

Moorebank Intermodal Terminal:
non-Aboriginal cultural heritage salvage strategy

FINAL REPORT

Prepared for Liberty Industrial on behalf of SIMTA

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Glossary

CBD	Central Business District
CoA	Conditions of Approval
CUST	Cullen Universal Steel Truss
DA	Development Application
DEWHA	Department of Environment, Water, Heritage and Arts
DP	Deposited Plan
DSEWPC	Department of Sustainability, Environment, Water, Population and Community
EA	Environmental Assessment
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPA	Environment Planning and Assessment
EPBC Act	<i>Environment Protection Biodiversity Conservation Act 1999</i>
EWMS	Environmental Work Method Statements
NPW Act	<i>National Parks and Wildlife Act 1974</i>
OEH	Office of Environment and Heritage (including NSW Heritage Council)
STRARCH	Abbreviation of 'stressed arch' referring to the design of the STRARCH hangar

1 Introduction

1.1 Project background

Biosis has been commissioned by Liberty Industrial on behalf of SIMTA to prepare a non-Aboriginal Heritage Salvage Strategy (Salvage Strategy). The Salvage Strategy has been prepared to guide the non-Aboriginal salvage required as part of condition B8 of the Minister's Conditions of Approval (CoA). The Moorebank Intermodal Terminal is located in Moorebank, NSW. The study area is located in the Liverpool Local Government Area, approximately 30 kilometres south-west of the Sydney CBD and 4 kilometres south of the Liverpool CBD (Figure 1).

The Moorebank Intermodal Terminal Environmental Assessment (EA) (Parsons Brinkerhoff, 2014) assessed the impacts of construction of the project on Aboriginal and non-Aboriginal heritage. As part of EA development, detailed non-Aboriginal cultural heritage assessment was prepared to address the Director General's Requirements issued by the then Department of Planning and Environment. The assessments were included in the EA as:

- Volume 8, Technical Paper11: European heritage impact assessment (non-Aboriginal heritage) (Navin Officer Heritage Consultants 2014a) (NOHC).

The following heritage documents were also prepared as part of the response to submissions:

- Appendix J: Cultural heritage report (NOHC 2014b).

1.2 Planning approvals

The concept and early works (stage 1) associated with the project received approval on 1 June 2016 under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) (SSD 5066). The Conditions of Approvals have a number of requirements relating to non-Aboriginal heritage, this document satisfies condition B8, which states that:

Prior to the commencement of Early Works affecting non-Aboriginal sites MHPAD1 and MHPAD2, the Applicant shall undertake any further archaeological excavation works recommended by the results of the non-Aboriginal excavation program.

Within 12 months of completing the above work, unless otherwise agreed by the Secretary, the Applicant shall submit a report containing the findings of the excavations, including artefact analysis and the identification of a final repository for finds, prepared in consultation with the OEH (Heritage branch) and to the satisfaction of the Secretary.

An archaeological salvage strategy for remains beneath the concrete floor of the CUST Hut has been included in this salvage strategy as it is required as an additional mitigation measure under Condition B9. The MH1 Dog Cemetery is omitted as at the time of writing it is unclear whether canine remains have been interred within the cemetery.

In order to further reduce environmental impacts, SIMITA has committed to undertaking a series of Recommended Environmental Mitigation Measures (REMMs). Fourteen of the REMMs relate to non-Aboriginal heritage, one of these needs to be considered as part of this salvage strategy. This is outlined below:

13F - No impacts would occur within the potential archaeological deposits (PAD) boundaries of Moorebank Historical Potential Archaeological Deposit (MHPAD) 1 and MHPAD2 without prior archaeological salvage, as these sites contain archaeological deposits, inclusive of in-situ building remains, that are assessed to be of local significance in the context of the history of military housing and training at Moorebank.

Specifically, Condition B8 requires that the non-Aboriginal works be undertaken in consultation with OEH (Heritage Division) and to the satisfaction of the Secretary. As such, this strategy should be submitted to OEH (Heritage Division) for their consideration.

Other relevant legislation and planning instruments that will inform this assessment include:

- *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act)
- *National Parks and Wildlife Act 1974* (NSW)
- *National Parks and Wildlife Amendment Act 2010* (NSW)

1.3 Contributors

This report was prepared by Alexander Beben, Principal Archaeologist at Biosis Pty Ltd. This report has been reviewed by Amanda Atkinson, Senior Archaeologist and Rebecca Steer, Wollongong Resource Group Manager. Dr. Iain Stuart (JCIS Consultants) reviewed the technical content of this report.

Figure 1 Location of the study area

Figure 2 Detailed aerial image of the study area

2 Salvage strategy

2.1 Summary of historical context

The assessment of non-Aboriginal heritage values within the study area was undertaken through the completion of the following tasks:

- Literature and database review
- Assessment of the built and non-built environment
- Archaeological test excavation
- Assessment of the cultural landscape and social values
- Assessment of the heritage significance and heritage impacts for individual items.

A comprehensive historical context to the study area is presented in Section 4 of the NOHC 2014a assessment. Based upon the historical context in NOHC 2014a the sequence of occupation within the study area can be defined as follows:

- Pre-European (Aboriginal)
- The Moorebank and Collingwood Estates
- Military use and land tenure up to World War II
- World War II
- Post War 1940s and 1950s
- 1960s and 1970s
- 1980s onwards.

A historical summary from NOHC 2014a for the study area is presented in Table 1.

Table 1 Historical summary of the study area (Source: NOHC 2014a: Table 4.1)

Key date	Development
Pre 1788	The Liverpool district was home to the Cabrogal clan of the Darug tribe.
1798	The first land grants in the Liverpool area were between 1798 and 1805 –including land granted to Eber Bunker on the western bank of the Georges River.
1805	The major recipient of land in the area was Thomas Moore, who received his first grant in the area of present day Moorebank. He ultimately received a total of 8000 acres on the east bank of the Georges River.
1809	Charles Throsby received his grant of 600 acres at Glenfield.

