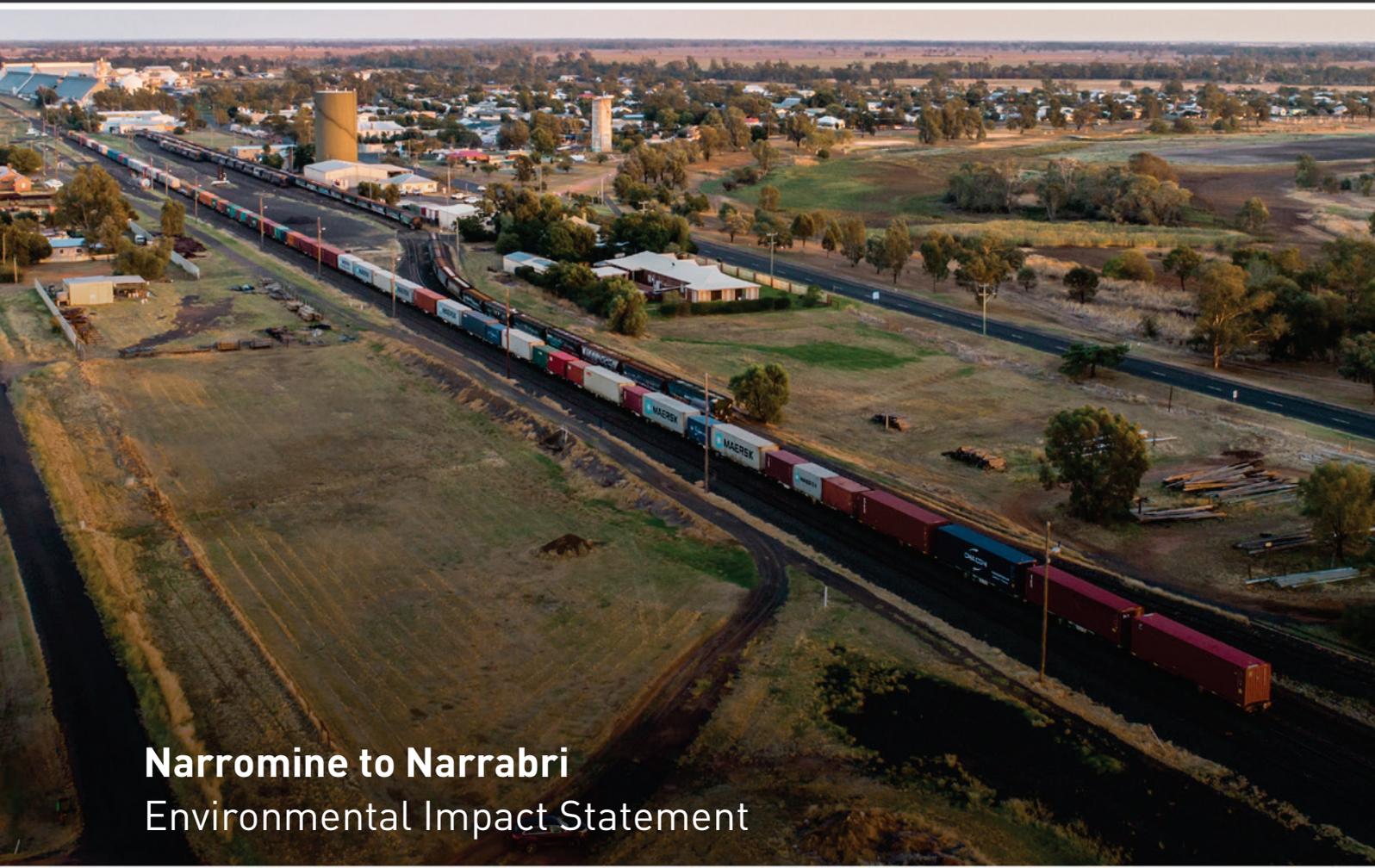


PART B

Impact assessment
proposal infrastructure



CHAPTER B7 Non-Aboriginal heritage



Narromine to Narrabri
Environmental Impact Statement



The Australian Government is delivering
Inland Rail through the Australian
Rail Track Corporation (ARTC), in
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B7. Non-Aboriginal heritage

This chapter provides a summary of the potential impacts of the proposal on non-Aboriginal heritage. A full copy of the assessment results is provided in Technical Report 7—non-Aboriginal heritage assessment and statement of heritage impact.

B7.1 Approach

A summary of the approach to the assessment is provided in this section, including the legislation, guidelines and/or policies driving the approach and the methodology used to undertake the assessment. A more detailed description of the approach and methodology is provided in Technical Report 7.

B7.1.1 Legislative and policy context to the assessment

Relevant legislation, policies and guidelines

The assessment was undertaken in accordance with the SEARs and with reference to the requirements of relevant legislation, policies and/or assessment guidelines, including:

- ▶ The EP&A Act, *Heritage Act 1977* (NSW) (Heritage Act) and EPBC Act
- ▶ *Assessing Heritage Significance* (NSW Heritage Office, 2001)
- ▶ *Statements of Heritage Impact* (NSW Heritage Office, 2002)
- ▶ *Historical Archaeology Code of Practice* (NSW Heritage Office, 2006)
- ▶ *Assessing Significance for Historical Archaeological Sites and Relics* (NSW Heritage Division, Department of Planning, 2009)
- ▶ *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance* (Australia ICOMOS, 2013) (the Burra Charter).

Secretary's Environmental Assessment Requirements

The SEARs relevant to non-Aboriginal heritage, together with a reference to where they are addressed in the EIS, are provided in Appendix A.

B7.1.2 Methodology

Study area

During the early phases of proposal development, a 2-kilometre (km) wide investigation corridor was established to allow environmental constraints (including heritage constraints) to be identified and inform route option analysis. For site surveys, an investigation corridor about 1 km wide was used. The study area for the non-Aboriginal heritage impact assessment included the proposal site (described in chapter A2), in relation to the proposal for direct impacts, and a 500-metre (m) wide buffer around the proposal site in relation to the potential for impacts on heritage items, as a consequence of works undertaken within the proposal site.

