

PART A

Introduction, project background
and description

**INLAND
RAIL** 



CHAPTER A2 Location and setting



Narromine to Narrabri
Environmental Impact Statement

ARTC

The Australian Government is delivering
Inland Rail through the Australian
Rail Track Corporation (ARTC), in
partnership with the private sector.

Contents

A2.	LOCATION AND SETTING	A2-1	Figures	
A2.1	Regional setting	A2-1	Figure A2.1	Conservation reserves and state forests A2-2
A2.2	The proposal site	A2-3	Figure A2.2	Rail network in the study area A2-9
A2.2.1	Definition	A2-3		
A2.2.2	Description	A2-3		
A2.3	The study area	A2-4		
A2.3.1	General biophysical environment	A2-4		
A2.3.2	General social and cultural environment	A2-5		

A2. Location and setting

The EIS assesses the potential impacts of the Narromine to Narrabri project (the proposal) on the proposal site and, where relevant, the broader study area. The chapter describes the proposal site and study area for the purpose of the EIS, and provides a summary of the general biophysical and cultural environment of the study area.

Further information on the existing environment, as it relates to the environmental issues assessed by the EIS, is provided in Parts B and C of the EIS.

A2.1 Regional setting

The proposal site is located in central and north western NSW and extends through the Western Plains and North West Slopes regions of NSW. As shown in Figure A1.1, the proposal site traverses five local government areas (LGAs):

- ▶ Narromine and Gilgandra LGAs (southern section)
- ▶ Coonamble and Warrumbungle LGAs (middle section)
- ▶ Narrabri LGA (northern section).

The five LGAs are predominantly rural, with the main local industries based around agriculture, including dryland livestock grazing and cropping.

The main towns in the immediate vicinity of the proposal site are Narromine and Narrabri. The southern end of the proposal site is located about 7.9 kilometres (km) south of Narromine. Narromine is located on the Macquarie River and the Mitchell Highway, about 35 km west of Dubbo.

The northern end of the proposal site is located about 5.7 km north of Narrabri. Narrabri is located on the Namoi River and at the junction of the Kamilaroi and Newell highways, about 96 km south of Moree.

Other larger towns in the region include:

- ▶ Gilgandra—located about 16.5 km east of the proposal site in the Gilgandra LGA
- ▶ Coonamble—located about 44.4 km west of the proposal site in the Coonamble LGA
- ▶ Coonabarabran—located about 50 km east of the proposal site in the Warrumbungle LGA.

