\textsuperscript{16} The choice of staithes conflicted with the wishes of some coal companies, which preferred their coal to be loaded by cranes. According to John Waddell, Manager and Shipping Agent of the Lambton Coal Company, there was less breakage of coal during loading by cranes and it was difficult to moor ships at the staithes because there was nothing to make them fast to.\textsuperscript{19} No mention was made of the hydraulic cranes and impressive engine house, which would be such a topic of conversation in the port within four years.

![Diagram of Newcastle Harbour showing The Dyke and man-made foreshores in broken lines.]

\textit{Plate 3.3: Plan of Newcastle Harbour showing The Dyke and man-made foreshores in broken lines. (Source: T. Callen, Bar Dangerous)}

\begin{flushleft}
\textsuperscript{16} E.O. Moriarty, evidence to Select Committee on Coal Staithes at Newcastle, 8 March 1871 NSW LAV&P

\textsuperscript{17} Report of the Select Committee on Coal Staiths ....

\textsuperscript{18} E.O. Moriarty, evidence to Select Committee on Coal Staiths ....

\textsuperscript{19} J. Waddell, Evidence to Select Committee on Coal Staiths ....
\end{flushleft}
3.5 THE CHOICE OF HYDRAULIC POWER

Despite extensive archival research, documents relating to the purchase and construction of the Bullock Island hydraulic engine house and cranes have not been located. It is assumed that they were lost in a fire in 1882, which destroyed the Garden Palace in Sydney. At that time the building was being used as a repository for government records, including those of the Harbours and Rivers Branch of the Public Works Department.

Secondary sources strongly suggest that the decision to purchase hydraulic cranes for Bullock Island was made as a result of recommendations made by the Sydney engineer Norman Selfe in 1874 for improvements at Circular Quay. Included in Selfe’s recommendations was the installation of hydraulic cranes, which had not previously been used in New South Wales. Details and prices for complete hydraulic installations were obtained by him from “eminent firms in England” but it would appear that the Government did not proceed with his suggestions regarding the cranes for Circular Quay at that time. However, Selfe later claimed that it was the publication of his proposals that prompted the decision to purchase Newcastle’s hydraulic cranes, which “quite left the old steam cranes in the shade.”

This was earliest large-scale application of hydraulic power in Australia: it was over ten years before the Sydney and Suburban Hydraulic Power Company was form 1889 to provide Sydney with power for various uses including lists, hoists, cranes and wool presses. The No.1 Pumping Station is now the Pump House Hotel.

There is little doubt that the government was anxious to meet the needs of the coal industry. In the Legislative Assembly in June 1874 it generally agreed that:

> It should never be forgotten that Newcastle was becoming a great seaport, and the present want of accommodation there was injuring the trade of the country ... it was better for the Government if they wished to protect the trade of Newcastle to provide full accommodation at once. It was the complaint of shipowners in England – they would not send their ships there because they could not get accommodation.

Newspaper reports in September 1874 indicated that orders had been placed in England for four hydraulic cranes to be placed along The Dyke, with the possibility of obtaining a further four if necessary. No reference to planned expenditure for the hydraulic installation has been found in New South Wales Parliamentary Papers of the time. There is, however,

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21 Information provided by Michael Clarke, former Chief Engineer, Public Works Department, New South Wales
22 NMH, 20 June 1874
23 Town and Country Journal, 26 September 1874
mention of expenditure of £20,000 for "Newcastle wharf, cranes, hydraulic engine house &c." in 1877.24

Plate 3.6: Artist’s impression of the Bullock Island Hydraulic Engine House.
(Source: Town and Country Journal, 22 July 1876)

Available evidence therefore suggests that, given the increasing demands of the coal trade, it is likely that Selfe’s recommendations were adopted with alacrity and the hydraulic engines and cranes were ordered from England soon after, from the Elswick factory of Sir William Armstrong. Armstrong, who has been described as a scientist, scholar, engineer and enterprising industrialist, had developed a hydraulic crane in the mid-1840s and established the Newcastle Cranean Company (later known as Armstrong’s Factory) in 1847.25 An extensive hydraulic plant which included 65 cranes was installed by Armstrong’s works at Kingston-upon-Hull in the late 1860s.26 After the Crimean War he became involved in the manufacture of armaments and many of his weapons were recognised as the best in the world.27

Predicting a prosperous future for Bullock Island, a Newcastle Chronicle reporter commented that it would require “no boundless stretch of imagination to foresee the time when the shrill shriek of the engine whistle shall supersede the cry of the wild fowl – when the iron rail shall take the place of the bush track, and when lofty chimneys [sic] shall rear their towering heads from busy factories erected on the once neglected ONEBYGAMBAH”.28

3.6 CONSTRUCTING THE WHARVES AND RAILWAY

Overall control of the Bullock Island project rested with the Harbours and Rivers Branch of the Public Works Department but another significant player was the Railways Department, which was responsible for the control of appliances for shipping coal. At the end of 1875, the Commissioner for Railways reported that further expansions to meet the demands of the coal trade were to be made “along the Bullock Island Dyke, which has a frontage of a mile and a half on the western side of the harbour”.

In preparation for the arrival of the cranes, tenders were called for the construction of four sections of wharf and by the end of 1875, eighteen sections of timber wharf, each 300 feet apart, had been completed. On four of these sections it was planned to erect the four 15 ton hydraulic cranes which had been ordered in 1874 and were then on their way from England.29 Coal was to be transported to Bullock Island via a branch line linking The Dyke with the Great Northern Railway. Construction of this line, together with a bridge linking the island to the mainland, was underway and expected to be finished “in time for the winter trade of 1877”.30

24 Account of Receipts and Expenditure under the Loan Fund, 39, Victoria, No.18, NSW LAV&P, 1877, p.88, published 6 November 1878
28 Newcastle Chronicle, 19 September 1874
29 Report of Commissioner for Railways, 1872-1875, p.29
30 ibid
3.7 THE HYDRAULIC ENGINE HOUSE AND EQUIPMENT

It has previously been assumed that the architect responsible for the design of the hydraulic engine house was the Colonial Architect at the time, James Barnet. While this may be so, there is a lack of supporting documentary evidence in records of the Colonial Architect, Public Works Department, parliamentary budget papers, NSW Government Gazettes and local newspapers. Nor is there reference to the building in a detailed biography of Barnet, which draws on his papers and other relevant primary sources. Consideration must therefore be given to the possibility that the engine house was designed in England. Given the specific requirements of the building, it is possible that it was designed in conjunction with the machinery it would house. It is of interest that surviving hydraulic engine houses in the United Kingdom (Glasgow, 1877 and Swansea, 1901) bear strong similarities to the Newcastle building, particularly the Swansea building which was built to replace earlier machinery installed by James Abernethy and Sir George Armstrong and has now been restored for use as a restaurant. 32

![Plate 3.7: Hydraulic Engine House in Swansea, Wales. (Source: www.swanseamarina.org.au)](image1)

In April 1876, the Department of Public Works, Harbours and Rivers Branch, Sydney, called tenders for erection of the "Engine-house, Boiler-house, Smoke-stack, and Hydraulic powers for Hydraulic Cranes about to be erected at Bullock Island". The government placed a notice in the Newcastle Morning Herald but, surprisingly, did not follow the normal procedure of publishing it in the NSW Government Gazette. The contract was awarded in July 1876 to W.H. Jennings who, in association with his partner, Pallister, had won the contract to erect the Newcastle Customs House two years earlier. Yellow semi-plastic bricks, used in the construction of both buildings, came from Joseph Bowtell's Steam Brick and Tile Works in the Newcastle suburb of Merewether. Interior brickwork in the hydraulic engine house featured Bowtell's sandstock bricks.

![Plate 3.8: Bowtell imprint in brick "frog". (Hunter history Consultants.)](image2)

31 P. Bridges and D. McDonald, James Barnet: Colonial Architect, Sydney, 1988
32 www.swanseamarina.org.au and www.angryhotelglasgow.co.uk
33 NMH, 25 April 1876
34 ibid; Brian McDonald + Associates, Newcastle Customs House Conservation Management Plan, 2000, p.15
Hydraulic water pressure to operate the cranes proposed for Bullock Island was generated from equipment housed in the engine house, measuring 144 ft. by 88 ft. Details of the building and the equipment it housed was published in the Newcastle Morning Herald in November 1876:

The large engine room will be 70 feet by 42'6". Abutting the building on the east and west ends will be erected accumulator towers, 56 feet in height, in which, as their name implies, the hydraulic power is accumulated and reserved for use. The steam engine in the large room alluded to will pump the water into a vertical cylinder in the accumulator tower, 45 feet high, in which cylinder a piston 20 inches in diameter will work. This piston is capped with a weight of 120 tons. The water is pumped in against this weight and thus the piston is raised, producing a pressure of 800 lbs. to the square inch. By a system of piping connecting the accumulator with the hydraulic cranes, the power is conducted to each crane, and held in reserve until the crane is required for use.

Abutting the engine room, and behind the western accumulator tower, will be constructed a boiler room 39 ft. x 33 ft. 6 in., to contain the immense boilers necessary for working the steam engine used for pumping the water into the accumulator. Should the increased trade require it, a similar boiler room will be constructed at the east end of the engine house, for which the concrete foundations are now in. To the west of the boiler will be erected the chimney or smoke stack, which will be 72 feet high. 35

Plate 3.9: Interior view of engine house showing hydraulic engines, 1893. (Source: Dept. of Public Works Annual Report, 1893-94)

Operation of the hydraulic engines required a continuous supply of fresh, pure water and for this purpose an immense iron tank was constructed near the Hamilton junction. The tank, which was capable of holding 20,000 gallons, was supported on a stand which raised it more than 30 feet above the ground. Water was drawn from 10 acres of nearby swamp, which was reserved for the purpose by the Government. To ensure the purity of the water, it was filtered through sand and collected into a 5,000 gallon tank before being pumped into the reservoir

35 NMH, 25 November 1876
above. From there, the water was pumped through a pipe to the engine house on Bullock Island. Water was also supplied to a reservoir at Honeysuckle Point, for use by railway locomotives.36

As Peter Cockbain noted in a paper on the engineering heritage of Newcastle's coal loading facilities:

The hydraulic circuit was a closed system with the water being returned to the power station. From anecdotal oral (interview) information, the pressure and return pipes running to the cranes, i.e. reticulation system were 6" cast iron pipes held in place by hardwood stringers under the wharf. Measurement of the remaining pipes in the power station show they were cast iron 10" OC and approximately 6" IC and were tested to 2000 psi. It would seem that the pipes of approximately 6" dia. Were the take off pipes to each crane outlet and in all probability the 10" pipes were the main reticulation size installed under the wharf.

The reservoirs for the return water (and suction to the pumps) were large cast iron vats located along the eastern wall of the hydraulic pump room, mounted on 3 longitudinal timbers each 12" wide and 6" thick.37

3.8 THE CRANES
The first four cranes had been ordered by September 1874 but it was a further twelve months before tenders were called for "supply and delivery at Newcastle of the Ironwork required for the foundation of the Hydraulic Cranes about to be erected on Bullock Island".38 The contract, which was awarded to Mort’s Dock and Engineering Company, Sydney, specified that:

The iron casings to be built up with plates and angle pieces, which shall be cast from the best hot blast grey metal, to the dimensions shown on the drawing, perfectly straight and exact to shape; the metal throughout shall be uniform thickness, and the casings sound, entirely free from air holes, sand cracks, flaws and defects of every description.

Lugs to be cast on the centre of the upper end of each plate for receiving the tie rods.

The casings shall be put together on the Contractor's premises, the horizontal and vertical edges of all the pieces at the joints being absolutely planed.

Ironwork for the first foundation was to be delivered within 10 weeks, with the second, third and fourth to be delivered at 12, 16 and 20 weeks respectively.39

The cranes were to be constructed at 300ft. intervals along the front of the wharf, and in March 1877 it was reported that No.6 crane was almost ready for connection with the pipes from the hydraulic tower. Foundations for Nos.5 and 7 cranes were complete but No.4 foundation was not expected to be finished for some time.40 All four cranes and associated hydraulic pipes were in situ in November 1877, waiting for completion of the engine house and machinery.41

36 Ibid.
37 P. Cockbain, "The Engineering Heritage Associated with Coal Shipment from Newcastle 1877 to 1967", paper presented at National Engineering Heritage Conference, Ballarat, 1997. This paper provides detailed technical information relating to the hydraulic cranes and associated equipment
38 Town and Country Journal, 26 September 1874: NSW Government Gazette, 12 October 1875
40 NMH, 24 March 1877
41 Ibid., 7 November 1977
Plate 3.10: No.11 fixed hydraulic crane loading coal from wagons, which have been hauled into place by the horse that can be seen to the left of the photograph. (Source: Port of Sydney, March 1969)

Plate 311: Fixed hydraulic crane loading coal. (Source: Snowball Collection)

Plate 3.12: Fixed Hydraulic Crane construction drawings. (Source: Commerce Plan Room)
3.9 THE CRANES IN OPERATION

Finally, on 21 February 1878, the cranes were ready for operation and a test lift of nearly 18 tons was made "with apparent ease, the whole of the gear working smoothly and perfectly." Three weeks later, Cecil Darley witnessed "the first practical application of these powerful levers" when a locomotive intended for use on the Great Northern Railway was hoisted from the Araby Maid onto the wharf "with comparative ease". Within a week, the first shipment of coal loaded by hydraulic cranes had left Newcastle harbour - a cargo of Lambton coal bound for Adelaide aboard the Downiemount, which had brought the cranes to Newcastle from Britain on her previous voyage.

The cranes were described in the Town and country Journal in March 1879 as "the chief glory of Newcastle":

These beautiful pieces of mechanism ... represent the last achievements of mechanical science in hydraulic machinery. The are all worked by hydraulic pressure produced by one pair of engines, and they could be manipulated by a child. The waggons of coal are brought into position by a rope worked by an hydraulic windlass. The man in charge has simply to press his foot on the treadle, while he draws in the rope, and the irresistible water pressure does the rest. The waggons being in position, the hooks of the chains are fastened in it, and the man standing on the platform of the hydraulic crane moves a lever, and the giant lifts the top of the truck as easily as a mother would lift her child, without a sound swings it over the ship's hatchway, where the lumpers knock out the pins which fasten the bottom of the truck, and then the coal disappears into the hold of the vessel. The whole process takes only a minute and a half.

The accumulators featured a number of safety devices:

There is a magnificent system of checks, by which all danger of a break is obviated. Were the piston to exceed its full stroke without a check, it would lift off the roof of the building. As the water is pumped into the accumulator, of course the piston rises, as water is used by the cranes, of course it falls. In the event of the cranes being at any time, or from any cause idle, and thereby absorbing none of the water, and the pumping still going on, the piston would, first of all, reach an ingenious system of buffers at the top. Next a chain would be touched, which would open a valve in the accumulator itself, and ease the pressure of the water, letting it back into the main, and should this break, or by any means become ineffective, and all else fail, there is a third check by which the throttle valve would be worked, and steam shut off.

Four more cranes — two of 15 tons and two of 25 tons — were ordered in 1877 and in 1879, another two engines, boilers and another accumulator were erected. It was 1880 before the first of the 25-ton cranes arrived and was installed north of the existing cranes. At the request of the Bullock Island Improvement Committee, the government built a boat harbour to the south of the first 25 ton crane (No.11) and directly east of the hydraulic engine house, to provide safe moorings for small craft.

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42 Ibid., 22 February 1878
43 Ibid., 20 March 1878
44 Town and Country Journal, 22 March 1879
45 NMH, 7 November 1887
46 Town and Country Journal, 29 March 1879
47 The Newcastle Directory and Almanac for the Year 1880/81, facsimile reprint published 1978 by the Library of Australian History, North Sydney, p.51
In 1884-5 contracts were let for a northern extension to the wharf and by 1886 The Dyke was almost three kilometres long. Four 9 ton cranes were ordered, but they were not erected until early in 1888, bringing the number of cranes to twelve.  

Congestion continued to be experienced, so in 1889 three steam cranes were transferred from Queens Wharf to ease the situation. This involved the construction of an additional 6,000 feet of rail line to provide access to the cranes.

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3.10 CONSTRUCTION OF THE BASIN

In November 1888 the government allocated funds for the construction of a basin at the south end of Bullock Island, initially providing an additional 4,000 ft. of extra wharfage, which would later be increased to 8,000 ft. When work commenced in February 1889, the average depth of water in the proposed 90 acre basin did not exceed 3ft. 6in. After an initial period of dredging, a sand pump was employed to lift sand and silt from the basin and deposit it behind stone walls which were constructed around its edge. To provide shipping access to the basin, it was necessary to blast several feet of rock from the harbour floor opposite the A.A. Company shoots. By July 1890 an area of 28 acres had been reclaimed between the engine house and the southern end of the dyke.

It was proposed to erect additional hydraulic cranes on the eastern side of the basin, to the west of those already operating on The Dyke. The existing machinery had been in use for 14

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49 E. Coulin, "Evolution of Coal Loading Plant and Newcastle" ... p.159
50 NMH, 18 September 1889
51 ibid., 14 November 1890
52 ibid., 30 July 1890
years and was severely taxed, being required to drive twelve cranes both night and day. Provision had already been made in the original engine room for additional machinery, and it was decided to install a new engine which was more powerful than the two units then in use. This engine would not only supply additional power for the hydraulic cranes, but would also provide power for lighting The Dyke with electricity. Produced by Armstrong’s factory in England, the new engine was of 250 horsepower, with a fly wheel 18 ft. in diameter. To accommodate four new tubular Babcock and Wilcox boilers, a second boiler room and smoke stack were constructed on the eastern side of the engine house.

