MOOREBANK INTERMODAL COMPANY

Moorebank Intermodal Terminal Project Environmental Impact Statement

Volume 8

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PARSONS BRINCKERHOFF

Technical Paper 11
European Heritage Impact Assessment

Technical Paper 11 – European Heritage Impact Assessment

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Moorebank Intermodal Terminal

European Heritage Assessment

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EXECUTIVE SUMMARY

INTRODUCTION

In May 2010 the Australian Government tasked the (Commonwealth) Department of Finance and Deregulation (DoFD) now the Department of Finance (DoF) to conduct a Feasibility Study into the potential development of an intermodal terminal (IMT) at Moorebank in south western Sydney. The Government has determined that the SME will relocate to new purpose-built facilities at the nearby Holsworthy Barracks with the move to be completed by around mid-2015.

In April 2012 the Australian Government committed to development of the Moorebank Intermodal Terminal (IMT) Project after reviewing the findings of a detailed business case for the facility (CDFD Feb. 2012). The Project is subject to planning approval with an Environmental Impact Statement due to be displayed late in 2012 to enable public feedback. Both Federal and NSW planning approvals are being sought.

Navin Officer Heritage Consultants Pty Ltd (NOHC) was commissioned in 2010 by Parsons Brinckerhoff to undertake a cultural heritage assessment for the Moorebank Defence precinct on behalf of the DoFD as part of the Environmental Impact Statement (EIS) for the Project.

The Moorebank Intermodal Terminal (IMT) Project (the Project) involves the development of approximately 220 hectares (ha) of land at the Project site (refer to Figure 1.1) for the construction and operation of an IMT and associated infrastructure, facilities and warehousing. The Project includes a rail link connecting the Project site to the Southern Sydney Freight Line (SSFL) and road entry and exit points from Moorebank Avenue.

The primary function of the IMT is to be a transfer point in the logistics chain for shipping containers and to handle both international IMEX cargo, and domestic interstate and intrastate (regional) cargo. The key aims of the Project are to increase Sydney's rail freight mode share including: promoting the movement of container freight by rail between Port Botany and western and south-western Sydney; and reducing road freight on Sydney's congested road network.

The Project proponent is Moorebank Intermodal Company (MIC), a Government Business Enterprise set up to facilitate the development of the Project.

The Project site is currently largely occupied by the Department of Defence's (Defence) School of Military Engineering (SME). Under the approved Moorebank Units Relocation (MUR) Project, the SME is planned to be relocated to Holsworthy Barracks by mid-2015, which would enable the construction of the Project to commence.

The key features/components of the Project comprise:

- *an IMEX freight terminal* – designed to handle up to 1.05 million TEU per annum (525,000 TEU inbound and 525,000 TEU outbound) of IMEX containerised freight to service 'port shuttle' train services between Port Botany and the Project;

- *an Interstate freight terminal* – designed to handle up to 500,000 TEU per annum (250,000 TEU inbound and 250,000 TEU outbound) of interstate containerised freight to service freight trains travelling to and from regional and interstate destinations; and

- *warehousing facilities* – with capacity for up to 300,000 square metres (m^2) of warehousing to provide an interface between the IMT and commercial users of the facilities such as freight forwarders, logistics facilities and retail distribution centres.

The proposal concept described in the main EIS (refer Chapters 7 and 8) provides an indicative layout and operational concept for the Project, while retaining flexibility for future developers and operators of the Project. The proposal concept is indicative only and subject to further refinement during detailed design.

The Project is subject to both Commonwealth and NSW State Government approvals, and this Environmental Impact Statement (EIS) has been prepared to support applications for both approvals (EPBC number 2011/6086 and SSD-5066).

APPROACH

This European (non-Aboriginal) heritage impact assessment comprised an assessment heritage significance and heritage impacts for individual items and of the Moorebank IMT site as a whole. The assessment included consideration of the cultural landscape and social heritage values, a literature and database review, field survey and archaeological test excavations. Recommendations for mitigation of identified impacts are also provided.

EXISTING ENVIRONMENT

The landscape of the proposed IMT has been transformed by a sequence of human land use practices and cultural processes. These have successively changed the landscape, many removing evidence of past phases. The sequence of human land use is defined as:

- Pre-European
- The Moorebank and Collingwood Estates
- Military use and land tenure up to World War II
- World War II
- Post War 1940s and 50s
- 1960s and 1970s
- 1980s onwards

The study defined and characterised the existing heritage landscape across four precincts and identified key archaeological features within the proposed Moorebank IMT site. In summary these comprise the following:

Precincts

- Precinct 1: Defence and private land north of Bapaume Road
- Precinct 2: Moorebank Base Administration Support Centre (BASC)
- Precinct 3: Defence Support Group (DSG)
- Precinct 4: School of Military Engineering (SME) – Steele Barracks.

Archaeological features

Ten archaeological features are recorded in the IMT study area:

- MH1 - Dog Cemetery
- MH2 - Drainage ditches (military origin)
- MH3 - Portion of light rail (not in situ)
- MH4 - Portion of light rail (not in situ)
- MH5 - Large above ground concrete slab (military origin)
- MH6 - Commemorative garden
- MH7 – Liverpool Golf Course
- CUST Hut
- RAAF STRARCH Hangar
- Building 99 (B99)

Potential archaeological deposits

Three potential archaeological deposits (MHPAD1, 2 and 3) have been identified at the location of former structures or facilities. One existing structure has been identified with an associated potential for archaeological deposits (the CUST Hut). An archaeological testing program was undertaken to further investigate and characterise the areas of potential archaeological deposits and to enable an assessment of significance to be undertaken.

SIGNIFICANCE ASSESSMENT

The Moorebank IMT project area, including the Moorebank Cultural Landscape and the components of the natural, built and archaeological landscape that comprise it, have been assessed against the NSW and CHL assessment criteria. The Moorebank Cultural Landscape and many of its constituent elements have been identified as having significance against both sets of criteria.

The following table is a summary of European cultural heritage elements within the project area, grouped according to their respective predicted significance ranking post Moorebank Unit Relocation project.

COMMONWEALTH	STATE	LOCAL	NIL
• Moorebank Cultural Landscape • CUST Hut • RAAF STRARCH Hangar • Remaining elements of the RAE Museum Sandstone Wall • MHPAD1 • MHPAD2 • MAPAD2 (Unit 1) • MAPAD2 (Unit 2) • MH1 • MH6 • Remaining elements of the RAE Chapel	• CUST Hut • RAAF STRARCH Hangar	• Moorebank Cultural Landscape • CUST Hut • RAAF STRARCH Hangar • Remaining elements of the RAE Museum Sandstone Wall • B99 • MHPAD1 • MHPAD2 • MAPAD2 (Unit 1) • MAPAD2 (Unit 2) • MH1 • MH6 • Remaining elements of the RAE Chapel	• MH 3-4 • MHPAD3 • MH2 • MH5 • MH7

MOOREBANK IMT PROJECT IMPACTS

The Project would have impacts on European heritage items within and adjacent to the proposed construction footprint. The general requirements included in the EARs specify that the heritage assessment must consider impacts from vibration, demolition, archaeological disturbance, altered historical arrangements and access, landscape and vistas, and architectural noise treatment.

In line with the requirements of the EARs all impacts are assessed against a post-MUR heritage landscape, i.e. they consider the impacts of the Moorebank IMT on the residual heritage environment left following the completion of the MUR.

Anticipated direct impacts within the residual landscape and the elements that comprise it would consist of:

- building, garden and memorial demolition;
- disturbance to archaeological deposits;
- destruction of the landscape setting and vistas;
- loss of and/or reduced historical associations;
- loss of existing internal street layouts and associated names; and
- loss of access to these items.

There are five items located adjacent to the Project area listed on the Liverpool City Council Local Environmental Plan (LEP) and other heritage registers considered as potentially being subject to indirect impacts as a result of the proposed Moorebank IMT. These comprise:

- Kitchener House;
- Glenfield Farm;
- the former Casula Power Station, located on the western side of the Georges River to the Project area;
- railway viaduct, Main Southern Railway Line (item 12), located adjacent to Woodbrook Road, Casula; and
- railway viaduct, Main Southern Railway Line (item 11), located approximately 200 m south of the former Casula power station.

In each case the Project may have negligible impacts on the visual context and landscape setting of the listed items as a result of the construction of buildings or structures within the proposed Moorebank IMT site or associated with one of the potential rail access alignment options..

Rail access options

The impacts from the internal Project layouts for each rail option are much the same across all options and will result in the loss of all heritage items and values.

Northern option

Potential exists for disturbance to MHPAD2 (Unit 2) deposits across this area and depending upon the nature of site preparation works, there may be disturbance to some sections of the MHPAD2 (Unit 1) deposits in this area.

The northern rail access option will also be connecting with the SSFL and the northern rail option connection is directly adjacent to heritage item *Railway viaduct, Main Southern Railway Line (item 12)*. The Project will not result in any additional direct impacts to this item compared with the construction of the SSFL. Indirect impacts may occur during construction of the rail connection through inadvertent impacts.

Central option

Surface survey undertaken in 2014 and documented in NOHC 2014a and b indicates that it is likely that flood deposits on the western bank of the Georges River may be similar to what was found during the northern powerhouse land testing; therefore this Project option will impact upon areas of predicted archaeological sensitivity that may have relevance in terms of historical heritage values.

The central rail access option will be connecting with the newly constructed Southern Sydney Freight line (SSFL) this line is directly adjacent to the Main Southern Railway Line (passenger line). The central rail option connection is directly adjacent to heritage item *Railway viaduct, Main Southern*

Railway Line (item 11). The Project will not result in any additional direct impacts to this item compared with the construction of the SSFL. Indirect impacts may occur during construction of the rail connection through inadvertent impacts.

Southern option

The southern option will not directly impact upon any areas of archaeological sensitivity however this option is adjacent to an item on the State Heritage Register, Glenfield Farm, and may have indirect impacts on this site (addressed above).

MITIGATION RECOMENDATIONS

Given that the proposed impacts to European heritage have the potential to result in the total loss of heritage values, a range of mitigation strategies have been proposed. These include:

- Archival recording;
- Interpretation;
- Salvage of archaeological deposits;
- Relocation; and
- Adaptive reuse.

Effectiveness of mitigation measures

In terms of effectiveness, the proposed mitigation measures will account for the majority of the Moorebank IMT impacts to European heritage. All items identified as having high social significance will be relocated by the MUR project, and all archaeological deposits identified as having research potential will be salvaged.

Residual heritage values at the former SME site following the completion of the MUR project include the Dog Cemetery (MH1), Commemorative Garden (MH6), CUST Hut, Transport Compound Workshop (B99) and RAAF STRARCH Hangar. Whilst their value in terms of the social context within which they sit will have been diminished by the MUR project actions, these items still retain value and meet criteria for Commonwealth Heritage Listing as well as Local and/or State levels of significance against NSW criteria as example of technology or as a point of historical interest. These items would all be demolished to make way for the proposed Moorebank IMT development.

Mitigation recommendations to address both direct and indirect impacts resulting from the proposed Moorebank IMT include:

- Further consideration is given to options for the retention and/or relocation and adaptive reuse of the CUST Hut and the RAAF STRARCH Hangar to mitigate impacts on heritage values associated with these structures and their broader cultural landscape context. The first preference would be to retain and adaptively reuse these items on the redeveloped Project Site (within the precinct but outside the secure area, as part of the administrative facilities or similar). If this is not feasible or practicable, the second preference would be for relocation to another appropriate location, potentially with adaptive reuse;

- Archival recording of all items of Commonwealth, State and Local significance will be required prior to any impact. This would include recording of salient physical aspects of the Moorebank Cultural Landscape;

- The European heritage interpretation strategy would be developed in close consultation with local historical societies, former and current staff and military personnel. The strategy could consider combining both European and Aboriginal interpretation within the Project area;

- No impacts should occur within the PAD boundaries of MHPAD1 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;

- In addition to archival recording of the Transport Compound Workshop (B99) consideration is given during the detailed design stage for the *in-situ* conservation or adaptive reuse of this structure within the Project. This would assist with mitigation of heritage impacts to the structure itself and the Moorebank Cultural Landscape as a whole;

- In addition to archival recording, the Dog Cemetery (MH1) is repositioned and the individual graves reinterred. This would be carried out in accordance with the wishes of the SME's Explosive Detection Dogs unit and respecting the social value of the site;

- In addition to archival recording consideration is given during the detailed design stage for the *in-situ* conservation of the Commemorative Garden (MH6). If *in-situ* conservation is not possible the plaques and planting should be relocated to an alternate location within public space within the Project;

- If the central rail access option is to go ahead Heritage item *Railway viaduct, Main Southern Railway Line (item 11)* should be noted on all plans and maps during construction and all care taken to avoid this item.

- If the southern rail access option is to go ahead heritage item *Railway viaduct, Main Southern Railway Line (item 12)* should be noted on all plans and maps during construction and all care taken to avoid this item.

- The unanticipated discoveries protocol at Appendix 7 would be followed in the event that historical items or relics or suspected burials are encountered during excavation works; and

- The unanticipated discoveries protocol at Appendix 7 would be followed in the event that historical maritime items or relics are encountered during bridge works within the Georges River.

These recommendations would be implemented in combination with those set out in the Aboriginal cultural heritage assessments for the Project (NOHC 2014a and b).

GLOSSARY AND ABREVIATIONS

CUST	Cullen Universal Steel Truss
Defence	Department of Defence
SEARs	Secretary's Environmental Assessment Requirements
DoE	(Commonwealth) Department of the Environment
DoF	Department of Finance
DoFD	Commonwealth) Department of Finance and Deregulation
EIS	Environmental Impact Statement
EM&A	Eric Martin and Associates
g	grams
ha	hectares
IMT	Intermodal Terminal
LCC	Liverpool City Council
LEP	local environmental plan
MIC	Moorebank Intermodal Company
MUR	Moorebank Units Relocation
NOHC	Navin Officer Heritage Consultants Pty Ltd
OEH	Office of Environment and Heritage
P&E	NSW Department of Planning and Environment
PAD	potential archaeological deposit
RAAF	Royal Australian Air Force
RAE	Royal Australian Engineers
SME	School of Military Engineering
SSD	State significant development
SSFL	Southern Sydney Freight Line
WWI	World War I
WWII	World War II

archaeological feature	a collection of one or more contexts representing some human non-portable activity that generally has a vertical characteristic to it in relation to site stratigraphy for example structural features, activity areas/surfaces, middens, pits and post holes
artefact	something made or given shape by man, such as a tool

bioturbation	is the reworking of soils and sediments by animals or plants
excavation	in archaeology, excavation is the exposure, processing and recording of archaeological remains.
trench	is a type of excavation or depression in the ground that is generally deeper than it is wide
Forensic Anthropology	generally the application of the science of anthropology in a legal setting—most often physical anthropology including the identification of burials and skeletal remains
Harris Matrix	a tool used to depict the the sequence of deposition on a archaeological site
in situ	a Latin phrase that translates literally to 'In position' In archaeology, in situ refers to an artifact that has not been moved from its original place of deposition.
Relic	the NSW Heritage Act (1977) defines a relic as any deposit, artefact, object or material evidence that: (a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and (b) is of State or local heritage significance.
stratigraphic units	based on soil stratigraphy layer of sediment or archaeological deposit
test excavation	purpose of test excavation is to determine the extent and characteristics of archaeological potential in a given area before extensive excavation work is undertaken
transect	a straight path within a test excavation area used to observe a sample of the area through surface observation or excavation. For this project a transect was a test excavation trench.

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1. INTRODUCTION

1.1 Project background

In May 2010 the Australian Government tasked the (Commonwealth) Department of Finance and Deregulation (DoFD) now the Department of Finance (DoF) to conduct a Feasibility Study into the potential development of an intermodal terminal (IMT) at Moorebank in south western Sydney. The IMT site is currently occupied by the Department of Defence (Defence) including the School of Military Engineering (SME) to the west of Moorebank Avenue. The Government has determined that the SME will relocate to new purpose-built facilities at the nearby Holsworthy Barracks with the move to be completed by around mid-2015.

Navin Officer Heritage Consultants Pty Ltd (NOHC) was commissioned in 2010 by Parsons Brinckerhoff to undertake a cultural heritage assessment for the Moorebank Defence precinct on behalf of the DoFD as part of the Environmental Impact Statement (EIS) for the Project.

The results of interim heritage studies conducted to date (surface & built environment), including field survey, the identification and assessment of heritage values, and a review of potential development constraints, have been reported in two preliminary reports:

- A scoping report which presented a summary of known and potential constraints based on a desktop review (NOHC 2011); and
- A report on existing Aboriginal and European Heritage (CDFD Aug 2011) which supported a Preliminary Project Environmental Overview (CDFD 2011).

In April 2012 the Australian Government committed to development of the Moorebank Intermodal Terminal (IMT) Project after reviewing the findings of a detailed business case for the facility (CDFD Feb. 2012). The Project is subject to planning approval with an Environmental Impact Statement due to be displayed late in 2012 to enable public feedback. Both Federal and NSW planning approvals are being sought.

The Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) has determined that the Moorebank IMT Project is a Controlled Action requiring the development of an EIS for assessment and approval under the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).* The Commonwealth has lodged a submission under the EPBC Act and elected to make a submission under Part 4.1 of the New South Wales *Environmental Planning and Assessment Act 1979* EP&A Act. Pursuant to the provisions of S 83(B) of the EP&A Act, a staged development application is proposed. This application is for a Stage 1 development application for the entire IMT. A staged development application sets out the concept proposals for the development of a site for which detailed proposals for separate parts of the site are to be the subject of subsequent development applications.

In May 2014, the NSW Department of Planning and Environment (P&E) issued Secretary's Environmental Assessment Requirements (SEARs) for the Project.

The report was commissioned by Parsons Brinckerhoff.

1.2 The Project site

The Project is situated on land in the Sydney suburb of Moorebank, NSW (refer Figure 1.1). The Project Site is approximately 220 hectares (ha) in area, and is located within a locality that includes the residential suburbs of Casula, Wattle Grove and North Glenfield, as well as industrial, commercial and Defence land.

The Project would provide connectivity to Port Botany by rail, and would connect to major regional and interstate roads and highways via the M5 and M7 Motorways.

Three separate rail access options are included as part of the proposal concept as detailed in this EIS, as shown in Figure 1.1. These options comprise:

- *northern rail access option* — with rail access from the north-western corner of the IMT site, passing through the former Casula Powerhouse Golf Course (which is currently owned by Liverpool City Council (LCC)) and crossing the Georges River and floodplain;

- *central rail access option* — with rail access from the centre of the western boundary of the IMT site, passing through Commonwealth land on the western bank of the Georges River (referred to as the 'hourglass land'); and

- *southern rail access option* — rail access from the south-western corner of the IMT site, passing through the Glenfield Landfill site (owned by Glenfield Waste Services) and crossing the Georges River and floodplain.

1.3 Planning and assessment process

The Project is subject to both Commonwealth and NSW State Government approvals, and this Environmental Impact Statement (EIS) has been prepared to support applications for both approvals (EPBC number 2011/6086 and SSD-5066). The Project is a 'controlled action' under the (Commonwealth) *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Therefore, MIC is seeking approval for the construction and operation of the Project from the (Commonwealth) Department of the Environment (DoE) under Part 9 of the EPBC Act.

Under the (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act), MIC is seeking a staged development approval for the Project as State significant development (SSD). At this stage, MIC is seeking Stage 1 SSD development approval for the proposal concept (as described in EIS) from NSW Planning and Infrastructure (NSW P&E) under Part 4, Division 4.1 of the EP&A Act (hereafter referred to as the Stage 1 SSD development approval). The Stage 1 SSD development approval application also includes a package of 'early works' that comprises remediation, clean-up and demolition or relocation of existing buildings, and establishment of a conservation area. This EIS is seeking approval for these early works without the need for any further approvals. Subject to Stage 1 SSD development approval being received, the Project (with the exclusion of the early works) will be subject to further development applications and environmental assessment under the EP&A Act (hereafter referred to as the Stage 2 SSD development approvals).

In 2011 NOHC undertook a cultural heritage desktop study of the Project and identified three areas of potential archaeological deposit (PAD) relating to early twentieth century military activities including accommodation and training areas with the Project area. These areas are Moorebank Historical potential archaeological deposit 1 - 3 (MHPAD1 - 3). The NOHC assessment and the Commonwealth Department of Finance and Deregulation (CDFD) *Preliminary Project Environmental Overview* identified the need to assess any potentially occurring archaeological resource in the Project area. The conduct of the subsurface testing program was required as part of the cultural heritage component of the Environmental Impact Statement for the Project.

A methodology for subsurface testing of MHPAD1, MHPAD2 and MHPAD3 (Figure 1.2) was prepared by NOHC (2012), in accordance with the Director Generals Requirements for the Project (SSD – 5066) (Appendix 8). These specify that the research designs and methodologies proposed for any physical archaeological works to be undertaken as part of initial heritage assessments should be

reviewed by: the NSW Department of Planning and Infrastructure (P&E) and the Heritage Branch of the Office of Environment and Heritage (OEH) and the Heritage Council of New South Wales.

The conduct of the subsurface testing program at MHPADs 1-3, its results and analysis are documented in this report as part of the Environmental Impact Statement (EIS) for the Project.

1.4 Environmental impact assessment requirements

This Technical Paper has been prepared by Navin Officer Heritage Consultants to address environmental impact assessment requirements of both the Commonwealth Government under the EPBC Act (the 'Final EIS Guidelines'); and the NSW Government under the EP&A Act ('the Secretary's Environmental Assessment Requirements (SEARs)')

Specifically this Technical Paper addresses the requirements outlined in the Table 1.1.