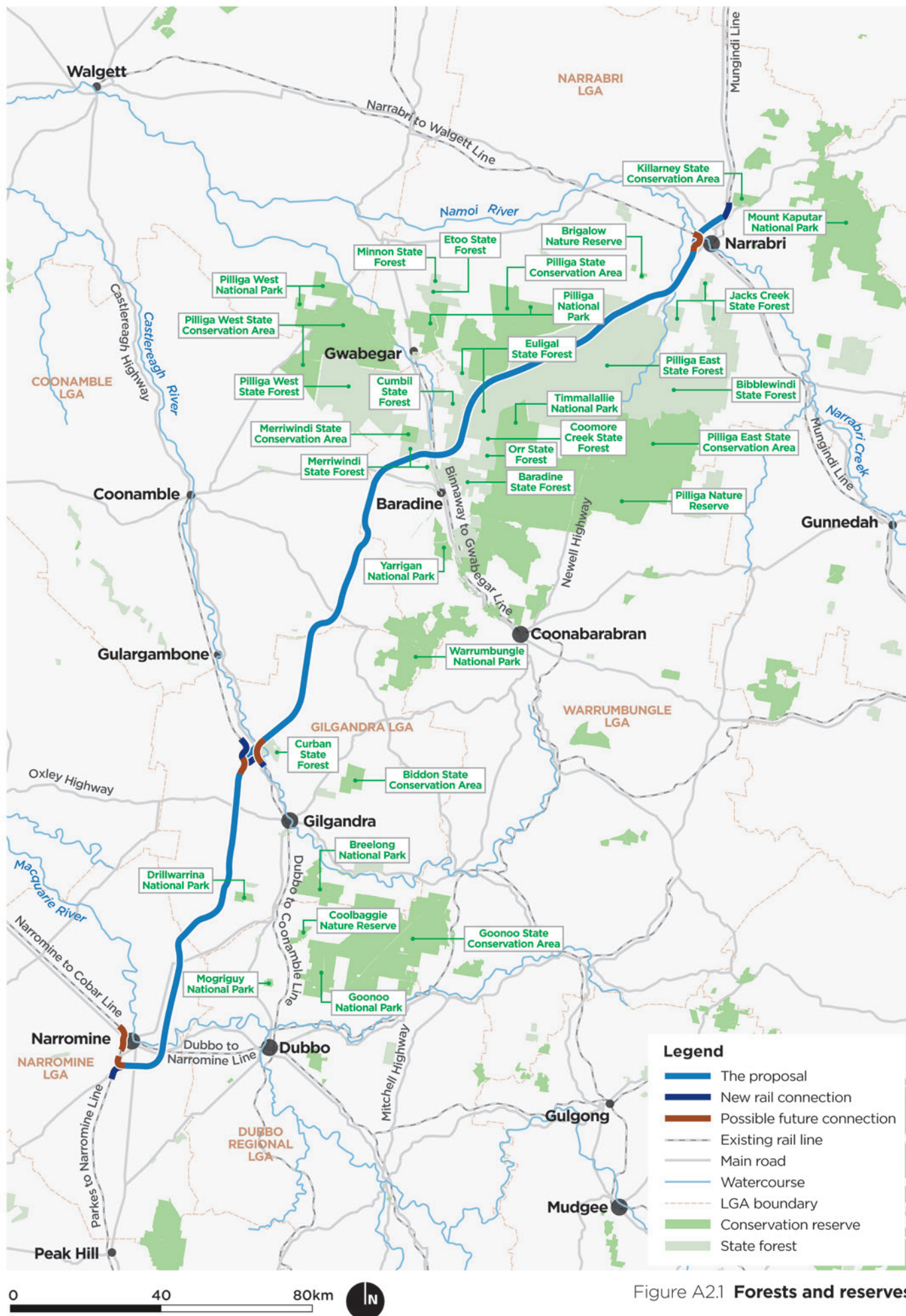
Smaller towns and villages located in the vicinity of the proposal site include Gulargambone and Baradine, located about 20 km west and 8.6 km south-east of the proposal site, respectively.

The southern and central portions of the proposal site extend through sparsely populated rural land dominated by large properties. The northern end of the proposal site (north of Baradine) is surrounded by a number of larger reserves, including State forests, conservation areas and national parks.

The proposal site extends through the Pilliga East, Euligal, Cumbil, Baradine and Merriwindi State forests. Conservation reserves close to the proposal site, and the approximate distance to the proposal site at the nearest point, include:

- ▶ Pilliga State Conservation Area (1.7 km from the proposal site)
- ▶ Pilliga National Park (8.2 km from the proposal site)
- ▶ Timmallallie National Park (7.1 km from the proposal site)
- ▶ Merriwindi State Conservation Area (6 km from the proposal site)
- ▶ Warrumbungle National Park (14.5 km from the proposal site)
- ▶ Drillwarrina National Park (4.8 km from the proposal site).

Conservation reserves and state forests in the vicinity of the proposal site are shown in Figure A2.1.



A2.2 The proposal site

A2.2.1 Definition

The term 'proposal site' is used in this EIS to refer to the area that would be directly disturbed by construction of the proposal (e.g. as a result of ground disturbance and the construction of foundations for structures). It includes the location of construction activities, compounds and work areas, and the location of permanent operational infrastructure.

For the purposes of the EIS, the proposal site generally has a width of 40 m, providing for the proposed minimum 40-m wide rail corridor. In some locations, the proposal site is wider, to account for topography and proposal features such as embankments and cuttings.

The proposal site includes all the required track infrastructure, drainage, access roads, bridges, culverts and level crossings. The proposal site also includes the location of key construction infrastructure and other construction compounds (described in chapter A8).

A2.2.2 Description

The southern end of the proposal site commences near the northern end of the Parkes to Narromine section of Inland Rail (on the existing Parkes to Narromine Line) just to the south of Narromine, about 950 m south-west of The McGrane Way/Craigie Lea Lane intersection, and about 7.9 km south-west of Narromine Station.

The proposal site extends in an easterly direction through rural land to the south of Narromine for about 6 km. It then extends in a northerly direction on the eastern side of Narromine, crossing the Narromine to Cobar Line, the Mitchell Highway and the Macquarie River on bridges.

