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NSW GOVERNMENT

M1 Pacific Motorway extension to Raymond Terrace

Non-Aboriginal Heritage Working Paper

Transport for NSW| July 2021

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Executive summary

Background

Transport for New South Wales (Transport) proposes to construct the M1 Pacific Motorway extension to Raymond Terrace (the project). Approval is sought under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* and Part 9, Division 1 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Performance outcomes

This assessment has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) (SSI 7319) relating to the non-Aboriginal heritage. In addition, the desired performance outcome for the project in relation to non-Aboriginal heritage as outlined in the SEARs (SSI 7319) is to:

- Ensure that the design, construction and operation of the project facilitates, to the greatest extent possible, the long term protection, conservation and management of the heritage significance of items of environmental heritage
- Ensure the design, construction and operation of the project avoids or minimises impacts, to the greatest extent possible, on the heritage significance of environmental heritage.

Overview of non-Aboriginal heritage impacts

Construction activities associated with the project have the potential to directly and indirectly impact on heritage items including demolition/destruction of items, vibration impacts, work within heritage curtilage and unplanned impacts from accidental damage by machinery.

A review of previous heritage studies, aerial imagery, and a search of relevant heritage registers identified eight listed heritage items and six areas of heritage potential within and next to the construction footprint, or subject to project-related work.

Following the field survey, a total of nine heritage items were assessed as being significant. The overall impact to each of the nine heritage items as a result of the project include:

- **Major impact:** Glenrowan Homestead (not listed, assessed as local significance) - demolition of one residential building, destruction of archaeological remains
- **Minor impact:** Hexham Shipbuilding Yards (listed on the Newcastle Local Environment Plan (NLEP) I180) – curtilage incursion but avoidance of archaeological remains
- **Negligible impact:**
  - Hannell Family Vault (listed on NLEP I179)
  - Residence, 29 Eastern Avenue, Tarro (listed on NLEP I548)
  - Tarro Historic Site (Original township of what was formerly known as Upper Hexham) (listed on NLEP A18)
  - Tarro Substation (listed on NLEP I546)
  - Pumping Station (listed on NLEP I550, Hunter Water Section 170 register)
  - Newcastle Crematorium (listed on NLEP I34)
  - Our Lady of Lourdes Church (listed on NLEP I547).

Management measures

To address the major impacts at the Glenrowan Homestead, measures such as archival photographic recording, archaeological salvage excavation, dilapidation surveys and vibration monitoring have been proposed for this heritage item to mitigate the impacts. Items with negligible to minor impacts identified will generally have dilapidation surveys completed and be protected with barrier fencing during construction. For any potential archaeological heritage items identified during construction, an unexpected finds procedure or further sub-surface investigations would be applied. These environmental management measures will be detailed within a non-Aboriginal heritage management plan that would be prepared as part of the project Construction Environmental Management Plan.

Conclusion

Overall, the project achieves desirable performance outcomes by firstly avoiding and then minimising impacts to heritage items within and next to the construction footprint. The project would have a major impact to the Glenrowan Homestead, requiring salvage excavation and archival recording activities to mitigate the impacts, while only negligible to minor impacts would occur to other heritage items affected by the project.

Contents

List of tables

List of figures

Appendices

1 Introduction

1.1 Background

Transport for New South Wales (Transport) proposes to construct the M1 Pacific Motorway extension to Raymond Terrace (the project). Approval is sought under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Part 9, Division 1 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The project would connect the existing M1 Pacific Motorway at Black Hill and the Pacific Highway at Raymond Terrace within the City of Newcastle and Port Stephens Council local government areas (LGAs). The project would provide regional benefits and substantial productivity benefits on a national scale. The project location is shown in **Figure 1-1** within its regional context.

1.2 Project description

The project would include the following key features:

- A 15 kilometre motorway comprised of a four lane divided road (two lanes in each direction)
- Motorway access from the existing road network via four new interchanges at:
  - Black Hill: connection to the M1 Pacific Motorway
  - Tarro: connection and upgrade (six lanes) to the New England Highway between John Renshaw Drive and the existing Tarro interchange at Anderson Drive
  - Tomago: connection to the Pacific Highway and Old Punt Road
  - Raymond Terrace: connection to the Pacific Highway.
- A 2.6 kilometre viaduct over the Hunter River floodplain including new bridge crossings over the Hunter River, the Main North Rail Line and the New England Highway
- Bridge structures over local waterways at Tarro and Raymond Terrace, and an overpass for Masonite Road in Heatherbrae
- Connections and modifications to the adjoining local road network
- Traffic management facilities and features
- Roadside furniture including safety barriers, signage, fauna fencing and crossings and street lighting
- Adjustment of waterways, including at Purgatory Creek at Tarro and a tributary of Viney Creek
- Environmental management measures including surface water quality control measures
- Adjustment, protection and/or relocation of existing utilities
- Walking and cycling considerations, allowing for existing and proposed cycleway route access
- Permanent and temporary property adjustments and property access refinements
- Construction activities, including establishment and use of temporary ancillary facilities, temporary access tracks, haul roads, batching plants, temporary wharves, soil treatment and environmental controls.

A detailed project description is provided in Chapter 5 of the environmental impact statement (EIS). The locality of the project is shown in **Figure 1-1**, while an overview of the project is shown in **Figure 1-2.**.

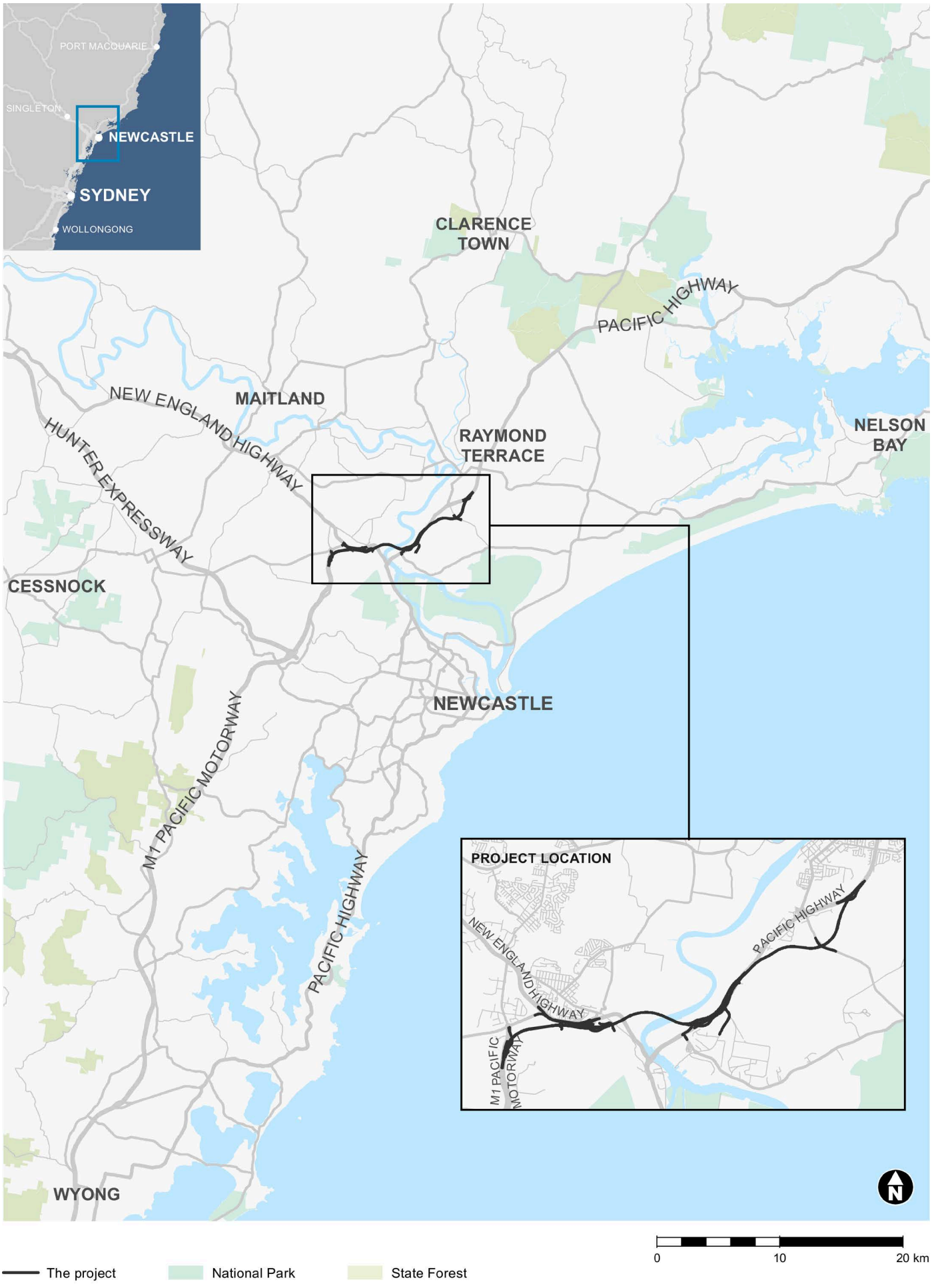

Figure 1-1 Regional context of the project

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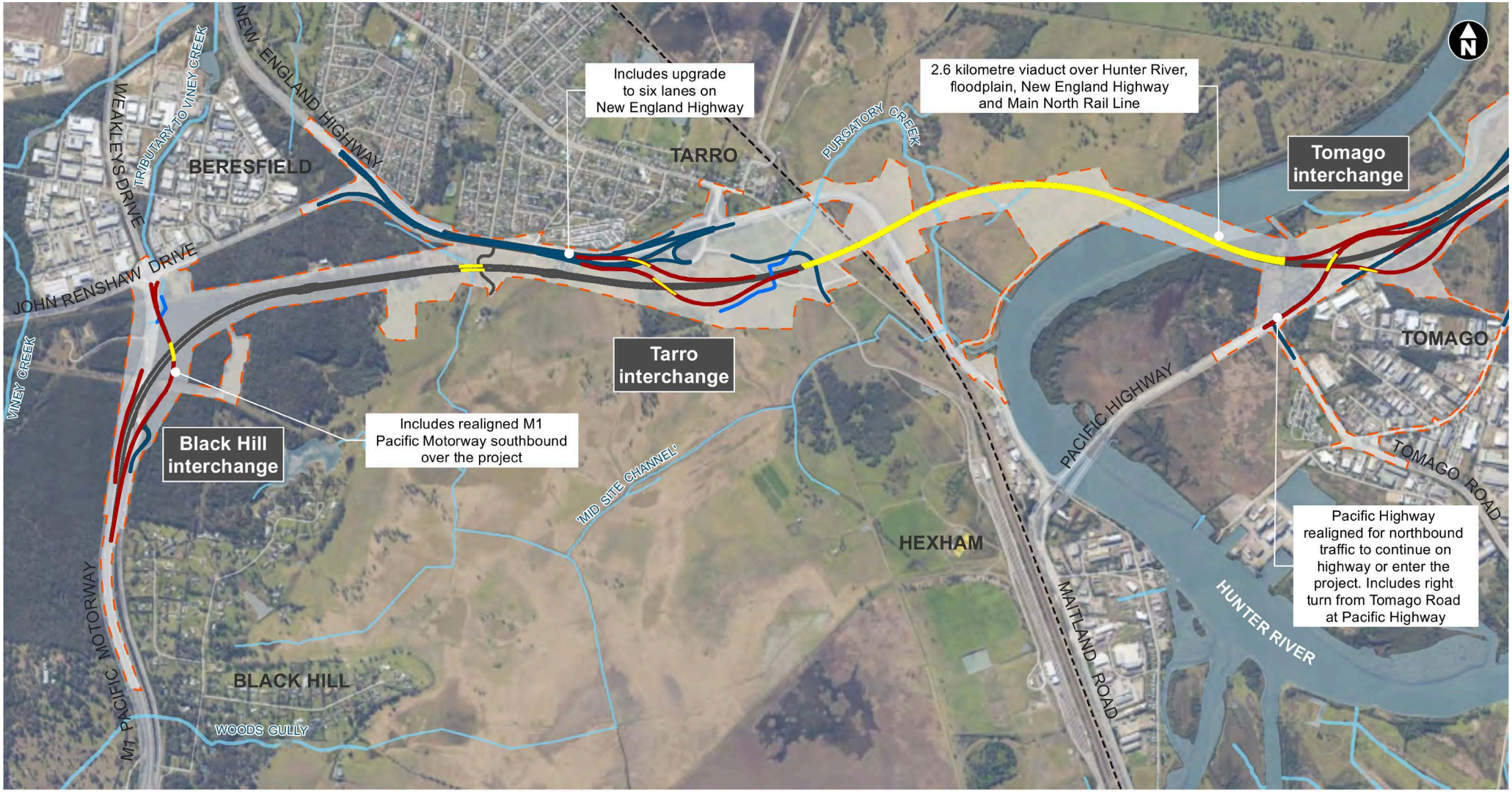

Figure 1-2 Project key features (map 1 of 2)

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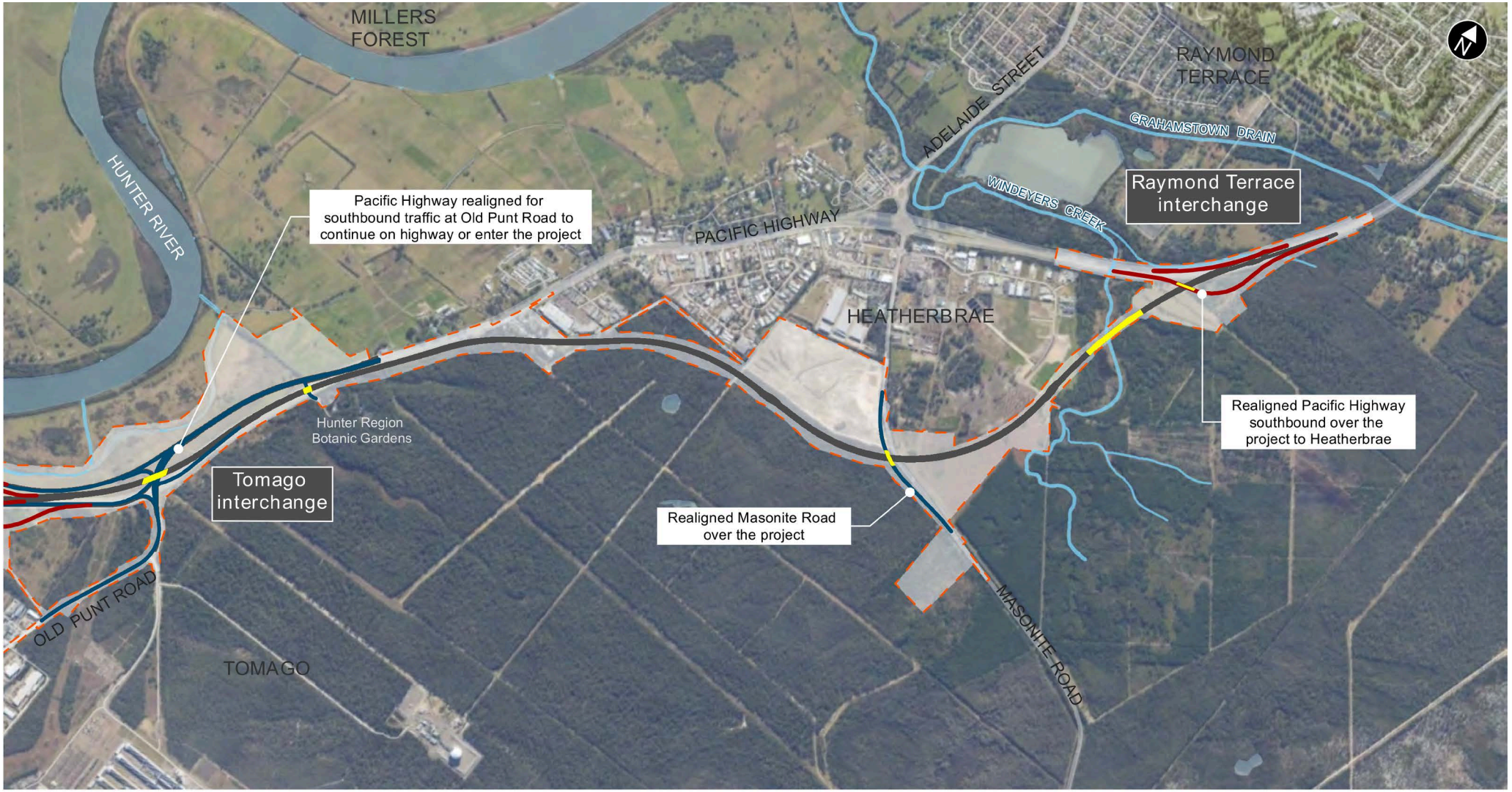

Figure 1-2 Project key features (map 2 of 2)

Page 2 of 2

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1.3 Performance outcomes

The desired performance outcomes for the project in relation to non-Aboriginal heritage are to:

- Ensure the design, construction and operation of the project facilitates, to the greatest extent possible, the long term protection, conservation and management of the heritage significance of items of environmental heritage (see **Chapter 5**)
- Ensure the design, construction and operation of the project avoids or minimises impacts, to the greatest extent possible, on the heritage significance of environmental heritage (see **Chapter 6** and **Chapter 7**).

1.4 Secretary's Environmental Assessment Requirements

This assessment forms part of the EIS for the project. The EIS has been prepared under Division 5.2 of the EP&A Act. This assessment has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) (SSI 7319) relating to non-Aboriginal heritage and will assist the Minister for Planning and Public Spaces to make a determination on whether or not to approve the project. It provides an assessment of potential impacts of the project on non-Aboriginal heritage and outlines proposed management measures.

In 2019 revised SEARs were issued for the project, which included non-Aboriginal heritage as a key issue. **Table 1-1** outlines the SEARs relevant to this assessment along with a reference to where these are addressed.

Table 1-1 SEARs relevant to non-Aboriginal heritage

Secretary's requirement	Where addressed in this report
2. Noise and vibration – structural	
1. The Proponent must assess construction and operation noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must include consideration of impacts to the structural integrity and heritage significance of items (including Aboriginal places and items of environmental heritage).	Statements of heritage impact which consider noise and vibration impacts from the project during construction and operation are provided in **Chapter 7**. Further discussion on vibration impacts on heritage structures are provided in the Noise and Vibration Working Paper (Appendix H of the EIS).
11. Visual amenity	
1. The Proponent must assess the visual impact of the project and any ancillary infrastructure (including noise barriers) on: c) heritage items including Aboriginal places and environmental heritage	Statements of heritage impact which consider impacts, such as visual impacts of the project, are provided in **Chapter 7**.
13. Heritage	
1. The Proponent must identify and assess any direct and/or indirect impacts (including cumulative impacts) to the heritage significance of: (c) environmental heritage, as defined under the *Heritage Act 1977*; and	Direct and indirect impacts are identified and assessed in **Chapter 6** and **Chapter 7.** Cumulative impacts are assessed in **Chapter 8**.
(d) items listed on the National and World Heritage lists.	There are no heritage items within the construction footprint that are listed on the National or World Heritage lists. Refer to **Section 4.2.2**.

Secretary's requirement	Where addressed in this report
2. Where impacts to State or locally significant heritage items are identified, the assessment must: (a) include a significance assessment and statement of heritage impact for all heritage items (including any unlisted places that are assessed as having heritage value);	Significance assessments and statements of significance are provided in **Chapter 5**. Statements of heritage impact are provided in **Chapter 7**.
(b) provide a discussion of alternative locations and design options that have been considered to reduce heritage impacts	Discussion on considered alternative location and design options is provided in **Section 6.1**.
(c) in areas identified as having potential archaeological significance, undertake a comprehensive archaeological assessment in line with Heritage Council guidelines which includes a methodology and research design to assess the impact of the works on the potential archaeological resource and to guide physical archaeological test excavations and include the results of these excavations;	Archaeological assessment, methodology and research design for future salvage excavations are provided in **Appendix B**. No planned test excavation for historical heritage were carried out. The results of the discovery of historical artefacts during Aboriginal archaeological testing for Item 3 are provided in **Section 5.3**.
(d) consider impacts to the item of significance caused by, but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access, increased traffic, visual amenity, landscape and vistas, curtilage, subsidence and architectural noise treatment (as relevant);	Statements of heritage impact which consider direct and indirect impacts are provided in **Chapter 7**.
(e) outline measures to avoid and minimise those impacts in accordance with the current guidelines; and	Proposed management measures are provided in **Chapter 9**.
(f) 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).	Details of the qualifications of the heritage consultants undertaking this assessment are provided in **Table 3-1**.

1.5 Report structure

The report is structured as follows:

- Chapter 1 – Introduces the project with a summary of the project background and assessment objectives
- Chapter 2 – Sets out the relevant heritage legislation
- Chapter 3 – Presents the methodology for the assessment including an overview, limitations, desktop assessment, field survey, and significance assessment
- Chapter 4 – Provides details of the existing environment of the construction footprint, including historical context, desktop assessment and field survey results
- Chapter 5 – Outlines the significance assessment of heritage items
- Chapter 6 – Includes a summary of the project activities and potential impacts
- Chapter 7 – Presents the findings of the Statement of Heritage Impact (SOHI)
- Chapter 8 – Presents the cumulative impacts
- Chapter 9 – Presents the management of impacts including site-specific and general management measures
- References
- Terms and acronyms
- Appendix A – Provides the Glenrowan Homestead Artefact Scatter catalogue
- Appendix B – Provides a research design and methodology for archaeological salvage at Item 3 Glenrowan Homestead.

2 Policy and planning setting

2.1 State legislation

2.1.1 Environmental Planning and Assessment Act 1979

The EP&A Act establishes a legislative framework for development in NSW and includes provisions for assessing the environmental impact of development. Approved projects to which Division 5.2 of the EP&A Act applies do not require approval under Part 4 of the *Heritage Act 1977* (Heritage Act) (for example, a Section 60 approval) for items on the State Heritage Register (SHR), or for an excavation permit under Section 139.

Local Environmental Plans

The development of Local Environmental Plans (LEP) is governed under the provisions of Part 3, Division 4 of the EP&A Act. Local heritage items, heritage conservation areas and archaeological sites are identified and listed in Schedule 5 Environmental Heritage of all LEPs.

2.1.2 Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) is designed to protect both listed heritage items, such as standing structures, and potential archaeological remains or relics. The Heritage Act provides a number of mechanisms by which items and places of heritage significance may be protected.

State Heritage Register

The Heritage Council of NSW maintains the SHR. Only those items which are of state-level heritage significance in NSW are listed on the SHR. Listing on the SHR controls activities such as alteration, damage, demolition and development.

Archaeological relics

Part 6 Division 9 of the Heritage Act protects archaeological 'relics' from being 'exposed, moved, damaged or destroyed' by the disturbance or excavation of land. This protection extends to the situation where a person has 'reasonable cause to suspect' that archaeological remains may be affected by the disturbance or excavation of the land. It applies to all land in NSW that is not included in the SHR.

A 'relic' is defined by the Heritage Act as:

> *Any deposit, object of material evidence which relates to the settlement of the area that comprises NSW, not being Aboriginal settlement, and has local or state significance.*

Section 139 of the Heritage Act requires any person who knows or has reasonable cause to suspect that their proposed work will expose or disturb a 'relic' to first obtain an Excavation Permit from the Heritage Council of NSW, unless there is an applicable exception. A Section 139 permit is not required for this project.

Section 146 of the Heritage Act requires any person who is aware or believes that they have discovered or located a relic must notify the Heritage Council of NSW providing details of the location and other information required.

Section 170 Heritage and Conservation Registers

Government agencies have responsibilities under section 170 of the Heritage Act. Section 170 requires agencies to identify, conserve and manage heritage assets owned, occupied or managed by that agency. Section 170 requires government agencies to keep a register of heritage items, which is called a Heritage and Conservation Register or more commonly, a s170 Register.

The Heritage Act requires government agencies to maintain their assets with due diligence. This is in accordance with State-Owned Heritage Management Principles approved by the Minister on the advice of the Heritage Council and notified by the Minister to government instrumentalities from time to time.

2.2 Commonwealth heritage legislation

2.2.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act includes 'national heritage' as a Matter of National Environmental Significance and protects listed places to the fullest extent under the Constitution. It also establishes the National Heritage List (NHL) and the Commonwealth Heritage List (CHL). The following is a description of each of the heritage lists and the protection afforded places listed on them.

Commonwealth Heritage List

The CHL is established under the EPBC Act. The CHL is a list of properties owned by the Commonwealth that have been assessed as having significant heritage value. Any proposed actions on CHL places must be assessed for their impact on the heritage values of the place in accordance with Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies (Significant Impact Guidelines 1.2) (Department of Sustainability Environment Water Population and Communities 2013). The guidelines require the proponent to carry out a self-assessment process to decide whether or not the action is likely to have a significant impact on the environment, including the heritage value of places. If an action is likely to have a significant impact an EPBC Act referral must be prepared and submitted to the Minister for approval.

National Heritage List

The NHL is a list of places with outstanding heritage value to Australia, including places overseas. Any proposed actions on NHL places must be assessed for their impact on the heritage values of the place in accordance with Matters of National Environmental Significance (Significant Impact Guidelines 1.1) (Department of Environment 2013). The guidelines require the proponent to carry out a self-assessment process to decide whether or not the action is likely to have a significant impact on a Matter of National Environmental Significance, including the national heritage value of places. If an action is likely to have a significant impact an EPBC Act referral must be prepared and submitted to the Minister for approval.

2.3 Non-statutory matters

Register of the National Estate

The Register of the National Estate (RNE) was formerly compiled by the Commonwealth government as a record of Australia's natural, cultural and Aboriginal heritage places worth keeping for the future. The RNE was frozen on 19 February 2007, which means that no new places have been added or removed since that

time. From February 2012 all references to the RNE were removed from the EPBC Act. The RNE is maintained on a non-statutory basis as a publicly available archive.

2.4 Relevant guidelines

This assessment was carried out and the report prepared according to the principles outlined in:

- Australia ICOMOS Charter for Places of Cultural Significance (The Burra Charter) *(*Australia ICOMOS 2013*)*
- NSW Heritage Manual (NSW Heritage Office 1996b) including the following sections:
  - Investigating History – used in undertaking research into historical context and history of individual heritage items
  - Investigating Fabric – used in surveying and recording individual heritage items
  - Assessing Heritage Significance (*NSW Heritage Office 2001*) – updated section of 1996 NSW Heritage Manual used to review existing significance assessment and carry out significance assessment for new heritage items
  - Investigating Heritage Significance (draft guideline) (*NSW Heritage Office 2004*) – updated section of NSW Heritage Manual used to carry out significance assessment for new heritage items
  - Statements of Heritage Impact (*NSW Office of Environment and Heritage 1996*).
- Skeletal remains: guidelines for the management of human skeletal remains (NSW Heritage Office 1998)
- Roads and Maritime Services Cultural Heritage guidelines (Roads and Maritime Services 2015).

3 Assessment methodology

3.1 Overview

The overall approach to the non-Aboriginal heritage assessment comprised identifying heritage items[1] within and next to the construction footprint through a review of previous heritage studies, searches of relevant heritage registers and schedules, and by undertaking field survey. The significance of each heritage item was assessed in accordance with NSW Heritage Office (2001) guidelines and the Australia ICOMOS Charter for Places of Cultural Significance 2013 (Burra Charter) (Australia ICOMOS 2013).

The potential impacts of the project on each heritage item were then assessed, both for direct and indirect impacts including impacts from vibration, demolition, archaeological disturbance, altered historical arrangements and access, increased traffic, landscape and vistas, subsidence and architectural noise treatment. Statements of Heritage Impact (SOHIs) were prepared in accordance with NSW Heritage Office (1996b) guidelines for each heritage item where impacts may potentially occur.

The project has been developed against a range of environmental considerations, including avoidance of non-Aboriginal heritage items (discussed further in **Section 6.1**). Appropriate management measures were identified to further avoid, minimise and manage impacts to each heritage item. This methodology was applied to the construction and operational aspects of the project. Decisions related to the location of the project also considered the potential for heritage impacts and sought to avoid and minimise impacts where possible. The assessment was carried out by a team of suitably qualified heritage consultants under the direction of Dr Karen Murphy (Technical Director, Archaeology and Cultural Heritage, Jacobs) (**Table 3-1**).

The detailed steps of the assessment approach are as follows:

- Review relevant heritage legislation (discussed in **Chapter 2**)
- Search all available historical heritage registers for areas within and next to the construction footprint, including the SHR, State Heritage Inventory (SHI), relevant Section 170 Heritage and Conservation Registers, relevant LEPs, National Trust of Australia (NSW) list (NTAR), RNE, CHL, NHL and World Heritage List
- Collate any known heritage curtilage (boundary) information as part of the heritage searches
- Carry out a literature review including previous archaeological reports, historical heritage studies, local heritage studies, conservation management plans, as well as regional and local history documents and maps where available
- Prepare summary contextual history
- Develop a predictive model for occurrence of historical site types in the landscape, including the use of aerial imagery, and apply this to the construction footprint to identify priority areas for field survey
- Carry out field survey of the identified priority areas to inspect known historical heritage items, identify any previously unidentified historical heritage items, assess potential for historical archaeology, and identify heritage curtilages where necessary
- Provide a list of historical heritage items and features located within or next to the construction footprint
- Prepare a SOHI (including assessments of significance) for all historical heritage items potentially impacted by the project
- Recommend management measures.

[1] The term ‘heritage item’ is used throughout this report to indicate any non-Aboriginal historical heritage place including buildings, structures, and archaeological remains. Each heritage item is individually numbered but may include either a single component or multiple components making up a broader complex with direct historical and cultural associations.

Table 3-1 Heritage consultants carrying out this assessment

Name	Qualification	Role
Dr Karen Murphy	PhD (Historical Archaeology) Bachelor of Arts (Honours) (Archaeology)	• Management and direction of overall assessment • Field survey • Technical review of report
Jennifer Chandler	Master of Cultural Heritage Bachelor of Archaeology (Honours)	• Field survey • Writing and preparation of report
Ildike Piercy	Master of Arts (Museum Studies) Bachelor of Arts (Honours) (Archaeology)	• Field survey
William Truscott	Bachelor of Archaeology (Honours)	• Field survey

3.2 Study area

The study area for the project comprises the construction footprint with a one kilometre buffer, used to identify the types and nature of heritage items in the broader region and to inform an understanding of the potential for previously unidentified heritage items within the construction footprint. The impact assessment focusses on those heritage items within or next to the construction footprint.

3.3 Desktop assessment

The following registers were searched using online databases on 25 November 2015, 23 May 2019 and 17 June 2020:

- NSW State Heritage Inventory (SHI)
- NSW State Heritage Register (SHR)
- Section 170 Heritage and Conservation Registers
- National Trust of Australia Register (NTAR)
- Register of the National Estate (RNE)
- Commonwealth Heritage List (CHL)
- National Heritage List (NHL)
- World Heritage List (WHL)
- Newcastle Local Environmental Plan 2012 (NLEP)
- Maitland Local Environmental Plan 2011 (MLEP)
- Port Stephens Local Environmental Plan 2011 (PSLEP).

The desktop assessment also included a review of previous heritage assessments, local heritage studies and aerial imagery to identify other potential heritage items in or next to the construction footprint that are not on any existing heritage registers.

