# 21. Socio-economic assessment

*This chapter provides a summary of the socio-economic impact assessment of the proposal. It describes the existing socio-economic environment, assesses the potential impacts of the proposal, and provides recommended mitigation measures. The full assessment report is provided as Technical Report 11.*

## 21.1 Assessment approach

### 21.1.1 Methodology

The assessment involved:

- reviewing background information on the proposal and the socio-economic environment of the study area
- analysis of available community survey data, including data and reports from the Australian Bureau of Statistics (ABS) *Census 2011*, NSW Bureau of Crime Statistics and Research, Bureau of Transport Statistics, and the local councils
- preparing a profile of the existing community that may be impacted by the proposal
- discussions with representatives of the Parkes and Narromine councils
- analysis of the outcomes of community consultation as summarised in chapter 4
- a desktop analysis of the potential impacts and benefits of the proposal, including the potential for both direct and indirect impacts on the community and businesses, in accordance with the principles and guidelines listed in 21.1.2
- identifying measures to mitigate and manage the impacts identified.

Further information on the methodology is provided in Technical Report 11.

### 21.1.2 Legislative and policy context to the assessment

#### Relevant legislation/guidelines

The EP&A Act establishes the framework for socio-economic impacts to be formally assessed in land use planning and development assessment processes. Under section 4 of the EP&A Act, the definition of 'environment' is 'all aspects of the surroundings of humans, whether affecting any human as an individual or in his or her social groupings'.

The assessment of socio-economic impacts has been undertaken with reference to:

- *International Principles for Social Impact Assessment 2003* (Vanclay, 2003)
- *Social Impact Assessment: Guidance for Assessing and Managing the Social Impacts of Projects* (Vanclay F, et al, 2015)
- *Environmental Impact Assessment Practice Note - Socio-economic assessment* (Roads and Maritime, 2013).

#### Economic policy context

The study area is covered by two regional development plans prepared by Regional Development Australia: *Central West Regional Plan 2013 – 2016* (RDA Central West, 2013) and the *Orana Regional Plan 2013 – 2016* (RDA Orana, 2015). The Central West Regional Plan is also supported by the NSW Central West Freight Study (RDA Central West, 2014).

The NSW Government's *Economic Development Strategy for Regional NSW* (NSW Department of Trade and Investment, 2015) also applies to the study area.

At a local level, economic development is considered within the community strategic plans prepared by Parkes and Narromine councils.

#### Community planning context

The context for local community planning is provided by the *Parkes Community Strategic Plan 2022* (Parkes Shire Council, 2012) and the *Narromine Community Strategic Plan* (Narromine Shire Council, 2013).

## 21.2 Existing environment

A general description of the proposal site and surrounds is provided in chapter 2. The proposal site traverses the outskirts of the towns of Parkes, Peak Hill, and Narromine. The main area of business/employment located near the proposal site is the Parkes National Logistics Hub (the Parkes Hub) site, which adjoins the proposal site at its southern end. Development of the Parkes Hub is being facilitated by Parkes Shire Council. Further information is provided in chapter 2.

Key socio-economic indicators (mainly from 2011 ABS census data) are summarised below. Further information on the socio-economic characteristics of the study area is provided in Technical Report 11.

### 21.2.1 Key socio-economic characteristics

#### Parkes local government area

The Parkes LGA has an estimated resident population (during the 2011 census) of 14,592 people, which increased to 15,337 in 2015. The town of Parkes had a population of 10,026 people during the 2011 census, which comprised 69 per cent of the LGA's population. Between 2001 and 2015, the population of the LGA grew by 4.9 per cent. In 2011, the population of Peak Hill was 755, comprising 5.2 per cent of the LGA's population.

Both the LGA and the town of Parkes have a similar age profile. Analysis of the age structure showed that the median age for the LGA was 39 years.

The most common occupations within the LGA are managers, technicians and trades workers, and professionals (17.7, 14.8 and 13.5 per cent of the workforce respectively).

There is a full time labour force participation of 56.1 per cent across the LGA. The most common employment industries in the LGA are retail trade, health care and social assistance, and agriculture, forestry and fishing, making up 12.7, 12 and 11.5 per cent respectively of the workforce. Of the workforce employed in agricultural industries, 10.9 per cent are employed in sheep, beef cattle, and grain farming.

The median average income of the LGA is $456 per week. 19.8 per cent of the population have a tertiary qualification.

Other economic indicators for the Parkes LGA include (for 2014/15):

- domestic exports – $255.4M
- international exports - $255.52M
- local sales - $852.60M
- worker productivity - $101,925 per worker.

Parkes is the main town within the Parkes LGA. It is a commercial centre with its major industries including agriculture, transport, mining, and tourism (Parkes Shire Council, 2016a). The CSIRO Parkes Radio Telescope is a key tourist attraction, as is the Parkes Elvis Festival, which attracts about 20,000 visitors each year.

A range of accommodation facilities are located in Parkes, including four caravan or cabin parks (providing a total of 86 cabins/units plus caravan and camping sites), seven hotels, 15 motels and five bed and breakfasts, with about 1500 bed spaces. Preliminary consultation with operators of some of these facilities indicates that frequent and/or longer term cabin/unit rental is common with workers of nearby mines and of the current Newell Highway upgrading project. Operators also indicated that demand for temporary accommodation is currently exceeding supply, with over half of this demand from mining workers.

The town has a range of community facilities and services, including education (schools and the TAFE Western Institute campus), childcare, parks and recreation facilities, emergency services, shops, and medical services (including the newly built Parkes Hospital).

As the main town within the LGA, people from surrounding areas and villages, such as Peak Hill, would travel to Parkes to access local facilities, including shopping, administrative services, the hospital, and the Parkes Community Health Centre.

Parkes Shire Council noted the following during consultation:

- mining is the largest contributor to the Parkes economy, and provides a skilled workforce base to the town
- existing accommodation in town should have the capacity to cater for the construction workforce for the proposal
- there is a positive view of the proposal throughout the community.

### Narromine local government area

The Narromine LGA has an estimated resident population (during the 2011 census) of 6,585 people, which increased to 6,822 in 2015. The town of Narromine had a population of 3,789 people during the 2011 census, which comprised 57.5 per cent of the LGA's population. Between 2015 and 2001, the population of the LGA decreased by 3.4 per cent.

Both the LGA and the town of Narromine have a similar age profile. Analysis of the age structure showed that the median age for the LGA is 39 years.

There is a full time labour force participation of 65 per cent across the LGA. The most common employment industries in the LGA are agriculture, forestry and fishing; retail trade; and health care and social assistance, making up 25.4, 11 and 9.2 per cent of the workforce respectively. The most common occupations within the LGA are managers; professionals; and labourers (24.1, 13 and 12.6 per cent of the workforce respectively).

The median average income of the LGA is $492 per week. 18.6 per cent of the population have a tertiary qualification.

The town of Narromine has a population of 3,789 people and is the biggest town in the Narromine LGA. With respect to employment, agriculture is the biggest employer of local residents (25.4 per cent). Other employers major include healthcare (11 per cent), retail (9.2 per cent), education and training (8.7 per cent), construction, and transport, postal and warehousing (both 5.8 per cent).

A range of accommodation facilities are located in Narromine, including the Narromine Tourist Park (11 cabins and 36 powered sites), three hotels, two motor inns, a bed and breakfast, and a farm stay.

A range of local community facilities and services are located in the town, including education and childcare, parks and recreation facilities, library, emergency services, shops, and medical/health services (including the Narromine hospital and community health centre).

People from Narromine may also access regional facilities in Dubbo, such as Dubbo Base Hospital, Lourdes Hospital, Dubbo Community Health Centre, and Macquarie Regional Library.

Narromine Shire Council noted the following during consultation:

- the residents are very community minded
- opportunities for the LGA associated with the proposal include future development, increased production in Narromine, and the removal of heavy vehicles from the road network.

## 21.3 Impact assessment

### 21.3.1 Risk assessment

#### Potential impacts

The environmental risk assessment for the proposal (summarised in Appendix B) included an assessment of the potential socio-economic risks. The assessed risk level for the majority of potential socio-economic risks was between medium and high. Risks with an assessed level of medium or above include:

- impacts to local amenity during operation due to increased frequency of trains
- impacts on community facilities during construction
- increased demand for accommodation during construction
- impacts on access to community facilities during construction.

#### How potential impacts have been avoided

The option development and assessment process for the Inland Rail location/route options is summarised in chapter 6. As noted in chapter 6, the shortlist of route options was subject to a detailed assessment, and the proposed alignment was refined based on evaluation of key considerations, including community impacts.

Potential socio-economic impacts would continue to be avoided by:

- designing, constructing and operating the proposal to minimise the potential for amenity impacts arising from traffic, noise and vibration, air quality, and visual amenity, including the implementation of mitigation measures in chapters 9, 11, 13 and 19
- minimising the potential for safety issues by implementing the mitigation measures in chapter 25
- implementing the socio-economic management and mitigation measures provided in section 21.4
- communicating with local residents and other relevant stakeholders (including Parkes and Narromine councils) to provide advance notice of construction activities and associated impacts, and provide information on the operation of the proposal.

### 21.3.2 Construction impacts

The key potential socio-economic impacts of the proposal during construction include:

- impacts to the local community and/or individual landowner/occupants resulting from changes to traffic, transport, and access arrangements
- community amenity and safety impacts
- access to accommodation and services
- economic impacts and benefits during construction, including employment generation.

## Socio-economic impacts due to property impacts

During construction, some landholders would experience some impacts resulting from changes to infrastructure and utilities within the property, establishment of compound sites and the need to gain access to private properties.

Frequent access to properties can disrupt private landholders through impacts to agricultural activities and lifestyles.

Potential land use and property impacts during construction are described in chapter 20.

## Community access impacts

As described in chapter 9, construction of the proposal would result in short term impacts to traffic and access within the study area, and an increase in both heavy and light vehicle movements on the local road network. The traffic assessment concludes that the anticipated maximum hourly volume on potential access roads is within the level of service threshold for these roads, and no significant community impacts are predicted.

Changes to the movement of traffic and access arrangements as a result of the construction of the Parkes north west connection (including the Brolgan Road overbridge) could result in a temporary increase in the distance travelled and delays for some residents in this area. This impact would be limited to the duration of the construction period.

The proposal would not directly impact on access to local businesses and social infrastructure. Access to individual properties would be maintained, and any potential impacts would be managed by the implementation of measures provided in chapters 9 and 20. In summary, no significant socio-economic impacts have been identified as a result of the predicted traffic, transport and access impacts.

## Community amenity impacts

Construction of the proposal may result in the following amenity impacts experienced by members of the local community:

- increase in noise for residents located around the proposal site due to the operation of plant and equipment, and construction traffic
- increase in traffic and associated noise for residents located around the proposal site and construction access routes
- increase in dust generated during construction, which may impact on local amenity
- visual impacts.

These issues have been addressed in other sections of this EIS, as follows:

- traffic (chapter 9)
- noise and vibration (chapters 11 and 12)
- air quality (chapter 13)
- visual impacts (chapter 19).

Amenity impacts would be temporary and appropriately managed with the mitigation measures provided in these chapters.

Potential safety issues and impacts are considered in chapter 25.

### Accommodation

An average of 150 workers would be required to construct the proposal. Preference would be given to locally/regionally based workers where practicable, with local workers likely to be sourced from the Parkes, Narromine, and Dubbo LGAs. Some workers would also need to be sourced from outside of the local area, dependant on the availability and skill of local workers and the proposal timeframes. Workers from outside the local area would require temporary accommodation. Workers would need to be accommodated such that potential impacts on the availability and affordability of rental accommodation are minimised. Housing and accommodation for future workers would be identified prior to construction to reduce any impact to local housing affordability and availability within the study area. Maximising the employment of local residents would reduce the demand for accommodation.

The non-resident workforce has the potential to increase demand for local services. Assuming that a larger proportion of the workforce would be residents from the area, consultation with both Narromine and Parkes Shire Councils confirmed that the existing community support and health services have the capacity to accommodate the increase in demand from the non-resident workforce.

### Economic impacts and benefits during construction

Construction of the proposal would generate employment, with the estimated workforce numbers provided in chapter 8. This would benefit the local community and businesses. The workforce is likely to include a mix of local residents, and people from outside the area who would need to be accommodated within the local area, potentially in the towns/villages of Parkes, Forbes, Peak Hill, Narromine, Dubbo and/or Gilgandra.