Table 1.1 EIS requirements addressed within this Technical Paper

Requirement	Where addressed in the technical Report Section #
EPBC Act – Final EIS Guidelines	
Provide description of the existing environmental values including .... historical ... values, of the site which may be affected by the proposal.	4, 5, 6, 7 and 8
identify, describe and map places or items of historical heritage value. Describe the significance of the values to people or groups associated with those places.	4, 5, 6, 7, 8, and 9; Appendices 1 and 4
Provide a comprehensive heritage assessment of the impacts the proposed action will have on any items with historical heritage values.	10 and Appendix 5
NSW EP&A Act - SEARs	
Outline the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of the mitigation measures) generally consistent with the guidelines in the *NSW Heritage Manual* (1996).	12 and 13 and Appendix 5
Be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed, the relevant consultant must meet the NSW Heritage Council's Excavation, Director criteria)	3, 9 and Appendix 8
Include a statement of heritage impact for all heritage items (including significance assessment) This should include detailed mapping of all heritage items and how they are affected by the proposal including actual or residual heritage impacts arising from pre-cursor or ancillary activities or projects (such as early works, decontamination, demobilisation or relocating the School of Military Engineering from the site)	Appendices 4 and 5

Requirement	Where addressed in the technical Report Section #
Include details of any proposed mitigation measures (architectural and landscape)	14
Consider impacts from vibration, demolition, archaeological disturbance, altered historical arrangements and access, landscape and vistas, and architectural noise treatment.	10 and Appendix 5
Develop an appropriate archaeological assessment methodology, including research design, in consultation with the Department and the Heritage Council of New South Wales, to guide physical archaeological test excavations and include the results of these excavations.	3, and 8; Appendices 2, 3 and 8
Provision of future mitigation strategies for all identified archaeological impacts that would arise from the project	14

1.5 This report

1.5.1 Outline

This report:

- documents the Project background (Section 1);
- describes the proposed development (Section 2);
- describes the methodology employed including the aim of the excavation, field procedures, laboratory analysis and treatment of artefacts (Section 3);
- provides a heritage context for the study area including historical research and existing heritage listings (Section 4);
- describes the results of the field survey (Section 5);
- describes the predictive assessment of the bed of the Georges River (Section 6);
- provides an analysis of the built environment (Section 7);
- provides an analysis of the excavation results and responses to research questions (Section 8);
- provides a significance assessment against NSW and CHL criteria for individual items and the study area as a whole (Section 9);
- provides an assessment of heritage impacts for all heritage items (Section 10);
- provides information relating to statutory and policy context (Section 11);
- provides mitigation and management strategies based on the results of the investigation (Section 12);
- provides recommendations for all heritage items (Section 13); and

- provides bibliographic details for all references (Section 14).

1.5.2 Copyright

Copyright to this report rests with Parsons Brinckerhoff except for the following:

- the Navin Officer Heritage Consultants logo and business name (copyright to this rests with Navin Officer Heritage Consultants Pty Ltd);
- generic content and formatting which is not specific to this Project or its results (copyright to this material rests with Navin Officer Heritage Consultants Pty Ltd);
- descriptive text and data relating to heritage items which must, by law, be provided to OEH for its purposes and use;
- information which, under Australian law, can be identified as belonging to Indigenous intellectual property;
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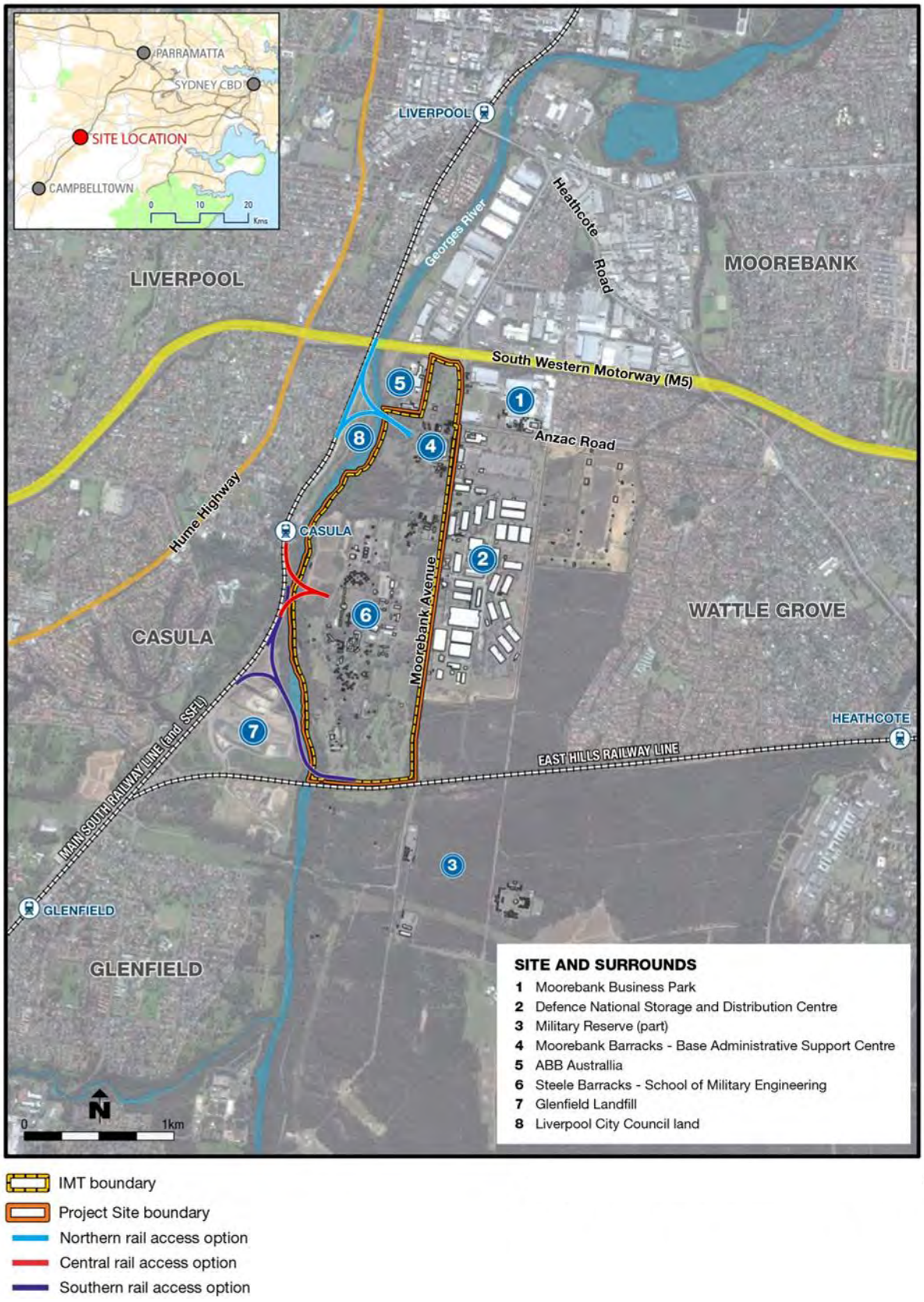

Figure 1.1 Project site and context

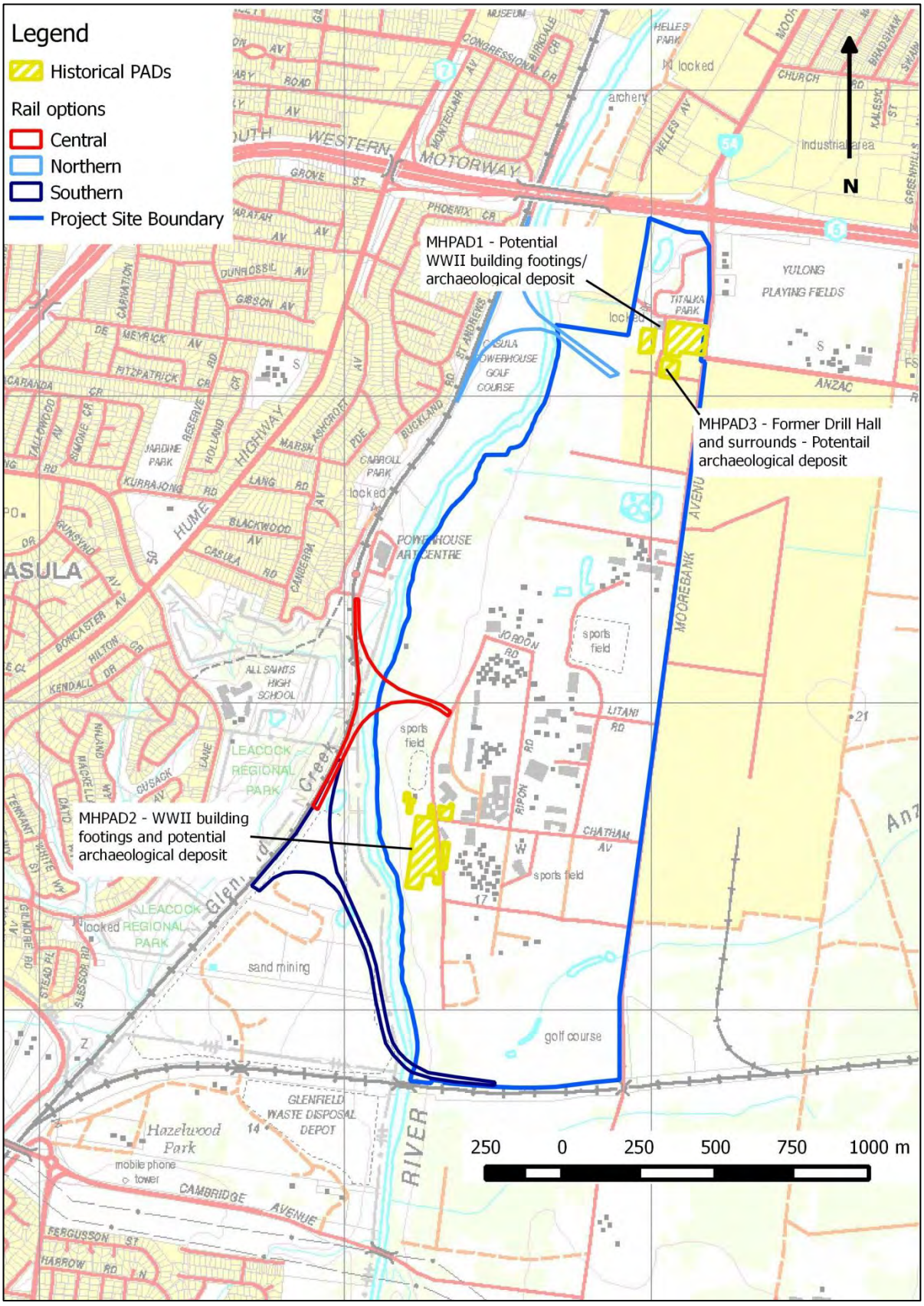

Figure 1.2 Location of European PADs

2. PROPOSED DEVELOPMENT

The Moorebank Intermodal Terminal (IMT) Project (the Project) involves the development of approximately 220 hectares (ha) of land at the Project site (refer to Figure 1.1) for the construction and operation of an IMT and associated infrastructure, facilities and warehousing. The Project includes a rail link connecting the Project site to the Southern Sydney Freight Line (SSFL) and road entry and exit points from Moorebank Avenue.

The primary function of the IMT is to be a transfer point in the logistics chain for shipping containers and to handle both international IMEX cargo, and domestic interstate and intrastate (regional) cargo. The key aims of the Project are to increase Sydney's rail freight mode share including: promoting the movement of container freight by rail between Port Botany and western and south-western Sydney; and reducing road freight on Sydney's congested road network.

The Project proponent is Moorebank Intermodal Company (MIC), a Government Business Enterprise set up to facilitate the development of the Project.

The Project site is currently largely occupied by the Department of Defence's (Defence) School of Military Engineering (SME). Under the approved Moorebank Units Relocation (MUR) Project, the SME is planned to be relocated to Holsworthy Barracks by mid-2015, which would enable the construction of the Project to commence.

The key features/components of the Project comprise:

- *an IMEX freight terminal* – designed to handle up to 1.05 million TEU per annum (525,000 TEU inbound and 525,000 TEU outbound) of IMEX containerised freight to service 'port shuttle' train services between Port Botany and the Project;
- *an Interstate freight terminal* – designed to handle up to 500,000 TEU per annum (250,000 TEU inbound and 250,000 TEU outbound) of interstate containerised freight to service freight trains travelling to and from regional and interstate destinations; and
- *warehousing facilities* – with capacity for up to 300,000 square metres (m^2) of warehousing to provide an interface between the IMT and commercial users of the facilities such as freight forwarders, logistics facilities and retail distribution centres.

The proposal concept described in the main EIS (refer Chapters 7 and 8) provides an indicative layout and operational concept for the Project, while retaining flexibility for future developers and operators of the Project. The proposal concept is indicative only and subject to further refinement during detailed design.

2.1 Rail access options and layouts

The Project is intended to connect to the SSFL, which was commissioned in January 2013 within the Main South Railway Line corridor. The SSFL connects Port Botany to west and south-western Sydney, and would provide a direct route for freight trains from Port Botany to the Project site.

In order to maintain flexibility for future developers and operators of the Project, the proposal concept, as presented in this EIS, provides three indicative IMT internal layouts; one for each of three proposed rail access options. Once the selected developer/operator has been appointed, the Project would progress to the detailed design phase and one of the three rail access options identified above would be selected.

2.2 Indicative Project development phasing

The Project is proposed to be phased (staged) in its development, as summarised in Figure 2.1. The proposed indicative phasing includes both construction and operational phases, which are likely to overlap at certain times. For the purposes of assessment of the Project, five Project development phases have been identified and detailed in this EIS. These are indicative only, but illustrate the type of construction and operation activities that would occur over time at the Project site.

The Project would likely commence in 2015 with the Early Works development phase and would progress with concurrent construction and operation through to the Project Full Build Phase (operation of full IMEX terminal, warehousing and interstate terminal) by approximately 2030.

The development phasing is proposed in line with the forecast market demand for processing of containers through the Project.

2.3 Road access to the site

Freight trucks would access the Project site from Moorebank Avenue, via the M5 Motorway. Trucks would then access the M7 Motorway and Hume Highway by the M5 Motorway. An upgrade to Moorebank Avenue would be included as part of the first phase of Project development (Project Phase A) to enable safe and efficient access to the Project site.

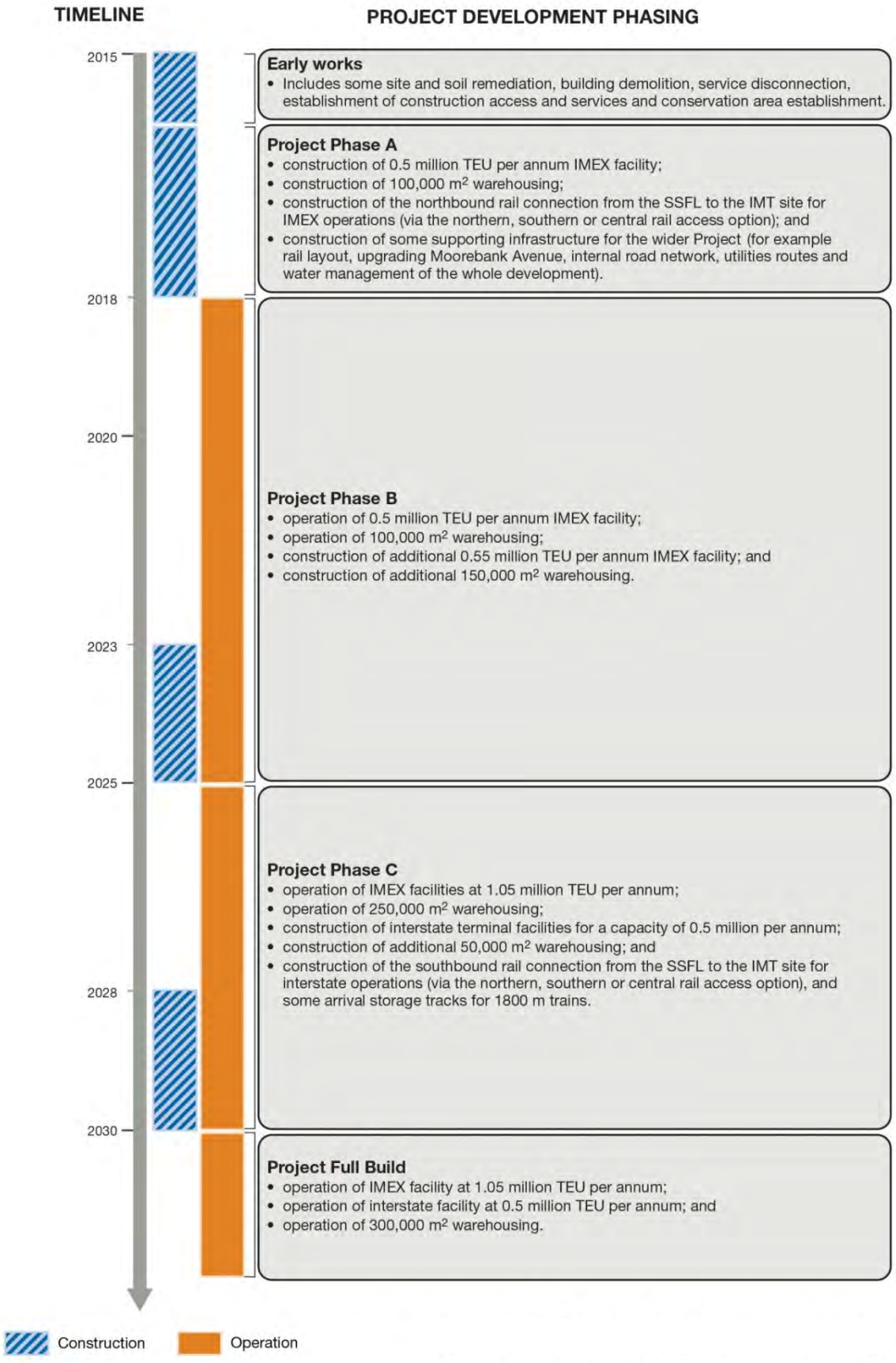

Figure 2.1 Project development phasing

3. STUDY METHODOLOGY

3.1 Contributors

Preliminary field surveys were undertaken by Kelvin Officer and Adrian Cressey in December 2010 and historical research for the preliminary investigations was conducted by Brendan O'Keefe and Kelvin Officer.

Additional field survey was undertaken by Rebecca Parkes and Adrian Cressey in February 2013.

The excavation methodology and research design was developed by Rebecca Parkes and Kelvin Officer.

Test excavations were directed by Rebecca Parkes, field assistants included Samantha Harper, Deirdre Lewis-Cook, Nicola Hayes, Thomas Knight and Joanne Dibden.

Specialist advice regarding military archaeology was provided in the field by David Pearson, who also conducted additional research at the Australian Army Museum of Military Engineering (AAMME) with assistance from Philip Hurren.

Denise Donlon provided a specialist report on a dental crown recovered during excavations (Appendix 4).

Field inspection of the central and southern rail corridor options was undertaken by Rebecca Parkes and Anthony Barham.

This report has been prepared by Rebecca Parkes, Kelvin Officer, Nicola Hayes and Damian Tybussek.

3.2 Land access and scope of assessment

The area subject to assessment consists of the lands and Defence property that would potentially be directly impacted by the construction and operation of the proposed Moorebank intermodal terminal. This is collectively defined as the Project area, the boundaries of which are presented in Figure 3.1. These lands and the corresponding scope of the assessment are:

- the Defence lands situated to the east of the Georges River, owned and managed by the Commonwealth;
- land to the west of the Georges River, owned and managed by the Liverpool City Council;
- the Glenfield Landfill site;
- Commonwealth land on the western bank of the Georges River; and
- a small portion of the Georges River, being unalienated Crown land.

The assessment of the Defence lands has been comprehensive and based on a review of archival sources and existing information, direct physical inspection, archaeological survey and test excavations.

The assessment of the Liverpool City Council land and Commonwealth land west of the Georges River has been comprehensive and based on a review of archival sources and existing information as well as direct physical inspection and archaeological survey. A program or Aboriginal archaeological test excavation n has been undertaken and reported in an addendum report to the Aboriginal heritage assessment for this Project (NOHC 2014a and b).

Glenfield Landfill was not able to be accessed for this assessment; therefore a desktop assessment of this area was undertaken.

The small portion of the bed of the Georges River was not directly surveyed for this assessment. The archaeological potential of this area was based on a review of historical source material, heritage registers and predictive analysis.

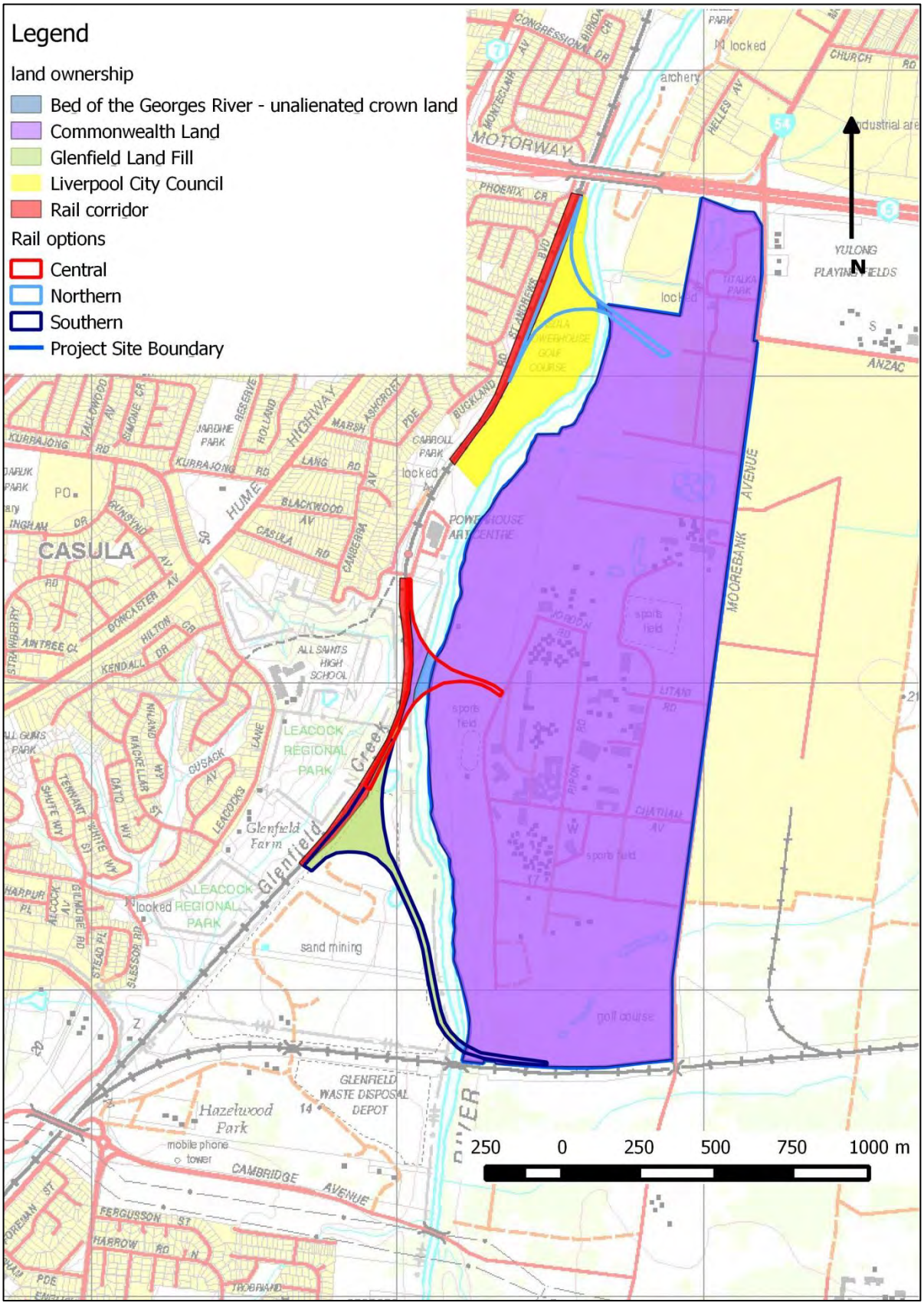

Figure 3.1 The Project area and various constituent land categories

3.3 Literature and database review

A range of archaeological and historical data was reviewed for the Moorebank Intermodal Terminal study area and its surrounds. This literature and data review was used to place the area within an archaeological and heritage management context. The review of documentary sources included heritage registers and schedules, local histories, and archaeological reports.

