INLAND RAIL

Executive summary

INLAND RAIL—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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COVER IMAGE
Existing Walgett Rail Branch.

ACKNOWLEDGEMENT OF COUNTRY

Inland Rail acknowledges the Traditional Custodians of the land on which we work and pay our respect to their Elders past, present and emerging.

Certification

Submission of environmental impact statement

Prepared under Division 5.2 of the *Environmental Planning and Assessment Act 1979* (NSW).

Environmental impact statement prepared by:

Name	Amanda Raleigh	Aryel Pyliotis
Qualifications	BSc(Hons), MURP	BSc(Hons)
Address	Level 3, 24 Honeysuckle Drive Newcastle NSW 2300	
Responsible person name and address (proponent)	Duncan Mitchell Project Director, Inland Rail Australian Rail Track Corporation Level 16, 180 Ann Street, Brisbane Qld 4000	
The address of the land to which the statement relates	Land within the Narromine, Gilgandra, Coonamble, Warrumbungle and Narrabri local government areas in NSW, as described within this environmental impact statement.	
Description of the infrastructure to which this statement relates	Construction and operation of the Narromine to Narrabri section of Inland Rail.	
Environmental impact statement	An environmental impact statement is attached addressing all matters in accordance with Division 5.2 of the *Environmental Planning and Assessment Act 1979* (NSW) and Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (NSW).	

DECLARATION

I certify that I have prepared this environmental impact statement in accordance with the Secretary's environmental assessment requirements received 9 September 2020. The environmental impact statement contains all available information that is relevant to the environmental assessment of the infrastructure to which the statement relates. To the best of my knowledge, the information contained in the environmental impact statement is neither false nor misleading.

SIGNATURE		
NAME	Amanda Raleigh	Aryel Pyliotis
DATE	30 November 2020	30 November 2020

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

Executive summary

Overview

The Australian Government has committed to building a significant piece of national transport infrastructure by constructing a high performance and direct interstate freight rail corridor between Melbourne and Brisbane, via central-west New South Wales (NSW) and Toowoomba in Queensland. Inland Rail is a major national project that will enhance Australia's existing national rail network and serve the interstate freight market.

The Inland Rail route, which is about 1,700 kilometres (km) long, involves:

- Using the existing interstate rail line through Victoria and southern NSW
- Upgrading about 400 km of existing track, mainly in western NSW
- Providing about 600 km of new track in northern NSW and south-east Queensland
- Inland Rail has been divided into 13 projects, seven of which are located in NSW.

This environmental impact statement (EIS) considers the potential impacts of the proposal to construct and operate the Narromine to Narrabri section of Inland Rail ('the proposal'). It has been prepared to support Australian Rail Track Corporation's application for approval of the proposal in accordance with the requirements of Division 5.2 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act).

The proposal is State significant infrastructure and is subject to approval by the NSW Minister for Planning and Public Spaces. The EIS addresses the environmental assessment requirements of the Secretary of the Department of Planning, Industry and Environment ('the SEARs'). The EIS was prepared based on the draft SEARs, which were finalised on 9 September 2020. The proposal is also determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) (EPBC Referral 2018/8259) and requires approval from the Australian Minister for the Environment. The EIS focuses on the key assessment requirements specified by the SEARs. It is supported by specialist technical assessment reports.

ARTC has requested that the proposal be declared by the Minister for Planning and Public Spaces as critical State significant infrastructure under section 5.13 of the EP&A Act.

Objectives of Inland Rail and the proposal

The objectives of Inland Rail are to:

- Provide a rail link between Melbourne and Brisbane that is interoperable with train operations between Perth and Adelaide, to serve future rail freight demand, and stimulate growth for inter-capital and regional/bulk rail freight
- Provide an increase in productivity that will benefit consumers through lower freight transport costs
- Provide a step-change improvement in rail service quality in the Melbourne to Brisbane corridor and deliver a freight rail service that is competitive with road
- Improve road safety, ease congestion, and reduce environmental impacts by moving freight from road to rail
- Bypass bottlenecks within the existing metropolitan rail networks and free up train paths for other services along the coastal route
- Act as an enabler for regional economic development along the Inland Rail corridor.

