



# Heritage Impact Statement


Proposed Ancillary Works at  
Narrabeen North Public School  
within a Coastal Wetlands Area -  
Designated Development

6 Namona Street, North Narrabeen NSW 2101

Submitted to JohnStaff Pty Limited  
On Behalf of Schools Infrastructure NSW

JANUARY 2023

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## 1. BACKGROUND

### 1.1. Introduction

City Plan Heritage (CPH) has been engaged by JohnStaff Pty Limited, on behalf of NSW Department of Education - School Infrastructure, to prepare this Heritage Impact Statement (HIS) to accompany a Designated Development for proposed ancillary works at Narrabeen North Public School within a coastal wetlands area.

Narrabeen North Public School forms part of the Narrabeen Education Precinct. Within North Narrabeen Public School are Binishell structures, which are locally listed heritage items (item no. 2270341) in Part 1 of Schedule 5 attached to the *Pittwater Local Environmental Plan 2014* (LEP) and is protected under the *Environmental Planning and Assessment Act 1979* (NSW). Under Section 5.10 (4) of Pittwater LEP 2014, Council is obliged to *'...consider the effect of the proposed development on the heritage significance of the item or area concerned'*. This HIS has been prepared to assist the Council in its consideration of the proposed development. All recommendations are made in accordance with statutory requirements and cultural heritage best practice.

### 1.2. The Site

The subject site is located at 6 Namona Street, North Narrabeen and falls within the local government area of Northern Beaches Council as shown in Figure 1.



Figure 1: Site Aerial Map indicating the location of the subject site (indicated in blue) within its surrounding context (Source: Nearmap).

Narrabeen North Primary School (NNPS) is located on the northern side of Namona Street, North Narrabeen and is legally described as Lot 3 Deposited Plan (DP) 1018621. NNPS is surrounded by residential dwellings to the east, grassed sporting fields (Warriewood Valley Sportsground) to the north and Northern Beaches Indoor Sports Centre to the west. Narrabeen Sports High School is located on the southern side of Namona Street.

For a more detailed description of the site and its context, see *Section 2.0 Site Description and Context*.

### 1.3. Legal Description

Narrabeen North Public School site comprises the following parcel of land on the records held by the NSW Land & Registry Services:

- Lot 3, DP 1018621

### 1.4. Heritage listing

NNPS contains two (2) Binishell domes (Block A and Block B) which are identified as a local heritage item under Part 1 of Schedule 5 of the Pittwater Local Environmental Plan 2014 as 'Concrete Geodesic Domes (North Narrabeen Public School)', (item no. 2270341) at 6 Namona Street comprising Lot 3 of DP1018621. The two (2) Binishell Domes are listed as State significant on DoE's Section 170 Heritage and Conservation Register. The Double Binishell Dome (Block B) is listed on the State Heritage Register (SHR) under the NSW Heritage Act, 1977 as part of the 'The Binishell Collection (Department of Education)' (SHR no. 02037) listing. The SHR listing curtilage excludes Bini Shell A, which remains as a local heritage item.

In addition, the basic search of the Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) identified zero Aboriginal Sites and Places recorded in or near the subject site within a buffer of 50 and 200 meters.

The subject site is also located in proximity to the following heritage items:

- "Alma's Tree", Moreton Bay Fig Tree', 1468 Pittwater Road, Warriewood (item no. 2270331)
- 'Warriewood Wetland', 14 Jacksons Road, Warriewood (item no. 2270516)



Figure 2. Heritage Map showing the location of North Narrabeen Public School (indicated in red) within its current heritage context (Source: Pittwater LEP 2014, Heritage Map - Sheet HER\_019).

### 1.5. Proposal

Narrabeen North Public School (NNPS) forms part of the Narrabeen Education Precinct.

The Designated Development (DD) seeks consent for the following works at NNPS within a mapped Coastal Wetlands area:

- Removal of eight (8) trees;
- New accessible pedestrian pathways;

- New substation on Namona Street frontage along with associated conduit connections;
- New fire hydrant booster and associated conduit connections;
- New hard and soft landscaping including planting of 12 new trees.

Other development works are occurring on the site under separate planning pathways including:

- Development Application (DA);
- Tree Removal (DA);
- Development without Consent (REF); and
- Exempt development

The proposed development does not seek to increase staff or student numbers.

Architectural Drawings - DesignInc Sydney Pty Ltd			
Date	Title	Drawing No	Revision
09.11.2022	Cover Sheet	LA-SCM-P-0010	A
14.11.2022	Materials Schedule	LA-SCM-P-0011	A
14.11.2022	Masterplan	LA-SCM-P-0020	A
14.11.2022	Tree Removal	LA-SCM-H-0120	A
14.11.2022	Canopy Cover	LA-SCM-P-0130	A
14.11.2022	Site Plan	LA-SCM-P-0140	A
14.11.2022	GA Plan - Sheet 01	LA-SCM-P-1001	A
14.11.2022	GA Plan - Sheet 02	LA-SCM-P-1002	A
14.11.2022	GA Plan - Sheet 03	LA-SCM-P-1003	A
14.11.2022	GA Plan - Sheet 04	LA-SCM-P-1004	A
14.11.2022	Fencing Plan	LA-SCM-P-1101	A
14.11.2022	Planting Schedule	LA-SCM-P-2000	A
14.11.2022	Planting Plan - Sheet 01	LA-SCM-P-2001	A
14.11.2022	Planting Plan - Sheet 02	LA-SCM-P-2002	A
14.11.2022	Planting Plan - Sheet 03	LA-SCM-P-2003	A
14.11.2022	Planting Plan - Sheet 04	LA-SCM-P-2004	A
14.11.2022	Sections Key Plan	LA-SCM-P-3000	A
14.11.2022	Section/Elevation- Sheet 01	LA-SCM-P-3001	A
14.11.2022	Sections/Elevation - Sheet 02	LA-SCM-P-3002	A
14.11.2022	Details 01	LA-SCM-P-4001	A



Architectural Drawings - DesignInc Sydney Pty Ltd			
14.11.2022	Details 02	LA-SCM-P-4002	A
14.11.2022	Details 03	LA-SCM-P-4003	A
14.11.2022	Details 04	LA-SCM-P-4004	A

## Relevant Reports and Statutory Instruments

The following previous studies and reports were reviewed during production of this report. Relevant information has been included where necessary:

- Pittwater Local Environmental Plan (LEP) 2014.
- Pittwater 21 Development Control Plan (DCP).
- Pittwater Heritage Inventory
- *Narrabeen Education Precinct - Heritage Report for Masterplan*, OCP Architects, 5 November 2019
- *Narrabeen Education Precinct, Historical Archaeological Assessment*, AMBS Ecology & Heritage, October 2019
- *A Heritage Assessment - Binishells NSW* for School Infrastructure NSW Department of Education dated May 2019, prepared by Anne Warr Heritage Consulting

## 1.6. Methodology

This HIS relates to the proposed redevelopment works to the existing Narrabeen North Public School within the mapped Coastal Wetland area at 6 Namona Street in North Narrabeen. This HIS has been prepared in accordance with the NSW Heritage *Manual publications, Statements of Heritage Impact, 2002 and Assessing Heritage Significance, 2001*. It is also guided by the philosophy and processes included in *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance, 2013 (Burra Charter)*.

The subject development has been assessed in relation to the relevant controls and provisions contained within the Pittwater LEP 2014 and the Pittwater 21 DCP. It forms one of a collection of specialist reports.

Research for this HIS has adopted a two-stepped approach. Step 1 comprised a desktop assessment and Step 2 was a site survey. This document provides the combined findings and recommendations resulting from this approach.

### Step 1

Research into the early development of the site was undertaken to get a better understanding of the place. In addition, the Aboriginal Heritage Information Management System (AHIMS) was searched to establish the location and background information on any Aboriginal objects or Aboriginal Places that are known to have special significance with respect to Aboriginal culture. Further, the Pittwater LEP 2014 and the SHR were examined to determine the known heritage values of the subject site and the items in vicinity.

### Step 2

A site survey of the subject site and the surrounding context was carried out by Kerime Danis (Director-Heritage) and Asmita Bhasin (Heritage Consultant) on 1 April 2022 with the purpose of photographing and understanding the place. All results are presented in *Section 2 - Site Context and Description*.

## 1.7. Constraints and limitations

- This report does not include a heritage landscape assessment
- The assessment in this report relates to the proposed works and documentation described in Section 1.5 - Proposal and Section 1.6 - Methodology. It does not relate to any additional or revised documentation by any party.
- This report does not include an archaeological assessment or opinions regarding such matters; neither does it form part of a Section 140 Application for an Excavation Permit or Section 144 Application for an Excavation Variation Permit
- This report does not include an assessment of Aboriginal values.
- Only a visual assessment of the subject site was carried out. Intrusive methods were not employed.
- This report does not include for the provision of a title search for the subject site.

## 1.8. Author Identification

This report has been prepared by Asmita Bhasin (Heritage Consultant) under the direction of Ms Kerime Danis (Director - Heritage) who has also provided input, reviewed, and endorsed its content.

## 1.9. Acknowledgements

CPH acknowledge the work and assessment undertaken by the following authors, which has been utilised in the preparation of this report:

- *Heritage Report for Masterplan - Narrabeen Education Precinct, Namona Street, North Narrabeen* for School Infrastructure NSW dated November 2019, prepared by OCP Architects.
- *Historical Archaeological Assessment - Narrabeen Education Precinct* for OCP Architects dated October 2019, prepared by AMBS Ecology + Heritage.
- *A Heritage Assessment - Binishells NSW* for School Infrastructure NSW Department of Education dated May 2019, prepared by Anne Warr Heritage Consulting.

## 2. SITE CONTEXT AND DESCRIPTION

### 2.1. Site Context

The subject site is located at 6 Namona Street, North Narrabeen, within the Northern Beaches Local Government Area (LGA) and approximately 22km northeast of the Sydney central business district (CBD). The surrounding setting can be defined as a largely low to a medium-density residential area with local and neighbourhood centres in the vicinity. A large part of the surroundings (northeast and west) of the school site comprises land allocated for Public Recreation.

Namona Street runs in between the two school sites, with Narrabeen North Public School in the north and Narrabeen Sports High School in the south. Jacksons Road runs north of Narrabeen North Public School. Northern Beaches Indoor Sports Centre is also located adjacent to Narrabeen North Public School.

The site is also located in proximity to a number of heritage items, described in *Section 1.4 - Heritage listing*.



Figure 3: Aerial view of the subject site (indicated in red boundary) within its surrounding context (Source: SIX Maps, accessed 6 June 2022).

### 2.2. Site Description

The subject site, as mentioned earlier includes Narrabeen North Public School (Lot 3 DP1018621). Narrabeen North Public School is located north of Namona Street and has structures listed as state and locally significant heritage items in Pittwater LEP 2014 and State Heritage Register.

#### 2.2.1. Narrabeen North Public School

The buildings on the Narrabeen North Public School site include a series of individual demountable classrooms. The buildings include a combination of low-height permanent and demountable structures,

where the permanent ones are constructed in brick and timber. The demountable structures are primarily located northwest and south of the public school. The buildings include:

- Building A / Binidome A - The singular Bini Shell, located at the centre of the public school, functions as an administration building (ground floor) with a library (first floor).
- Building B / Binidome B - The centrally double dome structure located adjacent to Binidome A functions as OOSH (Outside of School Hours) for Before and After School Care programs. The upper floor plate is used as storage space for the school.
- Building H - The building is a single-storey timber structure built in the 1950s, currently being used as a staff building. The building has a front-facing verandah with timber posts and supporting brackets, and timber flooring. The timber structure has a symmetrical façade with single-hung timber windows.
- Building J - Constructed in the 1950s, the building is a linear, single-storey timber structure functioning as another home base for the school. The building has a gabled roof form with north-facing covered verandah with timber posts and supporting brackets.
- Building K - Constructed in 1938, the brick building is a single-storey structure with a covered porch facing north. The building has a symmetrical façade with horizontal brick bands. The building has single-hung timber framed windows with brick sills and lintels. The northern façade of the building has wrought iron lettering depicting the name and year of the school. The building is being used to conduct school programs and craft sessions.
- Building V - Constructed in 2010, the building is a single-storey weatherboard structure currently functioning as a home base and a library.

The oldest building, the original 1938 school house (currently known as K block), is a single-storey face brick building with a hipped roof clad in terracotta tiling. The building has a covered elevated porch facing north with metal posts.

Most of the buildings at Narrabeen North Public School are aligned along the east-west axis located in the east with three Bini Shells, two of which are interconnected and located at the centre. Pittwater LEP 2014 has categorised the three Bini Shells as significant items with the North Narrabeen Public School.

The following information provides a brief description and photographs of the school buildings that would be modified (Block B, K & V) or demolished (Block H & V) under the current proposed development.



Figure 4: View of Building J and Demountable located south of the Narrabeen North Public School, view looking northwest.



Figure 5: View of Building K (left) and Building H (right), view looking west.



Figure 6: View of Building P located southeast of Binidome A, view looking northeast.



Figure 7: View of Building K (facebrick), view looking southwest.



Figure 8: View of Building H (weatherboard), view looking west.



Figure 9: View of Building K (left), Building V (behind building K), Building J (middle), and Building H (right), view looking south.

### 2.2.2. Binidomes A and B

The school site comprises centrally located three Bini Shells, two of which are interconnected. The singular Bini Shell (Bini Shell A) currently functions as an administration building with a library, while the interconnected Bini Shell (Bini Shell B) is used to run OOSH (Outside of School Hours) - Before and After School Care programs. Both Bini Shells are centrally located within the Narrabeen North Public

School site. Bini Shell A was one of the first 18-meter diameter domes constructed in New South Wales (NSW), while Bini Shell B, located adjacent to Bini Shell A, is one of the few dome structures formed of two interconnected domes, each 18 meters in diameter, constructed in steel and concrete with glass windows. Both Bini Shells are surrounded by rectangular face brick and weatherboard school buildings with hipped roofs.

Constructed in c1974 by the Italian architect Dr Dante Bini, the Bini Shells are one of the few remaining concrete futuristic bubble structures within the Binishell Collection at the Department of Education. They demonstrate distinctive landmark aesthetic qualities within their significant landscaped setting.

### Physical Description

The following physical description has been extracted from the State Heritage Inventory (SHI) form for 'Concrete Geodesic Domes (North Narrabeen Public School)' (item no. 2270341)<sup>1</sup>:

*The dome is one of the most efficient structures ever developed but also one of the most difficult and costly to build. The development of the Binishell process of pneumatically inflating concrete made the construction of concrete domes possible with both speed and economy, and introduced a new dimension into the range of architecture in new educational buildings in NSW. The first 18 metre diameter dome to be constructed in NSW was at Narrabeen North Public School, where a three-domed complex was erected. The project consisted of 2 interconnected domes, which were designed to be used as a library, while a third binishell served as an administration office for the school. The library had thick carpet covering a large part of the floor area, extending up the walls to the window sill level. Other parts of the floor were covered in deep brown quarry tiles and white floor tiles. Group activity, office, audio-visual work room and recreation areas were provided, along with toilets and a mezzanine floor. The library was furnished with circular moulded furniture imported from Italy, in bright colours of blue, green, white and yellow, which formed an effective contrast to the simple off-white colour of the interior walls. The administration unit incorporated a garden in the centre, with a small opening in the top of the dome. The unit contained two levels, with offices on the ground floor and staff facilities on the upper level. Materials used were concrete and steel (Glimpses 1989).*

### Interiors

The Bini Shell A is a single dome structure with its primary and only entrance along the southern surface. The dome structure has a central courtyard enclosed by timber and metal framed louvred windows. The courtyard is used as an indoor garden space with a skylight that is one of the prominent sources of light and ventilation within the dome. A staircase runs alongside the central courtyard leading to the first-floor learning space. Around the courtyard is a corridor that connects with the administration rooms placed in a hexagonal layout. Amenities like toilets, etc., are located at the ground floor level. The dome structure has triangular openings on its surfaces with recessed fixed and openable windows.