Key tasks

The assessment involved:

- ▶ Historical research, including a review of relevant reports, maps, plans, historical records and conservation management plans
- ▶ Searching statutory and other heritage lists and databases (see below) to identify whether any listed heritage items are located within or in the vicinity of the proposal site
- ▶ Reviewing the proposal description and plans
- ▶ A site survey (see below) and photographic inventory
- ▶ Consultation with local historical societies
- ▶ Assessing the potential impacts of the proposal on listed and potential heritage items in accordance with the guidelines listed in section B7.1.1

- ▶ Identification of areas of archaeological potential
- ▶ Preparing the non-Aboriginal heritage assessment and statement of heritage impact (Technical Report 7), in accordance with the guidelines listed in section B7.1.1.

Potential impacts on non-Aboriginal heritage were assessed based on impacts on the significance of a heritage item as a result of:

- ▶ Direct (physical) impacts—caused by removing or altering the item or fabric of heritage significance or excavating in areas of archaeological potential
- ▶ Potential direct impacts—incidental physical impacts from construction activities (such as damage as a result of the movement of construction machinery or vibration impacts)
- ▶ Indirect (visual) impacts—impacts on a heritage item or its surroundings (where the surroundings contribute significantly to heritage values) as a result of works outside the boundary of an item.

The level of impact on the heritage significance of each heritage item was assessed using the definitions in Table B7.1.

TABLE B7.1 DEFINITIONS OF LEVEL OF IMPACT ON HERITAGE ITEM

Level of impact	Scale	Intensity	Duration/frequency
Major	Medium to large	Moderate to high	Permanent, irreversible
Moderate	Small to medium	Moderate	Medium to 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 can be prevented through implementation of management measures (e.g. reduction of vibration).		

The main potential for direct and potential direct impacts would occur during construction. These potential impacts are considered in section B7.3.

The potential for indirect (visual) impacts is generally associated with operational infrastructure and the permanent changes to landscape and setting that would occur during operation. These potential impacts are considered in section B7.4.

Heritage lists and databases

The following heritage lists and databases were searched in February 2020:

- ▶ World Heritage List
- ▶ Australian heritage lists (under the EPBC Act):
 - ▶ National Heritage List
 - ▶ Commonwealth Heritage List.
- ▶ Register of the National Estate (it is noted that this is an archival list and is not a statutory heritage register)
- ▶ NSW heritage lists (under the Heritage Act):
 - ▶ NSW State Heritage Register
 - ▶ Section 170 NSW Government agency heritage and conservation registers.
- ▶ Local heritage lists under the local environmental plans that apply to the study area—*Coonamble Local Environmental Plan 2011* (Coonamble LEP), *Gilgandra Local Environmental Plan 2011* (Gilgandra LEP), *Narrabri Local Environmental Plan 2012* (Narrabri LEP), *Narromine Local Environmental Plan 2011* (Narromine LEP) and the *Warrumbungle Local Environmental Plan 2013* (Warrumbungle LEP).

Site survey

A site survey of known and potential heritage items was completed for publicly accessible areas within the 1 km investigation corridor (which included the proposal site) between 29 January 2019 and 1 February 2019. Where access to the investigation corridor was not available, desktop assessments of known and potential heritage items were undertaken using aerial sources such as Google Earth and Google maps.

The aim of the site survey was to inspect and record the location, nature, and current condition of listed heritage items/sites identified during the database and literature review, and to identify any potential heritage items. Additional targeted field surveys were undertaken in July 2019 and October 2019 to investigate the presence of known and potential heritage items in the vicinity of the proposed borrow pits.

B7.1.3 Risks identified

The environmental risk assessment for the proposal (see Appendix E) included consideration of potential non-Aboriginal heritage risks. Non-Aboriginal risks, with an overall assessed risk rating of medium or above, identified by the environmental risk assessment, included:

- ▶ Potential direct impacts on the two heritage-listed sites located partially within the proposal site and any potential heritage items located within/near the proposal site
- ▶ Impacts on heritage items from vibration during construction and operation
- ▶ Visual impacts on heritage items located close to the proposal site.

The non-Aboriginal heritage assessment considered the potential risks identified by the environmental risk assessment, in addition to potential risks and impacts identified by the scoping report (see section A9.1), the SEARs and relevant guidelines and policies (as appropriate).

B7.1.4 How potential impacts have been avoided/minimised

The shortlist of route options for the proposal (see section A6.2) was subject to a detailed assessment that included assessment of a broad study area to identify key constraints early in the design process and assist with avoiding and minimising impacts, including impacts on non-Aboriginal heritage items, as far as practicable.

B7.2 Existing environment

B7.2.1 Heritage context

A summary of the non-Aboriginal historical context and existing non-Aboriginal heritage features of the study area is provided in this section.

Exploration

The region was first surveyed by John Oxley (Surveyor General of NSW) in 1818. Arriving in Narromine in June 1818, the survey team followed the Macquarie River, heading west until it reached Macquarie Marshes before turning east towards the Pilliga. The team then moved on to Port Macquarie, discovering the Castlereagh, Peel and Hastings rivers along the way.

A decade later, in 1828, Captain Charles Sturt and fellow explorer, Hamilton Hume received permission to trace the course of the Macquarie River, with the idea of discovering an inland sea. They completed separate expeditions of the Macquarie River, to Macquarie Marshes and Bogan River.

In 1831, Thomas Mitchell (Surveyor General from 1828) further explored the region, including the Namoi, Gwydir and Macintyre rivers. The surveys identified flat lands between the Liverpool Range and Pilliga Scrub that were considered to be fertile and well-watered. This area was identified as the Darling Plains Region.

Grazing and agriculture

Following identification of the Darling Plains by the early explorers, squatters, and then pastoralists, began bringing their cattle and sheep to western NSW to graze. Mitchell's expedition route became the basic supply route into and out of the region.

During the 1840s, the area was characterised by squatting activity that made use of large pastoral runs for grazing. Over time, some of the areas taken up by squatters went on to become large pastoral properties or stations that gave their names to localities in the region. These included Narramine Station (now Narromine), Curban run (now Curban), Barradean (now Baradine), Mount Tenandra homestead and Narrabri run (now Narrabri).

In the 1860s, a series of reforms were introduced that were designed to break the squatters' hold on the large parcels of land they had assumed. This new legislation, including the *Crown Lands Alienation Act 1861* (NSW) and the *Crown Lands Occupation Act 1861* (NSW), marked the end of the domination of land tenure by squatters and the area was divided up into smaller parcels of land.