Key date	Development
1810	Moore became the first Magistrate of Liverpool and was responsible for granting town allotments and ensuring development adhered to proper building and planning requirements. Collingwood House built by Bunker on his Collingwood Estate; he was also granted a further 500 acres of land adjacent his Georges River holdings.
1836	Bunker died at Collingwood on September 27.
late 1830s-1850s	Collingwood Estate was subdivided and developed with a steam mill, abattoir, wool wash and other industries established on land to the north of the study area.
late 1850s	Main south railway line constructed on western bank of Georges River.
1888	The Moorebank estate was subdivided and offered for sale.
Late 1880s	New South Wales volunteer soldiers conduct training exercises in the area between the Georges River and the Royal National Park.
1900 – 1909	The area adjacent to the Project area and north of the M5 Freeway regularly used by various military units for the training camps. A rifle range was established in the area at the time.
1910	In January 1910 Lord Kitchener visits the Liverpool camps to inspect existing forces and advise upon the best means of developing the Defence forces of the country.
1912	As a result of Kitchener's report the government begins acquiring large areas of land in the Liverpool district for military purposes.
1914 – 1918	During World War I Liverpool Camp was the main training area for new recruits in New South Wales, including Light Horse, Engineers and Field Mining Companies.
1931	Liverpool Golf Club established and a new golf course started on the old Collingwood Estate
1930s	Artillery and Ordnance Division occupied north end of Project area.
May 1940	RAE School of Military Engineering (SME) established on a permanent basis. Located at Chowder Bay and Field Engineering Wing at Moorebank. SME's first location at Moorebank was in the area of the Base Administration Support Group (BASC) or Titalka Park.
1940s – 1944	Part of the BASC site accommodated units from the Australian Women's Army Service who worked at the 8th Advanced Workshops which were located within the present day DNSDC site opposite the Project area on Moorebank Avenue.
1943	War time peak occupation of SME numbered 1300 staff and students.
1944 – 45	The BASC site occupied by 2nd Land Headquarters.
1954 to 56	Reconstruction and replanning to large areas of the SME's site. Trade wing established. Works included: <ul style="list-style-type: none"> • new entry road • new sleeping quarters, mess hall, recreation rooms and parade ground • married quarters built - Jacquinet Court and Chatham Village • new training areas in buildings and field areas • new road layout and road names.
1963	New accommodation wings constructed at the BASC site. Mine training area added to south of SME's site. Expansion of SME to accommodate needs of National Service trainees, including construction of simulated Asian Village.

Key date	Development
1965 – 68	RAE Memorial Chapel constructed.
1971	Collingwood Golf Course closed prior to residential expansion
1992 – 94	Major redevelopment of SME's site. Nearly all pre-1950s development demolished. 1950s married quarters villages demolished. New accommodation, workshops, offices, sergeant's mess and headquarters buildings constructed.

The physical characteristics associated with the study area can be defined and characterised as a heritage landscape that exists across four precincts and is associated with several key archaeological features and areas of archaeological potential. These are summarised in Table 2 and their locations are identified in Figure 3.

Table 2 Non-Aboriginal heritage sites associated with the project

Site ID	Description	Significance
Precincts		
Precinct 1	Defence and private land north of Bapaume Road	Local
Precinct 2	Moorebank Base Administration Support Centre (BASC)	Local
Precinct 3	Defence Support Group (DSG)	Local
Precinct 4	School of Military Engineering (SME) – Steele Barracks.	Local
Archaeological features		
MH1	Dog Cemetery	Local
MH2	Drainage ditches (military origin)	Nil
MH3	Portion of light rail (not in situ)	Nil
MH4	Portion of light rail (not in situ)	Nil
MH5	Large above ground concrete slab (military origin)	Nil
MH6	Commemorative garden	Local
MH7	Liverpool Golf Course	Nil
-	CUST Hut	Stat
-	RAAF STRARCH Hangar	State
B99	Building 99	Local
-	Remaining elements of the RAE Museum Sandstone Wall	Local
-	Remaining elements of the RAE Chapel	Local

Site ID	Description	Significance
Areas of archaeological potential		
MHPAD1	Potential archaeological deposit – Titalka Park (location of former group of WWII buildings and WWI isolation camp)	Local
MHPAD2	Potential archaeological deposit (location of WWII period buildings)	Local
MHPAD3	Remnant paved and garden areas in the vicinity of the former Drill Hall group of buildings (former buildings B36 – 40)	Nil

Figure 3 Location of non-Aboriginal heritage sites associated with the project

2.2 Nature of the archaeological resource

The following section outlines the assessed nature of the archaeological resource and results of prior testing to inform the non-Aboriginal salvage strategy.

2.2.1 MH PAD 1

MH PAD1 has been identified as an area of archaeological potential which may contain the remains of World War I and II Department of Defence infrastructure and associated activities. The presence of WWII related remains are more likely than for the WWI period. The area of archaeological potential extends from the current Titalka Park to an area to the south and west of the Canteen and former tennis courts. These open spaces appear to have been subject to minimal development since the 1940s. The Titalka Park area consists of an area of 12 metres x 115 metres and the additional area has approximate dimensions 46 metres x 73 metres.