Documentary sources included regional and local histories, heritage studies and theses; parish maps; and where available, other maps, such as portion plans.

Searches were undertaken of the following statutory and non-statutory heritage registers and schedules:

- Statutory Listings:
    - World Heritage List;
    - The National Heritage List (Australian Heritage Council);
    - The Commonwealth Heritage List (Australian Heritage Council);
    - The State Heritage Register (NSW Heritage Branch, Office of Environment and Heritage);
    - Section 170 NSW State agency heritage register; and
    - Heritage Schedule(s) from the Liverpool City Council Local Environmental Plan 2008.
- Non-Statutory Listings:
    - The State Heritage Inventory (NSW Heritage Branch, Office of Environment and Heritage);
    - OEH Maritime Heritage Sites Database;
    - The Register of the National Estate (Australian Heritage Council);
    - Register of the National Trust of Australia (NSW); and
    - Australian Institute of Architects, Heritage Buildings List.

3.3.1 Historical research

An assessment of the heritage significance of the Project area was undertaken in 2004 as part of the Moorebank Defence Site Heritage Assessment. This report was prepared by Graham Brooks and Associates and covered a broader area. The assessment criteria applied in the 2004 report were as specified by the State government and for the Register of the National Estate. Neither of these sets of criteria is now applicable to the Project area, due to changes in legislation and Commonwealth jurisdiction. Despite this, the report is a professionally prepared assessment which is only eight years old. There has been little physical change to the site since its preparation. The report has been used as a reference source of factual and relevant information for the current study.

Eric Martin and Associates (EM&A 2011) were engaged by NOHC to prepare a built environment heritage assessment and management policies for the study area. This study used the information gained by Graham Brooks (2004). A site inspection of the study site was undertaken by Eric Martin and Associates on the 4th and 5th of November 2010. The study assessed the significance of the elements of the built environment and outlined conservation management policies for items if retained *in-situ*. The significance assessments against the Commonwealth Heritage List criteria prepared by EM&A have formed the basis for the significance assessments presented in this study.

An inspection of the Project area was conducted by Brendan O'Keefe on 1 December 2010, to complement his documentary research and development of a supporting historical background to the European heritage assessment.

3.4 Field survey

3.4.1 European heritage

The European (non-Aboriginal) heritage component was assessed as two components, the built environment (including all above ground structures), and the non-built environment (being an assessment of the potential for subsurface archaeological deposits).

The former assessment was conducted by Eric Martin and Associates (EM&A) and the latter by NOHC.

A site inspection was conducted by historian, Brendan O'Keefe, as part of the historical research component of the assessment (refer below).

3.4.1.1 The built environment

A site inspection was undertaken by Nicholas Goodwin of EM&A on 4-5 November 2010, with guidance from various Defence personnel as required for building access. The exteriors of all standing structures were inspected, with varying degrees of scrutiny and recording according to potential or previously determined significance.

There were a number of buildings and locations identified in the desktop study as having recognised or potential significance. These were inspected in more detail than other areas. Where access was open and unrestricted, the interior of a select number of buildings with known or suspected heritage significance were inspected. The recording of items included the use of photography, and basic site type, location and condition descriptions.

The built environment survey area was limited to the Project area excluding the LCC lands. A preliminary and broad-scale visual inspection from public easements was made of the LCC lands. Subsequent survey of the LCC lands in 2013 confirmed the absence of any built environment elements

The following limitations are noted regarding the European heritage inspections:

- As many of the buildings within the Project area are residential accommodation or contain restricted functions, site inspections were limited to the exterior of buildings except where buildings had either previously been identified as an item of cultural significance by existing registers or previous reports, or had been identified in the desktop study prior to the inspection as of potential heritage significance. This approach also enabled optimal use of time on site due to the large number of individual buildings on the study site.
- Plans of the majority of the buildings were not available.
- Buildings of similar design in the same site area have been assessed and described as a group, not individually e.g. Live-in Accommodation – Sergeant's, Buildings S76 to 106 at SME were constructed in 1995 to the same design.
- Inspections were non-intrusive. No fabric was removed to inspect concealed areas.
- Physical descriptions of buildings are general in nature and should not be interpreted as a condition assessment or structural report.
- Inspections were from the ground only and excluded roof cavity and sub floor areas.

3.4.1.2 The non-built environment

Archaeological field survey for the assessment of the European archaeological (subsurface) resource was conducted by NOHC personnel concurrently with the Aboriginal heritage field survey, and

separately in December 2010, February 2013 and May 2014. The 2010 survey encompassed the Defence owned land east of the Georges River, 2013 survey was focused on the Liverpool City Council land to the west of the river and the 2014 survey assessed the central and southern rail option areas excluding the Glenfield Landfill site. Survey involved inspection of areas with assessed potential for subsurface remains, and areas where historical sources indicated the former presence of structures.

The recording of items included the use of photography, and basic site type, location and condition descriptions.

3.5 Archaeological test excavation

The archaeological test excavation program was undertaken in August and September 2012.

The methodology for the subsurface testing program was developed in consultation with the NSW Department of Planning and Environment (P&E), and the Heritage branch of the NSW Office of Environment and Heritage (OEH). This was in keeping with the Director General's Environmental Assessment Requirements for the Moorebank Intermodal Terminal Project (SSD – 5066), which specified that, the research designs and methodologies for any physical archaeological works undertaken as part of initial heritage assessments should be reviewed by the P&E and the OEH Environmental Protection Authority.

3.5.1 Aims of excavation

The following is an indication of the information sought through test excavation:

- the heritage significance, if any, of the deposits at MHPAD1, MHPAD2 and MHPAD3;
- the structural history of the site, including the materials and construction methods used, the location and purpose of the structure(s), especially for those features not currently known or adequately identified;
- the historical sequence of European land use, in particular its use by the Department of Defence through the first half of the twentieth century;
- material culture, artefacts (ceramic, glassware, metal and masonry remains) that may provide:
    - an indication of the various uses of the site and/or details of the day-to-day lives of the people who worked or resided in the area; and
    - an insight into the origins of the material culture at the site and/or material possessions of the people who may have once worked or resided in the area.

3.5.2 Objectives and research questions

The primary objectives of the proposed test excavation program were to:

- conduct an investigation of sufficient scope, to gain a representative sample of the likely archaeological resource present.
- determine the nature and significance of any European archaeological evidence within the PAD areas;
- where necessary, determine appropriate strategies for the management of cultural heritage values related to any confirmed archaeological evidence, relative to the proposed Moorebank IMT development.

The test excavation program was directed at the following research questions:

- do traces of the known WWII buildings remain? Document and characterise to a level commensurate with the constraints of the testing regime and objectives.

- do traces of the WWI Isolation Camp remain? Document and characterise to a level commensurate with the constraints of the testing regime and objectives.

- what was the function of the U-shaped building in the north western portion of Titalka Park? Does the archaeological record confirm the documentary evidence for residential (married) quarters?

- are there subsurface deposits associated with the building footings observed at MHPAD2?

- if present, how intact are the deposits at MHPAD2 and what is their probable extent?

- do traces of Defence (or earlier) related structures or activities remain, which are not currently known from the documentary record?

- does the archaeological evidence have the potential to provide significant information which goes beyond, or falls outside of, that already known or which could reasonably be predicted, based on current knowledge and documentation of the period?

3.5.3 Excavation methods

The test excavation program employed both mechanical and by-hand methodologies. These methodologies were developed in consultation with the P&E through a series of meetings and research design reviews during July and August 2012. Following comments received (24 July 2013) from the P&E on a draft version of the research design, revisions were made by NOHC and the final version of the research design was submitted (Appendix 8).

The NSW Heritage Branch of the Office of Environment and Heritage has also been provided with the proposed methodology as part of this review process.

Following a meeting held with the P&E on 29 August 2012, an addendum to the research design was made in relation to additional investigations at MHPAD3 (Appendix 8).

Mechanical excavation was used at MHPAD1 and MHPAD3 to cut exploratory transects with the aim of exposing and tracing archaeological features. By-hand excavation was employed to further investigate identified features, as appropriate or warranted by the nature or fragility of the feature. By-hand excavation was also employed at MHPAD2, where there was clearer surface evidence for the presence of archaeological features. Excavation at MHPAD2 aimed primarily to confirm the presence and probable extent of subsurface deposits associated with the P1 buildings that were once located there.

Hand excavation was also employed for two test pits within relatively undisturbed garden areas at MHPAD3.

Progress of excavation and or spoil processing was dependent upon the presence of potential health risk or hazard to field workers. Examples included contaminated ground (primarily asbestos) and potential unexploded ordnance.

Figure 3.2 Commencement of Transect 1 at MHPAD1

3.5.3.1 Mechanical excavation methodology

A mechanical excavator with a 1000 mm straight edged bucket (Figure 3.2) was used to strip a series of ten exploratory transects across MHPAD1 (Transects 1-9) and MHPAD3 (Transect 1). These were achieved by the excavation of a series of scrapes (width of the bucket), up to the desired length. The length of each transect varied according to the area requiring testing, and the nature of any subsequent features encountered. The placement of each transect was determined according to an on-site appreciation of surface features, available historical mapping and aerial photography, and/or deposits and features encountered in previous transects.

Mechanical excavation involved the conduct of a series of shallow scrapes, each scrape or cut going down approximately 50 mm in depth. The surface of each scrape was inspected prior to excavation of additional scrapes. The final depth of each transect and part thereof varied according to the nature of the deposit and features exposed.

- following excavation of each transect scrape, the excavated area was inspected for the presence of cultural material and archaeological features such as post holes, building remains and rubbish pits, which were flagged for more detailed investigation/excavation following completion of mechanical excavation.

- where *in situ* artefacts or building remains were encountered, machine excavation was restricted such that no further machine activity occurred within an appropriate radius (nominally 1m) of this location until the extent of *in situ* deposits had been ascertained.

- areas of interest were cleaned by hand with trowels, hoes and brushes as necessary (refer to hand excavation methodology below).

- all identified features were photographed and mapped in detail, with site plans and levels linked to the site datum.

- all artefacts revealed by excavation were recorded and their locations cross referenced to the site plan; any loose items (i.e. dislodged by the machine) were collected and bagged accordingly[1].

[1] All artefacts/small finds were collected. Where building materials such as brick and concrete were encountered a sample was collected.

- a visual inspection of the excavated spoil was also conducted in order to check for additional archaeological material; any artefactual material identified in the spoil was collected and bagged accordingly.

- general notes and photographic records were kept for all works regardless of whether archaeological remains were encountered.

- once a test traverse had been cleared to a depth of 50 mm and any necessary by-hand excavation areas isolated, or completed, a subsequent cut of 50 mm was made using the same procedure outlined above. This was repeated, with recording and hand excavation conducted as required, until sterile deposits were encountered or the objectives of the testing program were achieved in that area. Further mechanical excavation did not proceed within areas of exposed *in situ* features, such as building foundations.

- the excavated area was backfilled with the excavated spoil.

3.5.3.2 By-hand excavation methodology

A by-hand excavation methodology was employed in the following instances:

- adjacent surface features at MHPAD2. In this instance, excavation trenches adjacent to a given feature did not exceed 2 m x 1 m, the aim being simply to clean up features for recording and confirm the presence of subsurface deposits;

- where surface features indicate the possible location of in situ and/or intact relics (such as the garden beds within MHPAD3); and

- where the mechanical methodology revealed features or in situ and/or intact relics that warrant (according to their nature or fragility) by-hand excavation.

At MHPAD2 excavation targeted adjacent three extant surface features. Information regarding the nature of deposits in these areas has been used to guide management decisions regarding the remainder of areas identified as being moderate to high archaeological potential at MHPAD2.

At MHPAD3 two areas of by-hand excavation were undertaken within remnant garden beds to the south of the former Drill Hall.

The by-hand excavation methodology employed across all three PADs was as follows:

- survey and map the micro-topography and all other features within the investigation area using an automatic level and photographic recording;

- survey and map any other relevant features in the immediate vicinity of the investigation area using an automatic level in conjunction with a tape and compass survey and photographic recording;

- collect surface/loose artefacts within the investigation area;

- conduct test excavation by hand across archaeological features, including intact structural features, activity areas/surfaces, middens, pits and post holes;

- record, through photographs and drawings, all archaeological features encountered

The detailed excavation procedure employed is outlined in the methodology that was reviewed by P&E (Appendix 8).

The following is a summary of the key elements:

- where excavation commenced without a preceding mechanical scrape, grass (where present) was removed by hand from the surface of the investigation area;
- test excavation in the targeted areas consisted of contexts defined either by stratigraphic units or arbitrarily defined units (whichever was smaller), such as:
    - Context 1 – Surface;
    - Context 2 – the turf layer to a depth of approximately 5 cm;
    - Context 3 – the friable root layer to about a depth of 10-15 cm; and
    - Context 4 – lower soil layer to about a depth of 15-25 cm.
- where discernible, stratified deposits were investigated as individual contexts;
- excavation was undertaken using trowels and handpicks;
- all excavated deposits were sieved through a 4 x 4 mm mesh, with use of a top 10 x 10 mm mesh where appropriate (subject to any safety constraints); and
- the excavated area was backfilled with the excavated spoil.

3.5.4 Additional excavation details

Excavations at MHPAD1 and MHPAD2 were conducted between 14 and 24 August 2012. Excavation at MHPAD3 was conducted between 12 and 14 September 2012.

All mechanical scrapes were conducted with a Yanmar VIO40 4 tonne excavator equipped with a 1000 mm straight edged bucket.

A 600 mm toothed bucket was also used to assist with removal of asphalt capping over Transect 1 at MHPAD3.

Transects at each site were numbered sequentially (Transect1, 2, 3 etc.) and a bearing recorded from south to north or west to east as appropriate. Each metre along the transect was assigned a number starting at “1” at the southern or western end (e.g. finds from a point 33.5 m along a transect were labelled as Square 34). Each scrape or cut within a given transect was numbered sequentially with “1” being the first cut (0-50 mm).

Surface artefacts were also collected from areas immediately adjacent excavation areas at MHPAD2.

Hand excavation squares within the test transects were numbered according to the above system and context numbers assigned according to the stratigraphic context of deposits being excavated.

All hand excavation squares were assigned alphanumeric labels based on an arbitrary grid with letters A-Z or AA-AZ (as appropriate), running west to east with numbers increasing from south to north (e.g. D25 or AG7).

Levels were taken across all excavation areas with a Leica NA270 Automatic Level and included, as a minimum, start and finish levels for all transects, start and finish levels for every by-hand excavation context and representative cross sections across additional site components as required to demonstrate the nature of site topography.

Section drawings were also produced for various features within both the mechanical test areas and the by-hand excavation pits.

A photographic record was kept of all excavations; a summary catalogue of images is provided at Appendix 2.

3.6 Laboratory analysis

All artefacts recovered during excavation were transported to Canberra for analysis.

This process involved cleaning artefacts when necessary and then sorting them into six material categories:

- ceramics;
- glass;
- metal;
- bone;
- miscellaneous; and
- samples.

The miscellaneous category consisted of those artefacts made of a different material to those of the first four categories.

The sample category consists of artefacts that do not have a strict recognisable form and are only sampled during excavation, such as charcoal, mortar, plaster, etc.

After sorting, artefacts were catalogued by recording their form, function, number, weight and any diagnostic features.

These catalogues are arranged by site in Appendix 3 of this report.

3.7 Cultural landscape, social and intangible cultural heritage values

An evaluation was made of cultural landscape values, together with social and intangible cultural heritage values. The recognition of cultural landscapes is based on physical evidence resident within the environment. Social and Intangible values however exist within human experience and action, and while they may be closely associated with physical items and places, they can exist independently.

It should be noted that the conduct of a comprehensive social values assessment was beyond the actions allowed for by the investigation brief. As a consequence, the recognition of social values remains at a basic level and draws upon input from a limited number of interviewees and the consultant's evaluation of the documentary and physical evidence.

The following sections provide definitions of the value categories employed.

3.7.1 Definition of cultural landscape

The following definitions and discussion are based on information provided on the NSW environment and Heritage website, and specifically in Coleman (2003).

The World Heritage Committee (in Phillips 2003) defined cultural landscapes as areas that:

> "are illustrative of the evolution of human society and settlement over time, under the influence of physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal."

In the 1996 *Australian State of the Environment Report* it was recognised that (AHC 2000:1):

> Much of Australia may be regarded as cultural landscape because of the traditions and practices of Indigenous peoples over thousands of years. Immigrants since the first European settlement have added further layers of historical evidence and social significance to the natural landscape. (Jane Lennon in Australia State of the Environment 1996)

The Australian Heritage Commission (2000:1) considered that

> "*cultural landscape* is applied to areas of landscape including landscapes where natural features have special meanings to people such as traditional Aboriginal Australian landscapes, to highly modified or developed landscapes. That land may have continuing use or may be a collection of extant remains."

To ensure a consistent approach by the Heritage Branch with national and international heritage agencies, three categories of cultural landscapes have been adopted (WHC 2003):

Designed A clearly designed landscape, designed and created intentionally by man. This embraces garden and parkland landscapes constructed for aesthetic reasons, which are often (but not always) associated with religious or other monumental buildings and ensembles.

Evolved A landscape which has resulted from an initial social, economic, administrative, and/or religious imperative and has developed its present form by association with and in response to its natural environment. Such landscapes reflect that process of evolution in their form and component features.

There are two sub-categories:

- A relict (or fossil) landscape is one in which an evolutionary process ended at some time in the past, either abruptly or over a period. Its significant distinguishing features are, however, still visible in material form.
- A continuing landscape is one which retains an active social role in contemporary society closely associated with the traditional way of life, and in which the evolutionary process is still in progress. At the same time it exhibits significant material evidence of its evolution over time.

Associative The inclusion of such landscapes on the World Heritage List is justifiable by virtue of the powerful religious, artistic or cultural associations of the natural element rather than material cultural evidence, which may be insignificant or even absent.

3.7.2 Definition of intangible cultural heritage

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO) 2003 Convention for the Safeguarding of the Intangible Cultural Heritage, the intangible cultural heritage (ICH), or living heritage, is defined as follows:

> Intangible Cultural Heritage means the practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artifacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their cultural heritage.

This intangible cultural heritage, transmitted from generation to generation, is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history, and provides them with a sense of identity and continuity, thus promoting respect for cultural diversity and human creativity.

Intangible cultural heritage can be expressed in the following ways:

- oral traditions and expressions, including language as a vehicle of the intangible cultural heritage
- performing arts
- social practices, rituals and festive events

- knowledge and practices concerning nature and the universe; and
- traditional craftsmanship.

3.7.3 Definition of social value

The Burra Charter defines social value as embracing 'the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group.' Most definitions of social significance, including that of the NSW Heritage Office, refer to the way a place may be important to a community's identity.

People and communities exist in time as well as space; in other words, there will nearly always be a history or story to the attachment people have to heritage places. To that extent significance can rarely be invoked separately from historic significance (Byrne et al, 2003:146).

Both Commonwealth and State government defined significance assessment criteria for cultural heritage recognise social values. These are presented below (refer also Section 10).

A place meets the Commonwealth Heritage listing criterion if the place has significant heritage value because of one or more of the following

a) The place has significant heritage value because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.

An item will be considered to be of State (or local) heritage significance if, in the opinion of the Heritage Council of NSW, it meets one or more of the following criteria:

Criterion (d) an item has strong or special association with a particular community or cultural

3.8 Assessment of heritage significance and heritage impacts

The significance assessments conducted for the Project have been based primarily on the results of historical research, in field investigations, and previous heritage assessments. Each item has been assessed against the NSW Heritage Branch criteria and the Commonwealth Heritage List criteria.

It should however be noted that the assessment of social values was limited due to Project constraints regarding interviews with current and past users of the study area. As a result of this limitation to the assessment, social and other intangible values have been assessed on the basis of documentary evidence, and where appropriate, assumed implicit associations (e.g. items associated with the history of military use are assumed to have a degree of social importance to past and present military service people).

In addition to the heritage assessments for each individual item, a holistic approach to heritage significance has been applied to the Project area as a whole. This has involved an assessment of the cultural landscape and the way in which its constituent elements, including both built and non-built environment, contribute to the overall heritage significance of that landscape.

Similarly, the assessment of potential impacts to heritage values has included impacts to individual items and impacts to the site as a whole.

The RAE Museum and Australian Army Museum of Military Engineering Collections were not reviewed in preparing this assessment nor was a detailed assessment of the Collections undertaken. The significance assessment was based on documentary research and consultation with the museum staff (EM&A 2011). The significance of the RAE Museum Collection has been confirmed by ERM (2013) as part of the heritage impact assessment (HIA) for the Moorebank Unit Relocation (MUR) project. The collection has been inventoried recently by FRD 2012; it will be relocated as part of the MUR prior to any impacts associated with the proposed IMT.

4. HISTORICAL CONTEXT

4.1 Pre-military occupation and use

4.1.1 Thomas Moore

The site of the proposed Moorebank IMT was formerly all part of the Moorebank Estate that was established and built up by Thomas Moore. Born at Lesbury in Northhamptonshire in 1762, Moore first visited Sydney in July 1792 when he was a ship's carpenter aboard the ship *Britannia*. After two more visits, he returned in May 1796 intending to settle in the colony. In October 1796, Governor Hunter appointed him the colony's Master Boat Builder in the Port Jackson dockyard. However, Moore was intent from the outset on pursuing a range of business opportunities. He traded in goods and, by 1797, owned a few sheep. Moore soon diversified into raising cattle and horses as well.[2] These he may have run on a grant of 470 acres between Petersham and the Cook's River.