The objectives of the proposal are to:

- Provide rail infrastructure that meets the Inland Rail specifications, to enable trains using the Inland Rail corridor to travel between Narromine and Narrabri, connecting with other sections of Inland Rail to the north and south
- Minimise the potential for environmental and community impacts during construction and operation, as far as practicable.

The proposal

Key design features

The proposal consists of about 306 km of new single-track standard-gauge railway with crossing loops. The proposal also includes changes to some roads to facilitate construction and operation of the new section of railway, and ancillary infrastructure to support the proposal.

The key features of the proposal involve:

- A new 306-km long rail corridor between Narromine and Narrabri
- A single-track standard-gauge railway and track formation within the new rail corridor
- Seven crossing loops located at Burroway, Balladoran, Curban, Black Hollow/Quanda, Baradine, The Pilliga and Bohena Creek
- Bridges over rivers and other watercourses (including the Macquarie River, Castlereagh River and the Narrabri Creek/Namoi River system), floodplains and roads
- Level crossings
- New rail connections and possible future connections with existing ARTC and Country Regional Network rail lines, including a new 1.2-km long rail junction between the Parkes to Narromine section of Inland Rail and the existing Narromine to Cobar Line (the Narromine West connection)
- Road realignments at various locations, including realignment of the Pilliga Forest Way for a distance of 6.7 km
- Limited road closures.

Ancillary infrastructure to support the proposal would include signalling and communications, drainage, signage and fencing, and services and utilities.

The proposal would be constructed to accommodate double-stacked freight trains up to 1,800 metres (m) long and 6.5 m high. It would include infrastructure to accommodate possible future augmentation and upgrades of the track, including a possible future requirement for 3,600-m long trains.

The land requirements for the proposal would include a new rail corridor with a minimum width of 40 m, with some variation to accommodate particular infrastructure and to cater for local topography. The corridor would be of sufficient width to accommodate the infrastructure currently proposed for construction, as well as possible future expansion of crossing loops for 3,600-m long trains. Clearing of the proposal site would occur to allow for construction and to maintain the safe operation of the railway.

Construction features

The following key infrastructure is proposed to support construction of the proposal:

- Borrow pits:
  - Borrow pit A—Tantitha Road, Narromine
  - Borrow pit B—Tomingley Road, Narromine
  - Borrow pit C—Euromedah Road, Narromine
  - Borrow pit D—Perimeter Road, Narrabri
- Three main compounds, which would include a range of facilities to support construction ('multi-function compounds'), located at:
  - Narromine South
  - Curban
  - Narrabri West.
- Temporary workforce accommodation for the construction workforce:
  - Within the Narromine South multi-function compound
  - Narromine North
  - Gilgandra
  - Baradine
  - Within the Narrabri West multi-function compound.

Other construction infrastructure would include a number of smaller compounds of various sizes located along the proposal site, concrete batching plants, laydown areas, welding yards, a concrete pre-cast facility and groundwater bores for construction water supply.

Timing

Subject to approval, the first phase of construction is anticipated to start in late 2021 and is expected to take about four years to complete. The proposal is expected to be operational, as part of Inland Rail as a whole, once all 13 sections are complete, which is estimated to be in 2025.

Operation

The proposal would form part of the rail network managed and maintained by ARTC. Train services would be provided by a variety of operators.

It is estimated that Inland Rail would be trafficked by an average of 10 trains per day (both directions) in 2025, increasing to about 14 trains per day (both directions) in 2040. This rail traffic would be in addition to the existing rail traffic using other lines that the proposal interacts with.

The trains would be a mix of grain, bulk freight, and other general transport trains. Total annual freight tonnages would be about 10 million tonnes in 2025, increasing to about 17.5 million tonnes in 2040.

Train speeds would vary according to axle loads and range from 80 to 115 km per hour.

Need for Inland Rail and the proposal

There is no direct continuous inland rail link between Melbourne and Brisbane. Interstate rail freight currently travels between Melbourne and Sydney via Albury, and then between Sydney and Brisbane, generally along the coast. About 70 per cent of the freight between Melbourne and Brisbane is carried by road, principally the Newell Highway in NSW, and connecting highways in Victoria and Queensland.