3.4 Site investigations

Prior to carrying out the field survey, priority areas for survey were identified using background information including aerial images, the predictive statement for historical site types, previous studies and field surveys, and historical heritage register listings. Known historical heritage items prior to survey are listed in **Table 4-3**. Areas identified as having potential historical heritage items are listed in **Table 4-4**.

Field survey was carried out on the following dates by the following personnel:

- 15 December 2015 by Karen Murphy (Technical Director) and Jennifer Chandler (Senior Archaeologist)
- 14 March 2018 by Jennifer Chandler (Senior Archaeologist) and Ildike Piercy (Senior Archaeologist)
- 29 June 2020 by William Truscott (Project Archaeologist).

3.5 Assessment of significance

The concept of cultural heritage significance helps in estimating the value of places, including aspects of places such structures and 'relics'. Places which are likely to be significant are those which 'help an understanding of the past or enrich the present, and which will be of value to future generations' (Australia ICOMOS 2000:12). In Australia, the significance of a place is generally assessed according to the following values:

- Aesthetic value
- Historic value
- Scientific value
- Social value.

The NSW Heritage Council has adopted specific criteria for heritage assessment, which have been gazetted pursuant to the Heritage Act. The seven criteria upon which the following assessment of significance is based are outlined below:

- Criterion (a) an item is important in the course, or pattern, of NSW cultural or natural history
- Criterion (b) an item has strong or special association with the life or works of a person, or group or persons, of importance in NSW cultural or natural history
- Criterion (c) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW
- Criterion (d) an item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons
- Criterion (e) an item has potential to yield information that will contribute to an understanding of NSW cultural or natural history
- Criterion (f) an item possesses uncommon, rare or endangered aspects of NSW cultural or natural history
- Criterion (g) an item is important in demonstrating the principal characteristics of a class of NSW cultural or natural places or cultural or natural environments.

Components of the NSW Heritage Manual (which was originally published in 1996 with subsequent section updates), published by the NSW Heritage Office and Department of Urban Affairs and Planning (NSW Heritage Office 2001) (now Heritage NSW), sets out a detailed process for conducting assessments of heritage significance. These guidelines have also been used to conduct the significance assessment outlined in **Chapter 5**.

3.6 Impact assessment

3.6.1 Level of impact

The level of impact on the heritage significance of each heritage item in the construction footprint has been assessed based on the definitions and framework for assessing severity of impacts from the EPBC Act Significant Impact Guidelines 1.2 (Department of Sustainability Environment Water Population and

Communities 2013) as there are currently no NSW or other state guidelines for identifying the level of impacts on heritage places. The following characteristics were used to assess the level of impact:

- The scale of the project and its impacts
- The intensity of the project and its impacts
- The duration and frequency of the project and its impacts.

The levels of impact used in this assessment are defined in **Table 3-2**. For impacts to meet a certain level they generally need to have two or more of the characteristics noted in **Table 3-2**. The level of impact assigned to each heritage item is based on the level assessed following implementation of management measures.

Table 3-2 Definitions of levels of impact

Level of impact	Characteristics assessed		
	Scale	Intensity	Duration/Frequency
Major	Medium - large	Moderate - high	Permanent/irreversible
Moderate	Small - medium	Moderate	Medium - long term
Minor	Small/localised	Low	Short term/reversible
Negligible	Little or no physical impact; or little or no impact on heritage significance from physical impacts; or potential physical impacts are now able to be prevented through implementation of management measures (for example, vibration).		

3.6.2 Statements of heritage impact

A SOHI is used to identify what impact the project would have on the heritage items identified in the assessment. A SOHI, together with supporting information, addresses:

- Why the item is of heritage significance
- What impact the proposed work would have on that significance
- What measures are proposed to mitigate negative impacts
- Why more sympathetic solutions are not viable (NSW Heritage Office 2002).

A SOHI has been prepared for each significant heritage item impacted by the project in accordance with the NSW Heritage Office (2002) Statements of Heritage Impact guidelines.

4 Existing environment

4.1 Historical context

4.1.1 Introduction

The project is located in the suburbs of Raymond Terrace, Heatherbrae, Tomago, Hexham, Tarro, Beresfield and Black Hill.

During the early days of convict settlement at Sydney, the favoured means of transport was by boat up and down the coast and inland via the waterways. In 1797, coal was discovered at the mouth of the Hunter River by Lieutenant Shortland and in 1801, Lieutenant-Colonel Paterson took the survey boat 'Lady Nelson' to investigate and report on this coal outcrop as well as other natural resources (Ward-Harvey 2008). A second survey was carried out by Charles Grimes and Francis Barrallier six months later. Shortly after their return to Sydney, Governor King established the first European settlement at Newcastle, located to the south of the construction footprint (Maitland and District Historical Society 1983:8-9).

In 1812, 1818 and 1821 Governor Macquarie took parties up the Hunter River. He named a location on the riverbank where they camped in 1818 as 'Raymond Terrace', located to the north of the construction footprint. They proceeded up the Hunter and Paterson Rivers, visiting some of the farms Governor Macquarie had permitted settlers to occupy. In the 1820s, grants for land east and west of the Hunter River was made available. The alluvial flats along the Hunter River began to be settled and by 1825 there were almost 300 settlers living in the region. The increase in population resulted in the construction of a carriage road between Wallis Plains and Newcastle, as well as the introduction of a regular boat service along the Hunter River, which dissects the construction footprint (Maitland and District Historical Society 1983:13). The history of the individual towns and Pacific Highway in the vicinity of the construction footprint is outlined below.

4.1.2 Raymond Terrace/ Heatherbrae/ Tomago

By the 1830s, paddle wheel steamships were able to reach upstream to Morpeth resulting in Raymond Terrace becoming a growing port of call with police, warehouses and shops. The region within and around the project continued to develop. From 1850 to the 1880s the McPherson family developed a large shipbuilding operation. Sandstone used for buildings was sourced from a quarry close to the town. A butter factory was built in 1902 in Raymond Terrace, which later led to the large, long-running OAK dairy factory being established at Hexham. Up until 1964, when bridges were built over the Williams and Hunter rivers, boats collected milk cans from the farms along the river in the region and taken to the dairy factory. In 1939 the Masonite Factory opened (in the Raymond Terrace area, followed by the Courtaulds Factory in the 1950s which began making yarns for motor tyres. The Tomago Aluminium Smelter was started in 1983. An RAAF Base was established in 1942 and then more recently the Newcastle Airport at Williamtown which has contributed further to the area's development (Ward-Harvey 2008).

4.1.3 Hexham

The first land grant in the Hexham area was in 1828 to Edward Sparke Senior and was 2,000 acres in size. A year later Alexander W Scott was granted 2,560 acres which was increased to 2,844. Scott also started up some local industries including an iron foundry, salt works and a tobacco factory. In 1841 land was advertised for sale in Hexham and there were already 140 people living in the area. A public wharf was built in 1842 with a punt service commencing across the Hunter River in 1843 (Raymond Terrace Historical

Society 2006:5). A new inn, called Wheat Sheaf Inn, was built in Hexham in 1856, by publican John Hannell. The inn was located on Maitland Road and was near the punt service (Scanlon 2017), located between 300 to 500 metres south of the construction footprint. Up until this time Hexham was primarily a rural community with crops such as hay, maize, fruit and vegetables grown. This changed in 1857 when a railway line was built after the discovery of coal in nearby Minmi. In 1927 the butter factory at Raymond Terrace transferred its headquarters to Hexham and later became Oak Dairy (Raymond Terrace Historical Society 2006:5).

4.1.4 Tarro/ Beresfield

Tarro and Beresfield were originally part of the 2,000-acre land grant to Edward Sparke in 1825. A track was built into the area for drays and wagons. The track, which passed through Tarro, is now known as Maitland Road. The Tarro and Beresfield area remained rural in nature until the 1920s, when it was subdivided as part of the Christie Estate. The new area was described as a 'Newcastle extension' and a 'new model suburb'. The land was close to the Main North Railway line, which made it attractive for potential buyers. The railway station at Tarro opened on 5 April 1857. Tarro is the older part of the district, with Beresfield developing in size after the Second World War (Bozier 2000-2020; Suters Architects 1996/7).

4.1.5 Pacific Highway

The Pacific Highway, located within the construction footprint, was the first large construction project carried out by the Main Roads Board. The establishment of industries, such as the steelworks, in Newcastle, located to the east of the construction footprint, resulted in Newcastle becoming the second largest city in NSW, prior to 1925. As a result of this growth, it was necessary to form a road connection with Sydney and the rest of NSW, particularly as motor cars became more popular. Work on the road commenced in 1925. (Broomham 2001:116). The North Coast Road between Hexham and Tweed Heads was proclaimed in 1928 and named the Pacific Highway in 1931 (Ozroads 2003-2019).

4.1.6 Present day

Today, the study area is used for a range of urban, rural and environmental uses. Land for grazing comprises the largest area of land in the study area, with managed resource protections and services uses the next largest land use types. Most of the primary production land in the study area is land used for grazing at Black Hill, Tarro, Woodberry, Tomago, Heatherbrae, and Raymond Terrace. Other uses include forestry, horticulture and cropping.

Residential uses (including residential uses on farming properties and farm buildings / infrastructure), including mainly low density urban residential areas are situated at Beresfield, Tarro, Woodberry, Heatherbrae and Raymond Terrace, and large lot rural residential uses at Black Hill, Tarro, and Heatherbrae. There are manufacturing and industrial activities at Beresfield, Hexham, Tomago, and Heatherbrae, and commercial, recreation and cultural services, including commercial and business uses at Tomago and Heatherbrae, and community uses such as open space, sporting and education facilities at Beresfield, Tarro and Heatherbrae.

The study area also includes land used for nature conservation, managed resource protection (for example, surface and groundwater supplies) and other minimal uses such as residual native cover and rehabilitated land. More than half of the land area covered by conservation and natural environment uses comprises land used for 'managed resource protection' associated with Hunter Water Corporation's assets such as the Tomago Sandbeds and Grahamstown Dam in Heatherbrae.

4.2 Heritage context

4.2.1 Previous heritage assessments

A number of heritage assessments have been previously carried out for the project or for other projects in the study area, including (from most recent):

- A preliminary environmental investigation (PEI) for the Pacific Highway/Maitland Road (A43) between Sandgate and Hexham Bridge (Hexham Straight) located about 480 metres south of the construction footprint (SMEC Australia Pty Ltd and Roads and Maritime Services 2019)
- Non-Aboriginal heritage assessment for the Newcastle Power Station, which overlaps with the construction footprint in Tomago. (Aurecon 2019)
- State Significant Infrastructure Application report (SSIAR) as part of an earlier assessment for this project (Roads and Maritime Services 2015)
- A preliminary environmental investigation for an earlier iteration of the project, which overlaps with some of the construction footprint (Hills Environmental 2014)
- A heritage assessment for a NSW Long Term Train Support Facility in Hexham, located to the south of the construction footprint (Aurizon 2014)
- Historical heritage impact assessment for the ARTC Hexham Relief Roads project which overlaps with the construction footprint in Tarro (Australian Museum Business Services 2012; EJE Heritage 2012)
- A heritage impact assessment for the Lower Hunter Estates Development in Black Hill, which overlaps with a small portion of the construction footprint in the west (ERM 2010)
- A heritage assessment for a gas pipeline, which overlaps with the construction footprint at Hexham (AECOM 2009)
- A preliminary non-indigenous heritage assessment of the 'F3 to Raymond Terrace Pacific Highway Upgrade' (Maunsell 2006).

The assessments listed above are described in the following sections.

SMEC Australia Pty Ltd and Roads and Maritime Services (2019)

A preliminary environmental investigation for the Pacific Highway/Maitland Road (A43) between Sandgate and Hexham Bridge was prepared by SMEC on behalf of Roads and Maritime (SMEC Australia Pty Ltd and Roads and Maritime Services 2019). The investigation area for the assessment was located about 480 metres south of the construction footprint for the current project. The study found there are six heritage items listed on the LEP and one heritage item listed on the RNE (Hunter Estuary Wetlands) located within the investigation area. There are three heritage items listed on the LEP located next to the northern boundary of the investigation area and one heritage item (Hexham Bridge) listed on both the SHR and Section 170 (s170) located at the northern boundary of the investigation area. With the exception of the Hunter Estuary Wetlands, none of the other heritage items are located within the construction footprint for the current project.

Aurecon (2019)

A non-Aboriginal heritage assessment for the Newcastle Power Station was prepared by Aurecon (2019) on behalf of AGL. The area of investigation overlapped with the construction footprint for the current project in Tomago. The non-Aboriginal assessment included a field survey. Ground surface visibility during the survey was poor (zero to nine per cent) across the investigation area. No non-Aboriginal heritage items were identified during the field survey and it was concluded that the area was unlikely to contain historical heritage values of local or State heritage significance. The archaeological potential of the area was considered to be very low.

Roads and Maritime Services (2015)

A report to support the State Significant Infrastructure Application report (SSIAR) for the current project was prepared by Roads and Maritime Services (2015). The report considered the potential environmental issues for the project, identified the proposed scope of the environmental assessment, and proposed further assessments.

The assessment found no registered non-Aboriginal heritage items located within 50 metres of the project area assessed at that time. Thirteen heritage places of local significance were identified within one kilometre of the project. The closest heritage place was identified as Residence, 29 Eastern Avenue, Tarro (NLEP 2012), located about 50 metres from the project.

The SSIAR noted four unlisted items with potential heritage significance, south of Heatherbrae, which were identified in a 2006 study by Maunsell (2006). The SSIAR also noted that there was limited potential for undiscovered heritage items to be located within the study area due to disturbance from road construction or some of the area being within floodplain or prescribed drinking water catchment areas (Roads and Maritime Services 2015:70).

Hills Environmental (2014)

A preliminary environmental investigation was carried out for the current project by Hills Environmental (2014). The study area was in a similar location to the current project's construction footprint, but with a Hunter River crossing further south than the current project.

The assessment found the following heritage items within the study area; Hannell Family Vault (NLEP); Oak Factory (NLEP); Hexham Bridge Over Hunter River (NLEP, Roads and Maritime Section 170 register); Moreton Bay Fig trees; and 'Kinross' including stone shed and landscape setting. The Hannell Family Vault (NLEP) is located within the construction footprint for the current project.

The study found no NHL or SHR items within the study area (Hills Environmental 2014:51). The study concluded that none of the listed heritage items would be directly affected by the concept design of the proposed works. However, recommendations were made that detailed assessment should be carried out to determine the indirect impacts to the heritage items, particularly to those near the proposed new Hunter River crossing (Hills Environmental 2014:65).

Australian Museum Business Services (2012)

A heritage impact assessment for historical heritage for the Hexham Relief Roads project was prepared by Australian Museum Business Services (2012). The report forms part of the EIS prepared for Australian Rail Track Corporation (ARTC). The Hexham Relief Roads project study area overlaps with the construction footprint of the current project at Tarro, west of the railway line and south of New England Highway. The Australian Museum Business Services assessment identified three historical heritage places that were within or immediately next to the Hexham Relief Roads study area: Hexham Railway Station (LEP I176), Oak Factory (LEP I178) and Minmi to Hexham Railway (LEP I332). All of these historical heritage places are outside the construction footprint for the current project. A field survey identified a series of discrete elements associated with the JABAS Coal Preparation Plant, the Coal & Allied Coal Preparation Plant sidings, and other elements of uncertain association (concrete silos and associated brick building, concrete storage bin and unidentified structural remains). The silos were assessed as likely to be associated with coal storage. All of these places are located outside the construction footprint for the current project, south of the area of overlap between the Hexham Relief Roads project and the current project.

EJE Heritage (2012)

A Statement of Heritage Impact was prepared for the proposed QR National Train Support Facility, Hexham by EJE Heritage (2012). The EJE Heritage study area was located in the town of Hexham, south

of the construction footprint for the current project. Built heritage items within the study area include a bath-house and control cabin, conveyor belt support footings, remains of a milking shed, milking machine hut, hay shed and feed silos and weighbridge hut. These heritage items are all located outside the construction footprint for the current project.

ERM (2010)

A heritage impact assessment was carried out for the Lower Hunter Estates Development in Black Hill, to the west of the M1 Pacific Motorway was prepared by ERM (2010). The assessment included a field survey for non-Aboriginal heritage with one survey transect carried out next to the M1 Pacific Motorway and the construction footprint for the current project. No historical heritage items were identified during the survey; however, it was noted that the study area had been used previously for mining activities.

AECOM (2009)

A heritage assessment for a proposed Gloucester Coal Seam Gas project between Gloucester and Hexham was carried out by AECOM (2009). The proposed pipeline overlaps with the construction for the current project footprint in the vicinity of Hexham. Only one known heritage item was located within the pipeline corridor. The heritage item was an indicative place listed on the RNE and located in Gloucester, well away from the current project. A field survey carried out for the project identified 11 unlisted historical heritage places. All were built structures, and none are located within or near the current project. The sites included a Cobb and Co Hut, a European scarred tree, stockyards, bridges and a mound. The assessment determined that one item was considered to have local heritage significance, and three items were considered to have potential significance.

Maunsell (2006)

A non-Aboriginal heritage assessment for the 'F3 to Raymond Terrace; Pacific Highway Upgrade' project was prepared by Maunsell (2006) to inform early planning for the current project. The report investigated feasible route options for the current project within their defined study area, which overlaps with the construction footprint for the current project. The assessment found that five heritage places listed on heritage databases were located within their study area with two of these located within the construction footprint for the current project (Maunsell 2006:11):

- 68 Wahroonga Street, Raymond Terrace (PSLEP 2000, RNE)
- Two Moreton Bay Fig Trees, Pacific Highway, just north of Hank Street (PSLEP 2000)
- Hunter Estuary Wetlands (RNE) (in current construction footprint of current project)
- OAK Factory site, 189 Maitland Road, Hexham (NLEP 2003)
- Hannell Family Vault, 398B Maitland Road, Hexham (NLEP 2003, National Trust of Australia (NSW) Register (NTAR)) (in construction footprint of current project).

Twenty-one listed heritage places were located within a one kilometre buffer zone of the study area and two of these are located near the construction footprint for the current project (Maunsell 2006:13-14):

- Residence, 29 Eastern Avenue, Tarro (NLEP 2003)
- Tarro Substation, 3 Woodberry Road, Tarro (NLEP 2003, NTAR, 'Indicative' on RNE).

Maunsell (2006) identified several non-listed potential heritage places within their study area during either field survey and/or review of literature and databases but noted that very little, if any, remains of these items, including:

- Mining sites, sand pits and quarries located in the Motto Farm region – most likely little remains due to land modification
- Motto Farm House – little remains due to modification
- Horse racing track on the Motto Farm – little remains due to development in the area

- Family home built in 1931 and named Strength has been demolished.

This 2006 study concluded that due to modification and development within the study area there was very limited likelihood of these items now remaining.

4.2.2 Historical heritage register search results

A search of statutory and non-statutory registers and databases for the study area identified six local heritage items listed on the NLEP within or next to the construction footprint. No heritage items that are listed on the SHR, SHI, NTAR, CHL, NHL, MLEP, PSLEP or WHL are located within or next to the construction footprint (**Table 4-1** and **Figure 4-1**).

Two LEP-listed heritage items, the Newcastle Crematorium (I34) and Our Lady of Lourdes Church (I547), are not situated within or next to the construction footprint but have been identified as being eligible for consideration of at-property architectural noise treatment in the Noise and Vibration Working Paper (Appendix H of the EIS) and hence have been included in this assessment.

One heritage item, Hunter Estuary Wetland was identified on the Register of National Estate (RNE), however this register was closed in 2007 and is no longer a statutory list.

A further 13 heritage items are situated within the study area (within one kilometre of the construction footprint). None of these items are considered further in this assessment due to their distance from the construction footprint, or the distance of key historical heritage elements of the item from the construction footprint.

Table 4-1 Heritage items from statutory and non-statutory heritage registers and databases within the study area

Heritage item no. if relevant to this assessment	Heritage item name	Register	Register Number	Significance	Location
Item 1	Hannell Family Vault	NLEP	I179	Local	398B Maitland Road, Hexham
Item 2	Hexham Shipbuilding Yards	NLEP	I180	Local	404 Old Maitland Road, Hexham
Item 4	Residence	NLEP	I548	Local	29 Eastern Avenue, Tarro
Item 6	Tarro Historic Site (Original township of what was formerly known as Upper Hexham)	NLEP	A18	Local	16 Anderson Drive, Tarro
Item 7	Tarro Substation	NLEP s170	I546	Local	6A Anderson Drive, Tarro
Item 8	Pumping Station	NLEP s170 RNE	I550 102132	Local	3 Woodberry Road, Tarro
Item 9	Newcastle Crematorium	NLEP	I34	Local	176 Anderson Drive, Beresfield
Item 10	Our Lady of Lourdes Church	NLEP	I547	Local	42 Anderson Drive, Tarro

Heritage item no. if relevant to this assessment	Heritage item name	Register	Register Number	Significance	Location
n/a (Item 5)	Hunter Estuary Wetlands (comprising Hunter Estuary Wetlands Ramsar Site, including Kooragang Nature Reserve and Shortland Wetlands, Hexham Swamp Nature Reserve and parts of Coastal Wetlands)	RNE	1296	Natural (historical heritage elements more than 700 m from construction footprint)	Pacific Highway, Kooragang
n/a ***within 1 km***	Beresfield Public School	NLEP	I35	Local	181 Anderson Drive, Beresfield
n/a ***within 1 km***	Tarro Community Hall	NLEP	I549	Local	2A Northern Ave, Tarro
n/a ***within 1 km***	Substation	NLEP	I551	Local	3 Woodberry Road, Tarro
n/a ***within 1 km***	Oak Factory	NLEP	I178	Local	189 Maitland Road, Hexham
n/a ***within 1 km***	Hexham Bridge	NLEP	I187	Local	Pacific Highway, Hexham
n/a ***within 1 km***	Moreton Bay Fig Trees (*Ficus macrophylla*)	PSLEP	I10	Local	Road Reserve, 2279 Pacific Highway
n/a ***within 1 km***	Raymond Terrace Cemetery and Pioneer Hill Cemetery	PSLEP	I39	Local	1A,2 and 4 Elizabeth Avenue, Raymond Terrace
n/a ***within 1 km***	"Boomerang Park" (including former stone quarry and mature tree planting)	PSLEP RNE	I45 18083	Local	17E Irrawang Street, Raymond Terrace
n/a ***within 1 km***	Tarro Telephone Exchange	RNE	103903	Local	Anderson Drive, Tarro
n/a ***within 1 km***	Goninans Administration Building	NLEP	I186	Local	230 Old Maitland Road, Hexham
n/a ***within 1 km***	Minmi To Hexham Railway	NLEP	I332	Local	Minmi
n/a ***within 1 km***	Railway Station	NLEP	I176	Local	Maitland Road, Hexham
n/a ***within 1 km***	J & A Brown's Hexham Workshop	NLEP	I183	Local	100 Old Maitland Road, Hexham

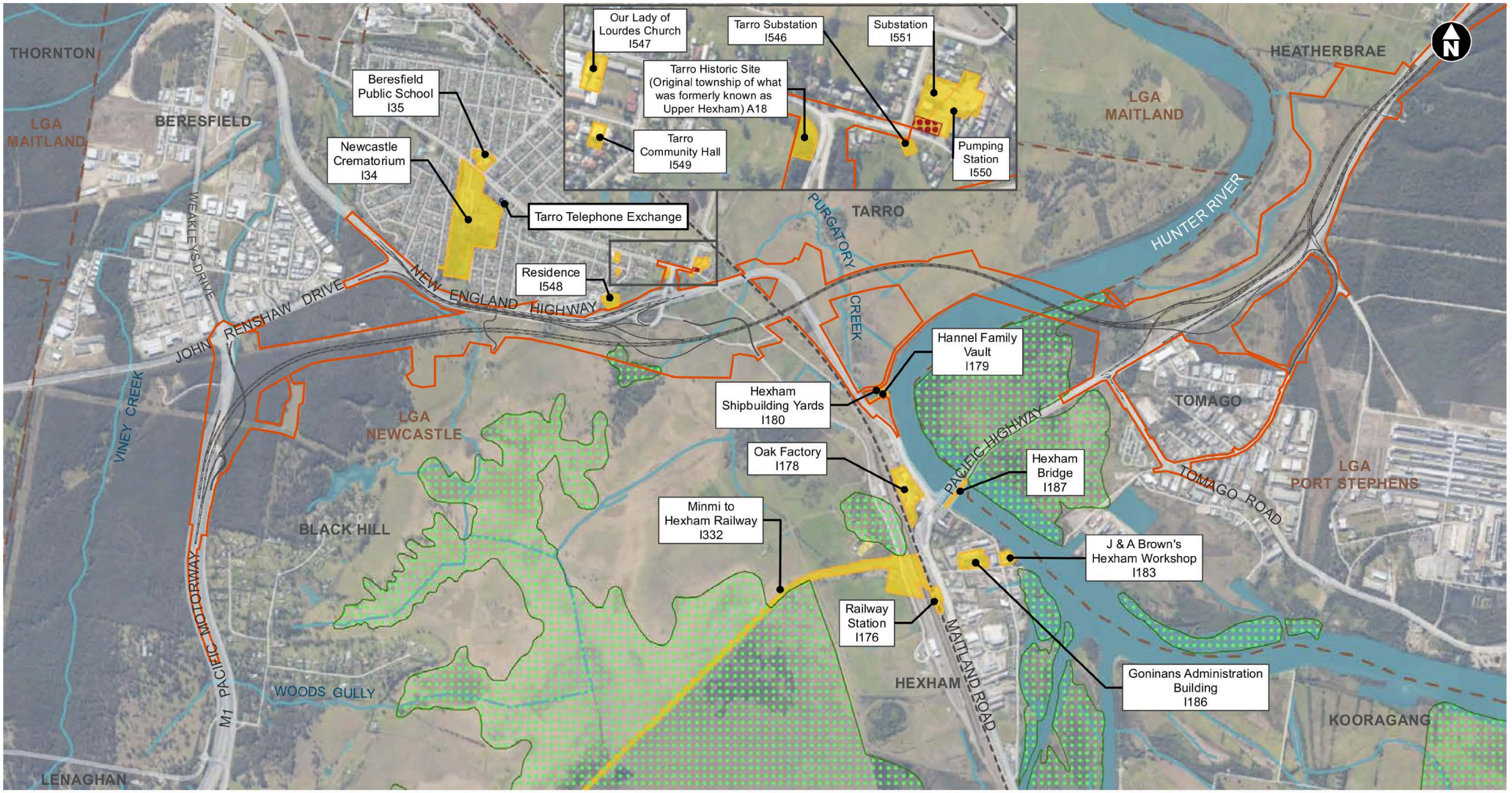

Figure 4-1 Listed statutory and non-statutory historical heritage items located within the study area (map 1 of 2)

Page 1 of 2

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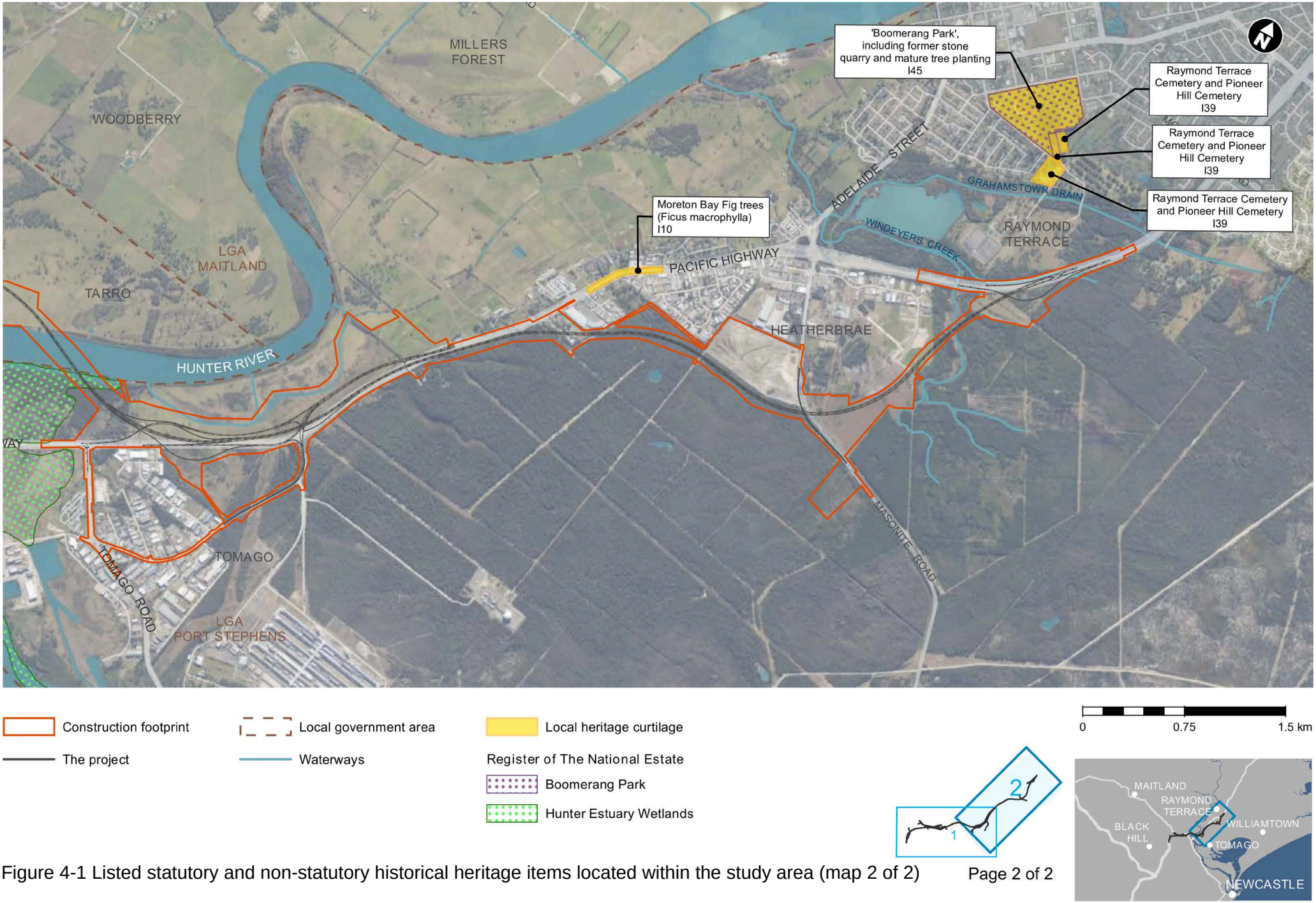

Figure 4-1 Listed statutory and non-statutory historical heritage items located within the study area (map 2 of 2)

Page 2 of 2

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4.2.3 Review of aerial imagery

Aerial imagery from 2015 was viewed to identify areas of heritage potential prior to the field survey. Several properties were identified, where the nature of features or buildings indicated that they may have some heritage potential. Of these properties, six areas were identified for field survey (**Table 4-2**).