Wheat growing began around Narrabri in 1873. The major agricultural pursuits in the area included wool, wheat and cotton growing, with oats in the east, oil and fodder grains elsewhere.

Travelling stock reserves

One of the activities associated with large pastoral stations was the movement of stock from one place to another, i.e. from grazing lands to markets or to shearing sheds. Originally, the movement of stock required what was known as a long paddock but eventually these developed into a network of travelling stock reserves. These reserves typically followed waterways and may have followed traditional Aboriginal pathways. Over time, travelling stock reserves were surveyed, notified and gazetted, resulting in a network of these reserves across the eastern seaboard.

Forestry

The initial impression of the Pilliga by Oxley in 1818 was that it was scrub land with little value, although it did have a number of new plants. Initially, the plains around what is now identified as the Pilliga was used by squatters for grazing, but some smaller backblocks or outstations were developed in the Pilliga itself.

Forestry operations began operating in the mid to late-19th century, with a number of sawmills and campsites springing up in and around the Pilliga. With the coming of the railway to the district in the second half of the 19th century, sleeper-cutters also sourced their timber from the Pilliga, particularly ironbark, and established small, temporary camps for those activities, such as that at Plumb's Well.

B7.2.2 Heritage-listed items and sites

Six locally listed heritage sites/items are located in the study area for the heritage assessment; however, only two sites/items (see Table B7.2) are located (partially) within the proposal site. All other items are located more than 200 metres (m) from the proposal site.

Representative photographs of the listed items within the proposal site are provided at Figure B7.1 and Figure B7.2. The location of these items is shown in Figure B7.3.

Further information on these items, and other listed items within the study area, is provided in Technical Report 7.

TABLE B7.2 HERITAGE-LISTED ITEMS WITHIN THE PROPOSAL SITE

Item name	Listing	Description	Heritage significance	Location with respect to proposal site
Woodvale Park Private Cemetery	Gilgandra LEP (heritage-listed item)	The item is located on the north-east corner of the Castlereagh Highway and National Park Road, within the Woodvale Park property at Curban. The entry on the State heritage inventory, indicates there are five graves dating from 1877 to 1893 in this location. The listing states that the graves are located within a star picket fence (see Figure B7.1); however, there was no access to the site during the field survey to confirm the location of the graves within the site.	Historical, associative, representativeness	Partially within proposal site The location of graves would be confirmed prior to construction (see section B7.5.2)
Curban Inn site	Gilgandra LEP (listed archaeological site)	The site is located on high level ground to the north of the Castlereagh River, the west of Terrabile Creek, and to the south of East Coonamble Road at Curban. There are no remaining built elements on the site. The location of the inn is presumed to be beneath a large stand of aloe plants (see Figure B7.2).	Historical, research potential, representativeness	Partially within proposal site