The Binishell B is an interconnected, double dome structure constructed using a concrete and steel framework. The primary entrance at the south of the structure is recessed, forming a covered porch, while the other two entry-exit points are located alongside the northeast and northwest surfaces of the Binishell. The rear dome of Binishell B contains an open gathering/meeting hallway, while the front dome is utilised as a library, administration, and service area, including a kitchen, washrooms, and laundry rooms. The front dome has a staircase leading to the upper level, currently functioning as a storage and office space. The front dome also has windows along the southeast and southwest surface of the dome. The rear dome has a circular skylight in the middle of the ceiling for a continuous inflow of natural light.

The Binishell has internal timber and glass partitions. The front dome has segregated rooms with wall surfaces clad in low-height timber panelling. The structure has varied window types, including single hung, casement, and jalousie windows with timber and metal frames and clear glass. The doors at the entry and exit points are double doors with timber frames and clear glass windows on both sides. Other than the front entrance, located in the south, the building can be accessed through north-eastern and north-western openings as they are used as secondary access points.

<sup>1</sup> Concrete geodesic domes (North Narrabeen Public School)', State Heritage Inventory (SHI) form, available at <https://www.hms.heritage.nsw.gov.au/App/Item/ViewItem?itemId=2270341>

The following images provide an overview of the existing external and internal presentation and configuration of the subject Bini Shells A and B.

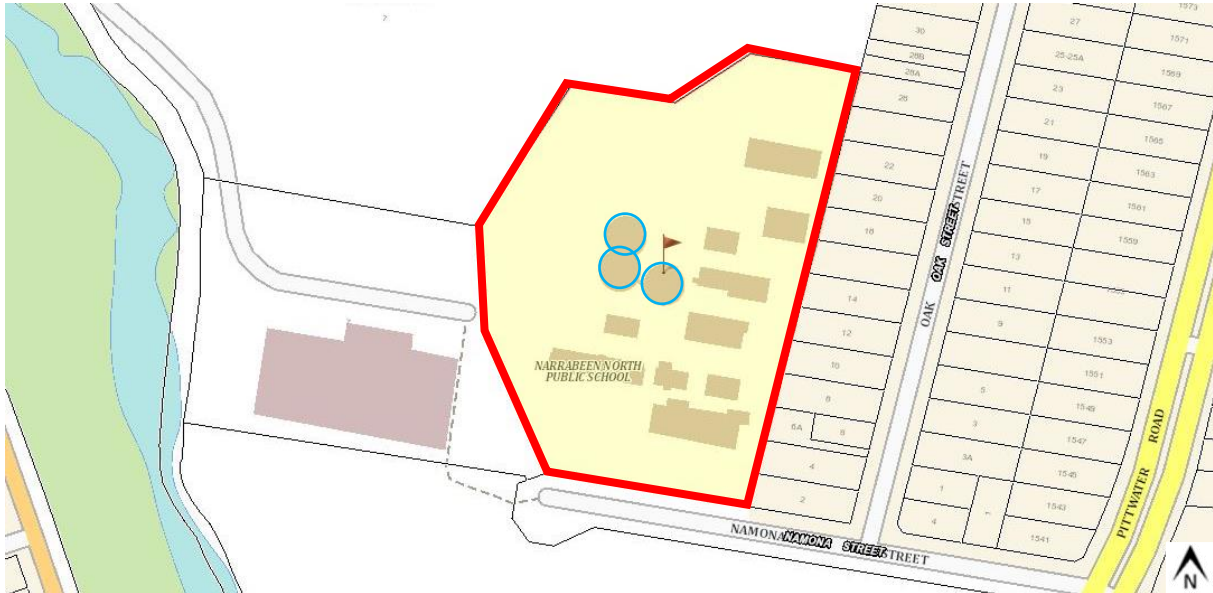


Figure 10: Bini Shells A and B (indicated in blue) located within the Narrabeen North Public School (subject site outlined in red) and their surrounding context and locality (Source: SIX Maps, accessed July 2022).



Figure 11: External view of Bini Shells A and B located in the center of North Narrabeen Public School, view looking northwest.





Figure 12: Primary entrance of Bini Shell B, view looking northwest.



Figure 13: Primary entrance of Bini Shell B, view looking northeast.



Figure 14: Secondary entrance/exit of Bini Shell B, view looking south. Note Bini Shell A to the most left of the image.

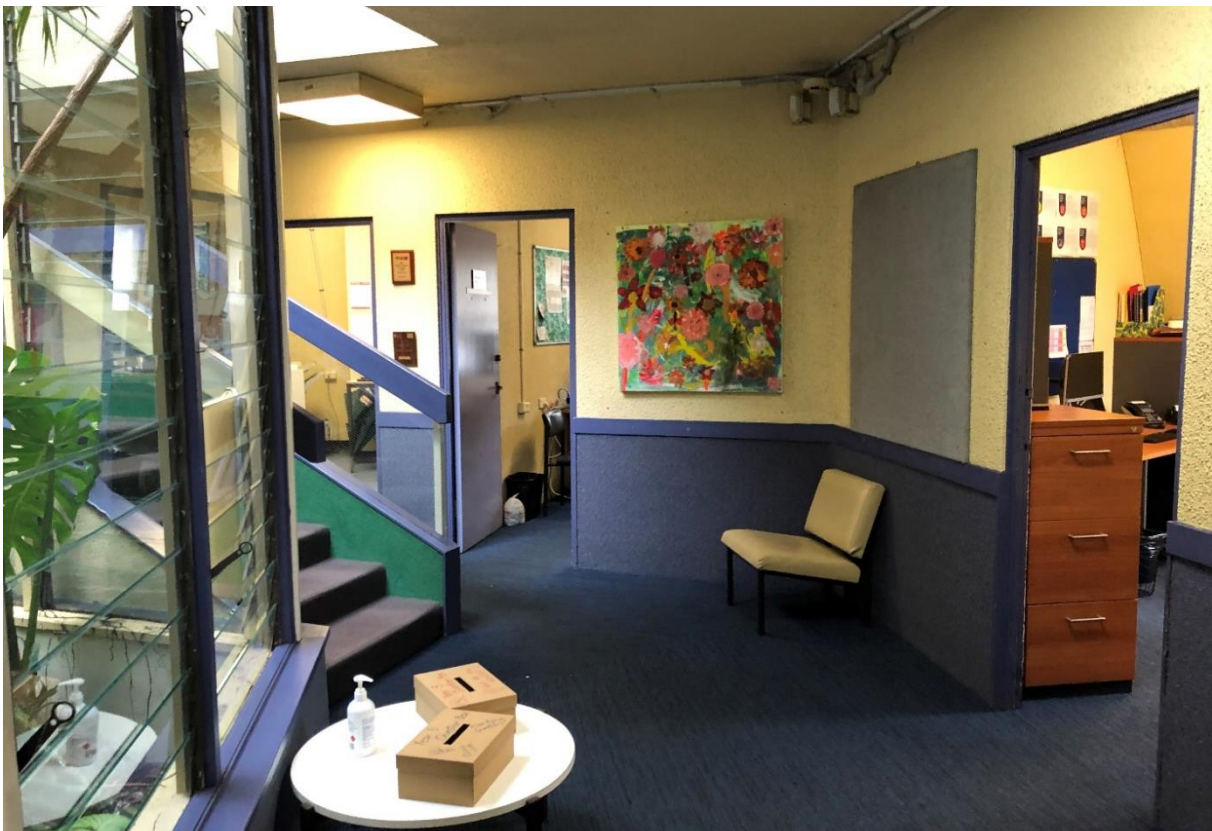


Figure 15: Internal layout of Bini Shell A with central enclosed courtyard (left) and administration area (right).



Figure 16: Staircase at Bini Shell A located adjacent to the enclosed courtyard space.

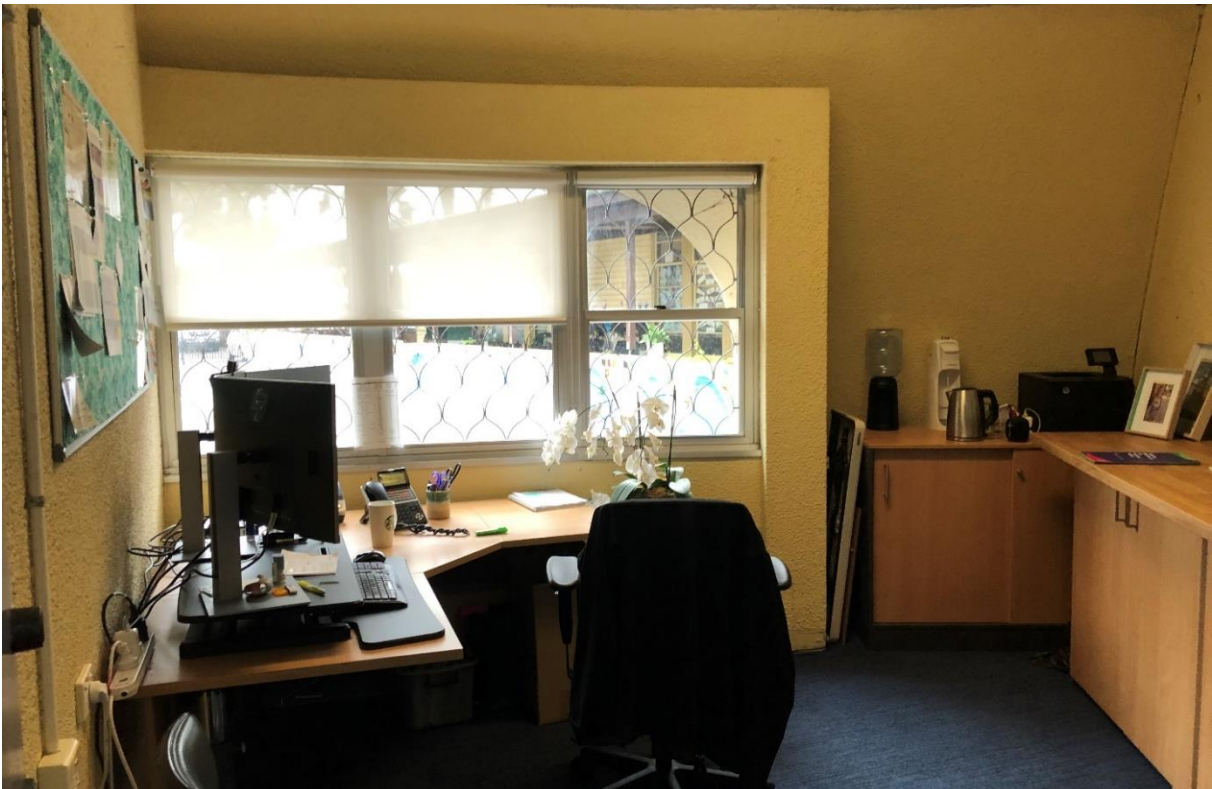


Figure 17: Administration room in Bini Shell A with single hung metal framed windows.



Figure 18: Learning space at first floor level in Bini Shell A.



Figure 19: Gathering Hall in the rear dome, view looking northwest.



Figure 20: Front dome with administration at ground floor and storage at the upper floor level.



Figure 21: Kitchen in the front dome of Bini Shell B.



Figure 22: Irregular window openings in Bini Shell B kitchen.

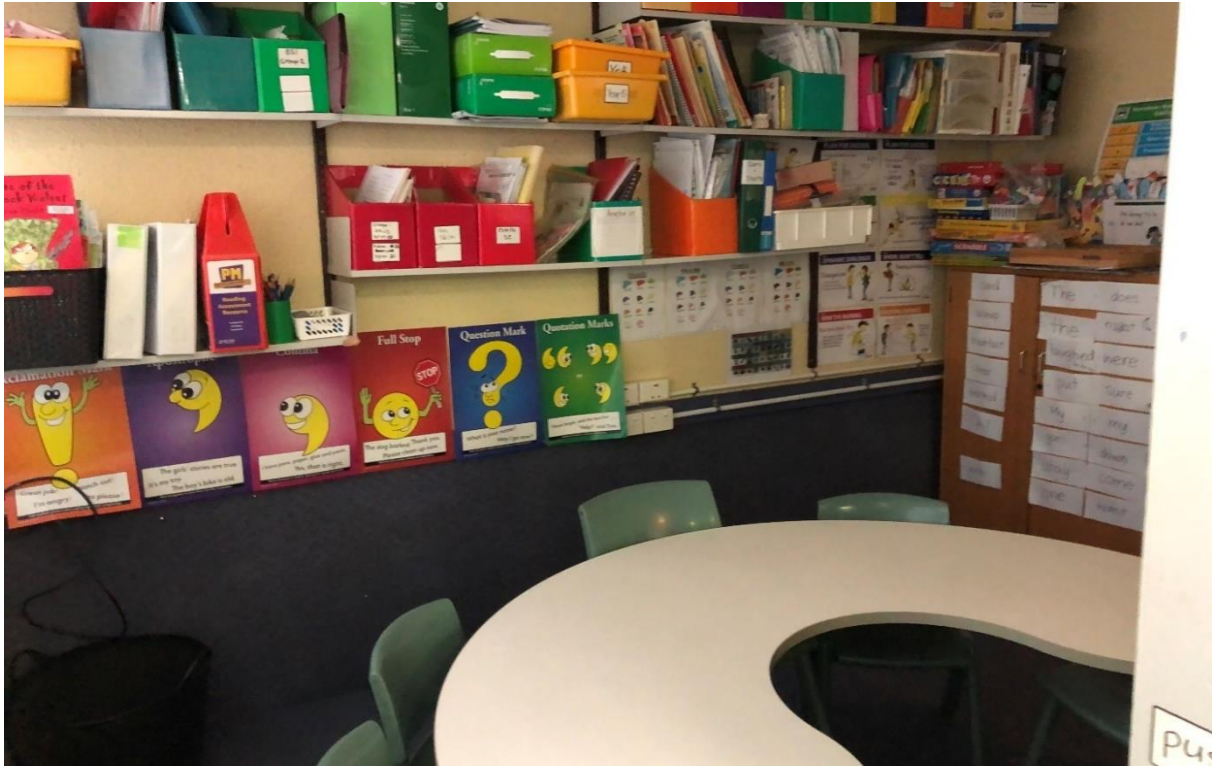


Figure 23: Internal leaning space at Bini Shell B with low-height timber wall panelling.



Figure 24: Existing secondary door and window openings at Bini Shell B, view looking northwest.