Table 4-2 Areas with potential for heritage items within the construction footprint, identified from aerial imagery

Description of area of potential	Location
Glenrowan Homestead	51 New England Highway, Black Hill Lot 2 DP873320
An industrial site at the former mineral sands processing site	1877 Pacific Highway, Tomago Lot 101 DP1038663
Building remains and footings	15 Pacific Highway, Tomago Lot 51 DP739336
A racetrack (possible Motto Farm)	2171 Pacific Highway, Tomago Lot 1 DP1169886
Possible building footings located next to the Hunter River and possible man-made canals	5/404 Maitland Road, Tarro Lot 131 DP1092779
A creek crossing	1 Anderson Drive, Tarro Lot 10 DP1150648

Subsequent changes to the construction footprint were also subject to an assessment of current aerial imagery. An assessment of the new areas of the footprint mainly comprised existing roads and road reserve. The other new areas are located within paddocks, treed areas, utilities alignments, a cadastral lot with a modern shed and an asphalt carpark, and the Hunter River. None of these additional areas were identified for further field survey.

4.3 Desktop summary

The review of previous heritage assessments (**Section 4.2.1**) and the heritage register searches (**Section 4.2.2**) indicated the following (mapped in **Figure 4-1**):

- Three listed heritage items located within the construction footprint; Hexham Shipbuilding Yards, Hannell Family Vault, and Tarro Historic Site (Original township of what was formerly known as Upper Hexham)
- Three listed heritage items located next to the construction footprint; Residence, Tarro Substation and Pumping Station.

A previous heritage assessment (Maunsell 2006) identified four potential historical heritage items that may be located within the construction footprint (Motto Farm region (mining sites, sand pits and quarries), Motto Farm House, horse racing track on the Motto Farm and a family home built in 1931 and named ‘Strength’). However, the physical remnants are no longer likely to be present.

Based on the review of aerial imagery and the relatively limited number and nature of the previous heritage assessments in the rural and industrial areas outside of townships in the region, there are several areas with the potential for previously unidentified historical heritage items to be situated within the construction footprint (**Table 4-2**).

Following a search of the registers detailed in **Section 3.2** and review of the previous literature, historical background and aerial imagery, the following types of historical heritage items may be found in the construction footprint, particularly in the more rural sections:

- Houses, homesteads and other buildings associated with the settlement of the region
- Past rural uses related to pastoral industry and farming, including stockyards, fences, sheds and outbuildings, and creek fords.

4.4 Field survey results

The results of the field surveys of listed historical heritage items within or next to the construction footprint are presented in **Table 4-3**. The results of surveys of the areas identified as having the potential for heritage items are presented in **Table 4-4**.

As described in **Section 4.2.2**, Item 5, Hunter Estuary Wetland, listed on the non-statutory RNE, was removed from further assessment as former listings have been superseded by stronger ongoing heritage protection provisions under national environment law. There is no current listing affecting this item within the construction footprint of the project.

Table 4-3 Listed historical heritage items surveyed within or next to the construction footprint

Location	Item name and register number	Results of survey
29 Eastern Ave, Tarro Lot 100 DP849413	Residence (Item 4) NLEP I548	Actual building of significance is located about 60 metres from construction footprint. No other heritage elements are in proximity to the construction footprint. Further details can be found in **Section 5.4**.
6A Anderson Drive, Tarro Lot 1 DP128309	Tarro substation (Item 7) NLEP I546	Survey of property to assess if any items are close to construction footprint. Building is located next to construction footprint. Further details can be found in **Section 5.6**.  Figure 4-2 Tarro substation, facing southwest, 15 December 2015

Location	Item name and register number	Results of survey
3 Woodberry Road, Tarro Lot 1 DP128309	Pumping Station (Item 8) NLEP I550	Survey of property to assess if any items are close to construction footprint. Building is located next to construction footprint. The survey confirmed that the description from the NLEP is accurate, as follows. The main building of the Tarro Pumping Station is a large, purpose-built water pumping station in the Federation style. The building is brick built in Flemish bond with black tuck pointing, which is now faded. The building has painted render and concrete details with a parapeted and hipped Marseille tiled roof. There are two timber louver vent stacks and extended eaves supported on steel brackets, as well as ornate dormer with cast detail. The building has a Colorbond downpipe and guttering. The entrance door is a panelled timber door with glazed overlight. There are mostly replacement timber windows, some glazed and some broken, as well as some original windows. Internally virtually all equipment has been removed and the space is largely used for storage  Figure 4-3 Pumping Station, facing northeast, 15 December 2015.
404 Maitland Road, Hexham Lot B DP405828	Hexham Shipbuilding Yards (Item 2) NLEP I180	The construction footprint overlaps with the curtilage of the heritage item. The construction footprint is related to a vehicle access track, which is about 10 metres wide in this location. The majority of the project access track overlaps with an existing imported gravel vehicle track with narrow bands of grass either side. The existing track is slightly raised above the surrounding landscape, which is flat and prone to flooding. Several large, shallow depressions, aligned in rows, were noted on either side of the existing gravel vehicle track, as well as some pieces of timber which were located at the end of one of the depressions. The depressions range from about 20 to 40 metres long and may have originally extended from one side of the imported gravel vehicle track to the other, before the track construction. Further details can be found in **Section 5.2**.

Location	Item name and register number	Results of survey
		 Figure 4-4 Depressions in foreground and construction footprint in background, facing south. 14 March 2018.
398B Maitland Road, Hexham Lot 1 DP1165954	Hannell Family Vault (Item 1) NLEP I179	The heritage curtilage of the vault includes the entire lot which overlaps with about 10 metres of the construction footprint at the western end of the lot. This section of construction footprint comprises mostly an existing gravel vehicle track, with a small band of grass on either side. The physical building comprising the vault is located about 120 metres east of the construction footprint. Within the construction footprint there is a narrow band of grass on either side of the existing gravel vehicle track. Further details can be found in **Section 5.1**.  Figure 4-5 Hannell Family Vault, facing southeast. 14 March 2018.
16 Anderson Drive, Tarro	Tarro Historic Site (Original township of what was formerly known as Upper Hexham) (Item 6) NLEP A18	This heritage item is located within road reserve on the corner of Anderson Drive and the Tarro interchange. At least three quarters of the heritage curtilage contains thick vegetation in the form of small shrubs and trees. The northern portion has short grass allowing visibility of several features. There is an undated stone plaque located on a concrete slab (**Figure 4-6**) in the centre of the grassed area marking the site as St Stephen's Church of England. To the east of the undated stone plaque is a second stone plaque on a concrete slab (**Figure 4-7**) which commemorates the opening of the Tarro Interchange in 1996. Northeast of the second stone plaque, and next to the road, there is a concrete slab containing a raised stone feature (**Figure 4-8**). No other historical heritage features were observed during the site inspection. Further details can be found in **Section 5.5**.

Location	Item name and register number	Results of survey
		 Figure 4-6 Undated stone plaque marking the site as St Stephen's Church of England, facing south, 29 June 2020  Figure 4-7 Second stone plaque marking the opening of the Tarro Interchange, facing south, 29 June 2020  Figure 4-8 Concrete and stone feature, facing south, 29 June 2020.

Table 4-4 Areas of historical heritage potential surveyed within or next to the project.

Location	Potential historical heritage item	Results of survey
51 New England Highway, Black Hill Lot 2 DP873320	Glenrowan Homestead, described as ***Item 3*** in this assessment	Detailed survey and photographic recording of property. The site comprised a farm complex including a main house, brick laundry, bluestone blocks alongside the driveway and entrance gate, fountain, four outbuildings/sheds, a weatherboard house, and remnant gardens. A large mound of building rubble and other material was also present. Potential heritage item – refer to **Section 5.3**.
1877 Pacific Highway, Tomago Lot 101 DP1038663	Industrial site – former mineral sands processing site	Survey and photographic recording of site. Site comprised extensive concrete slab footings, scattered and piles of building debris, water-logged and submerged concrete areas, vehicle tracks, steps and pillars. Areas of vegetation surrounding concrete areas. Zircon Rutile Ltd began operations in Byron Bay in 1934 and expanded into mid-NSW coast during the 1960s when northern NSW deposits were depleted (Ward 1970: 2-3). Not considered to be a heritage item due to the relatively recent nature of the remains, and therefore no further assessment has been carried out.  Figure 4-9 Concrete footings, facing southeast, 15 December 2015
15 Pacific Highway, Tomago Lot 51 DP739336	Building remains and footings	Detailed survey and photographic recording of site. Site comprised: • Wooden building in poor condition, concrete footings, series of wooden doors, remnants of corrugated iron roof • Square brick tank. Very rough bricklaying, located on concrete slab, brick floor at end of concrete slab • Pile of building debris, wooden posts, corrugated iron • Secondary pile of building debris, bricks, corrugated iron, old machinery and an artificial channel north of site. The nature of the construction techniques, including the types of bricks, modern, machine sawn nature of timbers etc, indicate the recent nature of the site. Additionally, the site is in extremely poor condition. There were no areas of archaeological potential, such as cess pits, identified at this location. It is not considered to be a heritage item, and therefore no further assessment has been carried out.

Location	Potential historical heritage item	Results of survey
		 Figure 4-10 Wooden building, facing east, 15 December 2015  Figure 4-11 Brick tank, facing east, 15 December 2015  Figure 4-12 Artificial channel, facing west, 15 December 2015

Location	Potential historical heritage item	Results of survey
2171 Pacific Highway, Tomago Lot 1 DP1169886	Racetrack, potentially Motto Farm racetrack identified in Maunsell (2006) assessment	Survey deemed unnecessary after speaking with property owner who confirmed that he constructed the racetrack 10 years ago and that there were no other former building remnants from the Motto Farm on his property (Tony Bott, pers. comm., 15 December 2015).
5/404 Maitland Road, Tarro Lot 131 DP1092779	Building remains and footings	The area has piles of debris, including concrete conglomerate, machine made triangular shaped grey bricks, timber beams with metal pegs, large concrete square object with metal screws. Specifically, the site comprised of the following: • Concrete slab to the north of the site • A low concrete wall lies on the east side of the site • Two standing concrete silos are located to the east of the site (which were originally identified on aerial imagery as building footings). The silos have been constructed by pouring concrete into corrugated iron water tanks • There are timber beams on the outside of the silos • There are large pieces of concrete next to the river in line with the silos and a concrete slab to the south of the silos near the river • Triangular shaped grey bricks are also along the bank of the river as well as mounds of modern bricks. No areas of archaeological potential such as cess pits or building footings were noted across the site. It is unlikely that archaeological deposits are located below the concrete slabs. The features noted were not considered to be potential heritage items, and therefore no further assessment has been carried out.  Figure 4-13 General view of area, facing west, 14 March 2018  Figure 4-14 Triangular shaped machine-made bricks, 14 March 2018

Location	Potential historical heritage item	Results of survey
		 Figure 4-15 Concrete silos with Hunter River in background, 14 March 2018
1 Anderson Drive, Tarro Lot 10 DP1150648	Purgatory Creek crossing	The Purgatory Creek crossing is located outside and next to the updated construction footprint. Survey was carried out as the creek crossing is located about 45 metres north of the construction footprint. The Purgatory Creek crossing is of modern construction (concrete pipe and gravel over top). No potential heritage item identified and therefore no further assessment has been carried out  Figure 4-16 Purgatory Creek crossing, 14 March 2018

4.5 Summary

Following the field survey, eight listed heritage items, one former listing (Item 5), and one potential heritage item (Item 3) were considered to occur within or next to the construction footprint, or would be subject to project-related work (see **Figure 4-17**). These are:

- Item 1: Hannell Family Vault (Newcastle Local Environment Plan (NLEP) I179)
- Item 2: Hexham Shipbuilding Yards (NLEP I180)
- Item 3: Glenrowan Homestead
- Item 4: Residence, 29 Eastern Avenue, Tarro (NLEP I548)
- Item 5: Hunter Estuary Wetland (RNE 1296)
- Item 6: Tarro Historic Site (NLEP A18)
- Item 7: Tarro Substation (NLEP I546)
- Item 8: Pumping Station (NLEP I550, RNE 102132, Hunter Water s170)
- Item 9: Newcastle Crematorium (NLEP I34)
- Item 10: Our Lady of Lourdes Church (NLEP I547).

As outlined in **Section 4.4**, Item 5 (Hunter Estuary Wetland) was removed from further assessment as former listings have been superseded by stronger ongoing heritage protection provisions under national environment law. There is no current listing affecting Item 5 within the construction footprint of the project, and therefore is not shown on **Figure 4-17**.

Figure 4-17 Listed and potential heritage items within or next to the construction footprint, or subject to project-related work

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5 Significance assessment

The eight listed heritage items and one potential heritage item within and next to the construction footprint, or subject to project-related work (mapped in **Figure 4-17**) have been subject to assessments of heritage significance. The assessment for each of the nine items are provided in the following sections.

5.1 Item 1: Hannell Family Vault (NLEP I179)

5.1.1 Description and history

The heritage item comprises a stone vault structure, located about 20 metres from the banks of the Hunter River, and standing about three metres above the flat Hexham Plain. The vault is surrounded by overgrown vegetation including shrubs, weeds and grass (**Figure 5-1** and **Figure 5-2**). Due to its proximity to the Hunter River, over the years it has been flooded several times and during major floods has been completely covered by water.

The field survey of the Hannell Family Vault was carried out on 14 March 2018. The section of the heritage item curtilage located within the construction footprint comprises an existing informal gravel vehicle track with narrow grassed sections either side of the track. The vault is located about 20 metres north of the construction footprint. The vault has a lot of overgrown vegetation in close proximity. The inside of the vault was observed from the door and is empty.

The NSW Heritage Database includes the following information about the site:

> *John Hannell was born in 1815 and moved from Newcastle to Hexham in 1843 to operate the original Wheat Sheaf Inn, which had been owned by the Sparke family in the 1830s. He also operated a punt between his hotel and the eastern bank of the Hunter River, opposite the hotel, as there was no bridge at that time. The original Wheat Sheaf Inn burnt down in 1853 and a new Wheat Sheaf Inn was built in 1856 on Maitland Road, Hexham, south of the Hannell Family Vault lot. The two-storey hotel was renamed Riverview when it became the Hannell's family home after John's death. The hotel building was later demolished in 1960 (Scanlon 2017)*.

John Hannell was known to have been 'a river pilot of note'. He sponsored Newcastle's first regatta which he then won in his boat 'Bee'. Hannell also founded the Newcastle Cricket Club, the Newcastle Jockey Club and the Newcastle Regatta Club (Scanlon 2017).

The NSW Heritage Database entry for this heritage item was updated (17 June 2020) during the duration of this assessment and includes the following information:

> *The Hannells are one of the founding families of Newcastle, three brothers arriving in the early 1830s from Sydney to join their mother Elizabeth Hannell who, after committing herself to abetting forgery, was in 1820 sentenced to 'Life' and transported to Newcastle. Family vault of the first Mayor of Newcastle and chief benefactor of the new Newcastle Hospital, James Hannell (who died on 31 December 1876, aged 63 years and was buried in Christ Church cemetery, Newcastle), his wife Mary Anne Sophia (who died in 1884, aged 65); his brother John Hannell (who died on 7 May 1891, aged 76 years) publican of the former Wheat Sheaf (or Wheatsheef) Inn on Maitland Road - a Halfway House or 'The House that Jack Built', a changing post for coach horses on the Newcastle-Maitland journey in the colonial era (original destroyed by fire in 1853, re-built 1856, demolished in 1960) and his wife Mary Ann Hannell (who died on 27 April 1902, aged 84 years); his brother Jesse Hannell (1818 to 1895) is credited as the first lighthouse keeper at Nobbys, took a major role in many boat rescues including the sole survivor of the paddle-steamer Cawarra which sank on the port's Oyster Bank in heavy seas in July 1866, Newcastle's worst maritime disaster.*

James Hannell took an active part in securing the incorporation of Newcastle Council in 1859, when he was elected an alderman to the city ward and then as its first Mayor from 1859-62, serving again in 1868-69 and 1871. In 1871, upon the incorporation of Wickham, James was elected first mayor of the borough, occupying the position until 1874. Hannell Street, in the Wickham Municipality being named after him. From 1860 to 1869 James was twice returned by the electors for Newcastle City, and between 1872-74 was twice victorious in the polls for the electorate of Northumberland.

5.1.2 Curtilage information

The curtilage of the Hannell Family Vault includes Lot 1 DP1165954 and is shown on **Figure 5-3**.

5.1.3 Significance assessment

The significance assessment presented in **Table 5-1** has been prepared by the author in accordance with the *Assessing Heritage Significance* manual (NSW Heritage Office 2001) and has assessed the heritage item to have local significance.

Table 5-1 Significance assessment for Item 1: Hannell Family Vault

NSW Criterion	Local level
A – Important in the pattern of NSW's history	The vault is associated with John Hannell who was important in developing specific sporting associations in the broader Newcastle region in the 19th century. John Hannell was from the Hannell family, who were a well-known and important family in the history of the Newcastle region.
B – Strong or special associations	The vault has a strong association with the Hannell family, a prominent family in the region in the 19th century.
C – Demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement	Does not meet this criterion.
D – Strong or special associations with a particular community or cultural group	Does not meet this criterion.
E – Potential to yield information	Does not meet this criterion.
F – Uncommon or rare	The vault is located outside a cemetery, in a less common setting, i.e. beside the Hunter River.
G – Principal characteristics of a class	Does not meet this criterion.

5.1.4 Statement of significance

The statement of significance is replicated from the NSW Heritage Database. Additions by the author are added in **bold** text and deletions are shown in strikethrough text.

*Associated with the **locally** prominent Hannell Family, **and in particular, John Hannell, who was a well-known publican, who also founded several sporting associations in the broader region**. **The vault is** an unusual monument **in an uncommon** location. ~~Provides insight into social class and lifestyle.~~*

Figure 5-1 The Hannell Family Vault, facing southeast

Figure 5-2 Front door of the vault

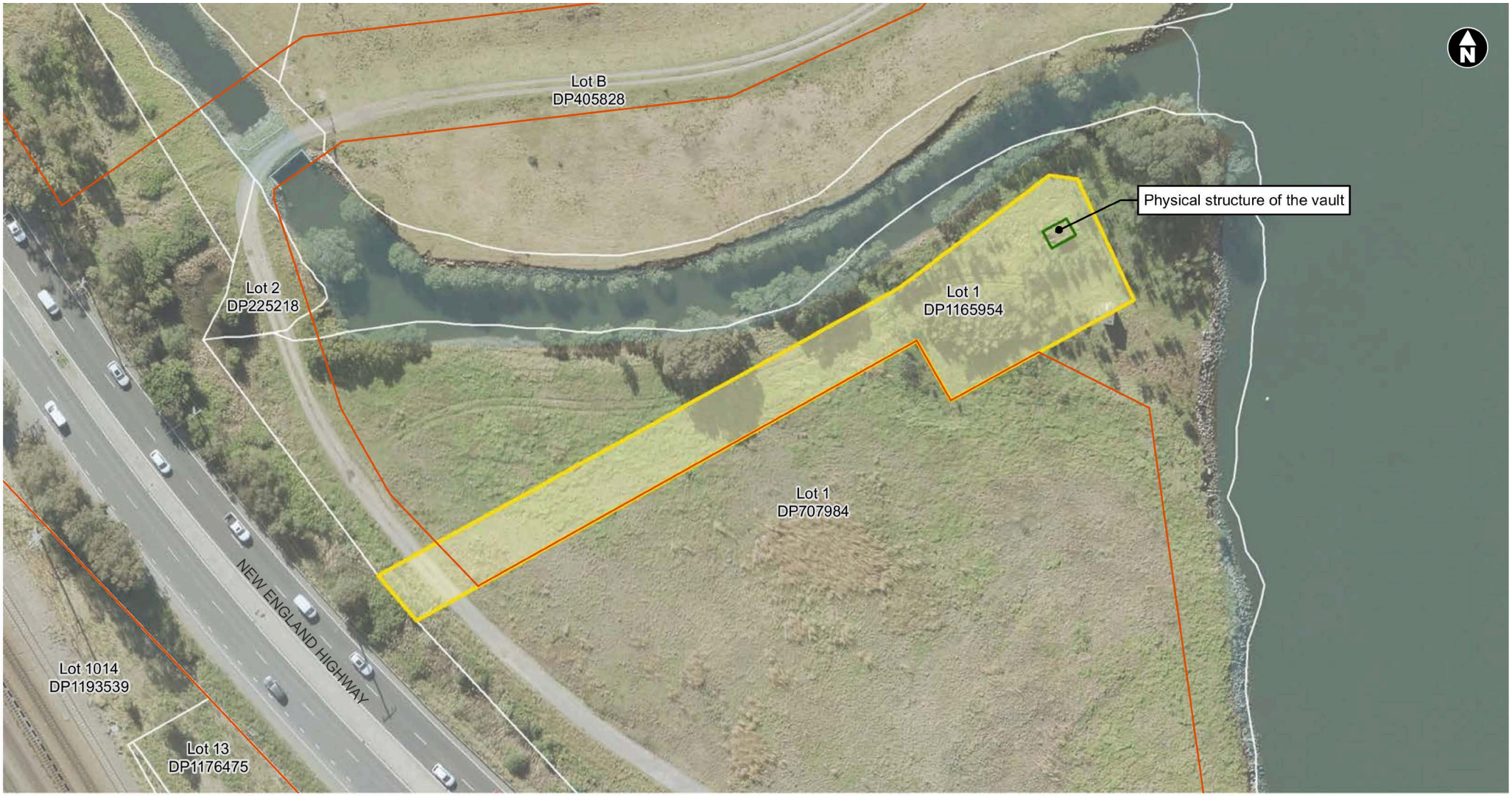

Figure 5-3 Heritage curtilage of Item 1: Hannell Family Vault

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5.2 Item 2: Hexham Shipbuilding Yards (NLEP I180)

5.2.1 Description and history

Previous assessment of the site

The description provided in the NSW heritage database states that the Hexham Shipbuilding Yards comprises a mangrove swamp containing straight cuts commensurate with 19th century boat building. The listing also includes a location description 'public open space', although the curtilage is located on privately owned land. The historical notes in the listing include the following description: 'The section behind Goninans (end of right angle bend in Old Maitland Road) was occupied by J. and A. Brown's coal shoots built in 1860 to 1861 to serve their Minmi Mines'. It is unknown if this description relates to the Hexham Shipbuilding Yards specifically or Hexham in general, as the right-angle bend in Old Maitland Road is located about 1.43 kilometres southeast of the heritage curtilage for the site.

The Newcastle City Wide Heritage Study (Suters Architects 1996/7*)*, carried out in 1997, recommended that the Hexham Shipbuilding Yards be listed on the LEP. There was little information about the shipbuilding yards included in the study; however a photo of the site was included. This photo is reproduced in **Figure 5-4**. The photo indicates that the site is located on the banks of the Hunter River, in the mangroves. A subsequent Newcastle LEP 2000 Heritage Review (Ecotecture Pty Ltd 2001) stated the following in relation to the Hexham Shipbuilding Yards:

> [the site is] *noted as being purely of archaeological value ie. no obvious remnants above ground level, and having potential to retain an archaeological resource rather than a known resource. Given the lack of obvious fabric, the uncertainty as to any archaeological relics that might exist, and hence often the inability to precisely define their location within specific legal allotments, such items do not fit readily into the current LEP schedule.* [The site is] *in public ownership and are unlikely to be subject to redevelopment pressure, and hence the lack of certainty as to location and/or the actual existence of relics is not a particular concern. In fact, they represent an important opportunity for interpretation.*

Description from the field survey

The field survey of the Hexham Shipbuilding Yards was carried out on 14 March 2018. The 20 metre wide construction footprint passes through the heritage curtilage of the Hexham Shipbuilding Yards. The construction footprint comprises an existing informal gravel vehicle track, built up by around one metre above the Hunter River floodplain (**Figure 5-5**). This is a raised embankment that serves as a continuous flood levee bank that was constructed as part of the Hunter Valley Flood Mitigation Scheme (DPIE 2020). The area to either side of the existing levee bank and overlying vehicle track is grassed. Several shallow depressions in the surrounding ground were noted next to the construction footprint on the north side of the vehicle track (**Figure 5-6**). Several pieces of timber were located at the end of one of the depressions but these are not situated within the construction footprint (**Figure 5-7**). There were no mangroves within the depressions. The single photograph from the original inventory datasheet (**Figure 5-4**) was viewed on site and appears to match the riverside location to the south of the construction footprint, near the confluence with Purgatory Creek.

Newcastle City Wide Heritage Study 1996 — **Inventory Datasheet**

PRESENT NAME:

Hexham Shipbuilding Yards

ITEM NO.

HEXH.001

OTHER NAMES OR USES:

FIELD SURVEY NO.

0831

PHOTOGRAPH/PLAN CAPTION:

SOURCE: Bairstow — ROLL NO: 1 — NEG NO: 16

DATE: 3/06/96

Figure 5-4 Reproduction of inventory datasheet (Suters Architects 1997: 99)

Figure 5-5 The Hexham Shipbuilding Yards, facing east

Figure 5-6 Area of shallow depressions, vehicle track in background, facing east

Figure 5-7 Timber fragments located at the site

Interpretation of shallow depressions

A review of aerial imagery from 1954 indicates that the shallow depressions noted during the survey to be next to the flood levee bank / vehicle track also occur around 185 metres north of this site, and on the west of the Hunter River (**Figure 5-8**). Like the depressions next to the flood levee bank / vehicle track, these depressions are also within 60 metres of the river bank. These shallow depressions also occur across the landscape in the general region away from the river, but close to other canals (**Figure 5-8**). The depressions are likely associated with previous agricultural land use of the area associated with irrigation and management of water, as outlined below. They are not thought to be associated with shipbuilding.

The Woodberry Swamp is a low-lying floodplain and wetland area around 4,350 hectares in size, located between Maitland and Hexham on the western side of the Hunter River. The swamp is around three kilometres northwest of the Hexham Shipyards site. Flood mitigation infrastructure over the past 200 years has resulted in a separation of the floodplain from the estuary for dry-land agricultural purposes. After a major flood event in 1955, significant floodplain drainage works were carried out, including the construction of drains and levees, and the installation of tidal floodgates (DS Rayner et al. 2016). The flood levee bank and its overlying vehicle track are connected to the nearby floodgates and form part of the wider flood scheme (DPIE 2020). A parish map (**Figure 5-9**) of the area shows ‘Woodberry Drainage Union’ marked as immediately north of the Hexham Shipbuilding Yard. It is likely that the depressions within the curtilage of the shipbuilding site and the other nearby areas shown in **Figure 5-8** represent an early form of irrigation or water management related to the swamp and the Hunter River. The Hunter River Flood Scheme is the most recent feature of this site and has the associated levee bank overlays the identified depressions.

Figure 5-8 1954 aerial imagery of the Hexham Shipbuilding Yards located within red circle. Other similar shallow depressions located within the blue circles. Source: NSW Department of Finance, Services and Innovation.

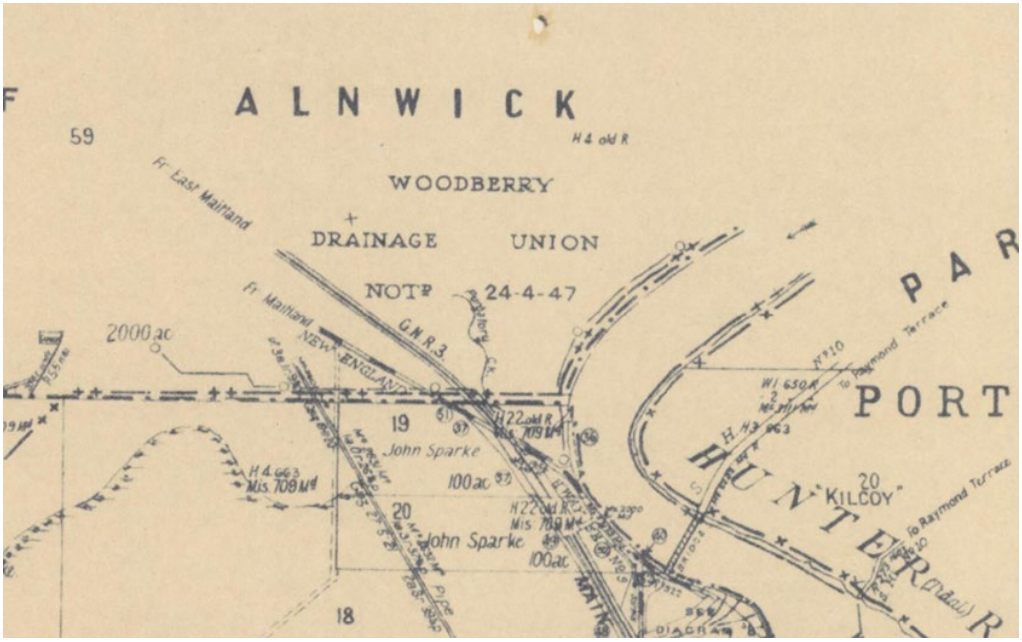

Figure 5-9 1953 Parish of Stockton map showing ‘Woodberry Drainage Union’ immediately north of the Hexham Shipbuilding Yard. Source: Parish of Hexham, County of Northumberland: Land Districts of Maitland and Newcastle, Lower Hunter Shire and City of Newcastle, Eastern Division NSW/compiled, drawn and printed at the Department of Lands, Sydney NSW

Shipbuilding in the region

The Newcastle City Wide Heritage Study Thematic History (Suters Architects 1996/7) states the following about shipbuilding in the region:

> *Shipbuilding is another of the traditional industries of the Hunter Region. Based initially on the abundant timbers of the valley of the Williams River, shipbuilding began in the Newcastle convict settlement but its commercial original may be traced to Clarencetown where William Lowe built many vessels, the most famous being William IV launched in 1831. Stockton too was important in wooden ship building until the 1880s but no Hunter region shipbuilder made the transition to iron/steel ships until a State Dockyard was opened at Walsh Island in 1914. Functioning discontinuously as a shipyard, it became a general engineering works until its closure in 1933. The second state dockyard also built ships for the war effort from 1942 and the BHP Company was active in small ship construction at this time. However, large steel ship construction has never been viable in peacetime conditions in the Hunter region and this dockyard ceased to build ships in 1983. Small ships continue to be built in whole or in sections in parts of the study area.*

Shipbuilding sites in the Hunter region include the Callen Bros Yard at Stockton (around 14 kilometres southeast of Hexham), the Walsh Island State Dockyard at Kooragang Island (around 11 kilometres southeast of Hexham) and the Carrington State Dockyard (around 14 kilometres southeast of Hexham). A 1899 photo of Murray's Shipbuilding Yard (located in Swansea, around 25 kilometres south of Newcastle) shows the construction of a timber boat (**Figure 5-10**). The photo indicates that the boats were constructed above the ground, on timber supports. Later shipbuilding activity in the region includes Carrington Slipways, originally opening in the suburb of Carrington in Newcastle by John Laverick Senior in 1957, then later moving to Tomago in 1972. Situated on Old Punt Road on the Hunter River, Carrington Slipways built a range of Lady-class and First Fleet-class ferries through the 1970s and 1980s for use on Sydney Harbour, as well as *HMAS Tobruk*, *HMAS Rushcutter* and *HMAS Shoalwater* for the Royal Australian Navy, and the icebreaker the *Aurora Australis* in the 1980s. The shipyard was purchased by Forgacs Engineering in 1997, and by Civmec in 2016.

This information, particularly the photograph, suggests this was the type of activity likely occurring at the Hexham Shipbuilding Yards, and also indicates the type of archaeological remains that might be expected at the site.