The successful tenderer for the work was E.J. King, who also secured the contract for the construction of a condensing house behind the main building. This room, sometimes referred to as the “Auxiliary Engine House”, was equipped with three Westinghouse engines driving Manchester Dynamos, to provide electric light for the whole complex. The electric lights replaced the existing gas light on 2 September 1891 and by February 1892 all the new machinery was in use.

The Newcastle Morning Herald praised the role of “our experienced and energetic Engineer for Harbours and Rivers” in the construction of the new wing of the engine house, which now presented “a more uniform and imposing appearance”:

The interior, especially when lit up at night by means of the arc and incandescent lights, with the ponderous and well-kept machinery in rapid motion, is a most pleasing sight. A stranger visiting the port and leaving without having paid a visit to the hydraulic and electric engine house will have missed seeing what the citizens of Newcastle may be justly pardoned for terming “one of our lions”.

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Plate 3.17: Interior view of the condensing house in 1893, showing the engines and dynamos which were installed in 1891. (Source: Dept. of Public Works Annual Report, 1893-94)

In 1890 the government staitthes on the southern side of the harbour were removed, and all coal loading moved to the northern side of the harbour (with the exception of coal loaded from the A.A. Co. chutes). While coal loading was the primary activity at The Dyke wharves, an area at the northern end was leased to the Sulphide Corporation in the 1890s. Cattle and

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53 ibid., 22 November 1890
54 ibid., 19 February 1892
55 O. Beinstow, “The Bullock Island Hydraulic Power House”
56 NMH, 25 December 1891
57 ibid., 9 September 1897

Carrington Hydraulic Engine House Final Draft Conservation Management Plan
sheep wharves were also established in this area and horses, together with the men who had enlisted from the Hunter, were shipped from this wharf during the Boer War (1899-1902).  

Plate 3.18: Panorama taken in 1904 showing the Hydraulic Engine House and the network of rail lines which carried coal to the port for loading into waiting ships. (Source: Newcastle Port Corporation)

Plate 3.19: The hydraulic engine house, following construction of the second boiler room and smoke stack. (Source: Newcastle Region Library)

3.11 TRAVELLING HYDRAULIC CRANES  
Between 1898 and 1903, wharves were built along the eastern side of the new basin. Six hydraulic cranes were imported from England, the first three commencing operation in May 1903. Due to delays in completing the last section of wharfare, it was a further four years before the remaining three were commissioned, and a seventh was added in 1915.

Unlike the earlier hydraulic cranes that were stationary, the new cranes were movable and could traverse along the wharf. This allowed ships to be filled by two cranes at the same time and removed the need to move the ship along the wharf during loading.

Plate 3.20: Movable hydraulic cranes during installation period, 1901. (Source: N. Barney & T. Callen, Between the River and the Sea)

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60 T. Callen, Bar Dangerous, p.107  
61 E. Coulin, 'Evolution of Coal Loading ...' p.160
3.12 MCMYLER HOIST
In 1909 the Railway Commissioners made an ambitious but ill-considered decision, which highlighted the problems, associated with divided, remote control of the port. In direct opposition to the wishes of local shipping interests, the Commissioners purchased four McMyler hoists from America. They were bought in anticipation of future needs, being designed to lift forty-ton rail wagons as opposed to the 10-ton wagons then in use at Newcastle.

The McMyler Hoist was erected on The Dyke between cranes Nos.14 and 15. No.15 crane was moved to make way for the new loading equipment, and No.14 could not be used because it was too close. The three steam cranes at The Dyke were also removed at this time.

It was found that the hoist's efficiency was considerably reduced when the smaller wagons were used, and the coal was inclined to break as it was dropped into the ships' holds. Criticism was intense, and several coal owners refused to allow its use in the loading of their coal. A subsequent Royal Commission into the disastrous purchase found that the hoist was "wholly unsuitable for loading at this port". The three remaining hoists were never brought into service, their parts left to rust on the ground at Carrington for many years, while the erected McMyler Hoist was officially closed in February 1916. It was not demolished until May 11, 1933.\(^{62}\)

To compensate for the failure of the McMyler hoist, Cranes Nos. 12 and 13 were replaced with two of 15 ton capacity and Nos. 7,8,9 and 10 were raised twelve feet higher at the base to allow them to load larger vessels. Plans were formulated in 1913 for the construction of a conveyor belt-loading system but the scheme was shelved when war broke out in 1914.

\(^{62}\) ibid. and R. Melville, "In the Shadow of the McMyler Hoist?"
A further advance in coal loading technology was introduced at The Dyke in 1914 when horses, which had traditionally been used to place coal trucks alongside the cranes, were replaced by hydraulic powered capstans. Tractors replaced horses at Western Basin in 1925, and at Eastern Basin in 1927, bringing to an end the role of the horse in coal loading operations at Newcastle.63

Plate 3.23: Movable hydraulic cranes loading a ship. Note horse being used to move coal wagons. (Source: Commerce)

3.13 ELECTRIC CRANES AND SUBSTATION
Construction of wharfsage on the western side of the Basin began in 1913. This was one of the strongest timber wharves in the world at the time, and was designed to carry six large electric travelling cranes.64 The first two electric cranes, from the British firm Messrs. Cowans, Sheldon & Co., came into service in May 1916 and the remaining four were in operation by April 1917. These electric cranes handled the bulk of coal loading operations in the port.65

To provide power for the new cranes, a temporary power plant was erected at the eastern end of the Newcastle Railway yards, on the site that would later be occupied by the much larger Zaara St. power station, which came into operation in 1920.66 High-tension submarine cables carried the 25-cycle current across the basin to Carrington, where the old generating plant became redundant. Electricity was also supplied to the railway workshops at Honeysuckle Point and the Walsh Island Dockyard, which made heavy demands on the current, particularly during the night. This had a detrimental effect on the operation of the cranes, and although moves to increase the power supply were underway in mid-1916, it would appear that this was not achieved until completion of the Zaara Street powerhouse.67 In the mid-1920s a connection was made for the supply of electricity from Zaara Street to BHP, via the sub-station at the hydraulic engine house.68 Electricity for use at the steelworks was generated on the site, but this arrangement allowed BHP to purchase additional electricity when required. The arrangement was reciprocal, with Zaara Street purchasing electricity from BHP when its own equipment was undergoing maintenance or repair.69

At the rear of the hydraulic engine house, a sub-station was erected where current received from the city power plant at approximately 6,000 volts, was transformed down to 375 volts.70 Three rotary converters produced the DC power used by the electric cranes. It is assumed that these converters were supported by three large concrete foundations, which are still present in the substation. It would seem that there were unrealised plans to extend this

63 E. Coulin, "The Evolution of Coal Loading..., pp.154-162
64 NMH, 16 March 1914
65 Ibid. p.162.
67 NMH, 22 July 1916
68 M. Fetscher, The Power Stations of the NSWGR ..., p.58
69 P.P. Cranney, Fueling the Fires of Steel: A History of the Coke and Energy Department, Newcastle, BHP, 1999, p.87
substation, as the brickwork at the ends of the north and south walls is unfinished and appears to have prepared for additional brickwork. The use of corrugated iron for the east and west walls, rather than brick that has been used elsewhere, suggests that these walls were intended to be a temporary measure until the building was completed. A brick workshop was constructed adjoining the northern side of the substation.

To overcome the problem of excessive fluctuations in voltage due to the bad load factor of the cranes, a 1,000 ampere-hour load storage battery, housed in a room at the rear of the engine house, was installed across the bus bars. This battery could also carry the station over peak loads, shut downs, or periods of light load when it may not have been necessary to run the converters.  

In 1923 the Carrington substation took on an added role when it began providing power for the tramway electrification programme. However, it appears it could provide only limited supply. As noted in Tramways of Newcastle, "tram travellers of that period vividly recalled difficulty in reading the evening paper in the PM peak hour when the trams had to share the meagre power supply with electric cranes loading export coal at the Carrington Dyke".  

During the Depression six of the fixed hydraulic cranes were decommissioned, and the remainder used only occasionally during the following years. Plans were prepared in 1940 for replacement of the boilers, steam engines and pumps by electrically driven centrifugal pumps but this did not eventuate until after the war. These changes involved considerable alteration to the engine foundations and floor on the eastern side of the engine room.

3.14 THE DEMISE OF THE SYSTEM
(from “chief glory of Newcastle” to “a decaying and obsolete system”)

Until the 1960s, coal loading in Newcastle was carried out by the hydraulic and electric cranes under the control of the Railways Department. It would seem that maintenance and upgrading was minimal, despite evidence suggesting that the Department made considerable gains from its coal loading operations. A report produced in 1957 indicated that one of the travelling hydraulic cranes had been out of action for more than two years, two for six months and others for lesser periods. Two world wars and a depression also contributed to the delaying modernisation, as did the depressed state of the coal industry during this period but perhaps the most paralysing factor was the divided control of the coal loading process, which resulting in an overlapping of responsibilities involving a number of government departments.

Plate 3.24: Electric cranes at work in The Basin in 1947. (Source: Anon, Newcastle, Industrial Capital of Australia)

71 ibid
72 D. Keenan, K. McCarthy, R. Willson, Tramways of Newcastle, Sydney 1999, P.124
73 D. Baird, "The Bulcock Island Hydraulic Power House"
74 NSW Government Railways and Tramways Annual Report of the Commissioners, 1924.
75 M. Copley, Secretary, Newcastle Waterfront Group of Unions to the Minister For Transport, Sydney, 20 February 1957, Newcastle Port Corporation Records
In the years following World War II, the export coal trade through the port expanded enormously as Japan’s steel industry, no longer able to source raw materials from Korea and Manchuria, turned to Australia for its coal supplies. Equipment which had once been “state of the art” now struggled to cope. In 1955 the majority of coal was loaded by the six electric and seven travelling hydraulic cranes in the basin, each still capable of lifting only 15 tons and described as a “decaying and obsolete system of loading colliers”. In a scathing attack on Newcastle’s complex and inept system of port administration, the editor of the journal Australian Coal, Shipping, Steel and the Harbour, wrote:

There is an atmosphere of comic opera stupidity and muddle associated with the operation of the Port of Newcastle, which is unique on the Australian seaboard. A Gilbertian system of port control exists which achieves little else than confusion ashore and the propagation of mud flats in what should be good navigable water channels in the harbour. Thus the port has been brought to such chaos as to make it almost unworkable.

.... at least three out of seven hydraulic loading cranes at the coal loading basin have hopelessly broken down and are out of action for some months to come, whilst the electric cranes on the other side of the Basin, though operating fairly well, are in imminent danger of dropping through the dilapidated wharf structure on which they stand.

All in all it is lamentable and tragic picture. There is not a port in Australia or elsewhere in the world, which could possibly present such an example of ineptitude and neglect.

In an attempt to improve the system of coal loading in Newcastle, the Railways Department had begun to install a conveyor-belt loader in 1952 but progress was so slow that it was taken over and completed by private interests. Known as the Newstan coal loader, it came into operation in July 1958.

Plate 3.25: The Newstan coal loader, built on the foundations of the McMyler Hoist. (Source: Port of Sydney, March 1959)

Federal Government moves to upgrade coal loading facilities in New South Wales resulted in financial assistance for the construction of a new coal loader which was commenced in 1964 and came into operation in 1967. Known as The Basin Coal Loader, it replaced the hydraulic cranes on the eastern side of The Basin and the electric cranes on the western side of The Basin, bringing to an end the use of cranes for coal loading in the port of Newcastle. Two electric cranes continued to be used for general purposes until 1988 when they were demolished, despite calls from the Institution of Engineers Australia for the retention of one of the “very early examples by world standards of heavy-duty wharf electric cranes”.

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77 “Newcastle’s Inadequate Port Facilities”, Australian Coal, Shipping, Steel and the Harbour, 1 July 1955, p.32
78 Ibid., p.88
79 Ibid., p.88
80 Interview with E. Coulon, cited in R. Melville, in the Shadow of the McMyler Hoist, unpublished manuscript
81 NMH 4 March 1988
Plate 3.26: Plan of Carrington showing location of the various cranes on The Dyke and in The Basin. (Source: Wilson's Newcastle, Maitland and Cessnock Street Directory, c.1930s)
The table below gives the history of the various cranes, which were erected on the eastern side of The Dyke. Numbering is post-1889, when original numbers were adjusted to include the steam cranes, which had been relocated from Queens Wharf.\textsuperscript{82}

<table>
<thead>
<tr>
<th>CRANE NO.</th>
<th>INSTALLED</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1889</td>
<td>Steam crane, 15 tons - relocated from Queens Wharf. Removed 1906.</td>
</tr>
<tr>
<td>2</td>
<td>1889</td>
<td>Steam crane, 15 tons - relocated from Queens Wharf. Removed 1906.</td>
</tr>
<tr>
<td>3</td>
<td>1889</td>
<td>Steam crane, 15 tons - relocated from Queens Wharf. In Removed 1908.</td>
</tr>
<tr>
<td>4</td>
<td>c.1880</td>
<td>15 tons. Decommissioned 1936.</td>
</tr>
<tr>
<td>5</td>
<td>c.1880</td>
<td>15 tons. Decommissioned 1936.</td>
</tr>
<tr>
<td>14</td>
<td>1888</td>
<td>9 tons. Removed post-1908 because it was too close to McMyler Hoist (erected between Cranes 14 and 15 1909, closed 1916, demolished 1933 Newstan coal loader built on top of hoist base, 1958).</td>
</tr>
<tr>
<td>15</td>
<td>1888</td>
<td>9 tons. Removed c.1908 to make way for McMyler Hoist.</td>
</tr>
</tbody>
</table>

Following demolition of the last hydraulic crane the machinery in the engine house was gradually removed, including the accumulators, which had to be cut into pieces before they could be taken from their towers. The chimneystacks that had dominated the Carrington skyline for nearly a century were demolished in the interests of safety. Within the engine house a handful of remnants, including sections of pipework, early light fittings and a measuring device for the accumulators, are all that remain of the impressive range of machinery, which provided the driving force for "the chief glory of Newcastle".

\textsuperscript{82} D. Bairdow, "The Bullock Island Hydraulic Power House ... E. Coulin, "Evolution of Coal Loading Plant at Newcastle ... p.154
### 3.15 NSW STATE HISTORICAL THEMES

<table>
<thead>
<tr>
<th>STATE THEMES</th>
<th>ASSOCIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commerce</td>
<td>The hydraulic engine house played a role in the sale of coal to local and overseas markets, through the provision of power for the operation of crane's which loaded the coal into ships berthed at wharves on The Dyke or in The Basin.</td>
</tr>
<tr>
<td>Mining</td>
<td>The hydraulic engine house is associated with this theme because of its role in the distribution of coal which had been produced in the Hunter region.</td>
</tr>
<tr>
<td>Technology</td>
<td>The building housed hydraulic machinery which was the first of its kind in Australia. Surviving hydraulic crane bases are also associated with this theme because they supported the first (and probably only) cranes in Australia to be powered by water hydraulics.</td>
</tr>
<tr>
<td>Transport</td>
<td>The hydraulic engine house and surviving crane bases are associated with this theme because of their role in the transport of coal through the Port of Newcastle.</td>
</tr>
<tr>
<td>Utilities</td>
<td>The building and remnant hydraulic lines were associated with the production and distribution of hydraulic power which was used to operate cranes on the nearby wharves.</td>
</tr>
<tr>
<td>Environmental cultural landscape</td>
<td>The site is linked to this theme because of the human involvement in the construction of The Dyke.</td>
</tr>
</tbody>
</table>

*In addition to the abovementioned themes, the following theme also applies at a local level*

<table>
<thead>
<tr>
<th>LOCAL THEMES</th>
<th>ASSOCIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilities</td>
<td>The substation constructed to the north of the hydraulic engine house has local historical significance because of its role in the provision of electricity to power the electric cranes, local tram service and BHP's Newcastle steelworks.</td>
</tr>
</tbody>
</table>
4.0 PHYSICAL EVIDENCE

4.1 THE SITE ELEMENTS

The site occupied by the Carrington Hydraulic Engine House, was originally underwater as part of the channel or northern arm of the harbour fed by the Hunter River.

The tidal mud flats associated with Bullock Island have undergone extensive filling works to construct and consolidate The Dyke that dates back to 1861 when work began using ballast from ships to fill the bank off Bullock Island.

Plate 4.1: Aerial photograph of the site showing the two chimneys (Source: Public Works Dept. 22/4/1960).

The site is therefore approximately 100% fill. This fill extends well beyond the present site of the Engine House, to The Basin to the south, to The Dyke wharves to the east, to Bourke Street and Carrington to the west and to the Port Corporation’s main entrance and industrial land to the north.

The resulting site topography was then determined by the levels of fill resulting in a virtually flat site.

Plate 4.2: Aerial photograph of the site today. (Source: Newcastle Port Corporation)
4.2 THE SETTING

The Carrington Hydraulic Engine House is surrounded by industrial development in the form of railway infrastructure and port related industrial buildings. The suburb of Carrington, once a separate council area to Newcastle, has been visually screened from the Engine House site for decades, a direct result of industrial development of the area.

Plate 4.3: Aerial photograph of the site The Basin and The Dyke today (Source: Newcastle Port Corporation)

Plate 4.4: View north along Bourke Street

Plate 4.5: View south to harbour and city

Plate 4.6: View west along Cowper Street

Plate 4.7: View of the site from Cowper Street
4.3 UNDERSTANDING THE FABRIC

The form and fabric of buildings on the Carrington Hydraulic Engine House site provides evidence of the development of the complex as a power provider for the port.

Generally, the external forms can be easily interpreted, however, the majority of the purpose designed internal spaces have been either modified by additions or alterations. This together with the removal of machinery has made interpretation of some areas difficult.

The following provides a summary of the existing fabric and design for each building or addition remaining on the site.

Hydraulic Engine House

The Hydraulic Engine House is a face brick and stone building, effectively two to three storeys in height, but constructed as a single storey space. The siting of the building at the head of The Basin assists in defining it as an imposing and substantial structure. The building is symmetrical in design and constructed in two stages. Stage one consisted of the Engine Room, two Accumulator Towers and the western Boiler House and associated chimney with all detail matching stage one.