### 3. HISTORICAL OVERVIEW

The following history has been extracted from the Heritage Report for Narrabeen Education Precinct - Historical Archaeological Assessment by AMBS Ecology & Heritage in October 2019 for the subject site:<sup>2</sup>

#### 3.1. The Northern Beaches

*The Indigenous heritage of the Northern Beaches is unclear, while it was generally understood that the Guringai occupied the land, the term Guringai was a term coined in the nineteenth century and does not accurately represent the region (Aboriginal Heritage Office 2015:41). Prior to the amalgamation of Manly, Pittwater and Warringah councils into the Northern Beaches in 2016, Narrabeen was located within the shire of Warringah, an area occupying the Northern Peninsula from Manly to Palm Beach, the shire was created in 1905<sup>3</sup>. The first explorations into the region occurred in March 1788 by Captain Phillip when he sailed north to the bay now known as Brisbane Water on the Central Coast. In June 1792, the waters of Bayview, Newport, around Church Point and McCarrs Creek were surveyed by William Dawes when he walked from Manly to Barrenjoey<sup>4</sup>.*

*The settlement of Warringah Shire was constrained by steep slopes and the lack of arable soil which limited agrarian pursuits; it was the lower slopes which were settled and cleared for farming and grazing (Figure 26)<sup>5</sup>. The earliest evidence of settlement occurs along the northern portion of the peninsula where there was access to the Hawkesbury River and the ocean<sup>6</sup>. Settlement in the southern portion of the shire occurred between 1810 and 1820<sup>7</sup>. While large land grants were made in the region, a lack of transportation and difficulties with the topography meant settlement was sparse and farms were few and far between<sup>8</sup>. Built structures during the early development of the region were simple with a mixture of timber structures and huts of slab and bark<sup>9</sup>. The first road was roughened out by James Jenkins, a key landholder in the region, in the early 1820s which went from Manly to Long Reef, this was later extended to Newport in the 1880s (Figure 25)<sup>10</sup>. It was not until the late nineteenth century with the establishments of roads and of a port at Newport when small pockets of the region were settled<sup>11</sup>.*

*The first industries in the region focused around agrarian pursuits and exploitation of natural resources such as timber-getting and shell gathering<sup>12</sup>. Heavy industry did not flourish in the region, attempts were made to mine coal in the late nineteenth century; however, this did not prove to be profitable<sup>13</sup>. The twentieth century saw further exploitations of natural resources, in sand dredging and oyster leases, and a shift to urban businesses<sup>14</sup>.*

<sup>2</sup> AMBS Ecology and Heritage (October 2019), 'Narrabeen Education Precinct - Historical Archaeological Assessment', pp. 4 - 21.

<sup>3</sup> Kennedy, B & Kennedy, B (1982). Sydney and Suburbs. A History & Description. Wellington: Reed, pp. 136.

<sup>4</sup> Kennedy, B & Kennedy, B (1982). Sydney and Suburbs. A History & Description. Wellington: Reed, pp. 137.

<sup>5</sup> Thorp, Wendy (1988b) Thematic Development History of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 6.

<sup>6</sup> Thorp, Wendy (1988a) Historical Archaeological Resource of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 4.

<sup>7</sup> Thorp, Wendy (1988b) Thematic Development History of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 6.

<sup>8</sup> Ibid.

<sup>9</sup> Thorp, Wendy (1988a) Historical Archaeological Resource of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 4.

<sup>10</sup> Thorp, Wendy (1988a) Historical Archaeological Resource of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 12.

<sup>11</sup> Kennedy, B & Kennedy, B (1982). Sydney and Suburbs. A History & Description. Wellington: Reed, pp. 137.

<sup>12</sup> Thorp, Wendy (1988a) Historical Archaeological Resource of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 4.

<sup>13</sup> Thorp, Wendy (1988b) Thematic Development History of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 44.

<sup>14</sup> Ibid.

<sup>15</sup> Thorp, Wendy (1988b) Thematic Development History of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 45.



Figure 25: The first ford across Narrabeen Lakes, used to guide carriages, the first bridge was constructed in the 1880s (Source: Sharpe 2004:89).



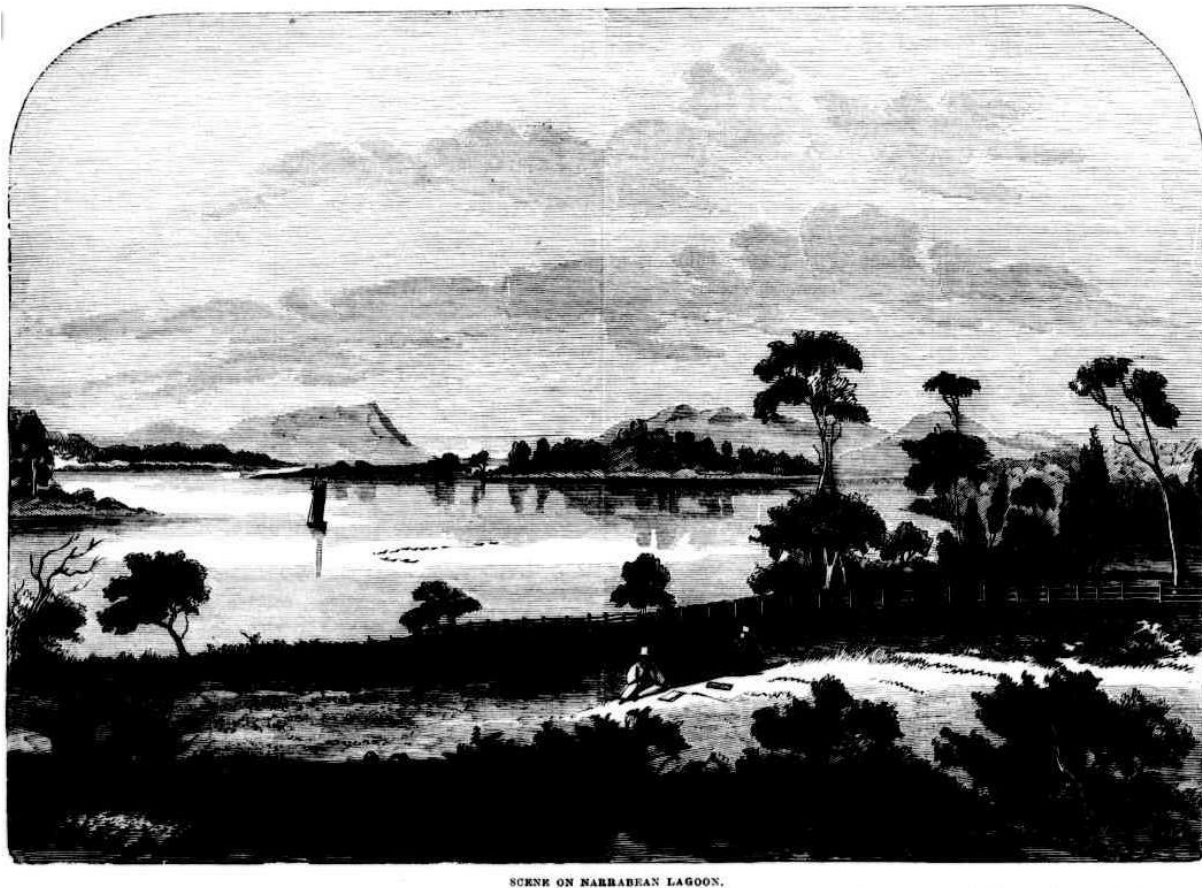
Figure 26: Narrabeen Lagoon 1890 (Source: State Library of NSW, Dixson Library, IE8795087).



### 3.2. Narrabeen

*The first record of Narrabeen appears in 1814 – 1815 on the maps of Surveyor James Meehan. The earliest land grants in the area was made to John Ramsay in 1818. James Jenkins received multiple grants in the area during 1824 – 1831, eventually holding over 600 acres (Pollen 1988:184). In 1882, Finding Narrabeen appeared in Sydney Punch describing the area with rugged rocks and sterile slopes, and bramble, briar, and thorn reaffirming the isolation of the region prior to reliable transportation<sup>15</sup>. Another article describes the scenery... on the Narrabeen Lagoon... is exceedingly fine in a broken, sterile, and uninteresting country (Figure 27)<sup>16</sup>.*

*Despite advertising land allotments during the 1820s and 1830s, the 1856 census only records five houses and 30 people permanently residing in the Narrabeen parish (Empire 1856:5). 1861 saw a substantial decrease in the population with only 18 people recorded (SMH 1862:4). When allotments were first being sold around Narrabeen, they were going for £5 to £10; however, by 1886 prices increased to between £25 to £60 (Figure 28)<sup>17</sup>.*



SCENE ON NARRABEAN LAGOON.

Figure 27: "Scene on Narrabeen Lagoon" sketch (Source: Australian Town and Country Journal, 1877:20).

<sup>15</sup> Sydney Punch (11 November 1882) Finding Narrabeen, page 3. Available from: <<http://nla.gov.au/nla.news-article253069538>> Accessed 25/09/2019.

<sup>16</sup> Colonist (28 February 1838) Broken Bay and Brisbane Water, page 2. Available from: <<http://nla.gov.au/nla.news-article31720524>> Accessed 25/09/2019.

<sup>17</sup> Evening News (20 February 1886) Advertising, page 3. Available from: <<http://nla.gov.au/nla.news-article11188350>> Accessed 25/09/2019.



had been drained and bridges had been built over the lagoons with a well paved road extending from Manly to Newport, dramatically reducing the time it took to travel from Sydney into the region<sup>25</sup>. Narrabeen began to grow in the twentieth century with touring cars operating between Narrabeen and Church Point during 1915 and 1920 before being superseded by buses<sup>26</sup>. The tram was proposed in 1889 with a route that would extend from the North Shore through to Broken Bay with stops at those places that were popular recreation spots, including Narrabeen<sup>27</sup>. During the early twentieth century, the region developed as a weekend and holiday destination; land close to the coast was developed with an emphasis on holiday cottages as well as developments on the steeper slopes to take advantage of the ocean views<sup>28</sup>.



Figure 29: The Narrabeen Rock Lily Pittwater bus, c. 1900, one of the coaches to offer tours around the Narrabeen region, along with E.J. Black Coach Proprietor (Source: Northern Beaches Council, Manly Local Studies Image Library, MML/288).

<sup>25</sup> Freeman's Journal (7 May 1898) A Sketch of Pittwater, page 20. Available from: <<http://nla.gov.au/nla.news-article11538653>> Accessed 25/09/2019.

<sup>26</sup> Thorp, Wendy (1988b) Thematic Development History of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 20.

<sup>27</sup> The Daily Telegraph (3 June 1889) Advertising, page 3. Available from: <<http://nla.gov.au/nla.news-article236019558>> Accessed 25/09/2019.

<sup>28</sup> Thorp, Wendy (1988b) Thematic Development History of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 5 - 7.



Figure 30: Narrabeen and Lakes aerial 1962, tram terminus arrowed (Source: National Library of Australia, Call Number: PIC FH/7114 LOC Cold store PIC HURL 217/10).

Narrabeen attracted the less affluent compared to more exclusive areas within the peninsula such as Palm Beach, with more affordable fibro cottages being built near the tram terminus (Figure 30)<sup>29</sup>. The tram terminating at Manly was extended to Collaroy Beach, in the southern portion of Narrabeen, in August 1912 with the route proposed to extended to Narrabeen Lake<sup>30</sup>. In February 1912, during the tram line's construction into the district, a strike occurred, affecting 60 men involved in the work and delaying the opening of the line<sup>31</sup>. The tram terminus was extended to Narrabeen, running parallel with Pittwater Road, in December 1913 where it was met by coaches and buses that were used to access the rest of the peninsula<sup>32</sup> (Figure 31 and Figure 32). The opening of the tram line was said to boost the development of the district and to grow as an easily accessible tourist territory<sup>33</sup>. In the 1920s, the area was advertised to potential residents as being 7 miles from Manly by tram, with a good hotel and the usual week-end accommodation cottages with one of the best surfing beaches in the state. The district is eminently suited for Orchards, Flower and Vegetable Gardens and Poultry Farms (Pollen 1988:184). In 1938, the tram to Narrabeen ceased and buses ran directly from Manly<sup>34</sup>. Prior to the closure of the tram line, the service had begun to see a loss in profit, this was attributed to a number of reasons including the

<sup>29</sup> Thorp, Wendy (1988b) Thematic Development History of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 20.  
<sup>30</sup> The Sun (4 August 1912) Narrabeen's Gala Day, page 10. Available from: <<http://nla.gov.au/nla.news-article228820805>> Accessed 26/09/2019.  
 Clarence and Richmond Examiner (22 October 1912) Tramway Extension, page 5. Available from: <<http://nla.gov.au/nla.news-article61666586>> Accessed 26/09/2019.  
<sup>31</sup> Northern Star (29 February 1912) Tramway Men Strike, page 5. Available from: <<http://nla.gov.au/nla.news-article72312090>> Accessed 26/09/2019.  
<sup>32</sup> Daily Telegraph (12 December 1913) Narrabeen Tram Opening, page 7. Available from: <<http://nla.gov.au/nla.news-article23896063>> Accessed 26/09/2019.  
 Thorp, Wendy (1988b) Thematic Development History of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 37.  
<sup>33</sup> The Sun (4 August 1912) Narrabeen's Gala Day, page 10. Available from: <<http://nla.gov.au/nla.news-article228820805>> Accessed 26/09/2019.  
<sup>34</sup> Thorp, Wendy (1988b) Thematic Development History of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 26.

*opening of the Harbour Bridge to bus services, an increase in wages and the rising costs of power – these combined, it was no longer financially viable to maintain the trams<sup>35</sup>.*

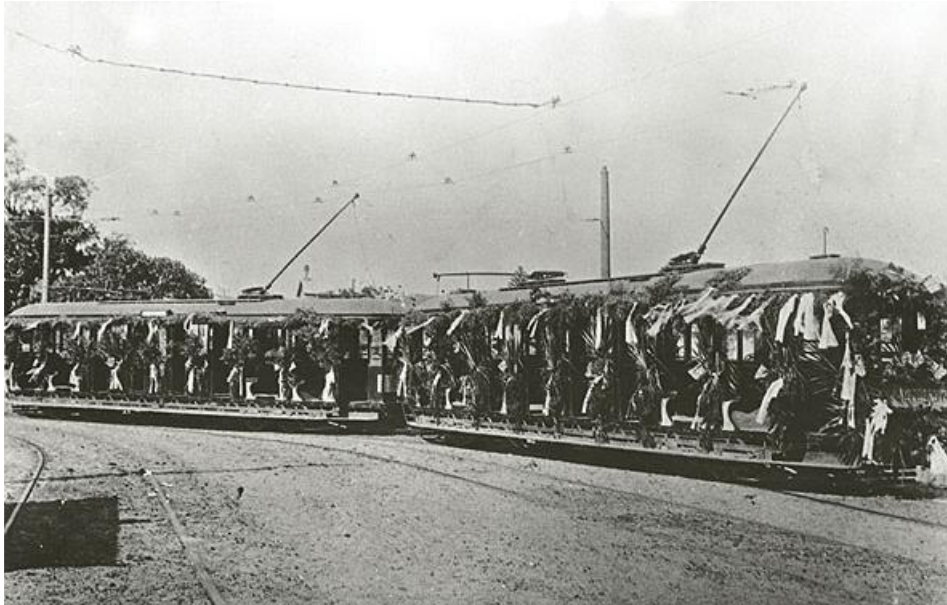


Figure 31: Opening of the Narrabeen Tramway 1913 (Source: State Records of NSW, ID: 17420\_a014\_a0140001165).