Figure 5-10 Murray's Shipbuilding Yard, Swansea, NSW, 7 March 1899. Source: Cultural Collections, University of Newcastle, NSW. https://www.flickr.com/photos/8571926@N06/3216088679

Land ownership and use at the Hexham Shipbuilding Yard

Parish maps and plans indicate the Hexham Shipbuilding Yard was located on one of the two 100 acre lots originally owned by John Sparke in 1835. In 1837 ownership of the land passed to John Terry Hughes and John Hosking. In 1846 the Port Phillip Patriot and Morning Advertiser (6 July 1846) reported on an insolvency case involving John Terry Hughes. The article noted that Hughes 'was in partnership with one Hosking and the firm carried on business as merchants'. Hughes was reported to own 'various quantities of land, in the interior, and in different townships'.

John Hannell, listed as a licensed victualler, then owned the land in 1850. John Hannell was interred at the Hannell Family Vault (Item 1), located south of the Hexham Shipbuilding Yards, on Lot 1 DP1165954, to the south of Purgatory Creek (see also Hannell Family Vault in **Section 5.1**). Hannell died in 1891, but the property remained in his name until 1901, when Joseph Arthur Carroll, a farmer, took ownership. The Hetton Bellbird Collieries Limited owned the Hexham Shipbuilding Yards property from January to May in 1935, before there was a transfer to butchers Stanley Sinclair and Patrick Francis Mahony. In 1957 the property passed to three individuals: Felix Reginald Mahony (manager), Rex Duncan Charters (milk vendor) and John Reginald Carroll (launch driver). Land passed to Frederick Toll, carrier, in 1960, Mary Toll in 1982, Ronald William Harris in 1982, Dean Edwin Harris and Craig William Harris in 2017, ending with Transport, the current owner. None of the records note any of the owners as shipwrights.

Other information about the shipyard location and its archaeological remains

Several structures next to the river along the northern bank of Purgatory Creek are visible in the 1954 historical aerial imagery (**Figure 5-11**). The structures were located within the heritage curtilage of the site and around 10 metres from the construction footprint. However, no physical evidence of these was identified during the field survey.

Figure 5-11 1954 aerial imagery close up showing location of structures within the red rectangle. Source: NSW Department of Finance, Services and Innovation.

Based on the historical and physical information gathered for this assessment, the upper soil deposits from the site are likely to have been dispersed over time through erosion from agricultural activity, loss of vegetation cover, and periods of flooding, such as the 1955 flood (Albrecht 2000: 14).

5.2.2 Archaeological assessment

The archaeological potential of the subject site within the construction footprint is assessed to be low for the following reasons:

- The area has been subject to substantial flooding in the past, which would have washed topsoil deposits from their original location
- Substantial flooding would also have impacted on the preservation of timber remnants
- The depressions noted on the site are most likely to be from irrigation of the Woodberry Swamp and Hunter River and not related to shipbuilding activities
- Buildings noted in the 1954 historical aerial imagery are located outside, and to the south of the construction footprint
- A title search of the property failed to indicate that there was a former shipyard on the property
- The description of the location of the site on the NSW heritage database is vague and refers to a location further south in the town of Hexham.

Outside of, and to the south of the construction footprint, there is moderate archaeological potential for archaeological deposits to be located immediately north of Purgatory Creek, where aerial imagery indicates there were former buildings. Archaeological relics would include:

- Possible building foundations
- Remnants of timber and tools used for shipbuilding
- Remnants of slipways.

Based on the available information, the possibility of any archaeological relics located within the construction footprint is low.

5.2.3 Curtilage information

The curtilage of Hexham Shipbuilding Yards includes part of Lot B DP405828 and is shown on **Figure 5-12**.

5.2.4 Significance assessment

The significance assessment in **Table 5-2** is replicated from the NSW Heritage Database with additions by the author in **bold** text and has assessed the heritage item as of local significance.

Table 5-2 Significance assessment for Item 2: Hexham Shipbuilding Yards

NSW Criterion	Local level
A – Important in the pattern of NSW's history	The Hexham Shipbuilding Yards are associated with the development of the Hexham area and the rise of shipbuilding along the Hunter River in the 19th century.
B – Strong or special associations	Does not meet this criterion.
C – Demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement	Does not meet this criterion.
D – Strong or special associations with a particular community or cultural group	Does not meet this criterion.
E – Potential to yield information	The archaeological remains of the Hexham Shipbuilding Yard could contribute to a greater understanding of the boat building industry. **However, a review of historical aerial imagery indicates there is low archaeological potential for remnants to be located within the construction footprint.**
F – Uncommon or rare	Does not meet this criterion.
G – Principal characteristics of a class	Does not meet this criterion.

5.2.5 Statement of significance

The statement of significance is replicated from the NSW Heritage Database.

> *The Hexham Shipbuilding Yards are locally significant as they are associated with the development of this area and the rise of shipbuilding along the Hunter River in the 19th century. The archaeological remains could contribute to a greater understanding of this industry.*

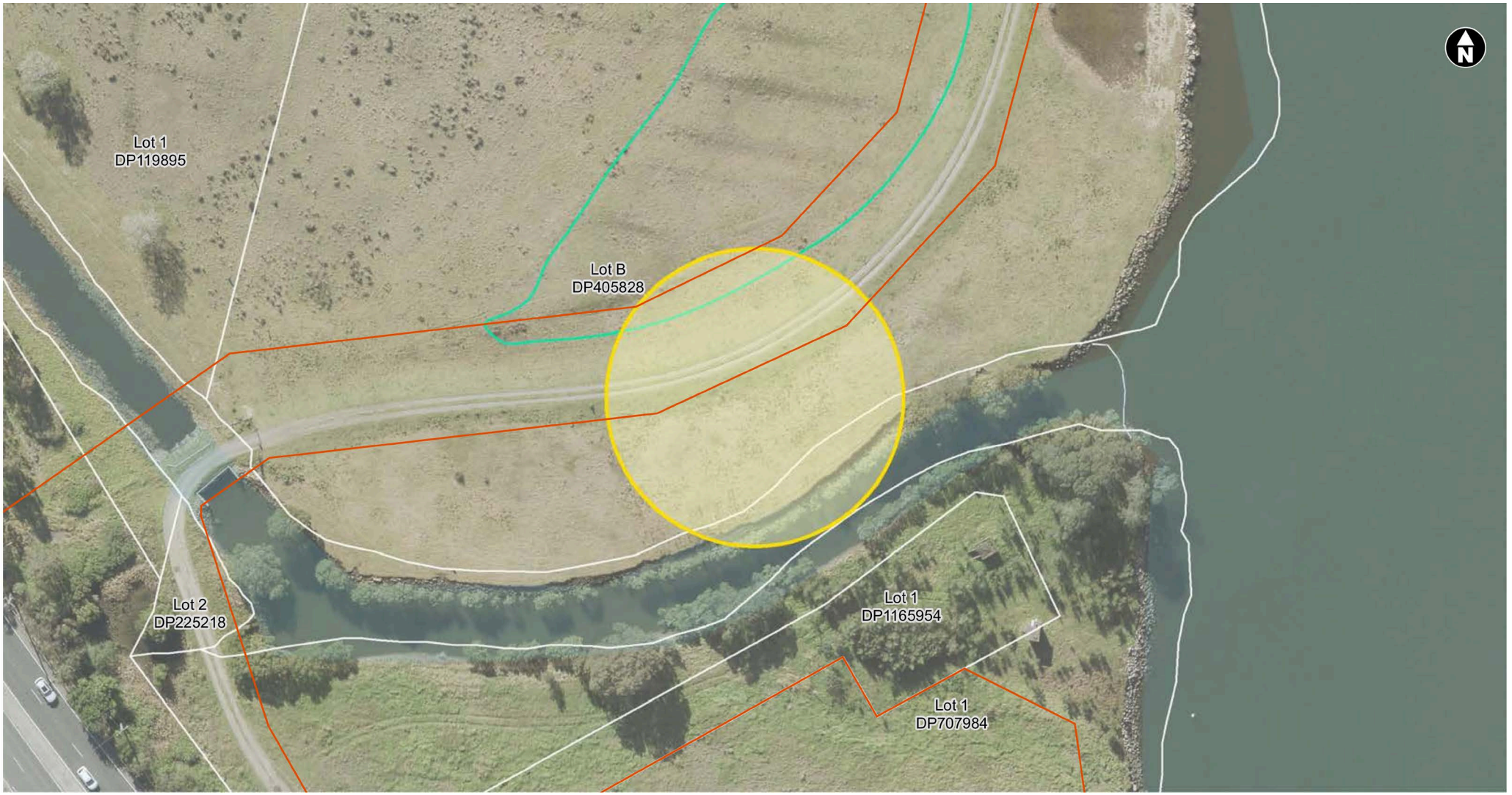

Figure 5-12 Heritage curtilage of Item 2: Hexham Shipbuilding Yards

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5.3 Item 3: Glenrowan Homestead

5.3.1 Description and history

Glenrowan Homestead is located on a large somewhat flat rise overlooking floodplain and swamp landforms. The Glenrowan Homestead is a farm complex comprising two clusters of buildings/structures, one located about 300 metres (Site 1) and one about 100 metres (Site 2) south of the New England Highway, Tarro. The houses at both of the sites were occupied at the time of the survey. The house at Site 1 has been modified over time and additional buildings have been constructed near the house at Site 2, reflecting the current residential use of the houses. An artefact scatter and area of archaeological potential are located about 130 metres south of the New England Highway (Site 3).

Site 1 at Glenrowan Homestead contains a single storey farmhouse, sheds, remnant gardens and a driveway. Site 2 at Glenrowan Homestead contains a weatherboard house. Site 3 contains subsurface historical archaeological artefacts. The three sites are mapped in **Figure 5-13** and described further in the sections below.

Parish maps and land title searches indicate that the Glenrowan Estate is located within land that was owned by the Sparke family from 1893. Edward Sparke arrived in Sydney from England in 1824 by ship with his wife and five sons. In 1825 Edward Sparke and his son William obtained land grants of 30,000 acres in the Hunter River District. The estates included Webland Park, Woodbury and Woodlands (Newcastle Morning Herald and Miners' Advocate (NMHMA), 23 August 1902).

The Glenrowan property was owned by Benjamin Green (Junior) in 1902. He had been living in the Hexham area for 50 years but it is unknown how long prior to 1902 he had owned the Glenrowan property (NMHMA 06 September 1902).

By 1916 the Glenrowan property was owned by the Mills family with Mrs G Mills advertising the property in the 'to let' column of the local newspaper (NMHMA, 26 September 1916). The property was subdivided into four dairy farms which were put up for sale in 1925 with Mrs M Mills listed as the vendor (NMHMA, 6 June 1925). In 1950 the property was owned by Ms I Mills and Mr C Mills who were joint owners. A lease notice in the local paper for the estate of the late Mrs M Mills described a five-roomed weatherboard cottage, dairying premises and sheds (NMHMA, 19 August 1950).

The Hunter Valley was an important area for farming from the early 19th century with land grants being established on the south side of the river, where Glenrowan Homestead is located, and immediately surrounding farming extending to Hexham, Tarro and Beresfield. These farms provided grain, fruit, vegetables, butter and meat for the Sydney population (Suters Architects 1996/7:35).

During the excavations for Aboriginal cultural heritage subsurface testing at the site of Beresfield 4 (AHIMS 38-4-0837), historical artefacts were recovered from an area near the Glenrowan Homestead. This area has been named Site 3 - Glenrowan Homestead Artefact Scatter, as a component of the overall Glenrowan Homestead. A description of the artefact scatter is outlined below and a catalogue of the artefacts provided in **Appendix A**.

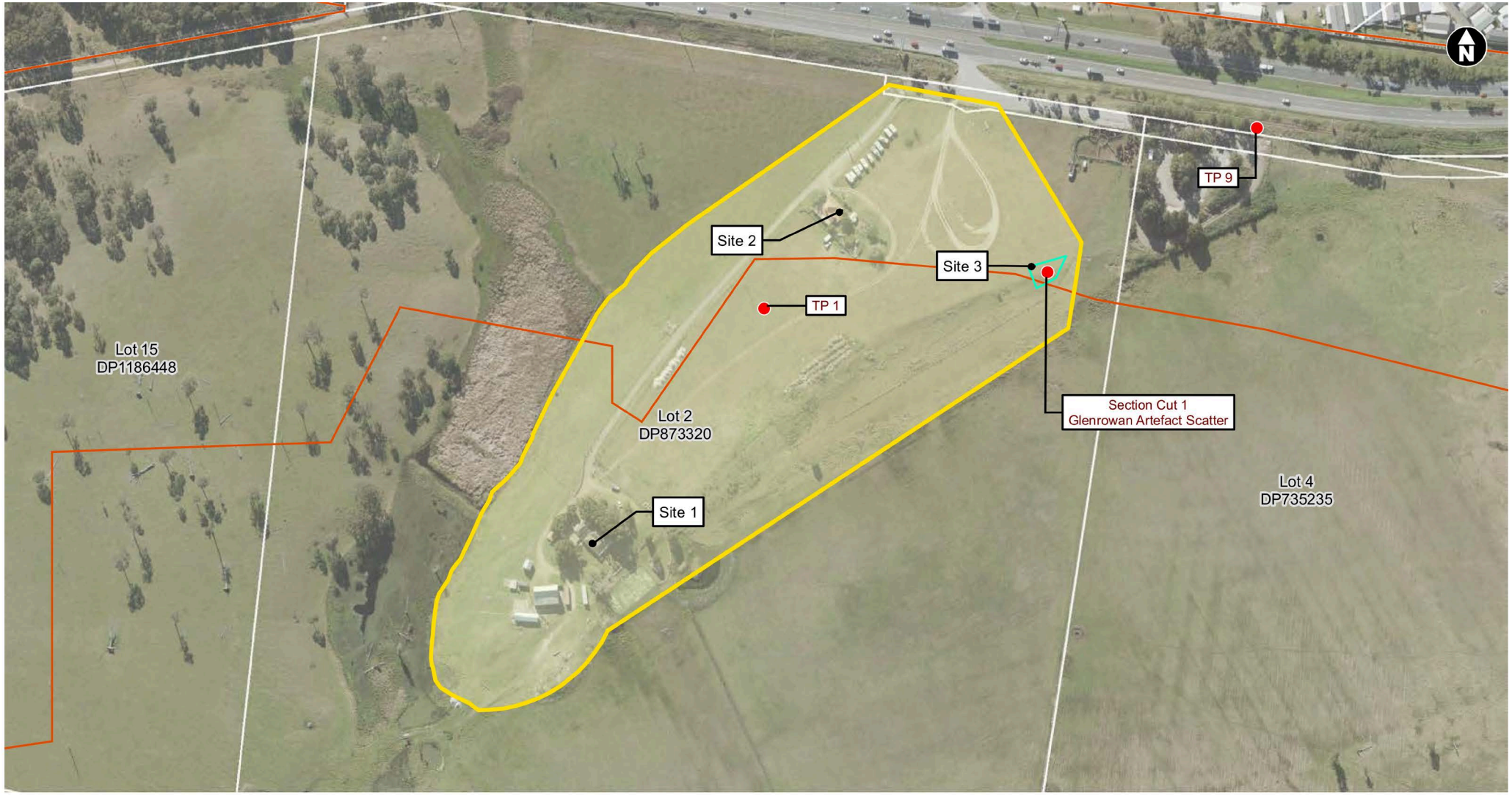

Figure 5-13 Heritage curtilage of Item 3: Glenrowan Homestead

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Site 1 – Main house and associated buildings, garden

Site 1 is comprised of the following key features:

- Main house. The house is a brick building with a corrugated iron roofed verandah (**Figure 5-15**). Sections of the main house are made from weatherboard indicating that there were originally two separate brick buildings which have since been joined (**Figure 5-17**). The brick walls in this part of the house appear to have handmade bricks laid in an English bond pattern and the bricks in the eastern section of the house are laid in stretcher bond pattern. The windows in the brick buildings have decorative window sills and lintels and are double sash and timber framed. There are two chimneys and a tiled roof with one of the chimneys (on the eastern building) having a stepped corbel and terracotta chimney pot, suggestive of Edwardian style (c1901). There has been a recent extension on the south-eastern verandah and to the south-west section of the main house (**Figure 5-16**). The north-western brick section has rendered door frames and chimney. This building also has a bull nosed corrugated iron and timber verandah with decorative timber latticework and timber posts. The north-western section was also possibly the original kitchen
- Laundry. This separate brick building is located about 10 metres east of the house and has a corrugated iron roof with a chimney for the copper. There are double doors at the northern end of the building, and a single door and window on the side facing the main house. The bricks are laid in stretcher bond pattern (**Figure 5-18**)
- Bluestone blocks and fountain. Large hand cut bluestone blocks are located along the side of the driveway and at the entrance gate (**Figure 5-19**) to the main house complex. There is a remnant water fountain located about 20 metres north-east of the main house in what would have been the front garden (**Figure 5-20**)
- Building. There is a small open wooden building with round posts and corrugated iron roof, north of tennis court and about 30 metres south-east of the main house (**Figure 5-21**)
- Store. The store is a rectangular brick building located about 35 metres west of the main house. The building is constructed from early handmade bricks in an English bond pattern. The gabled roof comprises corrugated iron on a timber frame. The single timber door is located at the northern end, and there are two long narrow timber framed windows on opposing sides (**Figure 5-22**). The windows have large single stone sills and decorative brick lintels. The door has a decorative brick lintel as well. Both lintels are in a shallow arch design
- Shed. The shed is a corrugated iron building located about 35 metres south-west of the main house (**Figure 5-23**). The building has a timber frame made with milled logs (**Figure 5-24**), and a corrugated iron gabled roof with extension. The timber frame is constructed from lap joints
- Shed/workshop. The shed/workshop is a weatherboard building located about 55 metres south-west of the main house. The building has a corrugated iron roof and cement sheeting on the inside (**Figure 5-25**).

Site 2 – Weatherboard house

- Weatherboard house. The building at Site 2 is located about 250 metres north-east of the main house at Site 1. The weatherboard building has a corrugated iron hipped roof with one chimney that has a stepped corbel and terracotta chimney pot, suggestive of Edwardian style (c1901) (**Figure 5-27**). The north-east side of the building has been subject to an extension. There is a wide verandah on the remaining three sides of the house. The verandah has a fence/wall using wide weatherboards at the base (**Figure 5-28**). The colonial style house has stained glass windows and is likely to date from the late 19th century or early 20th century. There is a small number of non-heritage sheds near the house which are not considered significant

- About 75 metres south-east of the house there is a large mound of dumped rubbish comprising building rubble, for example bricks, cement sheeting, timber and iron. Some of the bricks have maker's marks including 'Gulliver'. The pile measures about 50 metres long and 15 metres wide (**Figure 5-26**). While the mound comprises building rubble, it does not appear to relate to a building situated at the location of the mound. Instead it appears to be systematic dumping of material from elsewhere. It is not considered to be of archaeological significance.

Site 3 – Glenrowan Homestead Artefact Scatter

The Glenrowan Homestead Artefact Scatter is located within the boundary of the Glenrowan Homestead curtilage, about 330 metres north-east of Site 1, and 175 metres east-south-east of Site 2. It is situated on the upper slope, overlooking a floodplain.

During the excavations for Aboriginal cultural heritage subsurface testing at the site of Beresfield 4 (AHIMS 38-4-0837), 73 historical artefacts were recovered from an excavation trench (Section Cut 1 – SC1), and have been named Glenrowan Homestead Artefact Scatter (**Figure 5-13**). The proximity of the artefact scatter to Site 1 and Site 2 of Glenrowan Homestead indicates that the scatter is a component of the heritage item. An area of archaeological potential was subsequently identified surrounding SC1. SC1 is situated on the upper slope, overlooking a floodplain. The area surrounding SC1 is cleared of trees and shrubs, and is vegetated with grass. There is moderate archaeological research potential of the artefact scatter in determining the age range of artefacts, the extent of the artefact scatter and its association with the homestead. The area of archaeological potential (mapped as Site 3) has been defined as including the slope 10 metres in both directions from SC1.

The location of the built heritage (Site 1 and Site 2), and the artefact scatter and area of archaeological potential (Site 3) is mapped in **Figure 5-13**.

Archaeological excavation results

The artefacts that compose the Glenrowan Homestead Artefact Scatter were recovered during subsurface test excavations, in Section Cut 1 (SC 1). SC 1, comprised five test pits (SC 1A to SC 1E from the top of the slope to the bottom of the slope), each about one metre wide and up to two metres in length. The excavation was carried out in arbitrary spits of 100 millimetres depth. The stratigraphy is shown in **Figure 5-14**.

The majority of historical artefacts were recovered in SC 1B (n=44) and SC 1C (n=26), generally within the top layer of humic dark brown, damp, friable, silty sand, within about 100 millimetres of the ground surface[2] (refer to **Appendix A** for full catalogue of artefacts). However, two fragments of ceramic were recovered from SC 1A at a depth of about 400 millimetres below the ground surface in sand, and animal bone was recovered from SC 1B also at a depth of about 400 millimetres below the ground surface. A single artefact was recovered from SC 1E, near the base of the slope (**Figure 5-30**).

Ten artefacts consisting of three fragments of glass, three fragments of corroded metal, and four fragments of glazed transfer printed earthenware were recovered from a test pit (TP 1) on the flattened area between Site 1 and Site 2 of Glenrowan Homestead. TP 1 was about 2 metres x 1 metre, with the majority of artefacts being recovered from a depth of about 200 to 300 millimetres below the ground surface in silty sand. The three fragments of metal were recovered from the top 100 millimetres of sediment. These artefacts are not considered to be part of the Glenrowan Artefact scatter as they were located about 200 metres to the west. These artefacts would likely be part of a low density background scatter, and were not considered to be of heritage significance.

[2] It should be noted that due to the arbitrary excavation spits used in the methodology, and the steep nature of the slope, the data related to artefact location by spit provides a misleading indication of depth.

An additional seven artefacts consisting of two fragments of clear glass and five fragments of glazed transfer print earthenware were recovered from a test pit (TP 9) on a flattened area beside the New England Highway. TP 9 was one metre by one metre, with all artefacts recovered from a depth of about 300 millimetres to 400 millimetres below the ground surface in loose sand. Road construction overburden of gravel and clay comprised the top 190 millimetres depth of surface material. These artefacts were not considered to be part of the Glenrowan Artefact scatter as they were located about 150 metres to the north-east. One of the glass fragments appeared modern however the glazed flow transfer stoneware may be associated with the practices of discarding domestic rubbish. These artefacts may also be part of a low density background scatter deposited through road construction activity and general roadside refuse. These artefacts were not considered to be of heritage significance.

Artefacts recovered

There were 73 artefacts recovered from Glenrowan Homestead Artefact Scatter. The most common material was ceramic (n=32, 44 per cent) followed by shell (n=18, 25 per cent), bone (n=14, 19 per cent), metal (n=6, 8 per cent), glass (n=2, 3 per cent) and cement (n=1, 1 per cent). The complete catalogue of artefacts is included in **Appendix A**.

The ceramic artefacts are predominantly earthenware (n=22, 69 per cent) with stoneware (n=9, 28 percent) and one porcelain artefact (3 per cent). The porcelain artefact is a partial dog's head, and is likely part of a decorative ornament or toy (**Figure 5-31**). The earthenware fragments are predominantly yellow or white glazed. There are two pieces of white ceramic with embossed flower patterns on them, likely from the rim of a bowl or plate. There were four pieces that are likely to refit into the one, yellow earthenware cup with a line incised just below the rim (**Figure 5-32**). There are a variety of transfer print patterns and colours present, including blue, dark blue/black and green **(Figure 5-33**). There were also 11 artefacts with salt glazing, including ten fragments and one complete bottle. The bottle originally contained boot polish and has "…LACKING BO……..L…." inscribed in an arch shape over "9/J. R. D." which is the maker's mark for Joseph Bourne Denby (**Figure 5-34**). The maker's mark indicates a manufacture date of between 1817 and 1934 (Basford 2012). The pottery at Denby was established in 1809, and underwent a number of name changes, reflecting the changes in ownership (Perry 2011). The company is still trading in 2016 under the name 'Denby Pottery' (Denby Pottery 2016). There were two pieces of clay smoking pipe stem, with the heel present. An example of one fragment of clay smoking pipe stem is shown in (**Figure 5-35**).

The glass artefacts comprised one clear, non-diagnostic fragment, and one partial olive green, bottle rim with a double collar seal (**Figure 5-36**).

The pieces of metal were all corroded and had square cross sections, suggesting that they may have been hand-wrought nails. Hand-wrought nails were common up to the 1850s (Burke and Smith 2004). The bone was highly fragmented with few diagnostic features. Of the shell present at the site, four fragments were oyster, with the remaining pieces too degraded to determine a species.

Discussion and interpretation

The type of artefacts present is consistent with those expected in the dumping of domestic or household rubbish. The style of transfer print patterns, and the presence of a clay smoking pipe stem would suggest the artefacts date to the late 19th century. The variety of transfer print patterns and colours, relative to the number of artefacts recovered, suggests that the artefacts that were recovered may be part of a larger rubbish dump at the site. The nature of household dumping in the 19th century, often on creek banks, in gullies, or on slopes, suggests that the Glenrowan Artefact Scatter could extend along the slope in both directions from SC 1. This is most likely to concentrate in a similar vicinity downslope – that is, between about 1.8 metres and four metres from the top of the slope. This would be likely to relate to the practice of discarding objects over time from near the crest of the slope.

Given its close proximity, it would be most likely that these artefacts are part of a rubbish dump associated with the Glenrowan Homestead. Alternatively, they may have been dumped by residents of the nearby township of Tarro in a dump of a more communal nature.

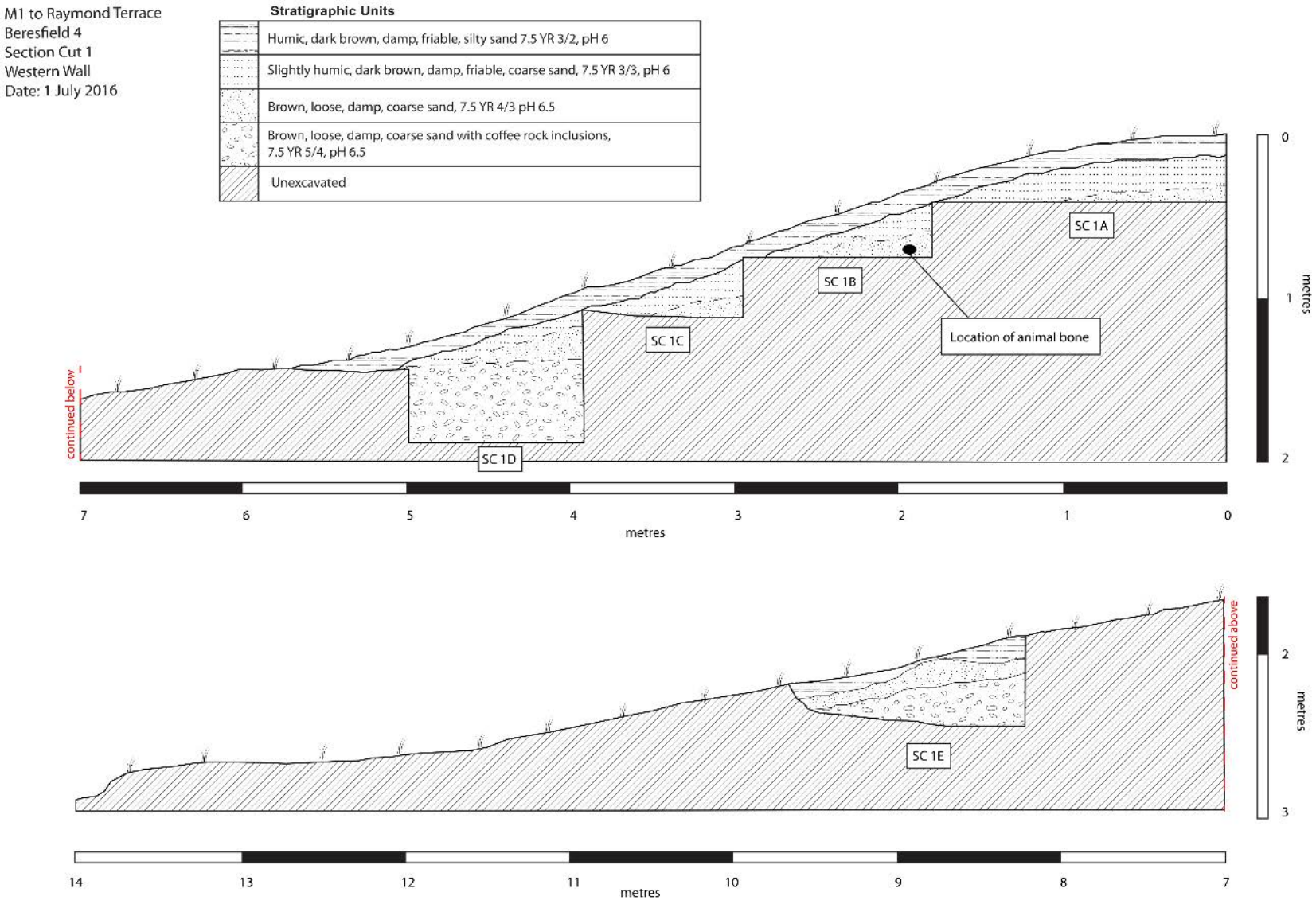

Figure 5-14 Stratigraphy of the western wall of Section Cut 1 (SC 1)

5.3.2 Curtilage information

The curtilage of Glenrowan Homestead includes Site 1, Site 2 and Site 3 (including area of archaeological potential) as described above and is shown on **Figure 5-13**.

5.3.3 Significance assessment

The significance assessment presented in **Table 5-3** has been prepared by the author in accordance with the *Assessing Heritage Significance* manual (NSW Heritage Office 2001) and has assessed the heritage item as of local significance.

Table 5-3 Significance assessment for Item 3: Glenrowan Homestead

NSW Criterion	Local level
A – Important in the pattern of NSW's history	The Glenrowan Homestead as a complex of buildings and features demonstrates the importance of dairying/grazing in the region from the early to mid-20th century. There is a cluster of buildings on the property which relate to different farming activities which reflects how farms operated during this period. The artefacts from Site 3 provide additional information about the historical operations of the farm and the residents, including potentially 19th century use of the homestead. The features and artefacts at the homestead can contribute information about the status and therefore importance of the homestead during the late 19th to early 20th century.
B – Strong or special associations	Does not meet this criterion.
C – Demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement	Does not meet this criterion.
D – Strong or special associations with a particular community or cultural group	Does not meet this criterion.
E – Potential to yield information	The artefact scatter at Site 3 of the Glenrowan Homestead has the potential to yield information about domestic life on a 19th century to mid-20th century dairy farm within a rural settlement. There is the potential that the artefact scatter extends further along the slope to the north-east and south-west. The artefact scatter has potential to yield information about if the area was used for discard over a short time or a longer period of time, what types of items were used, and if a relationship to the homestead can be established.
F – Uncommon or rare	Does not meet this criterion.
G – Principal characteristics of a class	Does not meet this criterion.

5.3.4 Statement of significance

A farm house is usually intimately connected with farming and a typical settlement pattern is one of a farm house and associated sheds, stables and yards being located as a single complex within the landscape. The Glenrowan Homestead, comprising these features, is significant at a local level for demonstrating early to mid-20th century dairying/grazing activities in the region and the particular way of life for residents during this period of time, who engaged in early farming. The artefact scatter identified at Site 3 of the Glenrowan Homestead site potentially extends further along the edge of the slope to the north-east and south-west.