New employment opportunities would also provide the opportunity for training and the development of new skills, which, for local residents, would benefit the local areas/region.

Construction activities, requirements and the needs of the workforce would have the potential to result in increased trade for local businesses, including:

- accommodation
- food services
- retail trade
- bus and coach drivers
- finance
- education and training
- health care
- recreation services.

## 21.3.3 Operation impacts

The key potential socio-economic impacts of the proposal during operation include:

- community amenity impacts and safety impacts
- access and connectivity impacts, including delays associated with a higher train frequency
- economic impacts, including potential local and regional benefits, and the benefits of Inland Rail as a whole.

Potential land use and property impacts during operation are described in chapter 20.

## Community amenity impacts

The main potential for community amenity impacts relates to the increase in train movements along the proposal site.

Changes to access, noise levels, air pollution, and visual changes from the presence of the proposal may impact on the amenity for the surrounding community. These impacts and mitigation measures are addressed in other chapters of the EIS, as noted above.

Potential community health and safety impacts are considered in chapter 25. Impacts to land use due to flooding are discussed in chapter 20. Social impacts associated with train delays are discussed below.

## Community access impacts

The main potential traffic impact of the proposal would be impacts to travel time for road users as a result of increased train activity at level crossings. Given the local nature of most affected roads, this impact is only expected to affect a small number of community members.

A very small number of community members may experience changed access to Parkes due to the realignment of Coopers Road and Millers Lookout Road. Further consultation would be undertaken with relevant stakeholders regarding the need for road alignment at Millers Lookout Road and Coopers Road.

Regional bus services may experience a small increase in delays at level crossings due to the increased frequency of trains. Delays would be minor when considered in the context of the distances travelled. Emergency vehicles may also experience delays at level crossings. Given that the level crossings are mainly located on local roads outside the towns, overall emergency response times are not expected to be significantly impacted. Consultation with local emergency services during detailed design would ensure emergency service providers are aware of accessible routes during operation, particularly alternate routes in the case of level crossing delays.

An increase in the number of trains may impact on community safety, as there would be an increase in the potential for a pedestrian or cyclist to encounter a train, and drivers may take additional risks to avoid being delayed.

There is the potential for some drivers, observing a train approaching, to take additional risks to avoid being delayed. Risks include speeding or ignoring warning controls at level crossings.

Changes to property access roads and the local road network may be required in some locations as a result of the rationalisation of level crossings. The closure of some level crossings may result in changes to how landholders and livestock move around their property, which in turn might impact agricultural activities and the operation of agricultural businesses.

Consultation with potentially affected landowners would continue during detailed design, and closures would only be undertaken following agreement with the owner.

## Economic and wider community benefits

### Local benefits

During consultation on the proposal, representatives of local councils expressed their strong support for the proposal, noting that Inland Rail offers significant potential benefits for the regions productivity and economic development opportunities. The study area is well positioned to leverage economically from Inland Rail as a result of the location of the Parkes Hub. The proposed Parkes north west connection would facilitate connections between Inland Rail and the Broken Hill rail line. To take advantage of this, Parkes Shire Council is facilitating development of the Parkes intermodal facility (Parkes Hub).

It is noted that no stop facilities form part of the proposal at this stage. The stopping patterns for Inland Rail trains continue to be firmed up, and would be finalised in consultation with regional stakeholders, included Parkes Shire Council.

The *Business Case for Inland Rail* (ARTC, 2015) notes that Inland Rail will enable farmers to move agriculture products more efficiently for domestic use and for export, as it will pass through some of Australia's most productive farming country. The Business Case also recognises further benefits to supply chain efficiencies for commercial freight, and benefits to consumers and regional areas.

**Wider benefits**

As part of the overall Inland Rail project, the proposal has the potential to contribute to wider economic and community benefits, including the following (ARTC, 2015):

- Strong benefit cost ratio – it is estimated that Inland Rail will have an economic benefit cost ratio of 2.62.
- Boost the Australian economy – Inland Rail is expected to increase Australia's gross domestic product by $16 billion during its construction and first 50 years of operation.
- Create jobs – it is estimated that an average of 700 additional jobs would be created during operation.
- Improve connections within the national freight network – Inland Rail enhances the National Land Transport Network by creating a rail linkage between Parkes and Brisbane, providing a connection between Queensland and the southern and western States.
- Provide better access to and from regional markets – Inland Rail will make it easier for freight to move from farms, mines and ports to national and overseas markets. It is estimated that two million tonnes of agricultural freight will switch from road to rail.
- Reduce costs – Transport costs for freight travelling between Melbourne and Brisbane will reduce by $10 per tonne.
- Increased capacity of the transport network – Inland Rail will increase capacity for freight and passenger services by reducing congestion along the busy coastal route and allow for growth in passenger services particularly in the Sydney region.
- Improve road safety – It is estimated that each year, Inland Rail will remove 200,000 truck movements from roads and reduce truck volumes in 20 regional towns; and reduce the number of serious crashes, avoiding fatalities and serious injuries.

As noted by the *Australian Infrastructure Audit Report* (Infrastructure Australia, 2015) 'Rail offers … societal benefits in terms of lower emissions, reduced road congestion and increased safety per tonne kilometre, particularly over longer distances or when carrying heavy goods.'

## 21.4 Mitigation and management

To mitigate the potential for socio-economic impacts, and enhance the benefits of the proposal, the following measures would be implemented.

***Table 21.1 Socio-economic mitigation measures***

| Stage | Impact/issue | Mitigation measures |
|---|---|---|
| Detailed design/ pre-construction, construction | Communication | Key stakeholders (including local councils, emergency service providers, public transport providers, the general community and surrounding land owners/occupants) would continue to be consulted regarding the proposal in accordance with the communication plan described in chapter 4. |
| | Local access to Inland Rail | ARTC would continue to work with relevant stakeholders, including Parkes Shire Council, to identify opportunities to facilitate local access to Inland Rail via the Parkes intermodal facility. |

| Stage | Impact/issue | Mitigation measures |
|---|---|---|
| | Accommodation | A temporary workforce housing and accommodation plan would be developed and implemented during construction. This would include a requirement for consultation to be undertaken with local accommodation providers and councils regarding the availability of accommodation, and the need to maintain some availability for non-workforce accommodation. |
| Construction | Communication | A communication management sub-plan would be prepared as part of the CEMP including a detailed list of the measures that would be implemented during construction to communicate with and respond to community concerns. The plan would include, as a minimum:<br>▸ requirements to provide details and timing of proposed activities to affected residents, the local community and businesses, and local bus operators<br>▸ consultation actions in relation to access arrangements and servicing requirements<br>▸ complaints handling procedure<br>▸ procedure to notify adjacent land users for any changed conditions during the construction period such as traffic, pedestrian or driveway access. |
| | | Local residents, businesses and other stakeholders would be notified before work starts, and would be regularly informed of construction activities. |
| | Access | Access to individual residences, services and businesses would be maintained during construction. Where alternative access arrangements need to be made, these would be developed in consultation with affected property owners/occupants. |
| | Workforce | Where practicable, the workforce would include workers sourced locally, and opportunities for training potential local employees would be provided. This would include exploring opportunities for local Indigenous participation in consultation with local Indigenous service providers.<br>A zero tolerance policy relating to anti-social behaviour would be adopted for work sites. |
| | Demands for goods and services | Local suppliers would be identified and approached for procurement of goods and services where practicable in line with a local business and industry procurement plan. |
| Operation | Community safety | A safety awareness program would be developed and implemented to educate the community regarding safety around trains. This would focus on community and rural property operators who cross the rail corridor to access their properties. |

# 22. Sustainability

*This chapter provides the sustainability assessment of the proposal. It describes the overall approach to sustainability, and the specific objectives and initiatives that would be incorporated into the proposal's design, construction and operation.*

## 22.1 Assessment approach

### 22.1.1 What is sustainability?

Sustainability, or sustainable development, has many different definitions, depending on the application and context. In 1987, the Brundtland Commission defined sustainable development 'as development that meets the needs of the present, without compromising the ability of future generations to meet their own needs' (WCED, 1987).

In 1992, ecologically sustainable development (ESD) was defined by the Ecologically Sustainable Development Steering Committee as 'using, conserving and enhancing the community's resources so that ecological processes, on which life depends are maintained, and the total quality of life, now and in the future can be increased' (Commonwealth of Australia, 1992).

In NSW, the concept of ESD was introduced into planning and development legislation by the EP&A Act. One of the objectives of the EP&A Act is '(vii) to encourage ecologically sustainability development'. In accordance with part 3 of schedule 2 of the Regulation, an EIS is required to include '(f) the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to the principles of ecologically sustainable development set out in subclause (4).' Section 6(2) of the *Protection of the Environment Administration Act 1991* states that ESD can be achieved through the implementation of:

- the precautionary principle
- intergenerational equity
- conservation of biological diversity and ecological integrity
- improved valuation, pricing and incentive mechanisms.

For infrastructure projects, 'infrastructure sustainability' is defined by the Infrastructure Sustainability Council of Australia (ISCA) as 'infrastructure that is designed, constructed and operated to optimise environmental, social and economic outcomes of the long term'. ISCA states that 'Infrastructure sustainability provides an opportunity to go beyond business as usual, or simply mitigating environmental and social impacts. It provides the opportunity to drive and measure performance towards enhanced liveability and productivity and better economic outcomes, in a strategic and holistic fashion' (ISCA, 2016).

Using a tool such as ISCA's infrastructure sustainability rating tool (the 'IS rating tool'), an assessment of the sustainability performance of an infrastructure proposal can be undertaken.

### 22.1.2 Sustainability context for Inland Rail

ARTC is committed to ensuring that its projects are implemented in a manner that is consistent with the principles of ESD. ARTC has applied, and will continue to apply, the principles of ESD throughout the development and assessment of Inland Rail and the proposal. ARTC has developed a Sustainability Implementation Framework for Inland Rail.

The implementation framework identifies that the following themes underpin the sustainability objectives for the delivery and operation of Inland Rail:

- safety
- community
- workforce

- procurement
- materials/waste
- ecology
- greenhouse gas and emissions
- governance.

The implementation framework outlines key recommendations and requirements for embedding sustainability across each of the above themes. It also outlines how monitoring and review of sustainability objectives for Inland Rail would occur.

A sustainability policy for Inland Rail has been developed as part of the implementation framework, underpinned by the following key commitments:

- put safety at heart of everything we do
- minimise our environmental footprint
- engage early and meaningfully with all stakeholders, including Aboriginal parties in accordance with established practices
- make decisions based on a strong understanding of technical, economic, environmental and social issues
- future-proof Inland Rail so it is efficient and effective in the long term
- promote economic benefits within regional communities
- regularly review and audit processes and performance.

### 22.1.3 Methodology

The assessment summarised in this chapter considers the application of sustainability principles to the proposal, and the opportunities to achieve sustainability targets and outcomes that are aligned with best practice infrastructure projects. The assessment was undertaken using the IS rating tool, and with consideration of the *NSW Sustainable Design Guidelines* (Transport for NSW, 2014).

By considering the results of the sustainability assessment, the proposal would continue to be designed, constructed, and operated to minimise potential sustainability risks, whilst also optimising environmental, social and economic outcomes.

#### ISCA's infrastructure sustainability rating tool

The IS rating tool can be applied to many different infrastructure projects, including rail projects. Ratings can be undertaken on a design, as built drawings, and operation of a project. An infrastructure project is assessed in terms of how it performs in each of 15 categories that are grouped into six themes in infrastructure sustainability. These include:

- management and governance
- using resources
- emissions, pollution and waste
- ecology
- people and place
- innovation.

Depending on the initiatives and performance of a project across each theme, it will achieve a score from one to 100 corresponding to a rating level of commended, excellent or leading.

An assessment was undertaken for Inland Rail using the IS rating tool. The following approach was used:

- the rating that would apply to the proposal under a business as usual approach was determined
- initiatives that could be implemented to provide additional value ('credits') to the proposal were identified
- the rating that could be achieved with the implementation of these initiatives was determined.

Further information on the application of the IS rating tool to the proposal is provided in Appendix I.

