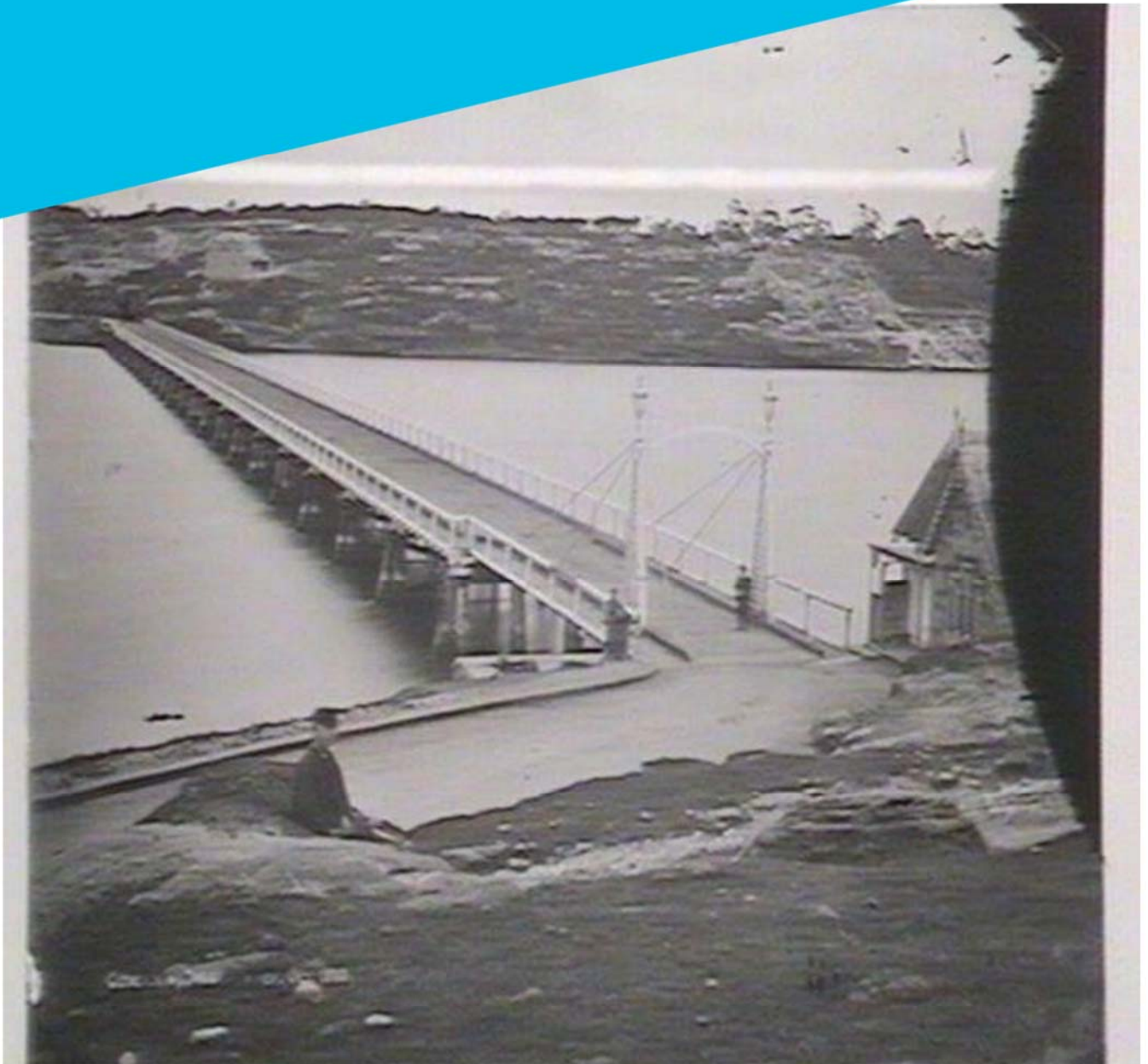


Archaeological Methodology Report

Glebe Island Concrete Batch Plan



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Glebe Island Concrete Batch Plan

Client: Hanson

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09-Nov-2021

Job No.: 60555976

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Quality Information

Document Archaeological Methodology Report

Ref 60555976

Date 09-Nov-2021

Prepared by Chris Lewczak

Reviewed by Dr Darran Jordan

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	09-Nov-2021	Internal Review	Dr Darran Jordan Principal Heritage Consultant	

Table of Contents

1.0	Project Background	1
1.1	Introduction	1
1.2	Site Location	2
1.3	Final design proposals	6
2.0	Historical Context	8
2.1	Preamble	8
2.2	Early European Phase (1788 – 1850)	8
2.3	Glebe Island Abattoir (1850 – 1916)	8
2.4	Silos (1916 – 1921)	13
2.5	Extension of the Facilities (1921 – 1932)	14
2.6	Depression through to post WW2 (1932 – 1960)	15
2.7	Later use and development (1960 – 2000)	15
3.0	Archaeological Potential and Significance	16
3.1	Archaeological Potential	16
3.2	Archaeological Significance	17
4.0	Archaeological Research Design	19
4.1	Historical Themes	19
4.2	Research Framework	19
4.2.1	Research Questions	19
4.3	Archaeological Approach	20
4.3.1	Archaeological monitoring	20
4.3.2	Methodology	20
4.3.3	Unexpected Finds Procedure	21
4.3.4	Reporting	22
5.0	References	23

List of Tables

Table 1	Archaeological significance assessed against NSW criteria	17
Table 2	Historical themes	19

List of Figures

Figure 1	Location of the Glebe Island concrete bathing plant (Site) (Source: NearMap Copyright 2017)	2
Figure 2	Stamped Plans of the concept layout of the Glebe Island Concrete Batching Plant	3
Figure 3	Stamped Approved Plan of the concept design showing the northern and southern elevations	4
Figure 4	Stamped Approved Plan of the concept design showing the eastern and western elevations	5
Figure 5	Updated Concept Plan (V26) showing design changes against the Development Consent Concept Design (V19)	7
Figure 6	<i>“A plan of part of Sydney and its environs: showing the bridges and roads to be constructed by the Pyrmont Bridge Company”</i> Allan & Wigley Litho 1857. Note: Glebe Island was connected via Abattoir Road only. The punt crossing was not depicted (Source Inner West Council Online Library)	9
Figure 7	Municipality of Balmain Water Board plan Sheet No. 74 (Glebe Abattoir, date c1885) (Source: http://trove.nla.gov.au/version/238100592)	10
Figure 8	First Glebe Island Bridge. Glebe (NSW) earlier than 1899 (Source: http://trove.nla.gov.au/version/48145927)	10
Figure 9	“Glebe Island Bridge – 10/1870” (source State Library of NSW Digital order no:d1_05719)	11
Figure 10	“Glebe Island Bridge collapse” August 1899 (Source ANMM Collection Gift from Bruce Stannard available online)	12

Figure 11	Glebe Island Bridge c.1910. Note: The pile remains of the first Glebe Island Bridge can be seen cut off near the water level on both sides of the timber fenders associated with the current Glebe Island Bridge (Source Tyrrell Collection held online at the National Library)	13
Figure 12	Glebe Island's wheat silos in a 1920 photo by Arthur Ernest Foster. Picture: State Library of NSW (Series 3 part 2 – file number FL412764)	14
Figure 13	Area of identified archaeological potential (shown in red) associated with the alignment of the first Glebe Island Bridge	17
Figure 14	Approximate areas for archaeological monitoring and excavation (shown in red)	20

1.0 Project Background

1.1 Introduction

Hanson has been granted development approval for a new concrete batching plant at Glebe Island. The Site was selected to facilitate the co-location of the concrete plant with aggregate shipping facilities, which in proximity to the Sydney Central Business District (CBD) and Bays Precinct offers several logistical and environmental benefits. Hanson, and its subsidiary Hymix, already provide 30-35% of Sydney's concrete demand from the two nearby sites (Blackwattle Bay and Pyrmont). The new approved facility at Glebe Island will allow Hanson to continue its supply of concrete to a range of concrete intensive projects around Central Sydney in a way that is efficient, reduces overall environmental impact and minimises regional road traffic impacts by securing ongoing aggregate shipping terminal capability.

The Project will be built on land identified under Schedule 2 of the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 as 'Bays Precinct Site' and meets the requirements for being considered a State Significant Development (SSD). A request for the Secretary's Environmental Assessment Requirements (SEARs) were applied for on 8 June 2017 and SEARs were issued on 7 July 2017 (SSD 8544).