The artefacts recovered have the potential to yield information about domestic life on a late 19th century to mid-20th century dairy farm and within a rural settlement. The artefacts also have the potential to indicate the importance of the homestead in the region through the types of artefacts present at the site.

Figure 5-15 North-western section of main house that may have originally been a separate kitchen (Site 1), facing south

Figure 5-16 South-eastern section of brick house (Site 1), facing north

Figure 5-17 Weatherboard extension joining the two brick buildings (Site 1), facing south-west

Figure 5-18 Brick laundry (Site 1), facing south-west

Figure 5-19 Bluestone blocks in driveway (Site 1), facing south

Figure 5-20 Water fountain between driveway and main house (Site 1)

Figure 5-21 Wooden building east of tennis court (Site 1), facing south

Figure 5-22 Brick store (Site 1), facing west

Figure 5-23 Corrugated iron shed (Site 1), facing south

Figure 5-24 Inside of corrugated iron shed (Site 1), facing southwest

Figure 5-25 Weatherboard and cement sheeting shed (Site 1), facing west

Figure 5-26 Rubbish pile (Site 2), facing north

Figure 5-27 Site 2 weatherboard house, facing south

Figure 5-28 Site 2 weatherboard house, facing east

Figure 5-29 Start of the test excavation at SC 1 facing south-east, looking downhill.

Figure 5-30 End of test excavation showing the full Section Cut 1 (SC 1), facing north-west, looking uphill.

Figure 5-31 Porcelain dog's head recovered from SC 1E

Figure 5-32 Earthenware cup and fragment from SC 1B Spit 7

Figure 5-33 Selection of ceramic material from SC 1B Spit 7

Figure 5-34 Complete boot polish bottle from SC 1B Spit 6

Figure 5-35 Clay pipe stem from SC 1B Spit 7

Figure 5-36 Partial bottle rim from SC 1B Spit 8

5.4 Item 4: Residence, 29 Eastern Avenue, Tarro (NLEPI548)

Item 4 is not located within the construction footprint however it is located next to the construction footprint and therefore has the potential to be indirectly impacted by the project.

5.4.1 Description and History

The following description and significance assessment is taken from the entry for the heritage item in the NSW Heritage Database for the LEP listing, and the field survey carried out on 15 December 2016. This heritage item has been included in the significance assessment as it is located next to the construction footprint.

This item is currently listed on the NLEP (I548). The site comprises a single storey facebrick work building with dichromatic brick work emphasising building edges around window openings and doorways, and corners of building. The main roof is hipped with corrugated metal sheets. It has a secondary bull nose corrugated metal roof over L-shaped verandah. The residence also has a number of brick squat chimneys to main building.

The residence (**Figure 5-37**) is situated on top of a rise which slopes steeply down to level ground next to the construction footprint. Rubbish comprising rubble and building refuse has been dumped over the edge of the steep slope (**Figure 5-38**).

5.4.2 Curtilage information

The LEP listed curtilage comprises the entire lot (Lot 100 DP849413) and is shown on **Figure 5-39**. There are four houses located within the lot, with the heritage listed building being the eastern-most building (labelled as ‘the residence’).

5.4.3 Significance assessment

The significance assessment presented in **Table 5-4** has been prepared by the author based solely on the NSW Heritage Database statement of significance and description for the heritage item and has assessed the heritage item as of local significance.

Table 5-4 Significance assessment for Item 4: Residence, 29 Eastern Avenue, Tarro

NSW Criterion	Local level
A – Important in the pattern of NSW's history	Demonstrating the development of social class and economic growth of the region.
B – Strong or special associations	Does not meet this criterion.
C – Demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement	Facebrick work building with dichromatic brick work.
D – Strong or special associations with a particular community or cultural group	Does not meet this criterion.
E – Potential to yield information	Does not meet this criterion.
F – Uncommon or rare	Does not meet this criterion.
G – Principal characteristics of a class	Local[3]

5.4.4 Statement of significance

The statement of significance has been replicated from the NSW Heritage Database statement of significance.

> *The house demonstrates the development of social class and economic growth of the region. The interiors are of significance.*

Figure 5-37 Residence located on top of a rise, facing north

Figure 5-38 Level ground at base of rise and rubbish pile, facing east

[3] The NSW heritage database lists the Residence as meeting criterion G with 'local' listed; however, no further information is included for criterion G in either the statement of significance or the description.

Figure 5-39 Heritage curtilage of Item 4: Residence, 29 Eastern Avenue, Tarro

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5.5 Item 6: Tarro Historic Site (Original township of what was formerly known as Upper Hexham) (NLEP A18)

5.5.1 Description and history

The description provided in the NSW heritage database states that heritage item is the actual site of the church of St Stephen and burial ground, and it represents the settlement of the area Upper Hexham, now called the suburb of Tarro. The earliest land grants of the area were given to people who settled on the banks of the Hunter River from 1825, after the cessation of the penal settlement at Newcastle. The NSW heritage database also states that the foundation stone was laid in 1840. In the 1840s, the original grantee of the estate (called Woodlands at Upper Hexham), Edward Sparke, gifted land for a church and burial ground to the Church of England. Historical sources indicate there have been two churches previously located at the Tarro Historic Site: one built in 1840 and one built in 1905; neither remain standing.

The field survey of the Tarro Historic Site was carried out on 29 June 2020. The northern portion of the site next to Anderson Drive contains two concrete and stone plaques, one commemorating the Tarro Interchange opening in 1996 and one to mark the location of the historic site of St Stephen's Church of England. A third concrete and stone feature is also present (**Figure 5-43** and **Figure 5-44**. No specific areas of archaeological potential were noted during the site visit. At least three quarters of the area within the heritage curtilage is covered with thick vegetation, including shrubs and trees (**Figure 5-45**). Grassed areas with more visibility were located to the north of the site and along Anderson Drive and the Tarro Interchange (**Figure 5-46**).

The Newcastle Morning Herald and Miners' Advocate (NMHMA, 23 February 1905) reported that St Stephen's Church was opened by the Bishop of Newcastle on the 22 February 1905. The church was described as being built in a Gothic style with red tiled roof and timber structure (**Figure 5-40**). The architect of the church as Peter Bennett and the cost of the building was reported to be £400. The 1905 building was built to replace an earlier church, described as St Stephen's Anglican Church, one of the oldest in the state at that time and in a state of decay. No date was given for the construction of the old church; however, the 1905 article stated that it was erected '*in the days of the very earliest settlers, perhaps 65 years ago'*. The earlier church was vacant at the time of the new church opening. The article states that the foundation stone for the new church rested on an old block laid by Bishop Broughton (the first Bishop of Australia) in 1839, but that '*the new church it was then proposed to build was never erected'*. The article suggests that there were two locations for the church, one church was proposed to be built where the foundation stone was laid in 1839 and one church was actually built around 1840 near the location of the 1905 church.

The following information[4] was sourced in relation to the site:

> *In 1841 Edward Sparke Snr, original settler and owner of "Woodlands" conveyed 2.43 hectares (6 acres) of land on the High Road to the Church of England and the Bishop of Australia. During the same year he donated 0.4 ha (1 acre) to the Lord Bishop of Australia, William Grant Broughton, for a burial ground. In 1842 Sparke and his wife Mary, with the approval of Robert Scott the mortgagee, sold Bishop Broughton 1.6 ha (4 acres) four acres "on which a Parsonage House is now built", commencing at the north east corner of the Township of Upper Hexham, for £100, "for erection and completion of Parsonage".*

[4] The information was sourced from Wikipedia; however, the information appears to be quoted from *Men of Their Time – Pioneers of the Hunter River* (Dulcie, 1995: 21). This book was unable to be accessed from the State Library of Victoria due to current pandemic restrictions.

> *A church, named St Stephens, was opened in Tarro around 1849. This rustic structure, was replaced by a more elegant wooden building in 1905. There was also a parsonage. This church was later joined by Sunday school hall in the 1960s. Next door was tennis court, which was later replaced by a youth centre in the early 1970s. Around 1980 St Stephens was sold and removed. The site of the church is now the site of the Tarro Interchange with the New England Highway.*

A 1954 historical aerial image of the location of the heritage item (**Figure 5-41**) indicates the 1905 church building was located where the Tarro Interchange is now. To the east of the church there is a large rectangular shape which is likely a tennis court. The NMHMA (28 April 1926) noted in 1926 that the council was to be asked to '*attend to the gutter in front of the Church of England and tennis court*'. The dimensions of the feature in the aerial photograph correspond with the dimensions of a tennis court.

An article in the NMHMA (29 June 1940) describes a Tarro church associated with Bishop Broughton and a graveyard under the heading 'Old Hexham Graveyard' as follows:

> *An old record shows that in 1838, Sparke dedicated a piece of land for this purpose, with an extra area for the erection of a church and parsonage. In due course God's Acre became tenanted by many a pioneer, whose eventful career had been finished; and to-day freeman and prisoner sleep side by side in this neglected spot not far from the road along which an endless stream of traffic passes. The ground was consecrated by Bishop Broughton.*

However, from the information available, it seems likely that the burial ground associated with the church was not actually located next to the church, but elsewhere in Tarro. An 1893 parish map (**Figure 5-42**) indicates a cemetery was located on a road that corresponds with the current Tarro cemetery on Quarter Sessions Road, and within Edward Sparke's estate. The existing Tarro cemetery contains burials that date to the late 1840s (Australian Cemeteries Index 2008), and is located 740 metres west of the Tarro Historic Site and 136 metres north of the construction footprint.

Information about the Tarro Historic Site is limited and interpretation of relevant newspaper articles has presented some challenges to understand where the two churches were situated. However, it appears that the original St Stephen's Church was located in the vicinity of this site in Tarro and a new church was built at the site in 1905. The 1905 church is the building shown in the aerial photograph which was where the Tarro Interchange was constructed around 1996. The evidence available indicates that the Tarro cemetery, which is associated with St Stephen's church, may not have been located at the Tarro Historic Site. It is possible that this was the burial ground gifted by Edward Sparke, rather than a burial ground at the Tarro Historic Site. However, due to the general paucity of available information the possibility that Tarro Historic Site contains burials cannot be ruled out without further investigation.

Figure 5-40 1920 photograph of St Stephen's Church, Tarro, constructed in 1905. Anderson Drive in foreground (The University of Newcastle 2020)

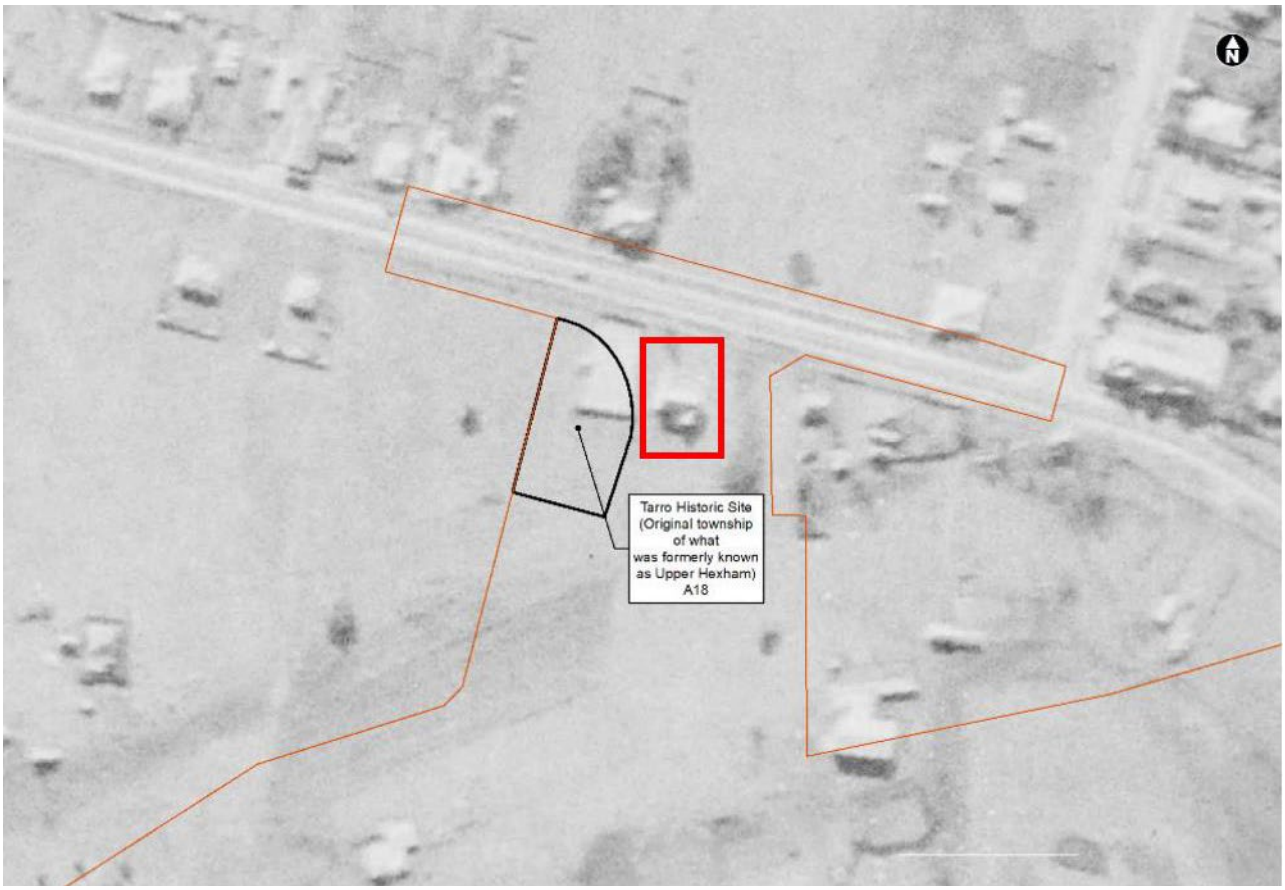

Figure 5-41 1954 aerial image of the site with 1905 church building clearly visible (in red) and site (A18 heritage curtilage) located in black. Construction footprint shown in orange.

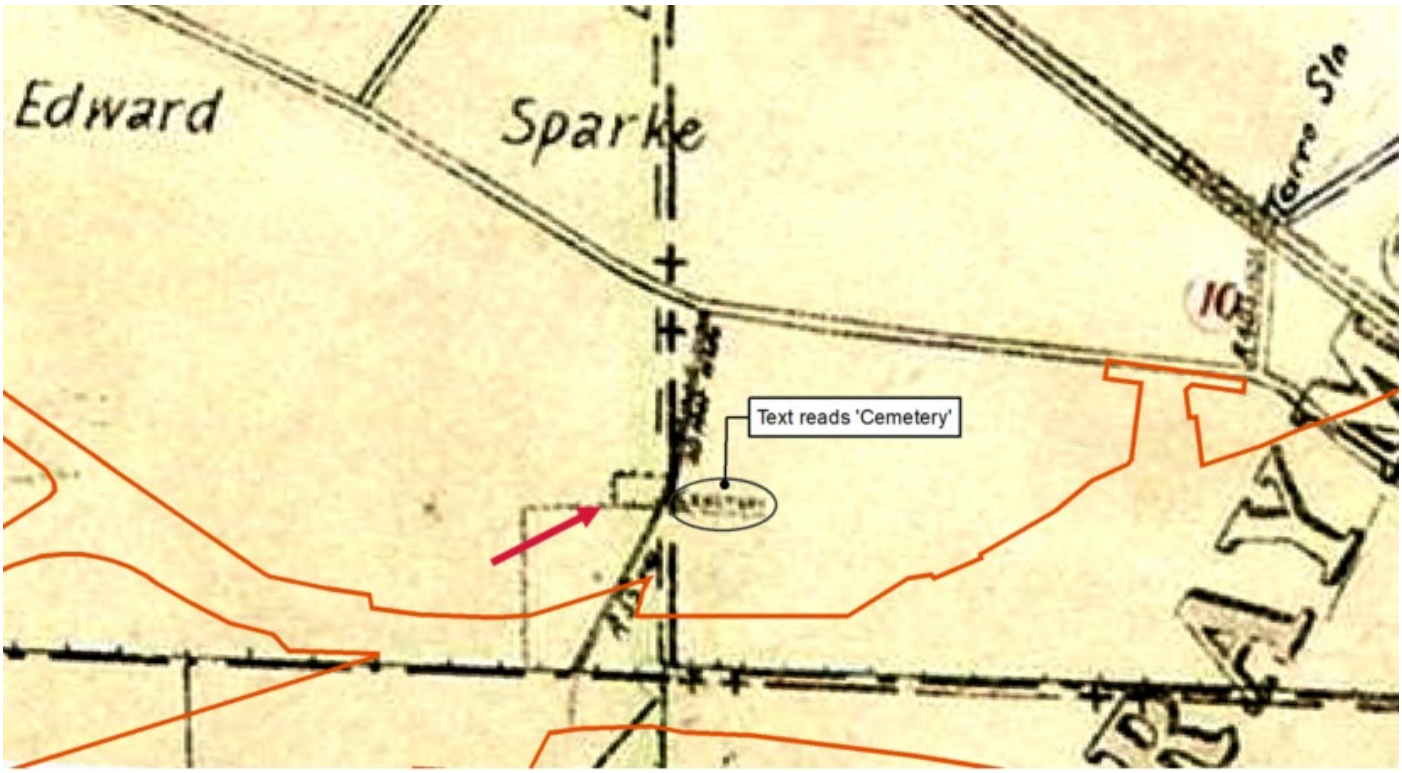

Figure 5-42 1893 parish map showing location of cemetery (red arrow) on what is now Quarter Sessions Road (Source: NSW Land Registry Services)

5.5.2 Archaeological assessment

A review of aerial imagery and historical sources has indicated that the timber St Stephen's Church, built in 1905, was located in the area which now forms the Tarro Interchange, constructed in 1996. The former church grounds extend into the curtilage of the Tarro Historic Site. The northern portion of the Tarro Historic Site corresponds with the location of a former tennis court. It is unclear from the image and available information where the original church was located. It is also unclear if the concrete and stone feature (without a plaque, see **Figure 5-43**) located within the heritage curtilage is the foundation stone laid by Bishop Broughton. The concrete and stone feature is located very close to the Tarro Interchange, so it is unlikely to be *in situ* if it is the original foundation stone. It is likely that the construction of the Tarro Interchange has impacted on any archaeological remnants relating to the 1905 church. However, the southern and western portion of the site may have potential for archaeological remnants relating to the church and burial ground as it appears to have little disturbance.

Archaeological potential associated with the location of the 1905 church outside to the east of the heritage curtilage of the heritage item is likely to be low, based on the level of ground disturbance associated with road construction of the Tarro Interchange in 1996.

5.5.3 Curtilage information

The curtilage of the Tarro Historic Site is located within road reserve and shown on **Figure 5-47**.

5.5.4 Significance assessment

The significance assessment presented in **Table 5-5** has been prepared by the author from the NSW Heritage Database statement of significance for the heritage item and has assessed the heritage item as of local significance.

Table 5-5 Significance assessment for Item 6: Tarro Historic Site

NSW Criterion	Local level
A – Important in the pattern of NSW's history	The subject site is associated with two phases of historical development: land which formed part of the large estate known as 'Woodlands' granted to Edward Sparke in 1825, and its development for the St Stephen's Church of England. The site of the church is historically significant to the local area for its association with religious worship.
B – Strong or special associations	The church is associated with Bishop Broughton (the first Bishop of Australia). Bishop Broughton laid a foundation stone at the site for a new church in 1839.
C – Demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement	Does not meet this criterion. Any archaeological relics at the site are unlikely to have aesthetic significance.
D – Strong or special associations with a particular community or cultural group	Although there is no known current social significance attached to the site, the church would have represented the heart of the early Tarro community. Archaeological relics of the church site may be significant to the present Tarro community; however, further community consultation would be required to understand the strength of this association.
E – Potential to yield information	The site has potential to yield information about early churches and burials. While the 1905 church location would have been impacted by the construction of the Tarro Interchange, the location of the original church is known to be located near the 1905 church. The southern and western portions of the site appear to have had less disturbance and therefore have potential for archaeological remnants of the church and potential burial ground.
F – Uncommon or rare	Does not meet this criterion.
G – Principal characteristics of a class	Does not meet this criterion.

5.5.5 Statement of significance

The statement of significance has been reproduced from the NSW Heritage Database and updated by the author. Updates are presented in **bold** text.

> *The Tarro Historic site is the site of the original township of Tarro, and the original site of St Stephens Church and burial ground from 1840. The site has local historical significance as a place of first settlement of the area and is associated with Edward Sparkes, the original grantee.* ***The site has a strong association with Bishop Broughton (the first Bishop of Australia)****. The site has local associative significance with the development of a settlement on high land to the west of the Hunter River and may contain relics of the period.*

Figure 5-43 Two features of the Tarro Historic Site, facing south.

Figure 5-44 The Tarro Historic Site, facing southeast

Figure 5-45 Vegetation at the site, facing southeast

Figure 5-46 The Tarro Historic Site next to road, facing north

Figure 5-47 Heritage curtilage of Item 6: Tarro Historic Site (Original township of what was formerly known as Upper Hexham)

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5.6 Item 7: Tarro Substation (NLEPl546)

Although Item 7 is not located within the construction footprint it is located next to the construction footprint and has the potential to be indirectly impacted by the project. Therefore, the item has been included in **Chapter 5**, **Chapter 6** and **Chapter 7** of this assessment.

5.6.1 Description and history

The field survey of the Tarro Substation was carried out on 15 December 2015 and the place was inspected again on 29 June 2020. The heritage item is listed on the NLEP and the Hunter Water s170 Register and is located in Anderson Street, Tarro. The physical structure of the building is located next to the construction footprint (**Figure 5-48** and **Figure 5-49**). The following information is replicated from the NSW Heritage Database and the Hunter Water s170 Register.

The Tarro Substation is a stretcher bond brick single storey building on concrete footings, with decorative render and stone features. It has a stop hipped Marseille tiled roof with timber ventilation and exposed eaves, a sheeted double door in a rusticated stone opening, and a multi-pane timber window within a rusticated stone framed opening. The building has moulded rendered concrete detailing.

The building was built at the same time as the Tarro Pumping Station in 1927 to 1928 (see **Section 5.7**).

5.6.2 Curtilage information

The curtilage of the Tarro Substation includes Lot 2 DP595526 and is shown on **Figure 5-50**.

5.6.3 Significance assessment

The significance assessment presented in **Table 5-6** has been prepared by the author from the NSW Heritage Database and the Hunter Water s170 Register statements of significance in accordance with the Assessing Heritage Significance manual (NSW Heritage Office 2001) as the existing significance assessment contained minimal information. The heritage item has been assessed to be of local significance.

Table 5-6 Significance assessment for Item 7: Tarro Substation

NSW Criterion	Local level
A – Important in the pattern of NSW's history	The construction of the Tarro Substation to support the Tarro Pumping Station boosted the Chichester Dam supply, and marked the end of the Walka Scheme which previously had pumped water from the Hunter River.
B – Strong or special associations	Does not meet this criterion.
C – Demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement	The Tarro Substation is an ornamented Federation style building, to complement the Tarro Pumping Station. The detailing of this building was part of Newcastle demonstrating its credentials as a modern city with a modern water supply system and evidences a high degree of civic pride in the undertaking.
D – Strong or special associations with a particular community or cultural group	The building is designed in a style which demonstrates the high degree of civic pride which the Hunter District Water Board took in its early infrastructure.

NSW Criterion	Local level
E – Potential to yield information	Does not meet this criterion.
F – Uncommon or rare	Rare example of this architectural style in this region.
G – Principal characteristics of a class	The building is representative of form and style of architecture used for this particular function.

5.6.4 Statement of significance

The following information is replicated from the Hunter Water s170 Register and the NSW Heritage Database.

> *The Tarro Substation is a small decoratively built masonry valve house across the street from the former Tarro Pumping Station. The building in still in service and complements the adjacent Pumping Station, with both designed in a style which demonstrates the high degree of civic pride which the Hunter District Water Board took in its early infrastructure.*
>
> *The building is representative of form and style of architecture used for this particular function and a rare example of this architectural style in this region.*

Figure 5-48 The Tarro Substation, facing southwest

Figure 5-49 The Tarro Substation, facing southwest

Note- Tarro Substation (I546) is located within Lot 1 DP128309.
The curtilage spatial data provided by the DPIE are not spatially coincident to the cadastre provided by the LPI.
The data is currently undergoing spatial adjustments in order to align curtilage to cadastre

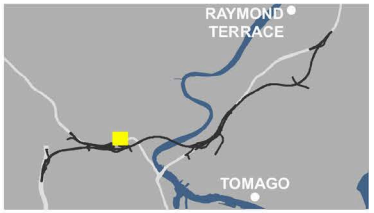

Figure 5-50 Heritage curtilage of Item 7: Tarro Substation

5.7 Item 8: Pumping Station, Tarro (NLEPl550)

Although Item 8 is not located within the construction footprint it is located next to the construction footprint and has the potential to be indirectly impacted by the project. Therefore, the item has been included in **Chapter 5**, **Chapter 6** and **Chapter 7** of this assessment.

5.7.1 Description and history

The field survey of the pumping station was carried out on 15 December 2015 and the place was inspected again on 29 June 2020. The heritage item is listed on the NLEP, Hunter Water s170 Register, the RNE and is located on Anderson Street, Tarro. The building is set back from the street; however, the fence is next to the construction footprint (**Figure 5-51**, **Figure 5-52**). The pumping station has been decommissioned and the building is used for storage. The following information has been replicated from the NSW Heritage Database and the Hunter Water s170 Register.

> *The main building of the Tarro Pumping Station is a large, purpose-built water pumping station in the Federation style. The building is brick built in Flemish bond with black tuck pointing, which is now faded. The building has painted render and concrete details with a parapeted and hipped Marseille tiled roof. There are two timber louver vent stacks and extended eaves supported on steel brackets, as well as ornate dormer with cast detail. The building has a Colorbond downpipe and guttering. The entrance door is a panelled timber door with glazed overlight. There are mostly replacement timber windows, some glazed and some broken, as well as some original windows. Internally virtually all equipment has been removed and the space is largely used for storage.*
>
> *The staff of the Hunter District Water Board designed the Tarro Pumping Station building, with construction commencing in the year 1927 to 1928. The building was designed to be of sufficient size to house the plant required for the boosting of the Chichester main as it existed at the time, as well as providing for any future amplifications thereof. As such, the plant first installed in the building only occupied a portion of the available space.*
>
> *The Annual Report for the year 1928 to 1929 noted that the installation of the pumps and motors, supplied by Messrs. Thompsons of Castlemaine in Victoria, as well as the connection of various pipes, was being carried out. It was also recounted in this report that as the building was in a conspicuous position, and was to be a permanent construction, the Board had decided that a substantial building of "good architectural appearance" should be erected. Whilst construction was officially completed on 7th March 1930, the pumping plant was installed and ready for operation on 11th October 1929, and used over the summer of 1929-30 to assist in the deliverance of water to Buttai Reservoir during periods of high consumption. The completion of the Tarro Pumping Station saw the Walka Waterworks superseded, as Chichester Dam replaced the Hunter River in supplying the district with water.*
>
> *The Tarro Pumping Station plant consisted of seven electrically-driven centrifugal pumping units, housed in a well-ventilated brick building. Pumping units nos. 1, 2 and 3 were designed to pump water from the Chichester Gravitation Main via Stoney Pinch to Buttai, Newcastle and other service reservoirs, whilst nos. 4, 5, 6 and 7 were to act as boosting pumps to increase the delivery of water from Chichester Dam to the Waratah Reservoirs. It was not until 1935-36 however, that the pumps that boosted the delivery of water to the Waratah Reservoirs were started up for the first time, when gravitational flow could no longer satisfactorily maintain the reservoirs.*

5.7.2 Curtilage information

The curtilage of the pumping station includes Lot 1 DP128309 and is shown on **Figure 5-53**.

5.7.3 Significance assessment

The significance assessment presented in **Table 5-7** has been prepared by the author from the NSW Heritage Database and the Hunter Water s170 Register statements of significance in accordance with the Assessing Heritage Significance manual (NSW Heritage Office 2001) as the existing significance assessment contained minimal information. The heritage item has been assessed to be of local significance.

Table 5-7 Significance assessment for Item 8: Pumping Station

NSW Criterion	Local level
A – Important in the pattern of NSW's history	The construction of the Tarro Pump Station to boost the Chichester Dam supply marked the end of the Walka Scheme which previously had pumped water from the Hunter River.
B – Strong or special associations	Does not meet this criterion.
C – Demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement	The Tarro Pump Station is a highly ornamented Federation style building of relatively large proportions, which was specifically designed to be visible from the (now-diverted) Pacific Highway. The rather lavish detailing of this building was part of Newcastle demonstrating its credentials as a modern city with a modern water supply system and evidences a high degree of civic pride in the undertaking. It is unusually well-designed and elaborately detailed for a semi-rural industrial building.
D – Strong or special associations with a particular community or cultural group	At the time of construction, the detailing of the building evidenced the high degree of civic pride in Newcastle's public infrastructure.
E – Potential to yield information	Does not meet this criterion.
F – Uncommon or rare	The Tarro Pumping Station is unique within the Newcastle water supply system as a highly ornamented pumping station building.
G – Principal characteristics of a class	The building is representative of form and style of architecture used for this particular function.

5.7.4 Statement of significance

The following information has been replicated from the Hunter Water s170 Register.

> *The Tarro Pumping Station is an exceptionally finely detailed early 20th century water pumping station, which superseded the pumping station at the Walka Water Works near Maitland. The Pumping Station is constructed in the Federation Free Style and is the most finely constructed building remaining within the Hunter Water network. It includes a matching boundary fence and valve house. As a purpose-built industrial building it is a rare example of public architecture, built at a time when the ornamentation of infrastructure was part of the civic pride in its development. Now decommissioned, the building lacks most internal elements or machinery.*

Figure 5-51 The Pumping Station, facing northeast.

Figure 5-52 The Pumping Station, facing northeast.