### NSW Sustainable Design Guidelines

The approach to sustainability detailed in the *NSW Sustainable Design Guidelines* (Transport for NSW, 2014) is underpinned by a series of themes and objectives, which define the approach to the delivery of sustainable assets. The *NSW Sustainable Design Guidelines* are divided into seven sustainability themes (with several sub-themes), and include compulsory and discretionary initiatives in relation to:

- energy and greenhouse gases
- climate resilience
- materials and waste
- biodiversity and heritage
- water
- pollution control
- community benefit.

Compulsory initiatives may relate to a corporate target or are considered to be fundamental to the delivery of sustainable assets. If a compulsory initiative is considered to apply, then it must be completed. A discretionary initiative may not be practical for a particular project or may not be the most appropriate initiative to meet a sustainability outcome. Written justification must be provided if a discretionary initiative has not been selected for implementation.

Projects can achieve a score of bronze, silver, gold, or platinum based on their selection of discretionary sustainable initiatives.

## 22.1.4 Legislative and policy context to the assessment

Sustainability considerations have been imbedded in a number of legislative and policy mechanisms, particularly in relation to resource use, waste, and energy efficiency. These include:

- *Waste Avoidance and Resource Recovery Act 2001* (the WARR Act)
- *National Greenhouse and Energy Reporting Act 2007*
- *National Strategy for Ecologically Sustainable Development* (Ecologically Sustainable Development Steering Committee, 1992)
- *National Waste Policy: Less Waste, More Resources* (Australian Government, 2009)
- *Sustainable Procurement Guide* (Australian Government, 2013)
- *NSW Sustainable Design Guidelines* (Transport for NSW, 2014)
- *NSW Government Resource Efficiency Policy* (OEH, 2014)
- *Infrastructure Sustainability Planning Guidelines* (ISCA, 2016)

The proposal is considered according to the principles of ESD in chapter 28.

## 22.2 Assessment results

### 22.2.1 IS rating tool

The process and results of the assessment undertaken using the IS rating tool are provided in Appendix I. Under a business as usual approach, the proposal would achieve a 'commended' rating. However, with the implementation of relevant sustainability opportunities that add value to the proposal, an 'excellent' rating could be achieved. Key opportunities include minimising:

- water usage during construction
- electricity usage during construction and operation
- greenhouse gas emissions from the consumption and burning of fossil fuels
- demand on local and regional resources
- the carbon footprint of construction materials (type, quality, quantity, location, end product)
- waste production.

The sustainability assessment using the IS rating tool would be updated as the development of the proposal progresses.

### 22.2.2 Sustainability objectives and initiatives

The next stage of the assessment involved translating the Inland Rail IS rating tool results and opportunities into objectives and initiatives that could be potentially implemented during design, construction, and operation of the proposal.

The sustainability objectives and supporting potential initiatives identified for the proposal are listed in Table 22.1. The objectives and initiatiatives are consistent with those identified as part of the IS rating tool assessment, required to achieve an 'excellent' rating. The outcomes and initiatives align with those outlined in the *NSW Sustainable Design Guidelines* and other relevant guidelines.

The potential initiatives outlined in Table 22.1 would be reviewed and refined during the design process and, where practicable, used to develop targets which would be included in contract documents for all detailed design, construction and operation contracts. Contractors would be required to clearly identify how they would ensure that specific initiatives and targets are met.

Implementation of the final sustainability initiatives and targets would be monitored and audited in line with the requirements of Inland Rail's Sustainability Implementation Framework.

*Table 22.1 Proposal sustainability objectives, outcomes and potential initiatives*

| Theme | Objectives | Desired outcomes | Potential sustainability initiatives for the proposal |
|---|---|---|---|
| Governance and management of the process | To integrate sustainability into management systems and approach.<br>To demonstrate leadership by embedding sustainability objectives into decision making.<br>To establish governance arrangements which support resource efficiency, and continuous improvement of sustainability performance.<br>To achieve an 'excellent' rating using the IS rating tool. | Policies, targets, and objectives are integrated in proposal documentation and commitments.<br>The proposal demonstrates a high level of performance against objectives and appropriate benchmarks.<br>A lessons learnt process is implemented to cover the broad project benefits and values, with consideration to all stakeholders.<br>Sustainability audits of the management systems are conducted.<br>Senior management participate in review of audits. | Ensure the proposal decision making framework includes sustainability criteria which consider the environment and community.<br>Develop a sustainability management plan for the proposal that incorporates performance targets across all sustainability themes, based on best practice benchmarking and response to policy and regulatory context.<br>Develop an assurance framework and reporting system to assist ARTC and contractors to report against sustainability performance.<br>Monitor sustainability performance and report results at all levels of the ARTC corporate structure.<br>Couple sustainability risk and opportunities with overall project risk processes to drive consistency and improve project outcomes. |
| Procurement and purchasing | To integrate sustainability into procurement systems.<br>To reduce the adverse environmental, social and economic impacts of purchased products and services throughout their life.<br>To influence contractors, subcontractors and materials suppliers to adopt procurement objectives in their works and procurement. | Transport-related costs such as fuel, vehicle maintenance and road congestion are reduced.<br>The proposal reduces the NSW Government's operating costs and ensures the effective and efficient use of resources (SEARs performance outcome). | Partner with local suppliers where economically and reasonably feasible.<br>Develop and implement a sustainable procurement policy in accordance with the principles and concepts outlined in the *Sustainable Procurement Guide* (2013), to apply to contractors, subcontractors and suppliers. |

| Theme | Objectives | Desired outcomes | Potential sustainability initiatives for the proposal |
|---|---|---|---|
| Climate change adaptation | To assess climate change risks and requirement for climate change adaptation measures.<br>To design infrastructure and operations to be resilient to the impacts of climate change. | Flood impacts on the proposal would be reduced, leading to a reduction on time and cost to restore track operations during a wash out event.<br>Heat stress on rail segments would be reduced.<br>Asset durability is improved with cascading improvements to service reliability and maintenance schedules. | Further refine the climate change risk assessment (undertaken as part of the climate change impact assessment – chapter 23) as the design of the proposal progresses.<br>Incorporate into the design adaption measures as per those provided in chapter 23 to mitigate extreme and high level climate change risks, and address medium level climate change risks on the proposal. |
| Energy and carbon | To understand the potential for minimising energy use from non-renewable sources and greenhouse gas emissions across the infrastructure life cycle.<br>To use energy sources more efficiently and reduce greenhouse gas emissions. | Energy use during construction and operation is reduced.<br>Cost-effective and innovative approaches to energy efficiency, energy procurement and low-carbon/renewable sources are supported.<br>There is a shift to lower carbon transport. | Establish energy efficiency targets for the proposal.<br>Monitor and track carbon emissions from construction and operation and reduce emissions through operating practices and design refinements.<br>Target a reduction in materials haulage through more efficient procurement.<br>Utilise and incorporate energy efficient construction plant and equipment, methods and practices.<br>Use local sources of materials, where feasible. |
| Water conservation | To understand the potential for minimising water use from potable sources across the infrastructure life cycle.<br>To reduce water usage during construction and operation. | Potable water usage is minimised.<br>Opportunities for rainwater, groundwater, greywater and blackwater harvesting and reuse are maximised. | Implement design and construction initiatives to minimise potable water consumption.<br>Undertake a water balance study to inform feasibility for reuse efficiencies. |

| Theme | Objectives | Desired outcomes | Potential sustainability initiatives for the proposal |
|---|---|---|---|
| Resource use and materials | To identify the life cycle environmental impacts of materials throughout the infrastructure asset life cycle.<br>To reduce the construction materials footprint by optimising the use of socially and environmentally responsible materials. | Conservation of natural resources is maximised. *(SEARs performance outcome)*.<br>The proposal reduces the NSW Government's operating costs and ensures the effective and efficient use of resources. *(SEARs performance outcome)*. | Establish targets to maximise the reuse of existing materials.<br>Optimise the design to minimise volumes of excavation, steel and imported materials.<br>Specify materials that reduce the need for virgin material supply.<br>Source materials from sustainable suppliers. |
| Discharges to air, land and water | To identify impacts to local receiving water quality, noise, vibration, air quality and light across the proposal's life cycle.<br>To minimise air, land and water pollution from the proposal's construction and operation. | Potential sources of pollution are reduced.<br>Control at the source of the pollution is optimised to avoid environmental harm. | Ensure an Environmental Management System and Construction Environmental Management Plan are in place prior to construction.<br>Avoid the use of dangerous goods and hazardous materials, where possible.<br>Monitor implementation of noise, air, soil and water quality mitigation measures.<br>Target zero major pollution incidents. |
| Land | To identify land that has previously been developed and where it can be reused.<br>To identify contamination risks and perform sustainable remediation.<br>To identify risks from flooding. | Remediation of any contaminated sites is undertaken where required.<br>Land use planning and minimisation of impact on critical land resources is considered. | Reduce clearing of vegetation where possible.<br>Optimise the design to minimise volumes of excavation and maximise reuse of topsoil where appropriate.<br>Apply soil management practices to protect and maintain land values, where possible.<br>Undertake appropriate flood design to minimise risk to the proposal resulting from flood risk and impacts on line outages. |

| Theme | Objectives | Desired outcomes | Potential sustainability initiatives for the proposal |
|---|---|---|---|
| Waste | To identify the potential for sustainable waste management plans and practices.<br>To minimise waste throughout the proposal's lifecycle. | The amount of waste disposed to landfill is minimised.<br>The amount of material reused during construction and operation is maximised. | Provide facilities in all construction compounds to allow for segregation of waste types to facilitate recycling.<br>Adopt waste recycling targets to maximise recycling of construction waste.<br>Balance site works to avoid excess or import of spoil.<br>Reuse ballast and structural fill either during construction or in the formation of spoil mounds.<br>Use prefabricated civil components where possible to reduce construction waste, material usage, pollution risks and travel.<br>Plan for final disposal of operational assets. |
| Ecology | To identify impacts to local ecological value and habitat connectivity.<br>To enhance environmental outcomes and improve stakeholder/community relations. | Biodiversity would be protected and enhanced through appropriate planning and management. | Prepare and implement a biodiversity management plan as part of construction.<br>Establish and achieve targets for biodiversity conservation and enhancement, where practicable. |
| Heritage | To enhance heritage outcomes and improve stakeholder/community relations. | Heritage would be protected and enhanced through appropriate planning and management. | Prepare and implement Heritage Management Plans for ongoing management and monitoring of heritage items, where relevant.<br>Develop partnerships with relevant stakeholders to utilise heritage places to promote local heritage values, where practicable. |

| Theme | Objectives | Desired outcomes | Potential sustainability initiatives for the proposal |
|---|---|---|---|
| Community amenity and benefit | To make a positive contribution to community health and well-being.<br>To assess the impact to design and practice in response to the likelihood of crime. | Landholders and community groups are engaged throughout the proposal's construction and operation.<br>Zero harm to the workforce and community is achieved.<br>Inland Rail is integrated with surrounding land uses.<br>Crime prevention is implemented to maximise safety during construction and operation. | Engage with the impacted community when selecting noise attenuation treatments.<br>Engage with landholders and affected communities throughout the proposal in order to reduce future safety incidents.<br>Listen to and act on community concerns.<br>Implement appropriate design practices in public interaction zones to minimise likelihood of crime. |
| Stakeholder participation | To assess the level of risk attributed to the engagement, and consideration of stakeholders and their concerns, in the context of the proposal's operation and maintenance.<br>To build a shared understanding of Inland Rail and effective working relationships. | Community believe their issues are being heard and addressed.<br>Local businesses are involved during construction and operation. | Provide design information to assist stakeholder consultation and engage the community and stakeholders during design.<br>Involve local business in the sustainable procurement strategy for the proposal. |
| Urban & landscape design | To identify the potential for adoption of best practice urban design principles. | Visual amenity of the proposal is improved. | Urban design principles are incorporated into aspects of design, where relevant. |

## 22.3 Mitigation and management

### 22.3.1 Approach to mitigation and management

A Sustainability Implementation Framework has been developed for Inland Rail to guide how Inland Rail would achieve consistency with an 'excellent' rating, based on the IS rating tool. The implementation framework underpins the sustainability objectives and targets for Inland Rail. A sustainability management plan would be developed for the proposal to incorporate the proposal specific objectives and outcomes required to achieve an 'excellent' rating, including those listed in Table 22.1.

### 22.3.2 Consideration of the interactions between mitigation measures

The sustainability management plan would be considered during development of the proposal's CEMP and OEMP (described in chapter 27) to ensure consistency with regards to sustainability.