The proposal site continues in a northerly direction through rural land, crossing Eumungerie Road. The proposal site then follows the alignment of Eumungerie Road north and a number of local roads, including Cobboco Road, Old Mill Road, Gilmours Road and Nancarrow Road, before crossing the Oxley Highway and heading north-east.

The proposal site crosses the Dubbo to Coonamble Line and Castlereagh River at Curban. The proposal site then extends in a northerly direction through rural land towards Baradine.

North of Baradine, the proposal site crosses the non-operational Binnaway to Gwabegar Line, to the south of Merriwindi State Forest, before extending north-east through State forest reserves (Baradine, Cumbil, Euligal and Pilliga East State forests).

North of the Pilliga East State Forest, the proposal site is located near the proposed site for the Santos Narrabri Gas Project water treatment plant. It then extends adjacent to the Newell Highway south of Narrabri, crossing the Narrabri to Walgett Line south-west of Narrabri.

The proposal site then extends to the west of Narrabri. In this area, it passes through rural and commercial/industrial land. The proposal site crosses the Narrabri Creek/Namoi River west of Narrabri on a bridge, which continues over Wee Waa Road and Kamilaroi Highway to the north-west of Narrabri. After the Kamilaroi Highway, it generally follows the Newell Highway for about 3.7 km. The proposal site then joins the southern end of the Narrabri to North Star section of Inland Rail, about 5.5 km north of Narrabri Station.

The proposal site for the Narromine West connection is geographically separate from the site described above. It commences on the Parkes to Narromine Line, about 110 m north of Old Backwater Road, and joins the Narromine to Cobar Line about 860 m south-east of McNamaras Lane to the west of Narromine.

The proposal site is shown in the map book (Part E).

A2.3 The study area

The study area is defined as the wider area, including and surrounding the proposal site, with the potential to be directly or indirectly affected by the proposal (e.g., by noise and vibration, visual or traffic impacts).

The actual size and extent of the study area varies according to the nature and requirements of each assessment and the relative potential for impacts; for example, the study area for the heritage assessment is generally restricted to the area with the potential for heritage impacts, extending for a distance of about 200 m on either side of the proposal site. In comparison, the study area for the noise and vibration assessment is based on noise catchment areas and extends for a distance of about 2 km on either side of the majority of the proposal site, and about 200 m around construction compounds.

A2.3.1 General biophysical environment

A summary of the general biophysical characteristics of the study area is provided below.

Biodiversity

The majority of the southern and central portions of the study area has been heavily modified by past and ongoing disturbances associated with existing land uses—mainly agricultural activities. Clearance and maintenance of rural properties has resulted in fragmentation, a high level of disturbance and degradation of vegetation.

The majority of the southern and central portions of the proposal site consists of non-native vegetation or cultivated land (comprised of improved pasture dominated by exotic species), with patches of native vegetation scattered within and around the proposal site.

The northern portion of the proposal site consists of a mix of cultivated land and areas of native vegetation and active forest plantations.

Native vegetation generally consists of woodland communities, with the dominant canopy species including Pilliga Grey Box (*Eucalyptus pilligaensis*), Baradine Gum (*Eucalyptus chloroclada*), Poplar Box (*Eucalyptus populnea*) and White Cypress Pine (*Callitris glaucophylla*). Scattered areas of derived natural grasslands also occur. The most common plant community type is Pilliga Box—White Cypress Pine—Buloke shrubby woodland in the Brigalow Belt South bioregion.

Five threatened ecological communities listed under the *Biodiversity Conservation Act 2016* (NSW) (BC Act), and five listed under the EPBC Act were identified during field surveys:

- ▶ White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland (listed as critically endangered under the EPBC Act and endangered under the BC Act)
- ▶ Weeping Myall Woodland (listed as endangered under the EPBC Act and endangered under the BC Act)
- ▶ Inland Grey Box in the Riverina, NSW South Western Slopes, Cobar Penneplain, Nandewar and Brigalow Belt South bioregions (listed as endangered under the EPBC Act and endangered under the BC Act)
- ▶ Brigalow within the Brigalow Belt South, Nandewar and Darling Riverina Plains bioregions woodland (listed as endangered under the EPBC Act and endangered under the BC Act)
- ▶ Fuzzy Box woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South bioregions (listed as endangered under the BC Act)
- ▶ Poplar Box grassy woodland on alluvial plains (listed as endangered under the EPBC Act).