Growth in freight demand

The Melbourne to Brisbane corridor is one of the most important general freight routes in Australia, supporting key population and employment precincts along the east coast and inland NSW. It is estimated that 21 million tonnes of non-bulk and complementary freight moves along this corridor each year. This is expected to grow to over 40 million tonnes per year by 2050.

With the population of the eastern states forecast to increase by 60 per cent over the next 40 years, the need for efficient and effective freight transport will continue to increase. Strong forecast population growth, accompanied by comparable growth in employment, is likely to place significant pressure on existing infrastructure and services.

Existing freight capacity and infrastructure issues

Without the increased use of rail, the growth in freight demand is likely to result in increasing pressure on the road network and associated safety and environmental issues, increased freight costs and a loss of economic opportunity. The current national infrastructure network cannot support this projected growth, with increasing pressure on already congested roads through Sydney, and increasing use of heavy trucks such as B-doubles and, potentially, B-triples along the Hume-Pacific and Newell Highway corridors.

Rail is generally the most productive and efficient mode for freight travelling from regional areas to export ports and urban destinations. Freight trains travelling along the Melbourne to Brisbane corridor currently travel through the Sydney metropolitan rail network, often experiencing significant delays. Travel time reliability is poor, as a result of the priority given to passenger services, freight transit curfews in the Sydney metropolitan area, and substandard rail alignments elsewhere. Limited capacity during morning and afternoon passenger peaks restricts freight movements at these times.

Summary of the need for Inland Rail and the proposal

Australia's freight task is set to experience significant growth over the coming decades. The existing freight infrastructure cannot support this projected growth, with increasing pressure on already congested roads and rail lines through Sydney, and increasing use of heavy trucks such as B-doubles and, potentially, B-triples along the Hume-Pacific and Newell highway corridors.

Inland Rail will address the growing freight task by helping to move freight off the congested road network and moving interstate freight off the congested Sydney suburban rail network. It provides a reliable road-competitive solution to the freight task and enables the commercial and social benefits of rail to be leveraged to meet Australia's long-term freight challenge.

Inland Rail will connect key production areas in Queensland, NSW and Victoria with export ports in Brisbane and Melbourne, and provide linkages between Melbourne, Brisbane, Sydney, Adelaide and Perth. It will reduce freight transit times, reduce congestion on rail and road networks, and enable the movement of larger freight volumes via rail by making the movement of longer and double stacked trains possible.

Inland Rail will provide the backbone infrastructure necessary to significantly upgrade the performance of the east coast rail freight network to better serve future freight demands, while also diverting demand from the constrained road freight and rail passenger network.

Inland Rail is fundamental to the continued growth of rail freight. It is estimated that Inland Rail will shift the share of freight moved by rail between Melbourne and Brisbane from 26 to 62 per cent so that, by 2050, about 7.9 million tonnes of inter-capital freight will be moved by rail between the two cities (ARTC, 2015). Inter-capital freight includes products such as hardware, steel, groceries and other consumer goods. It travels between major ports and capital cities before being distributed to retailers.

Inland Rail will also travel through some of Australia's richest farming regions and mining regions. It is expected to draw significant volumes of grain, cotton, chilled beef, coal and other commodities onto rail. During construction, Inland Rail is expected to be a major economic enabler in the regions, as ARTC will aim to utilise local procurement and employment as much as possible.

In summary, Inland Rail is needed to respond to the growth in demand for freight transport and address existing freight capacity and infrastructure issues. The analysis of demands undertaken by ARTC indicated that there would be sufficient demand for Inland Rail.

The proposal is a critical component of Inland Rail and is required to enable its operation.

The key overall benefits of Inland Rail are:

- **Improved network efficiency and reliability**: transit time between Melbourne and Brisbane is less than 24 hours, with 98 per cent reliability, which matches current road transport levels
- **Safety improvements**: up to 15 serious crashes, involving fatalities and serious injuries, will be avoided every year. Road congestion on some of Australia's busiest highways, including the Hume, Newell and Warrego, will also be reduced.
- **Boost to the Australian economy**: Inland Rail is expected to increase Australia's GDP by $16 billion during its construction and first 50 years of operation
- **Job creation**: Inland Rail is expected to create up to 16,000 new jobs at the peak of construction, with an additional 700 long-term jobs once it is operational
- **Improved sustainability**: moving freight by rail is four times more fuel efficient than moving freight by road. Carbon emissions will be reduced by 750,000 tonnes per year and truck volumes will be reduced in more than 20 of our regional towns (based on a 2050 estimate).