FIGURE B7.1 **WOODVALE PARK PRIVATE CEMETERY**



FIGURE B7.2 **CURBAN INN SITE**

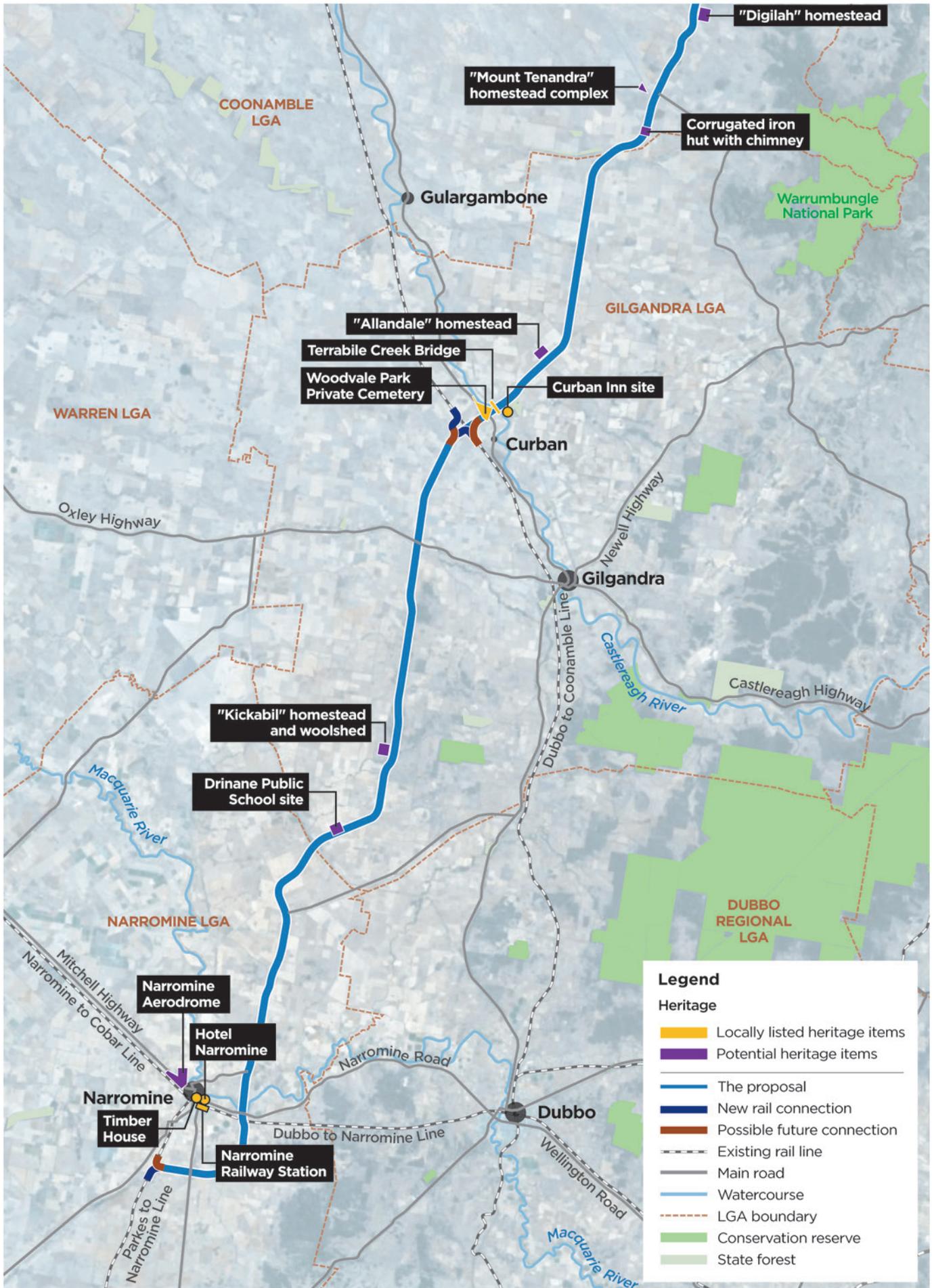
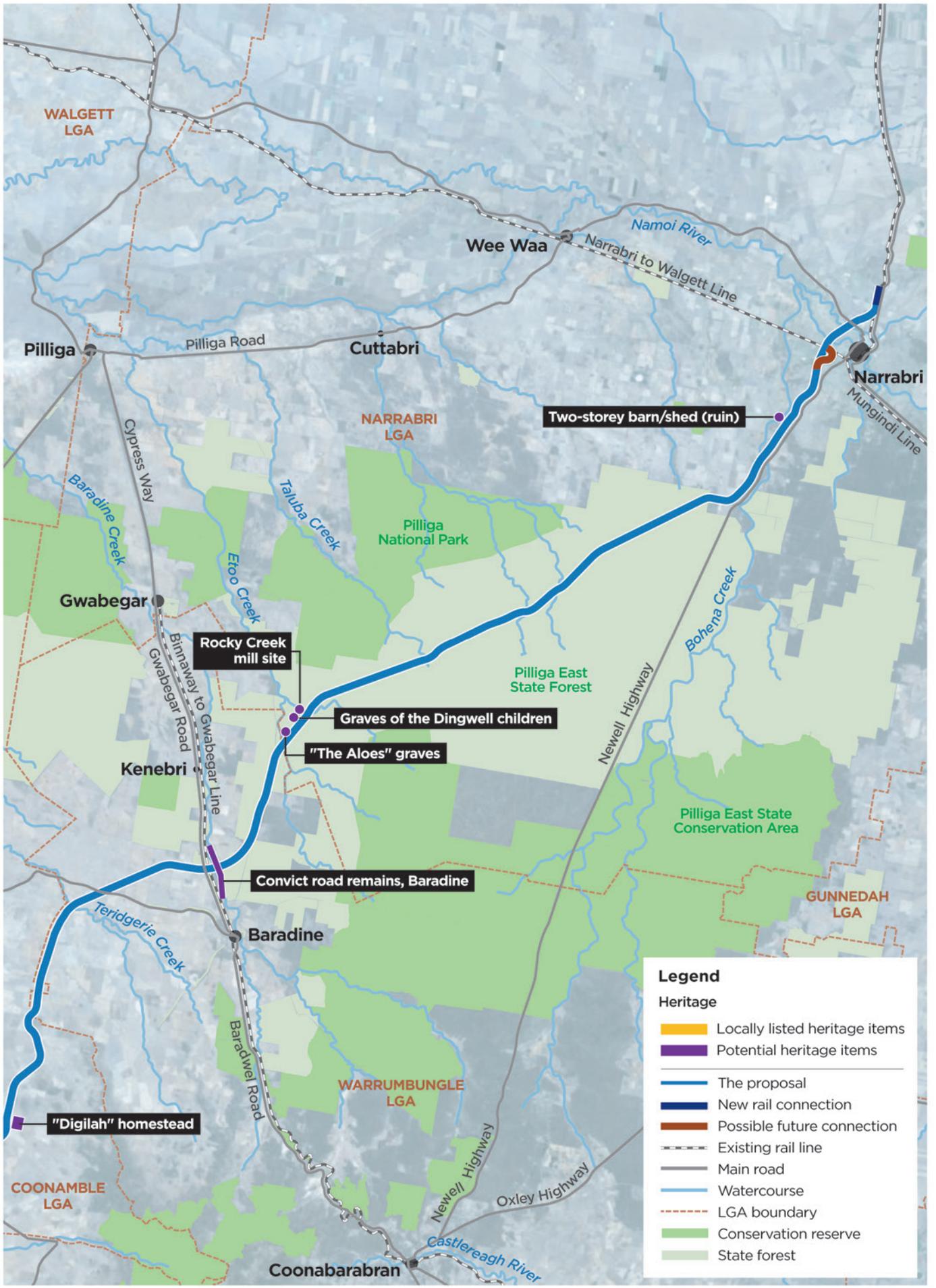


Figure B7.3 Listed and potential heritage items (map 1)



Legend

Heritage

- Locally listed heritage items
- Potential heritage items

- The proposal
- New rail connection
- Possible future connection
- Existing rail line
- Main road
- Watercourse
- LGA boundary
- Conservation reserve
- State forest



Figure B7.3 Listed and potential heritage items (map 2)

B7.2.3 Potential heritage items

The assessment identified a number of potential heritage items within the study area. A summary of those items that are located within/close to the proposal site is provided in Table B7.3. All items have been identified as having local heritage potential. The full assessments of significance for these items are provided in section 6 of Technical Report 7.

The locations of potential heritage items are shown in Figure B7.3.