Figure 32: Narrabeen tram sheds, Pittwater Road, Narrabeen 1925, with waiting coaches (Source: Northern Beaches Council, Warringah Image Library, Acc: 285206).

*Besides being a popular tourist destination, natural resources were found in Narrabeen which were subsequently mined. Coal mining began in the region in the late 1800s with the discovery of coal seams. In 1890 two diamond drill bores had been put down by Mr J Coghlan with natural gas discovered during the boring<sup>36</sup>. In 1904, a bore was drilled into the edge of Narrabeen Lagoon<sup>37</sup>. In the beginning of August 1884, the first powder works in Australia was opened in Narrabeen for the manufacture of blasting powder and gunpowder by Carl Von Bieren (Figure*

<sup>35</sup> The Sun (6 November 1938) Tram May Soon Give Way to Bus, page 13. Available from: <<http://nla.gov.au/nla.news-article231135173>> Accessed 26/09/2019.

<sup>36</sup> Newcastle Morning Herald and Miners' Advocate (12 July 1890) Natural Gas at Narrabeen, page 3. Available from: <<http://nla.gov.au/nla.news-article138937107>> Accessed 26/09/2019.

<sup>37</sup> The Capricornian (8 October 1904) Geological Discovery at Narrabeen, page 35. Available from: <<http://nla.gov.au/nla.news-article71961259>> Accessed 26/09/2019.

33)<sup>38</sup>. The high import rates of gunpowder proved the necessity of establishing a powder works in Australia, its opening would provide employment within Narrabeen as well as cheapen the costs of blasting compounds<sup>39</sup>. However, gunpowder would never be produced at Narrabeen, Carl Von Bieren declared insolvency in 1885 and attempted to leave the country before he was caught and tried for embezzlement<sup>40</sup>. After serving only a part of his sentence, Von Bieren was released and he disappeared<sup>41</sup>.



Figure 33: Powder works factory at Narrabeen (Sharpe: 91).

The first water supply was reticulated during the opening of the tram line to Collaroy Beach in August 1912, with a display made by the local fire department<sup>42</sup>. A new water pumping station opened up in Ryde in September 1921 to service the northern suburbs of Sydney, including Narrabeen, this increased the supply of water into the district<sup>43</sup>. The Northern Suburbs sewer began construction in 1920, a system which proposed to service 186 square miles including the peninsula and was said to be one of Australia's greatest engineering undertakings<sup>44</sup>. Electricity was extended to the district surrounding Narrabeen in 1923<sup>45</sup>. In March 1925, it was announced that works would begin in connecting Narrabeen and other towns on the peninsula to gas with 12 to 13 miles of mains to be connected, the work was expected to take 12 months<sup>46</sup>.

The second half of the twentieth century saw the region develop as a commuter district as well as an exclusive residential area, the development was aided by reliable transport and the connection of services in the region<sup>47</sup>. The construction of the Warringah Expressway, commencing in 1965, and regular ferry services, commencing in 1955, connected the Northern Beaches region to the city allowing for the development of a commuter suburb<sup>48</sup>. Between 1947

<sup>38</sup> Newcastle Morning Herald and Miners' Advocate (29 July 1884) New Powder Works, page 2. Available from: <<http://nla.gov.au/nla.news-article135855581>> Accessed 26/09/2019.

The Sydney Morning Herald (6 March 1884) A New Industry, page 3. Available from: <<http://nla.gov.au/nla.news-article13554539>> Assessed 26/09/2019.

<sup>39</sup> Illawarra Mercury (11 March 1884) The First Powder Mill in Australia, page 4. Available from: <<http://nla.gov.au/nla.news-article136462483>> Accessed 26/09/2019.

<sup>40</sup> Sharpe, Alan (2004) Pictorial Memories Manly to Palm Beach. Kingsclear Books: Alexandria, pp 91.

<sup>41</sup> Ibid.

<sup>42</sup> The Sun (4 August 1912) Narrabeen's Gala Day, page 10. Available from: <<http://nla.gov.au/nla.news-article228820805>> Accessed 26/09/2019.

<sup>43</sup> The Daily Telegraph (16 September 1921) Suburban Water, page 4. Available form: <<http://nla.gov.au/nla.news-article239709562>> Accessed 26/09/2019.

<sup>44</sup> Sydney Mail (4 August 1920) A Gigantic Undertaking: Northern Suburbs Sewer, page 15. Available from: <<http://nla.gov.au/nla.news-article159041168>> Accessed 26/09/2019.

<sup>45</sup> The Sydney Morning Herald (3 August 1923) The Suburbs. Electricity in Warringah Shire, page 14. Available from: <<http://nla.gov.au/nla.news-article16085068>> Accessed 26/09/2019.

<sup>46</sup> Evening News (27 March 1925) Gas at Last, page 14. Available from: <<http://nla.gov.au/nla.news-article117449239>> Accessed 26.09.2019.

<sup>47</sup> Thorp, Wendy (1988a) Historical Archaeological Resource of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp. 8.

<sup>48</sup> Thorp, Wendy (1988b) Thematic Development History of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp 31.

and 1961, Warringah saw a 187% increase in population from 32,856 to 94,440 with spikes in population during holiday periods<sup>49</sup>.

### 3.3. Development of the Narrabeen Education Precinct

*The earliest schools in the Northern Beaches region were built in the late nineteenth century with Bay View and Newport hosting the first school in 1884 and 1889 respectively<sup>50</sup>. The first school in the Narrabeen area, Narrabeen Public School, was proposed and opened in 1889, changing its name to Narrabeen Lakes in 1995 and continues to operate today<sup>51</sup>.*

*The Narrabeen Education Precinct is located within William Bernard Rhodes original 50 acres, Portion 47 of the Narrabeen Parish, granted on 16 December 1836 (Figure 34)<sup>52</sup>. Rhodes was a merchant from Wellington, New Zealand and sold his land to Thomas Collins in September 1849<sup>53</sup>. Throughout the nineteenth century, the land was owned and leased by numerous individuals including James Blair and John Thomas Collins<sup>54</sup>. In February 1903, when Edward Augustus Macpherson owned and occupied the study area, part of the original 50-acre grant was resumed under the Public Roads Act 1902, to deviate the road from Manly to Pittwater through Portion 47 (Figure 35)<sup>55</sup>.*

*On 26 March 1912, 55 acres 1 rood and 28 perches were transferred to Septimus W. Macpherson<sup>56</sup>. The associated Certificate of Title includes a 100 feet wide reservation along the Main Creek; the purpose of this reservation is unknown (Figure 36)<sup>57</sup>.*

*By 1912, the north-eastern section of the original 50-acre portion has been separated for a subdivision, with Oak Street established to service the new residential area (Figure 38). Between the time of Rhode's original purchase and 1912, when this subdivision occurred, the study area remained largely undeveloped, occupied by natural bushland (Figure 37). The development which did occur in the area following the subdivision was focused on Oak St where there had been allotment sales since 1912 (Figure 39).*

<sup>49</sup> Ibid.

<sup>50</sup> Thorp, Wendy (1988b) Thematic Development History of Warringah Shire. Prepared for the Warringah Shire Heritage Study, pp 21.

<sup>51</sup> Newcastle Morning Herald and Miners' Advocate (9 March 1889) Government Gazette, page 2. Available from: <<http://nla.gov.au/nla.news-article138842130>>. Accessed 26/09/2019.

NSW Department of Education (2019) School history database search. Available from: <<https://education.nsw.gov.au/about-us/our-people-and-structure/history-of-government-schools/school-database-search>> Accessed on 23/09/2019.

<sup>52</sup> NSW Land and Registry Services (2019) 'Primary Application 17427' Historical Lands Records Viewer (HLRV). Available from: <<https://www.nswlrs.com.au/Parish-and-Historical-Maps>> Accessed on 24/09/2019.

<sup>53</sup> Champion, Shelagh and Champion, George (1996) Profiles of the Pioneers in Manly Warringah and Pittwater. S. and G. Champion: Killarney Heights, pp 14.

<sup>54</sup> NSW Land and Registry Services (2019) 'Primary Application 17427' Historical Lands Records Viewer (HLRV). Available from: <<https://www.nswlrs.com.au/Parish-and-Historical-Maps>> Accessed on 24/09/2019.

<sup>55</sup> NSW Land Registry Services (2019) 'Crown Plan R7580.1603R'. Direct Info. Property Services and Products, Document Request. Available from: <<https://www.directinfo.com.au/>> Accessed on 24/09/2019.

<sup>56</sup> NSW Land Registry Services (2019) 'Crown Plan R7580.1603R'. Direct Info. Property Services and Products, Document Request. Available from: <<https://www.directinfo.com.au/>> Accessed on 24/09/2019.

NSW Land and Registry Services (2019) 'Certificate of Title Vol 2239 Fol 168'. Historical Lands Records Viewer (HLRV). Available from: <<https://www.nswlrs.com.au/Parish-and-Historical-Maps>> Accessed on 24/09/2019.

<sup>57</sup> NSW Land and Registry Services (2019) 'Certificate of Title Vol 2239 Fol 168'. Historical Lands Records Viewer (HLRV). Available from: <<https://www.nswlrs.com.au/Parish-and-Historical-Maps>> Accessed on 24/09/2019.



Figure 34: Detail of Narrabeen Parish Map (23 October 1867) with study area (Part of Portion 47) arrowed (HLRV: <https://hlrv.nswlrs.com.au/>).

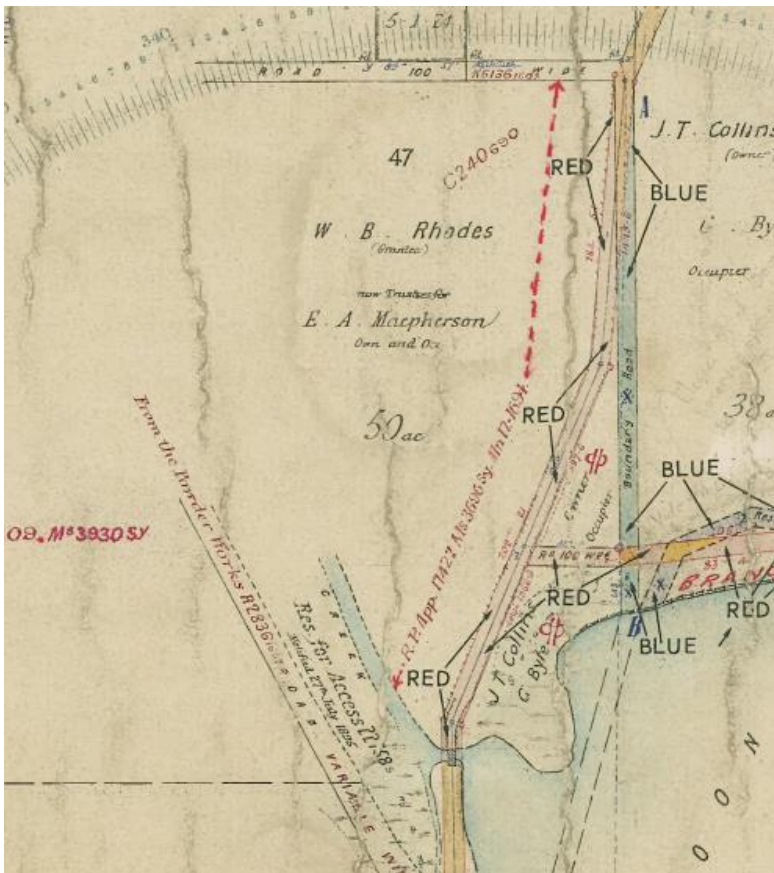


Figure 35: Detail of Crown Plan showing land coloured red (through Portion 47) resumed under the Public Roads Act 1902, to deviate the road from Manly to Pittwater (Crown Plan R7580.1603R).



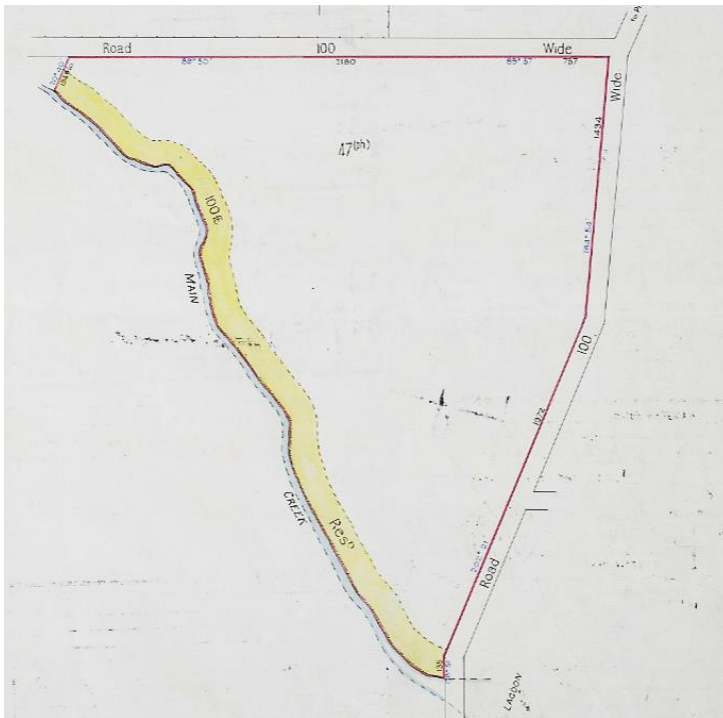


Figure 36: Map of Portion 47 (55 acres 1 rood 28 perches) transferred to Septimus W. Macpherson on 26 March 1912. Note the 100-ft wide strip of land west of the Main Creek, coloured yellow, was reserved (Certificate of Title Vol 2239 Fol 168).

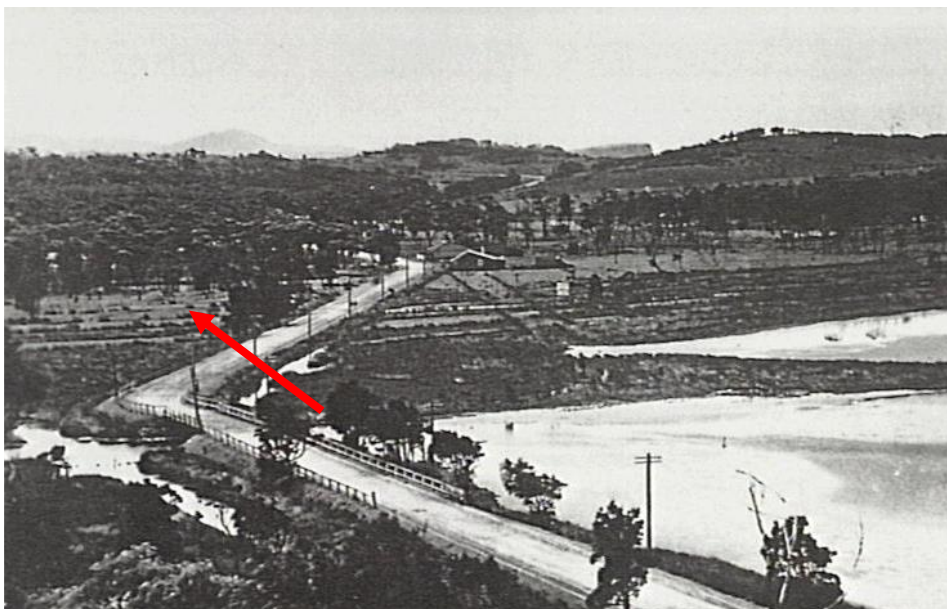


Figure 37: Photograph c. 1910 facing north towards bridge on Pittwater Road across Mullet Creek and Narrabeen Lagoon, showing the south-eastern portion of the study area as undeveloped (arrowed), as well as dense vegetation further north (before the Oak Street subdivision) (Source: Pittwater Image Library, NNAR-050).