In this period, there was a shortage of shipbuilding timbers in the colony. Accordingly, in May 1803, Governor King appointed Moore to be the official 'Surveyor of Timber throughout the colony for naval purposes'. Through this new commission, Moore became acquainted with the George's River as he pushed upriver in his quest for suitable timbers.

As early as 1798, grants of land had been made on or near the George's River in the Holsworthy area, particularly along Harris Creek. The recipients of the grants were mainly military or naval officers who had cleared some of the land and begun to grow wheat and maize and to raise sheep, cattle, hogs and horses. This early exploitation of the land did not extend to what would become Moore's extensive Moorebank property along the eastern bank of the river; this remained uncleared and unoccupied. The existing holdings, however, demonstrated to Moore the agricultural and pastoral potential of land in the area.[3]

In December 1805, Moore acquired partly by purchase and partly by grant an expanse of 750 acres along the eastern bank of the Georges's River in what are now the suburbs of Chipping Norton and Moorebank. This was the genesis of his Moorebank estate. The acquisition was also a critical point in his turning away from boatbuilding towards agricultural and grazing as his major business interest. This shift was further marked by his commencing to erect on his land a substantial new home for himself and his wife Rachel. The house, the site of which is situated in Thomas Moore Park, Whelan Avenue, Chipping Norton, was completed about the end of 1808. In September the following year, Lieutenant Governor Paterson granted Moore another 600 acres in the area. By this time, Moore had made his mind up to resign as Master Boat Builder. His resignation was accepted at the beginning of October and, a month later, he was granted another 1,000 acres which extended his holdings southward along the eastern side of the George's River.[4]

Like his predecessors in the Holsworthy area, Moore took to growing grain and raising sheep, cattle, hogs and horses on his extensive riverside property. In November 1810, the new Governor, Lachlan

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[2] Peter G. Bolt, A Portrait in his Actions: Thomas Moore of Liverpool (1762-1840), part 1, Lesbury to Liverpool, Camperdown, Bolt Publishing Services, 2010, pp. 15, 35, 116, 123, 143-4, 145, 162; M.L. Loane, 'Moore, Thomas (1762 - 1840)', Australian Dictionary of Biography [hereafter ADB], Carlton, Melbourne University Press, vol. 2, 1967, pp. 254-5.

[3] Christopher Keating, On the Frontier: A Social History of Liverpool, Sydney, Hale and Iremonger, 1996, p. 9; Bolt, A Portrait in his Actions, part 1, p. 352; Christa Ludlow and Catherine Snowden, 'History and Significance of the Site of the Remount Depot, Holsworthy', Report to the Defence Housing Authority, July 1993, pp. 5-13.

[4] Bolt, A Portrait in his Actions, part 1, pp. 240, 325-6, 352-3, 354; Bolt, Thomas Moore of Liverpool, pp. 109-10.

Macquarie, visited Moore and his wife at their Moorebank estate in the course of his tour of the colony and his search for sites for new townships. Macquarie fixed upon a site across the river from Moore as the site for a township to be called Liverpool. Moore, who had been gazetted a Magistrate for the George's River district the previous May, was the logical person to become the leading figure in the new community.[5]

As Moore accumulated significant wealth from his agricultural, pastoral and other business interests, he was able to consolidate his holdings in the Moorebank area. This process was considerably helped when, in August 1820, he received another grant amounting to 2,000 acres along the George's River. By this time, his holdings included seven miles of river frontage. He became one of the largest landowners in the colony and, in the local area, was known as the 'King of Liverpool'.[6]

Moore's wife died in November 1838 and Moore, who had no heirs, decided to leave all his property to the Church of England in New South Wales. Before his death, Moore transferred his Moorebank estate of approximately 6,400 acres, together with lots he owned in the township of Liverpool, to the church to be held in trust. The land was worth about £20,000.[7]

Moore himself died on 24 December 1840. Under the terms of his will, the rents and income received from 2,080 acres of his Moorebank estate were to serve as an endowment for the Church of England See of Sydney; those received from the other 4,315 acres were to provide a fund to augment stipends for the clergy. Moore also left his house and its grounds to the church for the establishment of a college for young Protestant men; this was the origin of Moore Theological College. The college opened in premises next to Moore's former home in 1856, but it was transferred to a site in Newtown near the University of Sydney in 1891.[8]

4.1.2 A Church of England Estate

With the passing of the Moorebank estate to the Church of England, the church leased out the land to a number of tenants engaged in farming and other rural pursuits.

By the 1880s at the latest, some tenants on the Moorebank estate had turned to poultry farming, while others had established orchards and vineyards on their holdings. Probably, the largest and longest-established orchard and vineyard was that run for the Church of England Diocese of Sydney by Frederick Edward Barker on Section 5 Lot 1 of the Parish of Holsworthy (in the southwestern corner of the Project area). Barker eventually purchased what was called the Verona Vineyard around the end of the 1910s. Consisting of over 32 acres, the property occupied a prime river frontage site and included a cottage in which Barker lived, first as caretaker and later as owner.

In the latter half of the 19th century, both the produce that Barker and tenant farmers produced and the rents that the tenants paid constituted a valuable source of income for the diocese. In 1892, after parts of the estate had been sold (Figure 2.1), the annual income the diocese was receiving from the estate lands still amounted to £1,067.[9]

In the mid-1880s, the Sydney Diocese decided to sell the estate. In 1888 the estate was offered for sale under the title of the Moorebank Farms Estate, in lots ranging from seven to one hundred acres

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[5] Loane, ADB, vol. 2, pp. 254-5; Bolt, A Portrait in his Actions, part 1, pp. 374, 376; Ludlow and Snowden, 'History and Significance of the Site of the Remount Depot, Holsworthy', p. 5.

[6] Keating, On the Frontier, pp. 25-6; Loane, ADB, vol. 2, pp. 254-5.

[7] Loane, ADB, vol. 2, pp. 254-5; Australian, 29 December 1840, p. 2.

[8] Loane, ADB, vol. 2, pp. 254-5; Keating, On the Frontier, p. 25.

[9] Keating, On the Frontier, p. 93; Municipality of Liverpool Valuation Book 1911-1913, assessment no. 2265; Sydney Morning Herald, 9 March 1889, p. 11; 18 August 1892, p. 7.

(Figure 2.2). Those lots with the benefit of a river frontage were quickly sold. In February 1893, an auction for the many remaining unsold allotments was held, with sale prices of about £14 an acre.[10]

Around this time, the NSW government showed interest in exploiting the Estate lands in a rather different manner. In 1889-90, the government commenced exploratory drilling for coal on the Estate. The drill eventually found a coal seam at a depth of 2,583 feet 4 inches [about 787 meters], but mining of coal in the area never proceeded.[11]

Figure 4.1 A real estate agent's depiction of life on the Moorebank Farms Estate, c 1888 [Estate plan, Map Folder 93, LFSP 1351, NLA]

Figure 4.2 Moorebank Farms Estate 2nd Subdivision, c 1888, including the northern part of the current study site [Estate plan, Map Folder 93, LFSP 1352, NLA]

[10] Keating, On the Frontier, p. 107; Sydney Morning Herald, 22 February 1893, p. 9.

[11] Sydney Morning Herald, 30 October 1889, p. 10; 16 April 1890, p. 4.

Following the sale of the Estate, the area retained its agricultural and rural character, although much of the land was still uncleared and would remain so for many years to come. The Municipality of Liverpool Valuation Book for the triennium 1911 to 1913 shows the ownership and, to some extent, the occupation and usage of land within the Project area on the eve of its takeover by the Commonwealth for military purposes (Figure 2.3). The Book indicates that there were orchards, vineyards, a dairy and at least one poultry farm in the area, while it also records houses and other structures standing on a number of allotments.

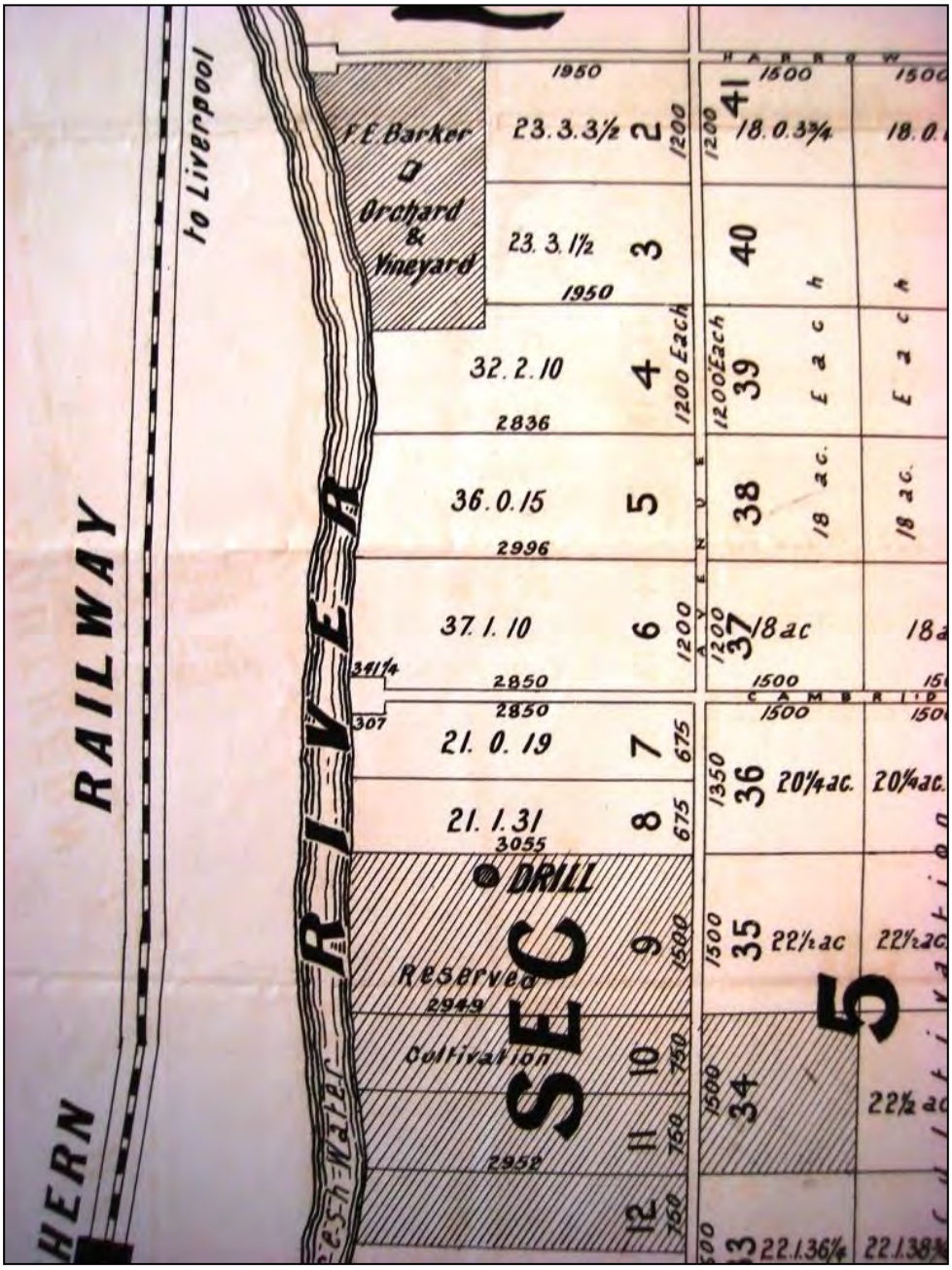

Figure 4.3 Moorebank Farms Estate 3rd plan, c 1888, showing the southern part of the Project area including the site of Frederick Barker's orchard and vineyard and the site of the exploratory drilling for coal [Estate plan, Map Folder 93, LFSP 1367, NLA]

4.1.3 Western side of Georges River

On the western side of the George's River, Moore was neighboured by *Eber (or Ebor) Bunker (Buncker)* (Stewart 2008), a seaman, merchant and farmer who has been called "the father of Australian whaling" (Cumpston).

It appears that Moore and Bunker shared a common problem in the early years of the nineteenth century:

> "NOTICE IS HEREBY GIVEN, There being great Quantities of TIMBER cut down and destroyed on my and Captain BUNKER's FARM adjoining to it, near Sydney, which would have been useful for NAVAL Purposes, It is therefore particularly requested, that no Person will cut down, unbark, or otherwise damage any of the Trees, Posts, Paling, Shingles, &c. on the said Premises, unless for the above Use, else they will prosecuted to the utmost rigour of the Law provided against Offenders
>
> July 5th 1803. T. MOORE" (The Sydney Gazette and New South Wales Advertiser, 17/07/1803)

Parish maps do not provide any information concerning structures and improvements to the land made by Bunker, and the above newspaper notice only suggests the common forms to be found on most landholdings at the time. The maps do however show the Great South Road wending its way through what was originally a 400 acre property west of the George's River, a portion of which corresponds to the Moorebank IMT study area.

Bunker was initially granted the 400 acres of land by Governor Philip Gidley King in recognition for his efforts in establishing a British settlement on the Derwent River in Van Diemen's Land (Stewart 2008).Tenant farming, similar to what occurred on the eastern side of the river, appears to have been undertaken on Bunkers estate as well:

> "To be LET, and every Indulgence given
>
> to an approved Tenant, a Valuable and Extensive FARM, 40 Acres of which are cleared, advantageously situate in the District of Bullanaming; the Property of Captain Buncker.--- Application to Mr. Thos. Moore." (The Sydney Gazette and New South Wales Advertiser, 04/03/1804, p.1)

Bunker named the property Collingwood, but it was also otherwise known as Bunker's Farm/Cottage according to Stewart. However, The Sydney Gazette and New South Wales Advertiser refers to a Bunker's Farm being only 3 miles from Sydney (20/12/1817 p.4). Associated with the estate was Collingwood House located outside the study area off the Hume Highway to the north. The house dates from 1810, the time at which Macquarie granted Bunker a further 500 acres adjacent to his initial George's River landholdings.

Bunker died at Collingwood in 1836, on September 27 (Cumpston). He had achieved a level of "seniority and respect within the colony" having been involved in a number of significant events, such as the other throw of Governor Bligh, and acting as Macquarie's representative on a trip to London in 1814. He also lent his name to Bunkers Hill at The Rocks. (Stewart)

To the south of Bunker's Collingwood property, in the vicinity of the central and southern rail access options, were Charles Throsby's land grants at Glenfield, which included a mile of river frontage and extended south to the crossroads. The original Glenfield land grant comprised 600 acres granted to Charles Throsby in 1809, it was part of 1500 acres that Throsby acquired in the Minto area. The Glenfield farm stayed in the Throsby family until the early 20th century, although 1000 acres of land was leased in the second half of the 19th century as a dairy farm. During the 20th century the farm was bought by James Freeland Leacock, who revolutionised dairying in the Liverpool region. The homestead complex of the Glenfield Farm is still extant on the western side of the southern railway, opposite the Glenfield landfill.

Other smaller properties, ranging in size from 60 to 300 acres also existed along the Georges River in the vicinity of what is now the Glenfield landfill. These appear to primarily relate to land selections from the second half of the 19th century.

There is no evidence from available historical maps of any structures or other potential features that may have occurred in the vicinity of the proposed southern and central rail access options.

4.1.4 Collingwood Estate

In the years following Bunkers's death, the estate underwent a process of disposal and development.

> "COLLINGWOOD ESTATE.
>
> To be Let upon Lease for any term not exceeding seven years
>
> ALL that splendid Estate, containing - five hundred acres, within one mile of Liverpool, and distant from Sydney twenty one miles, known by the name of COLLINGWOOD. The highroad to Campbell- town and the Southern Interior passes through it, and it is bounded on the east by the fresh water of George's River, to which it has a frontage of about one 'mile. On it stands erected- COLLINGWOOD HOUSE, containing seven rooms, with verandah, back and front, which faces an ornamental flower garden. In the rear is a detached kitchen, and private store, laundry, a bake-house containing two ovens, formerly used by the Government contractor, stable and coach-house store-house, slaughter-house and stock yards.
>
> An excellent kitchen garden and orchard, containing an abundant supply of fruit trees of every description in full bearing. The whole Estate is enclosed, and there are about two hundred acres of rich alluvial land, cleared and stumped, fit for the plough, and divided into four or five paddocks, a great portion of which has been under culture, and it has what very few farms can boast of so convenient to the capital, that is, an inexhaustible supply of fine fresh water, not only from the main river, but from a chain of ponds meandering through the center. The mails and public coaches pass before the door of course daily. To a contractor for public supplies this Estate would be found unequalled, as for a series of years it has been used by one. For particulars apply to C. H. Chambers, Esq , Solicitor, Sydney ; or on the Estate, which may be viewed daily, and instant possession given to a tenant." (SMH 18/05/1844 p.3)

Outside the study area, a steam flour mill and an abattoir owned by JH Atkinson opened in the 1850s, along with a wool washing outfit. There were structures associated with the industry (yards and pens) and these were established in the northern part of the estate, close to the township of Liverpool itself.

The area east of the Hume Highway appears to have kept its farming focus until the twentieth century, at which point the creeping suburbia of Liverpool saw the establishment of streets and housing in the area. The railway predates this suburban growth, which hadn't come into full effect until after the Second World War; 1943 aerial imagery shows a still undeveloped rural landscape on the western side of the Georges River (www.six.nsw.gov.au). A small shed is the only structure evident on the shingle bed of a creek line at the far northern end of the western Project area. The subsequent absence of this shed in the aerial photography record suggests that it was an ephemeral structure, possibly destroyed or removed after later flooding.

In the later twentieth century, this area was developed as a golf course. The recent construction of the Southern Sydney Freight Line, parallel and immediately adjacent to the Southern line, has resulted in substantial disturbance to all of the remaining locally elevated ground and a proportion of the river flats within the western Project areas. This was due to their use as construction depots and ancillary areas for the freight line construction.

4.2 Military occupation and history

4.2.1 Military use of the Liverpool area in the 19th Century

The Liverpool area has had a long association with military forces. After Governor Lachlan Macquarie received authorisation from the War Office in October 1811 to establish a Veteran Company in the colony, a detachment of the company was soon stationed in barracks built at Liverpool. The purpose of the Royal Veteran Company, as it became known, was to help keep order

in the colony. In March 1812, Lieutenant William Lawson, the company's second-in-command, was appointed to take charge of the Liverpool detachment.[12]

A detachment of the Royal Veteran Company was still based at Liverpool in May 1819, but it does not appear to have remained there for much longer. It appears to have been moved to Windsor and later Newcastle before it was broken up at the beginning of 1830 and disbanded two years later. There is no evidence of any continuity between this early military presence at Liverpool and the later period of military use and occupation, which continues to the present day.[13]

Renewed military interest in, and use of, the Liverpool area arose in the era of locally-raised colonial forces. As the Imperial government reduced its garrison forces in New South Wales from the late 1840s and withdrew them altogether in 1870, the responsibility for the defence of the colony fell to a much greater extent on the colonists themselves. In 1871, immediately after the British withdrawal, the NSW government formed two permanent companies of infantry and one permanent battery of artillery. The new forces underwent training at annual military camps, usually at Easter or in May. The first of the training camps was held at Richmond in April 1873 and the second at Campbell Fields, four miles from Campbelltown and nine from Liverpool, in May 1874.[14]

Later in the same decade, the various Australian colonies appealed to the British government for expert advice on the kinds of military defences they needed and on how to organise and co-ordinate them. In response, the British despatched two military experts to Australia in 1877, Major-General Sir William Jervois and Lieutenant-Colonel Peter Scratchley of the Royal Engineers. Over the next seven years, Jervois and Scratchley produced a series of reports detailing their recommendations for the defence of the Australian colonies.

Proceeding from the premise that the Royal Navy enjoyed total command of the seas, Jervois and Scratchley considered that the main military threat to the colonies would come from enemy raids by sea and that the colonies' defences should thus be organised to fend off such attacks until the Royal Navy arrived to deal with the intruders. As the last line of defence – and the one of most significance for the Liverpool area – they recommended the raising of a mobile field force, complete with field artillery. The role of this force was to deploy to wherever the invaders had breached the coastal defences and to prevent their further advance.[15]

Following their completion, the NSW colonial government started to organise its military forces along the lines recommended in the Jervois and Scratchley reports. The field artillery was staffed by a cadre of full-time soldiers, while infantry, engineers and torpedo forces were composed of partially-paid militia personnel. A little later in the 1880s, a light horse regiment was formed and some further militia infantry units. As with their predecessors, the new forces were obliged to undertake annual military training at Easter camps. Such a camp was held at Windsor in 1884 and, from 1886, they were staged in the National Park (later the Royal National Park). The Easter camp was held at

[12] Sydney Gazette, 26 October 1811, p. 2; 25 January 1812, p. 1; 14 March 1812, p. 1.

[13] Sydney Gazette, 22 May 1819, p. 2; 21 August 1819, p. 1; Sydney Monitor, 20 February 1830, p. 2; 24 December 1831, p. 2; Australian, 27 January 1832, p. 3; E.W. Dunlop, 'Lawson, William (1774-1850)', Australian Dictionary of Biography [ADB], vol. 2, pp. 96-7.

[14] Bob Nicholls, The Colonial Volunteers: The defence forces of the Australian colonies, 1836-1901, Sydney, Allen and Unwin, 1988, pp. 68-9; Sydney Morning Herald, 19 April 1873, p. 7; 25 May 1874, p. 5.

[15] Nicholls, The Colonial Volunteers, pp. 79-81.

Campbelltown in 1891, with the artillery camping overnight 'near Liverpool' on its way from Victoria Barracks at Paddington.[16]

After 1891, the camps lapsed for over five years probably because of the economic depression that afflicted the Australian colonies. Nevertheless, smaller training camps continued to be held, some of which retained the link to Liverpool.

4.2.2 First military use of Moorebank Estate

The first specific reference to the use of the Moorebank Estate for military purposes dates from May 1894. Over several days, artillery, cavalry, light horse, engineer and medical units carried out manoeuvres in the Liverpool area. On 26 May, a column of troops formed up in the town of Liverpool and marched to the Moorebank Estate where they were inspected by the commandant of the NSW forces, Major-General Sir Edward Hutton, and other senior officers.[17]

The military authorities must have secured permission from local landowners to use the Moorebank Estate for their parade, but it is not known which part of the estate they used nor what prompted them to select the Liverpool area in general for their manoeuvres. Possible reasons include access by road or rail from Sydney, and the expanse of unpopulated and undeveloped land to the south and southeast.