TABLE B7.3 POTENTIAL HERITAGE ITEMS WITHIN AND ADJACENT TO THE PROPOSAL SITE

Item name	Item location and description	Heritage significance	Location with respect to proposal site
Drinane Public School (former)	The site is located on the northern side of Old Mill Road, Drinane. Two of the remaining public school buildings are located on the property boundary facing away from the road. A tennis court/playground adjoins the buildings. At least two other buildings were noted further north away from the road.	Historical, rarity, representativeness	Curtilage is partially within the proposal site. Buildings are located within the proposal site.
'Kickabil' homestead and woolshed	The item is located on the north-east side of Kickabil Road, Kickabil. It is a plain, single-fronted weatherboard building with a hipped, corrugated iron roof. The frontage is aligned with Kickabil Road, suggesting its date of construction was at the time of construction of the road or later. The woolshed is located opposite the homestead. It is a rectangular, corrugated iron shed oriented north-south and is parallel with old properties boundaries.	Historical, representativeness	Curtilage is partially within the proposal site. Homestead is located 50 m from the proposal site. Woolshed is located 75 m from the proposal site.
'Allandale' homestead	The item located on the western side of National Park Road, Curban. The 'Allandale' homestead is consistent with a late 19 th /early 20 th century rural homestead. It is of weatherboard construction with a Dutch gabled iron roof and wraparound veranda.	Historical, rarity, representativeness	Curtilage is partially within the proposal site. Homestead is located 10 m from the proposal site.
Corrugated iron hut with chimney	The item is located at Weenya Road, Mount Tenandra. The corrugated iron hut is a classic example of a rural dwelling or workers hut.	Historical	Within proposal site
'Digilah' homestead	The item is located at Goorianawa Road, Black Hollow. Aerial photographs show a roofline consistent with a 19 th century homestead, with a number of various outbuildings. Private property access was not possible at the time of the site visit and the property was therefore not visited, nor was it visible from the road.	Historical	Curtilage is partially within the proposal site. Homestead is located 370 m from the proposal site.
Convict road, Baradine	The former convict road is located about 7 km north west of the town of Baradine, on the eastern side of the Gwabegar–Baradine Road. The former convict road comprises worked stone placed together to form a surface. It is about 3 m wide and about 600 m long, with about 100 m of original fabric of the former road visible. Parts of the convict road are within the alignment of a modern dirt track. Wheel ruts are visible on the stone's surface. The alignment is still visible to the north and south of the extant road surface.	Historical, associative, creative/technical, rarity and representativeness	Partially within the proposal site

Item name	Item location and description	Heritage significance	Location with respect to proposal site
'The Aloes' homestead site and graves	<p>'The Aloes' homestead site was occupied from the mid-19th century through to the 20th century. The main uses were as a sheep and cattle station, and as an outpost of the larger Cumbil pastoral station.</p> <p>The former homestead site is located in the Euligal State Forest and is currently a picnic area. It is located around 520 m west of the proposal site.</p> <p>There are no surface remains of the homestead; however, two water tanks, a septic tank and a windmill remain.</p> <p>Three graves associated with 'The Aloes' are located about 200 m to the east of the homestead site and about 35 m from the proposal site.</p> <p>It is believed that at least one of the graves is a convict burial and the other at least one member of the Cormie family. The cut pine logs surrounding the grave are not the original grave surrounds. They were placed by Forestry NSW following a bushfire in the 1990s.</p>	Historical, social, research potential	Graves are located 35 m from the proposal site
Rocky Creek Mill site	<p>This site covers a large area (about 12 hectares (ha)) located on both sides of The Pilliga Forest Way in the Euligal State Forest. The majority of the site is located on the western side of The Pilliga Forest Way and south of Rocky Creek. Part of the site is currently used as a picnic area.</p> <p>The site was originally used as a pastoral run in the 1860s and became a forestry sawmill in the 1950s. Although there is little evidence of structures remaining across the site there is an abundance of surface artefacts relating to the sawmill and workers' camp phase and some ash mounds remain. The site is associated with the Graves of the Dingwell children, described below.</p>	Historical, associative, research potential, representativeness	Immediately adjacent to the proposal site (within 9 m)
Graves of the Dingwell children	<p>The graves of the Dingwell children, who died in the 1890s, are located on the eastern side of the Pilliga Forest Way, about 150 m south of the intersection with Coxes Road.</p>	Historical, research potential	Within proposal site
Two storey barn/shed, Bohena Creek	<p>This structure is located on the western bank of Bohena Creek, a short distance north of the intersection with Cains Crossing Road, Bohena Creek, wholly within the proposal site.</p> <p>The structure appeared to be of wooden construction with a corrugated iron roof. Wooden palings were missing from the walls and the roof appeared to have been caved in. Its size, however, suggests that the building may have been of some importance when in use. Some historical sources note at least one sawmill and one 'assessment camp' on the western side of Bohena Creek; however, this two-storey barn/shed is as yet unidentified.</p>	Historical	Within proposal site

B7.2.4 Archaeological potential

Table B7.4 provides a summary of the sites and locations identified as having archaeological potential. These are associated with the listed and potential heritage items in Table B7.2 and Table B7.3.

TABLE B7.4 SITE OF ARCHAEOLOGICAL POTENTIAL

Site	Nature of archaeological potential	Assessment of level of archaeological potential	Location with respect to proposal site
Woodvale Park private cemetery	The potential exists for unmarked graves within the site extent	The archaeological potential is assessed high	Partially within proposal site
Curban Inn site	This site is listed on the Gilgandra LEP as an archaeological site. Surface artefacts were noted in an adjacent track; however, extensive vegetation cover prevented a comprehensive assessment of subsurface potential. Some glass and ceramic artefacts were noted in the track, as were a group of three milky quartz Aboriginal artefacts.	The archaeological potential is assessed as high	Partially within proposal site
Convict Road, Baradine	Remains of possible convict-built road comprising worked stone placed together to form road surface. The archaeological research potential may help determine if the road was laid by convicts to mitigate a boggy section of the road, or if it represents a later macadamised road surface.	There is considered to be a moderate archaeological research potential	Partially within proposal site
'The Aloes' homestead site and graves	Remains of the homestead and other domestic remains, as well as those associated with the pastoral operations. Surface artefacts in the form of hand-cut nails and blue and white transferware were noted on the site, as well as two water tanks, a septic tank and a windmill.	As a result of the site's more recent use as a picnic area, the potential for subsurface artefacts to be present is assessed as moderate	The archaeological site is located about 520 m west of the proposal site
Rocky Creek Mill Site	Remains of mill/s, pastoral residence, other domestic habitation and industrial remains of mill operations conducted on the site. This site has surface and potential archaeological remains of both domestic and industrial remains of multiple dwellings, at least two mills and associated structures. Extensive habitation and industrial artefacts were noted across the site, as well as the limited remains of structures.	The size of the site and extent of surface remains means the site's overall potential for subsurface artefacts is assessed as very high	Adjacent to proposal site, on opposite side of Pilliga Forest Way
Graves of the Dingwell children	The integrity of the presence of human remains or other burial remains at the site is unknown. The site has some potential for research into burial practices and human disease and mortality in isolated frontier communities.	The archaeological potential is assessed as high	Within the proposal site

B7.3 Impact assessment—construction

B7.3.1 Direct (physical) impact

The proposal would impact the listed items located partially within the proposal site. The proposal would also impact and/or have the potential to impact the potential heritage items located within/close to the proposal site. The potential impacts are summarised in Table B7.5. Measures to manage the key potential impacts identified are provided in section B7.5.