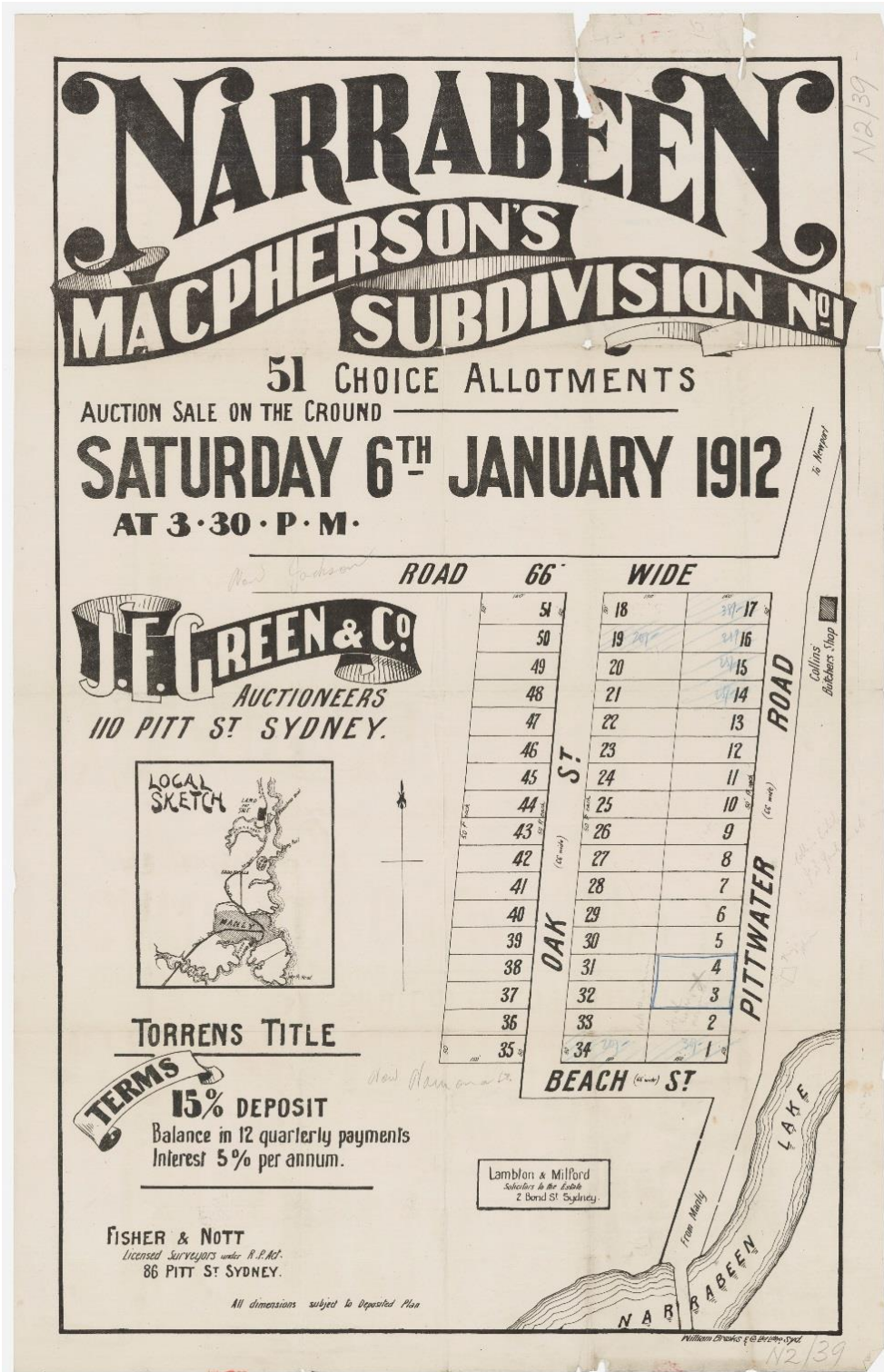


Figure 38: Macpherson's Subdivision No 1' 6 January 1912, showing 51 allotments for sale on Oak St, north-eastern section of Rhode's original 50-acre portion. Note: Namona Street was formerly known as Beach Street and only extended as far west as Oak Street (Source: NSW State Library, IE9053687).



Figure 39: c.1920 photograph facing north-east showing development on Oak Street (arrowed). This photo was taken during a flood event; water can be seen across the southern portion of the study area (Source: Historic Photographs, Photo ID: S127).

On 18 January 1928, a 5-acre portion of the original 50-acre grant (north of Namona Street) was purchased for Public School Purposes at Green Hills, "Narrabeen North"; this purchase was vested on 4 September 1929 in the Education Department (Figure 40)<sup>58</sup>. On 8 April 1932, the Narrabeen Beach Estates Limited became the proprietor of a 123-acre estate encompassing the study area; the associated Certificate of Title makes mention to 'reservations in the Grants of Portions 2 (2 of Parish/and Portion 96 of minerals and in the Grant of 50 acres (Portion 47 of Parish) of all mines of gold and silver', suggesting that mining activities occurred in the vicinity of the study area (and possibly in the 100 feet wide reserve within Portion 47) (Figure 41)<sup>59</sup>. The study area at this time, prior to the commencement of construction of the Narrabeen North Public School, remained undeveloped, as can be seen in aerial photographs of the area (Figure 42 to Figure 44).

On 17 January 1946, a plan was approved for part of the estate owned by Narrabeen Beach Estates Limited to be acquired for the Narrabeen North Secondary School; these 38 acres 2 roods and 16 perches of land (excluding the 100 feet reservation) were purchased by the Department of Education on 27 June 1947 (Figure 45). On 22 March 1948, King George VI became the proprietor of the estate acquired for the Secondary School, inclusive of the 100 feet reservation<sup>60</sup>. The land in the 100 feet reservation was resumed for the Secondary School by Government Gazette on 24 August 1956 (Crown Plan 11903.3000). One acre 1 rood and 22 ½ perches of the study area were appropriated for the widening of Pittwater Road to the, gazetted on 6 June 1958, for the purposes of the Main Roads Act 1924-1957<sup>61</sup>.

<sup>58</sup> NSW Land Registry Services (2019) 'Crown Plan 7018.3000'. Direct Info. Property Services and Products, Document Request. Available from: <<https://www.directinfo.com.au/>> Accessed on 24/09/2019.

<sup>59</sup> NSW Land and Registry Services (2019) 'Certificate of Title Vol 4525 Fol 219' Historical Lands Records Viewer (HLRV). Available from: <<https://www.nswlrs.com.au/Parish-and-Historical-Maps>> Accessed on 24/09/2019.

<sup>60</sup> NSW Land and Registry Services (2019) 'Certificate of Title Vol 5802 Fol 236' Historical Lands Records Viewer (HLRV). Available from: <<https://www.nswlrs.com.au/Parish-and-Historical-Maps>> Accessed on 24/09/2019.

<sup>61</sup> NSW Land and Registry Services (2019) 'Certificate of Title Vol 5802 Fol 236' Historical Lands Records Viewer (HLRV). Available from: <<https://www.nswlrs.com.au/Parish-and-Historical-Maps>> Accessed on 24/09/2019.

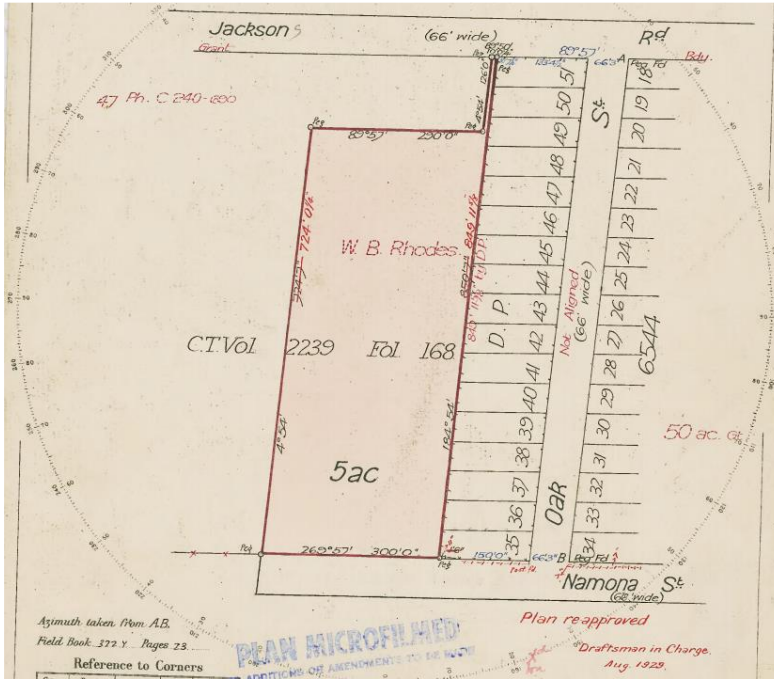


Figure 40: 5-acre portion of the original 50-acre grant purchased on 18 January 1928 for Narrabeen North Public School (Crown Plan 7018.3000).

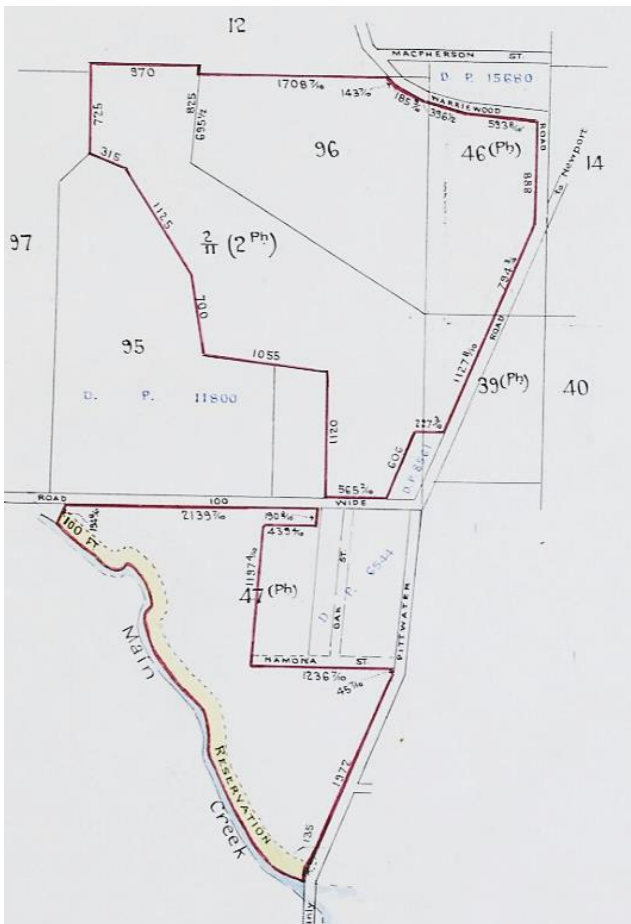


Figure 41: Estate of 123 acres 3 roods and 3 3/4 perches transferred to the Narrabeen Beach Estates Limited on 8 April 1932. Note the 5-acre portion of the study area that was reserved for Narrabeen North in 1928 (Certificate of Title Vol 4525 Fol 219).

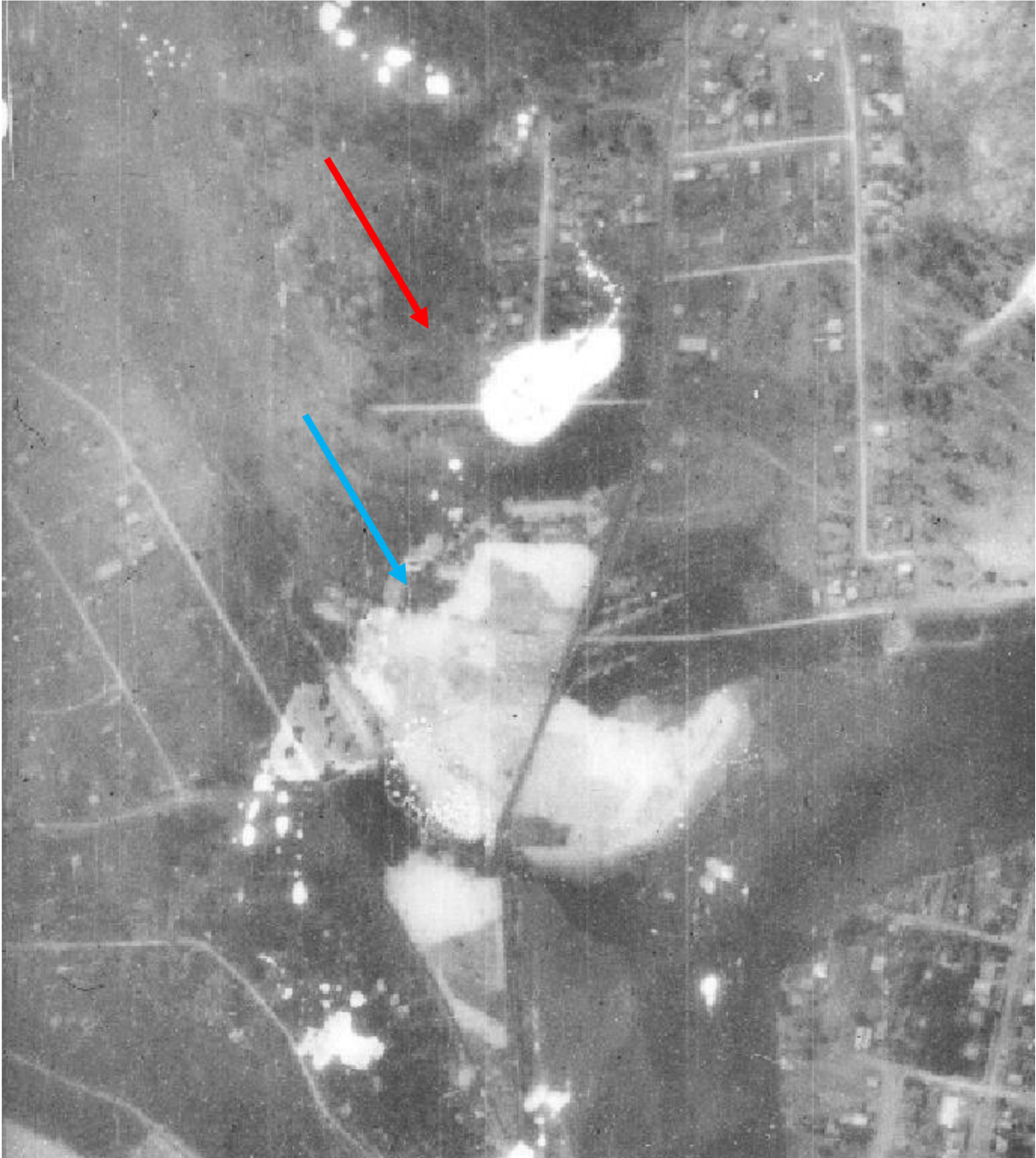


Figure 42: 1930 aerial of study area. While this aerial is of poor quality, it can be seen that there was little activity within the study area at this time. The location of the current NNPS is arrowed in red and NSHS is arrowed in blue (Source: NSW Department of Customer Service, Spatial Services, [spatialservices.nsw.gov.au](http://spatialservices.nsw.gov.au). Image CAC\_01\_1134).