The western portion of the MHPAD1 has primarily been defined to potentially include traces of a 'Military Isolation Camp'. NOHC (2014a: 126) indicates that the purpose of the camp was to provide temporary accommodation of any personnel who came into camp with communicable diseases, such as measles and mumps. The archaeological remains associated with the Isolation Camp are likely to be ephemeral in nature given that it is unlikely to have contained any permanent or built structures and may have instead consisted simply of tents. NOHC (2014a: 128) identified the eastern portion of MH PAD1 associated with Titalka Park to contain a number of WWII period buildings. These include three P1 type hut buildings which are shown on the south side of, and perpendicular to, Bapaume Rd (the northern boundary of Titalka Park), and a U-shaped building with enclosed rear yard and outbuildings is shown in the north-western portion of the future park. A number of smaller buildings and structures are associated with the P1 huts or situated near the southern park perimeter. MH PAD1 is likely to have contained the married quarters (NOHC 2014a).

The assessed level of archaeological potential associated with MHPAD1 is detailed in Figure 4.



Approx Scale 1:8157 200m

Base image: 2008 from www.six.nsw.gov.au

Figure 5.84 Interpretation of archaeological potential across MH PAD1



Approx Scale 1:8157 200m

Base image: 1945 aerial photograph from www.six.nsw.gov.au



1958 topographic map showing the development of the Moorebank Village, which required demolition and removal of the WWII structures (Moorebank Holsworthy Area GEN938d 1/9/57, Amended 22/4/58 Aus War Memorial 123, Item 493)

Key incl. Archaeological Potential

- *High* (least disturbance evident or inferred)
- *Moderate* (some disturbance evident or inferred due to proximity of later development)
- *Low* (considerable disturbance evident or inferred due to proximity of later development)
- *Nil* (including high degree of disturbance from later development and demolition)
- Approx. location of WWI Isolation camp
- Extent of WWII built environment
- WWII building (variously modified) extant at time of Dec 2010 survey but demolished in 2012
- Modified WWII building still extant

Figure 4 Archaeological assessment of MH PAD1 (Source: NOHC 2014a: Figure 5.84)

A program of test excavation was undertaken at MH PAD1 as part of the EA. A series of nine transects were excavated to identify whether any archaeological remains existed for the Military Isolation Camp, WWII P1 Huts, associated infrastructure and landscaping associated with former military accommodation (NOHC 2014a: 160). The excavations revealed a variety of features across the site that appeared to relate to buildings, paths and landscaping. The features dated from the WWII period and also predated this period of use. The test excavations identified brick footings and post holes associated with timber and fibro-cement (asbestos) structures. Other features including cross shaped features were identified which may indicate the presence of earlier training structures. A series of pathways and landscaping features were also identified.

A total of 1269 artefacts were identified during the testing at NOHC (2014a). There is little information in the reporting as to the provenance of these artefacts; however the testing appears to have located and identified occupational deposits, potentially in the form of sub floor deposits which may have accumulated beneath the wood and fibro cement huts. The majority of the MH PAD1 assemblage consists of a diverse range of domestic refuse. This included tableware items such as ceramic plates, saucers, glass tumblers, and teacups, as well as bottles, jars, and vials. Other household and personal items present included mirrors, glass lamp shades, coins, carbon batteries, an aluminium toothpaste tube, a plastic bike pedal, two pieces of possible plastic jewellery and a glass swirl marble. A small amount of bone was also recovered, the majority of which appeared to belong to large mammals such as sheep (NOHC 2014a: 174). The assemblage collected from MHPAD1 is comparable to many domestic assemblages from the early to mid-twentieth century, however in addition to the domestic evidence there was also evidence for the military use of the study area. The military evidence comprised spent bullet casings and the barrel group of a machine gun (NOHC 2014a: 176).

The location of test transects within MH PAD1 is outlined in Figure 5.