A Statement of Heritage Impact (SoHI) was prepared by AECOM (2018) that addressed the proposed impact to known heritage items and potential archaeological deposits that are within the Project area. The SoHI identified that there is the potential for archaeological remains associated with the first Glebe Island Bridge crossing to be present within the Project area, and that proposed construction works may impact on archaeological remains associated with the former first bridge crossing (AECOM Australia Pty Ltd, 2018). The SoHI included the following recommendation:

- A historical archaeological monitoring program should be undertaken concurrently with any excavation works below the existing hardstand in the vicinity of the proposed silo area... As the works are being undertaken as a State Significant Development, no permit from the Heritage Division is required, however, a Research Design and Methodology would need to be produced that outlines the methodology for the archaeological monitoring, recording procedure of any remains or relics that are uncovered, and research questions and reporting requirements.

The archaeological monitoring works must be undertaken by a suitably qualified historical archaeologist under the approved Research Design and Methodology document, and the document included in any Project detailed construction program.

At the conclusion of the work a report of the findings from the monitoring works should be prepared and submitted to the Heritage Division for their records.

The Office of Environment and Heritage (OEH), Heritage Division (now Heritage NSW, Department of Premier and Cabinet), requested a Research Design and Methodology document be prepared for review prior to any determination of the application.

Development Consent was granted for the project on 23 July 2021. Within the Development Consent, Condition 22 specifically related to archaeology on the site. Specifically, the conditions states:

C.22 Prior to the commencement of any works, an Archaeological Methodology Report (AMR) must be prepared by a suitably qualified and experienced expert and submitted to the Certifier, Planning Secretary and Heritage NSW. The AMR must be consistent with the "Archaeological Research and Design Methodology Rev A (Ref: 6055976)" prepared by AECOM dated 20 August 2018, and based on the finalisation of in-ground impacts of the development. Depending on the nature of in-ground impacts, further archaeological investigations may be required in order to determine the presence or absence of archaeological remains, and refine the assessment of significance. Appropriate archaeological management must be included in the AMR, and may include a combination of the following strategies:

- a) test excavation;
- b) salvage excavation;

- c) inspection by a qualified archaeologist of the ground surface underlying the existing slab/bitumen upon removal for the proposed development to confirm the historical disturbances within the areas of proposed works;
- d) heritage interpretation;
- e) unexpected finds procedures; and
- f) heritage inductions.

This report presents the updated final design plans, and the updated Archaeological Research Design (ARD) for the Project, based on the changes to the works.

1.2 Site Location

The Project will be constructed adjacent to Glebe Island Berth One (GLB1) located within Lot 10 in DP 1170710 (the Site) (see Figure 1). The Site is located within the Inner West Council LGA (formerly within the Leichhardt Municipal Council area).

The Site is not registered on any statutory heritage registers but is located adjacent to two items listed on the New South Wales (NSW) State Heritage Register (SHR): The Glebe Island Bridge (SHR #01914), and the White Bay Power Station (SHR #01015). The Project will not have a direct impact on either of these two heritage items, however both heritage items have recognised views and vistas to and from each item, from specific points around Sydney Harbour.



Figure 1 Location of the Glebe Island concrete bathing plant (Site) (Source: NearMap Copyright 2017)

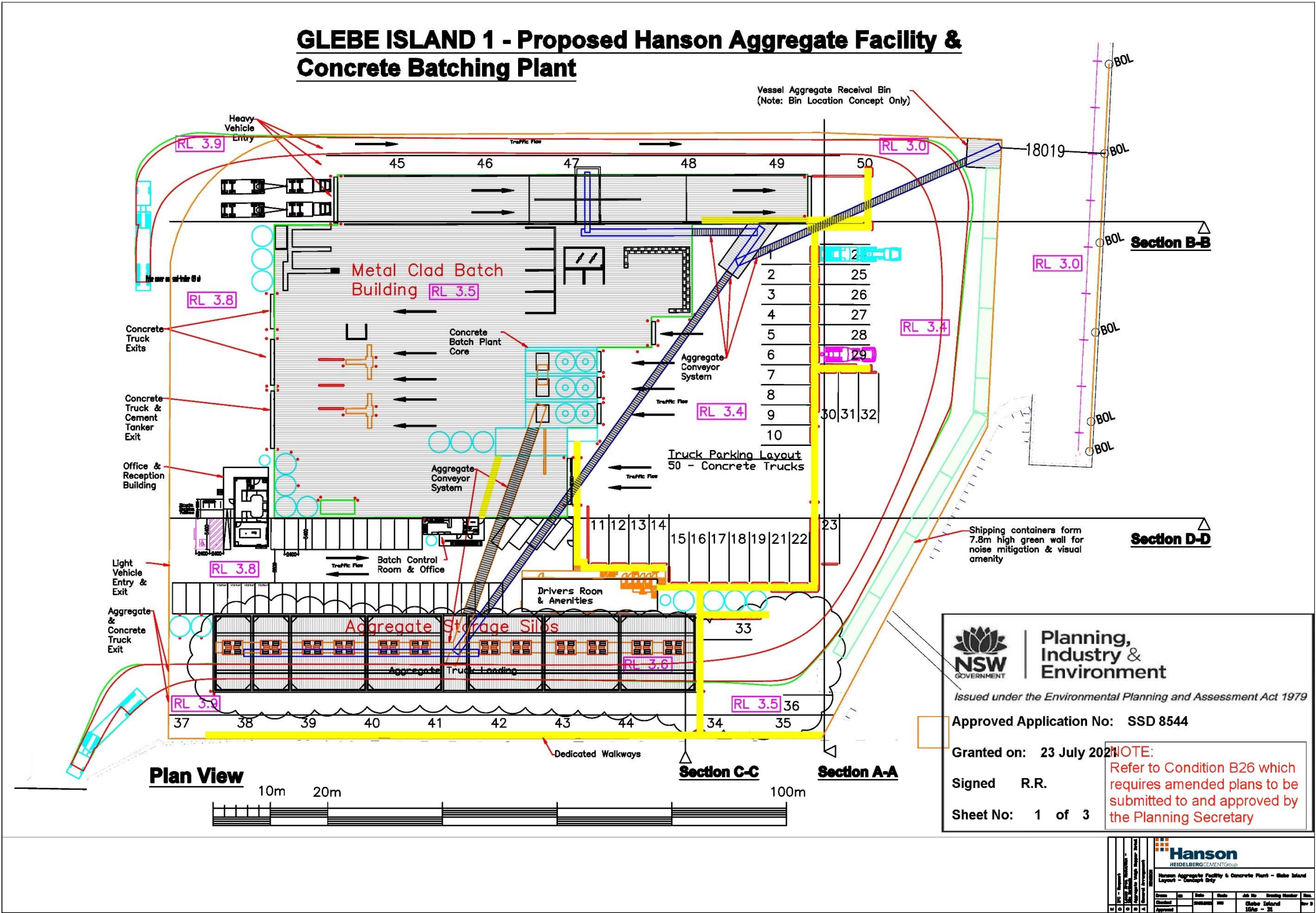


Figure 2 Stamped Plans of the concept layout of the Glebe Island Concrete Batching Plant