Figure 5-53 Heritage curtilage of Item 8: Pumping Station, Tarro

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5.8 Item 9: Newcastle Crematorium, Beresfield (NLEPI34)

5.8.1 Description and history

The following description is taken directly from the NSW Heritage Database:

> *The building is of rendered brick construction on reinforced concrete foundations. An informal plan of wings extends out from the square central tower. The building originally comprised a chapel, columbarium, cremating chamber, rest pavilion, and offices and retiring rooms. The chapel, flanked by colonnades, was designed to accommodate about 200 people, seated. Provision was made for the addition of a second chapel at a later date (which was undertaken in 1977). The columbarium was designed to house memorial urns and tablets. The cremating chamber is located to the rear of the chapel, and originally housed two Gibbons coke-fired cremation retorts.*
>
> *The building is Art Deco in style with clean lines and carefully considered proportions, with restrained detailing provided by columns and fluting. Original joinery and furnishings are generally of polished Queensland maple. Windows are of streel fame glazed with tinted Cathedral glass.*
>
> *The Crematorium is set in a large remembrance garden, in a formal style, which complements the architecture of the building. Drives, paths, lawns, plantings, and remembrance walls are laid out around a central medallion shape fronting the main chapel. The plantings are low and formally arranged, providing a clear view to the building from most viewpoints.*

The following historical excerpt has been taken from the NSW Heritage Database:

> *The Newcastle Crematorium was constructed c1936 for Cremations (Newcastle) Limited, on a site of 25 acres at Beresfield, ten miles from central Newcastle. The Crematorium and its landscaped grounds are associated with the themes of Phases of Life, Birth and Death, and Creative Endeavour. The Crematorium was designed by a prominent Sydney architect, Louis Leighton Robertson, in a similar style to his Woronora and Eastern Suburbs Crematoria in Sydney, using the Art Deco style in a restrained fashion to create a peaceful and respectful atmosphere. The Crematorium is among those constructed in the Inter-war period, just as cremation was becoming mainstream in Australia…*
>
> *From the early decades of the twentieth century, Newcastle began to take on the status of NSW's second city. Newcastle's splendid City Hall and Civic Theatre, completed in 1929, were architectural markers of this status. (Citywide Thematic History, p. 8) The Crematorium at Beresfield, constructed as the city climbed out of the Depression on the back of the steel industry, was another such marker, being a significant Art Deco building, and the first crematorium in the State to be constructed outside the Sydney region.*
>
> *Newcastle Crematorium originally comprised a chapel, columbarium, cremating chamber, rest pavilion, and offices and retiring rooms. The chapel, flanked by colonnades, was designed to accommodate about 200 people, seated. Provision was made for the addition of a second chapel at a later date. The columbarium was designed to house memorial urns and tablets. The cremating chamber is located to the rear of the chapel, and originally housed two Gibbons coke-fired cremation retorts. The layout of the site was also carefully designed with car parking, drives, lawns and plantings, developed as a 'Garden of Remembrance'. (Architecture, 1st April, 1936, Building, 24th April 1937)*
>
> *Maitland and Stafford note that although the Art Deco style had more commonly been 'associated with places of leisure, such as hotels and cinemas, its potential for more sombre and contemplative building types was demonstrated in the Anzac Memorial in Hyde Park, Sydney designed by C.*

Bruce Dellitt' in 1934. The 1920s-30s crematoria took on the Art Deco, or sometimes the Inter-war Mediterranean style, as simple and dignified architectural language with which to create a sense of clarity and tranquillity through a modern interpretation of classicism. The Newcastle Crematorium adopted an Art Deco design similar to that of the slightly larger Woronora Crematorium, and it was again repeated for the Eastern Suburbs Crematorium. The Woronora Crematorium was described in a 1930s promotional booklet as a place where 'beauty softens grief', and this same effect has been achieved at Newcastle. (Maitland and Stafford, Architecture Newcastle, p. 137); Graham Jahn, Sydney Architecture, p. 127; Architecture, 1st March, 1936)…

The building and its grounds have continued to operate as a memorial park, cemetery and crematorium for the Newcastle region. In 1977 a second chapel was added, sympathetically designed by Maitland architect Ian Pender.

5.8.2 Curtilage information

The curtilage of the Newcastle Crematorium includes Lot 10 DP1114807 and is shown on **Figure 4-1** and **Figure 4-17**.

5.8.3 Significance assessment

The significance assessment presented in **Table 5-8** is replicated from the NSW Heritage Database.

Table 5-8 Significance assessment for Item 9: Newcastle Crematorium

NSW Criterion	Local level
A – Important in the pattern of NSW's history	The Newcastle Crematorium has historical significance for Newcastle and the wider Hunter Region as it is associated with the introduction of the practice of cremation to the region. It is one of a number of Crematoria built in a similar spirit in the 1920s and 1930s in NSW, as cremation began to gain widespread acceptance in Australia, and together with the Woronora and Eastern Suburbs, and Northern Suburbs Crematoria in particular, the Newcastle Crematorium helps to demonstrate the changing understandings of and responses to death associated with this practice in NSW. Along with other architectural landmarks in Newcastle, the Crematorium is a marker of the status of Newcastle as NSW's second city as the city matured in the first half of the twentieth century.
B – Strong or special associations	The Newcastle Crematorium has a strong association with the prominent Sydney architect Louis Leighton Robertson, who designed the Newcastle Crematorium as well as the Woronora and Eastern Suburbs Crematoria. Alongside Bloomfield's crematorium architecture, Robertson's vision for a dignified and serene, yet highly modern, crematorium architecture, as expressed through the Art Deco designs of these three buildings, dominates the creative response to this form of funerary rite in NSW.
C – Demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement	The Crematorium has a high level of aesthetic significance. The clean, classical lines, and fine attention to detail creates an atmosphere of reverence both inside and outside the building. The formally laid out gardens that surround the building provide a richly coloured and textured setting for its pure white surfaces and geometrical shape. Like the Woronora and Eastern Suburbs Crematoria, it employs a modern Art Deco style to create a dignified and serene place of mourning and commemoration. As such it is one of a small group of buildings in NSW which have used the Art Deco vocabulary for solemn purposes.

NSW Criterion	Local level
D – Strong or special associations with a particular community or cultural group	Social significance has not been investigated within this review, but it is likely that the Crematorium has significance to the people of Newcastle and the wider Hunter Region as a place where departed loved ones are commemorated.
E – Potential to yield information	Within the limited scope of this review crematorium was not found to have significance under this criterion.
F – Uncommon or rare	The Newcastle Crematorium has some rarity value for the State as one of a small group of crematoria constructed in the 1920s and 1930s, and one of a small group of buildings in NSW which have used the Art Deco vocabulary for solemn purposes.
G – Principal characteristics of a class	The Newcastle Crematorium has some representative significance at a State level as it has the capacity to demonstrate the key characteristics of a small group of crematoria constructed in the 1920s and 1930s, and a small group of buildings in NSW which have used the Art Deco vocabulary for solemn purposes.

5.8.4 Statement of significance

The statement of significance is taken directly from the NSW Heritage Database:

> *The Newcastle Crematorium has a high level of historical and aesthetic significance for Newcastle and the wider Hunter Region. Its construction was associated with the introduction of the modern practice of cremation to the region, as this form of funerary rite became more widely accepted across the State in the 1930s. As part of a small group of NSW crematoria of that decade, the Newcastle Crematorium thus helps to demonstrate the changing understandings of and responses to death associated with the practice. The Newcastle Crematorium represents a high level of architectural and landscaping achievement within Newcastle and the wider Hunter region, as a fine example of the Art Deco style, set in a formally landscaped garden. Along with the other crematoria designed by Robertson, and the C. Bruce Dellitt's Anzac Memorial (Sydney), it forms part of a small group of commemorative buildings in NSW that employ the Art Deco style to create a dignified and solemn atmosphere. Along with other architectural landmarks in Newcastle, the Crematorium is a marker of the status of Newcastle as NSW's second city as the city matured in the first half of the twentieth century.*

5.9 Item 10: Our Lady of Lourdes Church, Tarro (NLEPI547)

5.9.1 Description and history

The following description is taken directly from the NSW Heritage Database:

> *Single storey facebrick work building with narrow elongated round arched windows positioned between structural buttresses. Front porch of the building is smaller in scale with gable facing street and round arched doorway with timber slatted round arched door. The main building has gable facing street with circular accent vent. Round arches are emphasized with different texture and colour. Roof material is corrugated metal sheets.*

The following historical information has been taken from the NSW Heritage Database:

> *Foundation stone laid December 4,1922. Old Church is part of the old Greta Migrant Camp Site.*

5.9.2 Curtilage information

The curtilage of the Our Lady of Lourdes Church includes Lot 42 DP1096998 and is shown on **Figure 4-1** and **Figure 4-17**.

5.9.3 Significance assessment

The significance assessment presented in **Table 5-9** is replicated from the NSW Heritage Database, noting the limited extent of the assessment.

Table 5-9 Significance assessment for Item 10: Our Lady of Lourdes Church

NSW Criterion	Local level
A – Important in the pattern of NSW's history	Local representative.
B – Strong or special associations	Does not meet this criterion
C – Demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement	Local representative.
D – Strong or special associations with a particular community or cultural group	Local representative
E – Potential to yield information	Does not meet this criterion.
F – Uncommon or rare	Does not meet this criterion.
G – Principal characteristics of a class	Local.

5.9.4 Statement of significance

The statement of significance is taken directly from the NSW Heritage Database:

> *Important local landmark representative of an important step in the development of church facilities in the suburb of Tarro. The interiors are of significance.*

6 Impact assessment

6.1 Impacts avoided and minimised

Route options were evaluated within a value management process between November 2005 and February 2006. Following selection of a preferred route and consideration of the community and stakeholder feedback, the preferred route design for the project was progressed into a concept design which was placed on public display in July and August 2008. After responding to submissions, a corridor was reserved and gazetted, and the concept design became the 2010 Preferred Route.

Alternate alignment options to the 2010 Preferred Route were identified to address the issues raised in the project review and to better meet the project objectives. This included providing improved accessibility, addressing design constraints in crossing the Hunter River and floodplain and minimising environmental impact. Accordingly, the area between Black Hill and Heatherbrae was reviewed. Alignment 1 and Alignment 2 were progressed for further investigation. A number of interchange arrangements were also investigated at Black Hill, Tarro, Tomago, Heatherbrae and Raymond Terrace. All of these options met the project objectives.

The preferred alignment selected from the options was Alignment 2. Alignment 0 (the 2010 Preferred Route) was closer to the LEP-listed Oak Factory (NLEP I178) and Hexham Bridge (NLEP I187) than Alignment 2. Alignment 0 would also have destroyed Site 1 at the Glenrowan Homestead (Item 3 of this assessment), with a greater likelihood of causing heritage impacts than Alignment 2. Alignment 1 was closer to the Hexham Shipbuilding Yards (NLEP I180) and the Hannell Family Vault (NLEPI179) with the potential to cause greater heritage impacts than Alignment 2. Alignment 2 was selected as the preferred option as it would avoid the high value biodiversity areas located either side of the Hunter River compared to Alignment 0 and Alignment 1, while best balancing the functional, social and economic and natural environment and culture considerations.

The concept design was revised in 2016 following community and stakeholder feedback. Further non-Aboriginal heritage assessment was carried out on these design refinements but there was no substantive difference to impacts on heritage from these changes.

Ultimately, the project alignment has reduced the potential for heritage impacts as compared to earlier options and alignments considered.

In locations, where impacts to heritage items were unable to be avoided, a number of management measures have been provided to avoid further impacts as a result of the project (refer to **Chapter 9**). Impacts associated with the current project is described in the following sections and **Chapter 7**.

6.2 Summary of potential impacts

The project activities that relate to the nine relevant heritage items identified for this assessment and associated potential impacts of these activities are presented in **Table 6-1**, including the level of impact assessed for each heritage item, with heritage items that would be directly impacted by the project listed first.

The overall impact to each of the nine heritage items as a result of the project include:

- **Major impact:** Item 3: Glenrowan Homestead
- **Minor impact:** Item 2: Hexham Shipbuilding Yards (NLEP I180)
- **Negligible impact:**
  - Item 1: Hannell Family Vault (NLEP I179)

- Item 4: Residence, 29 Eastern Avenue, Tarro (NLEP I1548)
- Item 6: Tarro Historic Site (Original township of what was formerly known as Upper Hexham)
- Item 7: Tarro Substation (listed on NLEP I546)
- Item 8: Pumping Station (listed on NLEP I550, RNE 102132, Hunter Water s170 register)
- Item 9: Newcastle Crematorium (listed on the NLEP I34)
- Item 10: Our Lady of Lourdes Church (listed on the NLEP I547).

A SOHI for each of the nine heritage items located within or next to the construction footprint, or subject to project-related work is provided in **Chapter 7**. The location of project activities in relation to the heritage items is shown in **Figure 7-1** to **Figure 7-7**.

Table 6-1 Potential impacts from project activities for each heritage item

Heritage item name, register number (if applicable) and item number	Project activities	Potential impacts level and description
Major impact		
Glenrowan Homestead Item 3	Construction of the motorway requiring demolition of Site 2 and destruction of Site 3	**Direct impact** • Demolition of weatherboard house and non-heritage buildings at Site 2 due to construction of motorway. • Destruction at Site 3 (artefact scatter) due to ground disturbance associated with construction of motorway. Although Site 3 is about twelve metres south of the main alignment, it is within the construction footprint and would be subject to impacts related to construction in the area. • The main house at Site 1 has been identified as being eligible for consideration of at-property architectural noise treatment such as double glazing or external windows and/or provision of ventilation systems (or similar). No indirect impacts to this heritage item are anticipated. The overall level of impact on the heritage item would be **major**.
Minor impact		
Hexham Shipbuilding Yards NLEP I180 Item 2	Upgrade of existing vehicle track involving building up and widening existing track	**Direct impact** • The construction of an upgraded access track would directly impact the heritage curtilage of the item. There is low potential for archaeological remains to be disturbed or destroyed by the works as the area with the highest potential for archaeological remains specifically related to the shipyards is outside the construction footprint. No indirect impacts to this heritage item are anticipated. The overall level of impact on the heritage item would be **minor** during construction and operation.
Negligible impact		
Hannell Family Vault NLEP I179 Item 1	Upgrade of existing vehicle track involving excavation of the ground surface Adjacent ancillary facility (AS8)	**Direct impact** • Direct impact to the heritage curtilage of the heritage item from upgrade of an access track located about 120 metres southwest of the vault; however, the vault itself would not be directly physically impacted and there would be no change to the curtilage.

Heritage item name, register number (if applicable) and item number	Project activities	Potential impacts level and description
		Possible direct impact • Possible unplanned impacts by accidental damage from machinery from the ancillary construction area (AS8) located about 20 metres south of the physical structure of the vault. **Possible indirect impact** • Possible indirect impacts from vibration during construction activities. The overall level of impact on the heritage item would be **negligible** during construction and operation.
Residence, 29 Eastern Avenue, Tarro NLEP I548 Item 4	Construction of motorway adjacent to LEP heritage curtilage	**Direct impact** The heritage item has been identified as being eligible for consideration of at-property architectural noise treatment. The overall level of impact on the heritage item would be **negligible** during construction and operation. **Possible indirect impact** • Possible indirect impacts from vibration during construction activities.
Tarro Historic Site (Original township of what was formerly known as Upper Hexham) NLEP A18 Item 6	Potential works on the existing road pavement, kerbs/gutters and subsurface drainage on Anderson Drive, Tarro	**Possible direct impact** • The proposed works would be confined to existing road pavement, kerb/gutter and subsurface drainage outside the heritage item curtilage • Possible unplanned impacts by accidental damage from machinery given the proximity of works to the site • If construction works are to take place within the curtilage of this heritage item the project would directly impact the site through destruction of potential archaeological deposits relating to the former church and burial ground. No indirect impacts to this heritage item are anticipated. If works do not take place within the curtilage of this heritage item, the overall level of impact on the heritage item would be **negligible** during construction and operation.
Tarro Substation NLEP I546 Item 7	Potential works on the existing road pavement, kerbs/gutters and subsurface drainage on Anderson Drive, Tarro	**Possible direct impact** • The proposed works would be confined to existing road pavement, kerb/gutter and subsurface drainage, about three metres from the building. • Possible unplanned impacts by accidental damage from machinery given the proximity of works to the site. **Possible indirect impact** • Possible indirect impacts from vibration as the distance is less than the safe working distances (less than 25 metres) for cosmetic damage from vibration as presented in the Table 2 of the Construction Noise and vibration Guideline (Roads and Maritime Services 2016). The overall level of impact on the heritage item would be **negligible** during construction and operation.

Heritage item name, register number (if applicable) and item number	Project activities	Potential impacts level and description
Pumping Station NLEP I550 Item 8	Potential works on the existing road pavement, kerbs/gutters and subsurface drainage on Anderson Drive, Tarro	**Possible direct impact** • The proposed works would be confined to existing road pavement, kerb/gutter and subsurface drainage, about four metres from the brick fence of the heritage item. • Possible unplanned impacts by accidental damage from machinery given the proximity of works to the site. **Possible indirect impact** • Possible indirect impacts from vibration as the distance is less than the safe working distances (less than 25 metres) for cosmetic damage from vibration as presented in the Table 2 of the Construction Noise and vibration Guideline (Roads and Maritime Services 2016). The overall level of impact on the heritage item would be **negligible** during construction and operation.
Newcastle Crematorium NLEP I34 Item 9	At-property architectural noise treatment	**Direct impact** • The heritage item has been identified as being eligible for consideration of at-property architectural noise treatment. No indirect impacts to this heritage item are anticipated. The overall level of impact on the heritage item would be **negligible** during construction and operation.
Our Lady of Lourdes Church NLEP I547 Item 10	At-property architectural noise treatment	**Direct impact** • The heritage item has been identified as being eligible for consideration of at-property architectural noise treatment. No indirect impacts to this heritage item are anticipated. The overall level of impact on the heritage item would be **negligible** during construction and operation.

7 Statements of heritage impact

7.1 Item 1: Hannell Family Vault (NLEP I179)

7.1.1 Project works

Works include the upgrade of the existing vehicle track to use as vehicle access track for the project about 120 metres west of the vault (**Figure 7-1**). Ancillary facility AS8 is located about 20 metres south of the vault and would be used to support the construction of the main viaduct with the area utilised for laydown, stockpiling, concrete batch plant and satellite compound including parking.

7.1.2 Impact assessment

The following aspects of the proposal respect or enhance the heritage significance of the item for the following reasons[5]:

The existing vehicle access track is located in the western portion of the Hannell Family Vault curtilage and would be widened for use by the project. While the access track intersects with about 12.5 metres of the curtilage of the heritage item, the physical structure of the vault is located about 120 metres northeast of the proposed access track. No direct impact would occur to the physical structure of the vault or the area and setting immediately next to the vault.

The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the measures to be taken to minimise impacts[6]:

A summary of the potential construction impacts to the Hannell Family Vault are provided in **Table 7-1**.

Table 7-1 Impact assessment for Hannell Family Vault

Potential impact	Commentary
Vibration	There would be no vibration impacts to the vault from upgrade of the vehicle access track due to its distance from the vault structure, however plant and machinery operating within the ancillary facility (AS8) may have potential to generate vibration and be within the safe working distances for heritage items. Where works are within the minimum working distances and considered likely to exceed the cosmetic damage objectives (see Table 5-2 in the Noise and Vibration Working Paper [Appendix H of the EIS]), construction works would not proceed unless: • A different construction method with lower source vibration levels is used, where feasible • Attended vibration measurements are carried out at the start of the works to determine the risk of exceeding the vibration objectives.
Demolition	Not applicable for this heritage item as there are no structures being demolished.
Archaeological disturbance	Not applicable for this heritage item as there is no archaeological potential identified.
Altered historical arrangements and access	Access to the vault would be temporarily restricted during construction works, however this would not impact on its heritage significance.

[5] These words are based on the Statements of Heritage Impact guidelines (NSW Office of Environment and Heritage 1996)
[6] These words are based on the Statements of Heritage Impact guidelines (NSW Office of Environment and Heritage 1996)

Potential impact	Commentary
Increased traffic	There would be increased traffic on the access track but this would not impact the physical structure of the vault, nor the heritage significance of the heritage item.
Visual amenity	There are no long-term visual impacts to the vault, as the project involves the upgrade of an existing vehicle access track located 120 metres west of the vault. There may be a short-term visual impact to the vault depending on the size of machinery and/or temporary buildings located within the ancillary facility (AS8) next to the vault.
Landscape and vistas	The landscape and vistas would not be impacted by the project once construction work on the project is completed.
Curtilage	There would be direct impact within the curtilage of the heritage item; however, there would be no impact on heritage significance. There would be no change required to the curtilage following completion of the project.
Subsidence	Not applicable for this heritage item as there are no ground disturbance activities in close proximity to the structure.
Architectural noise treatment	Not applicable for this heritage item as there are no structures which would qualify for such treatment.
Unplanned physical impacts	There is the possibility for unplanned impacts by accidental damage from construction vehicles and machinery on the vault from the ancillary construction area located about 20 metres south of the physical structure of the vault, due to the close proximity of the project.

No adverse impacts on the physical vault structure of the Hannell Family Vault have been identified. However, as a proposed ancillary facility is located 20 metres south of the physical structure of the vault, there may be indirect impacts to the vault due to vibration if vibration-generating machinery is operating within the ancillary facility (AS8) and within the safe working distances for heritage items (described further below). While the ancillary facility wouldn't require major civil activities, and therefore the presence of vibration-generating machinery is unlikely. If required, management measures for vibration detailed below would be implemented. The vault may also be incidentally impacted by accidental damage from machinery or vehicles operating in the vicinity. Further details on potential vibration impacts of the project (including on heritage listed buildings) are provided in the Noise and Vibration Working Paper (refer to Appendix H of the EIS).

By implementing the following management measures the potential impacts on the heritage item would be minimised:

- A dilapidation survey, review of the vibration criteria with respect to the condition of the structural item and vibration monitoring on the building will be carried out prior and during construction. This measure will manage the potential impact of construction activities within the safe working distances for heritage items as presented in the Table 2 of Roads and Maritime's Construction Noise and vibration Guideline (Roads and Maritime Services 2016)
- Temporary fencing during construction to avoid unplanned damage from ancillary activities.

Further details on potential vibration impacts of the project (including on heritage listed structures) are provided in the Noise and Vibration Working Paper (refer to Appendix H of the EIS).

There would be no operational impacts to the Hannell Family Vault as vehicle operation upon completion of the project would be confined to the motorway, which does not overlap with this heritage item.

Conclusion

The proposed work within the heritage curtilage of the Hannell Family Vault is not planned to physically impact the heritage item as it would occur 120 metres away from the physical structure of the vault. Any potential impacts from vibration are able to be reduced through implementation of management measures. As such, the level of impact on the heritage item would be **negligible** during construction and operation.

Figure 7-1 Location of Hannell Family Vault (Item 1) in relation to the project

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7.2 Item 2: Hexham Shipbuilding Yards (NLEPI180)

7.2.1 Project works

Upgrade of an existing informal gravel vehicle track to use as an access track (**Figure 7-2**) overlaps with the curtilage of the Hexham Shipbuilding Yards. The construction footprint is confined to a 20 metre wide corridor which bisects the heritage curtilage of the heritage item. It is proposed to build the track up nominally one to 1.5 metres above the existing ground level and widened to about 10 metres. As outlined in **Section 5.2.2** the archaeological potential of the subject site within the construction footprint is assessed to be low.

7.2.2 Impact assessment

The following aspects of the proposal respect or enhance the heritage significance of the item for the following reasons:

It is likely that the actual archaeological evidence of the Hexham Shipbuilding Yards is located next to the Hunter River, which is about 35 metres southeast of the construction footprint. The existing access track would be widened and built up as part of the project to support load from construction vehicles. Construction is not expected to impact the area where the shipyard remains are most likely to occur.

The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the measures to be taken to minimise impacts:

A summary of the potential construction impacts to the Hexham Shipbuilding Yards are provided in **Table 7-2**.

Table 7-2 Impact assessment for Hexham Shipbuilding Yards

Potential impact	Commentary
Vibration	Not applicable for this heritage item as there are no built structures present.
Demolition	Not applicable for this heritage item as there are no structures present to be demolished.
Archaeological disturbance	The potential for archaeological deposits associated with the shipbuilding yard within the construction footprint is considered to be low. As the access track is proposed to be built up the likelihood of the project impacting on archaeological deposits is also low.
Altered historical arrangements and access	Not applicable for this heritage item as access will be unchanged.
Increased traffic	There would be increased traffic on the access track both during the project and after the project, however this would not impact on the likely areas of archaeological remains.
Visual amenity	Not applicable for this heritage item as it is an archaeological site.
Landscape and vistas	The landscape and vistas would not be impacted further by the project as there is already an access track located within the curtilage of the heritage item.
Curtilage	There would be direct impact within the curtilage of the heritage item; however, there would be no impact on heritage significance and no change to the curtilage overall.

Potential impact	Commentary
Subsidence	Not applicable for this heritage item as there are no built structures present.
Architectural noise treatment	Not applicable for this heritage item as there are no built structures present.
Unplanned physical impacts	Not applicable for this heritage item as the area most likely to contain the archaeological remains is a sufficient distance from the construction footprint.

The project is unlikely to have a direct impact on the Hexham Shipbuilding Yards as the area most likely to contain the shipyard remains is outside the construction footprint, and the proposed access track would be built up over the existing ground surface and existing access track rather than heavily disturbing sub-surface remains. The Unexpected Heritage Finds Guideline (Transport for NSW 2019) will be followed during construction works should any possible archaeological remains be discovered during construction.

By implementing the following management measures, as much information as possible can be obtained about the site which contributes to our knowledge and significance of the heritage item:

- Implement the Unexpected Heritage Finds Guideline (Transport for NSW 2019) for construction works in the event that archaeological remnants are discovered in the area may relate to the shipbuilding yards.

Upon completion of the project, vehicle operation would continue as the upgraded access track may be retained for maintenance access. However, this would not cause operational impacts to the heritage item.

Conclusion

The proposed work within heritage curtilage of the Hexham Shipbuilding Yards may physically impact the heritage item. Any potential impacts are able to be reduced through implementation of management measures. Therefore, the scale is considered to be small/localised, with the intensity of the works limiting sub-surface ground disturbance. There would not be permanent or irreversible damage to the area likely to contain the shipyard remains, which is outside the construction footprint. Additionally, in the unlikely event that any archaeological remains are revealed during works, the Unexpected Heritage Finds Guideline would be implemented to mitigate impacts to the remains. As such, the level of impact on the heritage item would be **minor** during construction and operation.

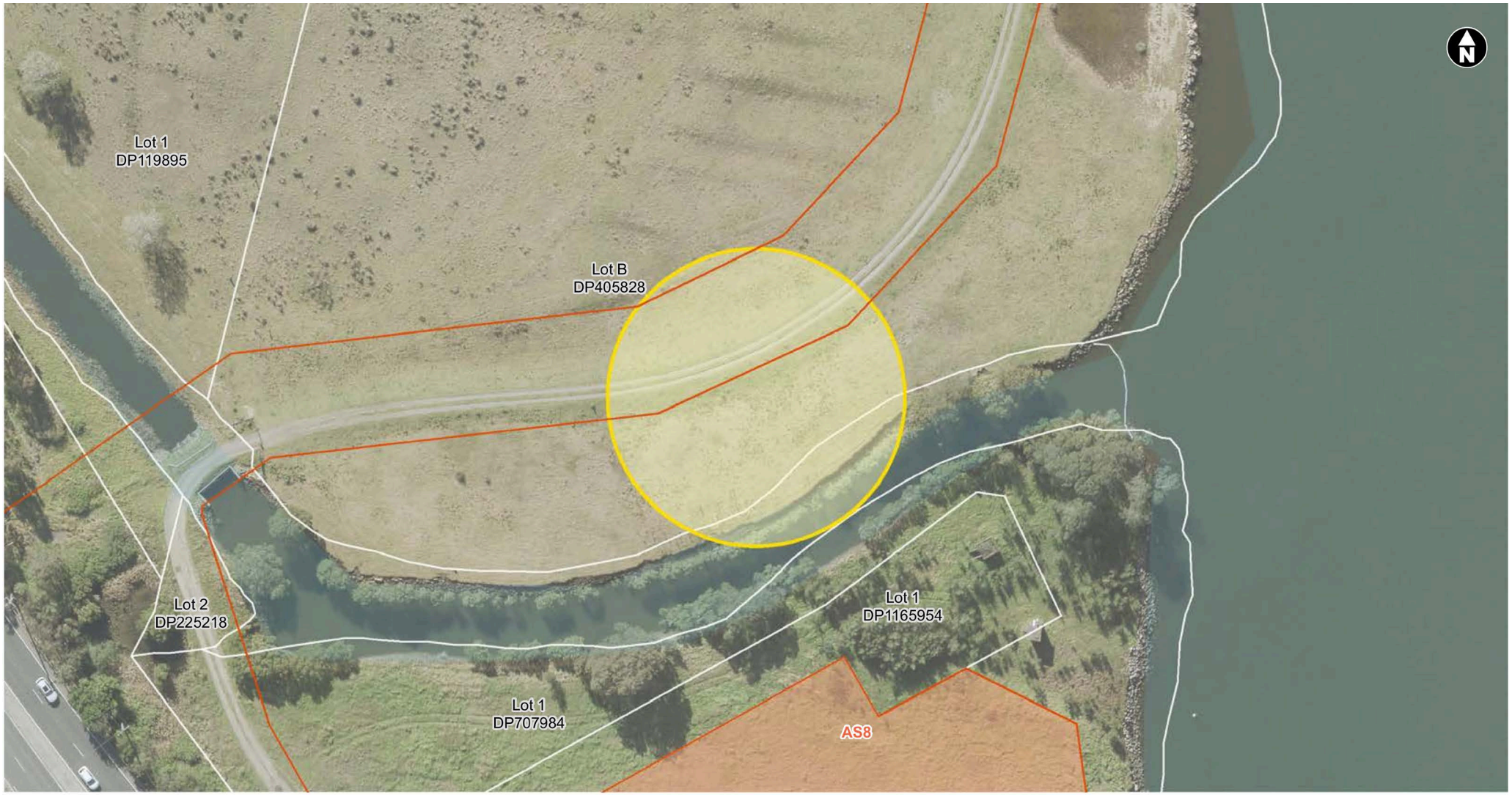

Figure 7-2 Location of Hexham Shipbuilding Yards (Item 2) in relation to the project

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7.3 Item 3: Glenrowan Homestead

7.3.1 Project works

Construction of the motorway overlaps with the heritage curtilage of Glenrowan Homestead complex which is comprised of three sites. Construction activities would require demolition of Site 2 (weatherboard house) and destruction of Site 3 through ground disturbance (**Figure 7-3**).

7.3.2 Impact assessment

The following aspects of the proposal respect or enhance the heritage significance of the item for the following reasons:

The project has avoided direct impact on the main house, buildings and gateway at Site 1.

All of the buildings and features at Site 1 would be retained as they are located outside the construction footprint. The bluestone gateway, which is the closest and northernmost component of Site 1 to the project, is about 38 metres south of the project. The buildings at Site 1 have been identified to be about 74 metres from the project.

The proposed demolition of the weatherboard house at Site 2 would impact on the significance of the heritage item overall by reducing the number of elements which reflects on farming activities and operation during the early to mid-20th century. However, as the main house, all of the outbuildings, bluestone gateway, bluestone blocks and fountain at Site 1 would be retained, there would still be sufficient features to retain a local level of significance.

The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the measures to be taken to minimise impacts:

A summary of the potential construction impacts to the Glenrowan Homestead are provided in **Table 7-3**.

Table 7-3 Impact assessment for Glenrowan Homestead

Potential impact	Commentary
Vibration	The Site 1 gateway and buildings are beyond the safe working distances for cosmetic damage from vibration, presented in the Table 2 of the Roads and Maritime's Construction Noise and vibration Guideline (Roads and Maritime Services 2016) (25 metres). However the safe working distances nominated in Roads and Maritime's Construction Noise and vibration Guideline for heritage buildings assumes that the heritage buildings are structurally sound. As this may not be the case for the buildings at Site 1, management measures for potential vibration impacts have been included for this item.
Demolition	The project would result in the demolition of a weatherboard house at Site 2, however as the majority of the heritage complex, including the main house and surrounding buildings at Site 1 would be retained, demolition of Site 2 would not impact on the heritage significance of the heritage item overall.
Archaeological disturbance	The project would result in the disturbance and destruction of archaeological deposits at Site 3 (Glenrowan Artefact Scatter).