TABLE B7.5 SUMMARY OF EFFECTS ON HERITAGE SIGNIFICANCE OF DIRECT (PHYSICAL) HERITAGE IMPACTS

Item name	Proposed works affected item	Impact on heritage item	Impact on archaeological remains
Listed heritage sites (local)			
Woodvale Park Private Cemetery	Construction of rail infrastructure. Establishment of a compound and temporary access road to support construction of the proposed bridge over the Castlereagh River.	Construction of the rail infrastructure would involve direct impacts within the listed boundary of this item. Establishing and using the proposed compound and access road would also directly impact land within the listed boundary of the item. A compound needs to be provided in or around this location to support construction of the proposed bridge. Potential impacts of the compound could be minimised by refining the location and boundaries of the compound during the detailed design and construction planning phase to minimise impacts on the site as far as practicable. Once the location of the graves has been confirmed, they would be fenced to exclude access and delineated as a no-go area. No direct impacts on the graves are anticipated at this stage of the construction planning process. The overall impact to this item has been assessed as negligible .	The overall impact on potential archaeological remains has been assessed as negligible , assuming the graves are able to be avoided.
Curban Inn site	Realignment of East Coonamble Road, Curban	The proposed road realignment could potentially extend into the northern boundary of the Curban Inn site, which would disturb the site and require removal of any archaeological items located in the area of disturbance. This potential impact may be able to be avoided by refining the location of the realignment during the detailed design phase to avoid impacts on the site.	The overall impact on potential archaeological remains associated with the item has been assessed as minor
Potential heritage sites			
Drinane Public School (former)	Construction of rail infrastructure	The proposal would require removal of the two buildings adjacent to Old Mill Road. Archival recording of the site and buildings would be undertaken. The overall impact has been assessed as major .	No archaeological potential identified

Item name	Proposed works affected item	Impact on heritage item	Impact on archaeological remains
'Kickabil' homestead and woolshed	Realignment of overhead utilities	<p>Realignment of the overhead utilities would be a direct impact within the heritage curtilage. This would not affect the heritage significance of the item.</p> <p>If inadequately managed, the realignment works, including movement of machinery and vehicles, may impact buildings close to the works. Standard construction measures (such as fencing and exclusion zones) would be implemented to manage this risk.</p> <p>The overall impact has been assessed as negligible.</p>	No archaeological potential identified
'Allandale' homestead	Utilities adjustments	<p>Utility adjustments would involve direct impacts within the curtilage of this item but would not directly impact the homestead building or other buildings with potential heritage significance.</p> <p>If inadequately managed, the realignment works, including movement of machinery and vehicles, may impact buildings close to the works. Standard construction measures (such as fencing and exclusion zones) would be implemented to manage this risk.</p> <p>The overall impact has been assessed as negligible.</p>	No archaeological potential identified
Corrugated iron hut with chimney	Construction of rail infrastructure	<p>This item would be directly impacted by the proposal and would need to be removed.</p> <p>Archival recording of the site and building would be undertaken.</p> <p>The overall impact has been assessed as major.</p>	No archaeological potential identified
'Digilah' homestead	Construction of rail infrastructure	<p>Construction of the rail infrastructure would involve direct impacts within the curtilage of this item; however, the key heritage buildings associated with the item, including the main homestead building, are more than 350 m east of the proposal site. The impacts within the curtilage would not affect the significance of the heritage item.</p> <p>The overall impact has been assessed as negligible.</p>	No archaeological potential identified
Convict road, Baradine	Construction of rail infrastructure Establishment of a construction compound	<p>Construction of the rail infrastructure would directly impact about 55 m of the convict road. The proposed archaeological investigation (see section B7.5) would recover as much site data as possible, with the bulk of the site protected from disturbance.</p> <p>A section of the road would also be located adjacent to the proposed location of a compound. Potential impacts associated with use of the compound could be avoided by standard construction measures (such as fencing and exclusion zones).</p> <p>The overall impact has been assessed as minor.</p>	The overall impact on potential archaeological remains associated with the item has been assessed as minor .
'The Aloes' homestead site and graves	Construction of rail infrastructure	<p>There is the potential that the log fence marking the graves has burnt down, which would leave them vulnerable to accidental damage during construction.</p> <p>Standard construction measures (such as fencing and exclusion zones) would be implemented to manage this risk.</p> <p>The overall impact has been assessed as negligible.</p>	The overall impact on potential archaeological remains associated with the item has been assessed as negligible .

Item name	Proposed works affected item	Impact on heritage item	Impact on archaeological remains
Rocky Creek Mill site	Adjacent to construction of rail infrastructure	The proposal would not directly impact this item. No potential direct impacts are anticipated. The overall impact has been assessed as negligible .	No impacts on potential archaeological remains are anticipated
Graves of the Dingwell children	Construction of rail infrastructure	This item would be directly impacted by the proposal and the graves would need to be removed from their existing location. The overall impact has been assessed as major .	The overall impact on archaeological remains would be major
Two storey barn/shed, Bohena Creek	Utilities relocation	It is likely that this item would be directly impacted by the works and would need to be removed. Archival recording of the site and building would be undertaken. The overall impact has been assessed as major .	No archaeological potential identified

B7.3.2 Other impacts

The potential for vibration impacts on heritage structures during construction was assessed by the construction noise and vibration assessment, and the results are provided in Technical Report 8—Noise and vibration—construction and other operations. The assessment concluded that construction vibration was not likely to cause structural damage beyond 35 m from vibration-intensive activities (such as bulldozers and vibratory rollers) or beyond 180 m from impact piling at bridges.

There are no heritage-listed structures within these distances. Most potential heritage structures that would not be removed as part of the proposal are located outside these distances. While three potential heritage structures are located within the construction footprint, no vibration-intensive activities would be undertaken near these structures; consequently, no vibration damage is expected during construction.

No other potential direct or visual impacts during construction were identified by the non-Aboriginal heritage assessment.