One threatened flora species was recorded in the proposal site during field surveys (Cobar Greenhood (*Pterostylis cobarensis*)). An additional nine threatened species listed under the BC Act are assumed to be present based on recent and known records in the study area and potential habitats observed during targeted surveys, of which four species are also listed under the EPBC Act.

Fourteen threatened fauna species listed under the BC Act were recorded during field surveys. Two threatened fauna species listed under the EPBC Act (Superb Parrot (*Polytelis swainsonii*) and Corben's Long-eared Bat (*Nyctophilus corbeni*)) were positively identified and one (Large-eared Pied Bat (*Chalinolobus dwyeri*)) was potentially identified (based on Anabat analysis) during surveys.

No conservation areas, reserves, or large areas of native remnant vegetation are located within or close to the southern and central portions of the study area. The northern portion of the study area includes a number of State forests and conservation reserves (see section A2.1), including the forests of the Pilliga.

Further information is provided in chapter B1.

Water

The study area is located within the major water catchments of the Macquarie-Bogan River, the Castlereagh River and the Namoi River. The proposal site crosses rivers in each of these catchments (the Macquarie, Castlereagh and Namoi rivers) and about 44 watercourses. The majority of the watercourses are non-perennial (i.e. either ephemeral or intermittent). The proposal site also crosses other intermittent unnamed tributaries.

The study area is characterised by relatively flat catchments (gradient of up to 5 per cent) with some locally steeper areas. Floodplain slopes are generally about a half to 1 per cent gradient. Existing flood behaviour is characterised by high flows in the Macquarie River, Castlereagh River and Namoi River and more localised, but often widespread flooding elsewhere.

Based on a review of publicly available information, water quality in the Macquarie-Bogan, Castlereagh River and Namoi River catchments is considered to be generally poor, largely due to elevated total phosphorus and nitrogen concentrations exceeding the recommended trigger values. Salinity levels in the Macquarie-Bogan and Castlereagh River catchments are also considered to be poor.

Based on the visual inspections undertaken, watercourses were noted to be generally in poor to moderate geomorphic condition and exhibited very low to no flow due to the prevailing drought conditions.

The majority of the proposal site is in the Coonamble Embayment region in the east of the Surat Basin, which forms the south-eastern portion of the Great Artesian Basin. Shallow and deeper groundwater systems in, and beneath, the Great Artesian Basin have the potential to be intercepted by the proposal. Further information on hydrology, flooding and water quality is provided in chapters B2, B3 and B5.

Topography, geology and soils

The presence of the elevated Great Dividing Range to the east, and the lower-lying and typically flat riverine plain of the Great Artesian Basin to the west, dictate the regional topography and geology within the vicinity of the proposal site. The regional topography varies between flat to gently undulating terrain, with hill slopes and other more pronounced slopes associated with the Pilliga State Forest and the foot slopes of the Warrumbungle National Park.

The oldest bedrock in the area is within the foothills of the Great Dividing Range, dominated by horizontally bedded Jurassic and Cretaceous quartz sandstone and shale, with limited conglomerates.

Soil types along the proposal site are generally as follows:

- ▶ Narromine to the Oxley Highway—dominated by red-brown earths, red earths and solodic soils
- ▶ Oxley Highway to Baradine—dominated by cracking clays (vertisols), red and red brown earths (non-cracking clays) and non-calcic brown soils (duplex soils)
- ▶ Baradine to Narrabri—dominated by solodic soils (duplex soils) and earthy sands (non-cracking clays)
- ▶ Narrabri—dominated by solodic soils (duplex soils) south of Narrabri and cracking clays (vertisols) close to Narrabri.

Further information on soils is provided in chapter B4.

A2.3.2 General social and cultural environment

A summary of the general social and cultural characteristics of the study area is provided below.

Socio-economic

The majority of the proposal site extends through a sparsely populated rural area dominated by large properties. The populations of the LGAs (from the 2016 census) range from 4,236 people in the Gilgandra LGA to 13,084 people in the Narrabri LGA.

The main population centres in the study area are the towns of Narromine and Narrabri at the southern and northern ends of the proposal site. Narromine and Narrabri are both medium-sized rural service towns, with populations (at the 2016 census) of 3,528 and 5,903 people, respectively. Other towns, villages and communities close to the proposal site (within 20 km) include Gilgandra (population of 2,595 people), Baradine (population of 626 people) and Curban (population of 131 people). Scattered residences are located on rural properties throughout the study area.