The windows and doors to the building are timber, originally Australian red cedar. The existing doors were reconstructed in 1995 from photographic evidence in Oregon timber. The windows were similarly reconstructed, retaining as much of the original cedar as possible and using Oregon timber for replacement sections where required.

The roof timbers were reconstructed following a fire during the same period, and the roof reslated. The lower roofs were not altered and so remain sheeted in aging corrugated asbestos cement. The timber ventilators for the Boiler Room roofs are also deteriorated and require reconstruction. Drawings exist of the detail of these units.

Plate 4.8: View of Engine House from Southwest.
Plate 4.9: View of the Engine House from the South

Auxiliary Engine House

This was the first substantial alteration and addition undertaken on the building following the completion of the stage two Boiler Room and machinery. The use of electrical power was the 4season for the addition and the limited floor area required at the time made a lean-to style structure between the two boiler rooms a simple solution.

Plate 4.10: View of the Auxiliary Engine House roof Infill addition seen over the subsequent lean-to addition, and below the roof of the Engine Room. The eastern Boiler Room roof is on the left. Note cast iron guttering dislodged and fallen to the lower roof.
Lean-to Additions to the Engine House
Further lean-to additions occurred to the Engine House beginning with an addition on the Auxiliary Engine Room (which then became the Dynamo Room) in light cream brickwork, called the Battery Room. To the west of this room a further structure was built reflecting some of the detail of the original building in yellow cream face brickwork with decoration in render, not stone. To the eastern side of the central lean-to structure, a similar structure was built in brown / grey coloured brickwork.

Plate 4.11: East (third)  
Plate 4.12: Middle (first)  
Plate 4.13: West (second)

Electrical Sub-station Building
The Electrical Sub-station building was constructed in face brickwork with an asbestos shingle roof, decorative terracotta tile ridge capping with corrugated iron temporary walls at either end and timber windows and doors throughout.

The building has been subjected to vandalism and termite attack over a number of decades resulting in severe deterioration of the structure. The adjoining Electrical Workshop was reduced in floor area following the construction of the new entrance to the port, however, the wall was reconstructed in a new position with detail matching the original.

Plate 4.14: Sub-station from Burke Street  
Plate 4.15: East Elevation  
Plate 4.16: View of reconstructed eastern wall to Workshop.

General Alterations and Additions
The Engine house has been subject to a number of small alterations over its lifetime, some of which impacts on the buildings' heritage significance. These impacts are in the form of wall openings and small lean-to structures. The majority of these works can be reversed during any future reconstruction and restoration works.

Plate 4.17: Eastern Boiler Room  
Plate 4.18: West Boiler Room  
Plate 4.19: West Boiler Room
4.4 MOVABLE OBJECTS

The site has very few movable objects in the form of industrial equipment, building materials or furniture discovered during the site inspections. Inspections of subfloor spaces were not carried out and these areas may contain movable objects of heritage value. Further investigations should be undertaken prior to any demolition work or sub-floor decontamination works. (Refer to Section 2.6 Limitations).

Industrial relics such as the crane in the Electrical Sub-station building should be assessed for its rarity and potential relocation for display purposes.

The missing weather vein from the apex of the pediment stone could be the subject of a future public appeal for its return and reinstatement.

4.5 COMPARATIVE ANALYSIS

The unique design of the Carrington Hydraulic Engine House is derived from the combination of the accumulator towers and the volume requirements of the engine room. Two English examples found are the Birmingham and Swansea Hydraulic Engine Houses.

The Birmingham example used the design of the accumulator towers in the gothic revival style to resemble a church.
The Hydraulic Engine House in Swansea, Wales is closer in design to the Carrington building except its heights is reflected as a two-storey building by the design of the windows. The Carrington building windows are increased in proportion to reflect the scale of a single storey building at distance.

Plate 4.24: Hydraulic Engine House in Swansea, Wales

Plate 4.25: Hydraulic Engine House Carrington. (J Carr)

The Walka Water Works at Oakhampton is a building resembling the proportions of the Carrington Hydraulic Engine House, being designed as a two storey pumping station. The decorative brick chimney survives, including the cast iron chimney capping.

Plate 4.26 Walka Water Works at Oakhampton near Maitland, NSW (Source: Commerce)

Like the Carrington building, the Walka Water Works building is symmetrically designed, however, uses polychromatic brick detailing in lieu of brick and stone.
4.6 HISTORICAL ARCHAEOLOGY ASSESSMENT

The site of the Carrington Hydraulic Engine House is similar to The Dyke in that it was made from ship's ballast deposited in the latter half of the Nineteenth century.

The Engine House
There is potential for evidence on how the Engine House functioned to be found under the floors of the building and in the surrounding site. The foundations of the two demolished chimneys are likely to be extant up to half a metre below ground level. Similarly, it is possible that hydraulic water lines exist both on the current site and in the wider area leading to The Dyke and Basin wharves.

The Boat Harbour
The position of the former small Boat Harbour has been plotted on the Port Corporation's survey plans of The Dyke wharf area. It is likely that the Boat Harbour was simply filled rather than demolished and the new services and structures built over it.

The Crane Bases
There is potential for evidence on how the crane bases functioned to be found including the underground hydraulic pressure piping.

Management of Archaeology

It is recommended that any disturbance of the ground surface of the Study Area should be within the following protocols:

➢ In general, in connection with any project or work that might have the capacity to disturb, damage or destroy the surface and/or surface of the site, the attention of the holder of the site for the time being, and all contractors, sub-contractors and employees, is directed to the provisions of the NSW Heritage Act 1977 (the Act). The developer must notify the Heritage Office of New South Wales or its delegate and suspend work that might have the effect of disturbing, damaging or destroying such relic until the requirements of Heritage Office have been satisfied.

➢ Having regard to the implications for disturbance of relics in consequence of any projected work that might have the effect of disturbing, damaging or destroying the surface and/or sub-surface of the ground within the site, a qualified historical archaeologist should be consulted at the inception of the planning stage of such work to...
advise on the archaeology, history, physical properties and heritage significance of the projected work area. The archaeologist would determine and advise whether such work falls within the framework of one or more of the exemptions and/or exceptions allowed in the Act.

> Subject to all of the foregoing, the basic requirements that if:

(i) a relic is suspected, or there are reasonable grounds to suspect a relic in ground, that is likely to be disturbed, damaged or destroyed by projected work;

(ii) any relic is discovered in the course of excavation that will be disturbed, damaged or destroyed by further excavation;

the developer must notify the Heritage Office of New South Wales or its delegate and suspend work that might have the effect of disturbing, damaging or destroying such relic until the requirements of Heritage Office have been satisfied.

The Act allows for exemptions and/or exceptions made from time to time by the Heritage Council. These exemptions are limited and usually relate to small or simple works that are unlikely to damage any relics, such as repair of existing subground services.

The text of the Act may be studied or downloaded at www.austlii.edu.au following links to NSW legislation and then to the title of the Act. The exemptions and exceptions made under relevant subsections of the Act may be studied or downloaded at www.heritage.nsw.gov.au under the subheading ‘Permits and Application Forms’.

In the planning of a project, the Project Manager should provide time and resources for the completion of any investigation, study and recording that may be recommended.

4.7 INDIGENOUS ARCHAEOLOGY ASSESSMENT

The site presently occupied by the Carrington Hydraulic Engine House, was originally tidal mud flats associated with Bullock Island and has undergone extensive filling works to construct and consolidate The Dyke that date back to 1861 when work began using ballast from ships to fill the bank off Bullock Island. (see Plate 3.3).

The site was filled to a depth of at least metres and possible more. It is unlikely that any indigenous archaeology would have survived the extensive changes to form the present site from that time.
5.0 CULTURAL SIGNIFICANCE

5.1 BASIS OF ASSESSMENT
The basis of this assessment is the methodology and terminology of the Burra Charter, the Criteria for Listing on the State Heritage Register and The Conservation Plan. The Statement of Cultural Significance has been developed from an understanding of the historical development of the place, and from an understanding of the extant fabric of the buildings and their context.

This assessment is intended to enable decisions on the future management of the place to be based on an understanding of its significance. It is important that the future decisions do not jeopardise the cultural significance of the place.

A Statement of Significance has been developed for the individual buildings on the site assessed as being significant.

5.2 THE BURRA CHARTER
Article 26.1 of the Burra Charter states that:

"Work on a place should be preceded by studies to understand of the place which should include analysis of physical, documentary and other evidence, drawing on appropriate knowledge, skills and disciplines."

Once the place has been studied, the cultural significance can be assessed. Article 1.2 of the Burra Charter defines cultural significance as the "aesthetic, historic, scientific social or spiritual value for past, present or future generations."

5.3 THE STATE HERITAGE REGISTER
The evaluation criteria for the assessment of cultural significance were developed by the NSW Heritage Council in association with amendments to the NSW Heritage Act 1977. They were developed with the goal of national consistency and community understanding and replaced the previously used State Heritage Inventory (SHI) assessment criteria. The State Heritage Register (SHR) criteria were gazetted following amendments to the Heritage Act and have been in force since April 1999. Assessments in this Conservation Management Plan were made using these criteria for listing on the State Heritage Register. Criteria are outlined in the publication Assessing Heritage Significance - Heritage Office 2000. Under each criterion a place is assessed to be of STATE or LOCAL or NO heritage significance.
A place assessed to be of **STATE** or **LOCAL** heritage significance if it meets **one or more** of the following criteria:

**HISTORIC**

**Criterion (a):** An item is important in the course, or pattern, of NSW’s cultural or natural history (or the cultural or natural history of the local area).

**Criterion (b):** An item has strong or special association with the life or works of a person or group of persons, of importance in NSW’s cultural or natural history (or the cultural or natural history of the local area).

**AESTHETIC**

**Criterion (c):** An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).

**SOCIAL**

**Criterion (d):** An item has strong or special association with a particular community or cultural group in NSW (or the local area), for social, cultural or spiritual reasons.

**SCIENTIFIC**

**Criterion (e):** An item has the potential to yield information that will contribute to an understanding of NSW’s cultural or natural history (or the cultural or natural history of the local area).

**RARE**

**Criterion (f):** An item possesses uncommon, rare or endangered aspects of the area’s cultural or natural history (or the cultural or natural history of the local area).

**REPRESENTATIVE**

**Criterion (g):** An item is important in demonstrating the principal characteristics of a class of NSW’s

- cultural or natural places, or
- cultural or natural environments.

(or a class of the local area’s

- cultural or natural places, or
- cultural or natural environments.)

### 5.4 GRADING OF SIGNIFICANT FABRIC

A five-tier system has been adopted based upon the grading listed in Assessing Heritage Significance (NSW Heritage Office, 2001). The recommended treatment for each level of significance is explained in the General Conservation Policies. The term interpretation or interpretability is used in the sense of the ability to explain the meaning of the place/item, so as the significance of the place understood.

<table>
<thead>
<tr>
<th>Grading (significance)</th>
<th>Justification</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. EXCEPTIONAL</strong></td>
<td>Rare or outstanding element directly contributing to an item’s local and State significance.</td>
<td>Fulfils criteria for local and State listing</td>
</tr>
<tr>
<td><strong>2. HIGH</strong></td>
<td>High degree of original fabric. Demonstrates a key element of the item’s significance. Alterations do not detract from significance.</td>
<td>Fulfils criteria for local and State listing</td>
</tr>
<tr>
<td><strong>3. MODERATE</strong></td>
<td>Altered or modified elements. Elements with little heritage value, but which contribute to the overall significance of the item.</td>
<td>Fulfils criteria for local and State listing</td>
</tr>
<tr>
<td><strong>4. LITTLE</strong></td>
<td>Alterations detract from the significance. Difficult to interpret.</td>
<td>Does not fulfil criteria for local or State listing</td>
</tr>
<tr>
<td><strong>5. INTRUSSIVE</strong></td>
<td>Damaging to the item’s heritage significance.</td>
<td>Does not fulfil criteria for local or State listing</td>
</tr>
</tbody>
</table>
Implications of Assessment

<table>
<thead>
<tr>
<th>GRADING</th>
<th>IMPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 EXCEPTIONAL</td>
<td>Elements to be conserved in terms of the Burra Charter.</td>
</tr>
<tr>
<td>2 HIGH</td>
<td>Elements to be conserved in terms of the Burra Charter but conservation is to be balanced by an assessment of the practical consequences for the continued conservation and use of the item.</td>
</tr>
<tr>
<td>3 MODERATE</td>
<td>Acceptable options include retention, recycling and replacement by new construction in a way that has either minimal adverse effect on, or enhances the significance of Grading 1 and Grading 2 elements.</td>
</tr>
<tr>
<td>4 LITTLE</td>
<td>Acceptable options include removal, modification replacement by new construction in order that the significance of related Grading 1, 2 or 3 elements are enhanced.</td>
</tr>
<tr>
<td>5 INTRUSIVE</td>
<td>The preferred option is for the removal of the element or its modification in such a way so that its adverse impact is eliminated</td>
</tr>
</tbody>
</table>

Schedule of Significant Fabric for the Site

<table>
<thead>
<tr>
<th>GRADING</th>
<th>ELEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 EXCEPTIONAL</td>
<td>The surviving original fabric (c. 1877 and 1900 additions) of the Carrington Hydraulic Engine House has all been ascribed a level of exceptional significance. Specific exceptional elements include:</td>
</tr>
<tr>
<td></td>
<td>➢ The mass &amp; scale of the building</td>
</tr>
<tr>
<td>2 HIGH</td>
<td>The surviving original fabric as follows:</td>
</tr>
<tr>
<td></td>
<td>➢ Chimney foundations</td>
</tr>
<tr>
<td></td>
<td>➢ Hydraulic lines to cranes</td>
</tr>
<tr>
<td>3 MODERATE</td>
<td>The surviving original fabric of the following buildings:</td>
</tr>
<tr>
<td></td>
<td>➢ The first infill to the northern elevation for generators</td>
</tr>
<tr>
<td></td>
<td>➢ 1915 Electrical Sub-station building</td>
</tr>
<tr>
<td>4 LITTLE</td>
<td>The surviving original fabric of the following buildings:</td>
</tr>
<tr>
<td></td>
<td>➢ The Battery Room (Showers)</td>
</tr>
<tr>
<td></td>
<td>➢ The second and subsequent lean-to additions</td>
</tr>
<tr>
<td></td>
<td>➢ Electrical Workshop lean-to.</td>
</tr>
<tr>
<td>5 INTRUSIVE</td>
<td>Those items, which in their present form adversely affect the significance of the place</td>
</tr>
<tr>
<td></td>
<td>➢ Position of chain wire fence to secure building</td>
</tr>
</tbody>
</table>
Schedule of Grading of Heritage Significance of Spaces and Fabric
The following schedules provide a description of elements and grade their importance for each building. This list is not exhaustive and should be used as a guide.

### Carrington Hydraulic Engine House

<table>
<thead>
<tr>
<th>Exceptional</th>
<th>State</th>
<th>➢ The Engine Room (including volume of space)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>State</td>
<td>➢ Original and early timber joinery</td>
</tr>
<tr>
<td></td>
<td>State</td>
<td>➢ Original masonry elements</td>
</tr>
<tr>
<td></td>
<td>State</td>
<td>➢ Metal trusses</td>
</tr>
<tr>
<td></td>
<td>Local</td>
<td>➢ Metal grated flooring</td>
</tr>
<tr>
<td></td>
<td>Local</td>
<td>➢ Roof vents to Boiler Rooms</td>
</tr>
<tr>
<td></td>
<td>Local</td>
<td>➢ Metal lights and ladders</td>
</tr>
<tr>
<td>Moderate</td>
<td>Local</td>
<td>➢ Reconstructed timber joinery</td>
</tr>
<tr>
<td>Little</td>
<td>Local</td>
<td>➢ Additional lean-to structure to northern side of the building.</td>
</tr>
<tr>
<td>Intrusive</td>
<td>Local</td>
<td>➢ Brick division wall to lean-to addition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>➢ Additional openings to facades</td>
</tr>
<tr>
<td></td>
<td></td>
<td>➢ Infill brickwork to Boiler Room windows</td>
</tr>
<tr>
<td></td>
<td></td>
<td>➢ Awning to the eastern facade</td>
</tr>
</tbody>
</table>

### Electrical Sub-Station & Workshop

<table>
<thead>
<tr>
<th>Exceptional</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
</tr>
<tr>
<td>Moderate</td>
</tr>
<tr>
<td>Little</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

### 5.5 ASSESSMENT OF CULTURAL SIGNIFICANCE FOR THE CARRINGTON HYDRAULIC ENGINE HOUSE.
(Based on SHR Criteria)

(a): An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).

**Guidelines for inclusion**

➢ shows evidence of significant human activity – Carrington Hydraulic Engine House was designed to provide hydraulic power to the Port's hydraulic cranes and was used from 1877 to the mid 1960's. The building remained in use by the Port from then to the early 1990's as a store. (State & Local significance)

➢ is associated with significant activity or historical phase – the development of the Port of Newcastle as a leading coal export centre. (State & Local significance)

➢ maintains or shows the continuity of a historical process or activity – not applicable.

**Guidelines for exclusion**

➢ has incidental or unsubstantiated connections with historically important activities or processes – not applicable.

➢ provides evidence of activities or processes that are of dubious historical importance – not applicable.