Climate change risk adaptation measures described in chapter 23 would be incorporated into the sustainability management plan.

### 22.3.3 Summary of mitigation measures

To optimise the environmental, social and economic performance of the proposal, the following measures would be implemented.

***Table 22.2 Sustainability mitigation measures***

| Stage | Impact | Mitigation measures |
|---|---|---|
| Detailed design/ pre-construction | Sustainability management plan | The potential sustainability initiatives identified for the proposal would be reviewed and updated during the detailed design stage.<br><br>A sustainability management plan would be developed to guide the design, construction and operation of the proposal to ensure that an 'excellent' rating (according to the ISCA infrastructure sustainability rating tool) is achieved.<br><br>The sustainability management plan would incorporate the updated sustainability initiatives, and the review and reporting requirements necessary to demonstrate how sustainability has been incorporated into the proposal during design, construction and operation. |
| Construction | Procurement | Procurement would be undertaken in accordance with the *Sustainable Procurement Guide* (Australian Government, 2013) and the *NSW Government Resource Efficiency Policy* (OEH, 2014). |
| | Reporting | Sustainability reporting (and corrective action where required) would be undertaken during construction in accordance with the sustainability management plan. |
| Operation | Sustainability management plan | Prior to operation commencing, the sustainability management plan would be reviewed and updated, and relevant initiatives would be implemented during operation. |

# 23. Climate change risk

*This chapter provides the climate change risk assessment of the proposal. It assesses the impacts of climate change on the proposal, and provides recommended adaptation and mitigation measures.*

## 23.1 Assessment approach

### 23.1.1 About climate change

Climate change has the potential to alter the frequency, intensity and distribution of extreme weather related natural hazards, including more intense and frequent heat waves, droughts, floods and storm surges. The risk of climate change impacts on rail infrastructure need to be considered as part of the design process, as structures need to be designed to last for many years, and therefore need to be resilient to climate change.

Climate change adaptation planning and risk management is an evolving field. Responses to reduce the risks of climate change broadly fall into two categories: mitigation and adaptation. Using the definitions of the *Inter-governmental Panel on Climate Change* (IPCC, 2007), mitigation aims to reduce human effects on the climate system by strategies to reduce greenhouse gas sources and emissions, and to enhance greenhouse gas sinks. Adaptation refers to adjustments in response to actual or anticipated climate changes or their effects, to moderate harm or to exploit beneficial opportunities. Infrastructure design and planning needs to incorporate adaptation measures, based on the assessed risk of climate change to a proposal.

### 23.1.2 Methodology

The purpose of the climate change risk assessment for the proposal is to:

- identify and assess the risks that climate change poses to the proposal
- prioritise risks that require further action as a basis for decision-making and planning.

The overall approach to the assessment involved modelling two potential climate change scenarios for the study area using the Commonwealth Scientific and Industrial Research Organisation's (CSIRO) 'Australian Climate Futures' climate change modelling tool, and assessing the potential risks for the proposal based on these scenarios.

The assessment involved:

- reviewing climate data
- developing projections of the future climate in the study area and determining the climate projection scenarios for the assessment
- undertaking a detailed climate change risk assessment and determining risk ratings
- identifying potential adaptation measures and/or design strategies based on the identified risks and potential impacts.

The longitudinal nature of climate change assessment makes it difficult to pinpoint potential impacts within a relatively short construction timeframe. Changes to climate over this timeframe would be associated with changes in weather and climate variability, which refers to the 'normal' monthly to decadal variability in the components of climate. As this chapter focuses on the assessment of climate change over the life of the proposal, any potential impacts during the construction phase are considered more appropriate for assessment in a shorter timescale. These impacts are therefore not considered further in this assessment and the chapter focuses on potential operational impacts.

As described in chapter 25 an emergency response plan would be prepared during detailed design and would include measures to mitigate potential impacts from emergency situations, including those potentially associated with climate change such as bushfires and extreme weather.

Further information on the methodology for the climate change risk assessment and the detailed results are provided in Appendix J. A summary of the results is provided in the following sections.

### 23.1.3 Legislative and policy context to the assessment

Relevant legislation, policies, guidelines and standards include:

- *National Greenhouse and Energy Reporting Act 2007*
- *AS 5334:2013 Climate change adaptation for settlements and infrastructure – a risk based approach*
- *AS/NZS ISO 31000:2009 (AS/NZS 2009) Risk management – principles and guidelines*
- *Climate Change Impacts and Risk Management – A Guide for Business and Government* (Australian Greenhouse Office, 2006)
- *Guide to Climate Change Risk Assessment for NSW Local Government* (OEH, 2011)
- *National Climate Resilience and Adaptation Strategy* (Department of the Environment, 2015)
- *Climate Change in Australia - Central Slopes Cluster Report* (CSIRO and BoM, 2015)
- *Checklist for best practice adaptation planning and implementation* (OEH, undated).

## 23.2 Assessment results

Key areas that may be at risk for the proposal include:

- track infrastructure
- critical supply infrastructure
- drainage systems, culverts and embankments
- bridges and structures
- electronics and signage
- safe operation of the network.

The key climate variables that may increase risk of impact from climate change are mainly:

- increase in average temperatures and extreme heat events
- changes to rainfall intensity and frequency of rainfall events
- changes to storm intensity and impacts from increased wind.

Potential risks rated high or medium are considered on the following page.

#### Potential risks

**Increasing average and extreme temperatures**

Temperatures have increased steadily and climate projections indicate there will be both an increase in average temperatures and extreme temperatures. With climate projections forecasting a potential increase in average daily temperatures of three degrees Celsius by 2070, this is likely to result in increasing heat stress on infrastructure assets and the need to respond with increased temperature ranges used in design to address this increased stress. Common areas which may be impacted by increasing average and extreme temperatures in rail infrastructure include:

- increased derailment from heat stress and buckling of rail lines
- failure of power supply and electronic equipment
- increased frequency of interruptions to mains power supply
- damage or deterioration of external surfaces
- failure of equipment such as ventilation or air conditioning units

- sagging of overhead lines
- failure of signalling and communications equipment.

**Increased rainfall intensity**

As temperatures increase the water cycle intensifies with more evaporation resulting in more intense rainfall events. This has a very specific impact on rail infrastructure by causing:

- increased water flows through drainage systems and culverts causing potential flooding or inundation
- structural scouring
- wash out of foundations or ballast
- inundation of buildings, electrical equipment and damage from flooding
- hail damage to external surfaces.

**Reduced average rainfall/drought**

Recent climate data and future projections show longer periods with little rainfall and conversely more intense rainfall events. This leads to more wetting and drying of soils leading to greater ground instability. Impacts on transport infrastructure can include:

- cracking and movement of concrete track form and failure of embankments
- sub-surface soil stability for prolonged periods of heating and drying
- instability and cracking of structural barriers
- cracking and wear of support structures
- increased maintenance and management of landscaped areas.

**Storm impact from wind/changes to wind speed**

Severe storms have the potential to cause damage not only from rainfall but also high winds and hail which can cause significant disruption and damage to infrastructure. Impacts may include:

- windblown debris (eg trees) contacting tracks or overhead equipment causing safety risks, disruption and potential power outages
- increased wind loading potentially causing damage to structures or derailment of double stacked trains
- direct wind or hail damage to electronics and signalling equipment.

**Other risks**

The following potential risks were identified, but are not considered to be relevant to the proposal:

- humidity: unlikely to impact upon proposal materially
- time in drought: unlikely to impact upon proposal materially
- solar radiation: unlikely to impact upon proposal materially
- sea level rise: not directly impacting the proposal due to its distance from the coast.

## 23.3 Mitigation and management

### 23.3.1 Approach to mitigation and management

The outcome of the climate change risk assessment is a priority list of risks for which a range of possible adaptation responses can be developed. Some identified risks may require immediate practical adaptation response or modifications to design, while others may require further investigation. The suggested adaptation measures for the proposal, developed as an outcome of the climate change risk assessment, are listed in Appendix J.

The sustainability management plan for the proposal (described in chapter 22) would include the adaption measures actions relevant to the proposal.

These measures would be reviewed as part of the detailed design process, and incorporated into the design and operating procedures as far as practicable.

### 23.3.2 Summary of mitigation measures

To mitigate the potential impacts to climate change, the following measures would be implemented.

*Table 23.1 Climate change mitigation measures*

| Stage | Impact | Mitigation measures |
|---|---|---|
| Detailed design/ pre-construction | Climate change risk management | The climate change risk assessment would continue to be refined as the design of the proposal progresses.<br>The adaptation measures identified for the proposal would be reviewed, and final measures would be incorporated into the design where practicable. |
| Operation | Climate change risk management | The recommended adaptation measures would be reviewed, and a final list of adaptation measures for implementation during operation would be confirmed and implemented.<br>Operational management and maintenance procedures would include measures relating to potential climate change risks, as listed in section 23.2.<br>Emerging opportunities to manage potential climate change impacts on the proposal would continue to be monitored. |

# 24. Waste

This chapter provides the waste impact assessment of the proposal. It assesses the impacts of construction and operation, and provides recommended mitigation measures.

## 24.1 Assessment approach

### 24.1.1 Methodology

The assessment involved:

- reviewing the regulatory framework for waste management
- identifying potential waste generating activities
- identifying the likely classification of waste generated by the proposal in accordance with relevant legislation and guidelines
- estimating quantities of waste, where feasible
- identifying available waste management options
- developing a conceptual waste management plan for construction and operation.

It is noted that the waste types and quantities estimated as an outcome of this assessment are indicative, and have been identified for the purpose of determining potential waste impacts and waste management options. Although the quantities of waste actually generated by the proposal may differ from the estimates made, the identified waste management options are variable and would be appropriate to the final waste quantities.

### 24.1.2 Legislative and policy context to the assessment

The main legislation relevant to the management of waste are the POEO Act, the *Protection of the Environment Operations (Waste) Regulation 2014* (the Waste Regulation) made under the POEO Act, and the WARR Act.

The POEO Act establishes the procedures for environmental control, and for issuing environmental protection licences regarding matters such as waste, air, water and noise. The Waste Regulation regulates matters such as the obligations of consignors (producers and agents), transporters, and receivers of waste in relation to waste transport licensing and tracking requirements.

The WARR Act aims to ensure that waste management options are considered against the following waste management hierarchy:

1. avoidance of unnecessary resource consumption
2. resource recovery (including reuse, reprocessing, recycling and energy recovery)
3. disposal.

It is an offence under the Waste Regulation to transport waste generated in NSW more than 150 kilometres from the place of generation for disposal, unless the waste is transported to one of the two lawful disposal facilities nearest to the place of generation.

The movement of controlled waste is also regulated by the *National Environment Protection (Movement of Controlled Waste between States and Territories) Measure 1998*, made under the *National Environment Protection Council Act 1994*.

The *Australian Dangerous Goods Code* (National Transport Commission, 2015) defines a set of requirements for the transport of dangerous goods defined in the code. In NSW, the *Dangerous Goods (Road and Rail Transport) Regulation 2009* gives effect to the Australian Dangerous Goods Code.

### Definition of waste

Schedule 5 of the POEO Act defines waste as:

*(a) any substance (whether solid, liquid or gaseous) that is discharged, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment*

*(b) any discarded, rejected, unwanted, surplus or abandoned substance*

*(c) any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, processing, recovery or purification by a separate operation from that which produced the substance*

*(d) any processed, recycled, reused or recovered substance produced wholly or partly from waste that is applied to land, or used as fuel, but only in the circumstances prescribed by the regulations*

*(e) any substance prescribed by the regulations to be waste.*

### Waste classification

The classifications that apply to waste in NSW and the descriptions of each are provided by the POEO Act, the Waste Regulation and supporting guidelines, including the *Waste Classification Guidelines* (EPA, 2014a). Many waste types are pre-classified under the POEO Act and do not require testing. However, if a waste is not pre-classified, it may need to be tested to determine its classification.

### Other

Consideration was given to the *NSW Waste Avoidance and Resource Recovery Strategy 2014 – 21* (EPA, 2014b). The primary goal of this strategy is to enable NSW to improve environment and community well-being by reducing the environmental impact of waste and using resources more efficiently. This strategy is informed and driven by the waste hierarchy defined in the WARR Act. It is supported by various regulations and policies including the POEO Act and Waste Regulation. To support the primary goal of the strategy, the proposal would be constructed and operated with consideration to the waste hierarchy. Additionally, any waste generated from the proposal would be disposed of in accordance with regulatory requirements.