Agriculture is an important contributor to the local economies, with the top industries by economic output within all LGAs except Narrabri being agriculture and forestry. The Coonamble and Warrumbungle LGAs are dominated by dryland grazing of beef cattle and sheep, and wool production; supported by cereal, other broadacre cropping and hay production. Mining is a large contributor to economic output in the Narramine and Narrabri LGAs. Tourism is an important and growing industry for the Dubbo, Narrabri and Warrumbungle LGAs.

Top industries in terms of employment include agriculture, construction, mining, manufacturing, and real estate. Unemployment levels vary across the region, with high rates of fluctuation throughout the year due to several factors, including the seasonal nature of the agricultural industry, which, combined with the recent drought, has affected many local businesses and economies.

Overall, the study area faces challenges such as population ageing, population decline, outmigration of young people, diversifying local economies and skill and labour shortages. There are also high numbers of Indigenous residents; however, there are high rates of social capital and cohesion, and a strong sense of community.

Further information is provided in chapter B14.

Land use and property

Land surrounding the southern and central portions of the proposal site is mainly used for agriculture and grazing purposes, with large rural properties surrounding the majority of the proposal site.

Land use surrounding the northern portion of the proposal site is dominated by reserves, used for forestry and conservation purposes, with surrounding areas used for agriculture and grazing.

Overall, land use in the study area is made up of cropping land (38 per cent), native forests (24 per cent), grazing of native vegetation (25 per cent) and pasture grazing (9 per cent). The remaining 4 per cent comprises other agriculture, horticulture, residential and farm infrastructure (0.3 per cent).

Major crops include wheat, barley, chickpeas and oats. Beef cattle and sheep and lambs are the predominant livestock.

Most landholders pursue multiple business opportunities from the one farm or property. This includes agricultural supportive services such as product storage, marketing, transport and processing facilities in addition to cropping or grazing activities.

At Narramine and Narrabri, land use in the vicinity of the proposal site includes a mix of more urban uses, including residential, transport (roads and rail), commercial and industrial.

Further information is provided in chapter B12.

Heritage

Aboriginal

A search of the Aboriginal Heritage Information Management System (AHIMS) identified five listed sites within 10 m of the proposal site. These include three scarred trees, one artefact scatter and one confirmed archaeological deposit.

A total of 22 new Aboriginal heritage sites were identified in the proposal site during the archaeological survey, including:

- ▶ 1 modified tree (scarred canoe)
- ▶ 10 modified trees (scarred)
- ▶ 5 artefact scatters
- ▶ 4 artefact scatters and PADs
- ▶ 2 PADs.

There are also a number of areas of archaeological sensitivity associated with elevated landforms and watercourses in the study area.

The proposal site intersects two areas subject to active native title claims. Between the Oxley Highway and Castlereagh Highway, the proposal site is located within the boundary of an active native title claim made by the Ngemba, Ngayampaa, Wangaaypuwan and Wailwan people. Between the Kamilaroi Highway and Castlereagh Highway, the proposal site is located within the boundary of an active native title claim made by the Gomeroi people.

Further information is provided in chapter B6.

Non-Aboriginal

Searches of statutory heritage databases and lists indicate that six locally listed heritage sites/items are located in the study area for the heritage assessment. Two of these sites/items, listed by the Gilgandra Local Environmental Plan 2011, are located (partially) within the proposal site:

- ▶ Woodvale Park Private Cemetery (heritage-listed item)
- ▶ Curban Inn site (listed archaeological site).

All other heritage-listed items are located more than 200 m from the proposal site.

Ten potential heritage items are located within/close to the proposal site:

- ▶ Drinane Public School site
- ▶ 'Kickabil' homestead and woolshed
- ▶ 'Allandale' homestead
- ▶ Corrugated iron hut with chimney
- ▶ 'Digilah' homestead
- ▶ Convict road, Baradine
- ▶ 'The Aloes' homestead site and graves
- ▶ Rocky Creek Mill site
- ▶ Graves of Dingwell children
- ▶ Two storey barn/shed, Bohena Creek.

Further information is provided in chapter B7.

Transport

Road network

The study area includes a network of highways, other arterial/main roads, local roads and private access tracks.

Four highways are located in the study area and are crossed by the proposal site:

- ▶ The Mitchell Highway is crossed by the proposal site about 5.7 km east of Narromine
- ▶ The Oxley Highway is crossed by the proposal site about 16.3 km west of Gilgandra
- ▶ The Castlereagh Highway is crossed by the proposal site at Curban, about 21 km north-west of Gilgandra
- ▶ The Kamilaroi Highway is crossed by the proposal site about 1.2 km north-west of the Newell Highway at Narrabri.