Summary of the key findings of the EIS

Biodiversity

The majority of the southern and central portions of the proposal site are located in land cleared for agriculture with areas of native grasslands and native woodland. Large sections of the northern end of the proposal site are located in areas dominated by vegetation associated with State forests. The proposal also passes through vegetated areas associated with travelling stock reserves, such as at Bohena Creek near Narrabri and the Macquarie River at Narromine.

Native vegetation cover represents about 52 per cent of the proposal site. The proposal site includes about 1,125 hectares (ha) of native woodland and forest vegetation in good condition, which contains an overstorey of mature trees. In addition, about 600 ha of native grassland and 7 ha of shrubland wetland is present.

Biodiversity impact assessments of the proposal were undertaken, including a terrestrial biodiversity assessment prepared in accordance with the *Biodiversity Conversation Act 2016* (NSW) (BC Act) and *Biodiversity Assessment Method* (OEH, 2017), an aquatic biodiversity assessment, and an assessment of the potential impacts on matters listed under the EPBC Act.

The main potential impact of the proposal on biodiversity would occur during construction, as a result of the clearing of native vegetation within the proposal site. At this stage of the design, it is estimated that the proposal would require the permanent removal of about 1,732 ha of native vegetation. This vegetation includes threatened ecological communities listed under the BC Act and/or the EPBC Act.

ARTC is committed to minimising the environmental impacts of the proposal. The area of direct impact would be further refined during detailed design, with the aim of reducing the amount of vegetation clearing required as far as practicable. To mitigate the potential impacts on biodiversity, a comprehensive biodiversity offset strategy is being prepared. This includes consideration of potential offset sites and/or opportunities to purchase biodiversity credits to offset the impacts of the proposal and/or apply the variation rules, according to the requirements for major projects under the EP&A Act, the NSW Biodiversity Offset Scheme and the assessment bilateral agreement between the Commonwealth of Australia and the State of New South Wales.

The main potential impacts on aquatic ecological systems would be as a result of the construction of new watercourse crossing structures along the proposal site. These potential impacts would be minimised by implementing the construction mitigation and management measures provided by the EIS. No significant impacts on aquatic threatened species or communities are predicted.

Water resources (hydrology and groundwater)

Construction would result in changes to surface water flows and geomorphological conditions due to the construction of bridges and culverts in flowing watercourses. Changes to overland flows are also anticipated due to the presence of construction infrastructure.

The proposal would require about 4,635 mega litres (ML) of water for construction, most of which would be sourced from deep groundwater bores. The proposed bores would target groundwater from below the Great Artesian Basin, as the Great Artesian Basin and overlying shallow groundwater system are either close to being or, are, fully allocated.

The passive or direct extraction of groundwater can lead to the lowering of the groundwater table or drawdown within the surrounding aquifer. Modelling indicates that the proposed extraction would change groundwater levels within the Great Artesian Basin, and the underlying rock aquifer that the bores would target, by less than 1 m. This change is within the bounds of natural variability due to climate and recharge processes. Potential impacts on groundwater levels in the shallow groundwater system beneath the proposal site are considered unlikely.

There may be some impacts on a small number of existing groundwater bore users, due to extraction of groundwater from the deep groundwater bores; however, with the exception of one existing bore, these impacts are within the minimal impact considerations outlined in the *NSW Aquifer Interference Policy* (DPI, 2012a).

The application of construction water sourced from deep groundwater bores could result in impacts on the water quality of shallow groundwater and/or surface water due to differences in water quality or being of unsuitable quality for use during construction. Further testing and analysis would be undertaken as part of the detailed design, to confirm the suitability of this water for construction use.