When the annual Easter training camps resumed later in the 1890s, the lack of space available for manoeuvres at other locations, such as land purchased for a cemetery at Rookwood, soon became a problem.[18]

Following the federation of the Australian colonies at the opening of the new century, their separate military and naval forces passed to Commonwealth control on 1 March 1901. In NSW, as in the other colonies, this brought little immediate change to the running and operation of the local military forces, including the system of annual training camps. There was no camp for the NSW-based defence forces as a whole in 1901, though a series of smaller camps were held at locations on Sydney Harbour, at Newcastle and in the National Park south of Sydney. But a major camp was held at Easter 1902, when manoeuvres were conducted over a wide territory that included Rookwood, Parramatta, Penrith and Richmond. For the purposes of these exercises, the forces acting as the enemy camped at Liverpool and a mock conflict between the two sides was staged there.[19]

Economic constraints again precluded the holding of a single camp for the defence forces based in NSW in 1903. In the following year, Liverpool was once more used as the site for a mock engagement between local defence forces and an invading 'enemy' force. The invaders attempted to cross the George's River at Liverpool, but were repulsed and were forced to retreat eastward with the defenders in pursuit. The country over which the action took place was described as 'rough and thickly wooded' and as covered with 'thick scrub'.[20]

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[16] Sydney Morning Herald, 8 April 1884, p. 7; 6 March 1886, p. 13; 5 March 1887, p. 11; 3 April 1891, p. 4; Richmond Cubis, A History of 'A' Battery: New South Wales Artillery (1871-1899), Royal Australian Artillery (1899-1971), Sydney, Elizabethan Press, 1978, p. 46.

[17] Sydney Morning Herald, 28 May 1894, p. 6.

[18] Sydney Morning Herald, 14 April 1898, p. 4; 5 April 1899, p. 5; 18 April 1900, p. 6.

[19] Sydney Morning Herald, 4 April 1901, p. 5; 28 March 1902, p. 6; 31 March 1902, p. 9.

[20] Sydney Morning Herald, 4 April 1903, p. 11; 5 April 1904, p. 7.

4.2.3 Liverpool Manoeuvre Area

Bit by bit, the military authorities were coming to view the country east and southeast of Liverpool as ideal for military training purposes, and were consequently using it more and more frequently. At the beginning of September 1905, a 'staff ride' was held over a wide area, including Liverpool, in which a defending force had to beat back an enemy force that had invaded Sydney. It was the next year, 1906, however, in which military attention really came to focus on Liverpool. At Easter, a whole divisional camp was held there, with about 4,000 troops taking part in manoeuvres over an extensive tract of country. The Easter training camp was again held in the Liverpool area in 1907, though on this occasion manoeuvres were carried out to the west of Liverpool and the George's River.[21]

It is highly likely that the site of the tented encampment for the 1906 Easter camp was on the eastern side of the George's River extending southward from what is now Newbridge Road to the north, with Moorebank Avenue as its eastern boundary. A newspaper article quoted in the 2004 Heritage Assessment (Graham Brookes and Associates 2004) states, of the January 1910 camp, that:

The camp is pitched upon the paddocks to the left of the railway station, *on ground that has been similarly occupied in recent years* ... [emphasis added].[22]

A map dated to *c.* 1915 and reproduced in the same report shows 'Liverpool Camp' as occupying this site (Figure 2.4). There is good reason to think that this was the same site at which camps dating from 1910 – and, almost certainly too, from 1906 – had been located. The site, in other words, had become from 1906 the customary location for the tented encampments for the military training camps in the Liverpool area.[23]

To enable the forces to carry out their training at the Easter camps of 1906 and 1907, some of the large landowners in the area had placed their land at the disposal of the military authorities. However, other landowners had not done so. After the 1907 camp, the Commandant of the forces in NSW, Brigadier-General J.M. Gordon, complained that the usefulness of the two camps had been 'greatly curtailed by the action of several large landholders refusing to allow the military to cross their property.' Gordon said that he had long stressed the necessity for the military to have available for training exercises suitable country that did not encroach on privately-owned land. He thereupon submitted a plan to the Military Board for a huge tract of land to be resumed for military purposes. Amounting to between 130,000 and 140,000 acres, the land was bounded on the north and west by the George's River, on the east by the South Coast rail line and on the south by a line from Waterfall to Campbelltown. The land, Gordon added, 'was nearly all Crown land' – though this did not apply to Moorebank – and, apart from a few isolated patches, was unoccupied, such that 'artillery shooting could be indulged in with perfect safety.'[24]

In putting forward his proposal, Gordon suggested that ...

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[21] Sydney Morning Herald, 24 March 1906, p. 11; 13 April 1906, p. 4; Military Forces of the Commonwealth, New South Wales: Report on the Annual Continuous Training, 1907, pp. 7-17, CRS A1194, item 12.30/4550.

[22] Daily Telegraph, 7 January 1910, p. 7, quoted in Graham Brooks and Associates P/L, 'Heritage Assessment: Moorebank Defence Site Moorebank', May 2004, p. 10.

[23] 'Plan of the Liverpool Manoeuvre area, c. 1915', figure 2.6 in Brooks, 'Heritage Assessment: Moorebank Defence Site Moorebank', p. 16. The map was held in the Liverpool Regional Museum in 2004, but has been transferred to the Liverpool City Library where it has not so far been located.

[24] Sydney Morning Herald, 26 January 1906, p. 7; 28 November 1907, p. 3; Liverpool Herald, 3 February 1906, p. 7; Report on the Annual Continuous Training, 1907-1908, p. 1, CRS A1194, item 12.30/4550.

> ... a permanent camp should be established on the ground somewhere close handy to Liverpool, where sheds could be erected for the storage of tents and equipment, and water laid on to the various camping grounds.[25]

More details about the proposed permanent camp emerged when the Water and Sewerage Board raised objections to Gordon's scheme. The Board was intending to extend the catchment for Sydney's water supply into the areas that Gordon wanted resumed and it feared that a permanent camp would cause pollution. While Board members were prepared to allow 'periodic' artillery exercises in the area, they could not agree to the establishment of permanent camps. Moving to reassure them, however, the military authorities indicated that they ...

> ... proposed to have a permanent camp on the flats at Moorbank (*sic*), and to utilise the other country in the direction of Woronora River as a range. They would always return to the main camp at night. The land was required for the new field guns which have a range of 10,000 yards, and there was no place except that within easy distance of the metropolis where such a range could be obtained.[26]

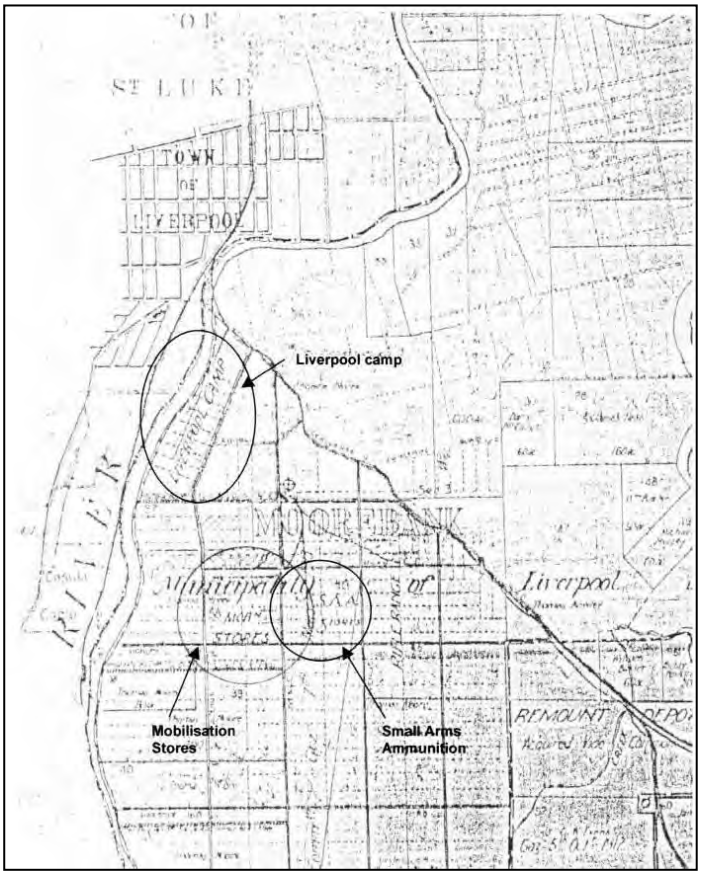

Figure 4.4 Plan of the Moorebank area c. 1915, showing the site of Liverpool Camp
[Graham Brooks and Associates, Heritage Assessment: Moorebank Defence Site, 2004]

This was the origin of the permanent military presence at Moorebank, with Gordon probably having in mind for his permanent camp the site of the tented encampments for the 1906 and 1907 camps. But while the Military Board and soon the Commonwealth government supported Gordon's proposal, it was to be several years before the resumption of the land was effected. In the meantime, however, the military forces began using the Liverpool area for training camps on a regular basis. The 1908 Easter camp for the permanent infantry and artillery and the militia forces was situated 'near the

[25] Sydney Morning Herald, 28 November 1907, p. 3

[26] Sydney Morning Herald, 2 August 1907, p. 4.

Moorebank Estate', while the light horse regiments trained on the same ground a few weeks later. Camps were held in the general Liverpool area in the ensuing five years, but there is no evidence that the military established a permanent camp or erected any permanent structures at Moorebank in this period.[27]

There was a good reason for the lack of development at Moorebank at this time, and that was of course that the Commonwealth had yet to resume the land. Pressure to do so was increasing. Since Federation, successive Commonwealth governments had recognised the need to improve the nation's defences and, in late 1907, they had commenced moves to introduce compulsory military training. Parliament passed a bill to this effect in 1910 but, before it came into operation, the government invited Lord Kitchener to Australia to provide expert advice on the size and organisation of forces required to defend the country.

During his visit in early 1910, Kitchener spent two days observing divisional military manoeuvres at Liverpool, staying for two nights in a cottage that is still standing on the eastern side of Moorebank Avenue (no. 208). The cottage is listed in the NSW State Heritage Inventory. The camp for the troops taking part in the manoeuvres was pitched on 'a sandy flat' and was a 'mile-long', with a parade ground adjacent to it. It is likely that the camp was located on the eastern side of the George's River, extending southward from Newbridge Road. This was very probably the same encampment site that previous camps from 1906 onward had used.[28]

As a result of his visit to Australia, Kitchener made a number of recommendations about the requirements for the nation's defence, including an expansion of the proposed system of compulsory military training and the establishment of a military college to train officers. The recommendations were promptly incorporated in an amending Defence Act and, on 1 January 1911, the new system of compulsory military training started. The Royal Military College opened at Duntroon in June of the same year.

Figure 4.5 View looking east from the railway line across the George's River to Liverpool military camp, 1910-11 (Follan Collection, Campbelltown City Library)

With the expansion of the forces brought about by the introduction of conscription, it was now even more imperative for the defence forces to have their own extensive areas in which to train. In the Liverpool area, formal acquisition of land for military purposes commenced in October 1912 when an area of approximately 883 acres at Holsworthy was gazetted as the site for a remount depot. The function of the depot was to train teams of horses to pull field guns. In March 1913, a much larger tract of land in the area, comprising 16,868 acres, was acquired for military purposes (Figure 4.6). This included all of the land at Moorebank which forms the Project area. After Enoggera near Brisbane, the Liverpool acquisition was only the second that the Department of Defence gained for a

[27] Sydney Morning Herald, 28 November 1907, p. 3.

[28] Sydney Morning Herald, 7 January 1910, p. 7; 10 January 1910, p. 5; 13 January 1910, p. 5.

field training area. Enoggera, however, was too small, and Liverpool remained the only suitable training area that Defence owned until well into the interwar years.[29]

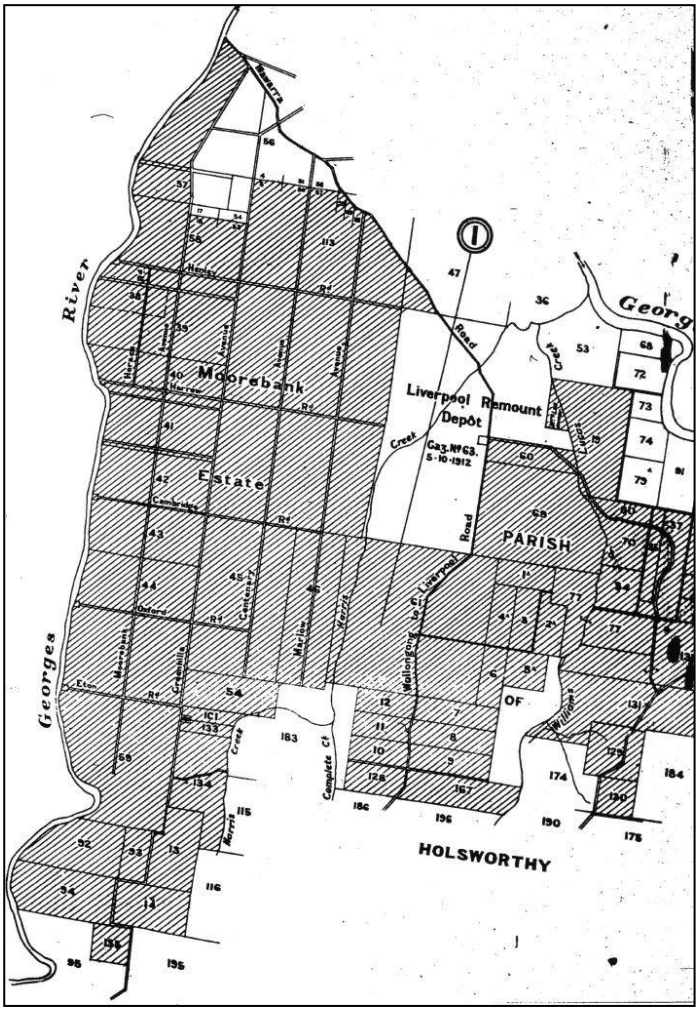

Figure 4.6 Map showing the land acquired by the Commonwealth for military purposes in 1913 [Commonwealth Gazette, 7 March 1913]

Having secured the Liverpool-Moorebank area for training purposes, the Department of Defence could now contemplate developing the area to suit its needs. About 1912, a Military Isolation Camp was set up on the western side of Moorebank Avenue in the northern portion of the Project area (Figure 4.7). The purpose of the camp was to isolate from their comrades any men who came into camp with communicable diseases, such as measles and mumps. The Isolation Camp may have contained no permanent or even built structures, and may have instead consisted simply of tents.[30]

In May 1913, Major-General G.M. Kirkpatrick, the Inspector-General of the Australian Military Forces, drew attention to the urgent need for the establishment of Mobilisation Stores in the area. To that

[29] Christa Ludlow and Catherine Snowden, 'History and Significance of the Site of the Remount Depot, Holsworthy', Report to the Defence Housing Authority, July 1993, pp. 48-51; Commonwealth of Australia Gazette, no. 16, 7 March 1913, pp. 535-8; Lieutenant-General Sir H.G. Chauvel, Report for the Inspector-General of the Australian Military Forces, 31 May 1925, part 1, p. 12, CRS A1194, item 20.15/14731.

[30] 'Plan of the Moorebank area ... c. 1912', Figure 2.5 in Brooks, 'Heritage Assessment: Moorebank Defence Site Moorebank', p. 15. The map was held in the Liverpool Regional Museum in 2004, but it too has been transferred to the Liverpool City Library where it has not so far been located.

point, he reported, no progress had been made in building them. However, by 1915, after the outbreak of World War I, such stores had been established on the eastern side of Moorebank Avenue just south of what later became known as Anzac Road. At the same time, Small Arms Ammunition Stores were set up immediately to the east, on the other side of what was then Greenhills Avenue. This marked the beginning of the Ordnance Corps' use of the area, though their facilities stood outside the Project area. A rifle range was established still further to the east.[31]

By 1915, too, there was an official Moorebank Parade Ground which adjoined Liverpool Camp. Though its actual site is uncertain, it may well have been the same parade ground that was used for the 1910 camp that Lord Kitchener attended. Whether it's designation in 1915, and in succeeding years during the war, is indicative that a formal gravelled parade ground had been established is not known. It may merely have been a relatively level, cleared piece of land next to the camp. Most likely, it was located to the east of the camp and therefore on the other side of Moorebank Avenue. If it were to the south of the camp, it would have been situated inside the Project area.[32]

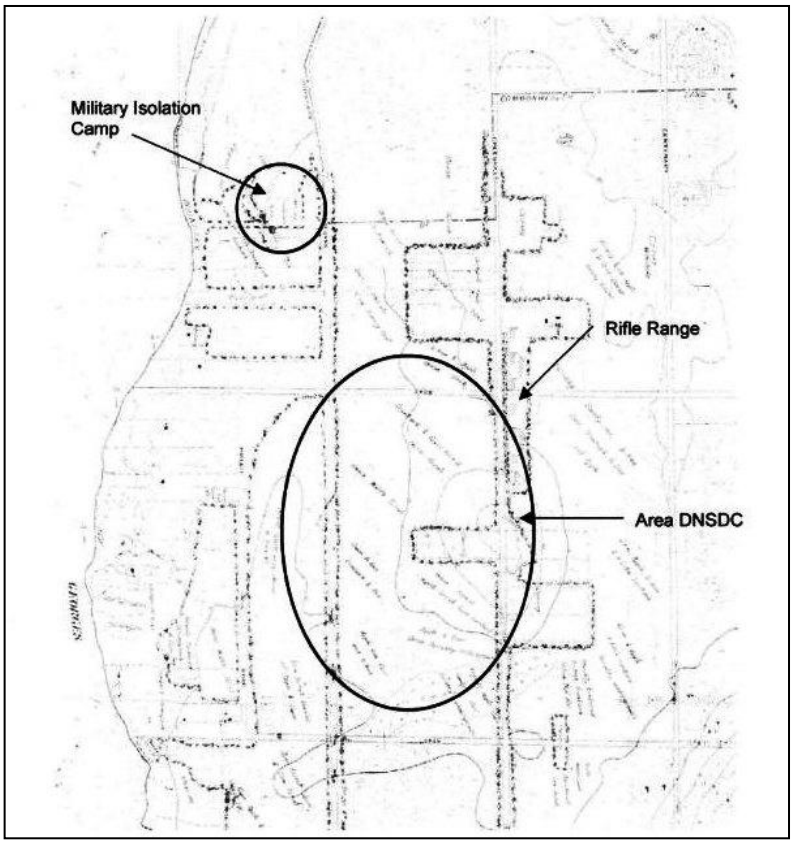

Figure 4.7 Plan of the Moorebank area c. 1912, showing the Military Isolation Camp
[Graham Brooks and Associates, Heritage Assessment: Moorebank Defence Site, 2004]

4.2.4 World War I: Liverpool Camp

During World War I, Liverpool Camp was the camp at which new recruits to the Australian Imperial Force [AIF] in NSW underwent training before they were despatched for overseas service. Tens of thousands of men passed through the camp in the war years. The camp, of which no overall plan has

[31] Annual Report by Major-General G.M. Kirkpatrick, Inspector-General of the Military Forces of the Commonwealth of Australia, 30 May 1913, p. 26, CRS A1194, item 20.15/6699; figure 2.6 in Brooks, 'Heritage Assessment: Moorebank Defence Site Moorebank', p. 16.

[32] Sydney Morning Herald, 9 December 1915, p. 10; 2 April 1917, p. 6; 11 May 1918, p. 7.

yet been found, extended southward from what is now Newbridge Road for three to four kilometres along the eastern bank of the George's River. It was situated between the river and Moorebank Avenue. Partial maps and photographs of the area at this time show a host of buildings, most of them presumably of timber construction (Figures 2.8 - 2.11), concentrated at the northern end of the camp. The buildings included a guard room, prison, ordnance store, ammunition stores, officers' mess and kitchen, numerous barrack blocks, kitchens, showers and latrines, a canteen and even a billiard hall and shooting gallery. South beyond the concentration of buildings, the camp was made up of a multitude of tents. In among the tents, however, there was the odd building.