The Newell Highway also runs parallel to the northern section of the proposal site, to the south of Narrabri.

Three other main (regional) roads in the study area are crossed by the proposal site—Tomingley and Eumungerie roads near Narromine and Gwabegar Road near Baradine. The proposal site passes to the west of Killarney Gap Road where this road intersects with the Newell Highway to the north of Narrabri.

The study area also includes a number of local roads, forestry roads and private rural roads located near and across the proposal site.

Further information on the existing transport environment is provided in chapter B11.

Rail network

The existing and proposed rail network in the study area, which includes the sections of Inland Rail to the south and north of the proposal site, is shown in Figure A2.2 and described below.

Existing freight and passenger rail infrastructure

- ▶ Two main rail networks operate in regional NSW, including the study area:
 - ▶ Country Regional Network—owned by Transport for NSW and managed by a contracted infrastructure manager—carries passengers and some freight
 - ▶ NSW Interstate, Hunter Valley and Metropolitan Freight Networks—owned by Transport for NSW and leased to, and managed by, ARTC—carries mainly freight, with limited passenger services in some areas.
- ▶ Narromine is located at the junction of three rail lines:
 - ▶ The **Parkes to Narromine Line**—this is a branch line travelling north from the Broken Hill Line near Parkes. The line was closed to passenger services in the early 1970s. It is used by trains carrying mainly grain and ore at an average rate of about three to four trains per day (both directions), with up to 10 trains on a peak day. This line forms part of Inland Rail (see below).
 - ▶ The **Dubbo to Narromine Line**—this line forms part of ARTC’s network and is also part of the Main Western Line, which travels between Sydney and Cobar via the Blue Mountains, Bathurst, Orange and Dubbo. Narromine Station, which opened on the line in 1882, is now closed to passenger services.
 - ▶ The **Narromine to Cobar Line**—this line forms part of the Country Regional Network and is also part of the Main Western Line.
- ▶ Between Narromine and Narrabri, the proposal site crosses two rail lines:
 - ▶ The **Dubbo to Coonamble Line**—this line branches from the Main Western Line at Dubbo, passing through Gilgandra and near Curban, and terminating at Coonamble. The line is used by goods trains that mainly carry grain.
 - ▶ The non-operational **Binnaway to Gwabegar Line**—this line branches from the Main Western line at Wallerawang, passing through Mudgee, Gulgong, Dunedoo, Binnaway, Coonabarabran and Baradine, before terminating at Gwabegar. The line is mainly used for coal trains operating between Baal Bone, Chabon and the Main Western Line. The section of line in the study area is not in use.
- ▶ Narrabri is located at the junction of two rail lines:
 - ▶ The **Mungindi Line**—this line branches from the Main North Line at Werris Creek Station and heads north-west through the towns of Gunnedah and Narrabri to Moree. Passenger trains (the Northern Tablelands Xplorer) operate along the line to Moree. Goods trains (mainly wheat) operate to Camurra. North of Narrabri, the Mungindi Line forms part of the Narrabri to North Star section of Inland Rail (described below).
 - ▶ The **Narrabri to Walgett Line**—this line branches from the Main North Line at Narrabri, passing through Wee Waa and terminating at Walgett. The line is used by goods trains (mainly carrying wheat).

The proposal interacts with the Parkes to Narromine, Dubbo to Coonamble, Mungindi and Narrabri to Walgett lines. The interactions are described in section A7.3.

Inland Rail infrastructure—proposed and under construction

Narromine is located at the northern end of the Parkes to Narromine section of Inland Rail, which received planning approval from the (then) NSW Minister for Planning in June 2018. The Parkes to Narromine section of Inland Rail consists of 98.4 km of upgraded track and 5.3 km of new track and associated facilities. It is generally located in the existing rail corridor for the Parkes to Narromine Line between the towns of Parkes and Narromine, via Peak Hill.

Narrabri is located at the southern end of the Narrabri to North Star section of Inland Rail, the application for phase one of which is currently subject to assessment. The Narrabri to North Star section of Inland Rail consists of 188 km of upgraded rail track and associated facilities. It is generally located in the existing rail corridor between Narrabri and the village of North Star, via Moree.



Figure A2.2 Rail network in the study area