➢ has been so altered that it can no longer provide evidence of a particular association – the Electrical Sub-station and Workshop building was never completed, as evidenced by temporary walls to the eastern and western ends of the building. The eastern half of the former Electrical Workshop was demolished and the wall reconstructed to allow relocation of the entry roadway to the Port from immediately in front of the Carrington Hydraulic Engine House to the northern side of the site.
Assessment:
The Carrington Hydraulic Engine House has **HIGH** historical significance (**State significance**):

- The Carrington Hydraulic Engine House site was strategically located to provide hydraulic power to the dyke and later Basin wharves. It has remained in government ownership and use since its 1877 construction.
- The use of hydraulic power for wharf cranes was rare in Australia, relying on the technology developed and used in Britain.
- The Carrington Hydraulic Engine House site has been in continuous ownership by the government from 1877 to the present.

**(b): An item has strong or special association with the life or works of a person or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area).**

*Guidelines for inclusion*

- shows evidence of significant human occupation – the Carrington Hydraulic Engine House is associated with provision of power for Port services from 1877 to the mid 1960’s. (Local significance)
- is associated with significant event, person, or group of persons – the Carrington Hydraulic Engine House is associated with Sir William George Armstrong (1810 – 1900) and with E. O. Moriarty Engineer in Chief, Harbour Rivers & Ports for the Public Works Department. (State significance)

*Guidelines for exclusion*

- has incidental or unsubstantiated connections with historically important people or events – not applicable.
- provides evidence of people or events that are of dubious historical importance – not applicable.
- has been so altered that it can no longer provide evidence of a particular association – not applicable.

Assessment:
The Carrington Hydraulic Engine House is of **HIGH** historical association (**State significance**):

- The site is associated with Sir William George Armstrong (1810 – 1900), founder of the Armstrong Machinery Factory in England and inventor of the Accumulator.
- The site is associated with Edward Orpren Moriarty (1825-1896), Engineer in Chief, Harbours Rivers & Ports for the Public Works Department.

**(c): An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).**

*Guidelines for inclusion*

- shows or is associated with creative or technical innovation or achievement – the Carrington Hydraulic Engine House shows technical innovation in its design to house state of the art hydraulic power machinery of its day. While the documentary evidence of who designed the building has not been found, it is obvious by the physical proportions of the building that an architect with knowledge of the requirements of the machinery, designed and detailed the building with a view to creating proportion and symmetry by increasing the size of the windows and doors to suit the height of the roof to the main Engine Room. (State significance)
- is the inspiration for a creative or technical innovation or achievement - not applicable.
- is aesthetically distinctive – the character of the Carrington Hydraulic Engine House is aesthetically distinctive, particularly the height of the main Engine Room and two Boiler Rooms, as well as the two chimneys now demolished. (State significance)
- has landmark qualities – the site is centrally located at the apex of The Basin and can be generally viewed from the Newcastle side of the harbour. (Local significance)
exemplifies a particular taste, style, or technology – the unique proportions of this building can be attributed to the Victorian Mannerist and Victorian Romanesque styles. (State significance)

Guidelines for exclusion
➢ is not a major work by an important designer or artist - not applicable.
➢ has lost its design or technical integrity - not applicable. The location of machinery is reflected in the substantial footings presently exposed below the floor level of the Engine Room.
➢ its positive visual or sensory appeal or landmark and scenic qualities have been more than temporarily degraded - not applicable.
➢ has only a loose association with a creative or technical achievement - not applicable.

Assessment:
The Carrington Hydraulic Engine House has EXCEPTIONAL aesthetic significance (State significance):
➢ The Carrington Hydraulic Engine House has a high degree of aesthetic significance for its siting centred on The Basin with views to and from Newcastle. The immediate site has virtually remained intact since first dedicated.
➢ The Carrington Hydraulic Engine House demonstrates unique proportions in its design to provide the impression of a single storey structure. The design uses style keys of the Victorian Mannerist and Victorian Romanesque architectural styles.

(d): An item has strong or special association with a particular community or cultural group in NSW (or the local area), for social, cultural or spiritual reasons.
Guidelines for inclusion
➢ is important for its associations with an identifiable group – the Carrington Hydraulic Engine House is associated with the Port and Railways staff from 1877 to the present day. (Local significance)
➢ is important to a community’s sense of place – the Carrington Hydraulic Engine House is well known to the Carrington and Newcastle communities. (Local significance)

Guidelines for exclusion
➢ is only important to the community for amenity reasons - not applicable.
➢ is retained only in preference to a proposed alternative - not applicable

Assessment:
The Carrington Hydraulic Engine House has HIGH social significance (Local significance):
➢ The site has been in continuous use as an integral part of the Port infrastructure from 1877 to the present day.
➢ Both staff and the Carrington community have an association with the site. The size of the structure is easily observed from the City of Newcastle.

(e): An item has the potential to yield information that will contribute to an understanding of NSW’s cultural or natural history (or the cultural or natural history of the local area).
Guidelines for inclusion
➢ has the potential to yield new or further substantial scientific and/or archaeological information – There is archaeological potential from demolished chimneys, sub-floor areas and hydraulic pressure line runs. (State significance)
➢ is an important benchmark or reference site or type – Hydraulic Engine House design. (State significance)
➢ provides evidence of past human cultures that is unavailable elsewhere - not applicable

Guidelines for exclusion
➢ the knowledge gained would be irrelevant to research on science, human history or culture - not applicable
Assessment:
The Carrington Hydraulic Engine House has **HIGH** scientific significance (State significance):

- The site contains construction techniques used in the 1870's for use of substantial load bearing masonry and long span metal trusses.
- The building is an example of design techniques used for housing the 1870's hydraulic pressure machinery.
- The site potentially contains archaeological evidence of footings and pipework associated with the building and masonry bases associated with the cranes.

*(f): An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).*

Guidelines for inclusion
- provides evidence of a defunct custom, way of life or process – provides evidence of a rare example of an 1877 hydraulic engine house. (State significance)
- demonstrates a process, custom or other human activity that is in danger of being lost - not applicable.
- shows unusually accurate evidence of significant human activity - not applicable.
- is the only example of its type - not applicable.
- demonstrates designs or techniques of exceptional interest – the Carrington Hydraulic Engine House is an impressive example of a large industrial building proportioned to reflect a style of building of a smaller scale. (State significance)
- shows rare evidence of a significant human activity important to a community – not applicable.

Guidelines for exclusion
- is not rare - not applicable.
- is numerous but under threat - not applicable.

Assessment:
The Carrington Hydraulic Engine House has **EXCEPTIONAL** rarity value (State significance):

- The Carrington Hydraulic Engine House is a rare example of 1870's industrial building, designed symmetrically and proportioned to reflect a smaller scale of structure.

*(g): An item is important in demonstrating the principal characteristics of a class of NSW's*

- cultural or natural places, or
- cultural or natural environments.

*(or a class of the local area's*

- cultural or natural places, or
- cultural or natural environments.)*

Guidelines for inclusion
- is a fine example of its type – the Carrington Hydraulic Engine House is representative of hydraulic engine houses in England. (State significance)
- has the principal characteristics of an important class or group of items – not applicable
- has attributes typical of a particular way of life, philosophy, custom, significant process, design, technique or activity – not applicable
- is a significant variation to a class of items – not applicable
- is part of a group which collectively illustrates a representative type - not applicable.
- is outstanding because of its setting, condition or size – the Carrington Hydraulic Engine House site is outstanding because of its size and location on the Newcastle harbour. (State significance)
- is outstanding because of its integrity or the esteem in which it is held – not applicable
Guidelines for exclusion

- is a poor example of its type - not applicable.
- does not include or has lost the range of characteristics of a type - not applicable.
- does not represent well the characteristics that make up a significant variation of a type - not applicable.

Assessment:
The Carrington Hydraulic Engine House has **HIGH** representative value (**State significance**):

- The Carrington Hydraulic Engine House is a rare Australian example of hydraulic engine houses constructed in England.
- The position of the site on Newcastle harbour and the overall size of the building demonstrates the technical and construction achievements of the 1870s.

**Plate 5.1:** Site Plan showing Levels of Significance of Buildings and Additions to the former Carrington Hydraulic Engine House.
5.6 SUMMARY STATEMENT OF SIGNIFICANCE

The Carrington Hydraulic Engine House is of **State** heritage significance, and is recognised through its listing on the State Heritage Inventory, the Newcastle City Councils LEP (2003) and is **classified** by the National Trust of Australia (NSW).

The Carrington Hydraulic Engine House is associated with the development of the Newcastle Harbour (and in particular The Dyke and The Basin wharves) for the loading and sale of coal to overseas markets (**Criterion a**).

The Carrington Hydraulic Engine House is associated with Sir William George Armstrong and E. O. Moriarty Engineer in Chief, Harbour Rivers & Ports for the Public Works Department (**Criterion b**).

The Carrington Hydraulic Engine House is associated with the importation and use of hydraulic technology and machinery, which were the first of its kind in Australia. The surviving original (and probably only) crane bases are included as they supported the first cranes in Australia to be powered by water hydraulics (**Criterion a, c and f**).

The design of the Carrington Hydraulic Engine House is aesthetically distinctive, particularly the height of the main Engine Room and two Boiler Rooms, as well as the two chimneys now demolished. The design uses style keys of the Victorian Mannerist and Victorian Romanesque architectural styles. (**Criterion c**).

The Carrington Hydraulic Engine House has been associated with the Port and Railways staff from 1877 to the present day as well as the local Carrington community (**Criterion d**).

The Carrington Hydraulic Engine House site and associated Crane Bases contain archaeological potential from demolished chimneys, sub-floor areas and hydraulic pressure line runs (**Criterion e**).

The Carrington Hydraulic Engine House is a rare example of 1870's industrial building, designed symmetrically and proportioned to reflect a smaller scale of structure (**Criterion f**).

The position of the site on Newcastle harbour of the Carrington Hydraulic Engine House and the overall size of the building demonstrate the technical and construction achievements of the 1870s (**Criterion g**).

The Electrical Sub-station and Workshop building is of **Local** heritage significance.

The Electrical Sub-station and Workshop is associated with the development of electricity supply to the Newcastle Harbour cranes, BHP's Newcastle Steelworks and the local tram service (**Criterion a**).
6.0 CONSTRAINTS AND OPPORTUNITIES

This CMP has been prepared as good heritage practice in relation to planned future changes by the Newcastle Port Corporation that may affect the former Carrington Hydraulic Engine House site. The listing of the site on the Corporation’s s170 register as an item of State significance and the Newcastle LEP provisions, are likely to require a CMP for future changes on the site.

6.1 STATUTORY REQUIREMENTS

Local Government

The Carrington Hydraulic Engine House site falls within the Newcastle Local Government Area. The Newcastle Local Environmental Plan 2003 (Heritage and Conservation) lists the following as items of State significance (Schedule 6 of the LEP):

<table>
<thead>
<tr>
<th>Suburb</th>
<th>Item Name</th>
<th>Address</th>
<th>Property Description</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrington</td>
<td>Hydraulic Power Station</td>
<td>106 Bourke Street</td>
<td>Lot 3 DP 834572</td>
<td>State</td>
</tr>
<tr>
<td></td>
<td>Bullock Island</td>
<td>38 Robertson Street</td>
<td>Lot 1 DP 834572</td>
<td>Local</td>
</tr>
<tr>
<td></td>
<td>Crane Bases</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The LEP does not contain any detailed information regarding the buildings listed, the other individual buildings on the site, the site as a whole or the curtilage. The following extracts are from the Newcastle Local Environmental Plan 2003:

Part 4 Environmental Heritage Conservation, clause 28 Conservation Management states:

"In assessing a development application to carry out work on a heritage item, the consent authority may, if it considers it to be appropriate, require the submission of a conservation management plan and have regard to the plan’s recommendations."

Part 4 Environmental Heritage Conservation, clause 34 Conservation Incentives states:

"Despite any other provisions of this plan, the consent authority may grant consent to the use for any purpose of a building that is a heritage item, or of the land on which a heritage item is erected, if:
(a) it is satisfied, on the basis of a heritage impact statement that the proposed use would not adversely affect the heritage significance of the heritage item or its setting and the conservation of the heritage item would be promoted or encouraged by the granting of the consent, and
(b) the proposed use is not contrary to the provisions of any conservation management plan applicable to the site which has been endorsed by the consent authority, and
(c) the granting of the consent to the proposed use would ensure that necessary conservation work identified in the conservation management plan is carried out, and
(d) the proposed use would not adversely affect the amenity of the surrounding area otherwise than to an insignificant extent.

The LEP notes the following work requires consent:
- a use of a land,
- the subdivision of land,
- the erection of a building,
- excavation or filling of land,
- disposal of waste,
- removal or pruning of trees or clearing of native vegetation,
- the injuring or poisoning of a tree,
- the demolition or removal of a building work, relic or place in whole or in part,
- works involving a heritage item or within a heritage conservation area involving the alteration of a building, work or relic by making structural or non structural changes to the detail, fabric, finish or appearance of its exterior except changes resulting
from any maintenance necessary for its ongoing protective care which would not adversely affect any heritage significance it may have,

- altering a heritage item by making structural or non-structural changes to the detail, fabric, finish or appearance of its interior except changes resulting from any maintenance necessary for its ongoing protective care which would not adversely affect any heritage significance it may have,

- disturbing or excavating a place of Aboriginal heritage significance or an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved or destroyed,

- the display of an advertising sign

- the carrying out of a utility undertaking described in Schedule 4 (of the LEP) otherwise than by a public authority.

The Council is also required to assess the impact of development in the vicinity of a heritage item, to determine the impact that the proposal will have on the significance of the item or place.

Zoning
The Carrington Engine House site is zoned 4(b) Port & Industry Zone.
The Zone Objectives are:

(a) To accommodate port, industrial maritime industrial and bulk storage activities, which by their nature or the scale of their operations, require separation from residential areas and other sensitive land uses.

(b) To require that development of land within 750 metres from the high-water mark of the shores of the Port of Newcastle, capable of docking ocean-going vessels, is used for purposes that:

(i) require a waterfront location that provides access to deep water, or

(ii) depend upon water-borne transport of raw materials or finished products, or

(iii) have a functional relationship that necessitates proximity to the activities described above.

(c) To facilitate sustainable development through the application of industrial ecology.

(d) To provide for other development, which will not significantly detract from the operation of large scale industries, or port-related activities, that is primarily intended to provide services to persons employed in such industries and activities.

Implications of the LEP
The Carrington Hydraulic Engine House site would require re-zoning for other uses than Port & Industry. Re-zoning of the site should be for the total site, including a curtilage zone within the site to preserve the heritage significance of the place. Newcastle City Council may require a separate re-zoning application prior to the lodgement of a development application for any proposed adaptive re-use of the site.

The NSW Heritage Act
The NSW Heritage Act was amended in 1999 to create the State Heritage Register (SHR). Any items on State agency Section 170 Heritage Registers that were identified as being of State or High significance were transferred onto the State Heritage Register.

The Carrington Hydraulic Engine House is not presently listed on the SHR, however due to the listing on the Newcastle LEP and following the completion of this CMP, the Heritage Office is likely to consider this site for listing on the SHR.

The Heritage Act requires consent from the Heritage Office to undertake works to items on the State Heritage Register where those works may affect the heritage significance of the listed item. The Heritage Act allows some limited exemptions from this requirement listed in the "Standard Exemptions for Works requiring Heritage Office Approval". This document relates to specific activities such as building maintenance, minor repairs, and alterations to
certain interiors or change of use. The document provides detailed definitions of these works and the extent to which they can be undertaken. Exemptions do not normally apply to excavation work.

**Excavation Permits**

A person must not disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed unless the disturbance or excavation is carried out in accordance with an excavation permit.

A person must not disturb or excavate any land on which the person has discovered or exposed a relic except in accordance with an excavation permit.

A relic is defined as:

...any deposit, object or material evidence, more than 50 years old relating to European settlement of an area or to a period of European settlement.

All "relics" are protected under the Heritage Act 1977 regardless of whether the place is listed as a heritage item on a local, state or national level. For places listed on the SHR, an excavation permit is obtained under section 60 of the Heritage Act 1977. For all other places, the disturbance of "relics" requires an Excavation Permit under Section 140 of the Heritage Act 1977.

Should excavation work be undertaken on the Carrington Hydraulic Engine House site, which is likely to disturb or destroy relics, and Excavation Permit must be obtained from the Heritage Office.

Excavation for services and maintenance for items listed on the SHR, which do not impact on areas designated as archaeologically significant is exempt from requiring an approval under Section 60 of the Heritage Act. This exemption applies only when the entire area covered by the listing has been the subject of an archaeological assessment. The assessment will identify areas, which are archaeologically significant and should not be excavated except for compelling reasons, and only with the approval of the Heritage Office. The assessment should also identify areas free of archaeological relics, so that excavation for services and maintenance can occur without the need for a Section 60 approval.

**Section 170 registers**

Section 170 of the NSW Heritage Act 1977 requires each government agency to establish and maintain a Heritage and Conservation Register (also known as a Section 170 register) of heritage assets under its ownership and care. The aims are to identify items of environmental heritage so that the State can efficiently plan for the future while effectively conserving the past for future generations.

Under the Heritage Act an agency is required to:

- Give 14 day notice to the Heritage Council before it removes, transfers ownership, vacates or demolishes any item listed on the Register
- Maintain its heritage assets in accordance with the Ministers approved management principals and Heritage Council’s guidelines
- Report annually on its compliance with the guidelines and on the condition of its heritage assets.

The Newcastle Port Corporation has included the Carrington Hydraulic Engine House site and associated crane bases on their register reviewed in 2005 by the EJE Group. Information from this CMP can be used to update this register.

**State Agency Heritage Guide**

The NSW Heritage Office has prepared a document for Management of Heritage Assets by NSW Government Agencies (copy appended in Appendix 8.4). The principals and guidelines have been issues under section 170A of the Heritage Act (NSW). The Minister approved the State Owned Heritage Management Principals on the 16th December 2004, underpinning the stewardship of government heritage assets in NSW. The Heritage Asset Management Guidelines were endorsed for issue by the Heritage Council of NSW on 1st December 2004 and relate to requirements for agencies to manage heritage assets under their care and control.
6.2 HERITAGE LISTINGS

To determine appropriate conservation policies for the building the external constraints that will impact on the future of the site have been investigated and are summarised in this section.