The concentration of overland flows under bridges and through longitudinal drainage and culverts could increase flow velocities and result in scour at outlets and worsening of existing erosional processes within watercourses if scour protection is not provided.

Mitigation measures are provided to minimise impacts on hydrology and groundwater. These would be implemented during the detailed design and construction phases.

Flooding

During construction there is potential for inundation of construction infrastructure such as compounds and temporary workforce accommodation, during flood events. This could pose a risk to workers and the public and result in the mobilisation of construction materials in flood waters. There is also potential for construction activities to impede flood waters and affect surrounding residences and land uses.

During operation, the introduction of the new rail infrastructure would change the flooding regime, with the potential to affect surface water flows across the floodplain. Overall, the changes in flood levels, hazards, velocities and inundation time are generally limited and highly localised. About 1 per cent of buildings in the study area that are already affected by flooding are predicted to be impacted by more than 10 millimetres (mm) in the 1% annual exceedance probability (AEP) event. A total of 22 sensitive buildings (comprised of residences, educational facilities, health facilities, community facilities and commercial/industrial premises) are predicted to experience an increase

of between 10 and 100 mm, of which all but one experience above-floor flooding under existing conditions. The majority of these buildings are located in Narrabri and Narromine.

For some flood events there would be minor increases in impacts on existing rail lines (the Parkes to Narromine, Dubbo to Coonamble and Mungindi lines).

The majority of watercourses crossed by the proposal are already experiencing high levels of degradation and erosion due to existing land use and flow velocities. For most watercourses, flow velocities would reduce or increase marginally; however, these are still likely to cause ongoing erosion and instability.

The proposal incorporates design measures to avoid or minimise potential impacts on flooding and watercourses. These would be further refined during detailed design.

Soils and contamination

Soils within the proposal site include dispersive soils, acid sulfate soils and saline soils, which could result in erosion and sedimentation, and contamination of soils and surface waters. Construction also has the potential to disturb contaminated soils where ground disturbance occurs in areas where potentially contaminating activities have been undertaken. Mitigation measures would be implemented to minimise these risks, including implementation of a soil and water management plan, as part of the construction environmental management plan (CEMP), and protocols for construction in areas of potentially contaminated soils.

Implementation of the proposed environmental controls and the CEMP would reduce the risk of potentially contaminating activities impacting on workers, surrounding residents and the environment.

The risk of contamination associated with operation is expected to be low. Sediment and erosion control plans for exposed soils would be adopted and implemented, which would reduce the risk of environmental impact.

Water quality

The potential impacts of construction mainly relate to erosion and the generation of sediment, particularly during the construction of bridges and culverts in flowing watercourses. This could result in impacts on downstream water quality if management measures are not implemented, monitored and maintained.

To mitigate these impacts, erosion and sediment control measures, including measures for the main watercourse crossings, would be implemented during construction in accordance with the CEMP. A surface water monitoring framework would be prepared to guide the monitoring of water quality.

During operation, surface water runoff would be managed through a drainage system that connects to cross drainage infrastructure at existing drainage lines and watercourses. The drainage system would include measures, such as scour protection at culvert outlets, to minimise the potential for scouring and erosion. Where appropriate, culvert outlets would be lined to minimise scouring.

Aboriginal heritage

Construction would result in direct impacts on 25 Aboriginal heritage items/sites located within the proposal site. Eighteen of these sites were assessed to have a significance of moderate or lower. Five sites were assessed as having moderate to high overall significance. Two potential archaeological deposits (PADs) and four PADs associated with artefact scatters were not assigned significance ratings and would be subject to archaeological testing prior to construction commencing to establish the extent and nature of any subsurface deposits.

Eight Aboriginal heritage items/sites within 10 m of the proposal site were identified as being vulnerable to inadvertent impacts during construction, as a result of the movement of vehicles and/or machinery, if appropriate management measures are not implemented.

Areas predicted to have moderate to high Aboriginal archaeological potential and/or cultural sensitivity were also identified within the proposal site but were not able to be inspected during the assessment due to land access restrictions. As a result, conservative assessments have been undertaken based on the results of the predictive modelling and discussions with registered Aboriginal parties during field surveys. Prior to construction commencing, targeted archaeological surveys would be undertaken in areas of moderate to high cultural sensitivity that have not previously been surveyed.