Figure 4.8 Liverpool Military Camp in World War 1, showing what appears to be a few buildings among the tents [Australian War Memorial]

Figure 4.9 Another view of Liverpool Military Camp in World War I, showing tents extending along the banks of the Georges River [Australian War Memorial]

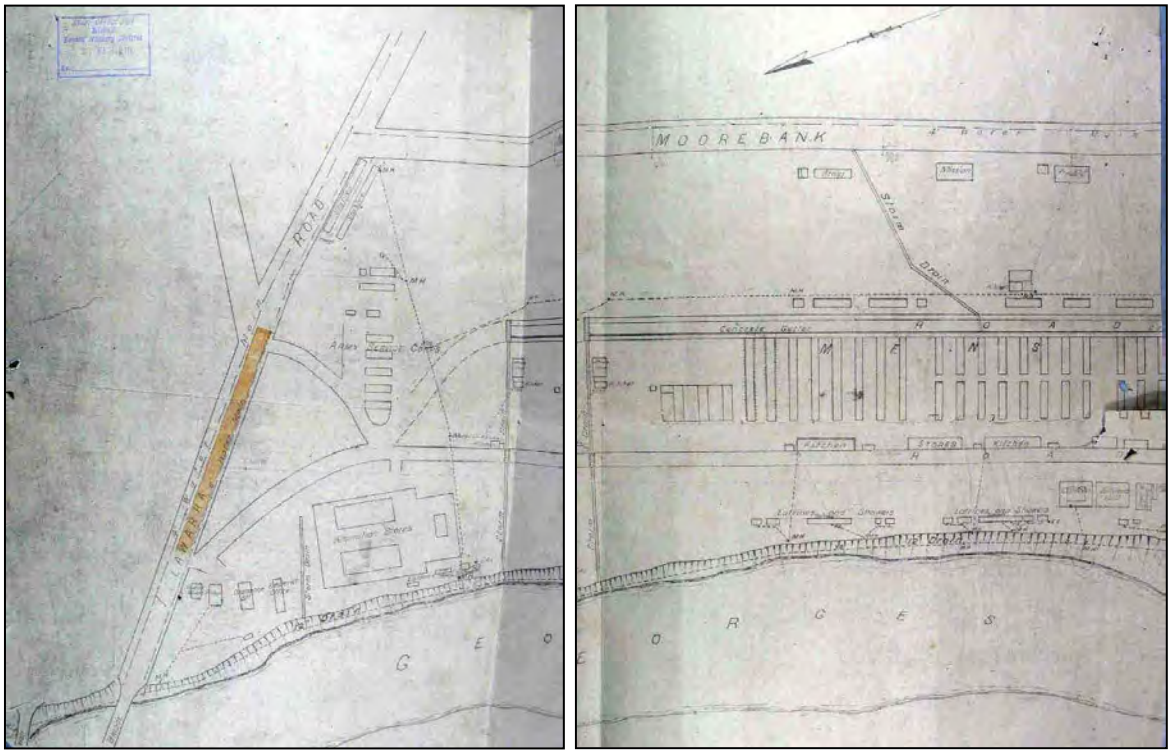

Figure 4.10 Two parts of the same plan showing structures at the Liverpool Military Camp about February 1918 [National Archives of Australia]

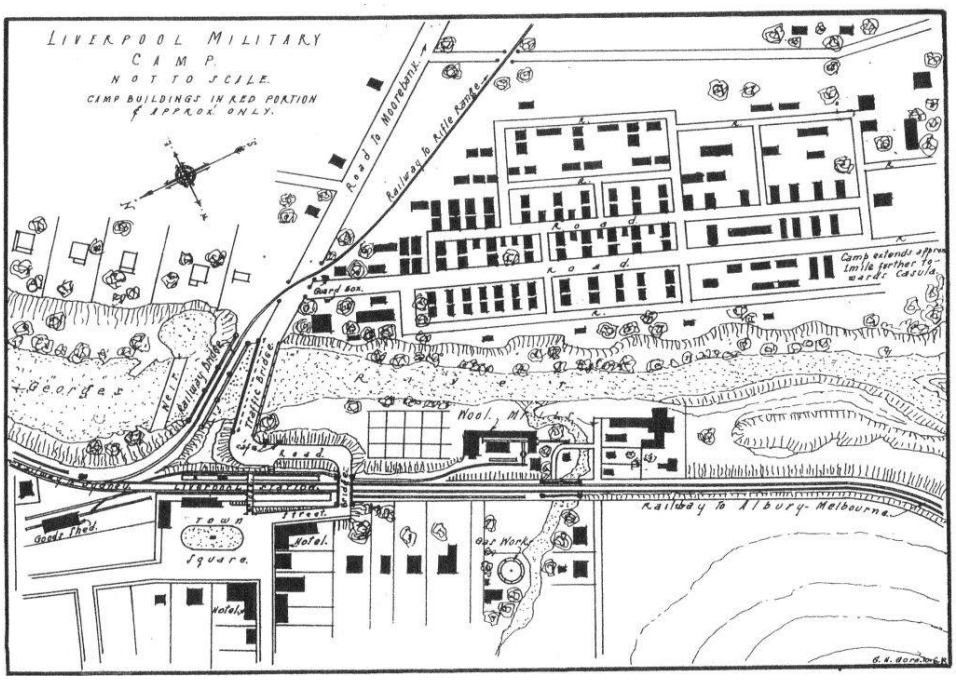

Figure 4.11 A partial map of the Liverpool Military Camp drawn by Sapper Geoffrey H. Gore c. 1919 [Army Engineer Museum, Moorebank]

East of Liverpool Camp, at the Old Army Camp at Holsworthy, an internment camp was established early in World War I for adult males of German origin and of other suspect nationalities. During their incarceration, the internees were used to quarry sandstone and build various structures of stone at their camp. Commencing in February 1917, too, they were employed in the construction of a branch railway line to service Liverpool Camp, the ordnance and ammunition stores, rifle range, Remount Depot, Veterinary Depot and internment camp itself. The line – which lay entirely outside the Project

area – was completed in January 1918 and included a rail bridge with stone piers that the internees built across Harris Creek at Holsworthy.[33]

Long after the war, the bridge and many of the sandstone buildings that the internees erected were partially or wholly demolished. However, some of the sandstone blocks of which they were constructed have been incorporated in structures now standing at Steele Barracks. The altar wall of the chapel is built of such blocks that were salvaged from a building at the Old Holsworthy Camp, while the facade of the Army Engineer Museum is constructed of stones from the bridge that the internees built over Harris Creek. One of the stones bears the inscription 'January 1917'. It shows some resemblance to another inscription that appears on a stone *in situ* on one of the bridge's piers.[34]

Figure 4.12 Inscription on pier of bridge over Harris Creek (NSW Heritage Office)

Figure 4.13 Inscription on sandstone block in facade of Army Engineer Museum

4.2.5 The Inter-War period

After the war, most of the buildings at the Liverpool Camp, not unexpectedly lapsed into a state of infrequent occupation and use. Indeed, in January 1923, the Acting Premier of NSW wrote to the Prime Minister asking if some of the huts at the camp could be used to house inmates of the state's hospitals and mental institutions. The request was refused. In these years, the buildings and the camp overall were used periodically when, as before the war, training camps were held.[35]

Among senior military officers in Australia, there was an acute awareness from their experience of the war that the nation needed to be well prepared in the event of the outbreak of any future hostilities. But political leaders, eager to save money, were not willing to commit significant funds to the military. Year after year throughout the 1920s, the Inspector-General of the Australian Military Forces, Lieutenant-General Sir Harry Chauvel, reported on the lack of readiness of the armed forces and pleaded for funds for training, buildings, arms and equipment. Facilities in the Liverpool-Moorebank area figured prominently in his thinking. In 1920, new Mobilisation Stores were built at Moorebank, probably on the same site on the eastern side of Moorebank Avenue that the stores had previously occupied. NSW was now the only state in which such stores had been established and all

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[33] P. Neve, 'The Liverpool – Anzac Rifle Range – Holdsworthy Military Line (N.S.W.)', Australian Railway Historical Society Bulletin, new series vol XV, no. 322, August 1964, pp. 142, 143; Commonwealth Heritage List [CHL], place IDs 105405 and 105406.

[34] 'Harris Creek Bridge', in NSW Heritage Inventory; Royal Australian Engineers: Heritage Precinct Guide, 200?, explanatory notes nos. 7 and 9.

[35] Letter, Acting Premier of NSW to Prime Minister, 25 January 1923; and letter, Prime Minister to Acting Premier of NSW, 21 February 1923, CRS A458, item V356/1.

requisite equipment, including vehicles, stored in them. Three years later, however, Chauvel reported that the stores were overcrowded and, presumably, required expansion.[36]

Chauvel had further plans for development at Moorebank. He wished to establish there a Central Training Depot whose purpose would be to train non-commissioned officer Instructors for the Army, as well as all new recruits to permanent units. The Depot was opened on a temporary basis in the Liverpool-Moorebank area in August 1921, but closed in February 1922 because of a lack of funds. Its location is unknown. A more successful initiative was the establishment of ordnance facilities at Moorebank. During 1922-23, a magazine, explosives store, laboratory test house and isolation store were completed in the area. Again, the exact location of these buildings is not known. Chauvel also wanted to erect a small ordnance workshop at Moorebank, but this does not seem to have been built at all during the 1920s.[37]

Existing facilities in the Liverpool-Moorebank area were meanwhile becoming rundown. In his 1924 report, Chauvel drew attention to the deterioration of buildings and services at centres for annual military training camps around the country. He urged that steps should be taken immediately to repair buildings and make improvements to drainage, sanitation, kitchens and other facilities, especially in the Liverpool-Moorebank-Holsworthy area. His entreaties appear to have elicited little reaction from the government, though some repairs and renovations were carried out on the Moorebank Explosives Depot in 1927.[38]

Of future significance to Moorebank, however, was the first military engineering course in the Liverpool area, held in 1923. Hutcheson (ref footnote 38) states that this was conducted in what was known as the Hospital Block which was situated across the road from what later became Yulong Oval (i.e. on the western side of Moorebank Avenue and north of Bapaume Road). Shortly afterwards, Chauvel noted that, as venues for their training, field engineers needed 'good digging ground and good facilities for bridging.' Moorebank fitted the bill admirably. This was soon even more the case when in 1924-25 the engineers introduced pontoon bridging at their training camps. The proximity of the George's River provided an ideal site for practice and training in bridging of this kind. In 1925-26, an Army School of Field Engineering was held in the Liverpool area, apparently for the first time. The purpose of the school was to establish a uniform system of instruction and training for field engineering units around Australia. After the school finished, Chauvel announced that such schools were henceforth to be held annually.[39]

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[36] 'Liverpool Mobilization Stores', CRS A2489, item 1920/4230; Chauvel, Report of the Inspector-General of the Australian Military Forces, 31 May 1921, p. 9, CRS A458, item H337/2; Chauvel, Report for the Inspector-General of the Australian Military Forces, Part 1, 31 May 1924, p. 9, CRS A1194, item 20.15/11987.

[37] Chauvel, Report of the Inspector-General of the Australian Military Forces, 31 May 1921, pp. 13, 16, CRS A458, item H337/2; Chauvel, Report of the Inspector-General of the Australian Military Forces, Part 1, 31 May 1922, pp. 16, 17, and Part 2, p. 7, AWM 113, item MH1/12 part 1; Chauvel, Report of the Inspector-General of the Australian Military Forces, Part 1, 31 May 1923, p. 11, and Part 2, p. 6, AWM113, item MH1/12 part 1; Major John D. Tilbrook, To the Warrior his Arms: A History of the Ordnance Services in the Australian Army, Canberra, RAAOC Committee, 1989, p. 102; Sydney Morning Herald, 30 March 1927, p. 11.

[38] Chauvel, Report for the Inspector-General of the Australian Military Forces, Part 1, 31 May 1924, p. 18, CRS A1194, item 20.15/11987.

[39] Lieutenant Colonel J.M. Hutcheson, 'The School of Military Engineering', Army Journal, no. 264, May 1971, p. 43; Chauvel, Report for the Inspector-General of the Australian Military Forces, Part 1, 31 May 1924, p. 15, CRS A1194, item 20.15/11987; Chauvel, Report for the Inspector-General of the Australian Military Forces, Part 1, 31 May 1925, p. 13, CRS A1194, item 20.15/14731; Chauvel, Report for the Inspector-General of the Australian Military Forces, Part 1, 31 May 1926, p. 20, AWM 1, item 20/8.

Figure 4.14 Two parts of the same map showing structures in the Moorebank area in 1929 [1:63,360 Liverpool topographic map 1929 National Library of Australia Bib ID 1853067]

Apart from training courses for field engineers, Moorebank continued to be the site for the usual compulsory training camps for infantry, artillery and other branches of the army. This remained the case when compulsory training was suspended in the early 1930s and was replaced by a voluntary system. But there was an uneasy relationship at Moorebank between the military's use of the area and local farming and gardening interests. In the latter half of the 1920s, and probably well before, orchardists and market gardeners in the area complained bitterly about military trainees stealing their produce, which included grapes and watermelons. The thefts became so serious that the army offered to mount an armed guard on market gardens at times when military training camps were held.[40]

With a decline in economic circumstances in 1928 and the onset of the Great Depression the following year, new and different activities were proposed and at times undertaken at Moorebank. In March 1930, the NSW government asked the Commonwealth if a portion of the huts at the Liverpool Military Camp could be used to house unemployed people over the coming winter. The request was turned down by the Minister for Defence and the local military commandant, partly because a training camp was to be held at the camp in August. The next year, however, the Commonwealth had relented to the extent that rooms at the military camp at Moorebank were made available for a Voluntary Trades School where unemployed men and boys could receive training in a variety of trades. During 1933, some 200 to 300 unemployed men were put to work cutting trees and grubbing out roots in the Moorebank area. Relief workers were still at work building a road in the area in 1935.[41]

Another new development was the commencement of sandmining on the eastern bank of the George's River and the construction of a light railway to service the operation. Since the early 1920s, S.W. Jackson of the Moorebank Sand Company had sought approval from the Commonwealth to remove sand from the riverbank at the southern extremity of the Liverpool Military Camp. Eventually securing approval, he bought the last section of the existing line to Holsworthy, which had been closed for some years, and took up the rail lines to re-lay them for his light railway track to the sandmining site. Opened on 1 January 1933, the track ran from the Ordnance Stores Siding just south of Anzac Road on the eastern side of Moorebank Avenue, westward across the avenue and

[40] Sydney Morning Herald, 28 March 1927, p. 18; 16 March 1928, p. 9.

[41] Letter, Premier of NSW to Prime Minister, 27 March 1930; file note, 'Buildings at Liverpool', 21 July 1930, both in CRS A458, item V356/1; Sydney Morning Herald, 18 July 1931, p. 12; 12 July 1933, p. 7; 6 March 1935, p. 13.

then in a south-south-westerly direction across the southern part of the current study site to the bank of the river (Figure 2.15). There was a sand loading stage about halfway along the track and sand loading bins and a siding near its end.[42]

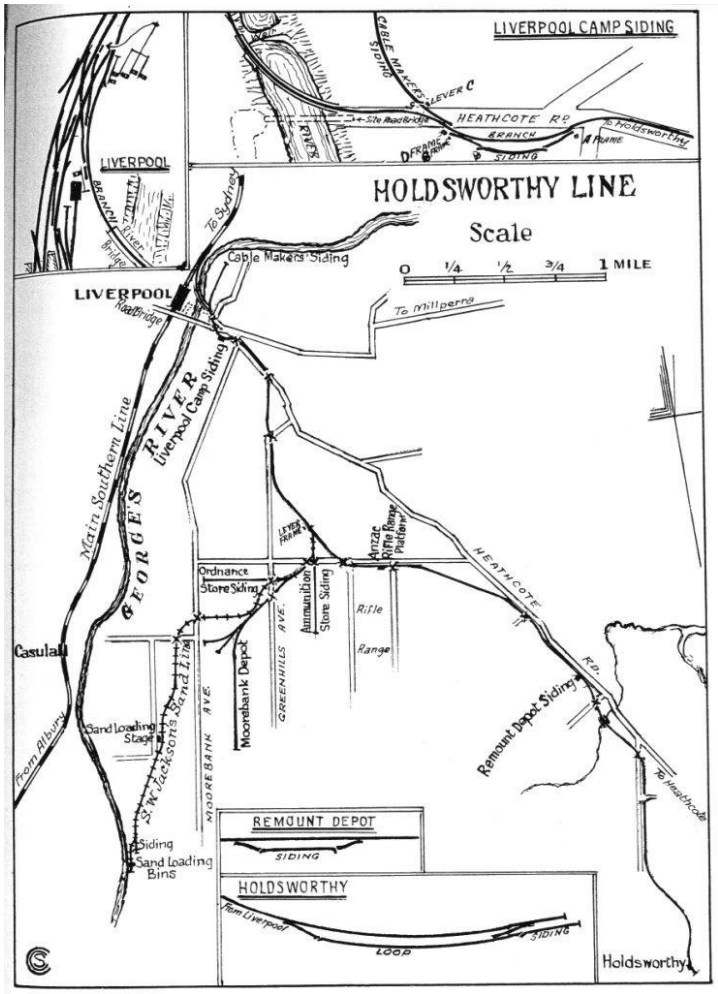

Figure 4.15 Plan showing the Moorebank Sand Company's railway line to the banks of the Georges River [P. Neve, Australian Railway Historical Society Bulletin no. 322, August 1964]

Although the existence of the light rail and of orchards and market gardens at Moorebank gives the impression of a large settled area, most of it remained uncleared bushland until the late 1930s. One reason for this was that since the first decade of the 20th century, field artillery units had used the area for firing practice. From about 1911 onward, artillery batteries located on an elevated position about two kilometres south of Heathcote Station had fired west and northwest across the Woronora River towards the George's River and Holsworthy. For the artillery practice to be held in October 1932, the army issued a notice advising the public to keep out of an area bounded by Moorebank, Deadman's Creek, the George's River and Eckersley. The army was more specific about the danger area for its practice artillery shoot in October 1935. It was bounded on the north by an east-west line through the ordnance stores at Moorebank, on the east by Deadman's Creek, on the west by the George's River and on the south by an east-west line through the Eckersley Post Office. The risk from falling artillery shells suggests that up to this time there were few, if any, military structures or other installations at Moorebank south of the ordnance stores. Presumably, sandmining operations were suspended during artillery practice times.[43]

[42] Neve, Australian Railway Historical Society Bulletin, August 1964, pp. 143, 145, 148.

[43] Cubis, A History of 'A' Battery, pp. 118-9; Sydney Morning Herald, 19 October 1932, p. 8; 19 October 1935, p. 18.

The Moorebank Sand Company, in any case, did not see out the decade. By May 1938, it was in financial trouble and its light railway line was not in use. Late in the year, the NSW Government Railways pronounced the line unsafe and forbade any use of it. Jackson's company was declared bankrupt in March 1940 and, in May, its licence to remove sand from the Moorebank military area was revoked. The light rail line was removed later in World War II and, in 1964, nothing was said to remain of the line except the junction points at the Ordnance Stores Siding.[44]

With a limited return to prosperity in the late 1930s and with gathering signs of war, the Commonwealth began to let tenders for various works at the military camp at Moorebank. In May 1938, the Department of the Interior let a contract worth £1,768 for the erection of two brick stores there. A month later, further tenders were let for repairs and painting to a number of buildings at the camp, while at the end of the year yet more Commonwealth government contracts were awarded for the construction of an ammunition depot and extensions to a road and railway siding. During 1939, the Central Training Depot, which had been closed since February 1922, was re-opened. The trainees were soon described as occupying 'airy and well-built huts' which even had beds with sheets and pillowslips. These initiatives reflect a renewed government commitment to the camp and may indicate that development was starting to spread southward. Such development might have been made possible by artillery units shifting to a new practice firing position at Greenhills, from where they fired south and southeast away from Moorebank.[45]

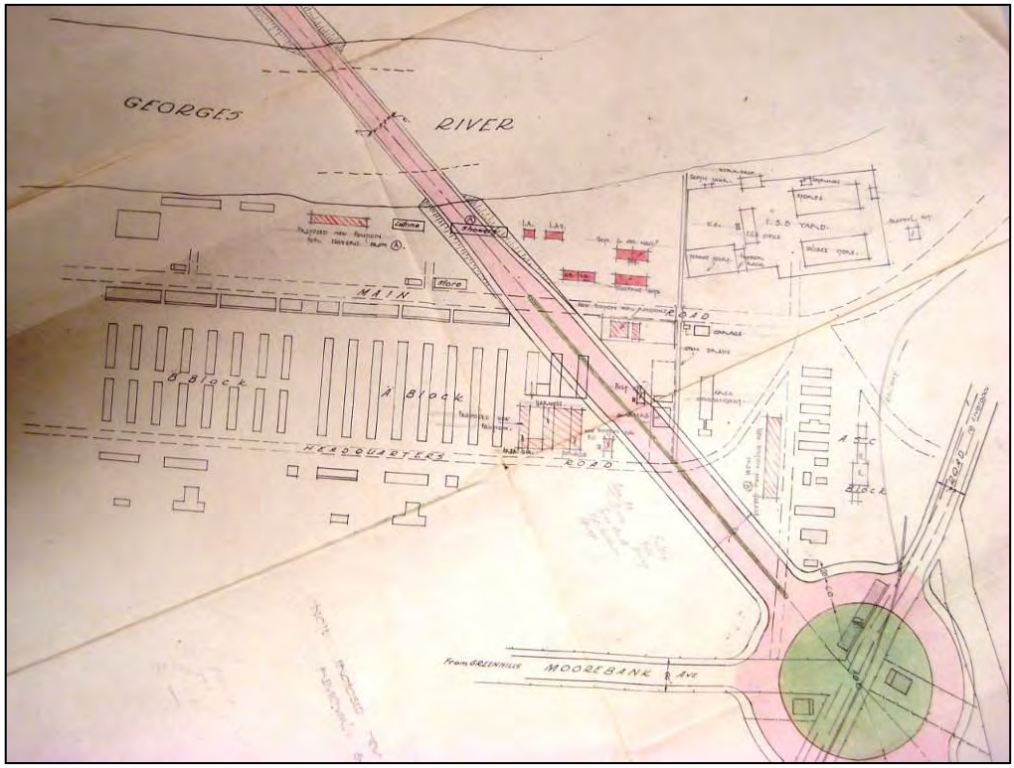

Figure 4.16 Plan showing buildings on the northern part of the Liverpool Military Camp about the end of the 1930s [National Archives of Australia]

4.2.6 World War II: Engineers at Moorebank

The outbreak of war with Germany on 3 September 1939 gave further impetus to development at Moorebank. After seeking advice from the British government as to the kind of military assistance

[44] Neve, Australian Railway Historical Society Bulletin, August 1964, pp. 148, 149.

[45] Sydney Morning Herald, 24 May 1938, p. 6; 21 June 1938, p. 5; 20 December 1938, p. 5; 19 August 1939, p. 18; 11 January 1940, p. 11; Neve, Australian Railway Historical Society Bulletin, August 1964, p. 149; Cubis, A History of 'A' Battery, p. 184.

Australia could give, the Prime Minister, R.G. Menzies, announced on 15 September that an army division, the 6th, would be raised for service either at home or overseas.

Despite the announcement, there were simply far too few trained engineering officers to fill the ranks of the proposed division. The solution arrived at was for the Army to hastily train qualified civilian engineers or engineering students for commissions in the new Australian Imperial Force [AIF]. On 15 September, the very day of the Prime Minister's announcement, an Army school of engineering was temporarily established on the 'Bank Block' at the Liverpool Military Camp; in November, it moved to the Hospital Block, the site of the first military engineering course held in the Liverpool area back in 1923. And in December, the first course to train civilian engineering volunteers for the AIF commenced at the new Army school of engineering. Shortly before the course started, the Commonwealth let two small contracts for repairs to and painting of military quarters in Moorebank and Greenhills Avenues. Whether these contracts related to the new Army engineering school or other military units based at Moorebank is not known.[46]

While the first training course was still in progress, the school moved eastward to the Anzac Rifle Range in early 1940. In May, the school was established on a permanent basis under the title of the 'Army School of Engineering'. This was changed in September to the 'School of Military Engineering', with its headquarters and anti-aircraft and fortress wing at Chowder Bay on Sydney Harbour and its field engineering wing at Moorebank. Meanwhile, in March, the Commonwealth had let a contract to F. Chambers of Merrylands to build 'training camp buildings for engineers and signal school' at Moorebank. As the contract was for the considerable amount of £4,743, it indicates a fairly substantial building program. These 'wartime buildings' may have been those that were later described as 'mainly unlined wooden huts or fibro igloos.' Late in 1940, the School of Military Engineering [SME] and the School of Signals moved into their new buildings on the site that is still occupied by SME. The School of Signals later moved to Bonegilla.[47]

Apart from the establishment of SME, the School of Signals and the Central Training Depot at Moorebank, there was a build-up of other military units and facilities in the area in the early war years. No. 1 Training School was opened somewhere in the area in late 1939, while a Mechanisation Centre or Depot was established by April 1940. At that time, the Commonwealth let a contract worth £33,775 to F.T. Eastment and Sons of Castlereagh Street, Sydney, for the erection of an ordnance store workshop and vehicle store at the depot. A smaller contract was simultaneously let for the provision of stormwater, sewerage and fire services for the facility. As part of the Australian Army Service Corps, the 8th Division Supply Column was raised in the area in July 1940. It is not clear where these units or facilities were located at Moorebank. They may have been situated on the eastern side of Moorebank Avenue and potentially spread across to the western side of the avenue.[48]

At first, the instruction given at SME was based on outmoded World War I models. According to Colonel J.A. McGowan, who was the head of the AIF School of Military Engineering in the Middle East, it consisted of 'four weeks squad drill, six weeks digging trenches and erecting barbed wire fences as for 1914-18 War, and two weeks to cover bridging and all other engineering subjects.' On McGowan's return from the Middle East in April 1942, the Engineer-in-Chief, Major-General Clive

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[46] Ronald McNicoll, The Royal Australian Engineers 1919 to 1945: Teeth and Tail, Canberra, Corps Committee of the Royal Australian Engineers, 1982, p. 20; Hutcheson, Army Journal, May 1971, p. 45; Sydney Morning Herald, 14 November 1939, p. 3.