The *NSW Sustainable Design Guidelines* (Transport for NSW, 2014) were also considered as the guideline includes compulsory and discretionary initiatives in relation to materials and waste. Further discussion regarding these guidelines and the associated initiatives is provided in chapter 22.

## 24.2 Impact assessment

### 24.2.1 Risk assessment

### Potential impacts

The environmental risk assessment for the proposal (summarised in Appendix B) included an assessment of the potential waste risks.

The assessed risk level for the potential risks was low. This is because the proposal is unlikely to result in significant amounts of waste being generated, with the exception of construction related waste.

### How potential impacts would be avoided

In general, with respect to waste, potential impacts would be avoided by:

- managing wastes in accordance with relevant legislative and policy requirements, as outlined in section 24.1.2
- designing, constructing and operating the proposal so that wastes are managed according to the waste minimisation hierarchy:
  - avoidance, where possible
  - treated as required, and reused on-site
  - recycled, either within the process or off-site
  - where other alternatives are not possible, wastes would be disposed of at appropriately licensed waste management facilities.
- implementing the waste management and mitigation measures provided in section 24.3
- implementing the air quality measures provided in chapter 13
- managing hazardous wastes in accordance with the mitigation measures provided in chapter 25.

## 24.2.2 Construction impacts

### Waste generation

The following waste generating activities would occur during construction:

- site preparation works
  - clearing and grubbing
  - topsoil stripping
  - site compound establishment
  - haul roads, access roads and laydown construction
  - fencing (temporary and or permanent).
- cut and fill earthworks
- drainage structure demolition, replacement or construction
- culvert replacement or construction
- welding
- ballasting and tamping
- level crossing closure, removal or upgrading
- site compound operation
- plant and equipment operation.

Waste from site preparation may include vegetation, roots, tree stumps, and general rubbish and debris.

Local accommodation at various towns would be used for construction staff. No construction camps are proposed, however site compounds would be established – some with office facilities and temporary amenities. The establishment of these site compounds may generate some minor quantities of construction material waste such as metals, wood, concrete etc.

Wastewater generated by site compound operations would include grey water and sewage from site amenities, and wash-down water used for vehicles and equipment.

Food waste, waste paper and cardboard, plastic, metal (including aluminium cans), glass and electrical waste would be generated by construction staff, as well as any office facilities at the site compounds. Maintenance fluids generated by the operation of construction plant and equipment would include paints, solvents, lubricants, and oils. Hydrocarbon and water mixtures or emulsions would be generated in plant and equipment wash-down areas within site compounds.

Waste generated during construction would include packaging waste, such as pallets, plastic film wrap, cable reels, and metal straps/bands.

Table 24.1 lists the predicted construction waste types, likely classifications, and estimated quantities.

***Table 24.1 Waste estimates and classification - construction***

| Activity | Waste | Classification | Estimated quantity (tonnes unless indicated) |
|---|---|---|---|
| Clearing and grubbing | Green waste | General solid waste (non-putrescible) | Zero off-site - stockpiled in bottom layer spoil mounds |
| | Rubbish and debris | General solid waste (non-putrescible) | 200 |
| Topsoil stripping | Topsoil | General solid waste (non-putrescible) or virgin excavated natural material | Zero off-site - placed over top of stockpiled spoil mounds |
| Rail formation | Sleepers, tracks | General solid waste (non-putrescible) | Rail 106 km x 2 and sleepers (106,000/0.6) mix timber steel |
| Site compound establishment | Waste concrete (for hardstand areas) | General solid waste (non-putrescible) | 100 |
| | Waste metal | General solid waste (non-putrescible) | 10 |
| | Waste wood | General solid waste (non-putrescible) | 20 |
| | Waste glass | General solid waste (non-putrescible) | < 1 |
| | Waste plastic | General solid waste (non-putrescible) | < 1 |
| Fencing (temporary and permanent) | Waste metal / timber posts | General solid waste (non-putrescible) | 20 km |
| Cut and fill earthworks | Contaminated spoil | Special waste | <1 based on existing contamination assessment results (see chapter 14) |
| Drainage structures and culvert construction/ replacement | Waste wood and concrete | General solid waste (non-putrescible) | 2,775 |
| | Waste metal | General solid waste (non-putrescible) | < 1 |

| Activity | Waste | Classification | Estimated quantity (tonnes unless indicated) |
|---|---|---|---|
| Welding | Waste metal | General solid waste (non-putrescible) | Rail off cut kept, other minimal (<1) |
| Ballasting and tamping | Waste ballast | General solid waste (non-putrescible) | Zero off-site - all ballast used, unsuitable stockpiled into spoil mounds |
| Site compound operation | Food waste | General solid waste (putrescible) | <1 |
| | Wastewater | Liquid waste | To be confirmed |
| | Waste paper | General solid waste (non-putrescible) | 1 |
| | Waste cardboard | General solid waste (non-putrescible) | 2 |
| | Waste plastic and glass | General solid waste (non-putrescible) | <1 |
| | Waste metal | General solid waste (non-putrescible) | 10 |
| | Electrical waste | General solid waste (non-putrescible) | 2 |
| | Waste from vehicle/plant equipment maintenance | General solid waste (non-putrescible) - drained oil filters (mechanically crushed), rags and oily rags only if they contain non-volatile petroleum hydrocarbons and no free liquids.<br>Hazardous waste - containers holding oil, grease and lubricants if residues have not been removed by washing (see Appendix 2 of the W*aste Classification Guidelines Part 1: Classifying Waste* (EPA, 2014a)) | <1 |

Approximate waste volumes and the potential classification would be estimated and/or confirmed following finalisation of the detailed design and incorporated into the CEMP prepared for the proposal.

Noise and dust impacts associated with the excavation, handling, storage on-site and transport of waste (where required) are considered as part of the construction scope of works assessed in chapters 11, 13 and 14. Sediment and leachate impacts associated with the stockpiling of spoil are considered in chapter 16.

## Spoil generation and management

### Spoil generation and quantities

Spoil is soil, rock or dirt excavated and removed from its original location. It is estimated that a total of 801,857 cubic metres of spoil would be generated during construction. All spoil is expected to be reused either for track formation/construction or used to create spoil mounds (as described in chapters 7 and 8).

Only some minor quantities of contaminated spoil may be generated. This spoil would not be reused on site and would be disposed of off-site at an appropriately licenced facility.

The estimated quantities of spoil that would be generated and reused are listed in Table 24.2.

The majority of spoil would be generated during excavation required for the construction of cess drains. Relatively smaller quantities would be generated during site preparation activities, and from other earthworks such as for the formation treatment.

*Table 24.2 Preliminary estimate of potential spoil generation*

| Location/source (start chainage) | Spoil generation estimate ($m^3$) | Spoil to be reused in track works ($m^3$) | Spoil to be used on site in spoil mounds ($m^3$) |
|---|---|---|---|
| 449.5 | 27,128 | 4,900 | 22,228 |
| 453.0 | 23,228 | 6,300 | 16,928 |
| 457.5 | 24,723 | 6,300 | 18,423 |
| 462.0 | 27,979 | 6,300 | 21,679 |
| 466.5 | 44,401 | 6,300 | 38,101 |
| 471.0 | 17,211 | 6,300 | 10,911 |
| 475.5 | 15,222 | 6,300 | 8,922 |
| 480.0 | 15,404 | 6,300 | 9,104 |
| 484.5 | 27,247 | 6,300 | 20,947 |
| 489.0 | 24,518 | 6,300 | 18,218 |
| 493.5 | 25,333 | 6,300 | 19,033 |
| 498.0 | 48,073 | 6,300 | 41,773 |
| 502.5 | 42,092 | 6,300 | 35,792 |
| 507.0 | 31,921 | 6,300 | 25,621 |
| 511.5 | 45,981 | 6,300 | 39,681 |
| 516.0 | 43,912 | 6,300 | 37,612 |
| 520.5 | 44,185 | 6,300 | 37,885 |
| 525.0 | 43,594 | 6,300 | 37,294 |
| 529.5 | 36,517 | 6,300 | 30,217 |
| 534.0 | 27,337 | 6,300 | 21,037 |
| 538.5 | 42,001 | 6,300 | 35,701 |

| Location/source (start chainage) | Spoil generation estimate ($m^3$) | Spoil to be reused in track works ($m^3$) | Spoil to be used on site in spoil mounds ($m^3$) |
|---|---|---|---|
| 543.0 | 39,418 | 6,300 | 33,118 |
| 547.5 | 43,351 | 6,300 | 37,051 |
| 552.0 | 41,085 | 10,550 | 30,535 |
| **TOTAL** | **801,857** | **154,050** | **647,807** |

As listed in Table 24.2, it is estimated that about 19.2 per cent of the spoil generated (154,050 cubic metres) could be reused in track works, with the remainder being used in spoil mounds. This would continue to be refined during detailed design. Consistent with the waste minimisation hierarchy, the approach to spoil management would follow the hierarchy of options listed in Table 24.3.

*Table 24.3 Spoil management hierarchy for the proposal*

| Priority | Reuse options | Approach |
|---|---|---|
| 1 | Avoid | The detailed design would be optimised to minimise spoil generation. |
| 2 | Re-use for construction of the proposal | Spoil generated during construction would be reused for the proposal, including reuse spoil for fill, embankments and mounds within a short haulage distance of the source. |
| 3 | Reuse on other projects | Reuse spoil for fill, embankments and mounds on other projects within a financially feasible transport distance of the proposal site. |
| 4 | Disposal | Excess spoil would be disposed of in accordance with the waste management plan prepared as part of the CEMP (refer section 24.3). |

## Waste handling and management

### Approach to waste minimisation and reuse

Waste management measures have been developed for the identified types of waste in accordance with the waste management hierarchy (refer Table 24.6). Although the waste management hierarchy has been considered for each waste type, not all waste management options are applicable to a given waste type. For example, some types of waste are non-recyclable. As such, only the applicable waste management options are applied.

### Recycling and disposal

The following waste management facilities are located in the study area:

- Parkes Waste Depot (Broglan Road, Parkes)
- Parkes Shire rural waste depots – Peak Hill, Alectown, Bogan Gate, Trundle, Tullamore and Gunningbland
- Narromine Waste Management Facility (Gainsborough Road, Narromine)
- Trangie Waste Management Facility (Trangie Tip Road, Trangie)
- Tomingley Waste Transfer Station (Gundong Road, Tomingley).

The majority of rural landfills or transfer stations are operated by local councils for use by residents. However, the larger landfills and transfer stations are able to accept commercial waste. Arrangements would be made with landfill/transfer station operators to ensure that the waste types and quantities could be accepted.

The approach to waste management during construction is described in section 24.3. The waste management measures proposed to align with the waste management hierarchy are listed in Table 24.6. This table also outlines the contingency measures (disposal) for wastes that cannot be avoided, reused, recycled or treated. Measures to facilitate segregation and prevent cross contamination are also provided.

## 24.2.3 Operation impacts

### Operation waste generating activities

The main waste generating activity during operation would be track maintenance. Small quantities of green waste may be generated during maintenance activities as a result of vegetation control, herbicide use, and maintenance of the entire rail corridor. Other general debris and litter are also expected to be collected during maintenance. These activities already occur under existing operational conditions.

Maintenance of plant and vehicles would be undertaken back at ARTC's existing provisioning centres therefore waste from maintenance of plant and vehicles during operation has not been considered further.

### Classification and estimates/details of the quantity of each classification of waste to be generated

The anticipated waste types, likely classifications, and estimated quantities during operation are listed in Table 24.4.

*Table 24.4 Waste estimates and classification - operation*

| Activity | Waste | Classification | Quantity (tonnes per year) |
|---|---|---|---|
| Track maintenance | Green waste | General solid waste (non-putrescible) | <1 |
| | Rubbish and debris | General solid waste (non-putrescible) | 200 |

### Waste handling and management

The approach to waste management during operation is provided in section 24.3. The waste management measures proposed to align with the waste management hierarchy are listed in Table 24.8. This table also outlines the contingency measures (disposal) for wastes that cannot be avoided, reused, recycled or treated. Measures to facilitate segregation and prevent cross contamination are also provided.