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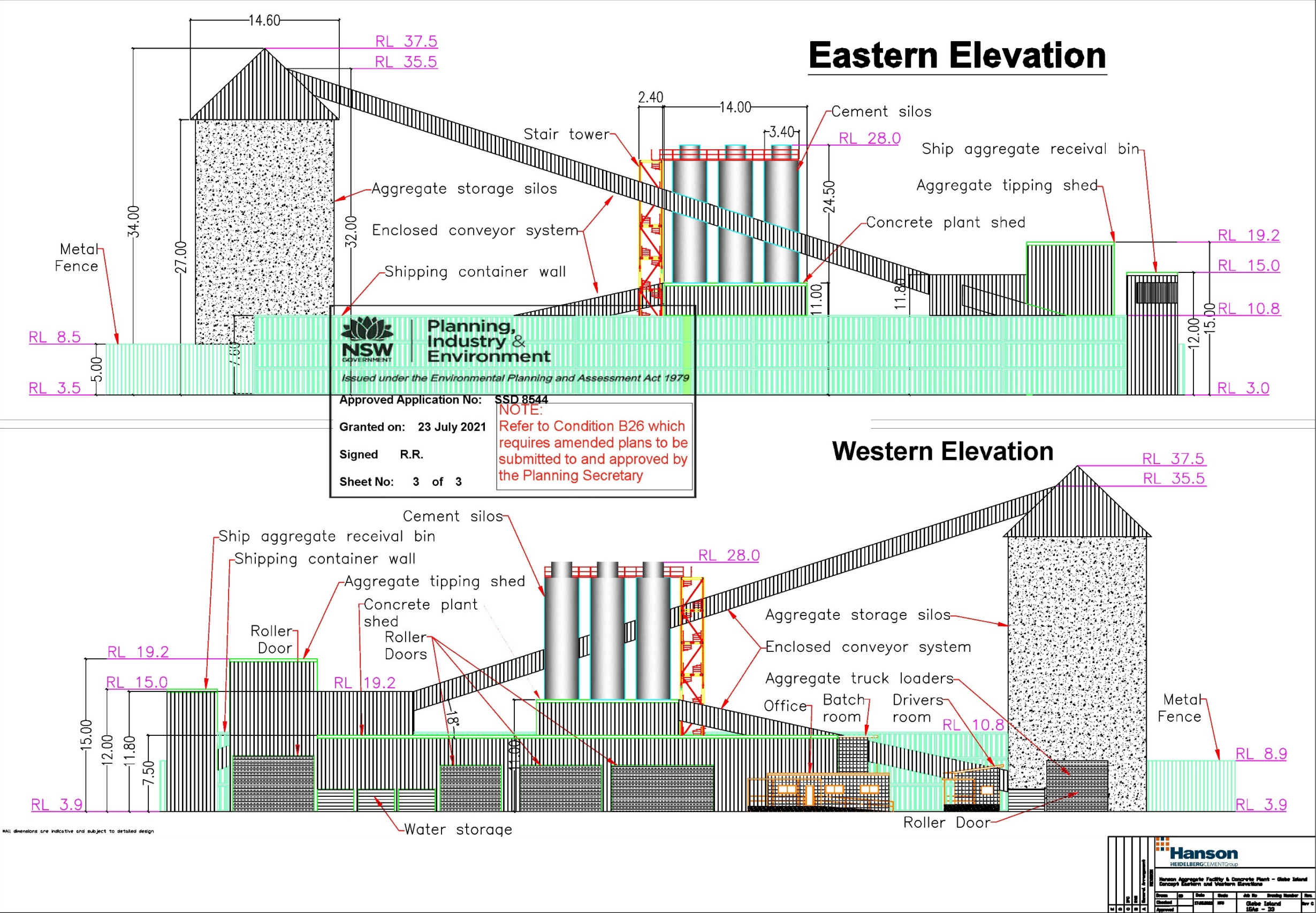


Figure 4 Stamped Approved Plan of the concept design showing the eastern and western elevations

1.3 Final design proposals

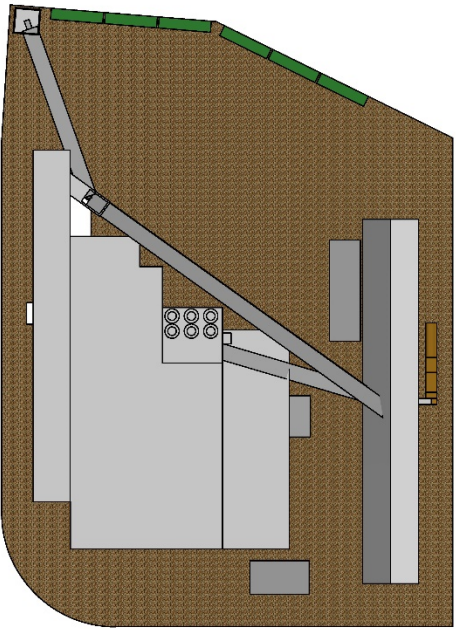
Development Consent has been granted based on the concept designs presented in Figures 2 and 3. As stated in Condition B26 of the approval, '*...amended plans and the Public Art Strategy must be submitted to and approved by the Planning Secretary*'. The condition also states that the final design must:

- (i) Reduce the height of the aggregate silos so that the maximum height of the silos (including roof) does not exceed the height of the ANZAC Bridge carriageway deck as measured at the pylon closest to the aggregate silos (RL 30.63 AHD, to be confirmed by survey)
- (ii) Reduce the length of the silos to provide opportunities for tree planting and landscaping in the south east corner of the site
- (iii) Revise the layout of buildings and carparking on site to reflect these changes and provide opportunities for landscaping
- (iv) Provide details of materials, textures, expressed structure, openings, etc
- (v) Provide details of relevant noise attenuation measures required by Condition B24 to be incorporated into the buildings and structures, such as cladding material, insulation, soft closing and time limited opening of doors and that the buildings and structures are fully enclosed.

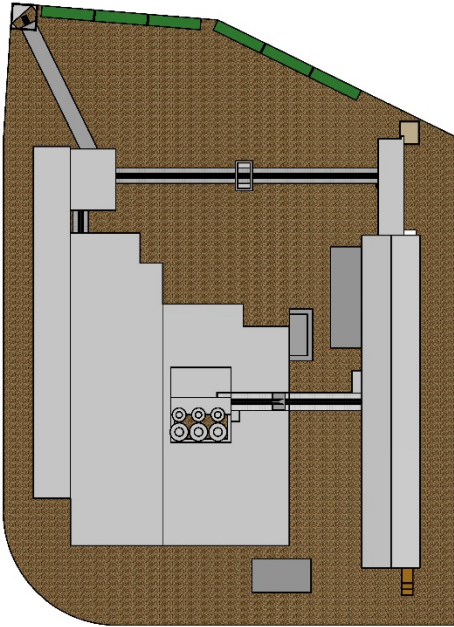
A new design has been prepared to meet the Conditions of the Development Consent. The new proposed concept design is contained within the original proposed site boundary, with the location of the silos, where deep excavations are required, in the same location.

At the time of preparing this AMR two designs had been prepared, which the final design would be chosen from. Both of these designs are contained within the original proposed site boundary, with the silo locations, where excavations are proposed over the site of the former first Glebe Island Bridge, positioned in the same location as the approved stamped concept plans.

The impact from the Project on the potential historical archaeological resource present within the Site boundary is the same as assessed in the SoHI prepared by AECOM (2018). The extent of works and the proposed excavation across the site also does not change or alter the proposed ARD prepared by AECOM (2018).



DA Concept - V19
PLAN



Proposed Concept - V26
PLAN

DRAWN	3/08/2021	Hanson Construction Materials	
ISS			
CHECKED			
GR		TITLE	
GA		Glebe Island Project	
		IPC Constraint Alterations	
		PLAN	
		V19 (DA) vs V26 (proposed concept GA)	
		SIZE	REV
		D	1
		SCALE	1:100
			SHEET 1 OF 1

Figure 5 Updated Concept Plan (V26) showing design changes against the Development Consent Concept Design (V19)

2.0 Historical Context

2.1 Preamble

The historical context presented below was prepared by AECOM for the SoHI (2018). This historical context has been presented to understand the former uses of the site, in order to understand and assess the potential for historical archaeological deposits that may be present. The following sections outline the development of Glebe Island.

2.2 Early European Phase (1788 – 1850)

Glebe Island was a small island, connected by a small narrow causeway at Balmain that was only exposed at low tide (Simon Davies, 1984). The island was originally described as being irregular and as being ‘precipitous and rocky’ (Glebe Island Abattoir, Public Works Special Bundle. 1850-7, n.d.). The land was first granted to Reverend Richard Johnson, whose original 160 acres on the edge of Sydney were acquired for the establishment of a church and Glebe (real estate that supported the clergy).

Johnson began clearing parts of his land, but not Glebe Island. A new grant of land near Canterbury was given to the Catholic Church to establish a church and grounds, so the original 160 acre land grant was left vacant. With the formation of the Church and School Lands Corporation in 1826, lands that were not being used by the Catholic Church were to be sold (J. Campbell, n.d.). Disposal of land began in 1828, but did not include Glebe Island at that time. The first allotment on Glebe Island, Allotment 1, was sold in 1839 to J. Hatfield who appears to have left the land vacant.

In 1841 plans were prepared to auction the south-western portion of the island. A scheme was devised whereby this land was subdivided into a neat grid system, the principal blocks separated by streets with names such as Johnsons, Mitchell, Glebe and Ferry Streets (“Plan of Part of Glebe Island for Sale by Auction 12.7.1841,” n.d.). The auction, held during April and May 1842, produced few sales.