[47] McNicoll, The Royal Australian Engineers 1919 to 1945, p. 23; Hutcheson, Army Journal, May 1971, p. 45; Sydney Morning Herald, 26 March 1940, p. 7; Brigadier P.J. Greville, The Royal Australian Engineers 1945 to 1972: Paving the Way, Loftus NSW, Corps Committee of the Royal Australian Engineers, 2002, p. 204.

[48] Sydney Morning Herald, 9 April 1940, p. 6; 25 October 1940, p. 9; Theo Barker, Craftsmen of the Australian Army: The Story of RAEME, Bathurst, Crawford House, 1992, p. 22; Lindsay, Equal to the Task, p. 101.

Steele, ordered him to take command of SME at Liverpool and turn out 2,000 trained engineering officers as soon as possible. Arriving at the School, McGowan as a temporary measure extended the existing course by eight weeks 'to include instruction in booby traps and anti-personnel mines, water supply roads, accommodation, bridge design, report writing, engineers in opposed landings; and concluded with engineer tactical exercises without troops for the final three weeks.'[49]

McGowan then set about reorganising SME. He introduced courses of 22 weeks' duration for members of the Officer Cadet Training Unit, six-week refresher courses for NCOs, courses of six to eight weeks' duration for senior officers, six-week electrical and mechanical training courses for both officers and NCOs, and six-week mechanical equipment courses for other ranks personnel. In all, SME ran twelve different types of courses throughout the war and trained a total of 7,450 students, both officers and other ranks. At its peak during the war, there were about 1,300 staff and students at SME, the staff numbering 31 officers and 191 other ranks personnel.[50]

In addition to the courses run at SME, the Royal Australian Engineers provided training for its sappers, that is, private soldiers, as opposed to officers, recruited to the corps. This was carried out at the RAE Training Centre which was established at Kapooka, also on Steele's initiative, in 1942. Developments at the Kapooka training centre would later have some impact on SME.[51]

4.2.7 Post-War: decline and redevelopment in the 1940s and 1950s

With the ending of the war and the demobilisation of Australian forces, SME's role and responsibilities declined to a low level and its staffing numbers concomitantly dropped. By December 1945 there were nine officers and 77 other ranks. A year later, the RAE Training Centre at Kapooka was disbanded and an RAE Recruit Training Squadron raised in its stead at Moorebank. Placed under the command of SME, it was later titled the Depot Squadron.[52]

It may have been shortly after these developments, and as a result of them, that the CUST Hut was relocated from Kapooka to Moorebank. A site plan dating from November 1956 implies that the building was on site before 1948. Another source, however, states that it was erected 'in approximately 1952'. At the time of the 1956 site plan, the Hut was occupied by the Plant, Roads and Airfield [PRA] Troop, which was part of the school's Military Training Wing. The building was originally open at both ends and apparently had an earthen floor.[53]

Standing for Cullen Universal Steel Truss, the CUST Hut was invented by an engineering officer, Lieutenant Colonel D.R. (Dan) Cullen, during World War II. He had served with the 7th Division Engineers in the Middle East where he also designed a series of bridges with rolled steel joists. On his return to Australia in 1942, he was one of the select group of officers handpicked to revamp the courses at SME. After the war, Cullen served in the Occupation Force in Japan where, in

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[49] Colonel J.A. McGowan, quoted in McNicoll, The Royal Australian Engineers 1919 to 1945, pp. 146-7.

[50] McNicoll, The Royal Australian Engineers 1919 to 1945, p. 147; Hutcheson, Army Journal, May 1971, p. 45.

[51] McNicoll, The Royal Australian Engineers 1919 to 1945, pp. 145-6.

[52] Hutcheson, Army Journal, May 1971, pp. 45-6; Greville, The Royal Australian Engineers 1945 to 1972, pp. 189, 190, 191, 192.

[53] 'Layout of Engineer Barracks Casula', attached to 'Development of Engineer Barracks Casula', Appendix G to E-in-C's Liaison Letter, No. 29, 1 December 1956; Greville, The Royal Australian Engineers 1945 to 1972, p. 206.

collaboration with another engineering officer, he had planned the new city of Hiroshima. He died in July 1971.[54]

The reduced activity at SME did not last long. The rise of Cold War tensions in the latter half of the 1940s meant that Australia had to enhance its state of military preparedness. Perhaps as part of this process, the Engineers Corps embarked at the commencement of 1948 on what became a three-phase rehabilitation and redevelopment of the SME site, the phases to some extent overlapping. A further stimulus to development at SME was the commitment of Australian troops to Korea in mid-1950. Conversely, the lead-up to the introduction of a new conscription scheme in March 1951 had a negative impact on the school. In preparation for the influx of the first conscripts, the staffing of SME (and other Army schools) was reduced in order to provide sufficient Regular Army personnel to operate the scheme.

The first phase of the redevelopment program at SME ran from 1948 to 1953 and involved the following works:[55]

> In 1949, the temporary wartime huts and igloos that 'other ranks' staff and students had occupied at SME were replaced by 'substantial barrack buildings brought in from other sites.' Officer and senior NCOs, meanwhile, continued to occupy other temporary wartime buildings.
>
> In 1950, following the formation of 7 Independent Field Squadron, there was insufficient accommodation at Moorebank to house the new unit. Buildings were thus brought in from 'other sites in the Liverpool area' and re-erected by squadron labour. The squadron's barracks area was extended in 1951 by the Commonwealth Department of Works.
>
> During 1953, contractors for the Department of Works built a new centralised mess and kitchen for all other ranks personnel in the SME area. At the same time, extensions and improvements were made to the officers' and sergeants' messes.

The second phase of the Moorebank redevelopment program covered the period 1952-53 and consisted of:

> In late 1952, after 1 Field Regiment moved from Queensland to Moorebank, contractors for the Department of Works commenced the construction of nine two-storey timber framed and clad barracks buildings. They were completed in 1953. At the same time, plans for a brick headquarters building for 1 Field Squadron and HQ 1 Field Engineer Regiment, as well as another four accommodation blocks, were not carried through after the latter unit was disbanded.
>
> In 1952, work commenced on the erection of imported prefabricated houses to serve as married quarters for officers and other ranks. Completed in early 1953, ten were built for officers on the southern part of the site, and 29 for other ranks on the northern part.
>
> 20 Field Park Squadron built a Bridging Hard and Boat Harbour at the wet gap bridging area on the river.
>
> 7 Independent Field Squadron erected an ARMCO Hut [building no. 186] and two Sydney Williams huts [buildings nos. 85 and 86] in the Bridging Store area.

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[54] Anon., Royal Australian Engineers: Heritage Precinct Guide, c. 2005, 'No. 8: The CUST Hut'; McNicoll, The Royal Australian Engineers 1919 to 1945, pp. 90, 146; Greville, The Royal Australian Engineers 1945 to 1972, p. 439.

[55] Information on the three phases is taken from: 'Development of Engineer Barracks Casula', Appendix G to E-in-C's Liaison Letter, No. 29, 1 December 1956; and Greville, The Royal Australian Engineers 1945 to 1972, pp. 204-5.

1 Field Squadron constructed a light rail line from the Bridging Store area to the wet bridging gap.

It was around this time, too, that dog training and a specialist dog training area were established at Moorebank. During 1953, kennels, classrooms and dog stores were built on a site directly west of Chatham Village adjacent to the Dry Bridging Area. SME conducted the first Dog Handlers Course at the site in 1954, the aim being to train the dogs in mine detection, patrolling and guard duties. The training was discontinued in the 1960s, but revived in 1969 as a consequence of US forces successfully using dogs for patrolling and mine detection in Vietnam. Either at the time it was revived or later, the dog training area was relocated to the northern part of the SME area.[56]

The third phase of redevelopment at Moorebank commenced in 1953 and lasted through to 1957. It coincided with the first major increase in the staffing establishment of SME since the war, coupled with an expansion in the training offered by the school.[57] The third phase comprised:

> In 1953, work commenced on the construction of the Trades Training Wing, which was of 'particular importance' in the expanded range of instruction that SME was to undertake. It was completed in 1954 and consisted of an administrative building, engineering workshops, carpentry workshop and thirteen lecture and demonstration rooms. (The Trades Training Wing was later called, successively, the Engineer Services Wing, the Constructional and Mechanical Engineering Wing, and the Construction Wing.)[58]
>
> In 1955, two brick instructional buildings were erected, each with two lecture rooms capable of holding 40 students.
>
> In 1955-56, two brick Q stores for SME and two for 7 Independent Field Squadron were built.
>
> In 1955-56, a brick Administrative Building for 7 Independent Field Squadron was erected adjacent to the RAE Memorial. This building later became the headquarters of the RAE Museum.
>
> In 1955-57, 17 Construction Squadron built a soldiers' club to cater for single and married soldiers and their families. The club, with a floor area of 11,688 square feet, was named the Peeler Club after Lance Corporal Walter Peeler, VC.
>
> In 1955, buildings nos. 20 and 22, which had been erected during World War II and used as barrack accommodation for officers and senior non-commissioned officers, were converted into training buildings. Building no. 20 was transformed into a theatrette and dark room, while building no. 22 became a soils laboratory.
>
> In 1956, an officers' mess was erected but, as it was too small to cater for the numbers of officers attending conferences and making Staff College visits, a steel-framed structure with wooden shutters was added to it. This was gradually upgraded until it became a proper extension to the building.

Though it was not strictly a part of the three-phase redevelopment of the SME site, a memorial to members of the Royal Australian Engineers who had lost their lives in service was designed and erected in the period 1952-56. It was designed by a Melbourne architect, Peter Grenville Gee, who had served as a lieutenant in 2/15 Field Company RAE during the war. Located 'appropriately in the

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[56] Greville, The Royal Australian Engineers 1945 to 1972, pp. 202-3.

[57] Hutcheson, Army Journal, May 1971, pp. 46-7.

[58] Hutcheson, Army Journal, May 1971, p. 46; anon., 'Royal Australian Engineers: History, Customs and Traditions', c. 2008, p. 37.

heart of SME' at the intersection of Ripon and Chatham Roads, the memorial was built by sappers of SME, its PRA Troop and especially members of 7 Independent Field Squadron.[59]

Another memorial was built later in the 1950s to commemorate General Steele, virtually the father of the Engineers Corps, who died in 1955, aged 62. In the following year, the Corps Committee decided that an appropriate monument would be the erection of memorial gates at the entrance to SME. The principal feature of the design by two Melbourne architects, Major S.M.C. Evans and Captain L.E.A. Orton, was its representation in half-scale of the Steele Bridge that Steele had designed in 1942 when Australia could no longer obtain Bailey Bridges. The memorial gates were officially opened on 11 October 1958.[60]

A further development in the 1950s was the establishment of a chapel. The absence of a chapel at Moorebank had been felt for many years, and in late 1956 SME sought approval to convert building no. 19 for such a purpose. Approval was granted in 1957, although it is not entirely clear whether building no. 19 was the actual 'hut' that was eventually converted into a chapel. Work on the building started in October 1957 and was sufficiently advanced for the first service to be conducted in it on Christmas Day that year. The chapel was officially opened on 2 March 1958, but it was succeeded a decade later by a new purpose-built chapel. It is not known if any of the fabric from the original chapel was incorporated in its successor.[61]

4.2.8 Expansion in the 1960s and 1970s

A second major period of expansion and improvement at SME commenced in 1963. In that year, a Nuclear, Biological and Chemical Warfare Wing was raised, and it expanded gradually over the next few years. Another major stimulus to expansion of SME and its facilities occurred in 1965 with the introduction of a new conscription scheme and the commitment of a battalion of Australian troops to Vietnam. The Depot Squadron was immediately expanded to enable it to train up to 1,200 RAE recruits a year and it used a Reinforcement Troop, also formed in 1965, to prepare soldiers for overseas service.[62]

For specialist training of sappers and non-commissioned officers proceeding to Vietnam, a mock Vietnamese village complete with 'typical huts, a well, tunnels, concealed hides and entrances' was set up at SME by January 1966. Called the Vietnamese Village Training Area, it was located opposite the western end of Jacquinot Court. A little later in the 1960s, two new double-storey barracks were built facing the parade ground, accommodation for officers and other ranks was improved, and a Corporals Club was established.[63]

One of the most important developments in this decade was the building of a new chapel in 1968. The chapel was designed by Colonel D.A. Davey and Captain J.M. Brindley and built by SME personnel supervised by the Engineer Services Wing. It was funded by donations from members and

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[59] Greville, The Royal Australian Engineers 1945 to 1972, pp. 212-3; Hutcheson, Army Journal, May 1971, p. 48.

[60] Engineer-in-Chief's Liaison Letter No. 35, 1 June 1958, p. 9; 'Unveiling of Memorial to Major-General Sir Clive Selwyn Steele, KBE, DSO, MC, VD ...', Annex H to Engineer-in-Chief's Liaison Letter No. 37, 1958; anon., Unveiling of the Memorial to Major-General Sir Clive Steele, KBE, DSO, MC, VD, 11 October 1958; Greville, The Royal Australian Engineers 1945 to 1972, p. 213; Hutcheson, Army Journal, May 1971, p. 48.

[61] 'Development of Engineer Barracks Casula', Appendix G to E-in-C's Liaison Letter, No. 29, 1 December 1956, p. 46; and Engineer-in-Chief's Liaison Letter No. 35, 1 June 1958, pp. 8-9.

[62] Hutcheson, Army Journal, May 1971, pp. 47, 49.

[63] Hutcheson, Army Journal, May 1971, p. 47; Greville, The Royal Australian Engineers 1945 to 1972, pp. 206, 207.

friends of the corps. The external walls of the building were constructed of stone hand-cut by convicts in the 1850s for the Bow Bowing Flour Mill at Campbelltown. The stones were donated by the Campbelltown Historical Society, in whose possession they had been. Additional sandstone blocks came from Victoria Barracks in Sydney, while the stones behind the altar were salvaged from old married quarters at Holsworthy that had been built by German internees during World War I.

At the end of the 1960s, the steel piling and timber wall at the Wet Bridging Area were extended after the site suffered flood damage. A small wharf supported on steel piles was also built. A Corporals' Club was established, and improvements were made to officers' and soldiers' living quarters. The old camp theatre, which had been described in the mid-1950s as a 'sub-standard building ... located in an unsuitable area', was converted into a training facility. Staff and students at SME erected a security fence around the whole perimeter, and a guard house was built to control entry to the compound. The grounds of SME were greatly improved, too, with the planting of lawns, shrubs and shade trees, while in 1971 the RAE Golf Course was established on the site.[64]

In 1972, the former Administrative Building for 7 Independent Field Squadron, which had been erected in 1955-56, was converted in the RAE's corps museum (or Army Engineer Museum). As noted above, the facade of the building is constructed of stones from the bridge that German internees built over Harris Creek in World War I.[65]

4.2.9 Development and organisational changes from the 1980s onward

Another major period of development at SME began, slowly at first, in the mid-1980s. In 1985, the Explosive Ordnance Disposal trade was re-introduced to the School. Two years later, the Engineers designed what became known as the Bicentennial Building (or the 'Corps Room' or, more colloquially, the 'Diorama Building'). It was built by 17 Construction Squadron as a Bicentennial Project and was opened on 1 July 1988.[66]

A major rebuild of SME's buildings and facilities was launched in 1989 at a cost of $40 million. As part of the redevelopment, the Directorate of Engineers-Army moved from Canberra in 1991 to be co-located with SME at what was soon called the Engineer Centre. About the same time, the School's theatre was closed and the building was extended to house the SME gymnasium. In 1995, the RAE Doctrine Section of HQ Training Command was established at the Engineer Centre and, in the next year, the Corporals' Club was closed down; the building was subsequently used to accommodate the Mine Warfare and Demolitions Section. With the incorporation of the Royal Australian Survey Corps back into RAE in 1996, the Geomatic Engineering Wing was established at Moorebank in December of that year.[67]

The re-integration of the Survey Corps into RAE led, in 1997, to the construction of the new Museum Building specifically to house the Survey Corps' historic collection. Originally one-third of its current

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[64] Greville, The Royal Australian Engineers 1945 to 1972, p. 206; 'Development of Engineer Barracks Casula', Appendix G to E-in-C's Liaison Letter, No. 29, 1 December 1956, p. 46; anon. 'Engineer Heritage within Steele Barracks', 2000, p. 10.

[65] Anon., Royal Australian Engineers: Heritage Precinct Guide, c. 2005, 'No. 7: Army Engineer Museum'; anon. 'Engineer Heritage within Steele Barracks', 2000, p. 7.

[66] Anon. 'Engineer Heritage within Steele Barracks', 2000, p. 7; anon., Royal Australian Engineers: Heritage Precinct Guide, c. 2005, 'No. 4: Bi-Centenary Building and Equipment Bridges'.

[67] Anon., 'Royal Australian Engineers: History, Customs and Traditions', c. 2008, pp. 38-9; excerpt from pamphlet, chapter 5, 'History of Steele Barracks (formerly the School of Military Engineering)', 2000, pp. 2, 3.

size, the building was substantially extended by 17 Construction Squadron and re-opened on 1 July 2002, the centenary of the foundation of RAE.[68]

Meanwhile, in 1998, the buildings that had long been used for the training of mine-detecting dogs – or Explosive Detection Dogs [EDD], as they were now called – were refurbished. Some important organisational changes soon followed at SME. In mid-1998, the school became a sub-unit of the Combat Arms Training Centre [CATC] at Puckapunyal and, at the end of the year, the Training Research Development Wing was removed from Moorebank to CATC. This latter organisation was responsible for training development across all arms corps. During 1999, the 2nd Training Group, the Eastern Region Cadet Wing and the Education Wing all moved from Ingleburn to SME, with the 2nd Training Group retitled the Regional Training Centre. The import of these changes was that SME was now no longer occupied solely by engineers. Reflecting the changes, the name 'School of Military Engineering' was dropped and was replaced by the title 'Steele Barracks' in honour of General Sir Clive Steele. At the end of the year, the school suffered a further blow to its status as a training entity in its own right when, together with infantry, artillery and armoured units, it was fully integrated into CATC and renamed the Mobility / Survivability Division. The new name did not last long. The title 'School of Military Engineering' was restored on 1 March 2001.[69]

During 2003-5, a Vietnam War Memorial dedicated to RAE personnel who lost their lives in Vietnam was erected at Steele Barracks. The memorial, has its origins in an earlier memorial established in Vietnam more than thirty years ago by 1 Field Squadron at the Australian Task Force's base at Nui Dat.[70]

A very recent innovation at Steele Barracks was the erection in about 2007 of the STRARCH hangar.

4.3 Historical summary

A summary outline of the history of the study area is presented in Table 4.1. This outline of key dates helps to establish the historical significance of the place and is based largely on information presented by Graham Brooks and Associates (GB&A 2004).

Table 4.1 Key dates in the European development of the site

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.

[68] Anon., Royal Australian Engineers: Heritage Precinct Guide, c. 2005, 'No. 1: New Museum Building'.

[69] Anon., 'Royal Australian Engineers: History, Customs and Traditions', c. 2008, pp. 38-9; excerpt from pamphlet, chapter 5, 'History of Steele Barracks (formerly the School of Military Engineering)', 2000, pp. 3, 4.

[70] Anon., Royal Australian Engineers Vietnam Memorial: A Short History, c. 2005; Anon., Royal Australian Engineers: Heritage Precinct Guide, c. 2005, 'No. 3: RAE Vietnam Memorial'; information from the Army Engineer Museum.

Key date	Development
1809	Charles Throsby received his grant of 600 acres at Glenfield.
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 Ordinance 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.

Key date	Development
1943	War time peak occupation of SME numbered1300 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: new entry road new sleeping quarters, mess hall, recreation rooms and parade ground married quarters built - Jacquinot 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.
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.

4.4 Previous cultural heritage studies

A number of previous environmental and heritage reports on the study area and adjacent Defence National Storage and Distribution Centre (DNSDC) site were reviewed for the preliminary stage of the Heritage Impact Assessment (NOHC 2012).

4.4.1 Moorebank Defence Site Heritage Assessment (Graham Brooks and Associates May 2004)

This assessment included all of the Defence lands within the potential IMT boundary situated south of Bapaume Road and east of the Georges River and a small area of Commonwealth land on the western bank of the river, south of the Casula Regional Arts Centre.

The assessment of heritage significance concluded that the following elements on the SME and Base Administration Support Centre sites were of cultural heritage significance:

- road pattern and boundary alignment
- naming of roads and areas within the SME

- memorials, chapel, museum, entrance gates and movable heritage relating to the use of the SME by the Royal Australian Engineers

- cultural plantings and natural landscape.

The report recommended that the above elements be retained within the continued occupation of the site by Defence. Should the site (in full or part) be redeveloped or cease to be in Defence ownership, selective retention, adaptive reuse or relocation of these elements as appropriate is recommended by the report.

The report found that should the site remain in Commonwealth ownership a number of elements should be recommended for listing on the CHL. To date, this course of action has not been implemented by Defence. The elements recommended for listing were:

"School of Military Engineering Group: comprising RAE Memorial Chapel, RAE War Memorial, Major Clive Steele Memorial Gates, CUST Hut, Drill Hall (Building B40), significant stands of trees, road layout and naming, open wooden [sic] nature and representative examples of timber 'P1' hut buildings."

In recommending these for listing, the report also notes:

"Such listing should consider not only individual unique items to the site, but also groups of similar building types and elements of which representative examples may only be required to be listed and retained in future proposals for redevelopment or adaptive reuse."