Due to the minimal amounts of waste likely to be generated during operation, the potential for significant environmental impacts associated with the excavation, handling, on-site storage and transport waste would be low. Any impacts would be minimised by implementing existing ARTC procedures and complying with the operational EPL.

## 24.3 Mitigation and management

### 24.3.1 Approach to mitigation and management

The waste management strategy for the proposal would continue to be developed and refined during detailed design, and would include:

- the procurement plan
- construction waste management plan
- consideration of waste in operational environmental management procedures
- waste auditing and monitoring.

A construction waste management plan would be developed for the proposal as part of the CEMP. Operational procedures would continue to consider waste management in accordance with regulatory requirements. Waste management during construction and/or operation would also be undertaken in accordance with ARTC's existing procedures and EPL. Implementation of these measures would ensure that waste is managed in an environmentally sound manner, and in accordance with legislative requirements for waste disposal and waste tracking.

In addition, waste auditing and monitoring would be undertaken to ensure that the waste management plan for construction are scaled with actual waste volumes. The proposed approach to environmental management during construction and operation is described in chapter 27.

### 24.3.2 Consideration of the interactions between mitigation measures

All mitigation measures would be consolidated and described in the environmental management plans for construction and operation. The plans would identify measures that are common between waste types and or impact categories. Common impacts and common mitigation measures would be consolidated to ensure consistency.

### 24.3.3 Summary of mitigation measures

To manage and mitigate the potential for waste impacts, the following mitigation measures would be implemented.

*Table 24.5 Waste mitigation measures*

| Stage | Impact | Mitigation measures |
|---|---|---|
| Detailed design | Excess waste generation | Detailed design would include measures to minimise excess spoil generation. This would include a focus on optimising the design to minimise spoil volumes, and the reuse of material on-site. |
| Pre-construction/ construction | Amenity and general environmental impacts | A waste management plan would be prepared and implemented as part of the CEMP. It would include measures to minimise the potential for impacts on the local community and environment. The waste management measures to be incorporated are listed in Table 24.6. |
| Construction | Waste management | Waste segregation bins would be located at site compounds to facilitate segregation and prevent cross contamination. |
| Operation | Waste management | The waste management measures listed in Table 24.8 would be implemented where practicable during operation. |

*Table 24.6 Construction waste management measures*

| Waste | Hierarchy | Management |
|---|---|---|
| Green waste | Avoid | Clearing would be minimised by placing temporary infrastructure in areas that have been previously cleared, degraded or have naturally lower above ground biomass. |
| | Reduce | Areas to be cleared would be marked to reduce incidental clearing. |
| | Reuse | As far as practicable, cleared material would be chipped, mulched and stockpiled for reuse during finishing works. Materials with special habitat value, such as hollow bearing logs or trees, would be selectively removed for reuse, or placed in nearby bushland. |
| | Dispose | Noxious weeds would be disposed of in accordance with relevant guidelines/requirements. |
| Rubbish and debris | Recycle | Where recycling is considered feasible, rubbish and debris would be stored for collection by an authorised contractor for offsite recycling. |
| | Dispose | Where rubbish and debris is not recyclable, the waste would be removed to a storage location for collection by an authorised contractor for offsite disposal. |
| Food waste | Disposal | Putrescible waste would be stored at allocated bins at each site compound, for collection by an authorised contractor, and disposed of offsite. |
| Wastewater | Dispose | Wastewater/sewage from site compound amenities/ablutions would be removed by an authorised contractor for disposal in accordance with regulatory requirements. |
| Spoil | Reduce | The proposal is designed to adhere to the natural ground profile, where practicable, in order to reduce earthworks. |
| | Reuse | All spoil is expected to be reused either for track formation/construction or used to create spoil mounds. |
| | Recycle | Surplus material that cannot be reused would be stockpiled on site. Options to recycle spoil would be investigated where practicable. |
| | Dispose | Only minor quantities of contaminated spoil will require offsite disposal at an appropriately licenced facility. |
| Topsoil | Reuse | Topsoil would be stockpiled for reuse during rehabilitation. Stockpiles would be managed to maintain soil structure and fertility. |
| | Treat | Low quality topsoil would be treated with ameliorants to improve structure and fertility. |
| | Dispose | Surplus or unusable topsoil would be disposed at locations within the rail corridor. |
| Waste concrete | Avoid | Procurement of surplus concrete powder would be avoided by adhering to the *Sustainable Procurement Guide* (Australian Government, 2013) and the *NSW Government Resource Efficiency Policy* (OEH, 2014). |
| | Reuse | Sleepers would be reused where appropriate. |
| | Recycle | Waste concrete would be crushed and recycled where practicable. |

| Waste | Hierarchy | Management |
|---|---|---|
| | Dispose | Waste concrete that cannot be recycled would be collected and stored in designated storage areas for offsite disposal by an authorised contractor. |
| Waste ballast | Avoid | Procurement of surplus ballast would be avoided by adhering to the *Sustainable Procurement Guide* (Australian Government, 2013) and the *NSW Government Resource Efficiency Policy* (OEH, 2014). |
| | Disposal | All unusable ballast would be placed into spoil mounds. |
| Waste metal | Avoid | Procurement of surplus metal, including rail, would be avoided by adhering to the procurement plan. |
| | Reduce | Waste metal would be reduce by limiting offcuts. |
| | Recycle | Suitable rail offcuts or scrap metal (including metal bands from packaging of construction materials and hot waste from welding) would be stored for collection by an authorised contractor and recycled offsite. Market demand for this recyclable waste would also be considered. |
| Waste wood | Avoid | Procurement of surplus wood would be avoided by adhering to the *Sustainable Procurement Guide* (Australian Government, 2013) and the *NSW Government Resource Efficiency Policy* (OEH, 2014). |
| | Reuse | Waste wood would be stored on site for reuse, where practicable. |
| | Recycle | Waste wood that cannot be reused on site (including cable reels from packaging) would be collected in designated recycling containers for offsite disposal by an authorised contractor, where recycling is considered feasible. Market demand for this recyclable waste would be considered. |
| Waste glass | Recycle | Waste glass would be stored at recycling bins at each site compound, for collection by an authorised contractor and recycled offsite, where feasible. |
| | Dispose | Where recycling is not considered feasible, the waste would be collected and stored in designated waste storage areas for collection by an authorised contractor for offsite disposal. |
| Waste plastic | Avoid | Procurement of surplus plastic would be avoided by adhering to the *Sustainable Procurement Guide* (Australian Government, 2013) and the *NSW Government Resource Efficiency Policy* (OEH, 2014). |
| | Recycle | Waste plastic would be stored at recycling bins at each site compound, for collection by an authorised contractor and recycled offsite. |
| | Dispose | Where recycling is not considered feasible, the waste would be collected and stored in designated waste storage areas for collection by an authorised contractor for offsite disposal. |
| Waste rubber | Avoid | Procurement of surplus rubber (e.g. gloves, earplugs, tyres) would be avoided by adhering to the *Sustainable Procurement Guide* (Australian Government, 2013) and the *NSW Government Resource Efficiency Policy* (OEH, 2014). |
| | Recycle | Waste rubber would be stored at recycling bins for collection by an authorised contractor and recycled offsite. |

| Waste | Hierarchy | Management |
|---|---|---|
| | Dispose | Where recycling is not considered feasible, or is contaminated, waste would be collected and stored in designated waste storage areas for collection by an authorised contractor for offsite disposal. |
| Waste paper | Avoid | Procurement of surplus paper would be avoided by adhering to the *Sustainable Procurement Guide* (Australian Government, 2013) and the *NSW Government Resource Efficiency Policy* (OEH, 2014). |
| | Reduce | Waste paper from office/administration facilities would be minimised by enabling 'secure print' feature on all printers and by encouraging double-sided printing. |
| | Recycle | Waste paper would be stored at recycling bins at each site compound, for collection by an authorised contractor, and recycled offsite, where feasible. |
| | Dispose | Where recycling is not considered feasible, the waste would be collected and stored in designated waste storage areas for collection by an authorised contractor for offsite disposal. |
| Waste cardboard | Avoid | Procurement of surplus cardboard would be avoided by adhering to the *Sustainable Procurement Guide* (Australian Government, 2013) and the *NSW Government Resource Efficiency Policy* (OEH, 2014). |
| | Recycle | Waste cardboard would be stored at recycling bins at each site compound, for collection by an authorised contractor, and recycled offsite, where feasible. |
| | Dispose | Where recycling is not considered feasible, the waste would be collected and stored in designated waste storage areas for collection by an authorised contractor for offsite disposal. |
| Waste aluminium cans | Recycle | Waste aluminium would be stored at recycling bins at each site compound, for collection by an authorised contractor, clubs or charities, and recycled offsite. |
| Electrical waste | Avoid | Procurement of surplus appliances and cabling would be avoided by adhering to the *Sustainable Procurement Guide* (Australian Government, 2013) and the *NSW Government Resource Efficiency Policy* (OEH, 2014). |
| | Reuse | Product stewardship arrangements would be sought, with a view to some electrical appliances being reused under return to supplier arrangements. |
| | Recycle | Electrical waste would be stored at recycling bins at each site compound, for collection by an authorised contractor, and recycled offsite, where feasible. Market demand for this recyclable waste would also be considered. |
| | Dispose | Where recycling is not considered feasible, the waste would be collected and stored in designated waste storage areas for collection by an authorised contractor for offsite disposal. |
| Waste oil, grease, lubricants, | Avoid | Procurement of surplus appliances and cabling would be avoided by adhering to the *Sustainable Procurement Guide* (Australian Government, 2013) and the *NSW Government Resource Efficiency Policy* (OEH, 2014). |

| Waste | Hierarchy | Management |
|---|---|---|
| oily rags and filters | Recycle | Only waste oil and oil filters to be recycled through storage in recycling bins at each site compound, collection by an authorised contractor, and recycling offsite, where feasible. |
| | Dispose | The waste would be collected and stored in designated waste storage areas for collection by an authorised contractor for offsite disposal. Where feasible, containers holding oil, grease and lubricants would be washed prior to disposal or stored separately for disposal as hazardous waste. |
| Waste pallets | Avoid | Procurement of surplus pallets would be avoided by adhering to the *Sustainable Procurement Guide* (Australian Government, 2013) and the *NSW Government Resource Efficiency Policy* (OEH, 2014). |
| | Reduce | Delivery of material on pallets would be limited wherever possible. If materials have to be delivered to site on pallets, ensure that pallets are returned to the supplier at time of delivery, where practicable. |
| | Reuse | Product stewardship arrangements would be sought, with a view to pallets being reused under the stewardship of the supplier. |
| | Recover | Options to recover wood from pallets by chipping, for reuse as mulch, would be pursued where practicable. |

*Table 24.7 Colour-coding scheme for waste segregation bins*

| Waste type | Colour |
|---|---|
| General waste | RED |
| Paper, cardboard, cans, bottles | BLUE |
| Metal | GREY |
| Plastics | ORANGE |
| Green waste, organics | GREEN |

*Table 24.8 Operation waste management measures*

| Waste | Hierarchy | Management |
|---|---|---|
| Green waste | Reuse | As far as practicable, green waste generated from maintenance activities would be chipped, mulched and reused for vegetation management, or collected by an authorised contractor and recycled offsite. |
| | Dispose | Noxious weeds would be disposed of in accordance with relevant guidelines/requirements. |
| Rubbish and debris | Recycle | Wastes would be would be collected by an authorised contractor and recycled offsite, where recycling is considered feasible. |
| | Dispose | Where waste is not recyclable, it would be collected by an authorised contractor and disposed offsite at a suitably licenced facility. |
| Waste metal | Avoid | Procurement of surplus metal, including rail, would be avoided by adhering to the procurement plan. |

| Waste | Hierarchy | Management |
|---|---|---|
| | Reduce | Waste metal would be reduced by limiting offcuts. |
| | Recycle | Suitable rail offcuts or scrap metal (including metal bands from packaging of materials for maintenance and hot waste from welding) would be collected by an authorised contractor and recycled offsite. Market demand for this recyclable waste would also be considered. |

# 25. Health and safety (including hazardous materials)

This chapter provides an assessment of the potential health and safety impacts of the proposal on the surrounding community and the environment. It assesses the potential impacts of construction and operation, and provides recommended mitigation measures.