Allotments 2 and 12 (a little over four acres combined) were bought by J. Marsh in April for a combined sum of approximately £249 and Allotments 5 and 6 (a little over three acres) were purchased by E. Buttenshaw in the following month for £180 (Glebe Island Abattoir, n.d.).

It is extremely unlikely that any of the new owners improved their new properties in any significant way, if at all. A later compensation case by one owner could only be based on the value of the stone within his land (Glebe Island Abattoir, n.d.).

A centralised abattoir was contemplated for the Island in 1849. Prior to 1849, the *Noxious Industries Act* had the effect of relocating various industries such as tanneries, slaughterhouses, boiling down works and the like away from the city limits, but not abattoirs. Glebe was one of the several inner suburbs that attracted the relocated businesses. The establishment of the principal city abattoir in this area was, therefore, in keeping with the developing industrial profile of the district. The Government Architect was asked to submit a plan for the new establishment as quickly as possible with consideration to be given to establishing both a permanent means of communication between the island and the mainland and a fresh water supply. Planning for the Project commenced in the following year.

2.3 Glebe Island Abattoir (1850 – 1916)

Glebe Island Abattoir was established by an Act of Parliament in 1850. The first steps towards realising the new facility were the resumption of the existing properties, in one case with a lengthy legal discussion and a compensation pay-out of £1500, and planning by the Colonial Architect. The latter noted that, although the island contained 23 acres, only a small portion was available in its existing state on which to build the new abattoir (Glebe Island Abattoir Public Works Special Bundle. 1850-7, n.d.).

The principal work carried out initially involved levelling the top of the island to form a platform for the buildings. This left a uniform surface of bare rock which was to be used for foundations. The excavated rock was to be used in the construction of the buildings, dams, embankments and roadways. A platform bridge was to be built, together with 24 slaughter-houses for cattle and yards for

sheep. It was found to be impossible to supply fresh water to the site except by means of reservoirs that stored water collected from the rooves. Salt water was to be pumped from the bay. The plan was devised with an expectation that it could be expanded as the need arose. The estimated cost was £12,000 (Glebe Island Abattoir Public Works Special Bundle. 1850-7, n.d.).

Work commenced on the site in 1852. A wharf was built and then a road from the wharf to the work site. A platform was cleared and several buildings were erected to facilitate the construction programme. A causeway was constructed from the Glebe mainland to the island. Work continued over the next few years and by 1854 the Colonial Architect estimated that the final cost would be over four times the original estimate, approximately £54,000, due to rising costs of material and labour (Glebe Island Abattoir Public Works Special Bundle. 1850-7, n.d.).

In 1855, the site was connected to the mainland by means of Abattoir Road, later renamed Banks Road, which crossed the island by means of a cable punt (Figure 6). Later this punt was replaced by a wooden toll bridge (in 1857); this was the first Glebe Island Bridge (Thorpe, 1990) (Figure 7).

The first Glebe Island Bridge was a private venture that connected Pymont to Glebe Island at the narrowest point in Johnstons Bay. The bridge was constructed out of Tasmanian Blackbutt timbers, including the piles, and consisted of 24 bents spanning across Johnstons Bay. Each bent consisted of four vertical piles with an additional two raked piles on the outside. Each bent also included a double upper and lower waler (or headstock) with two long cross beams spanning all four piles (Figure 8 and Figure 9). The approach to the bridge on the western side appears to have included an earthen embankment with potential stone abutments.



Figure 6 *“A plan of part of Sydney and its environs: showing the bridges and roads to be constructed by the Pymont Bridge Company” Allan & Wigley Litho 1857. Note: Glebe Island was connected via Abattoir Road only. The punt crossing was not depicted (Source Inner West Council Online Library)*

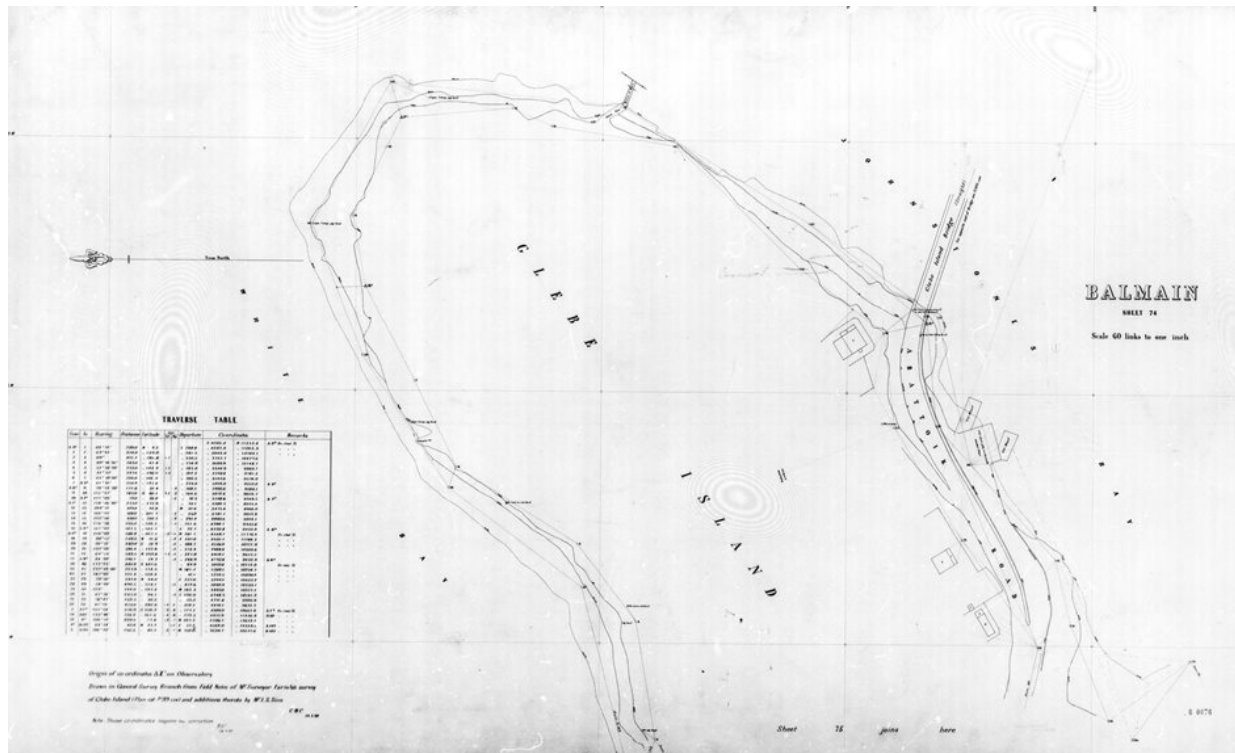


Figure 7 Municipality of Balmain Water Board plan Sheet No. 74 (Glebe Abattoir, date c1885) (Source: <http://trove.nla.gov.au/version/238100592>)



Figure 8 First Glebe Island Bridge. Glebe (NSW) earlier than 1899 (Source: <http://trove.nla.gov.au/version/48145927>)



Figure 9 “Glebe Island Bridge – 10/1870” (source State Library of NSW Digital order no:d1_05719)

Later, Glebe Island was connected to Victoria Road. The abattoir was opened in 1860. From its inception considerable local protest was directed at the abattoir. Complaints were made with respect to the stench and filth emanating from it.

Despite improvements made to the abattoir site, local opinion was still firmly against the continuing presence of the abattoir in the district. A petition was formed in 1887 to effect the removal of the establishment to Homebush (Thorp, 1990). Perhaps in response to this adverse local opinion, attempts were made to modernise the abattoir during the later 1880s and early 1890s (“Plan Showing Proposed Improvements at Darling Island and Glebe Island 1891,” 1891). The principal component of the scheme was the complete enclosure of the island by a wharf. The work did not proceed at this time.

In 1895 Drummoyne Council joined with Five Dock Council to “ask co-operation of the councils interested in an endeavour to urge the government to either abolish the abattoir at Glebe Island or provide carriage of stock to the Abattoir by rail or water to improve local amenities and roads” (Simon Davies, 1984).