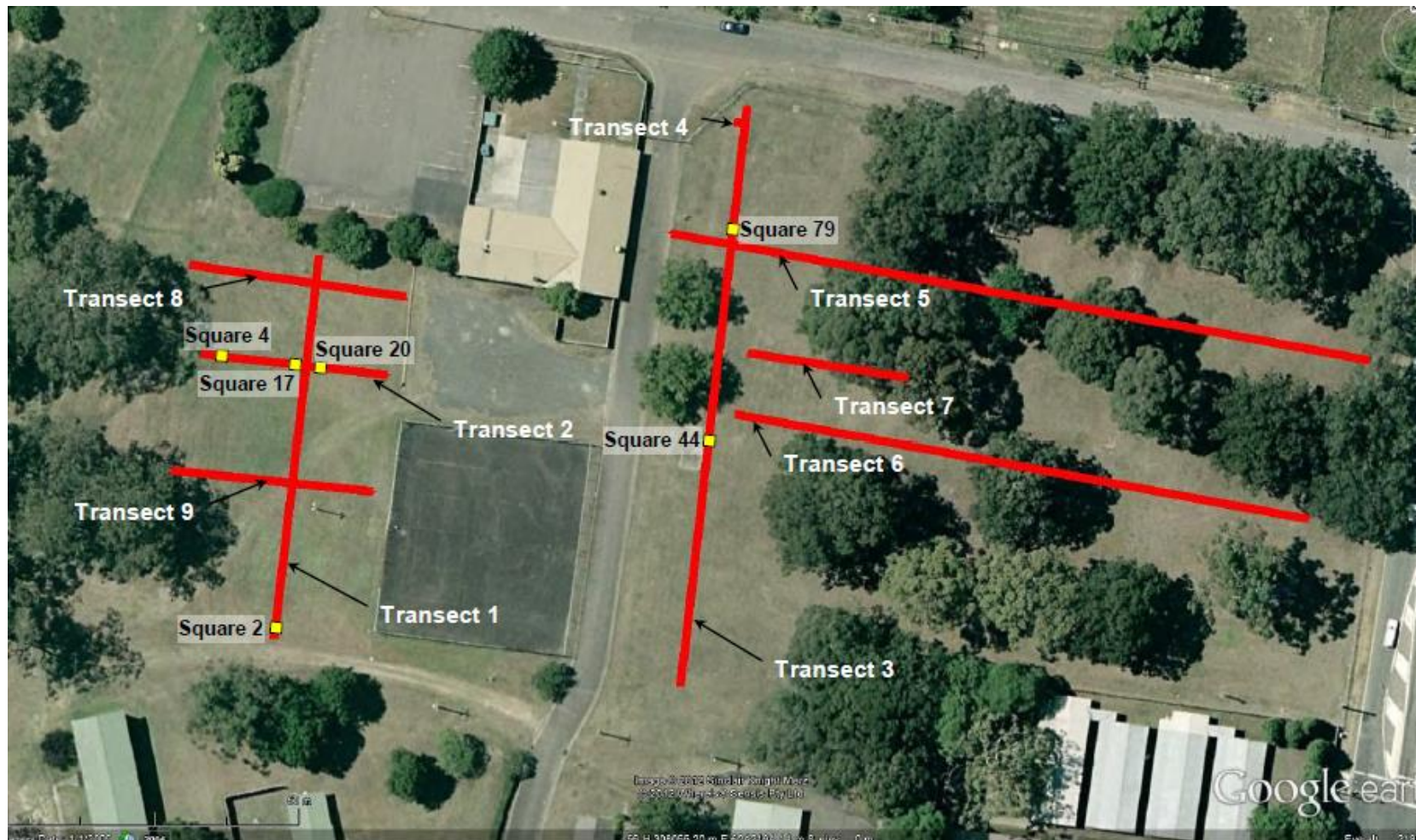


Figure 5 Location of transects within MH PAD1 (Source: NOHC 2014a: Figure 8.1)

2.2.2 MH PAD 2

MHPAD 2 consists of an area with the potential to contain the archaeological remains of World War II Department of Defence infrastructure and associated activities. NOHC (2014a: 132) state that MH PAD2 is situated at the eastern end of Chatham Avenue within the SME within a former locus of WWII buildings, most of which appear to have been P1 type buildings (NOHC 2014a: 167). The majority of this area has been heavily disturbed through post WWII development and training activities. Greatest potential occurs within areas that are distant from areas of post WWII construction and high impact training grounds. The largest area of least impact (defined as 'high potential') is a central northern remnant where some masonry remains (probably footings) are evident on the ground surface (NOHC 2014a: 167).

The archaeological potential associated with MH PAD 2 can be seen in Figure 6.

A program of test excavation was undertaken at MH PAD 2 as part of the EA. Three hand excavated test trenches measuring up to one metre x two metres in size. The test excavations at MH PAD2 focused on the inspection of surface remains, which consist of earth works and remnant in situ structural items such as concrete (NOHC 2014a: 177-17*). Structural evidence within MH PAD2 consisted of brick footings which would have supported earlier wooden or fibro cement structures. A total of 457 artefacts were recovered during the test excavations. As with MH PAD1 there is limited evidence for the provenance of these artefacts, however it would appear that occupational deposits, it is possible that sub-floor deposits were encountered. The assemblage from MH PAD2 consisted of primarily domestic refuse including tableware and food storage related items such as a ceramic platter and bottle glass. Other items present included lamp glass, coins, and an iron bulldog clip. Numerous fragments of heavy duty fabric, possibly canvas, were also recovered (NOHC 2014a: 178). Evidence for recent military activity within MH PAD2 was identified in the form of 74 of the Steyr ADI bullet casings.

The location of test trenches within MH PAD2 can be identified in Figure 7.



Base image from Google Earth Pro 2012

Figure 5.86 Interpretation of archaeological potential across MH PAD2



Base map: extract from Nov 1956 Layout of Engineer Barracks Casula

Archaeological Potential

- *High* (least disturbance evident or inferred)
- *Moderate* (some disturbance evident or inferred due to proximity of later development)
- *Low* (considerable disturbance evident or inferred due to proximity of later development)
- *Nil* (including high degree of disturbance from later development)
- Extent of WWII built environment

Figure 6 Archaeological potential associated with MH Pad2 (Source: NOHC 2014a: Figure 5.86)