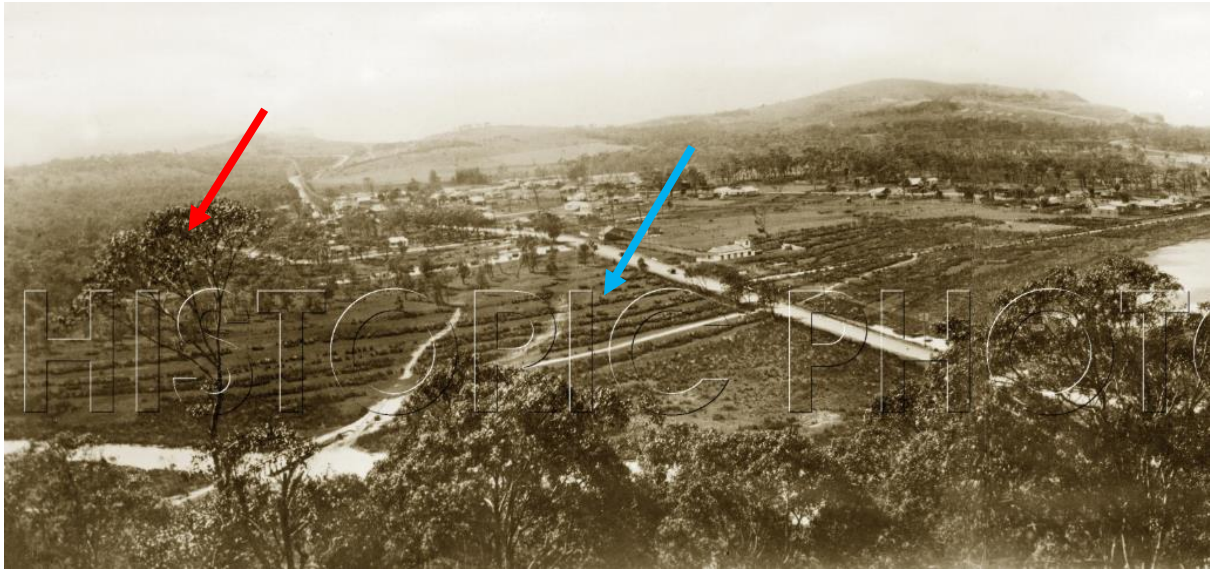


Figure 43: c1930 aerial photograph of the study area facing north-east towards Warriewood, showing study area as undeveloped. The location of the current NNPS is arrowed in red and NSHS is arrowed in blue (Source: Historic Photographs, Photo ID: P18).



Figure 44: 1943 aerial of southern portion of study area, Narrabeen Sports High School (Source: SIX, <https://maps.six.nsw.gov.au/>).

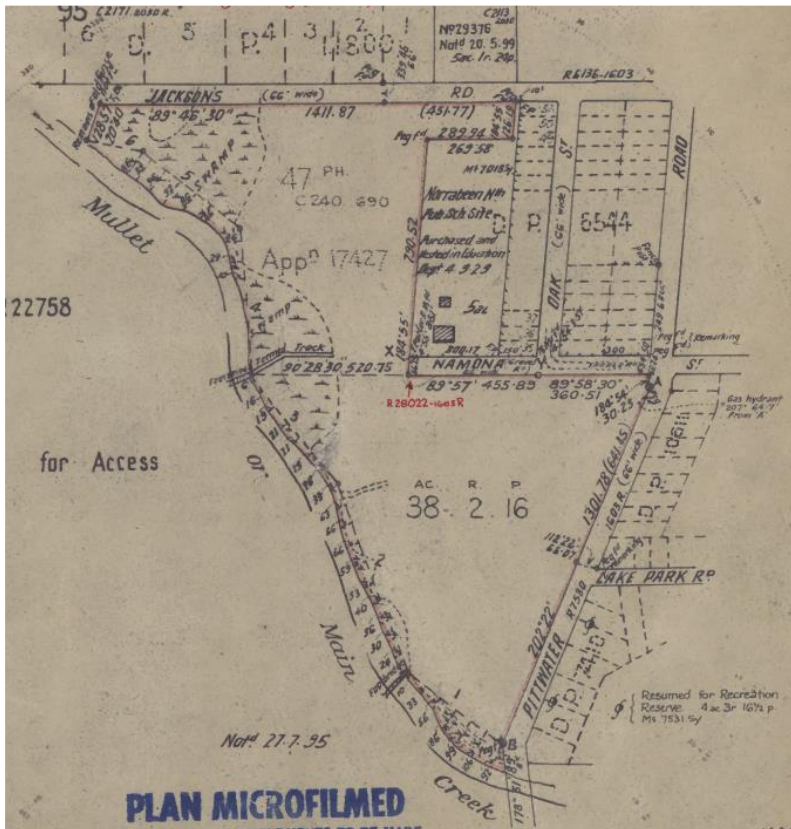


Figure 45: Crown Plan dated 17 January 1946 detailing land resumed for The Narrabeen North Secondary School, later purchased in June 1947. Note two buildings present in the 5-acre lot occupied by the Narrabeen North Public School site (Crown Plan 11903.3000).

### 3.3.1. North Narrabeen Public School

The North Narrabeen Infants' School was built on the 5-acre lot purchased for Public School purposes in 1928, as seen in the 1946 Crown Plan, two buildings were located on the site which could be the buildings referred to in the Sun article (Figure 40 and Figure 45). The North Narrabeen Infants School was officially opened in 1939; however, it had its beginnings in 1935<sup>62</sup>. Mrs V E Norman ran the first school out of the nearby Welfare Hall, later converted to a wire factory, from 1935 until the new school was constructed in 1938 (North Narrabeen Public School 1989:9). During the time the school operated out of the Welfare Hall, the Sun records floods in 1936 reporting that at the North Narrabeen Infants' School, the children's playing area was under water. The house adjoining the school hall was surrounded by water...<sup>63</sup>. A tender was placed in the Government Gazette in 1938 for new building at North Narrabeen and new brick closets in 1942 (Figure 46)<sup>64</sup>. Transport in the region for school children was poor, demonstrated by a strike in 1948 with parents protesting the lack of transport, highlighting the fact that some children were walking four miles to get to school; however, little improvements were made and another strike was held the following year (The Riverine Herald 1948:1; Daily Telegraph 1948:7).

North Narrabeen School attained Primary status in 1953, the Infants school was closed and was reopened as North Narrabeen Public School (North Narrabeen Public School 1989:11). Soon after the opening of the North Narrabeen Public School, a tender was put forward for the building

<sup>62</sup> NSW Department of Education (2019) School history database search. Available from: <<https://education.nsw.gov.au/about-us/our-people-and-structure/history-of-government-schools/school-database-search>> Accessed on 23/09/2019.

<sup>63</sup> The Sun (19 June 1936) Into the Sea. Lakes' Overflow, page 12. Available from: <<http://nla.gov.au/nla.news-article231312054>> Assessed 26/09/2019.

<sup>64</sup> Government Gazettes (20 May 1938) Tenders, page 2016. Available from: <<http://nla.gov.au/nla.news-article225120738>> Accessed 26/09/2019.

Government Gazettes (6 November 1942) Education Department Tenders, page 2937. Available from: <<http://nla.gov.au/nla.news-article225125448>> Accessed 26/09/2019.

of a four roomed timber classroom, demonstrating the growth of the school and the need for more teaching space<sup>65</sup>. In 1956 another timber framed building was erected that was also supplied with electricity<sup>66</sup>.



Figure 46: Students at Narrabeen North Public School 1939, in front of the original brick school building (current K Block) (Source: Pittwater Image Library, NNAR-051).

In 1974 a three concrete shell dome complex, was constructed at Narrabeen North Public School. This was achieved using the method devised by an Italian architect Dr Dante Bini; the domes are often referred to as Binishells, after Bini. The domes were 18 metres in diameter; two interconnecting domes were used as a library, and the third dome served as an administration office for the school.

### 3.4. Brief History of Bini Shells

The following history has been extracted from the Heritage Report for Masterplan - Narrabeen Education Precinct by OCP Architects in November 2019 for the subject site<sup>67</sup>. The following background information has been retrieved from the National Trust SHR nomination form, dated 18 September 2018:

*Dr Dante Bini built his first hemispherical, thin shell structure in 1964, constructing this prototype Bini shell in 60 minutes ("Binisystems"). The technique gained wide recognition in 1967 after Bini used a gigantic balloon and a robot to build a 50-foot tall concrete Binishell dome at Columbia University in less than two hours. He described the construction process as "Pressing a button. That's it".*

*The house that Bini built in 1969 for film director Michelangelo Antonioni in Gallura (Costa Paradiso), Sardinia, was...a pragmatic synthesis that only an architect-builder who was capable of inventing and exporting both architectural stylistic features and effective construction methods*

<sup>65</sup> Government Gazettes (24 September 1954) Tenders, page 2912. Available from: <<http://nla.gov.au/nla.news-article220293674>> Accessed 26/09/2019.

<sup>66</sup> Government Gazettes (27 July 1956) Tenders, page 2111. Available from: <<http://nla.gov.au/nla.news-article220388894>> Accessed 26/09/2019.

<sup>67</sup> OCP Architects (November 2019), 'Heritage Report for Masterplan - Narrabeen Education Precinct', pp. 8 - 12.



worldwide could realise. It was a business system which, at that time, had already proved to be successful in Italy, Japan and possibly even in Australia.

Bini's invention was the perfect, as well as obvious synthesis of three construction techniques that developed independently. First, the one for in-situ reinforced concrete shells; second, the inflatable and pneumatic membrane technology for air structures; third, the self-shaping steel reinforcement.

Bini's merit not only consists in having developed a construction technique which has met with success almost all over the world in the erection of round domes of large diameter (up to 300 feet) for schools, gymnasiums, and halls, but mainly in having generated "nuove formule architettoniche", that is new architectural formulae, as Bini himself defined them.

It is estimated that more than 1,500 Bini shells were built in 23 countries throughout the world, used as houses, schools, libraries, gyms and shopping centres.<sup>1</sup> The advantages of the Bini shells form of construction included the speed of construction and the relatively low cost in comparison to other forms of construction. The exterior walls and roof are erected in one completed operation, and the only materials required are steel and concrete.

...

From the first 'inflations', the Binishell system was gradually perfected. For example, the technique for the reinforcing bars was optimised by the addition of metal springs, permitting better control over the folding and position of bars during erection. The inflatable structure went from a single layer, placed beneath the cast concrete, to two layers, enveloping the shell both above and below during the phase of forming. Further, for the first commissions outside Italy, Bini prepared the membrane in Italy so that it was brought to the site ready for use; he sometimes brought it with him on the airplane. This was the case of the Binishell demonstration in America, performed for Salvadori at Columbia University. That experience taught him that jumps in temperature due to flights neutralised the effects of the glue, causing the PYC strips of the membrane to come apart. With the growing number of commissions from abroad, the preparation of the pneumatic formwork had to be radically reconsidered; this began with understanding that PVC sheets were easily available near the various work sites. Thus all of the pneumoforms in Australia were assembled with square PVC sheets 3m wide.

### 3.4.1. Binishells in NSW State Schools

Bini reported that he first got in touch with Australian authorities in Autumn 1971 because NSW Minister Leon Punch was seeking a rapid system to build multi-purpose centres, schools and libraries to fulfil election promises<sup>68</sup>. In 1973, Dr Dante Bini was invited by the NSW Government to introduce the Binishell concept to Australia. NSW Department of Works described the Binishells as 'A revolutionary "wet" building concept, which allows a layer of concrete to be blown up into a dome-shaped building<sup>69</sup>. The advantages of the construction type were recognised as being the considerably reduced construction time and economic use of labour and materials and it was considered that these advantages warranted an experimental program in NSW school buildings. In addition to minimising materials and labour, the sustainability of Binishells also related to reuse of the pneumoform to build more Binishells<sup>70</sup>.

The first Binishells constructed as part of the State's school building program were the three Binishells constructed at Narrabeen North Public School and one at Killarney Heights Public School, all of which comprised 18 metre diameter domes. Subsequent planning by the Department was for 'six shells of 36-metre diameter, which will be erected at selected high schools and used as school centres'<sup>71</sup> (Peakhurst, Randwick Girls, Fairvale, Ingleburn, Pittwater and Ku-ring-gai High Schools) following which the system was to be evaluated for suitability for a range of further applications.

<sup>68</sup> Bini, Dante, Building with Air, published by Bibliotheque McLean, June 2014.

<sup>69</sup> Department of Public Works NSW Annual Report 1973-74, p.11.

<sup>70</sup> Betteridge, Margaret, Binishells, Their Context and Significance in School Architecture in NSW, March 2018, p. 16; included in Heritage Asset Advisory, NSW Public Works Advisory, NSW Department of Education Binishell Strategy Stage 1, revised May 2019.

<sup>71</sup> Ibid.

By 1975, the NSW Department of Public Works and Department of Education jointly decided to adopt the system 'as part of the programme to provide multipurpose centres, or libraries, at selected schools.'<sup>72</sup> Dr Dante Bini held the patent rights to the system and entered into an agreement with the Department of Public Works to supervise the design, construction and fitting-out of the 18-metre and 36-metre Binishells. Binishells or multi-shell complexes were erected at fourteen schools in NSW, with the three-dome complex at Narrabeen North remaining as one of Bini's career favourites.

Enthusiasm for Binishells in Australia waned following collapse of the first 36-metre diameter structure at Fairvale High School on 4 January 1975. This event raised major concerns about their safety given their use as school facilities. While the situation deescalated when the reasons for the collapse were revealed (an exceptional temperature gradient of 25 degrees overnight when the shell was still uninsulated and unfinished) a second collapse at Pittwater High School on 4 August 1986 sealed the fate for use of Binishells in Australia, despite the installation of precautionary support towers in the other 36-metre domes (which affected the functionality of the interior spaces due to the introduction of columns). Other issues relating to leakage and maintenance costs led to a range of schools planning replacement of their Binishells with more conventional structures.

There are currently 11 remaining Binishells in NSW Public Schools, located on 9 separate school sites, including the 18-metre dome at Killarney Heights Public School which has received demolition approval early in 2018. As described by Margaret Betteridge:

*Their loss can be attributed to their ageing, lack of or deferred maintenance, poor quality repairs, the deterioration of concrete, the presence of asbestos, work, health and safety issues— and the ever-growing pressure for shiny new, improved school facilities<sup>73</sup>.*

### 3.4.2. The Binishell at North Narrabeen Public School

The Binishells at North Narrabeen Public School (NNPS) were constructed in mid 1974. While a number of other Binishells were constructed for the NSW Department of Education, those at Narrabeen North are notable as being the first complex completed for the NSW government. The complex was officially opened in November 1974 by NSW Premier, Sir Robert Askin.