B7.4 Impact assessment—operation

B7.4.1 Visual impacts

The proposal would have indirect (visual) impacts on several potential heritage items, as a result of a permanent change in their setting, from the presence of new infrastructure and the movement of trains. The assessment concluded that the proposal would have the potential for a minor visual impact on these potential heritage items:

- ▶ 'Kickabil' homestead and woolshed
- ▶ 'Allandale' homestead
- ▶ 'Digilah' homestead.

No other operational impacts from rail or road infrastructure were identified.

B7.4.2 Other impacts

The potential for vibration impacts on heritage structures during operation was assessed by the operational noise and vibration assessment, and the results are provided in Technical Report 9—Noise and vibration—operational rail. The assessment concluded that there would be no measurable or perceptible ground-borne vibration from rail operations that would impact on heritage structures.

B7.5 Mitigation and management

B7.5.1 Approach

Approach to mitigation and management

Approach to managing the key potential impacts identified

A key approach to managing the potential for impacts is refining the design to avoid impacts on items, significant heritage fabric and archaeological remains, as far as reasonably practicable. For example, the assessment has identified that the construction footprint may affect the Curban Inn site at Curban. Opportunities to refine the location of the footprint and minimise/remove this potential impact would be investigated during detailed design. For other affected items and sites, impacts are unavoidable and would be managed by implementing the measures provided in Table B7.6.

For areas where potential impacts on archaeology have been identified, an archaeological assessment, research design and methodology would be prepared, and test excavation would be undertaken where the proposal site overlaps with the heritage item. Archaeological research designs provide an outline of the research framework for archaeological work onsite and the methodologies to be used to realise the research potential of a site.

The proposal would require the removal of the graves of the Dingwell children. Measures are included in Table B7.6 to ensure that removal of the graves and human skeletal remains is in accordance with relevant legislation and guidelines. Consideration would also be given to reburial and memorialisation of the human remains at a suitable location, determined in consultation with relevant stakeholders. A plan of management for exhuming and re-interring the remains would be developed in accordance with these requirements and included in the heritage management plan (see below).

Approach to managing other impacts

The potential for impacts during construction would be managed in accordance with a project-specific heritage management plan, which would be implemented as part of the CEMP. The plan would detail processes and responsibilities to minimise potential impacts on heritage during construction. Further information on the CEMP, including requirements for the heritage management plan, is provided in Appendix I.

Other mitigation measures are listed in Table B7.6.

Expected effectiveness

During development of the design, impacts on listed and potential heritage items were adopted, where practicable; however, not all impacts on heritage can be avoided, as this would result in additional impacts in other areas. Therefore, further measures to mitigate impacts are required. The measures provided in Table B7.6 have been identified as an outcome of the non-Aboriginal heritage assessment and through considering best-practice approaches to managing potential impacts, as defined by relevant heritage guidelines. The non-Aboriginal heritage assessment was prepared, and relevant mitigation measures identified, by a qualified heritage consultant. As a result, the measures are expected to be effective.

The proposal has been designed to provide an important piece of national infrastructure that would provide local, state and national benefits once operational. In the context of the strategic benefit of the overall proposal, it is considered that the identified heritage impacts are acceptable.

Interaction between measures

Measures to minimise the potential for vibration impacts (see chapter B8) and visual impacts (see chapter B13) would minimise the potential for indirect impacts as a result of the proposal.

B7.5.2 List of mitigation measures

Measures that will be implemented to address potential impacts on non-Aboriginal heritage are listed in Table B7.6.

TABLE B7.6 NON-ABORIGINAL HERITAGE MITIGATION MEASURES

Stage	Ref	Impact/issue	Mitigation measures
Detailed design/ pre-construction	NAH1	<i>Avoiding and minimising impacts on non-Aboriginal heritage</i>	<p>Detailed design and construction planning would avoid direct impacts on identified items/sites of non-Aboriginal heritage significance, as far as reasonably practicable. This would include small sections of the following listed items that overlap with the proposal site:</p> <ul style="list-style-type: none"> ▶ Curban Inn site ▶ Convict Road, Baradine. <p>The location of construction compounds and associated access routes would be reviewed to ensure, as far as practicable, they are not located in areas of medium or high archaeological potential.</p>
	NAH2	<i>Avoiding and minimising impacts on non-Aboriginal heritage</i>	<p>The location of the graves at the Woodvale Park Private Cemetery listed item would be confirmed by an appropriately qualified archaeologist. Once confirmed, the location would be marked on plans, fenced onsite, and avoided during construction.</p>
	NAH3	<i>Avoiding and minimising impacts on non-Aboriginal heritage</i>	<p>In the event that the following items are unable to be avoided, an archaeological assessment, research design and methodology would be prepared. Test excavation would be undertaken by an appropriately qualified Excavation Director, in accordance with the NSW Heritage Council's Excavation Director criteria:</p> <ul style="list-style-type: none"> ▶ Curban Inn site ▶ Convict Road, Baradine.
	NAH4	<i>Heritage interpretation</i>	<p>A heritage interpretation strategy for non-Aboriginal heritage would be prepared. This would provide a framework for interpreting the heritage items (listed and potential) impacted by the proposal, set out the key interpretative themes and identify communication strategies.</p> <p>The strategy would include interpretation requirements for specific parts of the proposal, particularly where heritage items are proposed to be removed or archaeological sites are proposed to be excavated. These may include approaches such as interpretive signage at heritage items that have been removed or excavated, historical/artefact displays at local museums or visitor centres, and online media about heritage items and history in the vicinity of the proposal.</p> <p>The strategy would be prepared with regard to <i>Interpreting Heritage Places and Items: Guidelines</i> (NSW Heritage Office, 2005), and the NSW Heritage Council's <i>Heritage Interpretation Policy</i> (NSW Heritage Office, 2005).</p>
	NAH5	<i>Archival recording</i>	<p>Archival photographic recording of buildings to be removed would be carried out prior to removal in accordance with <i>Photographic Recording of Heritage Items Using Film or Digital Capture</i> (Heritage Council of NSW, 2006) and <i>How to prepare archival records of heritage items</i> (NSW Heritage Office, 1998a) at the following sites:</p> <ul style="list-style-type: none"> ▶ Drinane Public School (former) ▶ Corrugated iron hut with chimney ▶ Two-storey barn/shed.