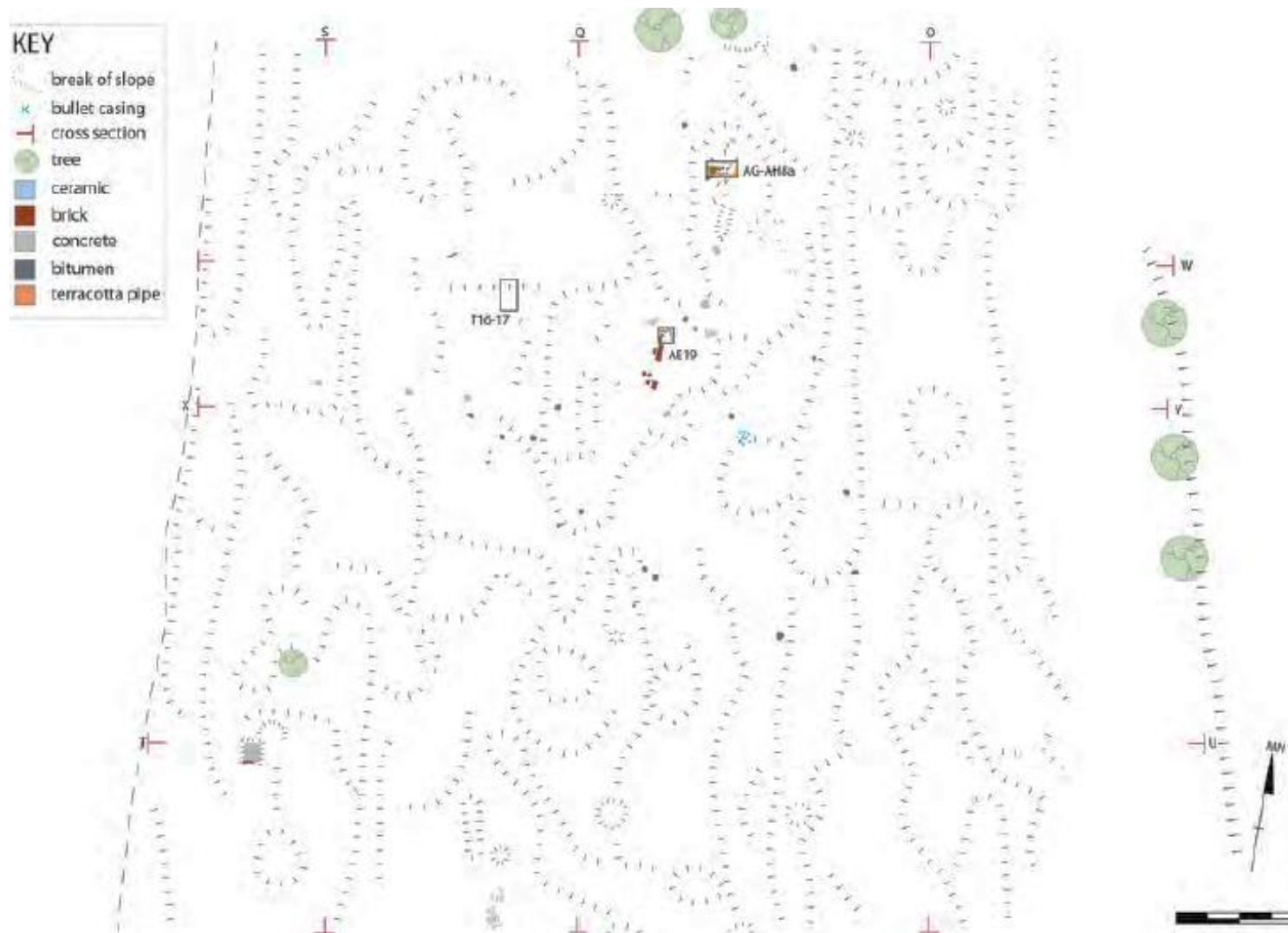


Figure 7 Located of test trenches within MH PAD2 (Source: NOHC 2014a: Figure 8.1)

2.2.3 CUST HUT

The CUST (Cullen Universal Steel Truss) Hut is a large clear span vaulted roof building which was relocated from the Royal Australian Engineers Training Centre at Kapooka to the Moorebank School of Military Engineering after 1946 and prior to 1949. There is some potential for occupational deposits to have accumulated prior to the installation of the concrete floor at Moorebank. Given the age of the Hut relocation, between 1946 and 1949, this period of potential accumulation is likely to relate to at least the first decades since the establishment of the SME at Moorebank around 1940.

As the CUST HUT has remained in use until recently no previous program of archaeological testing has been undertaken in relation to this item.

2.2.4 MH1 Dog Cemetery

In accordance with CoA B9, Biosis is in the process of formulating additional mitigation measures that may be required for the MH1 Dog Cemetery. The MH1 Dog Cemetery was assessed by NOHC (2014a: 195) as possessing a local level of significance against the NSW significance assessment criterion A, B and D.

The statement of significance for the item states that "*The cemetery as a memorial possesses significant social value at a local level whilst not possessing archaeological research potential.*" Whilst the archaeological investigation of the cemetery is unlikely to answer any meaningful research questions, archaeological approaches are likely to be the best means of identifying unmarked graves, determining the provenance of these remains and ensuring that all remains are retrieved in a respectful manner.

Biosis is awaiting clarifications from Defence concerning whether there are any canine remains associated with service dogs within the MH1 Dog Cemetery. In the event that canine remains are present, the additional mitigation measures will contain an archaeological methodology for the exhumation of these remains. This methodology will be prepared in consultation to NSW Heritage Council, Liverpool City Council, Moorebank Heritage Group and the School of Military Engineering as per the requirements of CoA B9. Given that MH1 requires an additional level of consultation, a separate document that analyses these remains and outlines methodologies for its further management will be prepared.

2.3 Statements of Significance

An assessment of significance was completed for MH PAD1, MH PAD2 and the CUST Hut as part of the EA. The Statements of Significance for each of these heritage items is outlined in Table 3.

Table 3 Statements of significance for MH PAD1, MHPAD2 and the CUST Hut (Source: NOHC 2014a)

Item name	Statement of significance	NSW Criterion
MH PAD1	This site maintains a high level of integrity and represents significant archaeological research potential at a local level The archaeological potential of this site and its association with MHPAD2 are such that potential exists for the two sites to be of State significance. Further heritage value in the form of social value could also be assigned to this site. These aspects of site significance assessment would necessitate broad area excavations	Local (Criterion E, with potential for A, C, F and G)
MH PAD2	This site maintains a high level of integrity and represents significant archaeological research potential at a local level The archaeological potential of this site and its	Yes – Local (Criterion E, with potential for A,

Item name	Statement of significance	NSW Criterion
	association with MHPAD1 are such that potential exists for the two sites to be of State significance. Further heritage value in the form of social value could also be assigned to this site. These aspects of site significance assessment would necessitate broad area excavations	C, F and G)
CUST Hut	The CUST Hut has a strong and special association with Lieutenant Colonel D.R. (Dan) Cullen. It is important in the history and development of the SME site. The integrity and intactness of this structure provides for a high level of technical significance. The possible subsurface integrity of this site represents significant archaeological research potential at a local level. The site is also rare and representative of its type. Further heritage value in the form of social value could also be assigned to this site. Refer to Museum Collection regarding items within structure.	Yes – Local/State(Criteria A, B, C, E, F and G)

2.4 Archaeological strategy

It is a requirement that subsurface salvage investigations be conducted for non-Aboriginal sites MH PAD1 and MH PAD2. Archaeological testing in the form of monitoring and test trenching has also been recommended for the CUST Hut. The following section details the archaeological strategy for undertaking these investigations. Research questions help define the program of works for archaeological investigations and frame the overarching aim of the salvage. The primary objectives of this strategy are to salvage as much archaeological information as possible by using the appropriate archaeological excavation methods and determining the nature of the archaeological deposits excavated.