Potential impact	Commentary
Altered historical arrangements and access	The project would result in altered access to the homestead, buildings and gateway at Site 1 as a new driveway would be constructed to the site. The existing driveway would be destroyed by the project. However, as the house at Site 2 would be demolished, the context of the driveway as a point of access between the two sites would be removed. As such, these revised permanent access arrangements would not impact on the significance of the heritage item.
Increased traffic	The project would result in increased traffic on the main alignment located 38 metres north of Site 1, however this would not impact on the significance of the heritage item.
Visual amenity	The visual amenity of Glenrowan Homestead would be altered, as it is currently within a rural setting. Upon completion of the project the surrounding area to the north of the homestead would be a motorway. However, given that there is already a highway in this location, the impact would be limited.
Landscape and vistas	The landscape and vistas to the north of the homestead would be impacted by the project due to the construction and operation of the project; however, the rural vistas to the south of the homestead would remain. Given that the vista to the north already comprises a highway, this impact would be limited.
Curtilage	The curtilage of the heritage item would be impacted by the project. Site 2 and 3 would be demolished and destroyed as a result of the project, and therefore would not retain their contribution to the heritage significance of the overall heritage item. As such the curtilage of the Glenrowan Homestead would be reduced to only encompass Site 1, following completion of the project.
Subsidence	Not applicable to this heritage item as ground disturbance works are a sufficient distance from the remaining structures.
Architectural noise treatment	The main house at Glenrowan Homestead has been identified as being eligible for consideration of at-property treatment. Eligibility would be confirmed during detailed design and in consultation with the landowner. This may impact on the heritage fabric of the building. Should architectural noise treatment be required, this would be done in such a way to minimise heritage impacts, while preserving owner amenity. Any treatment would be sympathetic to the heritage values of the item and would be carried out in accordance with the Burra Charter (in that any changes that reduce cultural significance should be reversible). The advice of a conservation architect would also be sought.
Unplanned physical impacts	Not applicable to this heritage item as the remaining structures are a sufficient distance from the construction footprint.

The following management measures would be implemented to minimise potential impacts on the significance of the Glenrowan Homestead by recording as much relevant information as possible about the weatherboard house at Site 2 (weatherboard house) before its demolition and at Site 3 (Glenrowan Homestead Artefact Scatter):

- An archival photographic recording would be made of the weatherboard house at Site 2, in accordance with the guidelines How to Prepare Archival Record of Heritage Items (Heritage Council of NSW 1998) prior to demolition, in order to capture information about its current form and structure. As the remaining buildings at Site 2 are non-heritage buildings, no archival recording will be made of them
- Further archaeological material recovered from the Glenrowan Homestead artefact scatter has potential to yield information which may contribute to information about domestic life on a 19th century to mid-20th century dairy farm within a rural settlement. Archaeological salvage excavation would occur at Site 3 prior to works proceeding in accordance with **Appendix B**
- A dilapidation survey, review of the vibration criteria with respect to the condition of the structural item at Site 1 and vibration monitoring on the building will be carried out prior and during construction

- Architectural noise treatment would be sympathetic to the heritage values of the item and would be carried out in accordance with the Burra Charter (in that any changes that reduce cultural significance should be reversible). The advice of a conservation architect would be sought.

Further details on potential vibration impacts of the project (including on heritage listed buildings) are provided in the Noise and Vibration Working Paper (refer to Appendix H of the EIS).

There would be no operational impacts to Glenrowan Homestead as vehicle operation upon completion of the project would be confined to the main alignment, the construction of which would have already impacted on specific elements of the heritage item within the construction footprint These elements include the demolition of Site 2 and salvage excavation of Site 3. The remainder of Glenrowan Homestead would not be subject to operational impacts.

Conclusion

The proposed work within heritage curtilage of the Glenrowan Homestead would impact on two of the three sites within the heritage complex's curtilage; Site 2 would be demolished and Site 3 would be destroyed. The impact would be of medium-large scale and moderate-high intensity, with the changes being permanent and irreversible. In order to obtain as much information as possible about each site, an archival photographic recording prior to demolition of Site 2, and salvage excavation of Site 3 would be carried out. Potential impacts from vibration are able to be reduced through implementation of management measures. While the proposed measures would mitigate some of the impact, the level of impact on the heritage item would be **major** during construction. The heritage item would not be subject to operational impacts.

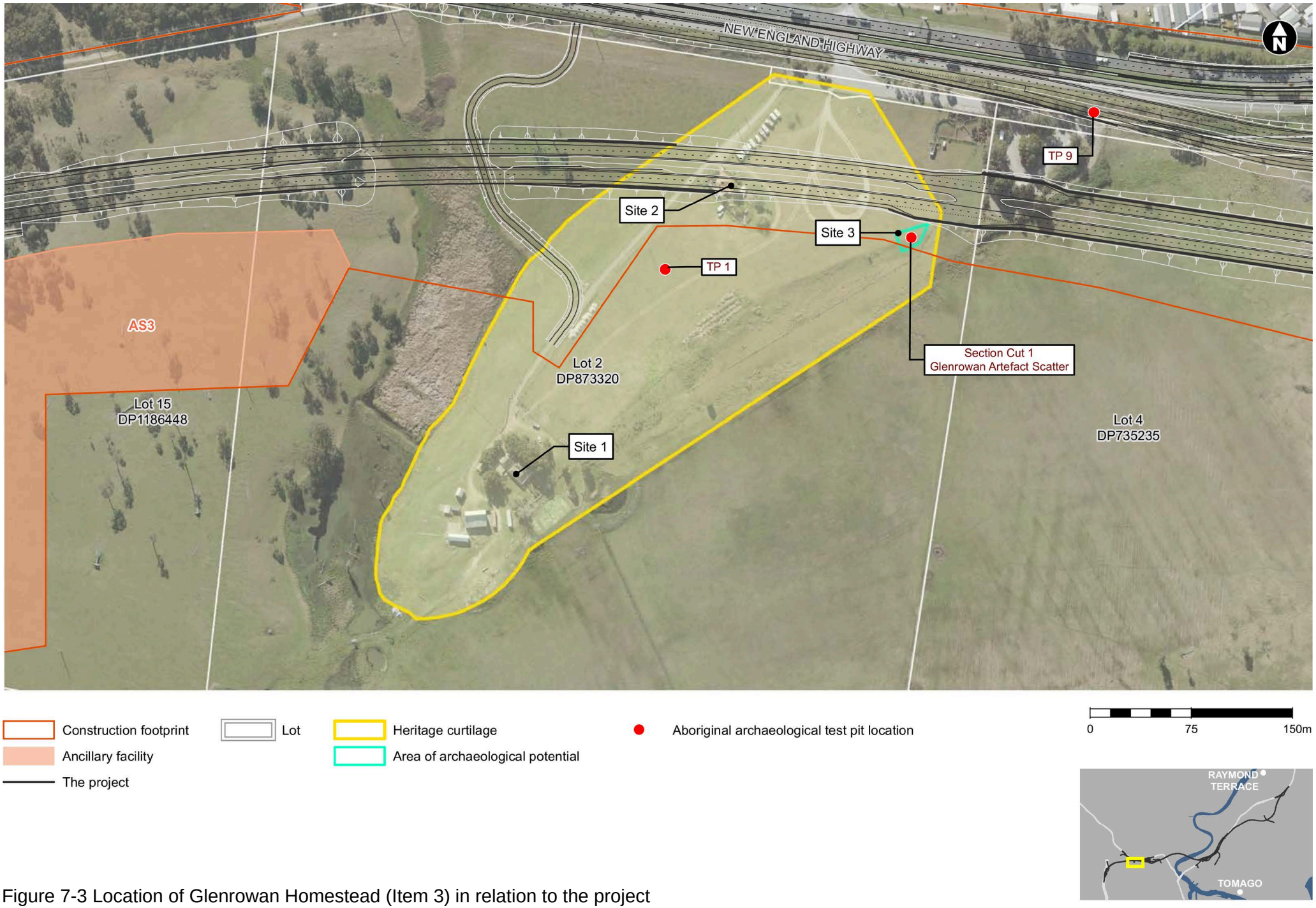

Figure 7-3 Location of Glenrowan Homestead (Item 3) in relation to the project

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7.4 Item 4: Residence, 29 Eastern Avenue, Tarro (NLEPI548)

7.4.1 Project works

Construction of the motorway, including a noise barrier, next to the heritage curtilage of the Residence, 29 Eastern Avenue, Tarro. No works are proposed within the heritage curtilage for this item (**Figure 7-4**).

7.4.2 Impact assessment

The following aspects of the proposal respect or enhance the heritage significance of the item for the following reasons:

No construction impacts to the heritage item are expected as construction would be limited to the construction footprint, next to the heritage item curtilage. The physical heritage building is located about 40 metres from the construction footprint and about 65 metres from the project.

The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the measures to be taken to minimise impacts:

A summary of the potential construction impacts to Residence, 29 Eastern Avenue, Tarro are provided in **Table 7-4**.

Table 7-4 Impact assessment for Residence, 29 Eastern Avenue, Tarro

Potential impact	Commentary
Vibration	The physical building is beyond the safe working distances for cosmetic damage from vibration, presented in the Table 2 of the Roads and Maritime's Construction Noise and vibration Guideline (Roads and Maritime Services 2016) (25 metres). However, the safe working distances nominated in Roads and Maritime's Construction Noise and vibration Guideline for heritage buildings assumes that the heritage building is structurally sound, which may not be the case. Management measures for potential vibration impacts have been included for this item.
Demolition	Not applicable for this heritage item as no demolition is planned.
Archaeological disturbance	Not applicable for this heritage item as there is no identified archaeological potential.
Altered historical arrangements and access	Not applicable for this heritage item as it is situated outside the construction footprint.
Increased traffic	Not applicable for this heritage item as it is situated outside the construction footprint.
Visual amenity	The construction of a noise barrier (NB.03) next to the heritage curtilage has been assessed in the Noise and Vibration Working Paper (Appendix H of the EIS) and the Urban Design, Landscape Character and Visual Impact Assessment Working Paper (Appendix O of the EIS). An 8 metre and 4 metre height noise barrier has been considered at this location. The 4 metre height noise barrier would provide a reasonable balance between addressing noise impacts and visual amenity impacts for adjacent receivers, including the heritage residence. Noise barrier installation and associated vegetation removal would change the character of the landscape setting for the heritage-listed residence at 29 Eastern Avenue by altering the spatial character and outlook. The existing highway is screened from the heritage item with mature trees, which do not form part of the heritage item nor contribute to its significance. A noise barrier would have the same effect in screening the highway from the heritage item. The residence is situated at the top of a steep embankment set back from the existing

Potential impact	Commentary
	highway, therefore the horizontal and vertical distance between the proposed noise barrier and the heritage is sufficient that there would be little or no impact on the heritage significance of the heritage item. Constraints affecting the feasibility of the noise barrier such as removal of vegetation (e.g. well established urban/native trees) as well as urban design and visual amenity impacts would be further investigated during design development.
Landscape and vistas	Not applicable for this heritage item as there is an existing highway already in the location of the construction footprint.
Curtilage	No impact to the curtilage of this heritage item.
Subsidence	Not applicable to this heritage item as it is situated a sufficient distance from the construction footprint.
Architectural noise treatment	The residence has been identified as being eligible for consideration of at-property treatment. Eligibility would be confirmed during detailed design and in consultation with the landowner. This may impact on the heritage fabric of the building. Should architectural noise treatment be required, this would be done in such a way to minimise heritage impacts, while preserving owner amenity. Any treatment would be sympathetic to the heritage values of the item and would be carried out in accordance with the Burra Charter (in that any changes that reduce cultural significance should be reversible). The advice of a conservation architect would also be sought.
Unplanned physical impacts	Not applicable to this heritage item as the structure within the curtilage is situated a sufficient distance from the construction footprint.

The following management measures would be implemented to minimise potential impacts on the heritage item:

- A dilapidation survey, review of the vibration criteria with respect to the condition of the structural item and vibration monitoring on the building will be carried out prior and during construction
- Architectural noise treatment would be sympathetic to the heritage values of the item and would be carried out in accordance with the Burra Charter (in that any changes that reduce cultural significance should be reversible). The advice of a conservation architect would be sought.

Further details on potential vibration impacts of the project (including on heritage listed buildings) are provided in the Noise and Vibration Working Paper (refer to Appendix H of the EIS).

There would be no operational impacts to the Residence as vehicle operation upon completion of the project would be confined to the carriageway which does not overlap with the heritage item.

Conclusion

The proposed construction works are not located within the heritage curtilage of the Residence and would not physically impact the heritage item. Any potential for vibration impacts would be managed. Architectural noise treatment would be designed to minimise impacts on the heritage significance of the heritage item. As such, the level of impact on the heritage item would be **negligible** during construction and operation.

Figure 7-4 Location of Residence 29 Eastern Avenue, Tarro (Item 4) in relation to the project

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7.5 Item 6: Tarro Historic Site (Original township of what was formerly known as Upper Hexham) (NLEP A18)

7.5.1 Project works

Works in the location would be confined to existing road pavement, kerbs/gutters and subsurface drainage on Anderson Drive and would not overlap with the heritage curtilage for this item (**Figure 7-5**).

7.5.2 Impact assessment

The following aspects of the proposal respect or enhance the heritage significance of the item for the following reasons:

The Tarro Historic Site has potential to contain relics associated with the former St Stephen's Church of England and possible burial ground. Works in the location would be confined to the existing road pavement, kerbs/gutters and subsurface drainage on Anderson Drive and would not overlap with the heritage curtilage.

The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the measures to be taken to minimise impacts:

If any works occur outside the existing road pavement, kerbs/gutters or subsurface drainage, within the heritage curtilage, these have potential to physically disturb or damage potential archaeological relics. The following measures would be implemented if works are required to be carried out outside of the existing road pavement, kerbs/gutters or subsurface drainage.

While it is unclear whether burials are present within the curtilage of Tarro Historic Site, undertaking ground penetrating radar or other appropriate geophysical inspection techniques would assist in identifying the presence of burials if construction activities are planned within the curtilage of this item.

A detailed archaeological investigation of the site, informed by the results of the geophysical inspection, including further research of historical documents, would be required. The archaeological investigation would enhance significance of the site through the realisation of its research potential. If substantially intact relics of the church have survived, their analysis may provide some insights into mid-1800s to early 19th century church construction, as well as information about the community of Tarro. If burials are present on the site, information such as past burial practices and health may be obtained.

A summary of the potential construction impacts to the Tarro Historic Site are provided in **Table 7-5**.

Table 7-5 Impact assessment for Tarro Historic Site

Potential impact	Commentary
Vibration	Not applicable for this heritage item as there are no structures present.
Demolition	Not applicable for this heritage item as there are no structures present being demolished.
Archaeological disturbance	Not applicable for this heritage item as works in this location are confined to the road pavement, kerbs/gutters and subsurface drainage on Anderson Drive.
Altered historical arrangements and access	Not applicable for this heritage item as it is located within road reserve.

Potential impact	Commentary
Increased traffic	Not applicable to this heritage item as there would be no increased traffic at the site as a result of the project.
Visual amenity	Not applicable to this heritage item as it is an archaeological site.
Landscape and vistas	As works would be confined to Anderson Drive, the landscape and vistas of the heritage item would not be impacted.
Curtilage	No impact to the curtilage of this heritage item.
Subsidence	Not applicable to this heritage item as there are no structures present.
Architectural noise treatment	Not applicable to this heritage item as there are no structures present.
Unplanned physical impacts	There is the possibility for unplanned impacts by accidental damage from construction vehicles and machinery due to the close proximity of the project.

Given the Tarro Historic Site is a community nominated heritage item, and is potentially associated with burials, it is recommended that construction works within the curtilage of the heritage item are avoided. If any works occur outside the existing road pavement, kerbs/gutters or subsurface drainage, within the heritage curtilage, the project would have a direct impact on potential subsurface archaeological deposits at the Tarro Historic Site. Any ground disturbing works may result in impact on the archaeological significance of the site.

By implementing the following management measures the potential impacts on the heritage item would be minimised:

- If construction works are to take place near the heritage item barrier fencing will be erected between the construction project activities and the heritage curtilage to reduce the possibility of unplanned physical impact from vehicles or construction machinery
- If construction works within the curtilage are to occur, ground penetrating radar or other appropriate non-intrusive geophysical inspection technique will be carried out across the curtilage of the heritage item to assist in identifying the presence of burials. Archaeological test excavation of the Tarro Historic Site, informed by the results of the geophysical inspection, would be carried out to minimise impacts and maximise the opportunity for realising the research potential at the site. The excavation would be conducted by a suitably qualified historical archaeologist who fulfils Heritage NSW's Excavation Director Criteria (Heritage Council of NSW 2011). This investigation would be conducted in accordance with Section 5.2.3 of the EP&A Act, whereby an Excavation Permit for testing prior to approval of an SSI project is not required. The archaeological test excavation would be carried out in accordance with a research design and methodology for the site
- If the results of the testing program demonstrate that the heritage item has potential for substantial, intact archaeological relics of local or State heritage significance, further salvage of the heritage item would be carried out.

There would be no operational impacts to the Tarro Historic Site.

Conclusion

Works in the location would be confined to the existing road pavement, kerbs/gutters and subsurface drainage on Anderson Drive and would not overlap with the heritage curtilage. As such, the heritage item would be avoided and the level of impact would be **negligible**.

If work was to take place within the heritage curtilage of the site, impacts would be considered permanent and irreversible. In this event, the level of impact on the heritage item would be major during construction and operation.

Figure 7-5 Location of Tarro Historic Site (Original township of what was formerly known as Upper Hexham) (Item 6) in relation to the project

7.6 Item 7: Tarro Substation (NLEP I546)

7.6.1 Project works

Works in the location would be confined to the existing road pavement, kerbs/gutters and subsurface drainage on Anderson Drive and would not overlap with the heritage curtilage (**Figure 7-6**).

7.6.2 Impact assessment

The following aspects of the proposal respect or enhance the heritage significance of the item for the following reasons:

The physical structure of the heritage item is located next to the construction footprint. Works in this location are confined to the existing road pavement, kerbs/gutters and subsurface drainage on Anderson Drive and about three metres from the building. There is no direct impact that would occur to the physical structure of the Tarro Substation as a result of the project.

The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the measures to be taken to minimise impacts:

A summary of the potential construction impacts to the Tarro Substation are provided in **Table 7-6**.

Table 7-6 Impact assessment for Tarro Substation

Potential impact	Commentary
Vibration	Depending on the location of vibration inducing works carried out within Anderson Drive there is potential to comply with the safe working distances for heritage items. However, where works cannot comply with the minimum working distances and considered likely to exceed the cosmetic damage objectives (see Table 5-2 in the Noise and Vibration Working Paper (refer to Appendix H of the EIS), construction works will not proceed unless: • A different construction method with lower source vibration levels is used, where feasible • Attended vibration measurements are carried out at the start of the works to determine the risk of exceeding the vibration objectives.
Demolition	Not applicable for this heritage item as no demolition is proposed.
Archaeological disturbance	Not applicable for this heritage item as there is no identified archaeological potential.
Altered historical arrangements and access	Not applicable for this heritage item as no change to access is proposed.
Increased traffic	Not applicable for this heritage items as there would be no increased traffic at the site as a result of the project.
Visual amenity	There would be no visual amenity impacts to the site as any project-related work would be confined to existing road pavement, kerbs/gutters and subsurface drainage within Anderson Drive.
Landscape and vistas	Visual and landscape impacts have been assessed in the Urban Design, Landscape Character and Visual Impact Assessment Working Paper (Appendix O of the EIS). The effect of the project would be major new visual elements in the mid distance of the view from the heritage item, and the loss of long-distance views across the floodplain. There would be no change to the foreground of the view. While the distant views would change, this would not impact on the heritage significance of the heritage item.

Potential impact	Commentary
Curtilage	No impact to the curtilage of this heritage item.
Subsidence	Not applicable to this heritage item as major ground disturbance is not proposed in this location.
Architectural noise treatment	Not applicable to this heritage item as the structure would not qualify for such treatment.
Unplanned physical impacts	There is the possibility for unplanned impacts by accidental damage from construction vehicles and machinery due to the close proximity of the project.

No adverse impacts on the Tarro Substation are expected from the project. However, as the project is located next to the Tarro Substation there may be unplanned impacts to the Tarro Substation building façade due to vibration or accidental damage from machinery or vehicles.

If any works are going to occur near the Tarro Substation, implementing the following management measures would minimise potential impacts on the heritage item:

- A dilapidation survey, review of the vibration criteria with respect to the condition of the structural item and vibration monitoring on the building will be carried out prior and during construction. Vibration impacts from the project are assessed for all buildings (including heritage-listed buildings) along the project. The heritage item has been identified to be next to the construction footprint, is about three metres from the asphalt on Anderson Drive, and is therefore within the minimum working distance (less than 25 metres) for cosmetic damage presented in the Table 2 of Roads and Maritime's Construction Noise and vibration Guideline (Roads and Maritime Services 2016)
- Temporary fencing during construction to avoid unplanned damage from machinery and vehicles.

Further details on potential vibration impacts of the project (including on heritage listed buildings) are provided in the Noise and Vibration Working Paper (refer to Appendix H of the EIS).

There would be no operational impacts to the Tarro Substation as vehicle operation upon completion of the project would be confined to Anderson Drive which does not overlap with this heritage item and there would be little or no change to the current operation of the road in this location.

Conclusion

Any potential impacts from vibration or accidental damage from machinery or vehicles are able to be prevented or managed through implementation of management measures. As such, the level of impact on the heritage item would be **negligible** during construction and operation.

Note- Tarro Substation (I546) is located within Lot 1 DP128309.
The curtilage spatial data provided by the DPIE are not spatially coincident to the cadastre provided by the LPI.
The data is currently undergoing spatial adjustments in order to align curtilage to cadastre

Figure 7-6 Location of Tarro Substation (Item 7) in relation to the project

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7.7 Item 8: Pumping Station, Tarro (NLEP I550)

7.7.1 Project works

Works in the location would be confined to the existing road pavement, kerbs/gutters and subsurface drainage on Anderson Drive and would not overlap with the heritage curtilage (**Figure 7-7**).

7.7.2 Impact assessment

The following aspects of the proposal respect or enhance the heritage significance of the item for the following reasons:

The heritage item is located next to the construction footprint. The physical structure of the Pumping Station brick fence is located about four metres from the existing road pavement on Anderson Drive. There is no direct impact that would occur to the physical structure of the Pumping Station as a result of the project.

The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the measures to be taken to minimise impacts:

A summary of the potential construction impacts to the Pumping Station are provided in **Table 7-7**.

Table 7-7 Impact assessment for Pumping Station

Potential impact	Commentary
Vibration	Depending on the location of vibration inducing works carried out within Anderson Drive there is potential to comply with the safe working distances for heritage items. The brick fence which forms part of the heritage item is immediately next to the construction footprint. However, where works cannot comply with the minimum working distances and considered likely to exceed the cosmetic damage objectives (see Table 5-2 in the Noise and Vibration Working Paper (refer to Appendix H of the EIS), construction works will not proceed unless: • A different construction method with lower source vibration levels is used, where feasible • Attended vibration measurements are carried out at the start of the works to determine the risk of exceeding the vibration objectives.
Demolition	Not applicable for this heritage item as no demolition is proposed.
Archaeological disturbance	Not applicable for this heritage item as there is no identified archaeological potential.
Altered historical arrangements and access	Not applicable for this heritage item as no change to access is proposed.
Increased traffic	There would be no increased traffic at the site as a result of the project.
Visual amenity	Visual and landscape impacts have been assessed in the Urban Design, Landscape Character and Visual Impact Assessment Working Paper (Appendix O of the EIS). The effect of the project would be major new visual elements in the mid distance of the view from the heritage item, and the loss of long-distance views across the floodplain. There would be no change to the foreground of the view. While the distant views would change, this would not impact on the heritage significance of the heritage item.
Landscape and vistas	As works in the vicinity of the heritage item would be confined to Anderson Drive, the landscape and vistas of the heritage item would not be impacted.

Potential impact	Commentary
Curtilage	No impact to the curtilage of this heritage item.
Subsidence	Not applicable to this heritage item as major ground disturbance is not proposed in this location.
Architectural noise treatment	Not applicable to this heritage item as the structure would not qualify for such treatment.
Unplanned physical impacts	There is the possibility for unplanned impacts by accidental damage from construction vehicles and machinery due to the close proximity of the project.

No adverse impacts on the Pumping Station are expected from the project. However, as the project is located next to the Pumping Station and its associated brick fence, there may be indirect impacts to the heritage item due to vibration or unplanned direct impacts by accidental damage from machinery or construction vehicles.

If any works are going to occur near the Pumping Station, implementing the following management measures would minimise potential impacts on the heritage item:

- A dilapidation survey, review of the vibration criteria with respect to the condition of the structural item and vibration monitoring on the building and brick fence will be carried out prior and during construction. The heritage item has been identified to be next to the construction footprint, with the physical structure of the Pumping Station located about four metres from the asphalt on Anderson Drive. It is therefore within the minimum working distance (less 25 metres) for cosmetic damage presented in the Table 2 of Roads and Maritime's Construction Noise and vibration Guideline (Roads and Maritime Services 2016)
- Temporary fencing during construction to avoid unplanned damage from machinery.

Further details on potential vibration impacts of the project (including on heritage listed buildings) are provided in the Noise and Vibration Working Paper (refer to Appendix H of the EIS).

There would be no operational impacts to the Pumping Station as vehicle operation upon completion of the project would be confined to Anderson Drive which does not overlap with this heritage item.

Conclusion

Any potential impacts from vibration or accidental damage from machinery are able to be prevented through implementation of management measures. As such, the level of impact on the heritage item would be **negligible** during construction and operation.

Figure 7-7 Location of Pumping Station (Item 8) in relation to the project

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7.8 Item 9: Newcastle Crematorium, Beresfield (NLEPI34)

7.8.1 Project works

The heritage item has been identified as being eligible for at-property architectural noise treatment. Refer to Noise and Vibration Working Paper (Appendix H of the EIS) for full details.

7.8.2 Impact assessment

The following aspects of the proposal respect or enhance the heritage significance of the item for the following reasons:

No motorway construction impacts related to the heritage item are expected as the main crematorium building is more than 500 metres from the construction footprint.

The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the measures to be taken to minimise impacts:

A summary of the potential construction impacts to the Newcastle Crematorium is provided in **Table 7-8**.

Table 7-8 Impact assessment for Newcastle Crematorium

Potential impact	Commentary
Vibration	Not applicable to this heritage item, as the main crematorium building is located more than 500 metres from the construction footprint and would not be subject to vibration.
Demolition	Not applicable for this heritage item as there are no structures being demolished.
Archaeological disturbance	Not applicable for this heritage item as there is no archaeological potential identified.
Altered historical arrangements and access	Not applicable for this heritage item as there would be no change to access.
Increased traffic	Not applicable for this heritage item as it is situated outside the construction footprint.
Visual amenity	Not applicable to this heritage item as it is situated a sufficient distance from the construction footprint.
Landscape and vistas	Not applicable to this heritage item as it is situated a sufficient distance from the construction footprint.
Curtilage	No impact to the curtilage of this heritage item
Subsidence	Not applicable to this heritage item as it is situated a sufficient distance from the construction footprint.
Architectural noise treatment	The Newcastle Crematorium has been identified as being eligible for consideration of at-property treatment. Eligibility would be confirmed during detailed design. This may impact on the heritage fabric of the building. Should architectural noise treatment be required, consultation would be completed with the owner and/or operator and any works would be done in such a way to minimise heritage impacts, while preserving owner amenity. Any treatment would be sympathetic to the heritage values of the item and would be carried out in accordance with the Burra Charter (in that any changes that reduce cultural significance should be reversible). The advice of a conservation architect would also be sought.
Unplanned physical impacts	Not applicable to this heritage item as the structure within the curtilage is situated a sufficient distance from the construction footprint.

The following management measures would be implemented to minimise potential impacts on the heritage item:

- Architectural noise treatment would be sympathetic to the heritage values of the item and would be carried out in accordance with the Burra Charter (in that any changes that reduce cultural significance should be reversible). The advice of a conservation architect would be sought.

There would be no operational impacts to the heritage item as vehicle operation upon completion of the project would be confined to the carriageway which does not overlap with the heritage item.

Conclusion

The only proposed works at or near this heritage item would be at-property architectural noise treatment. This would be carried out with the advice of a conservation architect and therefore impacts would be managed. As such, the level of impact on the heritage item would be **negligible** during construction and operation.

7.9 Item 10: Our Lady of Lourdes Church, Tarro (NLEPI547)

7.9.1 Project works

The heritage item has been identified as being eligible for at-property architectural noise treatment. Refer to Noise and Vibration Working Paper (Appendix H of the EIS) for full details.

7.9.2 Impact assessment

The following aspects of the proposal respect or enhance the heritage significance of the item for the following reasons:

No motorway construction impacts related to the heritage item are expected as the church is more than 250 metres from the construction footprint.

The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the measures to be taken to minimise impacts:

A summary of the potential construction impacts to the Our Lady of Lourdes Church is provided in **Table 7-9**.

Table 7-9 Impact assessment for Our Lady of Lourdes Church

Potential impact	Commentary
Vibration	Not applicable to this heritage item, as the church building is located more than 250 metres from the construction footprint and would not be subject to vibration.
Demolition	Not applicable for this heritage item as there are no structures being demolished.
Archaeological disturbance	Not applicable for this heritage item as there is no archaeological potential identified.
Altered historical arrangements and access	Not applicable for this heritage item as there would be no change to access.
Increased traffic	Not applicable for this heritage item as it is situated outside the construction footprint.
Visual amenity	Not applicable to this heritage item as it is situated a sufficient distance from the construction footprint.
Landscape and vistas	Not applicable to this heritage item as it is situated a sufficient distance from the construction footprint.
Curtilage	No impact to the curtilage of this heritage item
Subsidence	Not applicable to this heritage item as it is situated a sufficient distance from the construction footprint.
Architectural noise treatment	Our Lady of Lourdes Church has been identified as being eligible for consideration of at-property treatment. Eligibility would be confirmed during detailed design. This may impact on the heritage fabric of the building. Should architectural noise treatment be required, consultation would be completed with the owner and/or operator and any works would be done in such a way to minimise heritage impacts, while preserving owner amenity. Any treatment would be sympathetic to the heritage values of the item and would be carried out in accordance with the Burra Charter (in that any changes that reduce cultural significance should be reversible). The advice of a conservation architect would also be sought.

Potential impact	Commentary
Unplanned physical impacts	Not applicable to this heritage item as the structure within the curtilage is situated a sufficient distance from the construction footprint.

The following management measures would be implemented to minimise potential impacts on the heritage item:

- Architectural noise treatment would be sympathetic to the heritage values of the item and would be carried out in accordance with the Burra Charter (in that any changes that reduce cultural significance should be reversible). The advice of a conservation architect would be sought.

There would be no operational impacts to the heritage item as vehicle operation upon completion of the project would be confined to the carriageway which does not overlap with the heritage item.

Conclusion

The only proposed works at or near this heritage item would be at-property architectural noise treatment. This would be carried out with the advice of a conservation architect and therefore impacts would be managed. As such, the level of impact on the heritage item would be **negligible** during construction and operation.