Throughout the early 1900s, other schemes were devised to improve the site. The only practical outcome, however, was the replacement of the old Glebe Island Bridge with a new steel swing bridge. An international design competition for a new ‘Pyrmont Bridge’ was called in 1891. The Department of Public Works submitted a non-conforming design based upon a much larger bridge than specified in the design brief (NSW Heritage Division, 2013). Design of the bridge was led by Percy Allan, who had been appointed Engineer-in-Chief for bridge design in 1896. His assistant engineer was E. M. De Burgh and the junior engineers were H. H. Dare, J. J. Bradfield and J. W. Roberts, all of whom went on to have distinguished careers in public works engineering. Bradfield had charge of the team responsible for the substructure, foundations, abutments and retaining walls for both bridges. Tenders for the construction of both bridges (separate contracts) were invited in March 1899.

For both sites, Allan designed an electrically-operated swing bridge, the earliest use of electrical power for this purpose in Australia. The bridges were considered very innovative at the time of their construction and attracted international attention. For the Glebe Island Bridge, the large pivot pier was

founded on a nest of timber piles capped by concrete, whereas the Pyrmont pivot pier was founded on rock (NSW Heritage Division, 2013).

Construction commenced on the Glebe Island Bridge and Pyrmont Bridge at the same time but Glebe Island involved more extensive (and time-consuming) land resumptions (Figure 10). Over 100,000 tons of mud were dredged to establish the causeway and the fill was obtained by cutting down what was left of the hillock of Glebe Island, producing 5.3 hectares (thirteen acres) of flat land for railway yards and 853 metres (2,800 feet) of deep water frontage for wharfage (NSW Heritage Division, 2013).

Construction of the trussed swing spans at each site was by simple cantilevering out from the steel pivot ring. Where timber trusses were used for the approaches of the Pyrmont Bridge, the Glebe Island Bridge used two steel deck trusses, then stone-faced embankments to reach each shore. The use of steel trusses for the approach spans had been part of Allan's original design for the Pyrmont Bridge but the Parliamentary Standing Committee on Public Works directed that this material be replaced with timber, presumably as a cost-cutting measure. When Glebe Island Bridge was built, Allan's original specification was reinstated (perhaps owing to the use of built-up embankments and shorter approach spans, providing a more economical outcome) (NSW Heritage Division, 2013) (Figure 11).



Figure 10 “Glebe Island Bridge collapse” August 1899 (Source ANMM Collection Gift from Bruce Stannard available online)



Figure 11 Glebe Island Bridge c.1910. Note: The pile remains of the first Glebe Island Bridge can be seen cut off near the water level on both sides of the timber fenders associated with the current Glebe Island Bridge (Source Tyrrell Collection held online at the National Library)

Despite the works, by 1902 the Standing Committee had resolved that the best solution to the issue was the construction of a new abattoir at Homebush (Simon Davies, 1984).

Work on the new abattoir commenced in 1910. Glebe Island Abattoir was closed in 1916 (Spearritt, 1978). In 1917 a large fire broke out in some of the buildings that, by that time, were being used by Australian shipping line and merchant Burns Philp for copra storage (dried coconut kernel, used to extract oil). The damage done was extensive and this, as well as the selection of the site for the new grain storage facilities, led to the demolition of the buildings.

Prior to the closure of the abattoir, a scheme was initiated at Glebe Island that may be viewed as a precursor to the later silo programme. In 1913 work commenced on an extensive reclamation and wharfage project designed to facilitate wheat and coal handling at the island. The work was carried out on behalf of the City Rail Commissioners and was instigated as part of an overall goods railway scheme (Sydney Harbour Foreshore Authority Heritage, 1913). This Project had first been discussed and investigated at the turn of the century, being the subject of a parliamentary investigation to determine the value of such improvements to the wharfage scheme of the port.

Work on the scheme continued through until early 1916. At that time, when 1,170 feet of wharfage had been completed, the Chief Commissioner for Railways decided that, because of the plans then in hand for the bulk storage programme, work should cease on the railway scheme. With the acceptance of the silo proposal the wharfage scheme was adopted by the Department of Agriculture and became part of the site works necessary for the development of the bulk wheat handling facility (Sydney Harbour Foreshore Authority Heritage, 1913). Contracts which had been entered into as part of this scheme for cargo handling appliances were also cancelled at this time.

2.4 Silos (1916 – 1921)

In 1915 the American firm of Metcalfe and Co. Ltd offered their services to act as consulting and design engineers for the establishment of bulk facilities in four states. NSW was the only state to accept the invitation (Grain Elevators Board, 1972). In the following year, the State government entered into an agreement with that firm for the supply of full plans and specifications of six types of elevator (Grain Elevators Board, 1972) and an extra one, if required, for terminals at Sydney and Newcastle and four country types for 20,000 pounds as well as a supervision fee for the following five years.

Acceptance of this offer was partially due to the mouse plague that had hampered the storage of bagged wheat in NSW in 1916. Efforts were made to improve storage of bagged wheat, as well as procedures to stop shipping transporting mice around Sydney Harbour.

Initial work for the Sydney site commenced with quarrying work in 1917 designed to prepare it for the silos. The spoil from this work was used to extend the reclamation and wharfage work begun in the period 1913-1916 ("Sydney Harbour Trust Annual Report," 1917).

Work on the terminal buildings commenced in 1918, after tenders were considered by the committee. The successful tenderer for the construction of the silos was Mr Teasdale Smith (Grain Elevators Board, 1972). The rock blasting was carried out by the Harbour Trust under the direction of the Engineer in Chief.

The silos designed by J. S. Metcalfe and Co. were shaped as large cylindrical bins capable of holding 6,382,000 bushels. On top of the bins were six steel galleries with conveying equipment to direct the wheat, unloaded from trucks, through a tripper into the bins.

By mid-1921 the first phase of the system was near to completion and was so by the end of that year. The final cost of the terminal at this stage was £1,681,392 (Figure 12).



Figure 12 Glebe Island's wheat silos in a 1920 photo by Arthur Ernest Foster. Picture: State Library of NSW (Series 3 part 2 – file number FL412764)

2.5 Extension of the Facilities (1921 – 1932)

Bulk shipments had commenced at Glebe Island in 1922, but not in sufficient quantities to relinquish the old Darling Island wharves at Pyrmont which, from the 1890s onwards, had formed the focus for grain handling in NSW (Thorp, 1990). By 1925, a total of 63 country silos had been completed and, to facilitate the centralization of all wheat handling at Glebe Island, almost immediately after the completion of the silos further improvements were made to the site to provide more and better services.

Extensions had been made to the wharves in 1922 and much work to improve these facilities was carried out during 1924-1925. By mid-1925 the broadside wharf on the west side of Glebe Island was complete, as was the berth at the north end, and work had begun on similar facilities to the east side. The latter was completed by June 1926 (Grain Elevators Board, 1972).

The principal additions to the site, however, were the provision of facilities to handle bagged wheat. By mid-1926 two large sheds, complete with conveyors, had nearly been completed and railway lines had been laid behind these sheds. Another shed was to be built at the western end of the wharf as well as

an extension to the east and several smaller sheds were planned to be constructed behind the main sheds (Grain Elevators Board, 1972).

By mid-1927 these sheds for bagged wheat had been completed as well as a sub-station and control house. The arrangements were considered to be amongst the best systems in the world (Maritime Services Board, 1939). By this time another shed was under construction at the south-west point of the island and wharfage along the east side was again being extended in a southerly direction. The final completion of this work would provide 1,000 feet of wharfage along this portion of the island (Maritime Services Board, 1939).

In 1928 additional works were added to Glebe Island. A new shed was added to the south-west corner of the island, twelve horizontal conveyors and four elevators. Additional sheds were proposed to the land to the west as well.

By mid-1929, a shed for bagged wheat had been completed on the east side of the Island and the wharf at the north-east corner had been extended a total of 180 feet. By this time total wharfage on the White Bay side of the island amounted to 2,680 feet. Wharfage on the east side was extended nine hundred feet to give a total length of 1,720 feet. A sea-wall was constructed behind the wharves and additional rail facilities were made to connect Glebe Island with the Rozelle system. By mid-1930, two new sheds had been constructed and it was considered, by that time, that there were sufficient facilities to deal with bagged wheat for some considerable period (Grain Elevators Board, 1972).

2.6 Depression through to post WW2 (1932 – 1960)

During the depression years there were poor wheat exports and low shipments at the Glebe Island facilities. This did not improve until 1935 when there were large increases in the wheat production and storage, and a notable shift from bulk shipping exports and decrease in bagged wheat exports (Maritime Services Board, 1967). In 1937 the decision was made to transfer all bagged wheat loading operations to Glebe Island.