2.4.1 Research themes

Contextual analysis is undertaken to place the history of a particular site within relevant historical contexts in order to gauge how typical or unique the history of a particular site actually is. This is usually ascertained by gaining an understanding of the history of a site in relation to the broad historical themes characterising Australia at the time. Such themes have been established by the Australian Heritage Commission and the NSW Heritage Office and are outlined in synoptic form in New South Wales Historical Themes (NSW Heritage Council 2001).

There are 38 State Historical Themes, which have been developed for New South Wales, as well as nine National Historical Themes. These broader themes are usually referred to when developing sub-themes for a local area to ensure they compliment the overall thematic framework for the broader region.

Table 4 Identified historical themes for the study area

Australian theme	New South Wales theme	Local theme
Governing	Defence	Activities associated with defending places from hostile takeover and occupation.

Australian theme	New South Wales theme	Local theme
	Government and Administration	Activities associate with the governance of local areas, regions, the State and the nation and the administration of public programs – includes both principled and corrupt activities.
Developing Australia's cultural life	Domestic life	Activities associated with creating, maintaining, living in and working around houses and institutions.
	Leisure	Activities associated with recreation and relaxation.

2.4.2 Research questions

The purpose of the archaeological strategy is to clearly articulate the anticipated outcomes from a program of work: what questions we are asking of the program and how the work will be undertaken to address these questions.

In the case of the program of salvage excavation proposed for MH PAD1, MH PAD2 and the CUST Hut, several questions are proposed as the operating framework for the salvage. These are:

- To what extent does the project area contain archaeological remains relating to the Isolation Camp, P1 Huts and original use of the CUST Hut? Are sufficient archaeological profiles present so as to establish dates or specific associations for archaeological evidence revealed in them?
- Is it possible to identify changes in the configuration of the Moorebank and later SME?
- If present, what can depositional remains from MH PAD1 and MH PAD2 tell us about the lifestyles and economy of people who lived in and frequented the P1 Huts and Isolation Camp? Is it possible to distinguish between depositional remains contained within different structures?
- What demographics can be detected within the archaeological assemblage? Specifically, is it possible to determine the ethnicity, gender and age of inhabitants? What does the assemblage tell us about military personnel and their families? Is their evidence of married quarters being present?
- Is there any evidence of how Defence personnel and their families have utilised Moorebank for recreation and relaxation? What activities have been detected and what can this tell us about the lives of those living at Moorebank?

2.4.3 Archaeological methodology

The expected archaeological features may be discrete in nature due to the temporary nature of the occupational structures located on site. Given the research questions the most appropriate excavation methodology is to use open area excavation using a combination of machine and hand excavation with the aim of opening a large area to identify and record the archaeological remains of structures and associated features.

The proposed excavation areas associated with MH PAD1, MH PAD2 and the CUST Hut are detailed in Table 5. The locations and extent of these excavations are detailed in Appendix 1.

Table 5 Proposed method of excavation and estimated size

Site name	Method of excavation	Estimated excavation area	Methodology
MHPAD1	Open area excavation within eastern and western components	24095m ²	<p>The open area excavation will encompass the entirety of the areas identified by NOHC as possessing high archaeological potential. The excavation approach will be aimed at the identification of structural and depositional remains, specifically artefactual deposits (i.e. rubbish pits and subfloor deposits) that contain remains that can answer the research questions outlined in Section 2.4.2.</p> <p>Where dense deposits are encountered, these will be sieved or sampled to ensure that a full range of artefacts are salvaged for analysis as part of the archaeological assemblage.</p>
MHPAD2	Open area excavation within central area.	4734m ²	<p>The open area excavation will encompass the entirety of the areas identified by NOHC as possessing high archaeological potential. The excavation approach will be aimed at the identification of structural and depositional remains, specifically artefactual deposits (i.e. rubbish pits and subfloor deposits) that contain remains that can answer the research questions outlined in Section 2.4.2.</p> <p>Where dense deposits are encountered, these will be sieved or sampled to ensure that a full range of artefacts are salvaged for analysis as part of the archaeological assemblage.</p>
CUST Hut	Monitoring of removal of concrete and placement of test trenches within footprint of CUST Hut to test the nature of archaeological remains that may be present. Open area excavation will be undertaken based upon the results of the monitoring and testing.	To be determined based upon monitoring and outcome of test trenching.	<p>The purpose of the archaeological program is to identify whether archaeological remains (in the form of structures or deposits) remain beneath the concrete floor of the CUST Hut. To achieve this monitoring of the removal of the concrete floor will be undertaken. Upon the completion of the monitoring, the conditions beneath the concrete will be assessed and test trenches placed in areas that display the potential to archaeological remains. Specifically, the depositional remains may relate to the use of the CUST Hut over time by Defence personnel. Should archaeological remains be identified, open area excavation will be undertaken to determine the nature, extent and significance of these remains and salvage these accordingly.</p>

2.4.4 Excavation and recording techniques

Excavation would be undertaken using standard archaeological processes with the aim of removing each stratigraphic layer (or context) in the order in which it was deposited. All excavations will be undertaken in accordance with the following methodology:

- All excavation will be conducted in stratigraphic sequence; the excavation of all occupational/natural deposits will be by stratigraphic unit. This will be undertaken using either machine or hand excavation.
- Should identifiable modern fills (post 1950) be encountered within the trenches these deposits will be machine excavated until occupational or natural depositional horizons are encountered. All machine excavation from this point forward will use a smooth edged mud bucket to scrape back the deposits which cap the archaeologically significant structural and depositional remains.
- Excavation will be undertaken until natural deposits are encountered or where it is determined that further excavation will not yield beneficial diagnostic information.
- Artefacts would be collected and bagged with reference to their stratigraphic location.
- All or a representative sample of sub-floor deposits and high density deposits will be sieved through a 5mm mesh to retrieve all artefacts suitable for analysis.