8 Cumulative impacts

Cumulative non-Aboriginal heritage impacts may arise from the interaction of construction and operation activities of the project, and other approved or proposed projects in the area. When considered in isolation, specific project impacts may be considered minor. These minor impacts may, however, be more substantial, when the impact of multiple projects on the same receivers is considered.

The projects detailed in **Table 8-1** are in varying stages of delivery and planning. This chapter provides an assessment of cumulative non-Aboriginal heritage impacts based on the most current and publicly available information for these projects. In many instances this is a high-level qualitative assessment. For non-Aboriginal heritage, overlapping construction or operational timeframes do not usually add to the overall level of heritage impact as it does for other disciplines, such as traffic or noise. This is because once physical changes are made to a heritage place, regardless of whether they are made at the same time or separately, the impact level does not change.

Projects carried out in the vicinity of the construction footprint have had a negligible impact on non-Aboriginal heritage in the region. The contribution of the project to cumulative impacts on non-Aboriginal heritage in the area is minor, considering the heritage impacts are being addressed and managed through the implementation of a range of environmental management measures including avoidance, dilapidation surveys, noise and vibration controls, barrier fencing, archival photographic recording, archaeological salvage excavation, geophysical survey and archaeological test excavation (if required).

Table 8-1 Assessment of potential cumulative impacts for relevant identified projects

Project (approval status)	Relevance to non-Aboriginal cumulative impacts	Potential cumulative non-Aboriginal heritage impacts
Black Hill Employment Lands (Northern Estates) (In planning)	• Located south of John Renshaw Drive and west of M1 Pacific Motorway • Likely to be some overlap in construction program, meaning likelihood of concurrent (simultaneous) construction and operation.	The project application area does not contain any non-Aboriginal heritage values and further investigation was not considered necessary. In the Concept Plan for the development, the assessment states that it would be sensitively designed to address potential heritage impacts. As such, no cumulative non-Aboriginal heritage impacts are anticipated.
Kinross Industrial Heatherbrae/ Weathertex (Approved)	• Located within the project's construction footprint (AS16) on Masonite Road, Heatherbrae. • Likely to be some overlap in construction program, meaning likelihood of concurrent (simultaneous) construction and operation.	The industrial development is proposed on land identified for AS16. If the Kinross Industrial development is developed prior to or during construction, this ancillary site would be unavailable to the project for use. The non-Aboriginal heritage assessment was not available at the time of this assessment however there does not appear to be any listed heritage items within or next to the development site based on a review of heritage registers.
Black Hill Hunter Business Park, Cessnock (in planning)	• Located south of John Renshaw Drive and west of the M1 Pacific Motorway. • Likely to be some overlap in construction program, meaning likelihood of concurrent (simultaneous) construction and operation.	The non-Aboriginal heritage assessment was not available at the time of this assessment however there does not appear to be any listed heritage items within or next to the development site based on a review of heritage registers.

Project (approval status)	Relevance to non-Aboriginal cumulative impacts	Potential cumulative non-Aboriginal heritage impacts
Newcastle Power Station (In planning)	Located within the project construction footprint at Tomago near Old Punt Road	A field survey of the construction footprint did not locate any heritage items and it was concluded that there was minimal potential for items to be uncovered during the proposed development. The project would therefore not impact on non-Aboriginal heritage.
Hexham Straight (in planning)	• Located about one kilometre south of the project at Hexham • Potential to be consecutive (back to back) construction and concurrent (simultaneous) operation.	Based on preliminary studies for the Hexham Straight there are six heritage items listed on the LEP located within the investigation area, and one heritage item listed on the RNE (Hunter Estuary Wetlands) located within the investigation area. There are three heritage items listed on the LEP located next to the northern boundary of the investigation area and one heritage item (Hexham Bridge) listed on both the SHR and s170 located at the northern boundary of the investigation area. Apart from the Hunter Estuary Wetlands, none of these heritage items are located within the current project construction footprint.
Lower Hunter Freight Corridor (in planning)	Investigation area includes Hexham	The non-Aboriginal heritage assessment was not available at the time of this assessment; therefore, the level of impact on non-Aboriginal heritage is currently unknown. Consequently, cumulative impacts associated with the construction or operation of the project is unknown.
Richmond Vale Rail Trail to Shortland, including Shortland to Tarro cycleway (In planning)	Intersects the project at Tarro	The rail trail utilises the Minmi to Hexham Railway (I332), listed on the NLEP, and the Richmond Vale Railway (I214), listed on the Cessnock LEP (CLEP). The following heritage items were located within the project study area: Former railway cuttings John Brown's Model Farm (NLEP I340), remains of railway siding – John Brown's Model Farm (NLEP I338), John Brown's Model Farm (NLEP I337), Collieries of the South Maitland Coalfields/Greta Coal Measures (CLEP I215) and archaeological remains (former Minmi Wastewater Treatment Plant site (s170/SHI 3630123). The Heritage Impact Assessment for the project found that the proposed works would result in heritage impacts as follows: • Moderate physical and visual heritage impacts to the Minmi to Hexham Railway • Major physical and visual cumulative heritage impacts to the Richmond Vale Railway • Minor and moderate visual heritage impacts to the unlisted portions of the former Richmond Vale Railway Line, between the Newcastle/Cessnock LGA boundary and the Lake Macquarie/Cessnock LGA boundary.
Hunter Gas Pipeline (Approved)	Intersects the project at Tomago	The non-Aboriginal heritage assessment was not available at the time of this assessment; therefore, the level of impact on non-Aboriginal heritage is currently unknown. Consequently, cumulative impacts associated with the construction or operation of the project is unknown.

9 Environmental management measures

The following management measures (refer to **Table 9-1**) have been developed to specifically manage potential impacts to non-Aboriginal heritage which have been predicted as a result of the proposed works. These measures should be incorporated into relevant Environmental Management Plans (EMPs) during construction and operations.

Table 9-1 Management measures for non-Aboriginal heritage items

Impact	Reference	Management measure	Responsibility	Timing
Non-Aboriginal heritage impacts	NA01	A Non-Aboriginal Heritage Management Plan (NAHMP) would be prepared prior to construction in consultation with Heritage NSW. As a minimum, the NAHMP would include the following: • A list, plan and maps with GIS layers showing the location of identified heritage items both within, and near, the construction footprint. • Procedures to be implemented during construction to avoid or minimise impacts on items of heritage significance including protective fencing. • The Unexpected Heritage Finds Guideline (Transport for NSW 2019) which will be followed in the event that unexpected heritage finds are uncovered during construction. • A procedure for the unexpected discovery of human skeletal remains as per the Skeletal remains: guidelines for the management of human skeletal remains (NSW Heritage Office 1998).	Transport/ Contractor	Prior to construction
Hannell Family Vault	NA02	• A dilapidation survey will be carried out. • Barrier fencing will be erected between the construction project activities and vault structure.	Contractor	Prior to construction/ construction
Glenrowan Homestead	NA03	• Archival photographic recording of Site 2 will be carried out prior to demolition. • Archaeological salvage excavation at Site 3 under the supervision of an Excavation Director, who meets the NSW Heritage Council criteria will be carried out prior to works proceeding. • A dilapidation survey will be carried out. • Architectural noise treatment at the main house at Site 1 would be sympathetic to the heritage values of the item.	Contractor	Prior to construction
Residence, 29 Eastern Avenue, Tarro	NA04	• A dilapidation survey will be carried out. • Architectural noise treatment at the heritage residence would be sympathetic to the heritage values of the item.	Contractor	Prior to construction
Tarro Historic Site	NA05	If construction works are to take place within the site curtilage further archaeological investigation under the supervision of an	Contractor	Detailed design/ prior to

Impact	Reference	Management measure	Responsibility	Timing
		Excavation Director, who meets the NSW Heritage Council criteria, would be carried out as follows: • Non-invasive survey using ground penetrating radar or other appropriate geophysical inspection technique will be carried out across the curtilage of the heritage item to assist in identifying the presence of burials or other archaeological features. • Following the non-invasive survey, archaeological test excavation of the heritage item within the construction footprint will be carried out to confirm presence and nature of archaeological relics in accordance with a research design and methodology to be developed.		construction/ construction
Tarro Substation and Pumping Station	NA06	• A dilapidation survey will be carried out.	Contractor	Detailed design/ prior to construction/ construction
Newcastle Crematorium and Our Lady of Lourdes Church	NA07	• Architectural noise treatment at the heritage buildings would be sympathetic to the heritage values of the item.	Contractor	Detailed design/ prior to construction/ construction

10 Conclusion

Construction activities associated with the project have the potential to directly and indirectly impact on heritage items including demolition/destruction of items, vibration impacts, works within heritage curtilage and unplanned impacts from accidental damage by machinery.

A review of previous heritage studies, aerial imagery, and a search of relevant heritage registers identified eight listed heritage items and six areas of heritage potential within and next to the construction footprint, or otherwise subject to project-related works. A field survey identified that one of the six areas of heritage potential identified in the desktop investigations (Glenrowan Homestead, described as Item 3 in this assessment) was a potential heritage item.

Following the field survey, a total of nine heritage items were assessed as being significant. The overall impact to each of the nine heritage items as a result of the project include:

- **Major impact:** Glenrowan Homestead
- **Minor impact:** Hexham Shipbuilding Yards (listed on NLEP I180)
- **Negligible impact:**
  - Hannell Family Vault (listed NLEP I179)
  - Residence, 29 Eastern Avenue, Tarro (listed on NLEP I548)
  - Tarro Historic Site (Original township of what was formerly known as Upper Hexham) (listed on NLEP A18)
  - Tarro Substation (listed on NLEP I546)
  - Pumping Station (listed on NLEP I550, Register of National Estate 102132, Hunter Water Section 170 register)
  - Newcastle Crematorium (listed on the NLEP I34)
  - Our Lady of Lourdes Church (listed on the NLEP I547).

To address the major impacts at the Glenrowan Homestead, measures such as archival photographic recording, archaeological salvage excavation, dilapidation surveys and vibration monitoring have been proposed for this heritage item to mitigate the impacts. Items with negligible to minor impacts identified will generally have dilapidation surveys completed and be protected with barrier fencing during construction. For any potential archaeological heritage items, an unexpected finds procedure or further sub-surface investigations would be applied. Environmental management measures will be detailed within the project Construction Environmental Management Plan (CEMP), which will include an unexpected finds protocol for heritage items.

Overall, the project achieves desirable performance outcomes by firstly avoiding and then minimising impacts to heritage items within and next to the construction footprint. The project would have a major impact to the Glenrowan Homestead, requiring salvage excavation and archival recording activities to mitigate the impacts, while only negligible to minor impacts would occur to other heritage items affected by the project.

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Terms and acronyms

Term / Acronym	Description
AHC Act	*Australian Heritage Council Act* 2003
ARD	Archaeological research design
CEMP	Construction Environmental Management Plan
CHL	Commonwealth Heritage List
DPIE	Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EMPs	Environmental Management Plans
EP&A Act	*Environment Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ICOMOS	International Council on Monuments and Sites
Jacobs	Jacobs Group (Australia) Pty Ltd
LEP	Local Environmental Plan
MNV	Minimum Number of Vessel
NAHMP	non-Aboriginal heritage management plan
NHL	National Heritage List
NLEP	Newcastle Local Environmental Plan 2012
NMHMA	*Newcastle Morning Herald and Miners' Advocate* newspaper
NSW	New South Wales
NTAR	National Trust of Australia (NSW) Register
Project activities	Activities to be carried out as part of the construction and operation of the project
PSLEP	Port Stephens Local Environmental Plan 2013
RNE	Register of the National Estate
SEARs	Secretary's Environmental Assessment Requirements
SHI	State Heritage Inventory
SHR	State Heritage Register
SOHI	Statement of Heritage Impact
SSI	State Significant Infrastructure
Transport	Transport for NSW
the project	M1 Pacific Motorway extension to Raymond Terrace

Appendix A – Glenrowan Homestead Artefact Scatter catalogue

Date Recorded	Site	Test Pit	Spit	Depth (mm)	Material	Type	Colour	Quantity	Features/Description	Comments/Interpretation
29/06/2016	Beresfield 4	SC 1A	4	300-400	Ceramic	Stoneware	White	1	Fragment, blue floral transfer print, print inside	Dining ware
29/06/2016	Beresfield 4	SC 1A	4	300-400	Ceramic	Earthenware	Brown	1	Fragment, glazed both sides	Ginger beer or boot polish bottle
29/06/2016	Beresfield 4	SC 1B	6	500-600	Bone			11	Fragments of bone	29/06/2016
29/06/2016	Beresfield 4	SC 1B	6	500-600	Ceramic	Earthenware	Brown	1	Complete bottle, salt glazed with a slightly uneven colour, inscribed lettering "…LACKING BO……..L…." in an arch shape of "9/J. R. D."	Makers mark dates between 1817 and 1834
29/06/2016	Beresfield 4	SC 1B	7	600-700	Metal			1	Slightly squared cross-section, no diagnostic features	
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Earthenware	Yellow	1	Cup with complete base, broken sides, glazed yellow, incised line near the lip of the cup, refits with two fragments from the same square and spit	
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Earthenware	Yellow	2	Fragments with partial rim, glazed yellow on both sides, incised line just under lip, refit with the cup from the same spit	
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Earthenware	Yellow	1	Thick rim fragments, salt glazed on both sides.	Potentially part from the same object, potentially a platter or tray
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Earthenware	Yellow	1	Rim fragment, salt glazed on both sides, incised line near rim	May be part of the same set as the cup in this spit,
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Earthenware	Yellow	4	Undiagnostic fragments, salt glazed	Likely to be from a flat item
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Stoneware	White	1	Partial rim fragment, blue transfer print pattern	Potentially from a bowl or plate
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Earthenware	Brown	1	Brown salt glaze on convex side, unglazed on concave side, curve is very gentle, piece is thick	Potentially from a large closed vessel due to thickness of fragment and the glaze only being on one side
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Earthenware	Brown	1	Thick non-diagnostic fragment	
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Earthenware	White	1	Pipe stem	
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Stoneware	White	1	Fragment, embossed flowers on one side	Potentially part of a rim from a bowl or plate
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Stoneware	White	1	Fragment, green transfer print on one side	
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Stoneware	White	1	Fragment of rim, slightly curved, black line painted just below rim on concave side, blue and green painted pattern on the convex side	Probably from a hollow vessel
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Stoneware	White	1	Fragment, dark blue/black transfer print, curved at one end, pattern on concave side.	Potentially a plate or other open vessel

Date Recorded	Site	Test Pit	Spit	Depth (mm)	Material	Type	Colour	Quantity	Features/Description	Comments/Interpretation
29/06/2016	Beresfield 4	SC 1B	7	600-700	Ceramic	Stoneware	White	1	Fragment, slightly curved, blue transfer print pattern on the concave side	
29/06/2016	Beresfield 4	SC 1B	8	700-800	Glass	Bottle	Olive green	1	Partial bottle top with double collar seal	
29/06/2016	Beresfield 4	SC 1B	8	700-800	Metal			1	Heavily corroded, roughly square cross section	
29/06/2016	Beresfield 4	SC 1B	8	700-800	Metal			1	Heavily corroded, roughly square cross section coming to a point	
29/06/2016	Beresfield 4	SC 1B	8	700-800	Metal			1	Heavily corroded, roughly square cross section, potential nail head	
29/06/2016	Beresfield 4	SC 1B	8	700-800	Ceramic	Earthenware	Yellow	2	Partial rim, glazed on both sides, incised line near the rim	Potentially refits with cup in Spit 7
29/06/2016	Beresfield 4	SC 1B	8	700-800	Ceramic	Earthenware	Yellow	1	Thick, non-diagnostic fragment with salt glaze on one side	
29/06/2016	Beresfield 4	SC 1B	8	700-800	Ceramic	Stoneware	White	1	Fragment, slightly curved, blue transfer print pattern on the concave side	
29/06/2016	Beresfield 4	SC 1B	8	700-800	Ceramic	Earthenware	Yellow	1	Partial rim fragment, salt glaze on both sides	
29/06/2016	Beresfield 4	SC 1B	8	700-800	Ceramic	Earthenware	Yellow	3	Fragments, non-diagnostic, glazed both sides	Unlikely to all be from the same vessel
29/06/2016	Beresfield 4	SC 1B	8	700-800	Ceramic	Stoneware	White	1	Embossed pattern, grey lines present	Potentially part of a rim from a bowl or plate
29/06/2016	Beresfield 4	SC 1C	9	800-1200	Metal			2	Nails, very corroded, roughly square cross section	
29/06/2016	Beresfield 4	SC 1C	9	800-1200	Shell			4	Fragments of oyster shell	
29/06/2016	Beresfield 4	SC 1C	9	800-1200	Shell			13	Fragments of shell	
29/06/2016	Beresfield 4	SC 1C	9	800-1200	Bone			2	Fragments of bone	
29/06/2016	Beresfield 4	SC 1C	9	800-1200	Glass		Clear	1	Very fine fragment	
29/06/2016	Beresfield 4	SC 1C	10	1200+	Cement			1	Numerous inclusions of small stones	
29/06/2016	Beresfield 4	SC 1C	10	1200+	Bone			1	Fragment of bone	
29/06/2016	Beresfield 4	SC 1C	10	1200+	Shell			1	Fragment of bivalve shell	
29/06/2016	Beresfield 4	SC 1C	11	1000-1100	Ceramic	Earthenware	White	1	Fragment clay pipe, cup end	Bowl and stem join
01/06/2016	Beresfield 4	SC 1E			Ceramic	Porcelain	White	1	Partial dog's head - face, one ear and part of neck	Toy or ornament
04/07/2016	Beresfield 4	TP1 (A)	1	0-100	Metal			3	Fragments, heavily corroded, roughly round cross section, one possible head	Fragments of long nail(s)

Date Recorded	Site	Test Pit	Spit	Depth (mm)	Material	Type	Colour	Quantity	Features/Description	Comments/Interpretation
22/06/2016	Beresfield 4	TP1 (B)	1	Surface	Ceramic	Stoneware	White	1	White glaze on both sides, blue transfer print design present on one side	Too small to determine original item
22/06/2016	Beresfield 4	TP1 (B)	5	200-250	Glass		Light green	1	Small undiagnostic fragment	
22/06/2016	Beresfield 4	TP1 (B)	5	200-250	Ceramic	Stoneware	White	1	Blue transfer printed fragment, design on the inside of the vessel, partial base and footing, glazed white	
22/06/2016	Beresfield 4	TP1 (B)	5	200-250	Ceramic	Stoneware	White	1	Fragment, white glazed with blue transfer print on both sides	Too small to determine original item
22/06/2016	Beresfield 4	TP1 (B)	5	200-250	Ceramic	Stoneware	White	1	Fragment of vessel handle, slightly curved, white glazed with dark blue/black transfer print of the outside of the handle	Too small to determine original item
22/06/2016	Beresfield 4	TP1 (B)	6	250-300	Glass	Bottle	Olive green	2	Non-diagnostic fragments	
05/07/2016	Beresfield 4	TP9	4	300-400	Glass	Bottle	Clear	1	Fragment, fluted thick glass bottle	Bottle - Coca-cola (?)
05/07/2016	Beresfield 4	TP9	4	300-400	Ceramic	Stoneware	White	5	Fragments, transfer print (1 red, 4 blue), 2 pc flow blue transfer.	Dining ware, flow blue popular 1840s-1870s
05/07/2016	Beresfield 4	TP9	4	300-400	Glass	Ornament	Clear	1	Lip or base, some deformation	Glass jug or bowl
							TOTAL	**90**		

Appendix B – Research design and methodology for archaeological heritage items

Item 3: Glenrowan Homestead

The following Archaeological Research Design (ARD) identifies relevant historical themes to formulate appropriate research questions, which guide the strategy and archaeological methods employed during the investigation.

Historical themes

Table B-1 outlines historical themes, as identified by the NSW Heritage Council (2001), relevant to Glenrowan Homestead.

Table B-1 Historical themes relevant to the Glenrowan Homestead site

National theme	NSW theme	Local theme	Examples
Economy-Developing local, regional and national economies	Pastoralism	Activities associated with the breeding, raising, processing and distribution of livestock for human use	Pastoral station, shearing shed, slaughter yard, stud book, photos of prize-winning stock, homestead, pastoral landscape, common, fencing, grassland, well, water trough, freezer, boat shipwreck, wood store.
Developing Australia's cultural life	Domestic life	Activities associated with creating, maintaining, living in and working around houses and institutions	Domestic artefact scatter, kitchen furnishings, bed, clothing, garden tools, shed, arrangement of interior rooms, kitchen garden, pet grave, chicken coop, home office, road camp, barrack, asylum.

Research framework

The main aim of the archaeological salvage would be identifying the types of artefacts and the extent of the artefact scatter within the landscape. The proportion of the site that will be investigated is currently unknown but it is intended that the concentration of the dumped items in the vicinity of SC1 will be investigated. The excavation will be carried out to determine the extent of the artefact scatter found at SC1, inside the construction footprint. The following research questions are relevant to the construction footprint and would guide the strategy and archaeological methods employed during the salvage investigation:

- What stratigraphic sequences, if any, are represented at the site?
- What distance does the artefact scatter extend to?
- Does the assemblage indicate the area was used for discard over a short time or over a longer period of time?
- How many artefact fragments were recovered from the excavation of the site?
- How are these items distributed spatially and are there particular concentrations of artefacts within the slope area?
- What types and quantities of major artefact groups were recovered? These are likely to include architectural items, domestic tablewares and glass bottles, munitions, clay tobacco pipes, and tools.
- What are the Minimum Number of Vessel (MNV) counts for household ceramic and glass objects, and other relevant artefact types?
- How much diversity of form is there within each of these artefact groups?
- Can a relationship to the Glenrowan Homestead be established through the archaeological evidence?
- What activities were people doing here and why?
- Does the assemblage reflect any social/economic status of the people in the area at the time?

General strategy and approach

The aim of the archaeological work is to mitigate the impact of construction works on the physical remains of the artefact scatter. As the full extent of the site is currently unknown, the excavation will focus on identifying the extent of the artefact scatter within the area of archaeological potential, as this area is located within the construction footprint and likely to be impacted by the project. The excavation will also investigate the higher concentrations of artefacts located near SC1, as outlined previously in **Section 5.3.1**. There is unlikely to be any building features present and the remains are likely to be those associated with a late 19th century rubbish dump.

The following methodology is based upon the project description and also takes into consideration the proposed Aboriginal archaeological salvage methodology. Further details can be found in the Aboriginal Cultural Heritage Assessment Report (refer to Appendix L of the EIS). Should the proposed Aboriginal archaeological salvage methodology change, then the below methodology will require review and update where necessary.

As the majority of artefacts were located within the top 100 millimetres from the ground surface, manual hand excavation would be carried out in order to clarify, investigate and record the feature/deposit. Deposits will be manually excavated with trowels in five centimetre units, following cultural horizons where possible. Excavation units (contexts) will be recorded in a single running sequence. If any features are encountered, they will be planned to scale and photographed in situ using standard photography.

A series of one by one metre test trenches would be excavated at the site next to SC1. These will be excavated in a radial direction (excluding south) from SC1 to follow the artefact scatter from its known location across the slope. If artefacts are recovered from these trenches, additional trenches will be extended only as far as the boundary of the area of archaeological potential (as shown in **Figure B-1**) until no further artefacts are recovered from deposits or there is a very low density of non-diagnostic artefact fragments (less than 5 artefact fragments per square metre) (**Figure B-1**). Where the presence of dangerous materials (typically asbestos cement sheeting) or suspected soil contamination is identified, excavation will cease and the Excavation Director will seek advice as to whether it is safe to proceed with the excavation.

All deposits will be sieved through a set of nested ten millimetre, six millimetre and three millimetres sieves (or similar arrangement). Artefacts will not be point-provenienced but will be bulk bagged according to type within each feature, context or grid square.

As an Aboriginal archaeological salvage excavation is proposed for an area within the historical curtilage of the Glenrowan Homestead (at Aboriginal sites Beresfield 4 (38-4-0837 / Glenrowan (38-430358), both the Aboriginal and non-Aboriginal salvage will occur together and will be guided by the) Archaeological Assessment Guidelines (NSW Heritage Office 1996a), Historical Archaeology Code of Practice (Heritage Council of NSW and Department of Planning 2006), Assessing Significance for Historical Archaeological Sites and 'Relics' (NSW Heritage Branch 2009) and Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011). The excavation will be supervised by a suitably qualified archaeologist (i.e. must meet the Heritage NSW's Excavation Director criteria) and have the minimum qualifications for anyone undertaking archaeological investigation under the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW. Refer to Aboriginal Cultural Heritage Assessment Report (Appendix L of the EIS) for details of Aboriginal salvage excavation methodology.

Excavation methods

Standard archaeological excavation and recording methods would be adopted during the investigation. These include undertaking the following tasks:

- A survey datum would be established in order to record the levels of extant deposits and features
- Vegetation and grass would be removed using hand tools. Spoil from excavation would be placed next to the trenches so that they can be backfilled and the site restored on completion of the excavation
- After the removal of grass and topsoil manual excavation and recording of deposits would be carried out in reverse order of deposition to either the surface of significant archaeological features or deposits or culturally sterile clay, or as advised by the Excavation Director during works
- Scaled site plans and profile or cross-section drawings showing the location of all archaeological deposits and features revealed by excavation would be prepared, as required. These would be keyed to the site datum
- Photographic recording of all phases of the work on site would be carried out. This would involve recording of archaeological features using an appropriate photographic scale
- A standard context recording system would be employed, namely the location, dimensions and characteristics of all archaeological features and deposits would be recorded on sequentially numbered proforma context recording sheets. This form of written documentation would be supplemented by preparation of a Harris Matrix showing the stratigraphic relationships between features and deposits
- Historical artefacts retained for analysis would be cleaned off site, sorted according to their fabric classes, bagged and boxed with reference to the context from which they were recovered
- Excavation would be conducted until site clearance is achieved to the satisfaction of the Excavation Director in accordance with the limitations related to the defined area of archaeological potential and the density of artefacts in the General Strategy and Approach.

Post-excavation analysis

Historical artefacts recovered during test and salvage excavation would be catalogued and analysed for presentation and inclusion in an excavation report.

Artefact processing would be carried out off site, as follows:

- Artefacts would be cleaned and dried
- Artefacts would then be divided into categories according to their type and fabric and in the case of glass and ceramics, by colour. These would be further divided into those which are non-diagnostic and those which require more close consideration
- Non-diagnostic artefacts such as unmarked broken glass, shells, small wooden fragments, metal fragments etc. would be weighed and recorded, then discarded
- Remaining artefacts would be retained for analysis and research.

Post-excavation analysis of artefacts recovered during excavation would be carried out in a suitable secure location by a suitably qualified artefact specialist, such as an archaeologist with extensive artefact analysis experience, or an archaeological conservator.

Once post-excavation analysis of artefacts is complete Transport must liaise with local museums and/or historical societies to arrange a long term secure artefact repository for the artefact assemblage. Once that arrangement has been made, Heritage NSW must be notified for their records. In the short term, Transport must provide secure short term storage for the assemblage.

The excavation team

It is suggested that the excavation team would be comprised of an Excavation Director, two assistant archaeologists and an experienced site planner. The nominated Excavation Director would be a suitably qualified person who fulfils the requirements of Heritage NSW's Excavation Director Criteria to conduct test excavation of a locally significant archaeological site.

Reporting

Once archaeological monitoring and post-excavation analyses are complete an excavation report would be prepared by the Excavation Director or delegate. The report would present the results of the investigation, address the research questions listed above and include a revised significance assessment for the Glenrowan Homestead, if required due to the results of the excavation.

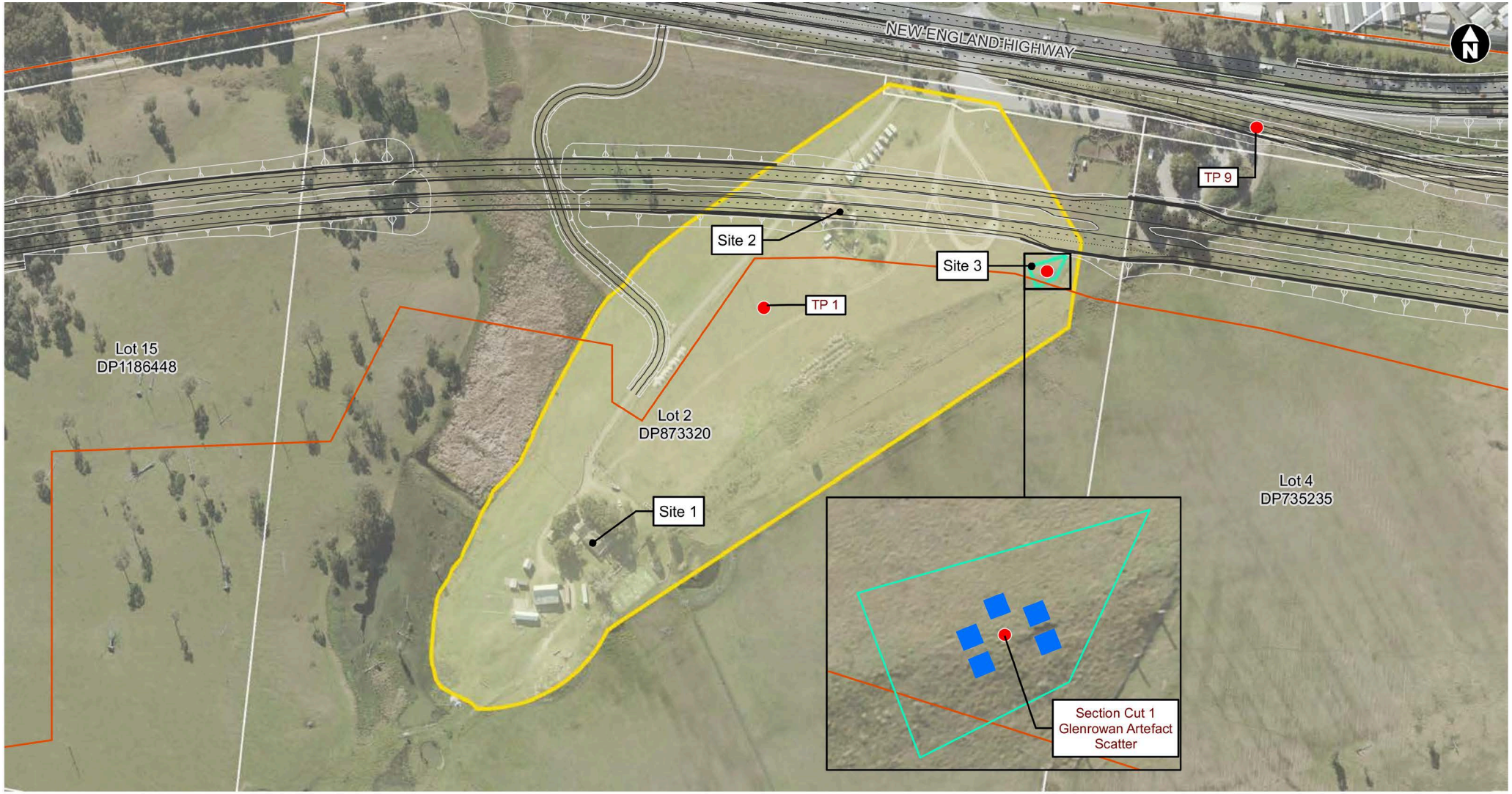

Figure B-1 Plan showing proposed test trench locations (in blue) at the Glenrowan Homestead

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