During the war years Glebe Island continued to store and export wheat and other cargoes, however the facilities were taken over under the National Security Regulations and its principal function became as a major armament and engineer's supply depot for the US Army. It was also used to dis-embark and re-embark troops. The RAAF also used certain sheds for storage. Of immediate advantage in the post-war years was the opportunity to purchase, by the Maritime Services Board, buildings and services constructed on the island for military purposes. This occurred and several were converted for port purposes (Reynolds, 2008).

Following the war though, several of the facilities at Glebe Island continued to be used for military purposes, in particular the storage of supplies to be shipped to Japan.

2.7 Later use and development (1960 – 2000)

The increase in wheat production saw an excess in wheat that required storage. A new 700 foot long concrete decked berth was built at Glebe Island to accommodate the larger more modern grain loading facilities. The other existing berths at Glebe Island were also being re-constructed at the same time. Additional silos and associated elevators were constructed during the 1970s to facilitate the modernisation and increases needed in storage capacity.

The function of the site as a grain silo ceased in 1984. During the later 1980s and early 1990s activity at the terminal had scaled down and several other uses had been adopted for the site. In 1993, for example, berths were leased as a vehicle import terminal (Maritime Services Board, 1974).

3.0 Archaeological Potential and Significance

3.1 Archaeological Potential

Based on the historic development of Glebe Island and the physical remains, an understanding of the potential historical archaeological remains present within the Site can be made.

The major development phases and impacts to Glebe Island occurred to convert it for use as the Sydney Abattoir. In the lead up to this in the 1850s, Glebe Island was cleared and a series of wharves and roads were constructed. These were constructed largely to the southern side of the existing Glebe Island Bridge, and therefore not within the Site.

To the north of the Glebe Island Bridge during this period, a few structures are present on historical plans. A cottage was built to the east of the Site located in the area above the rock cutting along Sommerville Road. Two jetties are also shown on these early plans to the north of the Site. Both the cottage and the two jetties were located outside of the Project area.

The location of the first Glebe Island Bridge was located on the northern side of the existing Glebe Island Bridge. The bridge was a lower pile and timber decked bridge located immediately to the north of the approach embankments of the present Glebe Island Bridge and located within the Site. The original bridge was constructed out of Blackbutt timber piles. The approach to the bridge on the western side appears to have included an earthen embankment with potential stone abutments. It is common practice when former wharves and bridges are demolished, that piles and other remains associated with the former structures would be built over. After the construction of the current Glebe Island Bridge, the former bridge was removed to allow for safe navigation through the new swing bridge into Black Wattle Bay. There is no information relating to the specific removal of those piles, either within water or on land. An early photograph from the 1920s when the Glebe Island Bridge had been constructed shows the remains of some of the piles from the former bridge still present in the water (Figure 11). It is therefore considered likely that evidence of the Bridge remains *in situ*. Any excavation below the current hardstand adjacent to the Glebe Island Bridge would have the potential to expose archaeological remains associated with the first Glebe Island Bridge (Figure 13).

The reclamation works that took place from 1917 onwards for the construction of the grain storage development and ultimately the construction of the grain silos, extended the land available to the east of the former Glebe Island foreshore. There is low potential for archaeological remains associated with the reclamation works to be present below the current hardstands on the Site behind the line of current wharves. The archaeological potential would be limited to fill material only and is not expected to have any archaeological research value.

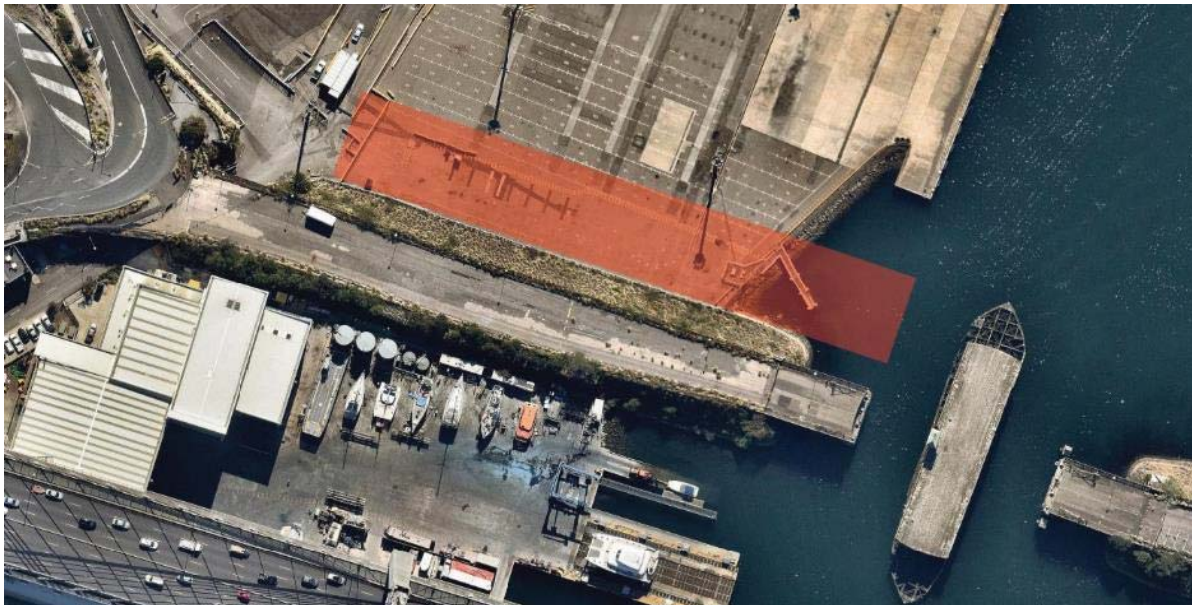


Figure 13 Area of identified archaeological potential (shown in red) associated with the alignment of the first Glebe Island Bridge

3.2 Archaeological Significance

The archaeological significance associated with the first Glebe Island Bridge has been assessed against the criterion outlined by the NSW Heritage Council (NSW Heritage Branch, 2009; NSW Heritage Office, 2001). Table 1 provides an assessment of the significance of the potential archaeological remains that may be present.

Table 1 Archaeological significance assessed against NSW criteria

Criterion	Assessment
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).	The first Glebe Island Bridge has historical significance at a State level as it relates to the first crossing west of Pyrmont that assisted the expansion of the city of Sydney. The bridge was an important crossing heading west that allowed for a more direct route for produce to reach the markets in Sydney. The bridge was a private toll bridge completed in 1862 and replaced the earlier punt crossing. The Bridge contributes to a historical understanding of how private enterprise filled the gaps in public road infrastructure and influenced the shape of the city. The bridge was constructed of Tasmanian Blackbutt timbers and included a hand cranked swing span located at the Pyrmont side of the bridge.
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 to area).	The first Glebe Island Bridge was a private Toll Road until the Government purchased the bridge in 1884 and abolished the tolls. The bridge is not likely to be associated with any one person in particular or associated with the life works of a group of people of cultural importance to the area.
Criterion (c) – an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical	The first Glebe Island Bridge was designed to allow for watercraft to pass through it via a hand cranked swing span at the Pyrmont end of the bridge and represents a design that allows for both road and maritime traffic to operate, although not concurrently.

Criterion	Assessment
<i>achievement in NSW (or the local area).</i>	The bridge was also constructed from Tasmanian Blackbutt, known to be a timber used in marine construction due to its natural resistance to marine borer attack. The use of this type of timber and importing large quantities from Tasmania for the bridge's construction required a high degree of technical knowledge and ingenuity. Archaeologically, the remains of the first bridge crossing are not considered to have aesthetic characteristics.
Criterion (d) – <i>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.</i>	The first Glebe Island Bridge was a valuable asset to the Sydney Community. It was used by the local butchers and abattoir workers and other produce growers to be able to access markets in Sydney more directly and in less time. The bridge also allowed for domestic growth alongside the commercial development for the inner western suburbs. As the Bridge was demolished in 1902, it is considered that this social significance has attenuated and the Bridge does not meet the threshold for listing under this criterion.
Criterion (e) – <i>an item has 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). Significance under this criterion must have the potential to yield new or further substantial information.</i>	It is anticipated that archaeological remains associated with the first Glebe Island Bridge may be present within the reclamation area on Glebe Island. There is also the potential for the abutments and approach on the western side of the bridge to be present within the same reclamation area. It is also possible that cut down piles are extant within the seabed crossing. If present, the archaeological remains would have research potential to provide information relating to the construction and design of this bridge which is not available elsewhere as there are no known extant plans. If present, the archaeological remains associated with the first Glebe Island Bridge would meet this criterion at a State level.
Criterion (f) – <i>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).</i>	The archaeological remains associated with the first Glebe Island Bridge are considered to be rare as they relate to the only known Tasmanian Blackbutt bridge structure built in Sydney when it was constructed in 1862. The remains are limited to the piles and other structural remains that may not have been salvaged when it was removed in 1902. As such, the archaeological remains are considered to be rare as information relating to this bridge would only be available from the limited historical photographs and from the archaeological record.
Criterion (g) – <i>an item is important in demonstrating the principal characteristics of a class of NSW's (or local area's):</i> - <i>cultural or natural places cultural; or</i> - <i>natural environments.</i>	The archaeological remains, if present, are not likely to demonstrate the principal characteristics of a class of NSW's natural or cultural places or environments. The Bridge does not meet this criterion at a State or local level.