## 25.1 Assessment approach

### 25.1.1 Methodology

A desktop level assessment was undertaken to identify potential impacts to the health and safety of the surrounding community and environment as a result of the construction and operation of the proposal. The assessment involved:

- reviewing the relevant regulatory framework and applicable guidelines
- identifying construction and operational activities with the potential to cause health and safety impacts to off-site receivers
- considering the potential impacts associated with hazardous materials, as defined by the guidelines to *State Environmental Planning Policy No 33 – Hazardous and Offensive Development* (SEPP 33)
- reviewing bushfire prone land maps for the proposal site, where available
- qualitatively assessing potential impacts to public health and safety
- providing mitigation measures for implementation during construction and operation.

The assessment focuses on those construction and operational activities with the potential to result in health and safety impacts on surrounding communities, land uses, and the environment (also known as 'off-site receivers'). The assessment does not take into account potential health and safety risks to on-site workers associated with normal construction operations, as these are regulated by workplace health and safety legislation (including the *Work Health and Safety Act 2011*), and are not relevant to approval of the proposal under Part 5.1 of the EP&A Act. Site management would be the responsibility of the construction contractor, who would be required (under the Work Health and Safety Act) to manage the site in accordance with relevant regulatory requirements.

### 25.1.2 Legislative and policy context to the assessment

The assessment gave consideration to the following relevant legislation, policies and guidelines:

- Rural Fires Act 1997
- Dangerous Goods (Road and Rail Transport) Regulation 2009
- Planning for bush fire protection (NSW Rural Fire Service, 2006)
- Australian Code for the Transport of Dangerous Goods by Road & Rail Dangerous Goods Code (National Transport Commission, 2016) ('the Dangerous Goods Code')
- Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (Department of Planning, 2011) ('Applying SEPP 33').

#### Dangerous goods and hazardous materials

Hazardous materials are classified based on their health effects, while dangerous goods are classified according to their physical or chemical effects, such as fire, explosion, corrosion and poisoning, affecting property, the environment or people.

As the proposal is State significant infrastructure, SEPP 33 does not apply to the proposal (refer to section 25.4.3). However, Applying SEPP 33 provide a process of identifying a potentially hazardous development by identifying storage and transport screening thresholds. The thresholds in Applying SEPP 33 represent the maximum quantities of hazardous materials that can be stored or transported without causing a significant off-site risk.

Hazardous materials are defined by Applying SEPP 33 as substances falling within the classification of the Dangerous Goods Code. Dangerous goods are substances that, because of their physical, chemical (physicochemical) or acute toxicity properties, present a risk to people, property or the environment. Types of substances classified as dangerous goods include explosives, flammable liquids and gases, corrosives, chemically reactive or acutely (highly) toxic substances. Dangerous goods are defined by the Dangerous Goods Code.

## 25.2 Existing environment

### 25.2.1 Sensitive receivers

The proposal would generally be located more than 200 metres from most sensitive receivers. Sensitive receivers and land uses close to the proposal site are described in chapters 11 and 20.

### 25.2.2 Existing goods transport arrangements

Existing operations along the rail lines in the study area are described in chapter 2.

### 25.2.3 Bushfire

Bushfire presents a threat to public safety and environmental (biodiversity) values. According to the *Bush Fire Risk Management Plan* (Parkes Bush Fire Management Committee, 2002) the major ignition sources in the Parkes LGA are:

- farm and road maintenance machinery
- road traffic
- lightening
- railways.

The risk of bushfire can be considered in terms of environmental factors that increase the risk of fire (fuel quantity and type, weather patterns and topography), as well as specific activities or infrastructure components that can exacerbate ignition risks. Environmental factors are considered in this section while potential ignition sources which may be generated by the proposal are described sections 25.3.2 and 25.3.3.

#### Existing risk

Bushfire prone areas are those areas which can support a bushfire or are likely to be subject to bushfire attack. Bushfire prone land maps have been prepared by most local councils across NSW and certified by the Commissioner of the NSW Rural Fire Service. These maps identify bushfire hazards and associated buffer zones within a local government area.

No bushfire prone land maps are publically available from Parkes or Narromine councils. However, a number of fire alerts during the summer months have been issued for locations surrounding the proposal site, and the presence of long grass in many areas would exacerbate the potential for grass fires near the proposal site, particularly during times of drought.

According to the *Bush Fire Risk Management Plan*, between 1951 and 1987 there were five major fires in areas that are now part of Goobang National Park. The *Bush Fire Risk Management Plan* also noted that every five to 10 years a major fire occurs in the eastern range of the Parkes LGA.

### Vegetation

The majority of the proposal site has been modified by uses and activities associated with rail transport and surrounding agricultural land uses. Vegetation within and in the vicinity of the proposal site is described in chapter 10.

### Topography

The slope of a site can also influence the rate of fire spread, with a doubling of the rate of spread for every slope increase of 10 degrees. As a consequence, a bushfire hazard downslope of a site would pose a greater risk, as the bushfire would travel upwards, with a corresponding increase in flame height and intensity. The proposal site crosses flat to undulating rises along the lower western slopes of a north–south trending range.

### Climate

The overall climate of the proposal site is temperate. The fire season within the Parkes Shire Bush Fire District generally runs from November through to March, and temperatures can range from the high 20s to the low 40s (degrees Celsius). The weather generally consists of hot dry summers with hot dry winds which come from the north-west, and cooler dry winds which come from the south-west. These cooler winds can be accompanied by electrical activity and occasional heavy thunderstorms.

## 25.3 Impact assessment

### 25.3.1 Risk assessment

#### Potential impacts

The environmental risk assessment for the proposal (summarised in Appendix B) included an assessment of the potential health and safety risks. The assessed risk level for the majority of potential risks to health and safety was between medium and high. Risks with an assessed level of medium or above are as follows:

- impacts from the transport, storage and use of hazardous substances and dangerous goods
- emissions from vehicles or plant during construction
- reduced safety for road users and pedestrians during construction
- health impacts from noise and air pollution during construction and operation
- potential for the proposal to exacerbate bushfire risk (as a result of the storage of dangerous goods, and construction site issues such as smoking or hot works)
- impacts from spills or accidents during the transport, storage, and use of hazardous substances and dangerous goods
- potential for train strike for pedestrians and vehicles crossing the rail corridor.

#### How potential impacts would be avoided

In general, potential health and safety impacts would be avoided by:

- managing construction and operation in accordance with relevant legislative and policy requirements, as listed in section 25.1.2
- designing, constructing and operating the proposal to minimise risks to health and safety
- implementing the management and mitigation measures described in section 25.4.3.

## 25.3.2 Construction impacts

### Storage, handling and transport of dangerous goods and hazardous materials

The storage and handling of dangerous goods and hazardous materials have the potential to impact the surrounding community and environment if leaks and spills occur, resulting in the potential contamination of air, soils, surface water and/or groundwater.

Dangerous goods that may be used during construction are listed in Table 25.1. These are compared to the storage and transport thresholds in Applying SEPP 33. These thresholds represent the maximum amounts of dangerous goods that can be stored or transported to and from a proposal site without causing a significant risk to off-site receptors.

In general, low volumes of dangerous goods would be stored in construction compounds adjacent to the rail corridor. The quantity of goods stored would be commensurate with the demand for those goods so that excess goods are not sitting idle.

*Table 25.1 Dangerous goods volumes and thresholds*

| Dangerous good | Australian Dangerous Good Code Class | Storage method | SEPP 33 thresholds | | |
|---|---|---|---|---|---|
| | | | Storage volume (in tonnes unless indicated) | Minimum storage distance from sensitive receptors (m) | Transport (weekly) |
| Petrol | C11; 3 PG III2 | 20 litre drums | Greater than 5 if stored with other Class 3 flammable liquids | 5 | n/a if not transported with Class 3 dangerous goods |
| Diesel | C11; 3 PG III2 | 20 litre drums | Greater than 5 if stored with other Class 3 flammable liquids | 5 | n/a if not transported with Class 3 dangerous goods |
| Lubricating and hydraulic oils and greases | C2 | 20 litre drums | n/a | n/a | n/a if not transported with Class 3 dangerous goods |
| Cement | n/a | Bags or pallets | n/a | n/a | Not subject to thresholds |
| Acetylene | 2.1 | Cylinders (up to 55 kg) | Greater than 100 kg | 15 | 2 tonnes/30 times per week |
| Epoxy glue | 3 PG III | Small containers | Greater than 5 | 5 | 10 tonnes/60 times per week |
| Premix concrete | n/a | Bags or pallets | n/a | n/a | Not subject to thresholds |
| Shotcrete accelerator | 3 PG III | 1,000 lt intermediate bulk containers (IBCs) | Greater than 5 | 5 | 3 tonnes/45 times per week |

| Dangerous good | Australian Dangerous Good Code Class | Storage method | SEPP 33 thresholds | | |
|---|---|---|---|---|---|
| | | | Storage volume (in tonnes unless indicated) | Minimum storage distance from sensitive receptors (m) | Transport (weekly) |
| Acids | 8 PG II | 1,000 lt IBCs | Greater than 25 | n/a | 2 tonnes/30 times per week |
| Bases | 8 PG II | 1,000 lt IBCs | Greater than 25 | n/a | 2 tonnes/30 times per week |
| Disinfectant | 8 PG II | 500 lt IBCs | Greater than 50 | n/a | 2 tonnes/30 times per week |

Notes 1: Classified as C1 if not stored with other Class 3 flammable liquids
2: Classified as 3PGIII if stored with other Class 3 flammable liquids

## Bushfire

Potential ignition sources during construction include cigarettes and domestic rubbish (such as glass bottles), and the generation of sparks through hot works such as welding or the excavator bucket making contact with rock or the rail track.

Fuel leaks and spills from plant and machinery, and the storage of dangerous goods during construction, could also provide a fuel source for bushfires.

## Underground and aboveground utilities

The potential rupture of underground utilities during excavation or collision of plant and equipment with aboveground services could pose risks to public safety. Rupture or contact with services during works could also result in short term outages, as could relocation of utilities and services.

Health and safety impacts associated with encountering utilities would be minimised by undertaking utilities investigations, including intrusive investigations, and consultation with service providers as part of the detailed design phase.

## Potential contamination

Contaminants of potential concern that could potentially be exposed during excavation include hydrocarbons and asbestos. Exposure to these contaminants could cause health and safety impacts to the community through inhalation and/or direct contact, or impacts to the environment due to contamination of land.

Health and safety impacts associated with potential exposure to contaminated and hazardous materials would be minimised through implementation of an unexpected finds protocol and waste management plan that would be prepared as part of the CEMP.

Further information on contamination and associated mitigation measures is provided in chapter 14.

## Risk of subsidence

As described in chapter 15, the potential for dewatering during construction is low, due to the shallow depth of excavation and the low potential for groundwater to be encountered in significant volumes at these depths. The proposal would also not involve the excavation of any tunnels or other sub-surface cavities. Based on the nature of the works being undertaken and the existing environment, the risk of subsidence as a result of construction is considered negligible.

### Emergency vehicle movements

As described in chapter 9, construction of the proposal would result in temporary impacts to traffic and access within the proposal area, and an increase in both heavy and light vehicle movements on the local road network. The proposed works on level crossings may also result in disruptions to local traffic. This could cause delays and/or potential access restrictions to emergency vehicle movement in the proposal area. However, the traffic impact assessment concluded that the road network performance would not decline as a result of construction. Therefore, any delays would likely be minor.

Impacts from delays and potential access restrictions would be managed through the implementation of a traffic management plan and appropriate traffic controls, which would consider emergency vehicle access and movements. Ongoing liaison with local councils, Roads and Maritime Services, and emergency services organisations would be undertaken as part of the detailed design phase to confirm any additional measures to mitigate potential impacts to emergency vehicle movements.

### Other health and safety risks

A number of other construction activities could result in impacts to the health and safety of site workers, users, visitors, and the local community if improperly managed. These include:

- working within an operating rail environment
- the operation of vehicles and construction equipment on site
- the transportation of equipment, excavated spoil and material to and from site
- construction failures or incidents resulting in flooding, inundation or excavation collapse.

In addition to the above, there is the potential for risks to pedestrian/public safety resulting from unauthorised access to construction work areas.

The potential for the above activities to cause health and safety impacts is considered to be minimal, based on the remote nature of the majority of the proposal site.