The following recording system is based upon that described in the first Port Arthur Manual (Davies and Buckley 1987) and will employ the following recording mechanisms:

- The excavation locations will be recorded with a DGPS and post-processed to sub 1 cm accuracy.
- A survey control for the site would be established, including main and subsidiary datum, a grid system tied to the Map Grid of Australia and the development grid, as well as the cadastre. Further datum for vertical control will be established to allow all trenches to be surveyed in to a nearby point. These will be tied back to Australian Height Datum.
- Surveying techniques for establishing the location of remains and artefacts identified will be undertaken using either a level or a DGPS whichever gives the most precise result.
- Each deposit of sediment or material will be recorded as a context and the relationship between each context will be recorded.
- Stratigraphy and archaeological features would be recorded through the preparation of plan and sections.
- A comprehensive digital photographic record will be prepared (NSW Heritage Branch 2001, revised 2004, 2006).
- The stratigraphic relationships between contexts would be described through the compilation of a Harris Matrix (Harris 1979).

- Analysis of fabric and detailed recording of the remains on context sheets according to best practice standards.
- Because of the site history, it is not expected that hazardous material such as friable asbestos cement will be encountered but if such material is encountered the archaeological work would be guided by Work Cover Workplace Health & Safety guidelines for dealing with such material. Biosis does not propose to retain any hazardous materials.
- Finds conservation, analysis and reporting requirements are detailed in Section 2.4.6 and Section 2.4.7.

2.4.5 Stockpiling of removed soil during all excavations

Turf and topsoil will be removed by mechanical excavator or hand and stockpiled at a safe distance from the edge of excavation. The toe of stockpile will be at least 0.5 metres from the test pit edge. Spoil will be stockpiled on the downhill side where possible and the area will be fenced off with the silt fence to ensure that silt does not move in the event of rain. The majority of excavation soil will be stockpiled for at most a couple of days at a time and the excavated pits will be backfilled after the completion of the excavation. The trenches will be reinstated through placing the turf over the topsoil to vegetate. Uncompleted test pits will be fenced off.

2.4.6 Finds conservation

Any artefacts recovered from the excavation will be recorded as inclusions in specific contexts. The artefacts will be retrieved from the site, stored in labeled context boxes and will be analysed within three months of the completion of the excavation. The latter will include cleaning, cataloguing and photography where appropriate. The information will be included in the analysis of the results of this excavation. The artefacts will be lodged with the local historical society or local Museum depending on the significance and conservation requirements of the artefacts encountered.

During field work

A simple computerised archaeological database will be used as the cataloguing and inventory software for artefacts.

Primary artefact processing is to be undertaken as part of the field program. The processing stages will include the following steps for each artefact:

- sorted into fabric
- cleaned, via either brushing or washing
- counted (raw counts)
- bagged and labelled
- entered into database.

This will necessitate an artefact processing 'lab' being set up in the field. As far as possible, artefact cleaning and cataloguing will occur on site during the excavation. The cataloguing will be a simple catalogue of material by type and context.

The collection as a whole would then be evaluated in connection with the results of the excavation to develop a plan for further artefact analysis. This will allow the artefact analysis to focus on artefacts from relevant stratigraphic contexts.

Post-excavation analysis

Specific artefact processing routines are to be developed for all artefact types. As an example, glass will be primarily sorted by colour into:

- black cylindrical
- black case
- olive – green tint
- clear.

The next stage of sorting will be minimum number of individual (MNI) counts for defined aggregates of stratigraphic units. Specialist analyses will then be undertaken on classes of material (fabric type or artefact function), with all data being added to the database.

Authoritative and experienced analysts will be sought to undertake typological and descriptive work if available, or to peer review the analysis. Provision will also be made for students and researchers to catalogue parts of the collection under supervision.

Assemblages from each element will be described in terms of their quantity, representation of different fabric and forms and other broad descriptive characteristics. More importantly, the assemblages will be interpreted according to possible functional evidence of how people lived and interacted with each other. This form of analysis is qualitative rather than quantitative, relying upon interpreting how artefacts are used in their social context.

Collection management policy

Artefact material recovered will be analysed in response to what is recovered and the research questions posed earlier. Analysis will be undertaken at Biosis' office at 8 Tate Street, Wollongong NSW.

Different retention methods and processing depending on its information potential will be undertaken. These will be decided once the excavation works have clarified the situation regarding artefacts.

A materials conservator will be engaged to assist in preparing artefact processing and storage protocols and for advice on recovery of delicate remains.

Hazardous materials will be recorded by photographs and discarded appropriately.

Building materials will be recorded photographically and catalogued and a small sample of items kept for further analysis and the remaining items discarded.

Once the scope of the artefact collection is established, a further discard policy will be developed in consultation with the Heritage Division, Department of Planning and Environment, identifying what materials are to be discarded, retained only as samples, retained for long-term storage and retained for possible display. Following confirmation of the policy, the collection will be culled and the remainder prepared for long-term storage at the responsibility of SIMTA.