4.0 Archaeological Research Design

4.1 Historical Themes

The following table identifies the relevant State historical themes and how these themes are represented.

Table 2 Historical themes

National Theme	State Theme	Local Theme
3. Developing Local, Regional and National Economies	Technology - Activities and processes associated with the knowledge or use of mechanical arts and applied sciences	Technologies of bridge building Technologies for adapting road transport to maritime systems
3. Developing Local, Regional and National Economies	Transport - Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements	Road Bridge
8. Culture-Developing cultural institutions and ways of life	Creative endeavour - Activities associated with the production and performance of literary, artistic, architectural and other imaginative, interpretive or inventive works; and/or associated with the production and expression of cultural phenomena; and/or environments that have inspired such creative activities	Technological innovation and design solutions

The archaeological investigations have the potential to contribute to an understanding bridge design and technology associated with the early expansion of Sydney.

4.2 Research Framework

The investigation is aimed at undertaking archaeological monitoring of construction works in the vicinity of the expected alignment of the first Glebe Island Bridge. As the project is being undertaken as a SSD project under the EP&A Act, the provision to apply for approvals under the *Heritage Act* are not required. This does not, however, turn off the requirement to undertake the necessary archaeological works that have been identified for the Project.

4.2.1 Research Questions

How was the first Glebe Island Bridge (1860-1900) constructed?

Is there any evidence of modifications and alterations present in the archaeological remains of this bridge?

What was the quality of the materials used in the bridge? Was copper sheathing used? Were pile shoes used to help drive in piles? What were the spacing of piles and the size and standard of fastenings? Does this say something about the choice to use Tasmanian Blackbutt and not a locally available material or the level of importance placed on the bridge by the private design and operators?

What can it tell us about the engineering skills available to the colony within the first few decades of European settlement?

What, if any, do the artefacts associated with the site tell us about the use of the bridge?

4.3 Archaeological Approach

4.3.1 Archaeological monitoring

The objective of this investigation is to archaeologically record remains associated with the first Glebe Island Bridge if present within the Project area. The archaeological works would be undertaken in conjunction with construction excavation works. Specifically, excavation required for the footings for the silos would be directly within the alignment for the former bridge (Figure 13). Archaeological monitoring is being proposed as the excavation for the silos will be deep and require shoring to prevent the excavation area from collapsing (Figure 14).

Archaeological monitoring will be undertaken until any remains of the former bridge are identified, such as piles or other associated timbers. If piles are exposed that are assessed as being *in situ*, mechanical excavation between the piles will continue under the direction of the archaeologist. When an appropriate section of piles have been exposed, the piles will be recorded as to their dimensions and any observations, such as construction method, shaping and condition.

In the event that relics are encountered, mechanical excavation will cease and manual excavation by the archaeological field team will commence where it is safe to do so. If depth of excavation and/or ground water does not make it safe to manually excavate, soil material will be excavated mechanically and will be placed adjacent to the Site where the material can be inspected by the archaeological team.

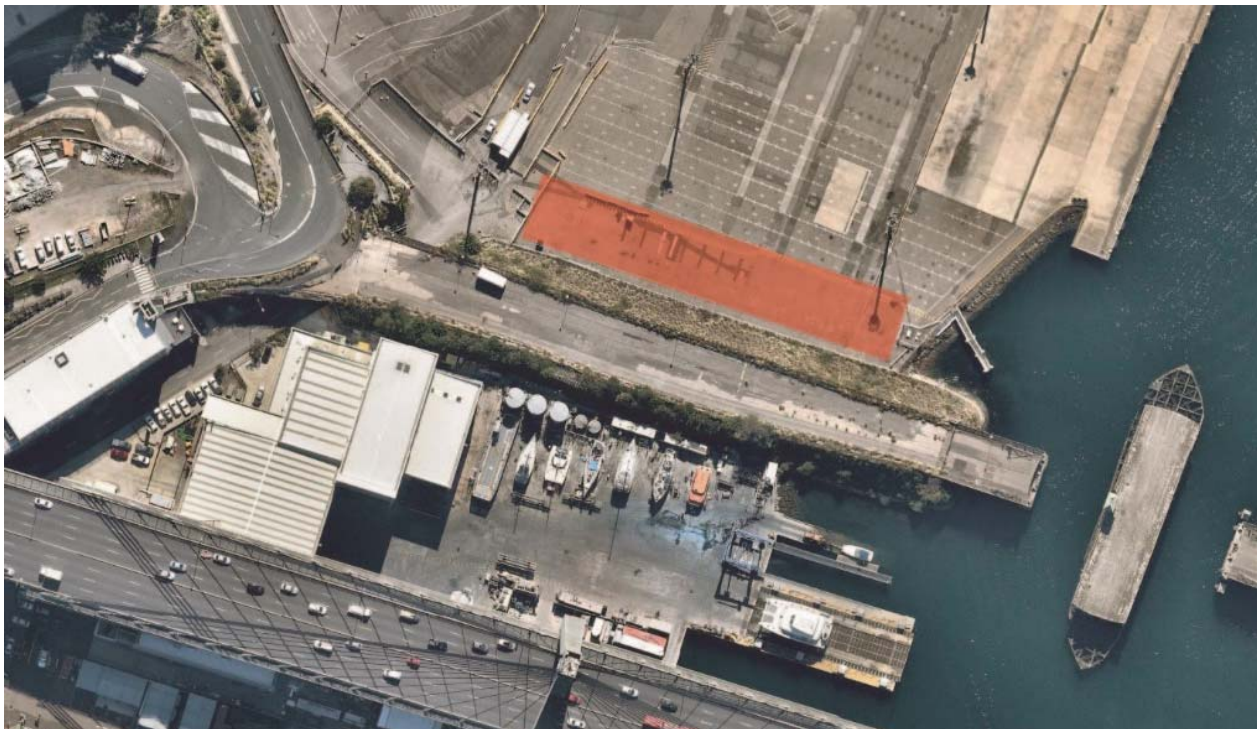


Figure 14 Approximate areas for archaeological monitoring and excavation (shown in red)

4.3.2 Methodology

The following methodology would be implemented by the nominated excavation director Chris Lewczak:

- Establish a survey datum to record the location of the features, deposits and/or relics.
- Existing hard stand will be removed as per the construction requirements.
- Excavation of the fill material below the hardstand will be undertaken under the supervision of the excavation director. The preferred method would be with the use of a batter bucket, however, if the fill material is too coarse or tightly packed, a toothed bucket may be used but only after consultation with the excavation director.

- If individual timbers, not including piles, are encountered, those timbers would be recorded to the depth and location where they were uncovered, and would be removed from the trench. Timbers would be placed in a safe area away from the immediate construction area where they can be recorded in detail.
- If *in situ* piles are uncovered, excavation around the piles will continue with the use of the mechanical excavator. When sections of the pile(s) are exposed, cleaning of the piles and recording will be undertaken by the archaeological team.
- Excavation around the piles will continue until the base of the excavation required for construction works is reached.
- Archaeological excavation and/or cleaning with hand tools would be undertaken, as required, in order to define the feature, deposits and/or relics that are encountered during excavation works.
- All features and bridge remains will be recorded using Differential Global Positioning Systems (DGPS).
- Scaled plans and cross-sections will be prepared, as required.
- Photographically record all phases of the monitoring and recording with an appropriate photographic scale and photographic log.
- A context recording form will be completed for each feature, which would be sequentially numbered and record the location, dimensions and characteristics of the feature, context and/or spit.
- Artefacts would be bagged according to the feature, context and/or spit from which they were retrieved. Artefacts would only be retrieved where leaving them *in situ* may endanger their integrity.
- Should substantial or intact deposits and/or relics of State or local significance be identified, they would not be removed or excavated. The deposits and/or relics would be protected with geofabric and temporary fencing while mitigation measures are discussed and determined by Heritage NSW, DPC, Sydney City Council and excavation director Chris Lewczak.