Currently, the Carrington Hydraulic Engine House site has the following heritage listings:

<table>
<thead>
<tr>
<th></th>
<th>Register of the National Estate</th>
<th>National Trust of Australia</th>
<th>DUAP 1989 (Hunter REP)</th>
<th>Newcastle City Council (LEP)</th>
<th>NCP S170 Register</th>
<th>Dept. Commerce (DPWS) Register</th>
<th>Heritage Council NSW (SIB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Former Carrington</td>
<td>No</td>
<td>Listed</td>
<td>Listed (Sch. 1)</td>
<td>Listed (Sch. 6)</td>
<td>Listed</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Hydraulic Engine House</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Former Electrical</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Listed (Sch. 6)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Sub-station &amp; Workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Australian Heritage Council**

The Australian Heritage Council is a Federal Government advisory body that maintains a National Heritage List, a Commonwealth Heritage List and retains the former Register of the National Estate as an evolving record of Australia's natural, cultural and Indigenous heritage places that are worth keeping for the future.

The National Heritage List is a list of places with outstanding heritage value to our nation, including places overseas. Listings are protected under the Australian Government's Environment Protection & Biodiversity Conservation Act 1999 (EPBC).

The Commonwealth Heritage List is a list of places managed or owned by the Australian Government and identified as having Commonwealth heritage values and protected under the EPBC Act.

**The National Trust of Australia**

The National Trust register lists buildings and items of heritage significance in NSW. The organisation, whilst having no statutory power, is an influential force regarding environmental matters in the state. Inclusion on the National Trust register generally indicates a high level of community support and insensitive redevelopment is likely to meet with community disapproval.

The National Trust of Australia (NSW) has classified the Carrington Hydraulic Engine House's facade.

**The Hunter Regional Environmental Plan 1989 Listing**

The Carrington Hydraulic Engine House is listed as an Item of "State Environmental Heritage" in the Hunter REP 1989. This listing has been superseded by the Newcastle LEP.

**The Newcastle Local Environmental Plan 2003 Listing**

The buildings are listed as items of State Significance.

**The Department of Commerce (formerly DPWS) Heritage & Conservation Register**

Prior to the listing of government owned buildings on individual Section 170 Registers, the Public Works Department (now the NSW Department of Commerce) prepared a register of historic buildings, which served as an interim register. The site is included in the Heritage and Conservation Register of the Public Works Department 1988.
Issues Arising from the Heritage Listings

The number of groups recognising the importance of the Carrington Hydraulic Engine House site in varying ways highlights the need for this CMP. The objective of this study is to further define the heritage significance of the site and buildings through the process of assessment of cultural significance as defined by the NSW Heritage Office.

The resulting clarification of the heritage significance will allow the various registers to more consistently reflect the value of the place. Listing on the State Heritage Register will provide additional protection for the place, which is currently protected by the Newcastle LEP.

This CMP will define the heritage significance of the place and individual buildings and the level of that significance. Adaptive re-use of the site will be guided by the levels of significance and the conservation policies associated with those levels of heritage significance.

6.3 FUTURE ADAPTIVE RE-USE REQUIREMENTS

A Masterplan for potential adaptive re-use of the site should be prepared using this CMP as the basis for setting parameters for future development. The Masterplan must address the site as a whole and the individual buildings that make up the place.

The Newcastle Port Corporation has indicated it is their intent to adaptively re-use the former Carrington Hydraulic Engine House site, by leasing the site for income generation to fund ongoing maintenance of the significant building fabric.

Individual Buildings

It may be possible that individual buildings of heritage significance could be used for different purposes requiring works associated with their adaptive re-use. This CMP should be used to guide any development together with the engagement of a heritage professional to coordinate further detailed study of the building fabric and development of proposals.

Future Owners

The former Carrington Hydraulic Engine House site may remain the property of the Newcastle Port Corporation, be vested in government ownership, or be fully privately owned. The significance of the site would restrict any physical division of the site area that would interfere with the interpretation of the building's significance and setting.

It is anticipated that the Conservation Management Plan and the site Masterplan will largely direct the future use of the site.

6.4 ORDINANCE COMPLIANCE

The Building Code of Australia is the operative building ordinance for the conservation and adaptive re-use of the Carrington Hydraulic Engine House buildings.

The requirements for compliance of the buildings with the BCA are based on the class of the building. The classification of the building is determined by the purpose for which it is adapted to be used. Where parts of the building are to be used for different purposes each part of the building will be classified separately.

Where compliance with the BCA may compromise the architectural integrity of the building and diminish its Cultural Significance, alternative solutions may be negotiated through the Fire, Access and Services Advisory Panel of the Heritage Council. The BCA does not necessarily apply to existing buildings and discretion may be used in its application to existing buildings.

The BCA however does apply to existing buildings that undergo a major refurbishment and may require the whole of the existing building to be upgraded to comply with the code.

6.5 IMPLICATIONS OF EXISTING CONDITION
The buildings on the Carrington Hydraulic Engine House site vary in condition depending on the age of the structure, the materials used in the construction and maintenance regime undertaken on the building during its life.

The Section on Conservation Policies addresses repairs to existing fabric. Generally existing significant fabric should be repaired rather than replaced. Where fabric has deteriorated to the point where it is believed to be beyond repair, advice should be sought from a conservation specialist before undertaking repairs.

**Significance**
Buildings with Exceptional and High significance should be regularly maintained, even at the expense of lower or non-significant buildings. Buildings of Exceptional and High significance should have intrusive elements removed where possible during maintenance contracts. The objective of regular maintenance is to protect and preserve original significant building fabric. Preservation of building materials is encouraged in lieu of their replacement, which should only occur as a last resort and match the material and profiles exactly.

**Maintenance**
Buildings of heritage significance will require ongoing maintenance. The work will include items of major maintenance, removal of building fabric considered to be Intrusive and capping of disused services.

**Services**
The Carrington Hydraulic Engine House site and buildings have had the majority of their services removed or cut following cessation of their use as a storage function. The future functions for each of the buildings is likely to require new or different services depending on the eventual function of the building.

**Access**
Adaptive re-use of the site and buildings will require consideration for inclusion of ramps and lifts to comply with the current disabilities access codes. The Commonwealth Disability Discrimination Act 1992 (DDA) requires that people with disabilities (physical, visual impairment, impaired hearing, intellectual/psychiatric) are given equal opportunity to participate in and contribute to the full range of social, political and cultural activities. The DDA also makes it unlawful to discriminate in the provision of goods and services or facilities against people on the basis that they may have a disability. The DDA is administered by the Human Rights and Equal Opportunity Commission (HREOC). Under the DDA, Disability Access Plans can be prepared by agencies to assist in clarifying their obligations under the Act.

It is recognised that heritage buildings often pose complex and difficult problems in terms DDA compliance. The document "Access to Heritage Buildings for People with Disabilities" prepared by E J Martin (Cox), August 1997 provides a framework for access to heritage places. It addresses issues such as parking, entrances, stairs, doors, thresholds, interiors, amenities, interpretation and landscapes, and sets down principles for the benefit of all people associated with access for people with disabilities and heritage places.

**6.6 INTERPRETATION**
A detailed interpretation plan is beyond the scope of this document, however the interpretive potential of the building was noted during the course of this study.

The large volume of the Engine Room in the former Carrington Hydraulic Engine House provides an area for public access to the building and for the provision of a permanent display outlining the development of the Port of Newcastle. Additionally, the room could be used for display purposes by the occupying tenant and by outside organisations requiring a space for temporary display purposes or to launch an event.

The use of this space would provide controlled public access to the building of State significance at different times of the year and could be open for general public access during Heritage Month.
Plate 6.1: Site Plan Showing Areas for Possible Future Development
6.7 CURTILAGE

Definitions
The NSW Heritage Office defines curtilage as "the extent of land around a place which should be defined as encompassing its heritage significance. This area of land is known as a heritage curtilage."

There are four types of heritage curtilage:

- Lot Boundary Heritage Curtilage, where the legal boundary of the allotment is defined as the heritage curtilage. The allotment will generally contain all associated features such as out buildings and gardens within its boundaries.
- Reduced Heritage Curtilage, where an area is less than the total allotment is defined as the heritage curtilage, and is applicable where not all parts of a property contain places associated with its significance.
- Expanded Heritage Curtilage, where the heritage curtilage is actually larger than the allotment, and is particularly relevant where views to and/or from a place are significant.
- Composite Heritage Curtilage, would generally apply to a larger area combining a number of separate places, such as heritage conservation areas based on a block, precinct or whole village.

Heritage Curtilage of the former Carrington Hydraulic Engine House
The location of the Carrington Hydraulic Engine House centred on The Basin, facing the harbour and the City of Newcastle would indicate an Expanded Heritage Curtilage would be the most appropriate curtilage for this site and building.

The nature of the design and detailing of the building emphasises the importance of the south facing façade, addressing the wharves and harbour. The aspect of views to and from the harbour and city are important to the context of the building's interpretation.

Plate 6.2: View of the Carrington Hydraulic Engine House from the harbour.
(Source: Newcastle Regional Library Collection)
7.0 CONSERVATION POLICIES

7.1 EXPLANATION
This Conservation Management Plan identifies the cultural significance of the Carrington Hydraulic Engine House, and should be used as a basis for decision making to ensure that future planning is done with due regard to the significance of the place.

This Conservation Management Plan is intended to be used by:
- The Newcastle Port Corporation as a guide to the conservation and ongoing maintenance of the buildings.
- The Lessee of the building as a guide for the future uses of rooms and activities and minor maintenance of the buildings and site.
- Any consultants undertaking work on the site.
- Approval Authorities (Newcastle City Council & the Heritage Office)
- Other Government agencies and authorities.

This section contains the Conservation Policies, which are aimed at ensuring that proposed changes to the fabric and use of the historic Carrington Hydraulic Engine House buildings are undertaken in such a manner that they do not affect its cultural significance.

7.2 INTEGRATION INTO THE MANAGEMENT OF THE SITE

Adoption of Conservation Plan
The effectiveness of this Conservation Plan depends on its being implemented. The document should be made available to, and read by all Staff using the Carrington Hydraulic Engine House, the Newcastle Port Corporation who is involved with development or maintenance of the site and buildings. In addition, it is essential that the Corporation and Lessees are aware of the process, which is to be followed when proposing maintenance, or other work, which involves the modification of significant building fabric.

Policy 1
The Newcastle Port Corporation should formally adopt this Conservation Management Plan as one of the basis for the future management of the place and the significant buildings.

Policy 2
The Newcastle Port Corporation should implement a management structure that:
- Integrates conservation into the overall management of the site;
- Provides for the long term conservation of significant fabric;
- Disseminates the aims and intentions of this CMP to appropriate officers;
- Outlines the responsibilities at each staff level, for implementing the CMP;
- Incorporates the CMP into future lease arrangements;
- Integrates the use of the State Agency Heritage Guide into maintenance plans.

Conservation Methodology
The Australian ICOMOS Charter for the Conservation of Places of Cultural Significance (the Burra Charter) has widely been accepted across Australia as the underlying methodology by which all works to buildings, which have national and state significance, be undertaken. The Burra Charter is included as an Appendix.
Policy 3
Ensure all conservation and associated development works to the Carrington Hydraulic Engine House site are undertaken:

- In accordance with the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (the Burra Charter);
- In accordance with the aims and intentions of this Conservation Management Plan;
- In accordance with the requirements under the Newcastle City Council LEP 2003 (Heritage & Conservation);
- In such a manner that respects the cultural significance of the place.

Access to the Conservation Management Plan
This Conservation Management Plan is a publicly accessible document with an ISBN Number making it a publicly available document. Copies of the completed Plan will be lodged with the Heritage Office, the State Library of NSW, Newcastle City Council and the Australian National Library.

Conservation Management Plans are a means of allowing community access and participation in places of cultural importance. They can be a valuable tool for engendering continued public support and ideally should be placed on public exhibition.

Policy 4
Ensure this Conservation Management Plan becomes a publicly available document.

Policy 5
On completion of this document, copies should be lodged with:

- Heritage Office Library (1 copy)
- State Library of NSW (1 copy)
- National Library of Australia (1 copy)
- Newcastle City Council Library (1 copy)
- Department of Commerce Library (2 copies)

Review of the Conservation Management Plan
A regular review of the policies contained within the Conservation Management Plan should be undertaken to ensure that appropriate conservation approaches and methodologies are integrated not only with the planning of new or conservation works, but also into the day-to-day maintenance program of the place.

Policy 6
Review this Conservation Management Plan regularly, ie within ten years, or whenever critical new information comes to light or changes in use or management takes place.

7.3 MANAGEMENT OF THE SITE

The land and buildings at the Carrington Hydraulic Engine House site are owned by the NSW government and managed by the Newcastle Port Corporation.

This Conservation Management Plan has been prepared for the Newcastle Port Corporation, who is currently considering the future direction of utilisation of the site. The CMP examines the existing buildings, together with associated maintenance and repair works in preparation for an adaptive reuse proposal of the heritage significant structures.

The Carrington Hydraulic Engine House site reflects a particular pattern of development in its surviving built environment and the associated industrial setting. It is essential that any new development or adaptive re-use proposal be based on an understanding of the historical development of the site, as well as the significance of the surviving built fabric and its integral industrial setting.
Change of use or Ownership
A change of use or ownership should be accompanied by a strategy for the ongoing protection of the building and its setting to ensure retention of the cultural significance of the place. This strategy should be built into any lease or sale agreements for the site. Similarly any other government department or authority in which the property title may be invested should adopt the strategy.

Policy 7
Any change of use OR ownership should be accompanied by a strategy for the ongoing protection of the significant fabric and the landscaped setting.

Ideally the buildings should not remain unoccupied, as this tends to lead to rapid deterioration of the fabric through natural causes and vandalism. Surplus buildings can be put to temporary uses provided that this does not result in substantial modifications to significant fabric. Temporary uses can include storage, however should not pose a fire hazard. Modifications to significant fabric should not be undertaken for short-term uses, ie less than five years.

Policy 8
Once restored and secured significant buildings must not be allowed to remain unoccupied for any length of time. If unavoidable provide security.

Policy 9
Disposal of significant heritage property by government agencies must follow the procedures set out under Section 170 of the NSW Heritage Act (amended).

Future Use
The continued use of the site and its buildings under the management of the Newcastle Port Corporation is desirable. The site is associated with the Port and is recognised to be culturally significant. This CMP considers future uses of the site and contains policies relating to changing use.

A use preserving the character of the building and conserving significant fabric and important volumes such as the main Engine Room should be encouraged. The responsibilities for maintaining the individual parts of the building and the site as a whole needs to be established prior to any new institutions utilising part or the entire site.

Policy 10
Continue the process of adaptive re-use of the Carrington Hydraulic Engine House and site whilst retaining its cultural significance.

7.4 PROCESS FOR APPROVALS
This document should form the basis of any forward planning for the Carrington Hydraulic Engine House site. It should also be consulted when planning maintenance work or the upgrading of individual buildings. This CMP should be used as the basis for the preparation of Statements of Heritage Impact to accompany future development applications.

A future development may be proposed that is contrary to the recommendations of this CMP. A Statement of Heritage Impact is a useful tool for arguing the case for alterations to a heritage item and ensuring that a best result between function and the retention of heritage significance is achieved.

Requirements of Council
The Newcastle LEP 2003 incorporates the following aim and objectives:
Aim 1
To respect, protect and compliment the natural and cultural heritage, the identity and image, and the sense of place of the City of Newcastle.

Objectives
Development should:
(a) respect and build upon positive aspects of local character and amenity, and
(b) contribute positively to the public domain, namely its urban streetscapes and open spaces, or its rural and natural landscapes, and
(c) conserve the environmental heritage of the City of Newcastle, and
(d) conserve the heritage significance of the existing built fabric, relics, settings and views associated with identified heritage items and heritage conservation areas, and
(e) ensure that archaeological sites and places of aboriginal heritage significance are conserved, and
(f) protect places and structures which have the potential to have heritage significance but have not been identified as heritage items, and
(g) ensure that nominated heritage conservation areas retain their heritage significance.¹

Part 4 of the Newcastle LEP 2003 expands on Environmental Heritage Conservation with specific reference to heritage assessment, conservation management, advertised development, referral to Heritage Council, development affecting places of aboriginal heritage significance, development affecting archaeological sites or relics of non-aboriginal heritage significance, development in the vicinity of a heritage item, and conservation incentives.

Major maintenance and repairs involving replacement or removal of building fabric will require a development application supported by a Statement of Heritage Impact identifying the scope of works. A detailed survey and recording of the fabric should be undertaken to form the basis of the documentation of repair or alteration works.

Policy 11
Seek approvals for development and conservation work as required by legislation.

Summary of the Approvals Process

<table>
<thead>
<tr>
<th>Development Application</th>
<th>All work except routine maintenance (see requirements of Council)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement of Heritage Impact</td>
<td>All work to areas identified as having significance, including maintenance that will impact on items of significance.</td>
</tr>
<tr>
<td>Detailed Conservation Assessment</td>
<td>Items of State Significance including Section 170 listed buildings.</td>
</tr>
<tr>
<td>Detailed Fabric Analysis (with SoHI)</td>
<td>Nominated items of State Significance which are to continue to fulfil the same function.</td>
</tr>
</tbody>
</table>

Section 170 Registers
Information from this CMP can be used to compliment the existing Corporation's Section 170 Registers in the following ways:
- the detailed information in the inventory can be used to update individual Section 170 listings; and
- assist the Corporation in the overall management and conservation of heritage assets.

Buildings included in the Section 170 Registers for the Newcastle Port Corporation can be found in the Review of Section 170 Heritage and Conservation Register (January 2005) by the EJE Group.