Detailed design would aim to minimise the potential impacts on these sites and areas as far as possible. Where impacts are unavoidable, the significance of impacts would be minimised by implementing the mitigation measures provided. Measures include preparing and implementing an Aboriginal cultural heritage management

plan to manage Aboriginal heritage and minimise the potential for impacts during construction, archaeological investigations, archaeological assessment and salvage methodology.

Non-Aboriginal heritage

A heritage-listed item (the Woodvale Park Private Cemetery) and a listed archaeological site (the Curban Inn site) are partially located within the proposal site. Both are listed on the *Gilgandra Local Environmental Plan 2011*. No other heritage-listed items are located within or close to the proposal site.

Construction would directly impact both the listed heritage item and listed archaeological site. It is expected that the graves at the Woodvale Park Private Cemetery would be able to be avoided during construction. Assuming this occurs, and an exclusion area is established, the non-Aboriginal heritage assessment concludes that impacts on the item would be negligible. The assessment also concludes that potential impacts on archaeological remains at the Curban Inn site would be minor.

Ten potential heritage items identified during the assessment are located within/close to the proposal site. Construction would impact and/or have the potential to impact these items. The assessment concludes that most of these impacts would be negligible (at five sites) or minor (at one site); however, the assessment identifies that the proposal would have major impacts on four potential heritage items—the Drinane Public School, corrugated iron hut with chimney, the graves of the Dingwell children and the two-storey barn/shed at Bohena.

The potential for vibration impacts on heritage structures located close to the proposal site is expected to be minimal, with implementation of appropriate management measures. This would be confirmed during detailed design and construction planning.

The presence of the new rail infrastructure would have the potential for a minor visual impact on three potential heritage items.

Detailed design and construction planning would aim to minimise the potential impacts on listed and potential heritage items as far as possible. Where impacts are unavoidable, the significance of impacts would be minimised by implementing the mitigation measures provided. Measures include preparing and implementing a heritage management plan to manage non-Aboriginal heritage and minimise the potential for impacts during construction; an archaeological assessment, research design and methodology; a heritage interpretation strategy; and archival recording.

Noise and vibration

There is the potential for construction noise to exceed relevant criteria at various receivers along the proposal site, including those along the proposed rail corridor, near multi-function compounds, temporary workforce accommodation and borrow pits. This includes exceedances during the proposed construction working hours and also during out-of-hours work.

There is also potential for blasting overpressure to exceed the relevant criteria at receivers near borrow pits C and D.

Mitigation measures have been developed with the aim of minimising or mitigating, where practicable, construction noise and vibration impacts. Where noise is above the construction noise management levels, all feasible and reasonable work practices to minimise noise would be implemented, and all potentially affected receivers would be informed. If no quieter work method is feasible and reasonable, consultation with occupants of affected residences would be undertaken to explain the duration and noise levels of the works and any respite periods that would be provided.

Construction vibration was assessed, and management and mitigation measures have been provided, to minimise the potential for significant human comfort and structural vibration impacts at the nearest receivers.

The key potential operational impact is the predicted exceedances of the noise criteria for train movements. The noise modelling predicts that, for the year of full operations (2040), noise levels would exceed the noise criteria at 66 sensitive receivers. The highest forecast noise level was 13 dB(A) above the noise assessment criteria. These receivers are eligible for consideration of feasible and reasonable noise mitigation.

As the design progresses, the proposal would continue to be refined to minimise the potential for operational impacts. The noise and vibration levels, and feasible and reasonable mitigation measures, would continue to be assessed and refined during detailed design. Mitigation options have been identified and would be refined in consultation with affected receivers. Feasible and reasonable mitigation measures would be identified where exceedances of operational noise and vibration criteria are confirmed as an outcome of an operational noise and vibration review.

Once Inland Rail has commenced operation, operational noise and vibration compliance monitoring would be undertaken at representative locations to compare actual performance against that predicted by the operational noise and vibration review. The need for any additional feasible and reasonable mitigation measures would be identified as an outcome of the monitoring.