4.3.3 Unexpected Finds Procedure

In the event that unexpected finds, such as bricks, sandstone, ceramics or glass, are encountered during the excavation works, and no archaeologist is present on site, works in the area should cease and the Project Archaeologist should be contacted immediately.

Photographs of the unexpected finds should be sent to the Project Archaeologist, along with a description of the find, and where the find was uncovered.

Once the information has been reviewed, the Project Archaeologist may deem it necessary to come to site to investigate the unexpected find further, including the area surround the find. When on site, the archaeologist may decide to continue the excavation around the unexpected find to positively identify the find, and to determine the extent of any potential archaeological deposit.

Depending on the nature and extent of the find, further archaeological works may be required, including (but not limited to):

- Targeted archaeological excavation in the location of the unexpected find to expose and record the find, and to assess its significance.
- Archaeological monitoring of excavation works in the area to monitor for additional unexpected finds in the area until the archaeologist is confident that no further archaeological remains are present in the area.
- No further historical archaeological works are required.

Depending on the significance of the find, notification to Heritage NSW may be warranted, as required under Section 146 of the *Heritage Act 1977*.

Examples of unexpected finds and how to photograph any finds is presented in Appendix A of this report.

4.3.4 Reporting

As required in Condition D41 of the Development Consent, a report would be prepared at the conclusion of all archaeological works on site. The report will be prepared by the Excavation Director and provided to the Planning Secretary, Place Management NSW and Heritage NSW.

The report would be produced detailing the monitoring, including the implementation of the methodology, the results of the monitoring and an assessment of the ability of the information to answer the research questions provided in Section 4.2, together with discussion of answers provided. The following headings will be used as a minimum and should include any additional requirements included in the Section 139 exception:

1. Executive Summary
2. Introduction
3. Site History
4. Research Design
5. Methodology
6. Monitoring results, including descriptions of features and artefacts identified (if any)
7. Analysis
8. Conclusion and future management recommendations (if required).

5.0 References

- AECOM Australia Pty Ltd. (2018). *Glebe Island Concrete Batch Plant Statement of Heritage Impact*.
- Glebe Island Abattoir, Public Works Special Bundle. 1850-7. (n.d.). Col. Arch. to Col. Sec. 18 September 1850.
- Glebe Island Abattoir, P. W. S. B. 1850-7. (n.d.). Surveyor General to Col. Sec. 25 June 1850.
- Glebe Island Abattoir Public Works Special Bundle. 1850-7. (n.d.). Select Committee on Mr J. Marsh Claim for Compensation for Land Resumed by the Government at Glebe Island. 18 December 1851.
- Grain Elevators Board. (1972). *Grain Elevators Board 50 years of bulk grain handling in New South Wales*. Grain Elevators Board of New South Wales, Sydney.
- J. Campbell. (n.d.). Notes on the Early History of Glebe. *JRAHS*, 15, 300–1.
- Maritime Services Board. (1939). *Maritime Services Board Annual Report*.
- Maritime Services Board. (1967). *Maritime Services Board Annual Report*.
- Maritime Services Board. (1974). *Maritime Services Board Annual Report 1973-4*.
- NSW Heritage Branch. (2009). *Assessing Significance for Historical Archaeological Sites and 'Relics.'* Parramatta. Retrieved from http://www.heritage.nsw.gov.au/docs/Arch_Significance.pdf
- NSW Heritage Division. (2013). Glebe Island Bridge.
- NSW Heritage Office. (2001). *Assessing Heritage Significance*. Parramatta. Retrieved from <http://www.heritage.nsw.gov.au/docs/assessingheritagesignificance.pdf>
- Plan of Part of Glebe Island for Sale by Auction 12.7.1841. (n.d.). Mitchell Library, State Library of NSW: ZML M2 811.1821/1841/2.
- Plan Showing Proposed Improvements at Darling Island and Glebe Island 1891. (1891).
- Reynolds, P. (2008). Glebe Island.
- Simon Davies. (1984). *The islands of Sydney Harbour*. Sydney: Hale & Iremonger.
- Spearritt, P. (1978). *Sydney since the twenties*. Hale & Iremonger.
- Sydney Harbour Foreshore Authority Heritage. (1913). *Sydney Harbour Trust Annual Report*.
- Sydney Harbour Trust Annual Report. (1917).
- Thorp, W. (1990). *Thematic History of White Bay to Blackwattle Bay. Central to Eveleigh Heritage Study*.

Appendix A

Unexpected Finds Protocol and Example of Finds

GLEBE ISLAND CONCRETE BATCH PLANT

DISCOVERY OF PREVIOUSLY UNIDENTIFIED HERITAGE OBJECTS DURING EXCAVATION ACTIVITIES EXAMPLE PHOTOGRAPHIC RECORDING GUIDE



- 1 SCALE IN EVERY PHOTO
Scale can be
 - Tape Measure
 - Photo Scale.
- 2 PHOTOS FROM DIFFERENT ANGLES
Flip the object over, or photograph the sandstone from side.
- 3 CLOSE UP OF DETAILS
Including features, text and marks.
Detailed photos can be taken in the site office at the end of the day.
- 4 PHOTOS MUST BE IN FOCUS
Details need to be clear when zooming in.
- 5 OBJECTS CAN BE CLEANED
Water can be used to gently remove dirt in order to highlight or reveal details.
- 6 OBJECTS MUST BE KEPT SOMEWHERE SAFE
Objects can be put into zip lock bags or blocks can be stacked somewhere safe.



EXAMPLE OF SANDSTONE ITEMS



How to photograph sandstone kerbing found in the side of the trench.

Scale should be placed vertical to one side.



How to photograph sandstone found within a trench.

If the trench is shallow - scale can be placed outside the trench.

If the trench is deep, the scale should be placed within the trench.



Example of a location photograph that should accompany the Finds Register.



EXAMPLE OF SANDSTONE ITEMS (cont.)



Sandstone cut drains.



Sandstone kerbing



Sandstone fence



Natural sandstone that has been bench-cut to form a road surface



Sandstone drains

When Uncovered → When archaeologically excavated

EXAMPLE OF BRICK ITEMS (cont.)



Bricks used to form a drain



Detailed photograph



Top of brick barrel drain



Bricks, slate and other building materials



Brick footings below a sandstone wall



Brick gutter

GLEBE ISLAND CONCRETE BATCH PLANT

B

EXAMPLE OF ROAD SURFACES



How to take photos of former road surfaces.

Clean back the area so the sandstone or other material can be clearly seen.

Scale should be placed either to the side or at the bottom of the photo and clearly seen.



Detailed photographs of the former road surfaces should be taken.

Clean back the area so the sandstone or other material can be clearly seen.

Scale should be placed either to the side or at the bottom of the photo and clearly seen.



Road surfaces or other items that are found in the side of the trench should be photographed.

Scale should be placed to the side of the item being photographed but clearly seen.



EXAMPLES OF GLASS ITEMS



How to photograph a whole bottle.
Scale kept straight, either below or to one side of the bottle.



How to photograph detail present on a glass bottle.

Scale kept straight and close to the detail being photographed.



How to photograph detail around the base of a glass bottle.

Scale is in line and kept straight.



How to photograph the detail on the base of a bottle.

The photo can be taken on an angle to help see the outline of embossing.

Scale is level with the section of the bottle to be photographed and kept straight.

EXAMPLE OF METAL ITEMS



Examples of how to take detailed photographs of metal items.

Photographs of the whole item should be taken before taking detailed photographs.

Scale should be present in every photograph and located close to the detail being shot.

Different angles of the same detail should be taken.



Multiple small objects can be photographed in one shot. Items should be spaced so each can be clearly seen.

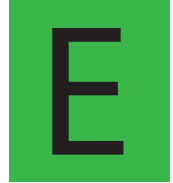
The scale needs to be visible so accurate measurements can be taken from the photos.

Detailed photos should still be taken if objects have writing or other stamped features on them.



GLEBE ISLAND CONCRETE BATCH PLANT

EXAMPLE OF TIMBER ITEMS



Examples of how to photograph unknown timber items.

Scale in every photograph.

The background of each photograph should be kept as clean as possible to see the item clearly.