Stage	Ref	Impact/issue	Mitigation measures
Detailed design/ pre-construction (continued)	NAH6	<i>Graves of the Dingwell children</i>	<p>Graves and human skeletal remains at the graves of the Dingwell children would be managed in accordance with the requirements of relevant legislation and guidelines, including the Public Health Regulation 2012 (NSW), <i>Heritage Act 1977</i> (NSW), <i>Work Health and Safety Act 2011</i> (NSW), NSW Health Procedures <i>Exhumation of human remains</i> (NSW Department of Health, 2013), and <i>Skeletal Remains—Guidelines for the Management of Human Skeletal Remains under the Heritage Act 1977</i> (NSW Heritage Office, 1998b).</p> <p>A plan of management for exhuming and re-interring the graves would be developed in accordance with these requirements and included in the heritage management plan (mitigation measure NAH8).</p> <p>Approval for exhuming the graves would be sought in accordance with the requirements of Division 4 of Part 8 of the Public Health Regulation 2012. The exhumation and re-interment process would be undertaken in accordance with the terms of the approval and the exhumation plan of management.</p> <p>The exhumation plan of management would also include:</p> <ul style="list-style-type: none"> ▶ An archaeological assessment, research design and methodology to undertake archaeological investigation during removal of the graves. The methodology would be developed and implemented by an appropriately qualified Excavation Director, in accordance with the NSW Heritage Council’s Excavation Director criteria. ▶ Strategies for appropriate reburial, memorialisation and interpretation signage developed in consultation with appropriate stakeholders, including Heritage NSW (Department of Premier and Cabinet), Narrabri and District Historical Society, Coonabarabran History Group, Narrabri Shire Council, NSW National Parks and Wildlife Service, and direct descendants of the Dingwell family.
	NAH7	<i>Visual impacts at heritage items</i>	<p>Opportunities to include plantings to screen the visual outlook from potential heritage homesteads would be considered during development of the urban design and landscape plan.</p>
Construction	NAH8	<i>Avoiding impacts during construction</i>	<p>A heritage management plan would be prepared and implemented as part of the CEMP. It would include measures to manage non-Aboriginal heritage and minimise the potential for impacts during construction.</p> <p>The plan would be prepared in consultation with the relevant heritage agencies (local councils) and take into account the outcomes of further investigations and surveys during detailed design.</p> <p>The heritage management plan would define a requirement for non-Aboriginal historical heritage awareness training for site workers prior to commencement of construction works. The awareness training would promote an understanding of heritage items that may be impacted during the works, and the requirements of the unexpected finds procedure.</p>

Stage	Ref	Impact/issue	Mitigation measures
Construction [continued]	NAH9	<i>Unexpected finds including human skeletal remains</i>	<p>An unexpected finds procedure would be developed and included in the heritage management plan to provide a consistent method for managing any unexpected heritage or archaeological items and unexpected human skeletal remains.</p> <p>The procedure would define the requirements for managing any human skeletal remains discovered during construction in accordance with relevant legislation and guidelines, including the Public Health Regulation 2012 (NSW), <i>Heritage Act 1977</i> (NSW), <i>National Parks and Wildlife Act 1974</i> (NSW), <i>Work Health and Safety Act 2011</i> (NSW), <i>Coroners Act 2009</i> (NSW), NSW Health Procedures <i>Exhumation of human remains</i> (NSW Department of Health, 2013), and <i>Skeletal Remains—Guidelines for the Management of Human Skeletal Remains under the Heritage Act 1977</i> (NSW Heritage Office, 1998b).</p>
	NAH10	<i>Avoiding impacts on heritage items</i>	<p>The following heritage items would be fenced and marked onsite plans within the CEMP as areas to be avoided during construction:</p> <ul style="list-style-type: none"> ▶ Graves within the Woodvale Park Private Cemetery ▶ Curban Inn site ▶ 'Kickabil' homestead and woolshed ▶ 'Allandale' homestead ▶ 'Digilah' homestead ▶ Convict road, Baradine ▶ Rocky Creek Mill site ▶ Graves within 'The Aloes' homestead.

B7.5.3 Managing residual impacts

Residual impacts are impacts of the proposal that may remain after implementation of:

- ▶ Design and construction planning measures to avoid and minimise impacts (see sections A7.2 and A8.1)
- ▶ Specific measures to mitigate and manage identified potential impacts (see sections B7.5.1 and B7.5.2).

The key potential non-Aboriginal heritage issues and impacts originally identified by the environmental risk assessment (see section A9.1) are listed in Table B7.7. The (pre-mitigation) risks associated with these impacts, which were identified by the environmental risk assessment, are provided. Further information on the approach to the environmental risk assessment, including descriptions of criteria and risk ratings, is provided in section A9.1.

The potential issues and impacts identified by the environmental risk assessment were considered as part of the non-Aboriginal heritage assessment, summarised in sections B7.3 and B7.4. The mitigation and management measures (listed in Table B7.7) that would be applied to manage these impacts are also identified. The significance of potential residual impacts (after application of these mitigation measures) is rated using the same approach as the original environmental risk assessment. The approach to managing significant residual impacts (considered to be those rated medium or above) is also described.

TABLE B7.7 RESIDUAL IMPACT ASSESSMENT—NON-ABORIGINAL HERITAGE

Assessment of pre-mitigated risk (see section A9.1 and Appendix E)					Mitigation measures Ref (see Table B7.6)	Residual impact assessment			
Phase	Potential impacts	Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating	How residual impacts will be managed ¹
Construction	Potential direct impacts on the two heritage-listed sites located partially within the proposal site and any potential heritage items located within/near the proposal site	Likely	Moderate	High	NAH1, NAH3, NAH4, NAH5, NAH6, NAH7, NAH8 and NAH10	Likely	Minor	Medium	The heritage management plan would include measures to minimise the potential for impacts during construction and avoid potential heritage items, where practicable. The measures provided would minimise the potential for residual impacts, as far as reasonably practicable.
	Impacts on heritage items from vibration during construction	Possible	Moderate	Medium	NAH8	Rare	Moderate	Low	n/a
Operation	Visual impacts on heritage items located close to the proposal site	Possible	Moderate	Medium	NAH7	Rare	Moderate	Low	n/a
	Impacts on heritage items from vibration during operation	Possible	Moderate	Medium	NAH2	Rare	Moderate	Low	n/a

Note:

1. For residual impacts with a risk rating of medium or above.