Air quality

The main potential impact on air quality during construction would occur as a result of the generation of dust from construction works and the movement of equipment and machinery along the proposal site. Emissions are also predicted to exceed the relevant criteria at receivers near key construction infrastructure (multi-function compounds, temporary workforce accommodation and borrow pits). These issues would be managed by implementing air quality management controls guided by the CEMP.

During operation, the increase in diesel-operated freight trains using the corridor has the potential to increase levels of pollutants such as nitrogen oxides and particulate matter. The air quality impact assessment considered the potential increases and concluded that the emissions are expected to be below the relevant impact assessment criteria. Air pollution from transport corridors decreases significantly with distance and is not expected to be an issue for the proposal given the distance from the majority of potentially sensitive receivers.

The proposal may result in an overall improvement to air quality within the study area as decreasing the number of heavy vehicles using major transport routes such as the Newell Highway would reduce air pollution for receivers along these routes.

Traffic, transport and access

Construction would result in temporary impacts on traffic and access and an increase in heavy and light vehicle movements on the local road network. This would include a temporary increase in vehicle movements and associated traffic impacts.

The proposal includes a number of road realignments and some closures. This has the potential to result in minor disruptions/delays to local traffic and temporary access changes/restrictions to private property.

During construction, traffic and transport would be managed by implementing measures detailed in a traffic, transport and access management plan. To minimise construction traffic movements and associated impacts on the public road network, construction access tracks would be provided within the construction footprint. This would enable materials and personnel to be transported within the proposal site, minimising traffic on local roads as much as possible.

During operation, the proposal would result in impacts on travel time due to the introduction of level crossings. An assessment of potential delays noted that at Castlereagh Highway, which is the busiest location at which a level crossing is proposed, there would be a maximum delay of 96 seconds and a maximum queue length of 39 m (about six vehicles). The frequency of trains, and therefore the likelihood of delays, is likely to increase over time as the number of trains using Inland Rail increases. Given the local nature of most affected roads, this impact would only affect a small number of cars and would have a localised impact.

Overall, it is expected that operation of the proposal as part of Inland Rail would have a positive impact on the road network, particularly along major transport routes, such as the Newell Highway, by decreasing the amount of heavy freight vehicles on the road. This has the potential to reduce travel times for road users and improve road safety.

Land use and property

The proposal would require land temporarily (during construction only) and permanently for the proposal's operational infrastructure.

The permanent land requirements would include use of land within about 274 properties, and include about 1,222 ha of privately-owned land and 501 ha of publicly-owned land, mainly owned by the NSW Government. An additional 1,612 ha would be required during construction only. The temporary construction land requirements are estimated to include about 1,158 ha of privately-owned land and 454 ha of publicly-owned land, mainly owned by the NSW Government. Construction would require temporary leasing of land from about 413 properties, which would include a number of properties affected by the proposal's permanent land requirements.

The proposal's land requirements would have the potential to partially affect a property where part of a site is required, requiring adjustments to/relocation of facilities to other parts of the site, or fully affect a property if the entire site on which a property is located is required.

The majority of land affected by the proposal is currently used for agriculture (about 2,554 ha or 78 per cent of the proposal site) and production native forests (about 612 ha or 18 per cent of the proposal site). During operation, direct impacts on land use would result from the permanent land requirements and the presence of operational rail and road infrastructure within the operation footprint.

The proposal site extends through, and directly affects, the Pilliga East, Euligal, Cumbil, Baradine and Merriwindi State forests. The proposal would permanently affect about 433 ha of land in these forests, representing about 0.2 per cent of State forest land in the study area.

As a result of the long linear nature of the proposal, the key potential impact on farming operations relates to property severance. The proposal has the potential to create some smaller parcels of land that are separated from properties; the size of the areas, configuration and/or access arrangements may affect how these areas of land are used in the future. The access arrangements for affected properties would be developed in consultation with landholders during detailed design.

Visual amenity

The proposal would generate visual impacts during construction as a result of visible elements, such as construction works, machinery and equipment, stockpiles, borrow pits, compounds, temporary accommodation (in particular within Gilgandra and Baradine) and partially constructed structures. Construction impacts would be temporary and limited to the construction period.