¹ Newcastle LEP 2003 Part 1 (page 5)
Policy 12
Update the relevant Corporation’s Section 170 Registers in the light of the findings of this Conservation Management Plan.

Policy 13
Update listing information on the relevant state and national inventories:
- State Heritage Register
- National Trust Register
- The National Heritage List

Policy 14
Ensure items of State Significance are entered on the State Heritage Register as required under s.170 of the Heritage Act.

7.5 CONTEXT

The earliest plans found of the development of Newcastle harbour is dated to 1871 and shows the approximate location of the stone ballast dyke and The Basin. This construction was carried out just north of Honeysuckle Point and also shows the realignment of the Newcastle waterfront and Stockton waterfront to the harbour and channel.

Formation of the Site
The Journal of Town and Country (22 July 1876) published a plan showing the new works at Bullock Island and an artist’s impression of the Bullock Island Hydraulic Engine House.

Policy 15
Retain the Expanded Heritage Curticle allowing views to the harbour and Newcastle and vice versa.

Development of the Site
The development of the site was staged by constructing the Hydraulic Engine Room, two Accumulator Towers and one Boiler Room and Chimney in the first stage to power four fixed hydraulic cranes.

The second stage saw two further engines added to the Engine Room, and additional Boiler room and Chimney erected and the second accumulator was installed in its tower in 1879.

Four more cranes including two of the first 25-ton cranes were installed in 1880. the Boat Harbour was also constructed that year.

Policy 16
Planning future development of the site should recognise and preserve sections of building fabric of exceptional and high heritage significance.

Policy 17
Preserve remaining crane bases for interpretive purposes. Preserve the archaeological remnants of the Boat harbour and consider methods to interpret its site location.

Entrances
The site was developed with no formal entrance except for the possible extension of Cowper Street. The design of the Carrington Hydraulic Engine House had its large entrance doors and accumulator doors facing south towards the harbour and Newcastle.
Policy 18
Planning future development of the site should maintain the open site to the south by the use of paving and low level landscaping to maintain views of and from the building.

7.6 INTEGRITY OF THE DESIGN

Stages of Development
The buildings on the site have been designed in distinct stages, the hydraulic machinery stage and the electrical stage.

The hydraulic stage is regarded as the most important as this was the reason for the development of the site. The electrical stage, comprising the initial lean-to addition to the original building is the next important stage as the hydraulic and electrical equipment were acting separately.

The third stage of development includes the secondary lean-to structures as well as the Battery room and the (incomplete) 1916 Electrical Sub-station and Workshop.

Policy 19
Preserve the various stages of the development of the site in order of significance. The hydraulic and early electrical are more significant than the later electrical stages.

Policy 20
Consider demolition of less significant stages of the buildings on the site where there is a clear benefit to the preservation of the most significant fabric.

Policy 21
Reconstruct any missing detail of the remaining significant building fabric where the detail new buildings or structures constructed within the site should be based on an understanding of the original design intention and the surviving elements.

Design Features
The design of the Carrington Hydraulic Engine House is unique for its treatment of proportions by increasing the sizes of windows and doors to provide what would appear to be a normally proportioned building that in reality would be the equivalent of three storeys in height.

The exaggeration of these elements in the overall presentation of the building to the harbour creates a well-proportioned and highly detailed façade complete with stone entablature, pediment, frieze, architraves, quoins and base course.

Policy 22
Conserve elements of the original design of the Hydraulic Engine House stage (exceptional significance) and elements of the electrical stage (high significance) that remain in tact and contribute to the site.

Policy 23
Consider removal of building elements that are not significant and detract or are intrusive on significant buildings or structures on the site.

Policy 24
Reconstruct missing detail of original fabric where known.
7.7 ARCHAEOLOGY

The Carrington Hydraulic Engine House site potentially contains a high level of archaeological resources, which can provide information relating to the operation of the hydraulic power system and hydraulic lines to the crane bases.

Additionally, there is potential for the Boat Harbour to exist, possibly buried under the present wharves.

The archaeological resource requires careful management to ensure that proper archaeological procedures are recognised and incorporated into any maintenance and proposals for future developments.

The investigation, documentation and interpretation of the visible and subsurface archaeological evidence is essential to the understanding of the cultural significance of the Carrington Hydraulic Engine House, the associated Crane Bases and the Boat Harbour sites. In addition it provides an opportunity to demonstrate to the community the process for responsible conservation and management of cultural heritage and archaeological resources. (See also Section 4.7 Archaeology)

Policy 25
Ensure that any excavation works that may damage or disturb archaeological relics is undertaken in a manner that conforms to the Heritage Act of 1977 and guidelines issued by the Heritage Office.

Policy 26
Ensure that excavation programs include a research design, archaeological methodology and long-term conservation program for artefacts, which meets Heritage Council requirements.

Policy 27
Ensure that an allowance is made for archaeological assessment, monitoring and/or investigation, in all contracts that may disturb or destroy relics. Should relics be uncovered during excavation works, ensure liaison with Heritage Office is undertaken to determine the appropriate treatment of the relics (ie removal or conservation in-situ).

Policy 28
Preserve crane bases in situ as relics. The harsh maritime environment will expose the masonry remains to deterioration over time. Maintenance of mortar joints and masonry elements will assist in slowing the process of deterioration.

7.8 CONSERVATION APPROACH

Conservation Works
The policies contained within this Conservation Management Plan are aimed at ensuring that all works, including conservation works, are undertaken with reference to the cultural significance of the Carrington Hydraulic Engine House site. An understanding of the historical development of the buildings should be a prerequisite for all those carrying out conservation works to the place.

It is essential that conservation work be undertaken in accordance with current conservation principles and methodologies. The current methodology stresses the need to document the reasoning behind the selection of a particular approach, either conservation or intervention, to enable those undertaking work in the future to understand the aims and intentions of a particular project.
The need for involvement of conservation practitioners in all stages of a project is essential. In addition, specialist advice from a conservator may be required for the conservation of particular elements such as metalwork.

**Policy 29**
Conserve the significant fabric of the Carrington Hydraulic Engine House buildings both externally and internally in accordance with the guidelines relating to treatment of fabric of different levels of significance (refer to Policy 33).

**Policy 30**
Ensure that a record of the underlying methodology for each conservation project is maintained including:
- documenting major decisions;
- records of any testing undertaken;
- ensure that this record is archived.

**Policy 31**
Seek funding to ensure all building works, including maintenance, are undertaken by skilled trades people familiar with conservation methodology and practice and supervised by a qualified professional.

**Treatment of Fabric**
The aim of any conservation work to the Carrington Hydraulic Engine House site should be to ensure that the existing fabric is stable, and to retard further deterioration, without detracting from the cultural significance of the place. There may be exceptions to these general rules for the treatment of fabric. Refer to the detailed policies to follow for rules relating to specific individual items. The following general policy refers to both internal and external elements, including decoration. There is no distinction or difference in level of significance between internal and external fabric. Refer also to the more detailed levels of significance found in Section 5 – Cultural Significance.

**Policy 32**
Elements identified as having Exceptional or High significance should be retained and conserved, preferably in situ. The retention of items of Moderate significance is desirable. Items of Low significance may be retained or removed. Intrusive items should eventually be removed.

The following table should be referred to as a guide for the treatment of the various building components and fabric.

<table>
<thead>
<tr>
<th>Grading (significance)</th>
<th>Recommended Treatment of Spaces &amp; Fabric</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXCEPTIONAL</td>
<td>Maintain, preserve, restore, reconstruct or adapt in accordance with the Burra Charter. If adaptation is necessary for the continued use of the place, minimise changes, removal and obscuring of significant fabric and give preference to changes that are reversible.</td>
</tr>
<tr>
<td>HIGH</td>
<td>Maintain, preserve, restore, reconstruct or adapt in accordance with the Burra Charter, in conjunction with minimum adaption for supplementary new construction if required for function.</td>
</tr>
<tr>
<td>MODERATE</td>
<td>Retain in situ in accordance with the Burra Charter (preferred). Adaption or removal in part is acceptable if necessary; or for adaptive reuse to ensure overall conservation. Retention may depend on factors other than heritage value.</td>
</tr>
</tbody>
</table>
LITTLE
Retain, recycle, add compatible new construction and/or remove in part as necessary for adaptive reuse, minimising adverse impact on fabric of exceptional or high significance and having the least practicable impact on fabric of moderate significance. Conservation of overall form and configuration preferred, often already substantially altered and can accommodate other change.

INTRUSIVE
Remove or modify, in the long term, to reduce adverse impact.

**The Hydraulic Engine House Building**
To retain the cultural significance of the Carrington Hydraulic Engine House listed as exceptional significance, it is essential that the form of the original building be retained. An important element of the building is the volume of the Engine Room. This space was created to house and operate the hydraulic engines and is associated with the vertical accumulator towers.

**Policy 33**
*Conserve the external facades and internal Engine Room volume identified as having exceptional or high significance including the:*
- retention and conservation of nineteenth century fenestration, joinery and stone elements;
- removal of intrusive openings, brickwork, metalwork and joinery;
- reconstruction of known missing joinery details; and
- provision of continuous care and maintenance.

**The Auxiliary Engine House**
The rear of the building was enclosed between the two Boiler Rooms in 1891 to provide electric lighting to replace the existing gaslights in the Engine House and provide lighting for The Dyke.

**Policy 34**
*Conserve the Auxiliary Engine House identified as having exceptional or high significance including the:*
- retention and conservation of nineteenth and early twentieth century fenestration, joinery and joinery elements;
- removal or adaption of intrusive openings, walls and joinery;
- reconstruction of known missing joinery details; and
- provision of continuous care and maintenance.

**The Lean-to Structures and Battery House**
The Auxiliary Engine House was extended in 1906 to provide a battery room to the northern side of the original building, as a lean-to to the re-named Dynamo Room. This was followed by another addition to the west of the lean-to reflecting some of the detail used in the 1877 building, however using render in lieu of stone decoration. The structures are extensively modified and in a derelict condition.

**Policy 35**
*These additions are of lower significance than the main building as they were later additions to augment the required floor area. Consider removal of these structures if it would benefit the preservation and interpretation of the Hydraulic Engine House.*

**Electrical Sub-station & Workshop**
The Electrical Sub-station & Workshop building was erected to receive current from the city power plant and covert it to DC power for the electric cranes. This building was obviously
planned for expansion in both a westerly and easterly direction and was centred on the middle of the Hydraulic Engine House footprint.

The building has been partially modified by the construction of a new entry roadway to the port. The building is currently in a derelict condition.

**Policy 36**

This building is of lower significance than the main building as it was a later addition to provide for the change from hydraulic to electric power. Consider removal of this structure if it would benefit the preservation and interpretation of the Hydraulic Engine House.

**Conservation of Major Internal Engine Room Space**

An important element of the building is the volume of the Engine Room. This space was created to house and operate the hydraulic engines and is associated with the vertical accumulator towers.

Adaptive re-use or refurbishment should retain the nineteenth and early twentieth century volumes. Retain industrial elements such as ladders, walkways lights and Accumulator water level gauges.

Any introduction of new platforms, mezzanine levels or walkways should be minimised to reduce the visual impact on the overall volume of the room.

**Policy 37**

Retain surviving original nineteenth and early twentieth century configuration of the Volume of the Engine Room. Discourage the introduction of new levels within the space unless they assist with the overall interpretation of the building.

### 7.9 INTERPRETATION OF THE PLACE

The Carrington Hydraulic Engine House site has been identified as being of State significance to, NSW and the City of Newcastle. It contains evidence of the use of hydraulic power to improve the loading of coal into ships by crane and the subsequent development of the Port of Newcastle. The building contains evidence of its unique arrangement of machinery that could form the basis of a display on the pattern of development of the port and coal loading from the mid nineteenth century to the present day.

**Policy 39**

Interpretation of the significance of the Carrington Hydraulic Engine House's history and usage should be provided for the public to increase their understanding and awareness of the place and its broader historical, physical and contemporary context with Newcastle and its development. Develop an Interpretation plan for the site.

### 7.10 INTRUSIVE BUILDING ISSUES

Items listed as Intrusive should be removed where possible to reveal the original heritage fabric they cover. Some additions have been constructed in areas obscuring the view of a significant item. This should also include incidental items such as disused or redundant services assessed as not significant as well as minor renovations or additions that detract from the item of significance.

**Policy 40**

Remove intrusive elements when undertaking renovations and maintenance of the heritage buildings. Consider the heritage impact prior to planning alterations to significant buildings, or existing buildings with a known impact on heritage.
7.11 ADAPTIVE RE-USE

The Carrington Hydraulic Engine House has been used for storage purposes since the mid 1960's until the mid 1990's. The roof of the Hydraulic Engine Room was reconstructed and the metal trusses restored in 1998 following a fire. The Newcastle Port Corporation is investigating the adaptive re-use of the site as a means to ensure the long term maintenance and survival of this important building.

Introduction of new functions to a building may result in a new vocabulary of details and materials developed to compliment the existing character of the building. Period detailing should be restricted to elements for which there is evidence of their original configuration. Where there is no evidence of the original detail, it is not necessary or appropriate to invent a period detail. The use of imitation (non-authentic) heritage detailing should be avoided.

The use of high quality integrated modern design is acceptable for modern elements and is preferable in inappropriate period design. New works which impact on significant fabric must be reversible in accordance with the guidelines in the Burra Charter.

**Policy 41**

*Ensure that modifications for adaptive re-use of buildings respect the original design features of the structure or area.*

**Policy 42**

*Ensure that all new work:*

- recognises the major heritage status of the complex;
- allows for the conservation of significant fabric; and
- the use a modern design compliments the surviving significant fabric.

**Policy 43**

*Undertake the introduction of new fabric in areas of high and exceptional significance in such a manner that:*

- it does not result in any loss of cultural significance;
- is identified as new work; and
- is reversible.

**Policy 44**

*Areas of moderate significance and upwards should not be modified for short term (ie up to five years) for temporary uses. These uses should be added in areas where modifications to the fabric will not have any impact on the cultural significance of the Carrington Hydraulic Engine House site.*

**Policy 45**

*Implement a mechanism to ensure ad-hoc works do not occur unless an assessment of the significance of the fabric has been undertaken.*

7.12 USE OF EXISTING BUILDING AREAS

The adaptive re-use of the existing significant building must be planned to avoid problems of overcrowding and over servicing the available accommodation. Growth in the amount of accommodation should be considered before committing to a defined area. Proximity to services for ablution facilities, modern communication, plant and electrical rooms etc, must be coordinated to reduce the impact on the significant fabric.
Policy 46
Plan adaptive re-use of spaces to minimise over crowding and allow for future growth.

Policy 47
Locate ablation facilities, modern communication, plant and electrical rooms etc to minimise impact on the significant building fabric.

Policy 48
Proposals to adaptively re-use significant building areas should be based on an understanding of the historical development of the building in context of the site and its cultural significance, as set out in this Conservation Management Plan, and should:
- not require major alterations to significant building spaces or modifications to significant building features;
- not obscure interpretation of the history of the site or building.

7.13 INTRODUCTION OF NEW BUILDINGS

The adaptive re-use of the Carrington Hydraulic Engine House will require the introduction of services such as toilet facilities, lifts and potentially additional floor area.

Planning of new facilities for the site should take into consideration the significant phases of development and levels of significance of the site. Additional floor area could be obtained by the introduction of mezzanine levels and additional structures linked to the main building.

The introduction of a new building on the site is required to respect the significance of the site and the individually significant Engine House.

Policy 49
Ensure that when planning new facilities, or upgrading existing facilities, consider the:
- intention of the original design;
- significance of the fabric; and
- extent to which the fabric has already been modified.

Ensure that new works are designed in such a manner as not to obscure evidence of the original design intention.

Policy 50
Any new buildings should be designed in such a manner as to compliment the design vocabulary used during the significant phases of development and the relationship between the built structures and the landscaped setting.

7.14 MOVABLE HERITAGE

Movable heritage includes movable items that have been assessed to be of cultural significance. An item of movable heritage reveals the use of a place and contributes to the overall cultural significance of that place. Movable heritage includes such things as furniture, garden ornaments, kitchenware, fountains, door furniture etc. (Refer also to Policy 29.)

Policy 51
Undertake an inventory of all movable heritage items with the assistance of an experienced heritage professional. Establish a safe repository, preferably on site. Catalogue all items to be stored.

7.15 MAINTENANCE OF EXTANT FABRIC
The building fabric of the Carrington Hydraulic Engine House has been assessed as being of cultural significance. To retain the cultural significance of the building both the form and detail need to be conserved. This is particularly important in a coastal and industrial environment due to salt and chemical pollution attack. Further detailed investigation of the building fabric is required prior to maintenance work, which will impact on significant fabric.

The external building fabric requires continual maintenance, which should be planned and undertaken on a regular basis. Conservation principals and methodology should be used on elements of moderate significance or higher.

It is recommended that a Maintenance Plan be prepared, setting out methods for the maintenance of each significant element including a cycle for each type of maintenance. The Maintenance Plan should be a working document and should be revised on a regular basis. Special items such as stonework, joinery and metalwork should be identified in the Plan to ensure care is taken when working near them.

**Policy 52**

Maintain the external fabric of the Carrington Hydraulic Engine House according to conservation principals including:

- preparing and implementing a Maintenance Plan;
- undertaking cycle maintenance;
- educating maintenance staff and contractors in conservation methods;
- reviewing the Maintenance Plan on a regular basis;
- the Maintenance Plan should be passed on whenever responsibility for maintenance changes.

**Stonework**

The Carrington Hydraulic Engine House and Auxiliary Engine House have been constructed with dominant sandstone detailing to the base, the building corners, the tops of walls under the roof and to architraves to windows and doors. The stonework varies in quality and carving detail from front to back with the main entry portico of the finest stone, incorporating carved detail including a lions head to the keystone to the entrance archway.