The two interconnected domes (Building B) were designed to be used as a library, while the third Binishell served as an administrative office for the school. Each of the three Binishell buildings at North Narrabeen are 18 metres in diameter. Only two other Binishells of this diameter were constructed in NSW schools, at Killarney Heights Public School and Ashbury Public School, with other Binishell complexes being 36 metres in diameter.

A photograph of this building was the initial (promotional) image in the Building Centre, London video - Dante and Nic Bini - Shell Structures produced in 2013. In that video, when Dante Bini is asked to nominate his favourite buildings, he nominates two buildings. His first favourite was the Sardinia La Cupola house he built in the late 1960s for the movie director Michelangelo Antonioni and his partner, actress Monica Vitti. His other favourite building was the North Narrabeen Binishell with the "oyster" at the opening of the "shell". He goes on to explain that he worked with the NSW Government Architect, JW (Ian) Thomson and he was requested by the then NSW Minister for Education, Sir Eric Willis "to do something that represents the knowledge of the world for the kids. So, first of all, I cut this shell, like a shell that was opening. And, when the pearl of the shell, which was representing to me the knowledge of the world, was exposed to the kids, this was something that everyone approved, the kids loved it. And also I used the concept of Michelangelo Antonioni to have a space which was not flat, underneath the shell."

<sup>72</sup> Department of Public Works NSW Annual Report 1974-75, p.12.

<sup>73</sup> Betteridge, Margaret, Binishells, Their Context and Significance in School Architecture in NSW, March 2018, p. 3; included in Heritage Asset Advisory, NSW Public Works Advisory, NSW Department of Education Binishell Strategy Stage 1, revised May 2019.



Figure 47: North Narrabeen Public School Binishells, 1975 (Source: NSW State Archives and records, GPO 2 - 47287, File No. FL2347486).

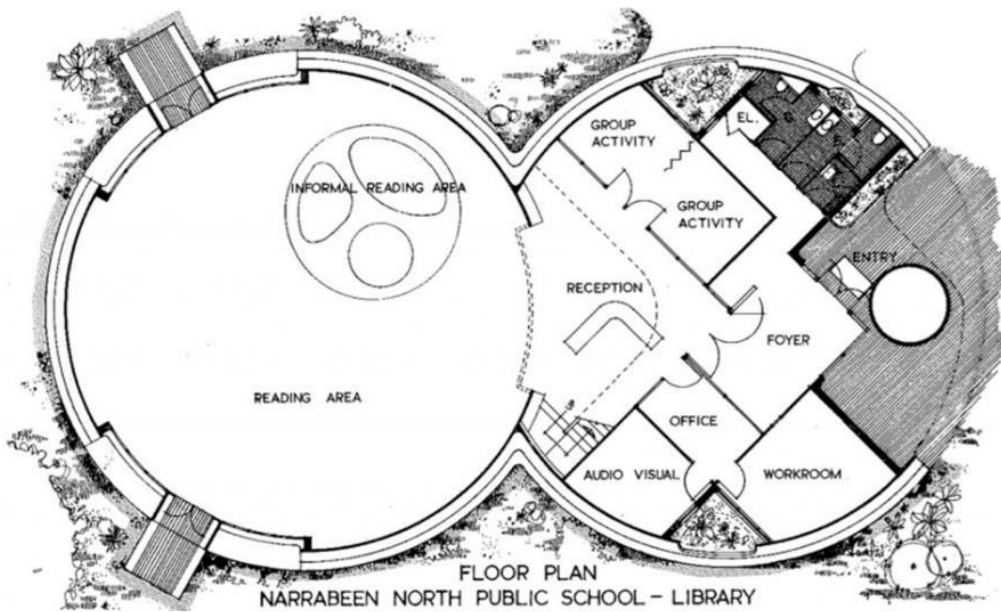


Figure 48: Narrabeen North Primary School Library, Floor Plan 1974 (Binishell B) (Source: Binisystems.com).

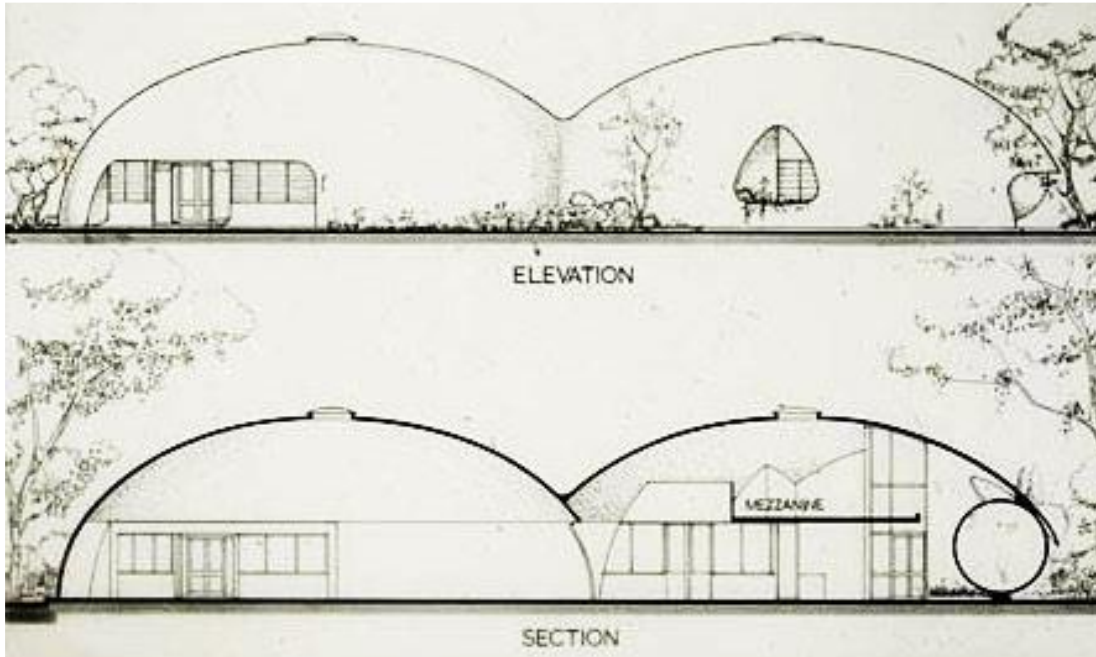


Figure 49: Narrabeen North Primary School Library, Elevation and section 1974 (Binishell B) (Source: Binisystems.com).

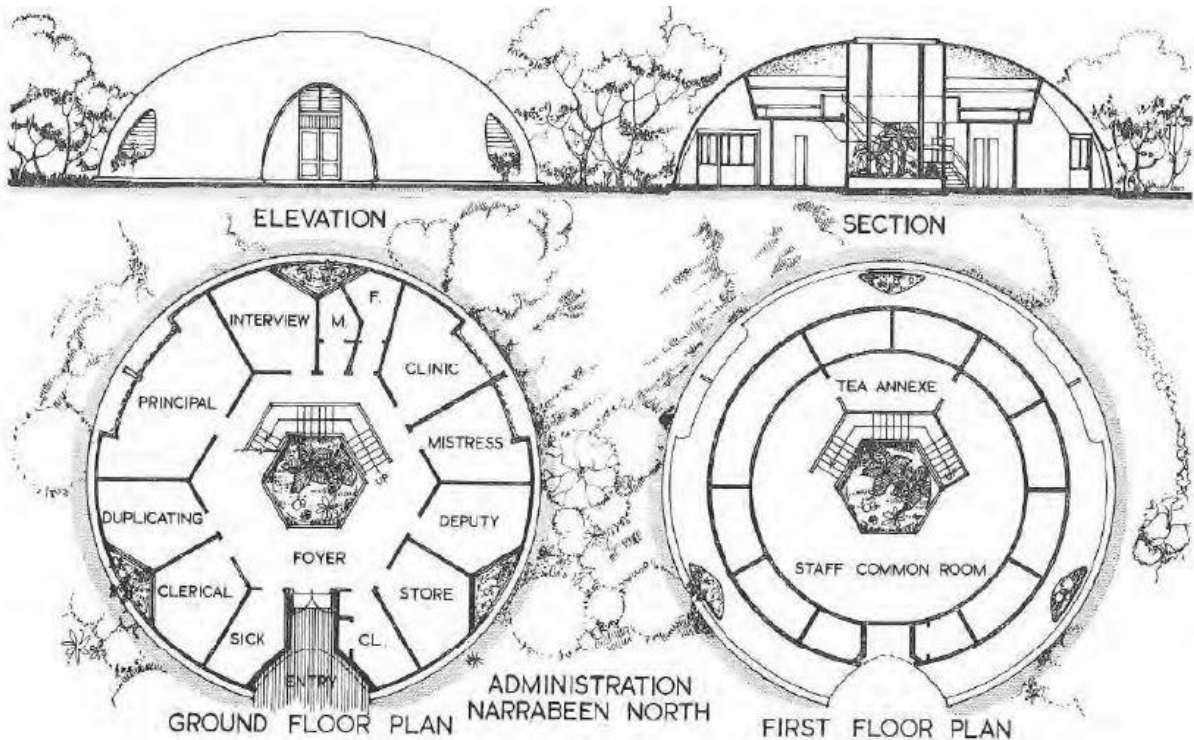


Figure 50: Plans, Section and Elevation for the Administration building, North Narrabeen Public School (Bini Shell A) (Source: Reproduced in construction of Binishell reinforced concrete domes, Department of Public Works, 1978, p. 9, cited in Betteridge, 2018, p. 22).

## 4. ASSESSMENT OF SIGNIFICANCE

### 4.1. Understanding Heritage Significance

Each place is unique and has its own combination of values. Therefore, before making decisions about the future of a heritage item it is essential to understand its heritage values so that these will be retained when making future decisions about the place. The statement of heritage significance summarises an item's heritage values.

### 4.2. Statements of Significance

#### 4.2.1. State Heritage Register

The following Statement of Significance has been extracted from the State Heritage Inventory (SHI) form for State heritage item 'The Binishell Collection (Department of Education)' (SHR no. 02037):<sup>74</sup>

*The Binishell Collection (Department of Education) is of state heritage significance for its historic values as part of the innovative NSW Public Works Binishell Program which successfully and quickly responded to the sudden growth in public schools in NSW at the end of the 1960s and through the 1970s.*

*The Binishell Collection (Department of Education) is of state heritage significance for its association with the NSW government's innovative response need to fast track an economical, labour effective and speedy program of building in NSW Schools in the early 1970s. It is also of significance for its association with the Italian architect, Dr Dante Bini who developed and patented the system of constructing reinforced concrete domes.*

*The Binishells in the collection are of state heritage significance as each demonstrate the distinctive, landmark aesthetic qualities and variations of the concrete futuristic bubble design popular in the late 1960s and 1970s.*

*The Binishell Collection (Department of Education) is of state heritage significance for its ability to demonstrate the innovative design and construction techniques used in their construction.*

*The Binishell Collection (Department of Education) is of state heritage significance an intact rare example of the Binishell as multipurpose school buildings in NSW schools.*

#### 4.2.2. Pittwater Local Environmental Plan 2014

The following Statement of Significance has been extracted from the State Heritage Inventory (SHI) form for heritage item 'Concrete geodesic domes (North Narrabeen Public School)' (item no. 2270341):<sup>75</sup>

*The concrete geodesic domes are one of a very limited number of Binishells in Australia and one of the few remaining constructed as part of the NSW Department of Public Works building program for schools in the 1970s. This program sought to construct 10 binishells across the state to provide large open floor spaces for schools, using the new construction method invented by Italian architect, Dr Dante Bini. This method of construction has been used around the world, mainly to build houses. These buildings are aesthetically and technically significant as they represent a new method of public building construction in the 1970s. The North Narrabeen Binishells were the first 18 metre domes built in NSW and were one of the first such buildings in NSW public schools.*

<sup>74</sup> 'The Binishell Collection (Department of Education)', State Heritage Inventory (SHI) form, available at <https://www.hms.heritage.nsw.gov.au/App/Item/ViewItem?itemId=5066940>

<sup>75</sup> 'Concrete geodesic domes (North Narrabeen Public School)', State Heritage Inventory (SHI) form, available at <https://www.hms.heritage.nsw.gov.au/App/Item/ViewItem?itemId=2270341>

#### 4.2.3. Binishells NSW - A Heritage Assessment

The following Statement of Significance has been extracted from the Heritage Assessment of Binishells NSW for School Infrastructure NSW Department of Education by Anne Warr Heritage Consulting in May 2019:<sup>76</sup>

*The construction of Binishells as school facilities to house libraries, multi-purpose centres and gymnasias in NSW schools between 1974 and 1979, demonstrated a period of creativity and experimentation by the NSW Government, including the Government Architects Branch and NSW Department of Education, to provide much needed accommodation for a booming school population. The program ceased in 1979 after fifteen Binishells were constructed across fourteen schools, making it the largest collection of Binishells in the world devoted to a public enterprise.*

*Binishells are significant for their association with Dr. Dante Bini, a highly creative Italian architect who patented the system of building reinforced concrete domes by using compressed air to inflate a large membrane covered with wet concrete, and developed the product in many forms and for many applications around the world. The Binishell project was able to come to fruition in NSW because of the atmosphere of creativity, experimentation and problem solving which flourished in the Government Architects Branch of the NSW Public Works Department in the 1970s. The willingness of NSW Government to import foreign ideas and expertise reflected the spirit of Internationalism of the time, embracing innovative ideas in a spirit of international<sup>77</sup> cooperation.*

*Binishells embody a high degree of aesthetic significance as examples of Modernism which departed from traditional rectilinear forms in NSW school architecture, and for a high level of intactness including custom designed interiors of timber joinery, colour schemes, furniture and spatial arrangements. It was an imaginative and cutting-edge initiative which brought 'space age' design and technical innovation to the forefront of public architecture.*

*The uniqueness of the construction and design enables the Binishell structures to reveal information over time about an innovative construction technique, modern architectural design, the use of space in learning environments, and lessons regarding durability of materials, maintenance and sustainability. The structural failure of two of the domes in 1975 and 1986 have provided opportunities for research into the reasons for the failures and the development of structural understanding and alternatives.*

*Of the fifteen Binishells originally constructed, eight<sup>2</sup> remain, six have been demolished and one collapsed. The eight remaining Binishells are a precious collection demonstrating a period of modern architecture which expressed optimism in the future, a willingness to experiment with new building techniques and a desire to create innovative learning spaces. It was an investment by the NSW government that has provided memorable experiences for generations of school children over the past 40 years. Although examples of Binishells can be found around the world, the comprehensive development of the system for school education by the NSW Department of Public Works remains unique in the world.*

A significance ranking of the existing fabric and view analysis have been undertaken by City Plan Heritage and provided as Appendix A for reference.

<sup>76</sup> Warr, A. (May 2019), 'Binishells NSW - A Heritage Assessment', pp. 2-3.