As part of the Heritage Interpretation Plan required by the CoAs and REMMs, a selection of artefacts that reflect the history and historical themes associated with Moorebank should be placed on display to the public. SIMTA will negotiate with relevant heritage groups (e.g. Liverpool Historical Society, Moorebank Heritage Group) to establish the preferred recipient of the permanent artefact collection regarding storage, conservation, curation and display of the collection. Should no permanent repository be identified at these historical societies, SIMTA will be responsible for identifying a permanent repository as part of the new development to house the final artefact assemblage.

2.4.7 Reporting

The report on the results of the non-Aboriginal archaeological investigation program, including recommendations (such as for further archaeological work), in consultation with the OEH (Heritage Division) and to the satisfaction of the Secretary, shall include, but not necessarily be limited to:

- Consideration of measures to avoid or minimise disturbance to archaeology, where archaeology of non-Aboriginal archaeological significance is found to be present.
- Where impacts cannot be avoided, recommendations for any further investigations for archaeology of historical archaeological significance.
- Management and mitigation measures to ensure there are no additional impacts due to pre-construction and construction activities.

To address the above points, Biosis will produce a non-Aboriginal archaeological assessment and investigation report for items MH PAD1, MH PAD2 and the CUST Hut which complies with the requirements of the OEH (Heritage Division). Dependent on the findings of the excavation, the final archaeological report will also include the following points:

- The compiled results of areas investigated and contexts or units encountered.
- A stratigraphic matrix and discussion of the sites phasing.
- GIS and CAD mapping where appropriate to illustrate the findings.
- A detailed description of the excavation results including discussion on phasing and possible land use.
- An artefact catalogue compiled on a commercially available computer database designed to reflect the research questions.
- A functional analysis of artefacts uncovered with reference to their provenance and pertinence to research questions.

- A synthesis of results to allow for comparison to other sites.
- Additional historical research to aid understanding of the archaeological evidence.
- A detailed interpretation of the results and addressing of the research questions.
- Illustration of significant artefacts in drawn or photographic form, and a photographic archive of excavation in progress.

A draft of the non-Aboriginal archaeological assessment and investigation report including all appendices will be submitted in Microsoft Word format to Liberty Industrial, SIMTA, OEH (Heritage Division) and the Secretary and will be subject to two rounds of comments.

The final report including all appendices and colour figures will be submitted as four hard copies, one bound copy and two electronic copies on CD, and will be provided to each of the above agencies and the Liverpool City Council local studies collection.

2.5 Public interpretation

Should substantial archaeological remains be encountered that are suitable for public display, a public open day will be organized in consultation with Liberty Industrial and SIMTA. If necessary, a program of public engagement will be undertaken that will consist of the dissemination information about the archaeological findings to print media, local radio stations, news (i.e. ABC, WIN News), identified Facebook pages, blogs and to members of local historical societies and veteran's organisations.

Given that the lack of public thoroughfares through the Moorebank IMT site the preparation of interpretive signs, leaflets and handouts are considered to have reduced effectiveness.

2.6 Unexpected recovery of state significant finds

If at any point state significant finds are encountered during the works, OEH (Heritage Division) will be notified and further discussion regarding consideration of appropriate interpretation will be undertaken.

2.7 Unexpected identification of Aboriginal objects or remains

None of the identified areas of excavation correspond with known Aboriginal sites or areas of potential that have been identified as part of the Aboriginal investigations associated with the project. Should aboriginal objects be identified then the unexpected finds protocols within the Construction Heritage Management Plan will be followed.

References

Davies and Buckley 1987, Archaeological procedures manual : Port Arthur Conservation and Development project.

Harris, Edward C.1979. Principles of Archaeological Stratigraphy. 40 figs. 1 pl. 136 pp. London & New York: Academic Press.

Navin Officer Heritage Consultants (2014) *Moorebank Intermodal Terminal – Aboriginal Heritage Assessment*, Chapter 20 prepared for Parsons Brinkerhoff.

Navin Officer Heritage Consultants (2014) *Moorebank Intermodal Terminal Aboriginal Heritage Assessment – Addendum Archaeological Subsurface Testing – MRSA2* prepared for Parsons Brinkerhoff.

Navin Officer Heritage Consultants (2015) *Moorebank Intermodal Terminal Aboriginal Heritage Assessment – Addendum Scarred Tree Assessment (MA6 and MA7)* prepared for Parsons Brinkerhoff.

Recommended Development Consent (Application No. SSD 5066), conditions B8 and B9.

Appendix A: Location of proposed excavations

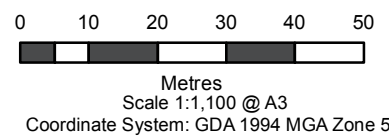


Figure A1: MHPAD1






Acknowledgements: Imagery (c) Nearmap 2014, Topo (c) NSW Land and Planning Information (2012), Source: All layers shown were manually digitised from image files provided by Liberty International. Locations should be regarded as indicative only.

Matter: 22906
 Date: 09 September 2016
 Checked by: ALA, Drawn by: ANP, Last edited by: aprichard
 Location: P:\22900s\22906\Mapping\22906_HHA_Appendix





Legend

-  Study area
-  Items of local significance
-  Extent of excavation

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Figure A2: MHPAD2



Acknowledgements: Imagery (c) Nearmap 2014, Topo (c) NSW Land and Planning Information (2012), Source: All layers shown were manually digitised from image files provided by Liberty International. Locations should be regarded as indicative only.

Matter: 22906
 Date: 09 September 2016
 Checked by: ALA, Drawn by: ANP, Last edited by: aprichard
 Location: P:\22900s\22906\Mapping\22906_HHA_Appendix

0 3.5 7 10.5 14 17.5

Metres
 Scale 1:350 @ A3
 Coordinate System: GDA 1994 MGA Zone 56