**Policy 53**

Prepare a stonework strategy that assesses the:

- condition of the stonework;
- availability of replacement stone;
- sources of funding; and
- staging of works.

**Policy 54**

Undertake a make-safe to remove all loose and exfoliated stone. All stone details should be recorded prior to removal.

**Policy 55**

Fully test and assess the impact of any proposed cleaning, paint and graffiti removal techniques on the stonework prior to commencement of any cleaning works. Ensure that the processes do not damage the stonework.

**Brickwork**

The external facades of the building are constructed of load-bearing machine made brickwork from the Newcastle Bowtell Brickworks. The bricks are distinctly yellow cream in colour and have been used on other buildings in Newcastle the best known being the former Newcastle Customs House. The present condition of the brickwork is generally good, with stains from pollution and organism growth evident. The joints are in fair condition, with a general deterioration of the mortar to a depth of 5 to 10mm over the entire building.
Policy 56
Do not use harsh chemicals or abrasive cleaning methods that teach the colour or remove the surface of the face brickwork.

Policy 57
Obtain a good match for colour and texture for any face brickwork replacement work.

Metalwork
The extant original and early cast iron gutters are an important part of the character of the main building façade.

Interior metalwork relates to the roof structure as trusses and the function of the spaces in the form of ladders, walkways and lighting.

Policy 58
Conserve the extant original nineteenth and early twentieth century metalwork by the:
- repair of damaged elements;
- reinstatement of missing elements if detail is known;
- repainting elements in appropriate colours if element was intended to be painted.

Joinery
The joinery to the Engine House has been deliberately designed in proportion to the building façade. The result provides doors up the five metres in height and double hung windows over four metres in height. The timber sections used to construct the door leaves and window sashes have also been proportionally increased in size. Some joinery reconstruction has occurred in the Engine Room and Accumulator towers, however other areas require extensive work to the joinery.

Policy 59
Retain and conserve the existing original joinery on the Engine House Building.

Policy 60
Conserve the timber joinery by:
- regular inspections;
- reinstatement of missing elements
- repair of damaged elements; and
- regular re-painting.

Roof Sheeting
The Engine House was originally constructed with a slate roof. Including the early additions. The Engine Room has been re-roofed in slate, however the remainder of the building requires re-roofing.

Policy 61
Re-roof the remainder of the Engine House in slate to match the roof over the Engine Room.

Ground Contamination
The ground under the floor of the Engine House and the surrounding site area may be the subject of contamination requiring removal of soil as part of the decontamination work. This area potentially contains archaeological evidence of the working of the site from the nineteenth century.
Policy 62
Ensure that any excavation works undertaken on the site which may damage or disturb archaeological relics, is undertaken in a manner which conforms to the Heritage Act 1977 and guidelines issued by the Heritage Office.

7.16 INTERPRETATION
An interpretation plan for the site should be developed as part of the adaptive re-use of the building.

Policy 63
Develop an interpretation plan for the site to be incorporated into the building in an area available for public access.

7.16 RECORDING
It is essential that a record of the changes to the Carrington Hydraulic Engine House site be maintained and archived. Recording should be undertaken wherever modification to significant fabric occurs, including during major maintenance works. It is likely that recording of the modification or removal of significant fabric will be a DA requirement.

Policy 64
Ensure recording, when required, is undertaken in accordance with the Heritage Office Manual. Catalogue and archive all recordings.

Plate 7.1: Detail of Keystone over Entry
8.0 POLICY IMPLEMENTATION

8.1 SHORT TERM

In the short term it is essential the site be made safe by removing loose or collapsing materials. Consideration should also be given to the timing of any site decontamination proposals.

Proposals for the adaptive re-use of the site and buildings should take into account the findings in this Conservation Management Plan.

Heritage advice should be sought during the process of determining a compatible adaptive re-use option for the building. Design proposals should be assessed according to their impact on the significant fabric of the building, as well as the impact on vistas of the building, the site as a whole and the physical context.

8.2 LONG TERM

The long term conservation of the significant fabric should be undertaken, both internally and externally. It is likely that most of the conservation work will be undertaken in conjunction with the conversion of the building for a new use.

8.3 MAINTENANCE WORKS

To prolong the life of the existing building fabric and any replacement fabric, it is essential that a cyclic maintenance program be instigated. The maintenance program should include mechanisms for continued, regular maintenance of the building fabric. This cyclic maintenance should be undertaken according to conservation principles and policies set out in this CMP.

8.4 RESPONSIBILITIES

The responsibility for the conservation of the former Carrington Hydraulic Engine House rests with the Newcastle Port Corporation in the first instance. The Corporation must obtain approvals from the Newcastle City Council and the NSW Heritage Office to undertake major building works, minor works that affect the significance of the item or excavation works that may potentially uncover archaeological remains.

The Corporation should obtain heritage advice when planning to undertake any work on the site that may affect the significant fabric. Staff and sub-contractors engaged to work on this site should be made aware of the significance of the place and the requirements associated with the retention of that significance.
9.0 APPENDICES
9.1 BIBLIOGRAPHY

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Carrington Hydraulic Power House
Carrington Hydraulic Power House
HYDRAULIC CRANES NEWCASTLE.

Arrangement of additional steam engine & pipes.
Parts listed supplied by Sir W.G. Armstrong Whitworth & Co.
Scale 4 inches = 1 foot.

ERECLING PLAN

NEWCASTLE. N.S.W.

W NO 905 SE
**NEW SOUTH WALES GOVERNMENT RAILWAYS**

**18199**

--- Sketch of Hydraulic Accumulators ---
--- Bullock Island Power House ---

**Diameter of ram** 20"
**Approx. weight** 3\(\frac{1}{2}\) tons
**Length** 27'-0"

**Gross weight of ram and the slew** 120 tons

**Capacity of accumulator** 50 cu ft
**Basin crane** 23\(\frac{1}{8}\) ft

Requires painting

---

**C.M. Eng. Office**
**Eveleigh** 4-1-18
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EXECUTIVE SUMMARY

This Conservation Plan was prepared at the request of the Maritime Services Board Hunter Ports Authority. Its purpose is to evaluate the heritage significance of the former Hydraulic Power House buildings at Carrington and provide information to assist in future conservation and appropriate site use.

The 1877 building is included in Schedule 1 of the Hunter Regional Environmental Plan 1989 (Heritage) as well as the National Estate Register and the National Trust of Australia (NSW), all of which recognise that the structure is of high cultural significance.

This report begins with a brief history of the building and the reasons for its construction, followed by a description of its present condition.

A Statement of Cultural Significance has been prepared by collating the information available from archival sources and the site. This is then followed by examination of potential future use of the site in broad terms. Accepted conservation principles have been used in the various recommendations.

The report proceeds to determine a Conservation Policy from which general recommendations flow. Following adoption of this plan, further detailed examination of the recommendations together with preparation of contract documentation and archival recording should proceed as funds are made available.

Generally the report reinforces the importance of the 1877 building as an item of National importance and highlights its impact on the use of hydraulic power and port loading facilities.

The report also recommends the buildings reuse, to provide a presence on site, thereby deterring vandalism and providing a source of funding for its conservation.
1.0 INTRODUCTION

1.1 BACKGROUND

Since the settlement of Newcastle early in the nineteenth century, the Hunter River has played a major role in industry and trade.

The mining and export of coal was instrumental in the development of Newcastle Harbour and associated wharves. Bullock Island (later Carrington) was chosen to develop a modern railway and shipping facility to service the growing export coal trade. The Hydraulic Power House was constructed following the decision to use the best technology available in coal loading facilities.

Over the last three decades the site and buildings have been used for storage facilities and are currently the object of constant vandalism due to their lack of day to day use. A recent fire begun by vandals has exposed the vulnerability of the structure and its site, despite current security measures.

In order for decisions to be made on the future of the site and buildings the Maritime Services Board of New South Wales has commissioned this study of the site and buildings.

1.2 THE BUILDINGS TO BE STUDIED

The buildings studied in this report are located on part of the site shown on the Maritime Services Board Survey Plan NC1024XL. The buildings are situated adjacent to the corner of Cowper and Bourke Streets, Carrington and the site limited by road and railway corridors. (illus. 1)

The Hydraulic Power Station and Sub-Station buildings are the primary subjects of the report. Incidental references are made to the Basin wharves for continuity.
1.3 STUDY TEAM

The history of the site and research into its use by the Department of Railways and Maritime Services Board was undertaken by Doctor John Turner of the Department of History, University of Newcastle.

The architectural evaluation of the buildings and compilation of the Conservation Plan was undertaken by John Carr of the Hunter Design Office, Public Works Department.

1.4 ACKNOWLEDGEMENTS

The following people and organisations have provided information and assistance:

MARITIME SERVICES BOARD HUNTER PORTS AUTHORITY;
PUBLIC WORKS DEPARTMENT;
DEPARTMENT OF RAILWAYS ARCHIVES;
NEWCASTLE REGIONAL PUBLIC LIBRARY;
STATE ARCHIVES OF N.S.W.;
MITCHELL LIBRARY SYDNEY;

Previous related research by:

Dr D. Bairstow
Mr E. Coulin
Mr T. Callen
Mr K. Longworth
2.0 HISTORY

2.1 BACKGROUND TO CONSTRUCTION

Edward Orpen Moriarty (1825-1896), an Irish consulting engineer and surveyor, joined the NSW Surveyor-General's Department in 1849, became engineer and surveyor (later chairman) of the NSW Steam Navigation Board and in 1855 was appointed engineer in charge of Hunter River Improvements. While holding this position Moriarty made plans to concentrate the loading of Newcastle's coal on Bullock Island (later Carrington) where he proposed to develop an extensive sand bank into a modern railway and shipping facility capable of handling the developing overseas and colonial coal trade.

Work on this ambitious project began in 1862 under the supervision of Moriarty who had been promoted to engineer-in-chief for harbours and river navigation in the NSW Department of Works.

By 1874 the stone dyke was in place, the channel was being dredged, contracts had been allocated for a railway link and the world famous Armstrong Hydraulic Machinery Factory at Elswick in the United Kingdom had been asked to design a power station and the cranes needed to bring the project into use.

2.2 THE CHOICE OF HYDRAULIC POWER

Sir William Armstrong (1810-1900), Baron Armstrong of Cragside, began to use hydraulic pressure to operate cranes at a railway ferry station in England in 1850 on a flat, silted site which offered no possibility of constructing an elevated reservoir to provide water pressure. This he accomplished by inventing an accumulator, a large cast-iron cylinder, fitted with a loaded plunger to give pressure to the water injected by the engine.
This device permitted huge increases in the pressure available for industrial applications and permitted the use of hydraulic machinery in almost every situation. It was particularly suitable where power was required at intervals and for short periods and the Armstrong Factory began to produce machinery for working cranes, hoists and lifts, opening and shutting dock gates, docking and launching ships, moving capstans, turn-tables and so on. The system was economical of power and efficient and Moriarty was opting for the best technology available by choosing hydraulics to power the Bullock Island facility.

2.3 CONSTRUCTING THE POWER STATION

It appears that records relevant to the construction of the power station were destroyed in the Garden Palace (then a Government repository) fire in 1882 and this report is based on published sources and fragmentary records surviving in State Archives and State Rail Archives.

Two separate agencies appear to have been involved in construction, the Harbours and Rivers Branch of Public Works led by Moriarty and the office of Government Architect, James Barnet. Governed by the design specifications of the machinery, the building was erected by private contractors employed by the Harbours and Rivers section supervised by its Resident Civil Engineer, Cecil Darley. Documentary evidence of the Government Architect's role has not yet been located but custom and the nature of the building strongly suggest that his office was responsible for exterior design. The usual practice, reinforced by departmental jealousies, required the designs to pass through the hands of the Government Architect for his approval and that this was done is borne out by similarities between the Newcastle Customs House and the Power Station, both under
construction in 1877. Naturally, Barnet's staff included several architects and he collaborated in the Customs House design with Edmund Spencer. Whether Spencer was also involved with the Power station is to be investigated.

Late in 1877 the Newcastle Morning Herald (7 November) reported that the Power Station was nearly completed and provided a detailed description of the site and its building materials. Comprised of ballast from many overseas and colonial ports, this artificial island would puzzle geologists in the distant future:

Here we have geological specimens from every part of the world. The whole expanse of ground has been built up of ballast from the ships that come to our harbour. In one place we tread upon a layer of London flint, next a collection of stones from the shores of the sunny Mediterranean. These are succeeded by a rocky mound from Scandinavian coasts and these in turn give place to blue stone from Melbourne, green trap from New Zealand, limestone from Singapore and even the sun burnt bricks and glazed uncouth carvings from a dismantled village in far off China.

Significantly, since the stonework of the building is now grey in colour, the Herald report stresses the whiteness of the Sydney sandstone:

Huge blocks of shining white sandstone ... It is a magnificent structure of solid sandstone masonry, being built of white glistening sandstone blocks, beautifully dressed ...
The tender for constructing the power station was awarded to Jennings & Company of Sydney, who were also building the Newcastle Customs House in 1877. The materials and craftsmen employed on the Hydraulic Powerhouse are believed to be the same as those employed on the Customs House. The yellow bricks came from Bowtell's Merewether Brickworks and were not imported from Holland as some writers have suggested.

Noting that the plans allowed for future expansion of the hydraulic machinery, the Herald expressed entire satisfaction with the project and Darley's supervision of it:

The whole arrangements are most complete and reflect the greatest credit on Mr Darley under whose watchful supervision the works have reached the present advanced stage. As a specimen of Hydraulic Engineering, there are probably no harbour works in the world that will excel these for completeness, extent and power. They are so planned as to admit of extension at any time to meet every probable requirement of the port for generations yet to come; and when completed, and the cranes fairly set to work, will vie with those of any port, perhaps in the world.

The building which so enthused the local newspaper consisted of the facade, the twin towers, the engine room and one boiler room.

On heavy foundations, then thought essential for any major building on reclaimed land, this Classic Revival edifice is of yellow, compressed brick, with Sydney sandstone quoins, architrave, frieze and pediment. The roof was boarded and slated. The
overall length was 43.9 metres (144 ft), the depth 26.9 metres (88 ft). The engine room measured 21.3 by 12.3 metres (70 ft by 40 ft 6 in).

The Newcastle Morning Herald, on 25th November 1876, gave the dimensions of the boiler-room as 11.9 by 10.2 metres (39 ft by 33ft 6 in) but this seems an error, perhaps typographical. The present dimensions are about 11.9 by 13 metres (39 by 43 ft) and there is no record nor indication in the building of any extension. The accumulator towers stood 17 metres (56 feet) high. To the west of the boiler-room was a 22 metre (72 ft) chimney stack. Foundations were laid for a second boiler-room and for three more engines in 1890 (illus. 2).

After testing in February, when Moriarty saw the cranes he had envisaged for more than two decades each lift 18 tons of coal, the first cargo loaded hydraulically left the port on 19 March 1878. (illus. 3)

2.4 SUBSEQUENT DEVELOPMENTS

In 1879 two more boilers and another engine arrived and the second accumulator was under construction. More cranes, some capable of lifting 25 tons, were gradually added as the wharf area was extended and by 1890 more power was required. The two original engines had been working for 14 years and were now driving 12 cranes night and day in peak periods so that, as the Herald pointed out the machinery at present in use is severely taxed.

Provision had already been made in the original engine room for additional machinery so it would accommodate the new 250 hp compound steam pumping engine but it was now necessary to construct the eastern
1876 ARTISTS IMPRESSION (D. BAIRSTOW)

Bullock Island Hydraulic Power-House. This was how the Town and Country Journal of 22 July 1876 thought it would look when finished in 1877.
Newcastle N. S. W.

Patent self contained hydraulic crane.
to lift 25 tons or 9 tons through 45 feet.

Scale 3 inch to 1 foot.
boiler room on the foundations provided in 1877. According to the Herald it was 11.9 x 13 metres (39 x 43 ft) and seven metres high with a 27.4 metres stack beside it. Four tubular Babcock and Wilcox boilers were installed by E J King who also secured the contract for a condensing room to be built behind the main building. This room, sometimes referred to as the "Auxiliary Engine House" was also built of yellow brick similar to the original bricks but it was not as heavy or as finished as the 1877 building; it was equipped with three Westinghouse engines driving Manchester Dynamos, to provide electric light for the whole complex. The Electric lights replaced the existing gas light on 2 September 1891 and by February 1892 all the new machinery was in use. (illust. 4 & 5)

The growth of the coal trade in the first decade of this century led to the installation of seven movable hydraulic cranes and in 1914 hydraulic capstans were introduced to replace the horses used to move coal wagons to and from the cranes but the peak of hydraulic power had been reached.

When the western side of the basin was constructed provision was made for six large electric cranes which began to operate in 1916; they were supplied with power from the Newcastle Power Station. This trend continued into the 1930s when two of the older hydraulic cranes were demolished and six others fell into disuse. Hydraulic power was still required for the movable cranes but the Hugh boilers and steam engines which had produced the necessary water pressures were replaced by centrifugal pumps driven by electric motors.
As Dr Bairstow points out, when a new pumping engine was installed in place of the original two hydraulic engines after the Second World War, it was necessary to make extensive changes to the foundations of the eastern side of the engine room.

2.5 THE END OF AN ERA

That the Power Station continued to produce hydraulic power until the 1960s is a reflection of the protected state of the NSW Coal industry. The loss of the export trade in the decade after the First World War reduced the need for competitiveness and the Port of Newcastle continued to rely partly on relatively slow crane-based coal loading until the 1960s. It is probable, too, that the continued role of the Railways Department in controlling the Port's loading system slowed down technological change. Though the Maritime Services Board was established in 1935, it did not win effective control of the Port of Newcastle until changes to the legislation governing the MSB in 1961.