<sup>77</sup> Interestingly, the construction method was brought to the attention of the NSW Minister for Public Works by Sir William Davis Hughes, himself a former NSW Public Works Minister, then Agent General in London. David Hughes was the initial intermediary between the architects at NSW Public Works and Dante Bini. (Source: Betteridge/Musecape 2018).



view corridors to help celebrate the 1970s futuristic concrete bubbles directly via the main entrance to the public school, which is not currently available.

According to the historical imagery for the subject site, the mature tree located at the southwest corner of the public school dates from an earlier period but is required to be removed to accommodate a new substation for better functioning of the site. Although the proposed substation will require the removal of a mature tree, it will result in providing clear and better visual connectivity with the state and locally significant Binidomes. The proposed substation and fire hydrant booster fronting Namona Street, along with associated conduit connections, are necessary for efficient electricity supply within the existing and the proposed school buildings (subject to REF - development without consent planning pathway) and make the building fire and safety compliant. Each piece of equipment is located at the opposite corner of the main entrance and is not a dominant intrusion to the site. Therefore, no impact on the significant views, two and from the Binidomes, is anticipated.

The part of the subject site allocated for designated development is categorised as Coastal Wetland Area. It is further proposed for new landscaping elements (mostly trees) around the proposed pathway to be located south of the proposed Block D. The proposed landscaping will enhance the existing wetland area and contribute to the existing natural and historic landscape of the place and leafy setting of the 1970s futuristic concrete bubbles.

Considering the Aboriginal and Non-Aboriginal cultural heritage qualities of the subject site and the impact of the proposed works, the subject site went under Historical Archaeological Assessment in October 2019 by AMBS Ecology and Heritage<sup>78</sup>, and the assessment concluded that the Narrabeen Education Precinct has no archaeological significance. Therefore, archaeological remains with research potential or significance are unlikely to be present within the site. Further, a basic search of the Department of Premier and Cabinet AHIMS Web Services (Aboriginal Heritage Information Management System) was undertaken for the following allotments comprising the Narrabeen North Public School site for 50m, 200m and 1000m buffer zones:

- Lot 3, DP 1018621

The results have shown that 'O' Aboriginal sites and 'O' Aboriginal places have been declared in or near the location. Only one Aboriginal site has been identified, but it's within the buffer of 1000m, and no impact on a known Aboriginal place of significance is anticipated.

If any archaeological remains were present on site, those would be associated with the twentieth-century development of the school and would not make a substantive contribution to research questions relevant to the early history of the site or local area that are not available from other sources. However, recommendations have been included in this heritage impact statement if any unexpected archaeological finds are uncovered during any groundwork.

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<sup>78</sup> AMBS Ecology and Heritage (October 2019), 'Narrabeen Education Precinct - Historical Archaeological Assessment', pp. 38.



## 6. CONCLUSION AND RECOMMENDATIONS

In conclusion, it is considered by City Plan Heritage that the proposed works, including the removal of a few trees from the Coastal Wetlands Area to accommodate new accessible pedestrian pathways, provision of a new substation and new fire hydrant booster along with associated conduit connections, and proposed landscaping at Narrabeen North Public School are relatively minor works and will have no impact on the heritage significance of the Concrete Geodesic Domes (Binidomes A and B). They will rather open up new view corridors that will allow for direct views and help celebrate the aesthetic qualities of 1970s futuristic concrete bubbles. There will be no impact on the significance of the nearby heritage items, which are distant from the school site with limited to no visual connections. The proposed change to the site aims to upgrade the school and available facilities to meet the current educational standards of the Narrabeen Educational Precinct. The design and the location of these changes have been selected considering the fundamental need to retain the site's significant heritage elements and their appreciation.

The works will ensure the continuation of the school functions in line with the current educational standards and improve the facilities that are essential for its continuing function as a school complex. The upgrading of educational facilities (forms part of various planning pathways) is integral in ensuring that the site remains capable of servicing the long-term use of the Narrabeen Educational Precinct while ensuring no physical impact on the 1970s Dante Bini's Bini Shell structures of the high and exceptional significance. The continuation of the site's active use as an educational facility assists in ensuring the continued maintenance and conservation of the site's significant heritage values as part of the Department of Education's Binishell Collection.

Currently, there is no direct view to the Binidomes from Namona Street entrance of the school as it is obscured by Blocks H and J limiting their views to the internal garden areas only. As such, the views to the Binidomes will significantly be improved with proposed development (subject to Development without consent - REF) and new accessible pedestrian pathways via Namona Street and Northern Beaches Indoor Sports Centre (NBISC) carpark, as well as the appreciation of *their distinctive, landmark aesthetic qualities and variations of the concrete futuristic bubble design popular in the late 1960s and 1970s* as described in the Statement of Significance of the Binishell Collection.

The following recommendations have been made to ensure the assessed heritage values of the subject site, and its layered history is conserved and communicated to its future users:

- Ensure STOP WORK provisions are in place for any unexpected findings that could be considered archaeological relics or an Aboriginal object during the works to prevent any harm to the finds. Consult a suitably qualified archaeologist to inspect the find and advice on the appropriate management approach.
- A photographic archival recording of Binidomes and their surroundings where the proposed development will take place should be undertaken prior to the commencement of any works in accordance with the Heritage NSW guidelines for *Photographic recording of Heritage Items Using Film or Digital Capture (2006)*;
- A built heritage specialist should be involved and be on site during all critical processes that require specialist heritage expertise and detailing; and

Provided that the above recommendations are integrated into the application process (Designated Development), the proposed development is deemed acceptable from a heritage perspective and is consistent with the relevant controls regarding heritage contained in the Heritage NSW and heritage best practice guidelines. We trust the above Heritage Impact Statement will satisfy the requirements of the School Infrastructure NSW in the assessment of the proposed works.

## **APPENDIX A:**

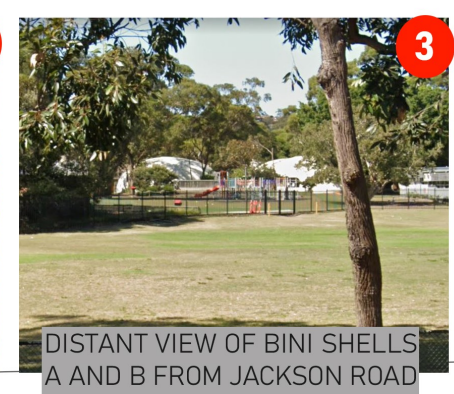
Significant elements, and views & vistas to & from  
Binidomes A and B



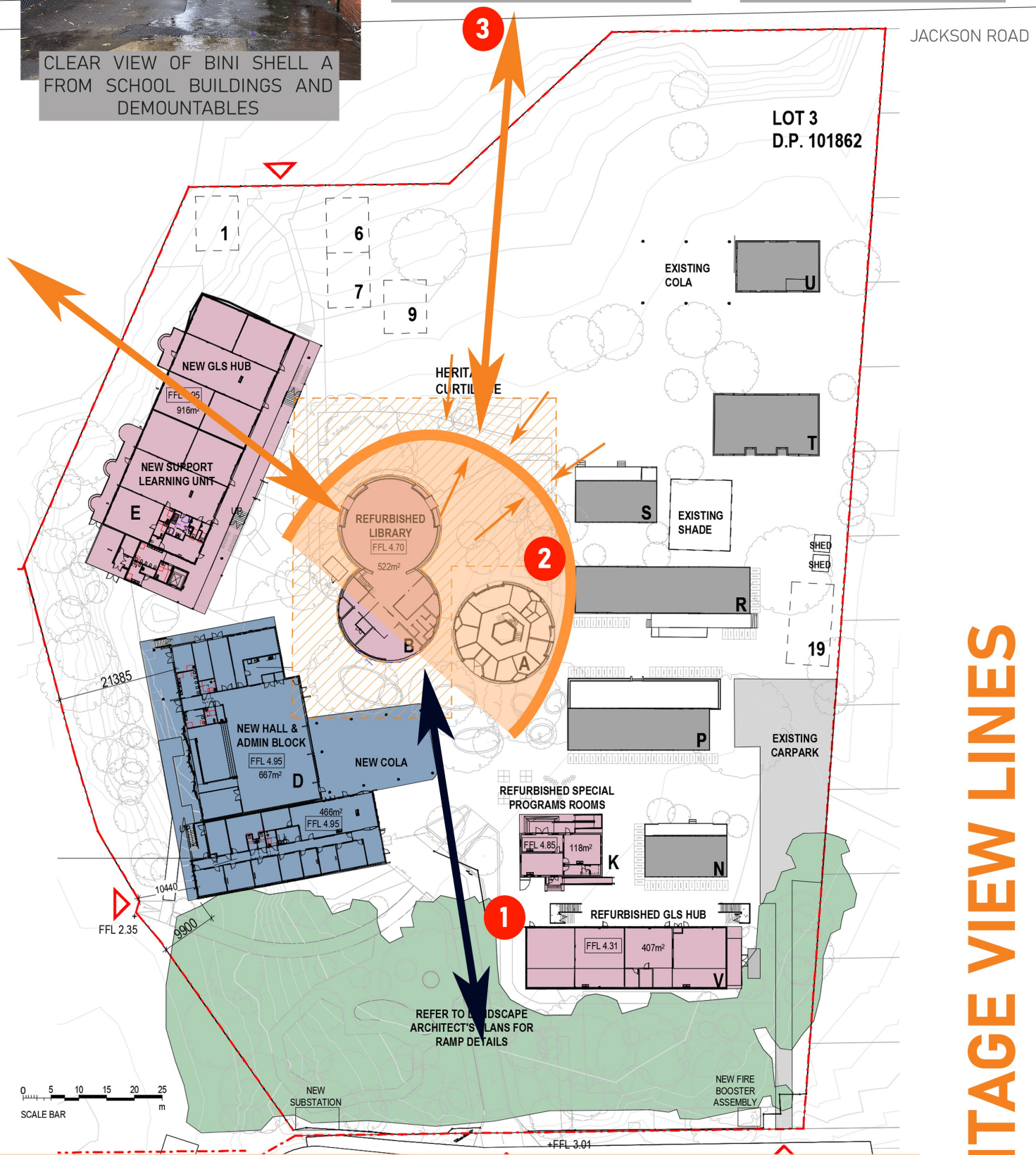
CLEAR VIEW OF BINI SHELL A FROM SCHOOL BUILDINGS AND DEMOUNTABLES



EXISTING SIGNIFICANT VIEWS OF BINI SHELL A AND BINI SHELL B



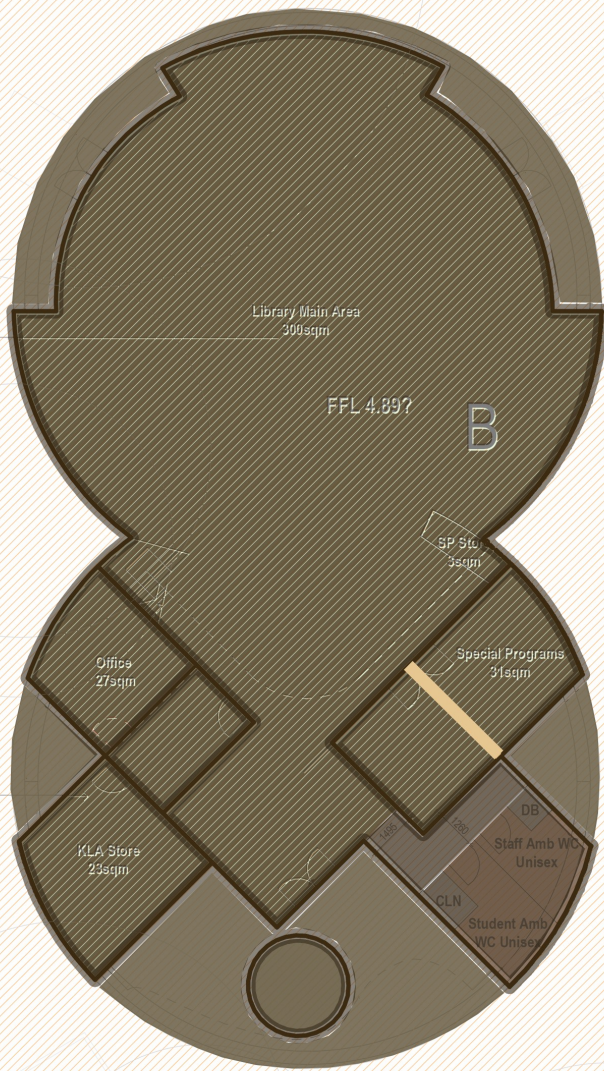
DISTANT VIEW OF BINI SHELLS A AND B FROM JACKSON ROAD



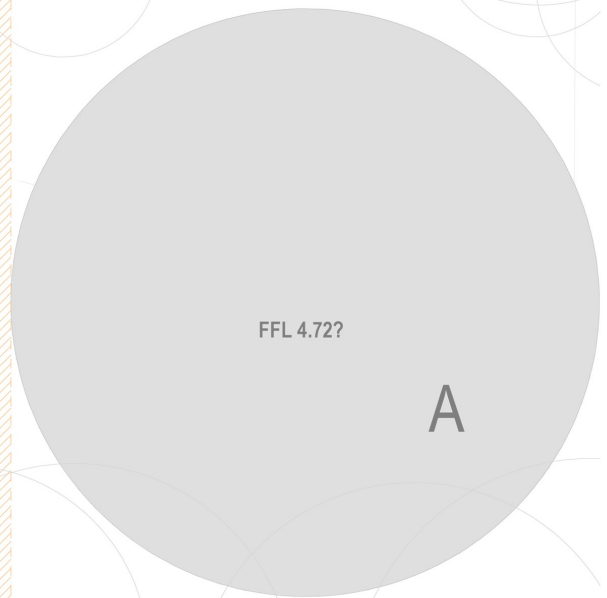
# HERITAGE VIEW LINES

## LEGEND















- DEVELOPMENT APPLICATION
- DEVELOPMENT WITHOUT CONSENT
- DESIGNATED DEVELOPMENT APPLICATION
- DEMOUNTABLES
- EXISTING PERMANENT BUILDING / STRUCTURE
- COASTAL WETLANDS/ BIODIVERSITY ZONE
- PROJECT SITE EXTENTS
- HERITAGE CURTILAGE
- MAIN ENTRY
- SECONDARY ENTRY
- ENHANCED VIEW CORRIDOR
- EXISTING SIGNIFICANT VIEW CORRIDOR



Note: Additional 18sqm of KLA Store on Mezzanine if acceptable by BCA & Access.  
Or alternatively as joinery within the Library Main Area.



## LEGEND

	DEMOLISHED		HALL HUB		HIGH SIGNIFICANCE
	HERITAGE CURTILAGE		LIBRARY HUB		MODERATE SIGNIFICANCE
	BIODIVERSITY PROTECTED LAND		AMENITIES & SERVICES		LITTLE SIGNIFICANCE
	GENERAL LEARNING SPACE HUB		CIRCULATION		
	SUPPORT LEARNING SPACE HUB		EXISTING BUILDINGS		
	ADMIN & STAFF HUB				

**Note:** This diagram shows indicative grades of significance for the Bini Shell B, building and internal spaces only. Individual elements in these spaces may be of higher (or lower) significance.



**FABRIC SIGNIFICANCE GRADING**