NSW workplace safety laws require construction sites to have adequate site security, which includes appropriate fencing. All construction work would be isolated from the general public. The construction contractor would need to ensure that construction sites are secure at all times, and take all possible actions to prevent entry by unauthorised persons.

Health and safety risks during construction would be managed by the implementation of standard workplace health and safety requirements.

A work health and safety management plan and safe work method statements would be developed in accordance with regulatory requirements.

## 25.3.3 Operation impacts

### Storage, handling and transport of dangerous goods and hazardous materials

The amount of hazardous materials and dangerous goods that would be used during maintenance activities would be much smaller than the volumes required during construction. Hazardous materials and dangerous goods required during maintenance would be similar to those listed in Table 25.1, and would be transported in vehicles/trucks to areas requiring maintenance.

Transport of hazardous materials and dangerous goods via rail during freight operations has the potential to cause impacts to the surrounding community and the environment through leaks and spills. The transport of hazardous materials and dangerous goods would be the responsibility of the freight operator/s and would be undertaken in accordance with relevant standards and regulatory requirements (including the *Australian Dangerous Goods Code* (National Transport Commission, 2015) and ARTC's standard operating procedures).

### Bushfire

The potential for bushfire during operation would be similar to that during construction, although the likelihood of a bushfire occurring during operation would be less than construction.

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.

### Emergency vehicle movements

As described in chapter 15, the proposal may increase the extent or duration of flooding of public roads at some locations, which could lead to road closures and restrict movement of emergency vehicles. However, flooding would only occur at the same public road locations as that where it is currently occurring. No additional public roads would be closed due to flooding. Therefore, there would be no additional impacts to emergency vehicle movements as a result of the proposal.

### Other health and safety risks

Potential impacts to the health and safety of the local community include:

- risks to pedestrians and road vehicles as a result of collisions with trains at stops and level crossings
- other safety risks, such as security risks, unauthorised access etc
- general worker health and safety issues for drivers and maintenance staff.

These potential impacts would be managed by undertaking the design with an appropriate emphasis on safety according to relevant design standards and requirements.

Targeted community education programs would be implemented prior to and during operation to provide information about Inland Rail operation and safety, particularly at level crossings (refer to chapter 21).

Works within the rail corridor would be undertaken in accordance with ARTC's standard operating procedures, thereby reducing the potential for impacts to the health and safety of workers, visitors and users.

## 25.4 Mitigation and management

### 25.4.1 Approach to mitigation and management

### Bushfire and emergency response

An emergency response plan would be developed as part of the CEMP in consultation with state and regional emergency service providers. The plan would include protocols and procedures to be followed during emergency situations associated with construction (including bushfires, explosions, vehicle and rail collisions, spillage or flooding events) in addition to:

- roles and responsibilities
- traffic management/control systems in the case of emergency
- training programs to ensure that all staff are familiar with the plan
- design and management measures to address the potential environmental impacts of an emergency situation.

Response to bushfire and other emergencies during operation would be undertaken in accordance with ARTC's existing Safety Management System (SMS) and associated procedures.

### Storage, handling and transport of dangerous goods and hazardous materials

The CEMP and operational procedures for Inland Rail as a whole would include requirements for the storage, handling and transport of dangerous goods and hazardous materials in accordance with relevant regulatory requirements and ARTC's standards.

A spill response procedure would also be developed as part of the CEMP and would include notification and clean-up requirements in the event of a spill.

### Community safety

As discussed in section 21.4, a safety awareness program would be developed and implemented to educate the community regarding safety around trains. This would focus on community and rural property operators who cross the rail corridor to access their properties.

## 25.4.2 Consideration of the interactions between mitigation measures

Mitigation measures to control impacts to health and safety of workers, visitors and the public may replicate mitigation measures proposed for the control of impacts associated with noise, air quality, water quality, traffic and access and waste management.

All mitigation measures for the proposal would be consolidated and described in the CEMP. The plan would identify measures that are common between different aspects. Common impacts and common mitigation measures would be consolidated to ensure consistency and implementation.

## 25.4.3 Summary of mitigation measures

To mitigate the potential health and safety risks, the following measures would be implemented.

***Table 25.2 Health and safety mitigation measures***

| Stage | Impact | Mitigation measures |
|---|---|---|
| Detailed design/ pre-construction | Public safety | A hazard analysis would be undertaken during the detailed design stage to identify risks to public safety from the proposal, and how these can be mitigated through safety in design. |
| | Services and utilities | The location of utilities, services, and other infrastructure would be identified prior to construction to determine requirements for access to, diversion, protection and/or support. |
| Pre-construction/ construction | Public safety from bushfires, fires, explosions, flooding and inundation | An emergency response sub-plan would be developed and implemented as part of the CEMP in consultation with relevant stakeholders. It would include measures to minimise the potential for health and safety impacts on the local community and environment. |

| Stage | Impact | Mitigation measures |
|---|---|---|
| Construction | Storage and handling of dangerous goods | Hazardous materials and dangerous goods would be stored, handled and transported in accordance with relevant regulatory requirements and relevant Australian Standards, including SEPP 33 thresholds. This would include a requirement to provide a minimum bund volume of 110% of the largest single stored volume within the bund.<br><br>A risk management strategy would be developed to manage the potential for risks in situations where the minimum distance from sensitive receivers cannot be achieved, or the quantity of hazardous materials exceed SEPP 33 threshold levels. |
| Operation | Bushfire, storage and handling of dangerous goods, other health and safety risks | Operation would be undertaken in accordance with ARTC's standard operating procedures. |

# 26. Cumulative and residual impacts

*This chapter provides an assessment of the potential cumulative impacts of the proposal. It describes other projects in the study area, and identifies where there is the potential for cumulative impacts to occur. It also provides an assessment of the potential for residual impacts following implementation of the mitigation measures provided in chapters 9 to 25.*

## 26.1 Overview

For an EIS, cumulative impacts can be defined as the successive, incremental, and combined effect of multiple impacts, which may in themselves be minor, but could become significant when considered together.

The SEARs for the proposal requires (item 2.1(n)):

> *'an assessment of the cumulative impacts of the project taking into account other projects that have been approved but where construction has not commenced, projects that have commenced construction, and projects that have recently been completed'.*

The assessment of potential cumulative impacts has been undertaken in accordance with the SEARs, and considers the potential for impacts taking into account other projects in the study area. The assessment draws on the findings of chapters 9 to 25, and environmental impact assessments of other projects. The cumulative impact assessment is provided in section 26.2.

The SEARs also require an assessment of the potential for residual impacts, including consideration of how these would be managed or offset. For the purpose of the EIS, residual impacts are considered to be the impacts of the proposal that may remain in the medium to long term, even after the implementation of the mitigation measures provided in chapters 9 to 25. The residual impact assessment is provided in section 26.3.

## 26.2 Cumulative impact assessment

### 26.2.1 Methodology

The following tasks were undertaken to assess the potential for cumulative impacts:

- identifying existing or proposed projects in the study area (either proposed or approved) based on information available in the public domain
- screening identified projects for their potential to interact with the proposal
- identifying and assessing the significance of potential cumulative impacts.

The study area for the cumulative impact assessment was the Parkes, Narromine, and Dubbo LGAs. Projects in the study area were identified based on a search of the following data sources, undertaken in December 2016:

- the Department of Planning and Environment's online major projects database
- proponent websites
- local council websites/DA tracking databases
- the public register under the POEO Act 1997.

The projects identified were screened in relation to their potential for cumulative impacts with the proposal, based on their nature, size, and proximity to the proposal site.

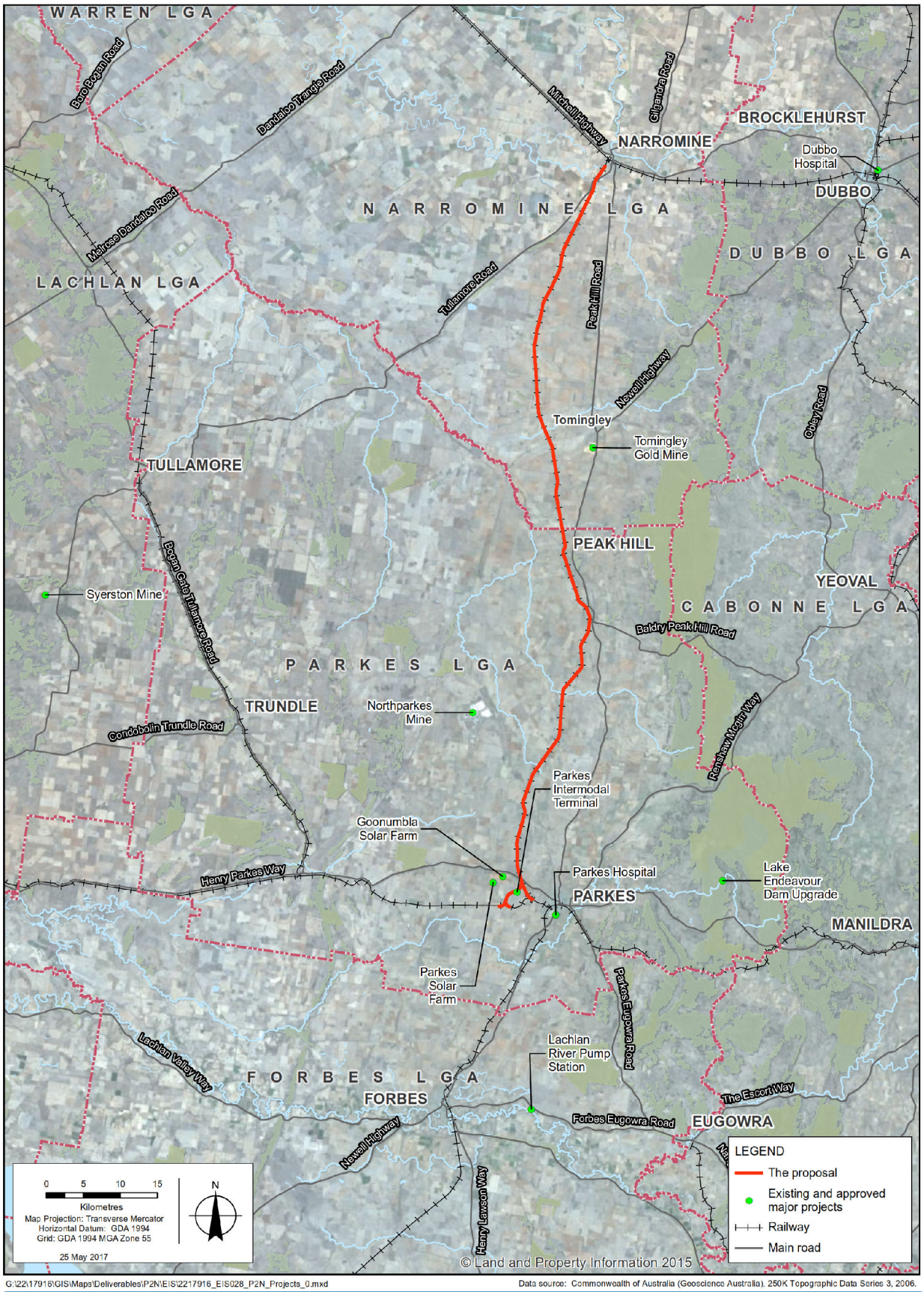
Screening of potential cumulative impacts was undertaken by comparing the extent and duration of impacts, and their potential to occur in the same place at the same time as that for the proposal. The significance of these cumulative impacts was then assessed, with consideration of the extent, magnitude, and duration of the impact and the sensitivity of the environment.

### 26.2.2 Other projects in the study area

Existing or proposed projects in the study area considered to have the potential for cumulative impacts with the proposal are listed in Table 26.1 and are shown in Figure 26.1. Further information on these projects on the following pages.

*Table 26.1 Existing or proposed projects*

| Project | Proponent | Type | Status | LGA | Approx. distance from the proposal site (km) |
|---|---|---|---|---|---|
| **Existing projects** | | | | | |
| Syerston Mine | Black Range Minerals | Mineral extraction | Operational | Parkes | 40 |
| Northparkes Mine | Rio Tinto, Sumitomo Metal Oceania Pty Ltd and Sumitomo Corporation | Metal mining | Operational with approval to expand | Parkes | 10 |
| Parkes Hospital | Health infrastructure | Hospital | Operational | Parkes | 1.5 |
| