PART B
Impact assessment
proposal infrastructure

INLAND RAIL

CHAPTER B12
Land use and property

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.

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B12. Land use and property

This chapter provides a summary of the potential impacts of the Narromine to Narrabri project (the proposal) on land use and property, including agricultural land uses. A full copy of the land use assessment results is provided in Technical Report 11—Agriculture and land use assessment. Property impacts are considered in Technical Report 13—Social assessment.

B12.1 Approach

A summary of the approach to the assessments is provided in this section, including the legislation, guidelines and/or policies driving the approach and the methodology used to undertake the assessments. A more detailed description of the approach and methodology is provided in Technical Reports 11 and 13.

B12.1.1 Legislative and policy context to the assessment

Relevant legislation, policies and guidelines

The assessments were 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 and the *Biosecurity Act 2015* (NSW)
- The local environmental plans that apply to the study area—the Coonamble, Gilgandra, Narrabri, Narromine and Warrumbungle LEP
- *Guideline for Agricultural Impact Statements at the Exploration Stage* (NSW Government, 2015b)
- *Agricultural impact statement technical notes* (NSW Department of Primary Industries (DPI), 2013a)
- *Infrastructure proposals on rural land* (DPI, 2013b)
- *Land use conflict risk assessment guide* (DPI, 2011).

Secretary's Environmental Assessment Requirements

The SEARs relevant to land use and property, together with a reference to where they are addressed in the EIS, are provided in Appendix A.

B12.1.2 Methodology

Study area

The study area encompasses the five LGAs traversed by the proposal—Narromine, Gilgandra, Coonamble, Warrumbungle and Narrabri.

Key tasks—agriculture and land use assessment

The assessment involved:

- Reviewing the regulatory framework for land use and management, including relevant State, regional and local planning legislation, environmental planning instruments, policies, strategies and guidelines
- Reviewing, identifying and mapping existing land uses within the proposal site and immediate surrounds (study area), based on a desktop review of geographical information system (GIS) spatial data and aerial photography, including:
  - Land uses based on mapping from the Department of Planning, Industry and Environment
  - Land use zoning provided by the zoning maps that form part of the relevant LEPs for Coonamble, Gilgandra, Narrabri, Narromine, and Warrumbungle
  - Strategic agricultural land as identified under the NSW Government's *Strategic Regional Land Use Policy* (2015b) and biophysical strategic agricultural land mapping
  - Significant properties and/or landholdings
  - Agricultural uses, including any areas of regionally significant farmland; areas used for cropping, grazing and horticulture; travelling stock reserves; and agricultural infrastructure
  - Crown land

    - Conservation and forest reserves, including national parks, conservation areas and State forests
    - Exploration and mining leases and licenses.
- Field assessments to verify the identified land uses
- Assessing the potential for impacts on agricultural land uses during construction and operation, in accordance with the *Agricultural impact statement technical notes* (DPI, 2013a)
- Assessing the potential for non-agricultural land use impacts, including impacts on mining and other land uses, such as forestry
- Undertaking a land use conflict risk assessment in accordance with the *Land Use Conflict Risk Assessment Guide* (DPI, 2011)
- Providing measures to mitigate and manage the impacts identified.

Key tasks—property impact assessment

The assessment of potential property impacts was informed by the agricultural and land use assessment, and included:

- Review of cadastral and property ownership information
- Identification of properties located within the proposal site
- Review of ARTC-led consultation with landholders to understand property usage and operation
- Consideration of the potential for impacts on property during construction and operation
- Providing measures to mitigate and manage the impacts identified.

B12.1.3 Risks identified

The environmental risk assessment for the proposal (see Appendix E) included consideration of potential land use and property risks. Land use and property risks with an overall assessed risk rating of medium or above, identified by the environmental risk assessment, included:

- Indirect impacts on agricultural land use/production and livestock from construction activities, including impacts from changes to access, noise and air pollution
- Disruption to forestry practices as a result of works within State forests
- The movement of construction machinery and materials introduces biosecurity risks
- Severance of properties resulting in smaller lot sizes that may affect existing use and/or development potential and/or changes to the arrangement of properties that may affect agricultural use and productive capacity
- Effects on access to and within properties as a result of changes to private access roads and internal access arrangements
- Land permanently required for the proposal affects the productive capacity of individual properties
- Land permanently required for the proposal results in a change to land use in the study area, negatively affecting the availability of land for non-transport related uses (including changes to the availability of agricultural and forestry zoned land).

The land use and property assessments 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).

B12.1.4 How potential impacts have been avoided/minimised

The shortlisted route options for the proposal (see section A6.2) were assessed using a range of criteria, including potential property and community impacts. Relevant criteria included property impacts, current and future land use impacts, and impacts on business and agricultural viability.

The design has sought to follow property boundaries, as far as practicable, to minimise direct impacts on properties.

B12.2 Existing environment

B12.2.1 General land use description

An overview of general land uses in the study area is provided in chapter A2 and Figure B12.1 (showing land use zoning from the relevant LEP). The location of reserves and State forests is shown in Figure A2.1. Further detail is provided in the maps in Part E.

The majority of land within the study area is held in freehold title. This includes properties held in freehold by private landowners and various NSW Government departments. The study area also comprises areas identified as Crown land, including reserves, waterways and public roads. Some private properties operate on land leased from the Crown.

The history of land use and agricultural enterprises within the study area is typical of the development of rural areas that has occurred in many parts of Australia. The land was inhabited prior to colonisation, and is inhabited today, by Indigenous people from a number of Aboriginal nations. Since colonisation, large areas of vegetation in the region have been cleared for agriculture or substantially modified. Areas of intact native vegetation are mainly located in national parks, nature reserves, State forests and travelling stock routes.

The main land uses within the study area can be summarised as follows:

- Agricultural-related land uses account for about 80 per cent of the total land area. Of this land, about 44 per cent is used for grazing, about 32 per cent is used for dryland cropping, and about 4 per cent is used for irrigated cropping.
- Conservation areas account for about 13 per cent of the total land area. These include the Pilliga State Conservation Area, Macquarie Marshes Nature Reserve, Nombinnie State Conservation Area and Yathong Nature Reserve.
- State forests account for about 5 per cent of the total land area. These include the Pilliga East State Forest, Bibblewindi State Forest and Jacks Creek State Forest.

Table B12.1 provides a summary of the main land uses in the proposal site and broader study area based on land use mapping. Further detail is provided in Technical Report 11.

TABLE B12.1 SUMMARY OF LAND USES IN THE PROPOSAL SITE AND BROADER STUDY AREA

Land use	Proposal site (%)	Study area (%)	Total (ha)
Cropping	38	32	1,455,362
Production native forests	24	5	248,999
Grazing native vegetation	25	32	1,472,164
Grazing modified pastures	9	11	501,773
Transport and communication	3	0.40	18,131
Irrigated cropping	0.75	4	194,236
Residential and farm infrastructure	0.3	1	24,547
Manufacturing and industrial	0.21	0.03	1,378
Mining	0.21	0.11	4,882
Other minimal use	0.2	5	204,765
Services	0.03	0.05	2,185
Managed resource protection	0.01	0.02	959
Nature conservation	0.1	8	362,181

Land uses within the proposal site

As shown in Table B12.1, the land uses within the proposal site are generally proportionately similar to the overall land uses across the study area. This is with the exception of production native forests, which comprise a higher proportion of land use the proposal site, and nature conservation, of which there is minimal within the proposal site.

Over 98 per cent of the proposal site is zoned for agricultural or forestry purposes. The majority of the proposal site (76 per cent) is zoned RU1 Primary Production and 22 per cent is zoned RU3 Forestry. There is a small amount of

Large Lot Residential (zone R5) zoned land within and adjacent to the proposal site in the vicinity of Narromine. A small area of IN1 and IN2 is located within the proposal site on the western fringes of Narrabri.

The proposal site also crosses a small amount of land used for transport purposes in the form of roads.

Adjoining/surrounding land uses

The majority of land surrounding the proposal site is used for agriculture (RU1 Primary Production) and forestry (RU3 Forestry).

At the southern end, the proposal site is located to the east of Narromine. With the exception of a parcel of Large Lot Residential (R5) that is intersected by the proposal site, the surrounding land is zoned RU1 Primary Production.

At Narrabri, around the northern end of the proposal site, there are parcels of General Industrial (IN1) and Light Industrial (IN2) zoned land, generally to the east of the proposal site on the western edge of Narrabri.

The proposal site is also adjoined by a number of roads.

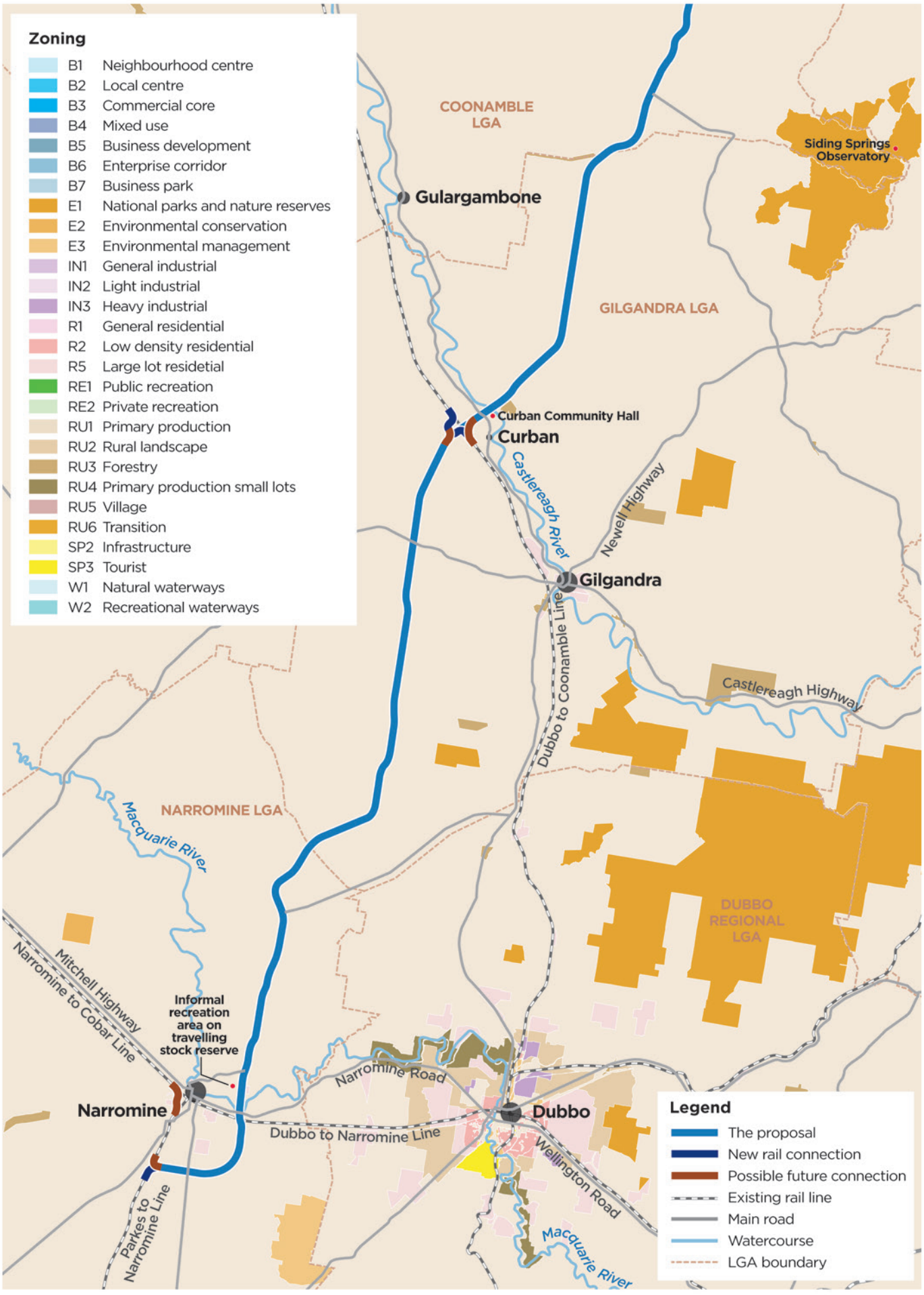

Figure B12.1 **Land use zoning and key land uses (map 1)**

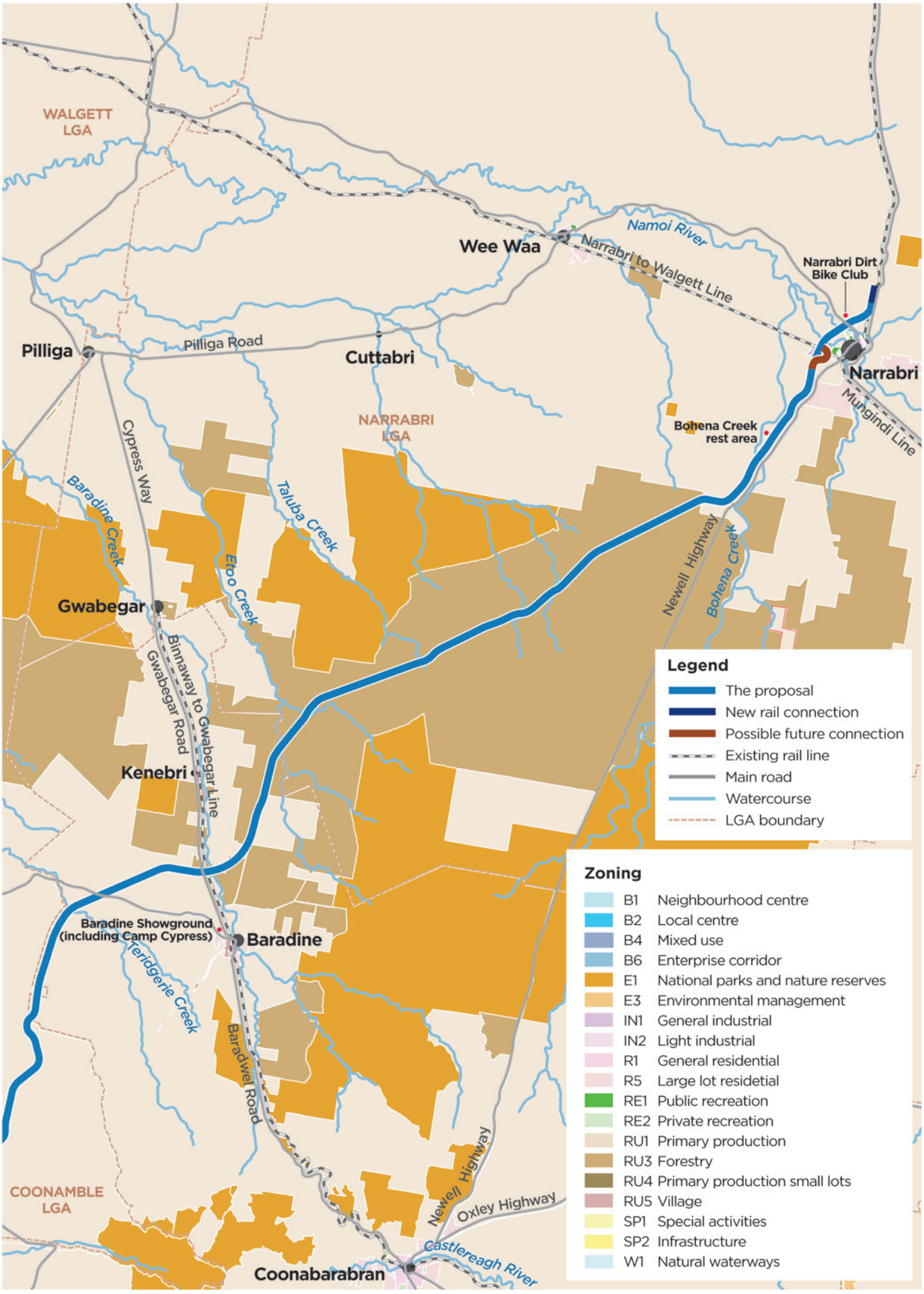

Figure B12.1 **Land use zoning and key land uses (map 2)**

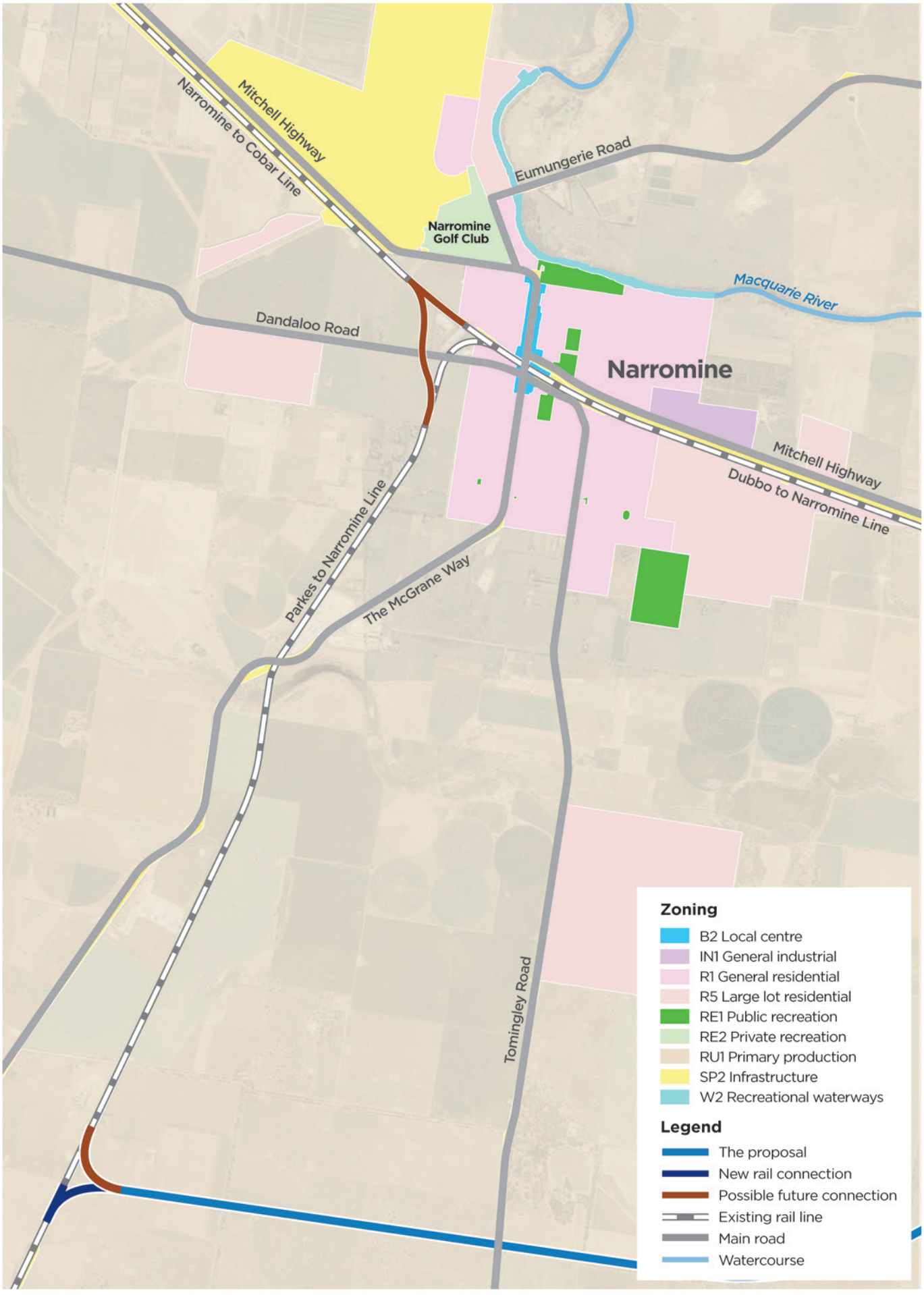

Figure B12.1 **Land use zoning and key land uses (map 3)**

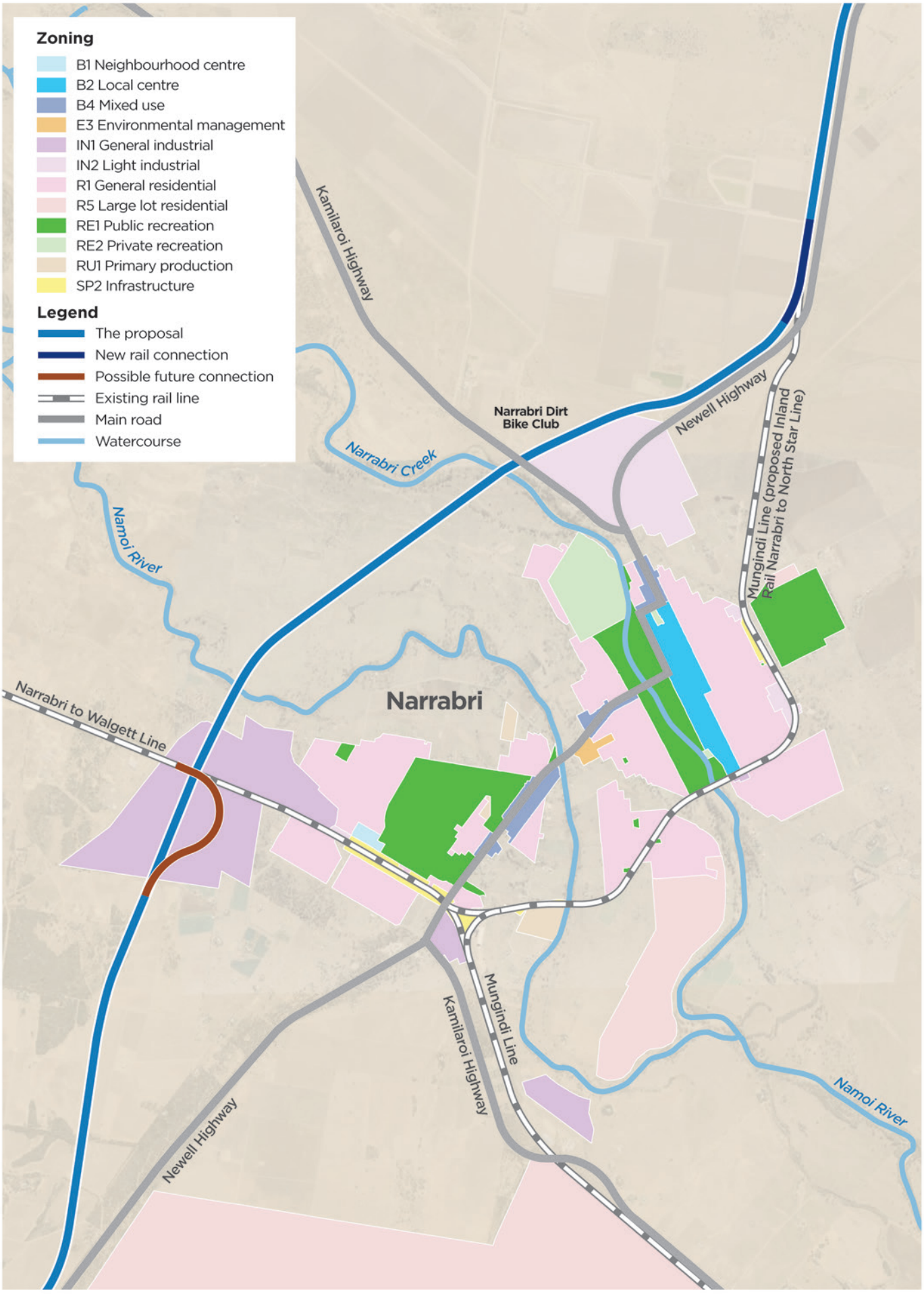

Figure B12.1 **Land use zoning and key land uses (map 4)**

B12.2.2 Agriculture uses and activities

Agricultural land capability and productivity

Land in NSW is commonly classified according to the capability of land to remain stable under particular land uses. Land capability systems classify land in terms of its inherent physical characteristics or constraints and considers the optimum use of land rather than the maximum use. In general, the classification will not change over time.

About 89 per cent of land in the study area is classified as land and soil capability class 2 (very high capability land) to class 5 (moderate to low capability land). The land and soil capability of land within the proposal site reflects a similar distribution.

Biophysical strategic agricultural land is land with high-quality soil and water resources capable of sustaining high levels of productivity. There is about 141,286 hectares (ha) of this land in the study area and about 199 ha within the proposal site.

Agricultural production

Key characteristics of agriculture uses and activities in the study area include:

- Irrigated cropping is mainly located in the Narromine and Narrabri LGAs
- Intensive animal production comprises about 561 ha and includes poultry farms, beef and sheep feedlots, piggeries, horse studs, aquaculture and saleyards
- Horticultural enterprises (dryland and irrigated) comprise about 1,105 ha and include tree fruits, olives, vegetables and herbs and grapes.

Generally, the typical farm in the area consists of grazing or mixed farming operations that run several different livestock and cropping enterprises on the same farm.

The major crops grown are wheat, barley, chickpeas, oats and cotton. The areas planted with these crops are evenly distributed across the study area, with the exception of cotton, which is predominately grown in the Narrabri LGA under irrigation. Winter cropping of cereal grains, oilseed and pulses is one common land use, with pre-crop fallowing for moisture conservation the usual practice.

Beef cattle, sheep and lambs are the predominant livestock within the study area. There are also a small number of pigs (pork production) and dairy cattle (milk production).

Further information on agricultural production in the study area is provided in Technical Report 11.

Water resources and extraction

In addition to land capability considerations, agricultural production is also influenced by surface and groundwater resources (see chapter B2).

The rivers and their tributaries provide water to support communities, agriculture and the environment. Access to water (both groundwater and surface water) and favourable soil conditions has guided agricultural land uses in the region.

Cotton (mostly irrigated) accounts for about 39,417 ha within the study area, with about 85 per cent located within the Narrabri LGA.

Groundwater (including bores) and surface water resources are also used for stock and domestic purposes. Surface water dams for livestock drinking water are an important resource for the livestock industries.

Key agricultural support services

There is a diverse range of agricultural enterprises in the study area, which has resulted in the development of:

- Support services, including farm input suppliers, consultants, agronomists, financiers, accountants and legal services
- Agricultural infrastructure, including product storage, marketing, transport and processing facilities
- A number of dedicated research institutions.

Food and agribusinesses are clustered around Narromine, Dubbo and Narrabri.

Several large businesses are based in the study area, including Agrigrain at Narromine and Coonamble, and Auscott Limited at Trangie, focused on cotton. They have substantial operational freight requirements throughout the year.

There are also a range of other agricultural and related businesses in the study area, including:

- Major commercial nurseries
- Plant and seed production companies and research facilities
- Large machinery manufacturers
- Rural produce stores
- Aquaculture.

Apiary industry

The Australian beekeeping industry is an important agricultural industry. It produces honey and beeswax, and bees are also important for the pollination of a number of agricultural crops, which support the economies of regional towns.

Apiarists generally rely on the use of public land for their hives, with 70 per cent of NSW's honey production derived from eucalyptus species. Eucalypt species tend to flower on a two to five-year cycle; therefore, it is important for apiarists to have a variety of forests available in different locations throughout the year.

The areas of conservation land and State forests in the study area support the apiary industry, as they provide important seasonal floral resources for Australia's migrating beekeepers. The Pilliga East State Forest is a preferred site for beekeepers, as production responds positively to an increase in rainfall. In addition, the forest offers protection from pesticide use and locust control measures that occur elsewhere in the region.

B12.2.3 Mining, exploration and petroleum leases and licences

Leases and licences

There is extensive mining exploration licensed in the study area. The DPIE Resources and Geoscience data shows that the Narrabri LGA is the only LGA hosting active mines (black coal) and coal seam gas wells. All LGAs have some exploration activity occurring, generally for metallic minerals.

A summary of the types of mining licences/activities in the study area is provided in Table B12.2.

TABLE B12.2 MINING ACTIVITIES IN THE STUDY AREA

Type	Coonamble	Gilgandra	Narrabri	Narromine	Warrumbungle	Total[1]
Active/operating mines	0	0	4	0	0	4
Coal seam gas boreholes[2]	0	0	122	0	0	122
Mining and assessment licences	0	0	18	1	0	19
Exploration licences	6	8	20	22	18	58
Exploration applications	0	1	4	3	1	8

Source: Department of Planning, Industry and Environment: Resources and Geoscience, accessed 18 March 2020.

Notes:
1. Where licenses span LGA boundaries, the licence is accounted for in both LGAs.
2. Excludes boreholes that have been plugged and abandoned.

The majority of the proposal site passes through areas that are licensed for exploration or assessment. About 56 per cent of the proposal site passes through areas with active mining exploration or assessment licences, including areas proposed for coal seam gas extraction as part of the Narrabri Gas Project. A further 14 per cent passes through areas subject to exploration applications.

The proposal site intersects, or is located in the vicinity of, nine active licences; two are for metallic minerals exploration and the others are for coal seam methane exploration.

The four active (black coal) mines in Narrabri are located some distance from the proposal site. The nearest mine is the Narrabri North Mine, located about 17 kilometres (km) from the proposal site. The Maules Creek, Boggabri and Tarrawonga mines are located between 39 to 46 km from the proposal site.

Two hard rock quarry proposals located in the vicinity of the proposal site near Narromine are currently under assessment.

Coal seam gas wells

While a variety of coal seam gas boreholes have been developed in the study area, there are no production wells currently in service; however, there are a number of operational exploration and pilot wells. The nearest non-plugged coal seam gas well is located over 5 km from the proposal site.

The Narrabri Gas Project is a current proposal to extract coal seam gas in the Pilliga. A State Significant Development Application lodged by Santos in 2017 proposes to develop a 95,000-ha coal seam gas field of up to 850 gas wells over 20 years, including ancillary infrastructure. The ancillary infrastructure includes gas compression facilities, water and brine storage cells and local gas pipeline connections. The proposal site passes immediately north of the existing Leewood Produced Water and Brine Management Ponds, which is proposed to form part of the Narrabri Gas Project. The proposed Leewood to Wilga Park underground power line would pass under the proposal site within an existing gas pipeline corridor.

B12.2.4 Crown land, travelling stock reserves and State forests

Crown land

Crown land holdings includes land managed for forestry and conservation as well as Crown roads and Crown reserves, managed under the *Crown Land Management Act 2016* (NSW). Crown reserves are lands retained in public ownership for specified purposes. In the study area, common purposes are for the retention of native vegetation and forestry.

As described in section A6.3.3, there are a number of Crown or 'paper' roads in the study area. Some Crown roads now form a valuable component of remnant vegetation, while others are made available for agricultural use under lease or permit. Crown roads that are no longer required for access may be sold or converted to a Crown reserve.

The majority of Crown land in the study area consists of land reserved for forestry or conservation (see section A2.1). The proposal site crosses a number of Crown roads, most of which are not used. The proposal site also crosses some areas of Crown land leased to private landholders.

Travelling stock reserves

Travelling stock reserves are parcels of Crown land originally reserved for the use of travelling stock. The travelling stock reserve network is now used for a range of purposes, including:

- Travelling stock, emergency stock refuge and transport of stock to market
- Providing biodiversity corridors
- Providing access and connection to country for Aboriginal peoples
- Maintaining heritage.

In the study area, the majority of travelling stock reserves are to the west of Narromine, Gilgandra and the Pilliga. A 'livestock highway' (a linked string of travelling stock reserves) extends from Narromine to Coonamble via Tenandra. Incomplete corridors are located from Dubbo to Walgett, via Gilgandra and Coonamble, and from Binnaway to Pilliga via Coonabarabran.

The proposal site crosses about eight travelling stock reserves, located at Narromine, Kickabil, Curban, Gilgandra, Bohena Creek and Narrabri.

Travelling stock reserves are shown in the maps in Part E.

State forests

The study area includes a number of State forests, providing valuable forest materials that are not available from NSW coastal forests. Within the study area, the key State forests are the State forests of the Pilliga (see Figure A2.1). The western hardwood and tableland forests, like the river red gum and white cypress forests, have been managed for timber production for long periods. The key resources available for forestry in the study area are white cypress and western ironbark logs.

The proposal site extends through the Baradine, Cumbil, Euligal and Pilliga East State forests. The Cumbil and Euligal State forests are open to the public and support recreation activities, including picnicking, camping, four-wheel drive trails and hunting.

Native title

There are two native title claims registered in the study area that are crossed by the proposal site.

The Ngemba, Ngiyampaa, Wangaaypuwan and Wayilwan claim (NSD38/2019) generally extends to the west of the proposal site. The proposal site passes through the portion of the application between Nancarrows Road, Gilgandra and the Castlereagh River at Curban. The claim has been accepted for registration and is awaiting determination.

The Gomeroi People claim (NSD2308/2011) extends from the Castlereagh River at Curban to the Barwon River where it forms the NSW–Queensland border. The claim has been accepted for registration and is awaiting determination.

B12.2.5 Services and utilities

The proposal site contains, or is located in the vicinity of, a range of gas, electricity, communications, water and wastewater services, particularly around Narromine and Narrabri. Santos has also identified two potential routes for a new gas line in the vicinity of Narrabri. Further information on services and utilities is provided in section A8.12.

B12.3 Impact assessment—construction

B12.3.1 Land requirements

The proposal would require the use of land both temporarily and permanently. While the permanent land requirements would be long term and relate to operation, these impacts would commence during construction and are summarised below. Further information on the estimated land requirements is provided in Appendix F.

It is noted that the land requirements are based on preliminary estimates, which would be refined and confirmed as the design and construction planning progress. The estimates have been based on known ownership information and treat each collection of adjacent lots with the same owner as a separate property. As such, they may overstate the number of properties affected.

Permanent land requirements

The proposal's operational footprint consists of the land that would be permanently required for the proposal's functional and operational infrastructure (described in chapter A7). The operational footprint is shown in the maps in Part E. The anticipated land requirements within this footprint are listed in Appendix F.

It is estimated that about 1,723 ha of land would be permanently required for the proposal in addition to land already owned by ARTC and land that does not need to be acquired (such as land in existing road corridors). These requirements are anticipated to include about:

- 1,222 ha of privately-owned land
- 501 ha of publicly-owned land, mainly owned by the NSW Government (includes about 20 ha of land leased to private landholders).

These permanent land requirements would directly affect about 274 properties, including about:

- 142 privately-owned properties
- 132 publicly-owned properties.

Temporary land requirements

In addition to the indicative permanent land requirements noted above, some land would be required during construction only. These areas, which are listed in Appendix F and shown in the maps in Part E, would be temporarily required for some construction infrastructure and compounds not located within the operational footprint, to:

- Establish the key construction infrastructure described in chapter A8
- Provide access to construction work areas
- Facilitate manoeuvring of construction plant and machinery.

It is estimated that an additional 1,612 ha of land would be temporarily required during construction only. These requirements are anticipated to include about:

- 1,158 ha of privately-owned land
- 454 ha of publicly-owned land, mainly owned by the NSW Government (includes about 9 ha of land leased to private landholders).

Land required during construction only would be via a lease or memorandum of understanding with the relevant government agency or private landholder. As construction is completed, this land would be rehabilitated and returned as close as practicable to the pre-construction condition, or as agreed with landowners.

Construction would require temporary leasing of land from about 413 properties, which would include a number of properties that are also affected by the proposal's permanent land requirements. Properties affected by temporary leasing would comprise about:

- 180 privately-owned properties
- 233 publicly-owned properties.

Acquisition or lease arrangements

Acquisitions and lease arrangements would be carried out in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW). The approach to managing this process is described in section B12.5.

Residual land

Some land acquired as part of the acquisition process may not be required for the proposal's operational footprint. The preferred option for the future use of residual/surplus land (including sale or transfer) would be confirmed for each land parcel during detailed design.

B12.3.2 General land use impacts

Direct impacts on land use during construction would result from the permanent and temporary land requirements described in section B12.3.1 and the short-term presence of construction equipment, plant, vehicles, compounds and work sites within the construction footprint. During construction, the use of this land would change from those uses described in section B12.2 to a construction site. Public access to this land (where it is currently available) would be restricted.

During the construction phase, about 3,316 ha of land would be affected, comprising the proposal's permanent land requirements, the additional temporary construction requirements, land already owned by ARTC, and other areas that do not require acquisition (such as existing road corridors). The land that would be affected is currently mainly used for:

- Agriculture (about 2,554 ha, which is about 78 per cent of the proposal site)
- Production native forests (about 612 ha, which is about 18 per cent of the proposal site).

Smaller areas of land used for transport and communication (about 2.2 per cent), residential and farm infrastructure (about 1 per cent) and natural areas, such as rivers and marshes, would also be affected.

The majority of land affected by the proposal is zoned RU1 Primary Production (about 2,530 ha or about 76 per cent of affected zoned land). Other land affected comprises land zoned:

- RU3 Forestry (about 618 ha or about 19 per cent of affected zoned land)
- IN1 General Industrial (about 116 ha or 4 per cent of affected zoned land)
- R5 Large Lot Residential (about 12 ha or 0.2 per cent of affected zoned land).

It is noted that land uses have been defined using Department of Planning, Industry and Environment mapping, and land use zoning is based on LEP mapping. There may be some discrepancies between the two data sets, which generate small differences in total areas within some land use categories.

B12.3.3 Agricultural land use impacts

Agricultural land and land capability

Construction works and associated land requirements would have a range of potential impacts on agricultural resources, depending on the different stages of construction. In addition to land use change, construction has the potential to directly affect land capability and the availability of strategic agricultural land in the region, with the potential to reduce the productive potential of agricultural land.

As noted in section B12.3.2, it is estimated that about 2,554 ha of agricultural land would be affected by the proposal site. This would reduce agricultural yields and income for farm operators. A breakdown of the various existing uses of this land is provided in Table B12.3. The majority of affected land is currently used for grazing or cropping. Limited irrigated cropping land would be affected by the proposal, with about 23 ha removed from production.

The affected land represents about 0.07 per cent of agricultural land in the study area. The impact on biophysical strategic agricultural land would comprise about 91 ha, which represents about 0.064 per cent of available strategic agricultural land in the study area. About 2 per cent of affected land would be class 2 (very high capability) land, with the majority of land (98 per cent) being class 3 to 6.

The affected land includes about 1,512 ha of agricultural land that would be temporarily affected during construction only. This land would be rehabilitated and available for agricultural use once construction is complete.

TABLE B12.3 AREA OF AGRICULTURAL LAND AFFECTED DURING CONSTRUCTION

Type of agricultural use	Approximate area affected during construction (ha)	Proportion of total (%)
Cropping	1,417	55
Grazing native vegetation	825	32
Grazing modified pastures	286	11
Irrigated cropping	23	1
Farm buildings / infrastructure	2.2	0.1
Perennial horticulture	1	0.04
Intensive animal production	0.13	0.1
Irrigated perennial horticulture	0.01	0

Impacts on farm infrastructure and farming operations

Property severance/lot realignment

As a result of the long linear nature of the proposal, the key potential impact on farming operations relates to property severance. This could occur where the new rail corridor or changes to road infrastructure result in part of an overall property being physically separated from the remainder of the property (either temporarily or permanently). Property severance could permanently disrupt the overall configuration of a property, affecting efficiency, productivity and viability. This could occur, for example, as a result in changes in access arrangements for the movement of farm machinery or stock movements to different areas of a property. Additional capital investment could be required to replace current infrastructure (e.g. livestock handling yards) in some locations.

Realignment of paddocks as a result of severance could affect the sustainability, productivity and profitability of individual paddocks that have previously been set up for controlled traffic (tramline) and precision farming systems. Controlled traffic (tramline) farming systems are built using permanent wheel tracks. Farm machinery implements have a specific span and are confined to specific lanes, improving profitability and sustainability. The realignment of lots could cause issues where farm machinery can no longer achieve the efficiencies in long continuous runs and new crops are unable to achieve the previous yields on compacted soils if new tramlines have to be established. This may result in the permanent reduction in crop yields in some locations.

Some severed portions may become unviable due to size of remaining area, configuration or access.

Access impacts

The proposal also has the potential to affect internal access arrangements within properties, including internal farm access tracks/roads. Internal farm access roads have been constructed to provide maximum efficiency and provide all-weather access to hubs and key infrastructure (including homesteads). Severance could result in the isolation of farming operation hubs.

In addition to access within properties, construction could also impact farming operations by temporarily affecting access to properties as a result of blockages, temporary rationalisation of access points, any damage to roads from heavy vehicles, and an inability to access key infrastructure during flood events. Further information on the potential for access impacts during construction, and the approach to managing these impacts, is provided in chapter B11.

Other impacts

Other potential direct impacts on farm infrastructure and farming operations could occur as a result of:

- Impacts on soil and/or surface or groundwater resources/supplies
- Inadvertent damage to property/farm infrastructure
- Impacts on livestock fencing that could result in unintended livestock risks
- Impacts on animal welfare and stock behaviour.

Potential indirect impacts on agricultural production could occur as a result of construction activities on adjoining areas, which could affect the ability of landholders to fully utilise the productive capacity of their land. These include:

- Interrupted management of various crop and livestock husbandry operations, such as weed spraying and harvesting
- Dust (affecting crops and pastures), noise and light (affecting grazing patterns of livestock)
- Reduction in water availability
- Competition for labour supply
- Reduced throughput for local agricultural supply, marketing and transport services as a result of a reduction in total agricultural production.

The main impact expected as a result of any combination of these types of impacts is increased time and costs for farm owners/operators. Typically, farms have been physically set up to maximise efficiency, productivity and profitability. Any requirement to reduce or displace this set up has the potential for detrimental impacts on the effective functioning of farm operations. The extent and significance of these potential impacts would vary across individual properties.

Further information on potential property impacts is provided in section B12.3.6. The potential economic impacts on agricultural production are considered in chapter B14. The approach to managing potential impacts is described in section B12.5.

The proposal includes establishing groundwater extraction bores to provide water for construction. These bores would not affect water sources used by agricultural activities as a result of their depth. Further information on potential impacts on water resources is provided in chapter B2.

Biosecurity risks

The productivity and profitability of agricultural production depends, in part, on the management of pests and diseases, including the prevention of incursion of pests and diseases onto properties. Biosecurity is a term that is commonly used for such management and the set of measures adopted to protect a property from the entry and spread of pests, diseases and weeds.

The *Biosecurity Act 2015* (NSW) provides a framework for the prevention, elimination and minimisation of biosecurity risks. The General Biosecurity Duty under the Act requires a person who deals with a biosecurity risk and ought reasonably to know it must ensure (as far as reasonably practicable) that the risk is prevented, eliminated or minimised. In practical terms this requires people to be aware of their surroundings and take action to prevent the introduction and spread of pests, diseases, weeds and contaminants. The *Biosecurity Regulation 2017* sets out a range of additional mandatory measures for biodiversity risk management.

If a new weed, pest or disease becomes established, it can affect agricultural properties through increased costs (for monitoring, production practices, additional chemical use and labour), reduced productivity (in yield and/or quality) or loss of markets.

The proposal would result in the increased movement of vehicles and people to, around and within the proposal site during construction. The main biosecurity risk relates to the spread of weeds that may result from the increased movement of vehicles. Weed seeds could be transported through and within the site on clothing and via vehicle wheels and undercarriages.

B12.3.4 Impacts on State forests

State forests

The proposal site extends through the Merewindi, Baradine, Cumbil, Euligal, and Pilliga East State forests for a distance of about 70 km.

The proposal would impact about 618 ha of land zoned RU3 Forestry during construction (including temporary and permanent impacts). The proposal generally intersects areas of forests classified Zone 4: General Management Zone, with areas near watercourses classifed Zone 3A: Forestry Exclusion Zone. The proposal site also intersects two areas zoned Zone 3B: Special Prescription Zone.

As a result of these impacts, the rearrangement of forestry compartments and access tracks may be required to allow for the efficient harvesting of timber, with a review of the affected Zone 3B components required to ensure the appropriate retention of fauna habitat. About 60 per cent of the proposed rail corridor is located adjacent to existing roads, minimising the level of fragmentation of the forest resource. The balance of the alignment is located in areas with minimal road infrastructure.

Level crossings are proposed along the rail corridor within the affected forests to allow the rail corridor to be crossed by access tracks about every 3 to 4 km.

Hunting is permissible with a licence in State forests. For safety reasons there would need to be some limitations imposed during construction. ARTC would consult with the relevant stakeholders to establish appropriate management measures and communications requirements.

About 2 km of the proposal site would pass through compartment 505 of the Pilliga East State Forest, which is proposed to be harvested before the end of 2020. As a result, the potential impacts on yield would be minimal at this location. The proposal site would also intersect with the southern edges of compartments 477, 478 and 479, where the site is immediately adjacent to Pilliga Forest Way.

The proposal site would pass through compartment 330 of the Cumbil State Forest and would require about 14 ha of land along the western boundary of the compartment, which has a total area of about 385 ha. Compartment 330 includes a Continuous Forestry Inventory plot, which has an area of about 0.1 ha, located about 70 metres (m) west of Cumbil Road. This plot would not be impacted by the proposal.

The proposal would also require realignment of about 6.7 km of Pilliga Forest Way to minimise the number of level crossings. This would affect forestry operations at this location during construction as a result of changed access arrangements, with the potential for longer travel distances to access appropriate detours.

Forest products that would need to be removed could be used for a number of beneficial uses. Where trees are suitable, the highest and best use would be for use as sawlogs. Lower value applications would need to conform to the requirements of the Integrated Forestry Operations Agreement.

At the completion of construction, about 185 ha of land zoned RU3 Forestry, which would be affected by the proposal's temporary land requirements, would potentially be available for forestry uses. ARTC would consult with the Forestry Corporation of NSW to agree final land uses and outcomes.

Construction has the potential to increase the risk of bushfire in forest areas. Potential ignition sources include uncontrolled discarding of cigarettes and domestic rubbish (such as glass bottles) by construction workers and the generation of sparks through hot works, such as welding, or an excavator bucket making contact with rock. Fuel leaks and spills from plant and machinery and the storage of flammable goods during construction could also provide a fuel source for bushfires, if ignited.

Waterfront land and access for recreational fishing

The proposal site would cross numerous watercourses and floodplains via bridges and culverts. Construction of crossings would interface with waterfront land. The potential impacts on waterfront land are considered in chapter B2.

Recreational access to watercourses crossed by the proposal site, including the Macquarie River, Namoi River and Castlereagh River, would be restricted in the vicinity of the proposal site during construction, for safety reasons. Given the non-perennial nature of most watercourses where crossings are proposed, it is unlikely that the majority of these would be used for recreational fishing.

B12.3.5 Other land use impacts

Impacts on travelling stock reserves

In the majority of cases, the rail corridor would achieve near-perpendicular crossings of travelling stock reserves; however, between the Pilliga forests and Narrabri, the alignment is more parallel to the reserves, as both the reserves and the rail alignment tend to follow the Newell Highway.

The proposal allows for stock crossings at the following travelling stock reserves (shown in the maps in Part E):

- R34248—by passing under the proposed bridge over the Macquarie River
- R3420—via the adjacent proposed level crossing
- R48903 and R23332—by passing under the proposed bridge over the Castlereagh River
- R23332 (northern)—via the adjacent level crossing
- R44590 and R941—by passing under the proposed bridge over the tributary to Bohena Creek
- R27999—via a culvert.

These crossings would enable the continued use of the travelling stock reserves for their intended purposes.

The proposal would require land within connected travelling stock reserves R44590 and R941, located near Cains Crossing Road and immediately west of the Newell Highway. These reserves have been classified by Local Land Services as category 3 sites, which are *'rarely if ever used for travelling stock or emergency management, but are important, valued and used for other reasons'*. Reserve access would be maintained via the diverted Cains Crossing Road.

Travelling stock reserve R43452 'Marchants', which is a stock camp, would be divided by the proposal site. This reserve is classified as a category 3 site. A crossing is not proposed at this location, as it has not been identified as required during consultation undertaken to date. The proposal would split this reserve into two approximately equal parts, with each part of the reserve accessible via Berida Road. About 12 per cent of the reserve would be directly affected.

About 0.03 ha of travelling stock reserve R9489 'Narrabri West' is currently encroached by the construction footprint. Given the minimal encroachment, it is likely that impacts on this reserve could be avoided during detailed design and construction planning.

The proposal would also affect an area used as an informal recreation reserve/rest area, located adjacent to the Mitchell Highway and the Macquarie River. This area, which is known as Three-mile Reserve, forms part of travelling stock reserve R34248. The proposal site crosses the Macquarie River and reserve at this location via a bridge. Construction may affect access within areas of the reserve.

No livestock highways would be affected.

Impacts on mining leases and licences

As noted in section B12.2.3, the proposal site intersects, or is located in the vicinity of, nine active exploration licences. The size of these areas is very large relative to the proposal site, making the likelihood of high-value resources being discovered under the proposal site reasonably low, despite being in an exploration area. The proposal site is generally aligned close to other infrastructure and property boundaries, minimising the potential for the proposal to sterilise land from mining. Similarly, the inclusion of numerous level crossings means that the proposal is unlikely to form a barrier to future exploration of the area.

The proposal would not directly impact any coal seam gas wells. The nearest existing coal seam gas wells are located around 5 km from the proposal site. Given the nature of coal seam gas extraction processes, it is unlikely that the proposal would indirectly impact on the capacity to extract coal seam gas.

The proposal would not directly impact any active mines. The four active (black coal) mines in Narrabri are located some distance from the proposal site.

The proposal is unlikely to negatively affect the viability of the proposed quarries near Narromine (located close to the proposal site), with road access maintained to both sites.

Impacts on Crown land

In general, the proposal site does not run within and along existing formed road corridors. One of the main exceptions to this is at the Newell Highway north of Cains Crossing Road, where the limited space between Bohena Creek and the highway means that the proposal site encroaches into the existing road reserve. At this location the road reserve is about 75 m wide. The impact of this encroachment would be that if the highway needs to be modified in this location in the future there could be less design flexibility than otherwise would have been the case. Given the constraints at this location, the impact is considered to be acceptable.

The proposal site interacts with a number of roads, including Crown (paper) roads. Further information on public road interactions, and a description of the proposed road realignments, crossings and closures, are provided in sections A6.3.3 and A7.4.

The proposal would also affect two parcels of Crown land (lot 49 of DP 752563 in Gilgandra and lot 7004 of DP 1060845 in Quanda), which have been designated/reserved for the preservation of trees and vegetation. The potential impacts on biodiversity, including native vegetation, are considered in chapter B1.

Acquisition of Crown land would be undertaken in consultation with the Department of Planning, Industry and Environment, and in accordance with the requirements of the *Crown Land Management Act 2016* (NSW) and the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW).

The physically large scale of native title claims, and their undetermined status, makes it difficult to assess the ultimate impact on these claims. Any acquisition of non-alienated Crown lands would be subject to the 'future acts' provisions of the *Native Title Act 1993* (Cth).

Services and utilities impacts

The design has, and would continue to, take into account the location and potential impacts on services and utilities within and adjacent to the proposal site. Where required, these would be relocated and/or protected. The majority of overhead electrical cables would require raising to provide adequate clearance for the double-stacked freight trains. All relocations would be designed and undertaken in consultation with the relevant asset owner.

B12.3.6 Property impacts

The main property impacts would be associated with the proposal's land requirements (see section B12.3.1), which have the potential to:

- Partially affect a property where part of a site is required, potentially requiring adjustments to, or relocation of, facilities to other parts of the site as a result of direct impacts and/or severance
- Fully affect a property if the entire site on which a property is located is required.

The temporary land requirements would be in addition to the permanent land requirements; however, the majority would affect the same properties. Construction requires a larger working area beyond the operation footprint.

Where properties are partially affected by the proposal, ARTC would generally undertake acquisition of the freehold or leasehold interests of the directly affected portion of a property. Partial land requirements for the proposal may require the removal or relocation of infrastructure, such as fencing, farm dams and other directly affected structures. Concerns about potential impacts on farm infrastructure, such as dams, water infrastructure, silos and machinery storage, were raised during consultation with landholders. These potential impacts would be considered as part of the acquisition process (see section B12.5).

Concerns were raised by landholders during consultation with ARTC about potential impacts associated with the severance or fragmentation of rural properties due to partial land requirements. In particular, issues raised related to issues such as severance, viability of farming operations, impacts on efficiency of farming operations and increased operating costs due to changed farm access. Potential impacts on farming operations are considered in section B12.3.3.

The proposal site has been located along property boundaries, as far as possible, to avoid fragmentation of properties. Despite this, partial land requirements would result in the severance or fragmentation of numerous properties, particularly larger land holdings. Disruptions to internal property access has the potential to reduce the efficiency of farming operations, increase operating costs associated with the movement of livestock and/or farm machinery within a property, and require changes to current farming practices. This would have the potential for property impacts, with the significance of these impacts varying according to a range of factors across different properties. Access to residual property parcels would be maintained via existing local roads or provision of level crossings, as far as reasonably practicable. ARTC would undertake further consultation with affected landowners to identify residual parcels of land and develop appropriate management measures, which may include acquisition.

Partial property requirements for road infrastructure would mainly be associated with localised road realignments to maintain safe vehicle access across the rail corridor. This would generally affect land adjoining existing road corridors or the proposed corridor. The requirement for this land is not expected to impact the overall use or functioning of affected rural properties beyond that described for the proposed rail corridor.

B12.4 Impact assessment—operation

B12.4.1 General land use impacts

Direct impacts on land use during operation would result from the permanent land requirements and the presence of operational rail and road infrastructure within the operational footprint.

About 1,805 ha of land would be permanently affected by the proposal, comprising land that is mainly used for:

- Agriculture (about 1,300 ha, 75 per cent of the proposal site)
- Production native forestry (about 429 ha, 24 per cent of the proposal site)
- Transport and communication (about 51 ha, 3 per cent of the proposal site).

Other land uses affected comprise small parcels of land (each less than 6 ha in total) used for residential and farm infrastructure, services, manufacturing and industrial, mining and natural resources (including rivers and reservoir/dams).

The majority of land that would be permanently affected by the proposal is zoned RU1 (primary production) (about 1,324 ha or 73 per cent of affected zoned land), with the remainder comprising:

- RU3 Forestry (about 433 ha or 24 per cent of affected zoned land)
- IN1 General Industrial (about 15 ha or 0.8 per cent of affected zoned land)
- R5 Large Lot Residential (about 9 ha or 0.5 per cent of affected zoned land).

The majority of this land would be located within the new rail corridor.

About 1 per cent of land affected during construction would be class 2 (very high capability) land, with the remainder being class 3 to 6.

Operation would result in a permanent change in the use of the above land, from the existing land uses to a transport (rail or road) use.

B12.4.2 Agricultural land use impacts

Agricultural land and land capability

It is estimated that the permanent (operational) land requirements would result in about 1,300 ha of land being removed from agricultural production. This represents about 0.04 per cent of agricultural land in the study area. A breakdown of the various existing uses of this land is provided in Table B12.4. This loss of productive land is expected to have a minimal impact on overall agricultural output across the region.

There could also be a permanent change in land use from cropping to grazing in some areas due to reconfiguration of paddocks, which could occur following return of land temporarily occupied during construction only (see section B12.3.1) and/or property severance impacts (see section B12.3.3 and following).

TABLE B12.4 AREA OF AGRICULTURAL LAND AFFECTED DURING OPERATION

Type of agricultural use	Approximate area affected during operation (ha)	Proportion of total (%)
Cropping	682	52
Grazing native vegetation	444	34
Grazing modified pastures	159	12
Irrigated cropping	14	1
Farm buildings / infrastructure	0.80	0.01
Intensive animal production	0.02	0.1

Impacts on farm infrastructure and farming operations

The potential issues and impacts described in section B12.3.3 would continue to be relevant during operation for those properties affected by the proposal's permanent land requirements.

Property severance has the potential to result in ongoing additional time and costs in moving livestock and machinery between severed parcels of land, making farm operations less efficient and practical. Additional capital investment could be required to replace current infrastructure in some locations.

Property severance may also reduce the land capability and viability of some parcels of land as a result of reduced or impractical sizing of paddock parcels, requiring conversion to a lower yield of agricultural production, or even discontinuation of use of some parcels of land. This would require additional capital investment for any conversion activities and could affect the profitability of some farm holdings.

The impact of severance on farming operations is highly dependent on the circumstances of each farming business. Relevant factors include the nature of farming enterprise, the capacity of severed land to be accessed from on-farm operational hubs and the capacity of the enterprise to adapt to the changed operational circumstances. Measures to address severance impacts, including, but not limited to, amalgamation opportunities, would need to be considered on a property-by-property basis as part of the land acquisition process, consistent with Division 4 of Part 3 of the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW).

Permanent alternations to access arrangements may increase time and cost for the movement of agricultural machinery and livestock. Potential access impacts are considered in section B11.4.2.

The movement of trains along the new rail line, together with changes to access arrangements across the rail line, has the potential to affect movement patterns for farm machinery and livestock that need to cross the rail corridor. Affected agricultural landholders may need to consider train movement patterns to assist with safe scheduling of routine agricultural activities.

Biosecurity risks

Road vehicular movements along the rail corridor during operation would be limited to occasional maintenance vehicles using the operational access road within the corridor. Consequently, the risks for the dispersion of weeds would be low and would be managed in accordance with ARTC's standard maintenance procedures.

While any residual lands remain in ARTC's ownership/control, ARTC would continue to manage the land in accordance with the General Biosecurity Duty under the *Biosecurity Act 2015*.

B12.4.3 Impacts on future use, subdivision and development potential

The proposal has the potential to result in a change in the distribution of holding sizes as a result of land requirements and severance impacts.

Development controls within local environmental plans restrict the subdivision of rural land below a specified size (typically 500 to 1,000 ha). New lots that may be created as a result of the proposal (e.g. located across the rail corridor from the main property) may be below the minimum lot size.

The proposal has the potential to create some smaller parcels of land separated from the main area of a property. The size of the parcels and the remaining area, configuration and/or access arrangements may affect how these areas of land are used in the future. Appropriate consideration of access arrangements for affected properties would be developed in consultation with affected stakeholders during detailed design.

The proposal is unlikely to affect the capacity of urban zoned land to be used for its purpose. The part of the proposal that is closest to sensitive urban land uses, the Narromine West connection, is already located close to existing rail infrastructure. As a result, the proposed connection in unlikely to substantially alter the urban land use potential of this area.

The proposal passes through lot 52, DP 661453, Eumungerie Road, Narromine. This land is currently used for agriculture but was rezoned to R5 Large Lot Residential in 2015. Land would be required from this lot (about 9 ha). This would result in a small reduction (about 7 per cent) of the area available for any future development of the lot. In addition, given the proximity of the remaining land to the proposal site, any future development of land near the rail corridor would have the potential to be affected by amenity impacts (particularly noise and visual impacts) during operation.

The proposal passes within 200 m of land zoned R5 Large Lot Residential located to the south of the Narrabri town centre. No development of this land has occurred to date. About 200 ha of the total area of this land (about 1,900 ha) is located within about 1 km of the proposal site. The proposal has the potential to affect the amenity of this area (mainly as a result of the potential for night-time noise impacts during operation).

It is expected that amenity changes at properties along the rail corridor resulting from train operations would be intermittent throughout the day. The landscape and visual amenity of some areas close to the proposal site would change as a result of the proposed rail infrastructure (e.g. rail line, fencing, bridges and culverts) and train operations. The significance of impacts would depend on the location. Potential operational noise and visual impacts are considered in chapters B9 and B13 and mitigation measures are provided in those chapters to minimise the potential impacts, as far as reasonably practicable.

Decisions will be made by individual landowners about existing and future developments based on their own assessment of the potential impacts of the proposal. Such individual assessments may affect decisions around land development beyond the outcomes of the assessment and statutory approval process for the proposal.

B12.4.4 Impacts on State forests

The proposal site would permanently affect about 433 ha of State forest (land zoned RU3), representing around 0.2 per cent of State forest land in the study area. As noted in section B12.3.4, at the end of construction, around 185 ha of land could be returned for forestry use. Depending on the final form agreed, it might be a long period of time before these areas would become productive forests again.

It is not expected that operation would result in permanent impacts on recreational activities in State forests, as level crossings and alternative access tracks would provide connectivity across the rail corridor.

Once the Pilliga Forest Way is realigned, it should provide a benefit for local road users through improved road safety and sight lines.

Operation has the potential to cause ignition sources through littering and the mechanical failure of infrastructure components that can exacerbate ignition risks. This could include failure of metal components at high speeds. This is considered to be a minor risk and would be managed in accordance with ARTC's standard maintenance procedures.

B12.4.5 Other land use impacts

Impacts on travelling stock reserves

Operation is not expected to have any additional impacts on travelling stock reserves beyond those identified in section B12.3.5.

Impacts on mining and petroleum licences

The proposal is not expected to permanently affect any operating mines or extractive industries, or impede exploration activities or access for future exploration.

Impacts on Crown land

Road changes, including to Crown roads, are proposed, as described in sections A6.3.3 and A7.4. The proposal seeks to maintain access to properties by a reasonable public road route. This approach would minimise the potential for access impacts and functionally continues to deliver the purpose of the existing road reserve/land use.

Operation is not expected to have any other impacts on Crown land beyond those identified for construction (see section B12.3.5).

Services and utilities impacts

Operation is not expected to have any impacts on services and utilities.

Waterfront land and access for recreational fishing

All bridges and culverts have been, and would continue to be, designed with consideration to the *Guidelines for watercourse crossings on waterfront land* (DPI, 2012b). Where bridges are provided, the proposal is unlikely to impact accessibility for recreational fishing. Watercourses crossed using culverts are unlikely to impact recreational fishing, as the vast majority of watercourses are non-perennial.

B12.4.6 Property impacts

During operation, property impacts would be associated with the permanent land requirements of the proposal (see section B12.3.1). This has the potential to reduce the amount of land available at a particular property and/or affect farming operations at agricultural properties.

The potential impacts at each individual property would differ. In general, similar to the potential impacts during construction, the main potential for property impacts would be associated with changes to property access, severance, and permanent loss of land for productive agricultural uses.

Many agricultural properties affected by the proposal operate as a single management unit. During operation, the proposal would have the potential to affect property configuration, and may result in the severance of properties and the isolation of key agricultural infrastructure. As far as practicable, the design has sought to follow property boundaries to minimise severance of properties and sterilisation of larger properties. The rationalisation of access points could affect access to property and result in additional time and costs associated with accessing paddocks, properties and undertaking routine agricultural operations within the same property.

Internal access/rail corridor crossing and fencing arrangements within properties would be identified in consultation with landholders.

B12.5 Mitigation and management

B12.5.1 Approach

Approach to mitigation and management

Approach to managing key potential impacts identified

The key approaches to managing the potential impacts identified would involve:

- Minimising the construction and operation footprints as far as practicable
- Managing the acquisition process in accordance with relevant requirements
- Minimising the potential for direct impacts on properties; in particular, agricultural operations and infrastructure.

Minimising the construction and operation footprints

The design would continue to be refined to minimise the proposal's land requirements and associated property impacts as far as possible. Consultation with landholders would be ongoing to identify opportunities to minimise impacts on property operations and farm infrastructure, where practicable.

Utility adjustments required would be confirmed during detailed design in consultation with utility owners. Adjustments would be contained within the proposal site (including within existing or new road corridors), where practicable; however, there is the possibility that adjustments could extend beyond the proposal site. Minimising the construction and operation footprints would also assist in minimising the extent of utility adjustments.

Interruptions to utilities would be minimised as far as possible. Where interruptions are required, consultation with affected landowners and utility owners would be undertaken and advance notice provided by the appropriate body, to minimise any unavoidable impacts as far as practicable.

A utilities management framework (provided in Appendix J) has been prepared, adopting a risk-based approach to avoiding and/or minimising impacts associated with the relocation and/or adjustment of public utilities affected by the proposal. The framework provides a consistent approach to the assessment and management of public utilities relocation/adjustment across all proposal activities.

Acquisition or lease arrangements

ARTC is responsible for undertaking land acquisition negotiations for Inland Rail on behalf of Transport for NSW. All property acquisitions would be managed by ARTC in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW). It is Transport for NSW's preference to acquire land by negotiated agreement; however, a compulsory acquisition process may be required if agreement cannot be reached or is otherwise necessary.

ARTC would undertake the acquisition process for the proposal's permanent land requirements in accordance with the Inland Rail Acquisition Protocol Deed between ARTC and Transport for NSW.

Land required during construction only would be via a lease or memorandum of understanding with the relevant government agency or private landholder.

Acquisitions and leases on privately-owned land, or land owned by the NSW/local government, would be carried out in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW). Information about acquisitions under the Act can be viewed online at **finance.nsw.gov.au/land-property/land-acquisition-reform-2016**.

Compensation payable pursuant to section 55 of the *Land Acquisition (Just Terms) Compensation Act 1991* (NSW) generally includes, among other things, provisions for market value and disturbance items, such as associated legal costs, valuation fees, relocation and removal expenses, and mortgage costs (i.e. fees associated with the discharge of mortgages and creation of a new mortgage where relocation is required).

Depending on the individual circumstances of each land/business owner and the proposed impacts on the land and to operations, compensation may take the form of money or land/works—as agreed by the parties.

Managing property impacts

The approach to managing potential property impacts, particularly impacts on farm infrastructure and farming operations, would involve developing property-specific measures to manage the requirements at individual properties during the acquisition process. This would involve determining requirements, in consultation with individual landholders, for property-level responses during construction and operation.

During the property acquisition/leasing process, ARTC would seek to secure agreement with affected landholders, to guide property-level design requirements and the management of construction on, or immediately adjacent to, private properties. These may include:

- Measures to minimise property impacts, including on agricultural operations
- Specific requirements to ensure that operations, including the movement of livestock and farm machinery, are able to be maintained as efficiently as possible
- Measures to manage severance impacts, where practicable, including appropriate access solutions and amalgamation opportunities (where available)
- Required adjustments to affected structures.

The agreements would be prepared in accordance with ARTC's acquisition strategy for Inland Rail.

Property impacts would be compensated in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (as noted above) and with reference to *Determination of compensation following the acquisition of a business* (NSW Government, n.d) (as appropriate).

Property owners and occupants would be consulted in accordance with the communication management plan for the proposal. Consultation would ensure that owners/occupants are informed about the timing and scope of activities in their area, and any potential property impacts/changes, particularly in relation to potential impacts on access, services, or farm operational arrangements. It would also assist in identifying feasible and reasonable property-specific measures where construction is located on, or immediately adjacent to, private properties and has the potential to affect farm operational arrangements.

Approach to managing other impacts

Other measures to further minimise impacts on land use and property are provided in section B12.5.2.

Expected effectiveness

The mitigation measures specified in Table B12.5 are anticipated to reduce the likelihood and/or consequence of the identified risks. Developing property-specific measures to managing impacts at affected properties, in consultation with individual landholders, is expected to be the most effective measure to minimise the potential impacts of the proposal as far as reasonably practicable.

Interaction between measures

During construction, options for impact mitigation would depend on the specific activity being undertaken, and the location where it is occurring. For example, it would be the responsibility of the construction contractor to select and implement appropriate traffic controls in accordance with the construction traffic, transport and access management plan (see section B11.5).

Mitigation measures to manage the potential for traffic and access, air quality, noise, socio-economic, waste, and health and safety impacts would also assist in minimising the potential for land use and property impacts. In particular, measures to manage the potential for access impacts are provided in section B11.5.

The rehabilitation strategy (see section A8.7) would also assist in mitigating potential property impacts.

B12.5.2 List of mitigation measures

Measures that will be implemented to address potential impacts on land use and property are listed in Table B12.5.

TABLE B12.5 LAND USE AND PROPERTY MITIGATION MEASURES

Stage	Ref	Impact/issue	Mitigation measures
Detailed design/ pre-construction	LP1	*Land use and property impacts, including severance and other impacts on operations*	The design and construction planning would continue to be refined to minimise potential impacts on land uses and properties as far as reasonably practicable. Consultation with landholders would be ongoing to identify opportunities to minimise impacts on their operations where practicable.
	LP2	*Acquisition and property impacts*	All property acquisitions would be undertaken in consultation with landowners and in accordance with the requirements of the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW). In line with the *Land Acquisition Act (Just Terms Compensation) Act*, ARTC's preference is for acquisition by agreement, where practicable.
	LP3	*Acquisition and property impacts*	During the property acquisition process, ARTC would seek to secure agreement with affected landholders, to guide property-level design requirements and the management of construction on, or immediately adjacent to, private properties. The agreements may include: ▸ Measures to minimise property impacts, including on agricultural operations ▸ Specific requirements to ensure that operations, including the movement of livestock and farm machinery are able to be maintained as efficiently as possible ▸ Measures to manage severance impacts, where practicable, including appropriate access solutions and amalgamation opportunities ▸ Required adjustments to affected structures. Where land is acquired, compensation would be assessed in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW) and *Determination of compensation following the acquisition of a business* (NSW Government, n.d.).

Stage	Ref	Impact/issue	Mitigation measures
Detailed design/ pre-construction [continued]			Depending on the individual circumstances of each land/business owner and the proposed impacts on the land and to operations, compensation may take the form of money or land/works—as agreed by the parties.
	LP4	*Acquisition and property impacts*	Property owners and occupants would be consulted in accordance with the communication management plan, to ensure that owners/occupants are informed about: ▸ The timing and scope of activities in their area ▸ Any potential property impacts/changes, particularly in relation to potential impacts on access, services, or farm operational arrangements ▸ Activities that have the potential to impact on livestock. Feasible and reasonable property-specific measures would be identified in consultation with landholders and implemented during construction where construction is located on, or immediately adjacent to, private properties and has the potential to affect farm operational arrangements.
	LP5	*Maintaining permanent access, addressing changed access arrangements*	Where any legal access to a property is permanently affected and a property has no other legal means of access, alternative access to and from a public road would be provided to an equivalent standard, where feasible and reasonable. Where an alternative access is not feasible or reasonable, and a property or part of a property is left with no access to a public road, consideration would be given to acquisition of the property or part of the property in accordance with the provisions of the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW). In accordance with the Act, ARTC's preference is for acquisition by agreement, where practicable.
	LP6	*Maintaining permanent access, addressing changed access arrangements*	Where the proposal affects property access arrangements, input would be sought from relevant landholders prior to finalising the detailed design. Where changes to access arrangements are required for individual properties, ARTC would advise relevant property owners/occupants and consult with them in advance regarding alternative access arrangements.
	LP7	*Impacts on Crown land*	The acquisition of Crown land would be undertaken in consultation with the Department of Planning, Industry and Environment, and in accordance with the requirements of the *Crown Lands Management Act 2016* (NSW) and the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW).
	LP8	*Impacts on livestock*	The need for additional stock management infrastructure on either side of level crossings, such as forcing yards and holding pens, would be identified in consultation with the relevant landholders.
	LP9	*Impacts on livestock*	Livestock fencing would be provided in agricultural areas (as required) to minimise the risk of livestock-train collisions. The preferred fencing arrangements would be confirmed in consultation with landholders.
	LP10	*Maintenance of fencing*	Maintenance agreements would be established for fencing along the rail corridor located within private properties. The agreements would include protocols for reporting damage and arranging repairs of shared boundary fencing.
	LP11	*Minimising impacts on travelling stock reserves*	Local Land Services would continue to be consulted during detailed design to confirm how impacts on travelling stock reserves would be avoided during construction and operation. Alternative access arrangements would be made as required, subject to maintaining rail safety.

Stage	Ref	Impact/issue	Mitigation measures
Detailed design/ pre-construction [continued]	LP12	*Minimising impacts on travelling stock reserves*	Opportunities to refine the design to avoid construction footprint impacts on travelling stock reserve R9489 'Narrabri West' would be investigated.
	LP13	*Impacts on services and utilities*	The location of all utilities, services and other infrastructure, and requirements for access to, diversion, protection and/or support, would be confirmed prior to construction. This would include (as required), undertaking utilities investigations, including intrusive investigations, and consultation and agreement with service providers.
	LP14	*Impacts on, and construction within, State forests*	The Forestry Corporation of NSW would continue to be consulted in relation to: ▸ Minimising the potential impacts on forestry management practices, including the need for exclusion zones in specific areas where required ▸ Opportunities for beneficial reuse of forest products that would be removed during construction.
	LP15		Appropriate management measures and communication requirements for users of State forests in the vicinity of the proposal site would be defined in consultation with the Forestry Corporation of NSW and forest users.
Construction	LP16	*Biosecurity*	The biodiversity management plan included in the CEMP (mitigation measure BD7) would include measures to minimise the potential for biosecurity risks during construction in accordance with the *Biosecurity Act 2015.*
	LP17	*Access to properties*	Access to individual residences, services and businesses, and for livestock across the rail corridor, would be maintained during construction. The construction traffic and transport plan included in the CEMP (mitigation measure TT5) would include measures to ensure that access to properties would be maintained at all times during construction. Where alternative access arrangements need to be made, these would be developed in consultation with affected property owners/occupants, and Local Land Services for travelling stock reserves.
	LP18	*Access within State forests*	The traffic, transport and access plan included in the CEMP (mitigation measure TT5) would include measures to ensure that access within State forests is retained, to enable forestry operations to continue during construction.
	LP19	*Rehabilitation*	The rehabilitation strategy (mitigation measure BD11) would include measures to restore disturbed sites that do not form part of the operational footprint (such as compounds, temporary workforce accommodation) as close as practicable to the pre-construction condition or as agreed with the landholder. Rehabilitation of disturbed areas would be undertaken progressively, consistent with the rehabilitation strategy and property-level design requirements (where relevant).
	LP20	*Water supplies for farm operations*	Farm water pipelines, dams and drainage channels would be replaced or reinstated to ensure continuity of stock and domestic water supplies prior to removal of existing impacted infrastructure.
Construction [continued]	LP21	*Bushfire risk in forest areas*	The flood and emergency response plan (mitigation measure FH4) would include measures to minimise the potential for bushfire risks.
Operation	LP22	*Safety*	Guidance would be provided to agricultural landholders at the commencement of operation regarding the frequency of train movements to assist with safe scheduling of routine agricultural activities.

B12.6 Residual impact assessment

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 B12.5.1 and B12.5.2).

The key potential land use and property issues and impacts originally identified by the environmental risk assessment (see section A9.1) are listed in Table B12.6. 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 land use and property assessment, summarised in sections B12.3 and B12.4. The mitigation and management measures (listed in Table B12.5) 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 B12.6 RESIDUAL IMPACT ASSESSMENT—PROPERTY AND LAND USE

Assessment of Pre-mitigated risk (see section A9.1 and Appendix E)					Mitigation measures ref (see Table B12.5)	Residual impact assessment			
Phase	Potential impacts	Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating	How residual impacts will be managed[1]
Construction	Indirect impacts on agricultural land use/production and livestock from construction activities, including impacts from changes to access, noise and air pollution	Possible	Moderate	Medium	LP1, LP4, LP16, LP17, LP20 and mitigation measures in other chapters	Unlikely	Minor	Low	n/a
	Disruption to forestry practices as a result of works within State forests	Possible	Moderate	Medium	LP14	Unlikely	Minor	Low	n/a
	The movement of construction machinery and materials introduces biosecurity risks	Possible	Moderate	Medium	LP16	Unlikely	Minor	Low	n/a
Operation	Severance of properties resulting in smaller lot sizes that may affect existing use and/or development potential	Likely	Moderate	High	LP1 – LP3	Possible	Moderate	Medium	Potential impacts would be managed through appropriate measures identified in consultation with individual landholders and defined in the individual property agreements
	Severance of properties resulting in changes to the arrangement of properties that may affect agricultural use and productive capacity	Likely	Moderate	High	LP1 – LP3, LP5, LP6	Possible	Moderate	Medium	Potential impacts would be managed through appropriate measures identified in consultation with individual landholders and defined in the individual property agreements

Assessment of Pre-mitigated risk (see section A9.1 and Appendix E)					Mitigation measures ref (see Table B12.5)	Residual impact assessment			
Phase	Potential impacts	Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating	How residual impacts will be managed[1]
Operation (continued)	Effects on access to and within properties as a result of changes to private access roads and internal access arrangements	Possible	Moderate	Medium	LP1, LP5, LP6	Unlikely	Minor	Low	n/a
	Land permanently required for the proposal affects the productive capacity of individual properties	Possible	Major	High	LP1 – LP3, LP5, LP6	Possible	Moderate	Medium	Potential impacts would be managed through appropriate measures identified in consultation with individual landholders and defined in the individual property agreements
	Land permanently required for the proposal results in a change to land use in the study area, negatively affecting the availability of land for non-transport related uses (including changes to the availability of agricultural and forestry zoned land)	Unlikely	Major	Medium	LP1	Unlikely	Minor	Low	n/a

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