In 1956 five of the older hydraulic cranes were demolished to allow the installation of a belt loader (illus. 6) and the last of the movable cranes was removed in 1964. Subsequently the power house machinery was dismantled and removed from the buildings which are the only substantial remains of a loading system which used to amaze our Victorian ancestors. Since then the Power House has been used for storage purposes.
Section of the piles being driven on the hydraulic side of Carrington coal basin yesterday to repair a foundation for dolphins on which will be built the conveyor structure for a temporary coal-loading plant. At least 20 piles will be driven. The work is expected to be completed to permit the loader to start operating in February.
3.0 DESCRIPTION AND PHYSICAL CONDITION

3.1 PHYSICAL EVIDENCE OF FABRIC

The site contains substantial evidence of its own history together with the archival documentation describing the development of the railways and wharves. (illust. 7)

The series of plans (illust. 8) are arranged to show the development stages on the site (C 1877 C 1890 C1915).

3.2 1877 BUILDING

This is the original and main building on the site. It is an imposing and substantial structure, sited as it is at the head of The Basin, and requiring a large volume to house the various engines and accumulator equipment.

The building is structurally sound despite requiring extensive repairs and replacement of fabric due to damage by decay and vandalism.

The roof is asbestos cement that is fire damaged over the Engine Room, and the remainder has reached the end of its effective life. Roof drainage is practically non existent, leading to decay of joints to the fabric and decay of the fabric itself.

The walls are of massive construction, comprised of face brickwork and decorative stone pediments, cornices, quoins, basecourse, and window and door architraves.

Floors are a combination of cast iron grating in the Engine Room and timber and concrete to remaining areas.
7. ARIEL VIEW OF SITE (P.W.D. 22.4.1960)
Various alterations and scarring has taken place on the fabric, particularly in the post WWII period when amenities were introduced into the former Battery Room. A large wall section was removed between the Engine Room and the Generator Area, and a movable hoist and beam installed.

Apart from the demolition of the two large chimneys, the Boiler Rooms have stayed largely intact, despite the boilers being removed and some changes to window and door openings.

All services to the buildings require replacement.

The general appearance of the building both internally and externally is good, despite the alterations, peeling paint internally and the need for the building to be cleaned of over a century of industrial fallout.

3.3 1915 BUILDING

This structure was added to supplement power supply to the new electric cranes operating on the wharves. The building was constructed with two temporary ends together with toothed brickwork to enable the extension of the structure in bays to match, at each end. (illus. 9)

The roof comprises diamond patterned asbestos cement shingles, typical of the period, with terracotta decorative ridge capping. Metal trusses similar to the 1877 building supported the roof in the Electrical Building and traditional timber green post trusses, purlins and rafters supported the roof to the Workshop.

The walls are face brickwork painted internally with some openings added to the Workshop. The temporary walls are of galvanised iron.

CARRINGTON HYDRAULIC POWER HOUSE
CONSERVATION PLAN 23
9. PLANS SHOWING ALTERATIONS & ADDITIONS (D BAIRSTOW)
Floors are of concrete with the Electrical Building having a low ceiling basement area for plant.

The appearance of the Workshop is good with only minor work required to restore it to a useful structure. The Electrical Building is in poor condition due to deterioration of the temporary walls and adhoc lean-to additions.

3.4 THE SITE

The site has generally been cleared of related industrial development in particular the two large chimneys associated with the Boiler Rooms and the various railway tracks.

Photographic evidence shows the site to be quite barren and devoid of any form of landscaping.

Archaeological investigation may possibly allow exposure of any remaining footings from the chimney stacks.
4.0 CULTURAL SIGNIFICANCE

4.1 CONCEPT OF CULTURAL SIGNIFICANCE

The Burra Charter is the "Charter for the Conservation of Places of Cultural Significance" prepared by the Australian National Committee of the International Council on Monuments and Sites (Australia ICOMOS). It is the accepted standard for conservation practice in Australia and compliance with its principles is a condition of all loans and grants under the National Estate Program or the NSW Heritage Fund.

The Burra Charter describes cultural significance as a simple concept. Its purpose is to help in identifying and assessing the attributes which make a place of value to us and our society.

Once the significance of a place is understood, informed policy decisions can be made, knowing the suggested constraints, and the flexibility of areas designated for adaption.

Cultural significance means aesthetic, historic scientific or social value for past present, or future generations.

Cultural significance is a concept which helps in estimating the value of places. The places that are likely to be of significance are those which help an understanding of the past or enrich the present, and which will be of value to future generations.

4.2 AESTHETIC VALUE

The 1877 building is of high architectural merit considering its original purpose, and is Carrington's most significant architectural landmark. It is a large classical revival building sited in a prominent position to the harbour at The Basin. (Illustr. 10)
The proportioning and detail of the stonework combined with the large wall areas of the cream brickwork contributes largely to its aesthetic significance. Added to this, the oversized doors and windows help to create the appearance of a dominant classical detailed structure.

The 1915 building, while not following the same architectural character of the original structure, shows signs of thought and detail in its design. Although not complete, the facebrick loadbearing walls are set out with regular pier spacings combined with special brick profiles to provide character to its large walls.

Some elements of classical design have been reflected in the brick gables to the Workshop Area, in a form consistent with economical industrial design of that period.

4.3 HISTORIC VALUE

The site and buildings are of great historic value, not only from an architectural point of view, but more particularly from an industrial archaeological aspect. The surviving buildings were the result of a decision to provide the most modern form of loading system of the day. Unfortunately, the machinery and cranes no longer survive, however, the building together with photographs, plans and associated files do survive to detail the use of hydraulic power in the port industry. (illust. 11 & 12)

4.4 SCIENTIFIC VALUE

The 1877 building is a surviving example of a Victorian industrial building encased in a highly decorative envelope. The use of hydraulic power was a practical of economic form of energy developed by Sir William Armstrong in 1850. This technology was used by Armstrong in the Carrington
facility. The development of hydraulic machinery and the building construction used to house this machinery, together with adjacent wharves may have potential for future historical research in engineering and industrial history. (illust. 13, 14 & 15)

4.5 SOCIAL VALUE

The port facilities in Newcastle together with the coal industry affected the greater part of the population. This site is a focus of part of that activity that was in constant use for over a century.

4.6 ASSOCIATION VALUE

The site is significant for its association with the development of the wharves and harbour loading systems in particular the development of Dyke and The Basin.

4.7 STATEMENT OF CULTURAL SIGNIFICANCE

The 1877 Hydraulic Power House building is of major heritage significance:

* for its classical revival architectural character and detail.

* for its contribution to the townscape of the port area and as viewed from the harbour

* for its value to the engineering and industrial history of the port

* as an example of a high quality industrial building

* as a link to the vast workforce employed on the wharves, railways, coal and shipping industries.

* for its association with the development of the wharves and loading systems.
The 1915 building is of slight significance to the site:

* as a development from hydraulic power to electrical power.
16. MOBILE HYDRAULIC CRANES LOADING COAL. NOTE HORSE USED TO MANOEUVRE COAL TRUCKS UNDER THE CRANE (P.W.D./STATE ARCHIVES)
5.0 FUTURE OF THE SITE AND BUILDINGS

5.1 RESTRICTIONS

The 1877 building is listed under Schedule 1 of the Hunter Regional Environmental Plan 1989 as an item of State environmental heritage.

The building is also included on the National Estate Register.

The building is classified by the National Trust of Australia (N.S.W.).

Owners of heritage items identified in Schedule 1 require development consent from their local council if they propose to demolish, renovate, extend or after the building, excavate or subdivide the land or erect another building on the same site as a heritage item. This includes making structural changes, modifying the outside appearance of the building or making changes that can have an impact on the landscape or horticultural features of the setting. In general, no formal consent is needed for internal repairs, painting and non-structural changes.

5.2 THE SITE

The ideal use for the site would be one that allows for their conservation and reuse in a manner that maintains public accessibility.

Uses such as industrial or port museum, office accommodation or commercial development.

The extent of site required to service the buildings for reuse, in the form of landscaping, paving, parking etc would need to be determined depending on the proposed development.

As noted by the newspaper articles of the day, the fill used to develop this site would reveal some interesting artifacts for archaeologists.
The site provides for views of the harbour, close proximity to associated port functions, and the Carrington shopping centre.

Further sympathetic building development associated with the northern section of the site may provide potential for future office or industrial growth of the site.

5.3 THE 1877 BUILDING

Due to the large volumes associated with this building and the original nature of housing industrial machinery, the possibility exists to provide mezzanine floor levels within the Engine Room and possibly the Boiler Rooms to increase the floor space and provide an economic basis for restoration of the original fabric.

Generally all alterations and additions should be designed so as not to permanently damage the fabric. They should also be able to be removed when the current use of the building changes to return the structure to its original form.

The large spaces lend themselves readily to office or commercial use.

5.4 THE 1915 BUILDING

This building is of less significance on the site and allows greater flexibility for reuse and possibly extension, or demolition. Being incomplete, the structure would lend itself to additions and major refurbishment. Restrictions to alterations of the building would be minimal and generally related to the aesthetics of the architecture.

Demolition could be considered in the event of site development where the existing incomplete structure was not suitable for adaptive re-use or extension. This may take the form of built site development or landscaping enhancement to the 1877 building.

CARRINGTON HYDRAULIC POWER HOUSE
CONSERVATION PLAN 37
6.0 CONSERVATION POLICY

6.1 DEFINITIONS

This Conservation Policy is to be read in conjunction with the document as a whole and with reference to the Burra Charter. The following terms are used in accordance with the Burra Charter definitions.

Conservation means all the processes of looking after a place and may include preservation, restoration, reconstruction and adaptation.

Preservation means maintaining the fabric of a place in its existing state and retarding deterioration.

Restoration means returning the existing fabric of a place to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material. Restoration is appropriate only if there is sufficient evidence of an earlier state of the fabric and only if returning the fabric to that state recovers the cultural significance.

Reconstruction means returning a place as nearly as possible to a known earlier state. Reconstruction does not mean conjectural reconstruction.

Adaptation means modifying a place to suit proposed compatible uses.

Maintenance means the continuous protective care of the fabric, contents and setting of a place, and is to be distinguished from repair. Repair involves restoration or reconstruction and it should be treated accordingly.

PLACE means site, area, building or other works together with pertinent contents and surroundings.
6.2 FABRIC AND SETTING

The site should be conserved in a manner which ensures that the cultural significance of the place is maintained and enhanced.

Buildings of heritage significance must retain their originality and therefore the primary purpose of any conservation work is to retain and preserve the fabric of significance.

Future work on the site should be planned with the following priorities:

* securing the buildings
* waterproofing and draining the buildings
* reconstruct and repair of missing and damaged fabric following exactly the existing details.

6.3 FUTURE USES

The 1877 building be used for a purpose that allows it to be conserved in accordance with guidelines set out in the Burra Charter.

Proposed uses should not require:

* additions to the building;
* demolition of walls;
* insertion of windows or doors to external fabric.

The 1915 building be used for purposes that cannot be included in the 1877 building due to their nature or impact on the fabric.

The 1915 building would be suitable for alterations and additions.

The place is suitable for the following uses:

* museum
* office accommodation
* light industrial
* commercial including retail and restaurant accommodation
6.4 INTERPRETATION

Due to the significance of this place in relation the port, relocation and preservation of surviving related port equipment can play a major part in assisting the public to understand the important role of this building.

Items such as antique cranes, railway coal trucks on static display located in the near vicinity to the building.

A particular room or public foyer may also house a permanent display of documents outlining the development of hydraulic power as used by the port. This may form part of the restoration and reuse of the 1877 building.

6.5 MANAGEMENT

The site is currently on land owned and administered by the M.S.B. Hunter Ports Authority and as such, they are the obvious organisation for the care and administration of the place. Alternative possible managers would be the Department of Conservation and Land Management or the Property Services Group.

For the M.S.B. Hunter Port Authority to manage the site, it will be necessary to obtain advice on a regular basis about the conservation of the buildings and use of the site.

This can be achieved by the engagement of suitably qualified consultants from time to time to provide advice to the authority. The authority should set up a small committee with responsibility to obtain advice, funding, and then implement the recommendations.

A long term programme of maintenance and restoration work should be drawn up for the use of the committee to assist them in achieving their goals.
Management would be responsible for ensuring control on investigations that take place on the site to prevent the diminishing of the cultural significance.

Strict control must be exercised by the management committee on any form of intervention on the site that would damage the cultural significance.

6.6 REVIEW

Over the period as the various Stages of maintenance and restoration work is carried out, accurate recording of the fabric is to be undertaken and filed with the Conservation Plan.

This is important, as work on site may reveal hidden evidence of the past that may be crucial to the Conservation Policy for the building in the future.

Information obtained and recorded would be used as a basis of review of the Conservation Policy.
7.0 ANALYSIS OF WORK INVOLVED

7.1 CONSERVATION

The initial work required on the buildings is retrospective maintenance and preservation. It is essential to halt the rate of decay on the fabric by both weather and vandalism.

Further stages of work will involve restoration and reconstruction, particularly to joinery and masonry.

The final stage will be adaption. Care must be exercised in removing old services and accretions when restoring and adapting rooms and spaces.

PRIORITY OF WORK:

The following schedule of work is provided as a guide to categories of work and order of priority.

* Security of buildings and site including fencing, lighting, electronic security, and fire detection systems.

* Waterproofing and drainage of buildings incorporating roofing, guttering, downpipes and stormwater system.

* Repointing of masonry generally to all facades, with particular attention to stonework.

* Repair of joinery, in particular windows and doors to external walls. Reconstruction of altered, damaged or missing sections of the external fabric.

* Cleaning of the masonry and external painting generally.

* Siteworks including archaeological investigations and landscaping.
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* Cleaning of the masonry and external painting generally.

* Siteworks including archaeological investigations and landscaping.
7.2 MAINTENANCE

Future maintenance of the building will be the responsibility of the N.S.B. Hunter Port Authority (or the body managing the site). External maintenance will be required to be carried out at a maximum of five yearly intervals. Internal maintenance may be carried out at ten yearly intervals, however, some work may be required every five years, particularly to the external walls and frames to openings.

7.3 NEW CONSTRUCTION

New construction may be approved for the area to the north of the 1877 building. The new construction however should also satisfy the following criteria. The development:

* should not encroach on the visual curtilage of the building.
* should not visually overshadow the building when viewed from Cowper Street, Bourke Street, or the harbour.
* should be composed of forms and materials which are harmonious with the historic building.
* will not be of an industrial nature that would physically damage the historic building by pollution or other means.
APPENDIX

* PLAN OF NEWCASTLE HARBOUR C.1878 (RAILWAY ARCHIVES)

* SITE & SURROUNDINGS C.1894 (NEWCASTLE REG. PUBLIC LIBRARY COLLECTION

* ENGINE ROOM & BOILER ROOM LAYOUTS (RAILWAY ARCHIVES)

* FIXED HYDRAULIC CRANE DETAILED DRAWINGS (P.W.D.)

* FOUNDATION PLAN (RAILWAY ARCHIVES)

* HYDRAULIC ACCUMULATOR DETAILS (RAILWAY ARCHIVES)

* 1992 FLOOR PLAN

* 1992 SOUTH ELEVATION

* 1992 WEST & EAST ELEVATIONS

* 1992 NORTH ELEVATION

* 1992 PHOTOGRAPHS OF BUILDINGS & SITE
  
  - ENTRY & SOUTH ELEVATION OF 1877 BUILDING

  - DETAIL OF DATE STONE
  
  - DETAIL OF TOP OF FLAGPOLE (NOTE CRANE AND COAL TRUCK).

  - EAST & WEST ASPECTS OF 1877 BUILDING

  - NORTH ASPECT OF 1877 BUILDING
  
  - EAST ASPECT OF 1915 BUILDING

  - NORTH WEST ASPECT OF SITE
  
  - NORTH EAST ASPECT OF SITE WITH HARBOUR IN BACKGROUND.

  - DETAIL OF UPPER SECTION OF STONE CORNICE
  
  - DETAIL OF LOWER SECTION OF STONE CORNICE.

  - DETAIL OF BRICKWORK JOIN DETERIORATION & SPALDING OF STONEWORK.

  - ROOFS OF BUILDINGS

CARRINGTON HYDRAULIC POWER HOUSE CONSERVATION PLAN
HYDRAULIC - SHIPPORE APPLIANCES, NEWCASTLE.

Plan of Engine Room W. channel position of Pipes containing Journal, Main Valve.

20 June 1939.

Scale 4 feet to one inch.
Engine No. FOR BULLOCK ISLAND HYDRAULIC CRANES

DETAILS OF COFFERDAMS FOR FOUNDATIONS

Scale 3 FEET TO ONE INCH

Boiler House

Engine Room

Building Line of Cooper Street.

23-8-35
Sketch of Hydraulic Accumulators
Bullock Island Power House.

Diameter of ram 20"
Approx. weight 300 lbs.
Length 27'
Gross weight of ram and the slag 120 tons.
Capacity of accumulator 60 cu. ft.
Basin crane 23" ft.

Guide shoe.
Requires painting.

8" x 2" Hardwood.
Guides 2½ x 2½ angle iron.

C.M. Eng's Office
Eveling 4-1-18.
NORTH ELEVATION.
DETAIL OF BRICKWORK JOINT.
DETERIORATION & SPALDING OF STONEWORK.

ROOFS OF BUILDINGS
NORTH ASPECT OF 1877 BUILDING

EAST ASPECT OF 1915 BUILDING
NORTH WEST ASPECT OF SITE

NORTH EAST ASPECT OF SITE
WITH HARBOUR IN BACKGROUND.
EAST & WEST ASPECTS OF 1877 BUILDING
DETAIL OF TOP OF FLAGPOLE
(NOTE CRANE AND COAL TRUCK).

DETAIL OF DATE STONE
DETAIL OF UPPER SECTION OF STONE CORNICE

DETAIL OF LOWER SECTION OF STONE CORNICE.