Overall significance ratings at key viewpoints ranged from negligible to moderate, with six viewpoints predicted to have a moderate potential for impact as a result of vegetation clearing, construction of major features close to the viewpoint and changes in landform due to borrow pits.

Operational impacts of the proposal would occur as a result of the introduction of new structures in the landscape, including new rail infrastructure and bridges and changes to the appearance of some existing roads.

The significance of permanent landscape character impacts would range from negligible to moderate. Moderate impacts were predicted at two viewpoints (viewpoints 14 and 22) due to the extent of vegetation removal and the introduction of a new rail bridge, respectively. Fourteen viewpoints (viewpoints 1, 2, 4 to 9, 11, 13, 17 to 19 and 21) were found to have a moderate–low visual impact. Impact to views from the two recreational areas assessed were found to be negligible.

The proposal has been designed to minimise potential impacts, through careful siting of proposal elements, and by minimising clearing as far as practicable. Mitigation measures are provided to further reduce the visual impacts of the proposal. These would be implemented during the detailed design and construction phases.

Socio-economic impacts

Socio-economic benefits and impacts would result from constructing and operating the proposal. Beneficial impacts during construction include increased employment opportunities (an estimated workforce of up to 2,000 people at peak periods), training opportunities and flow-on local and regional economic benefits. Construction of the proposal would result in:

- Social impacts, for property owners/occupants and local communities, as a result of the proposal's land requirements and potential property impacts
- Temporary impacts on the amenity of the local community in some areas
- Impacts associated with the inflow of the workforce into the local area and temporary workforce accommodation, particularly within Gilgandra and Baradine
- Direct impacts on community infrastructure, including the Narrabri Dirt Bike Club and recreation areas in State forests.

Mitigation measures are provided to mitigate and manage the impacts identified as far as reasonably practicable.

During operation, the proposal would result in changes in amenity due to increases in noise in some areas and the presence of permanent proposal features.

Beneficial impacts as a result of operation of Inland Rail include the following opportunities, which would be refined as Inland Rail progresses:

- Better access to and from our regional markets
- Enabler for regional economic development along the Inland Rail corridor
- Safety and amenity benefits as a result of the reduction of freight transport on major road corridors.

The potential for short-term environmental and social disturbance as a result of construction has to be balanced against the long-term benefits of Inland Rail overall.

Other issues

The main wastes that would be generated during construction include spoil, vegetation, construction materials, and general waste. The proposal would generate about 690,000 cubic metres of spoil. Options to reuse spoil have been considered, with the preferred option being to rehabilitate borrow pits.

Sustainability principles have been incorporated throughout the design development process. ARTC is committed to achieving a minimum Infrastructure Sustainability Council of Australia rating of 'excellent' for the proposal. This would require implementing identified sustainability initiatives during the detailed design, construction and operation stages.

A preliminary climate change assessment was undertaken to consider climate change risks, opportunities and adaptations to inform the design process. Further consideration of the potential for climate change risks would be undertaken to support detailed design. This would include a detailed climate change risk assessment, considering both direct and indirect risks, conducted in accordance with *AS 5334-2013 Climate change adaptation for settlements and infrastructure—A risk based approach* (Standards Australia, 2013).

The potential for cumulative impacts resulting from the interaction of the proposal with other projects, either existing or proposed, in the surrounding area is considered low. During construction there could be minor cumulative impacts associated with biodiversity, noise, traffic and amenity. There are no anticipated cumulative impacts during operation.

Environmental mitigation and management

Potential impacts resulting from the proposal are considered manageable through the implementation of the proposed mitigation and management measures.

The detailed design for the proposal will be developed with the objective of minimising potential impacts on the local and regional environment and the local community. The design and construction methodology would continue to be developed, taking into account the input of stakeholders.

To manage the potential impacts identified by the EIS, and in some cases remove them completely, the assessment chapters outline a range of mitigation measures that would be implemented during construction and operation. The environmental performance of the proposal would be managed as described in chapter D5, including implementing the proposed mitigation measures, the construction environmental management plan and operational environmental procedures. Implementation of the environmental management plans during construction and operation would also ensure compliance with relevant legislation and any conditions of approval.