As part of the process of transferring the property from Commonwealth ownership (if this were to occur in the future) the report recommends that appropriate heritage management procedures be put in place to transfer protection of these significant items. Under NSW Heritage legislation this would probably involve nomination of the elements to the NSW Heritage Register and the LCC LEP Heritage Schedule. Archival recording of any significant building or elements prior to their demolition or relocation is recommended.

The report provides conservation strategies for protection of significance under both an ongoing Defence site occupation scenario and a non-Defence occupation situation.

The strategies for a non-Defence (Commonwealth) use of the site in brief included:

- relocation of the RAE Memorial, RAE Memorial Chapel and Clive Steele Memorial Gates to the new site occupied by SME and Royal Australian Engineers; this could be considered following appropriate stakeholder consultation.

- relocation of the Heritage Park and Museum, including contents and external displays, with SME to a new site. A Heritage Park and Museum should be established on the new site; this could be considered following appropriate stakeholder consultation.

- adaptive on site reuse of the CUST Hut.

- retention on site of representative examples of the World War II timber hut buildings as well as the former Drill Hall (Building 40). The building should be refurbished for active ongoing use. Consideration should also be given to relocation of the representative examples to another defence site. Figure 3.4 identifies the locations of these items.

4.4.2 Environmental Assessment for the proposed South Sydney Freight Line (Parsons Brinckerhoff 2006)

In 2006 Parsons Brinckerhoff undertook an Environmental Assessment for the proposed South Sydney Freight Line (Parsons Brinckerhoff 2012). The proposed SSFL would provide a dedicated freight line for 30 km between Macarthur and Sefton in southern Sydney. The Built Heritage was assessed by the Caldis Cook Group as a component of the EA.

Within the northern rail option design this assessment identified the Casula railway station and footbridge, opened in 1894, the Casula Regional Arts Centre (the former Liverpool Power Station),

built in 1953, and the Casula Railway Viaduct, an 1891 brick masonry viaduct, as affected built heritage items.

The Casula railway station and footbridge was assessed as being of local significance and the footbridge is listed on the RailCorp S170 register. The Casula Regional Arts Centre was assessed as having local significance, and was not yet listed. The Casula Railway Viaduct was assessed as being of local significance and is listed on the Campbelltown City Council LEP.

4.4.3 Moorebank Intermodal Terminal – Existing Aboriginal and European Heritage (CDFD 2011)

In 2011 Parsons Brinckerhoff prepared a review of the existing Aboriginal and European heritage for the Moorebank Intermodal Terminal (CDFD 2011).

The Project area included Commonwealth-owned land occupied by the Department of Defence. The Project area is approximately 220 hectares in size and is located within the suburb of Moorebank within the City of Liverpool Local Government Area approximately 30 kilometres south-west of the Sydney Central Business District. The Project area is generally defined as the land bounded by the Georges River to the west, Moorebank Avenue to the east, the M5 Motorway and ABB Medium Voltage Production facility to the north and the East Hills Railway line to the south.

This European heritage assessment addressed both a European built environment component and a European archaeological (non-built environment), or subsurface, component. The archaeological field surveys identified six European archaeological sites and one potential archaeological deposit within the Project area. An assessment of heritage impacts should be undertaken upon confirmation of a preferred concept.

4.4.4 Environmental Assessment Part 3A Concept Application for SIMTA (Sydney Intermodal Terminal Alliance), of the Moorebank Intermodal Terminal Facility (Urbis 2012)

In 2012 Urbis undertook an Environmental Assessment Part 3A Concept Application for SIMTA (Sydney Intermodal Terminal Alliance), of the Moorebank Intermodal Terminal Facility (Urbis 2012) prepared by Jennifer Cooper and Danielle Pinkerton. The assessment of non-indigenous heritage within this EA was prepared by Artefact Heritage Services. The proposed rail corridor is this assessment crosses the southern portion of the current study area.

The assessed study area encompassed the Defence National Storage and Distribution Centre (DNSDC, the 'SIMTA' site), excluding the DNSDC car park, and several portions of land to the south of the SIMTA site to encompass the proposed rail corridor. The lands within the rail corridor include a section of the School of Military Engineering, and the northern section of the Glenfield waste facility.

This assessment identified the School of Military Engineering as listed on the Liverpool LEP (2008) under its alternative name, the Australian Army Engineers Group (Item 57) (Urbis 2012), and includes the Royal Australian Engineers Memorial Chapel, RAE Monument, Major General Sir Clive Steele Memorial Gates and the CUST Hut, and an area of land around these built structures.

This assessment also identified the Casula Regional Arts Centre in close association with the study area, and as listed on the Liverpool LEP. This building was built in the 1950s by the Electricity Commission of NSW, as one of a number of "package" power stations, all of a similar design. The assessment of the buildings heritage significance was based on the site demonstrating the development of Casula post-WWII when industrial expansion and residential growth necessitated an interim local power supply.

4.4.5 Moorebank Intermodal Terminal – Liverpool City Council Northern Powerhouse Land; Aboriginal Subsurface Testing (NOHC 2014b)

NOHC conducted subsurface testing within the Northern Powerhouse Land and provided an Aboriginal heritage assessment of the Northern Powerhouse Land.

The test excavation program within the Northern Powerhouse land demonstrated that while the archaeological significance of the upper 120-150 cm of deposits is generally low, the deposits are likely to have significance in terms of being a representative example of environmental changes that resulted from European settlement, in particular the construction of the Liverpool Weir. The Unit 1 and Unit 2 deposits have the potential to be of significance in terms of their scientific value, natural value, educational value, representativeness and social value (importance to the Aboriginal community and the broader Australian community) at local, State and National levels.

4.5 Previous recordings

Relevant Commonwealth, State and Local Heritage Registers, and non-statutory listings were reviewed to determine whether there were any currently listed items on or near the study area. This provides an indication of whether there is any existing established heritage significance for individual items or elements within the study area. The findings are summarised below. Consistent with the requirements of the proponent, only statutory listings are considered here.

4.5.1 Commonwealth Heritage List

The *CHL Place 105641 Defence National Storage and Distribution Centre, Moorebank Avenue*, is on the eastern side of Moorebank Avenue and outside of both the Project and study areas.

4.5.2 State Heritage Register and Inventory

There is one place near study area that is listed on the State Heritage Register.

Glenfield Farm is listed under the NSW Heritage Act for its notable associations with Dr. Charles Throsby, his nephew Charles Throsby and his family. This farm is the oldest continuously worked farm in Australia, and its buildings rank amongst the earliest buildings in the country for their design and workmanship. The Dairy, barn, homestead and Glenfield Farm Group are on the Inventory.

There are seven places in or near the study area listed on the State Heritage Inventory as they are listed by local Government and state Government agencies:

- Glenfield Farm is listed separately as:
    - Glenfield Farm homestead;
    - Glenfield Farm barn,
    - Glenfield Farm (former) dairy; and
    - Glenfield Farm Group
- Kitchener House (formerly Arpateelie) 208 Moorebank Avenue (item no. 58). This is a Federation cottage used by Lord Kitchener in 1910 to review the status of the Australian army. The building is outside of the study area boundary. The building is now privately owned. .
- Australian Army Engineers Group (item no. 57) including:
    - RAE Memorial Chapel
    - RAE War Memorial
    - Major-General Clive Steele Memorial Gates
    - CUST hut.

    The Heritage Schedule defines item no 57 as Lots 3001 – 3005 DP1125930.

- Former Casula Power Station (item no. 10). This site is on the western side of the Georges River near the main northern railway. This is outside of the Project area boundary. The building has been adaptively re-used as an art gallery. See Figure 4.17 for location.

- Railway viaduct, Main Southern Railway Line (item no. 12), adjacent to Woodbrook Road, Casula. This is outside of the Project area boundary. See Figure 4.17 for location.

- Railway viaduct, Main Southern Railway Line (item no. 11), approximately 200 m south of the former Casula power station. This is outside of the Project area boundary. See Figure 4.17 for location.

- The School of Military engineering (SME) is included as a complex/group. The Inventory employs the term SME as an overall name, but also refers to the Steele Barracks, Australian Army Engineering Museum and Heritage Park.

4.5.3 Liverpool City Council Local Environmental Plan

There are six places in or near the study area listed on the Heritage Schedule of the LCC LEP. See Figure 4.17 for location. These include:

- Glenfield Farm Group, including homestead, barn (former dairy and stables) (item no. 14)

- Kitchener House (formerly Arpateelie) 208 Moorebank Avenue (item no. 58). This is a Federation cottage used by Lord Kitchener in 1910 to review the status of the Australian army. The building is outside of the study area boundary. The building is now privately owned. .

- The SME is included as the Australian Army Engineers Group (item no. 57) including:

  - RAE Memorial Chapel

  - RAE War Memorial

  - Major-General Clive Steele Memorial Gates

  - CUST hut.

  The Heritage Schedule defines item no 57 as Lots 3001 – 3005 DP1125930. LEP listing includes a cadastral definition that is inclusive of all of the Project area south of Bapaume Road

- Former Casula Power Station (item no. 10). This site is on the western side of the Georges River near the main northern railway. This is outside of the Project area boundary. The building has been adaptively re-used as an art gallery. See Figure 4.17 for location.

- Railway viaduct, Main Southern Railway Line (item no. 12), adjacent to Woodbrook Road, Casula. This is outside of the Project area boundary. See Figure 4.17 for location.

- Railway viaduct, Main Southern Railway Line (item no. 11), approximately 200 m south of the former Casula power station. This is outside of the Project area boundary. See Figure 4.17 for location.

The LCC LEP listing does not have any statutory control over the Commonwealth's use of the site. However the listing demonstrates local significance and interest in the site. It is recommended that LCC be consulted in the planning process for the future use of the Steele Barracks site.

4.5.4 The Register of the National Estate

Kitchener House and Glenfield Farm are also listed on the Register of the National Estate. This is now a static register and has no statutory control on the activities of the Commonwealth. However, it is an indication of potential community interest in a place.

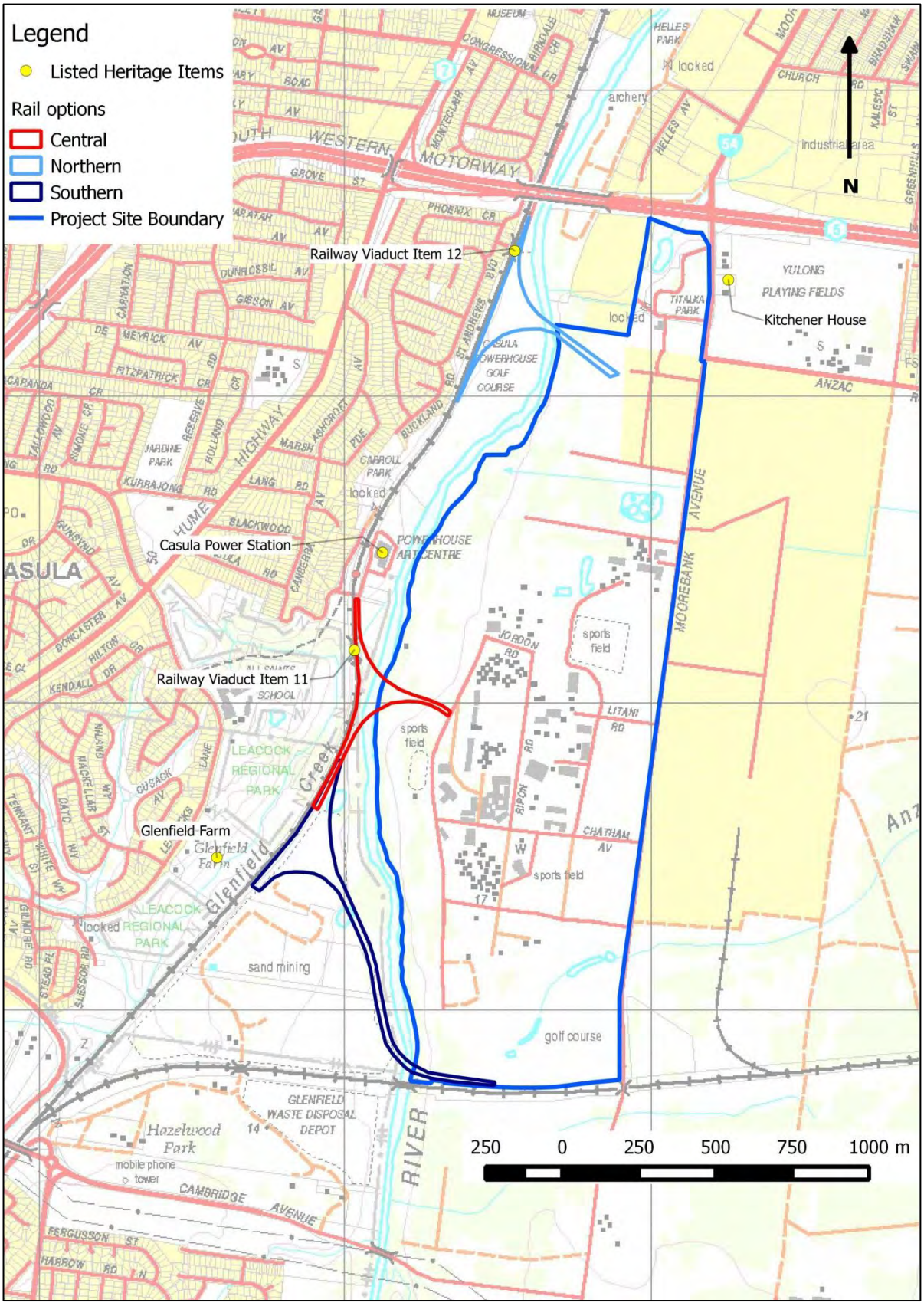

Figure 4.17 Location of listed items adjacent to the Project area

4.6 Historical themes

The national, state and local historical themes relevant to the Moorebank study area are summarised below in Table 4.3.

Table 4.3 Summary of historical themes applicable to the Moorebank IMT study area.

Australian Theme	NSW Theme	Local Theme(s)
Peopling Australia	Migration	Early nineteenth century land grants and European settlement along Georges River
Developing local, regional and national economies	Agriculture	Development of Moorebank Estate and later Church of England for agricultural purposes nineteenth century into twentieth
	Environment – cultural landscape	Subdivision of the Moorebank Estate Development of the Moorebank Defence area
	Events	WWI and WWII use of the Moorebank Defence site
	Health	Isolation camp
	Mining	Sand mining activities and infrastructure
	Pastoralism	Development of Moorebank Estate and later Church of England for pastoral industry purposes nineteenth century
	Transport	Light railway
Building settlements, towns and cities	Land Tenure	Early nineteenth century land grants Passing of Moorebank Estate to Church of England mid nineteenth century
	Accommodation	WWI isolation camp, WWII barracks (P1 buildings), CUST Hut
Educating	Education	Military training
Governing	Defence	Military training, WWI and WWII camps/barracks Establishment of Commemorative Garden, memorials and chapel
Developing Australia's cultural life	Domestic life	Military camps/barracks
	Creative endeavour	Camp buildings including invention of the CUST Hut and relocation of example to Moorebank from Kapooka STRARCH Hangar
	Sport	Establishment, use and abandonment of the Liverpool Golf Course on the Collingwood Estate
Marking the phases of life	Birth and Death	Establishment of Commemorative Garden, memorials and chapel
	Persons	Association with Thomas Moore, one of largest landowners in NSW ("King of Liverpool") Association with Lord Kitchener's visit to NSW

5. SURVEY RESULTS

This section provides descriptions of all European cultural heritage recordings generated as a result of the archaeological field survey and built environment inspection of the Project area. Together with the test excavation results (Section 6), these sections present a description of the existing environment and the cultural heritage resource.

5.1 Built environment

The study area includes four distinct areas which are defined by physical character, function and defined location. These areas or precincts are dealt with as separate areas in this report.

The four precincts as identified on Figure 5.1 include:

- Precinct 1: Defence and private land north of Bapaume Road
- Precinct 2: Moorebank Base Administration Support Centre (BASC)
- Precinct 3: Defence Support Group (DSG)
- Precinct 4: School of Military Engineering (SME) – Steele Barracks.

5.1.1 Precinct 1 – Defence and private land north of Bapaume Road

5.1.1.1 Location and setting

Precinct 1 is bordered to the south by Defence land (the northern boundary fence of Moorebank BASC), to the west by the Georges River, to the north by the M5 freeway to the eastern by and Moorebank Avenue (refer Figure 5.2).

Precinct 1 contains two distinct parts. The western half is occupied by a privately owned industrial complex. There are a number of large Colorbond steel clad buildings on the site ranging to about 12 m high. The buildings occupy most of the site and appear to have been constructed circa 1980s and 1990s (refer Figure 5.3). There is some perimeter landscaping, however, the majority of the open area around buildings is either bitumen or dry land grass.

The eastern half of the precinct is presently vacant and overgrown with grasses. The site was formerly the Moorebank Village residential accommodation. There are scattered trees throughout the site and some screening shrubs along the western boundary fence line. The trees appear to have been planted for the village.

There is some evidence within the overgrown site of the main roadways from the Moorebank Village era. The site presently has an open parkland character. There is no built evidence of former uses above the level of the grass (refer Figure 5.4). Entry roadways into the site are still visible on Bapaume Road.

Figure 5.1 Precinct location plan

Figure 5.2 Precinct 1 location plan

Source: EMA 2010

Figure 5.3 General view of ABB industrial complex, looking northwest

Source: EMA 2010

Figure 5.4 View of the former Moorebank (accommodation) Village area, looking north

5.1.2 Precinct 2 – Moorebank Base Administration Support Centre (BASC)

5.1.2.1 Location and setting

Precinct 2 extends south of Bapaume Road, and west from Moorebank Avenue through to the Georges River. At the time of the survey, the built development was restricted to the eastern half of the site adjacent to Moorebank Avenue (refer Figure 5.6). The area had large areas of open space between the buildings which, combined with large areas of natural bushland, playing fields and recreation spaces to the south, west and north provided a very open character to the precinct. The mature trees set in open grassland and formal plantings of exotics along the street contributed greatly to the area's character (refer Figure 5.5). An area, set aside as parkland in 1949, known as Titalka Park is located in the north eastern corner of this precinct.

With the exception of building B99 and some associated sheds in the transport depot, all of the precinct 2 buildings were recently demolished in a Defence instigated program conducted in mid-2012 (Bermagui Constructions 2012). The assessment and justification for the demolition program was conducted separately and independently of the current Project assessment. One potential archaeological deposit (PAD), (MHPAD3), was identified following an inspection of the area after demolition (refer Section 5.3).

The following descriptions are included as a record of the December 2010 inspection and to provide context to the analysis of recording MHPAD3. The descriptions are subdivided into demolished and existing buildings. Only the existing buildings and PADs are considered further in subsequent sections of this assessment.

Figure 5.5 View looking to river from north end of Precinct 2

5.1.2.2 The demolished buildings

The buildings within the precinct were either single or two-storeys in height and generally grouped in accordance with when they were constructed. The precinct contained buildings constructed in the 1940s, 1960s, 1970s, 1980s and 1990s. General descriptions are provided below.

Figure 5.6 Precinct 2 location plan

1940's era buildings

These buildings were single storey timber framed structures in a simple rectangular plan. The exteriors were clad in a mix of weatherboard and asbestos cement sheet, paint finished. The roofs were clad in corrugated galvanised iron or corrugated (low profile) asbestos cement. The buildings were examples of the P1 style building used during World War II. The windows were typically painted timber framed awning. Aluminium framed windows had been installed in some of the buildings in the group (e.g. buildings B44 – B50). External doors were vertical timber board ledged and braced type, paint finished. Some doors had been replaced with flush panel paint finish doors. Buildings in this group included B36–B39, B44–B50 and B18–B20 (refer Figures 5.7, 5.8 and 5.10).

The buildings included a timber framed floor with hardwood floorboards. They were typically set up on brick piers. Some had timber or brickwork infill to the perimeter below floor level. There was evidence in some of the unmodified interiors (Building 38) that the original floor finish was vinyl or linoleum. This had been replaced or covered with carpet in later refurbishments (B36, B47–B50) (refer Figure 5.10), and ceramic tiles in wet areas.

Figure 5.7 Building B36-B39, from the north

Source: EMA 2010

Figure 5.8 Building B44 from southeast

Source: EMA 2010

Figure 5.9 Building B47 from southwest

Source: EMA 2010

Figure 5.10 Building B38 part interior

Source: EMA 2010

Internal walls were timber framed and lined; with asbestos cement sheet and cover batten paint finish. In some buildings this had been replaced with plasterboard in some areas. Ceilings were lines either in flat sheet and batten, or plasterboard.

The buildings varied in condition from poor (requiring a lot of maintenance work) to good condition (sound with minimal maintenance required). There were three other buildings of the 1940s era, of the P1 type which were larger and constructed for non-residential uses. These buildings are briefly described below:

Building B40

Known by some as the Drill Hall this building had formerly been a theatre and entertainment hall. It contained a timber stage with several rooms backstage. A projection room had been constructed above the main entry. This was an addition to the building (based on photographic evidence), with the external cladding in the entry area differing from the rest of the building. Toilets with a more recent fit out had been installed adjacent to the entry foyer (refer Figure 5.11). The exterior had been painted since 1944 (an Australian War Memorial photo shows buildings in this precinct unpainted in 1944–45).

A false ceiling had been installed in the auditorium area. The ceiling followed the original ceiling line (photographic evidence), but was of a different material. The exposed roof struts had been boxed in (Figure 5.14).

The flooring had been changed to particleboard in the auditorium. At the time of the inspection, this building was used as a furniture store. Internally the condition was good. Externally the condition varied from good to poor. Paint work was generally in poor condition and there was some rotting timber visible (refer Figures 5.12 and 5.13).

Some of the external doorways appeared to have been modified and some original doors had been replaced.

Building B41 – Former Officer's Mess

This building had an irregular plan form but the original areas of the building were constructed in the basic P1 style (refer 1940s era buildings above for description). There had been several extensions to the building. On the south wall facing the former site entry road, there was an incongruous bay window. Unsympathetic additions had been made to the northern end of the building. The building was located adjacent to a former site entry road. Lawn areas to the east and west of the building were enclosed by timber and brick fences. There were small areas of garden beds within the enclosed yards. These did not present a strong design character to the spaces (refer Figure 5.15 and 5.16).

At the time of the inspection this building was vacant and in poor condition in some external areas.

Figure 5.11 Drill Hall Building B40 from southeast

Source: EMA 2010

Figure 5.12 Drill Hall Building B40 from northwest

Source: EMA 2010

Figure 5.13 Generall view of interior - Building B40

Source: EMA 2010

Figure 5.14 Detail of box bracing and altered doorway - Building B40

Source: EMA 2010

Figure 5.15 Building B41 - view from south

Source: EMA 2010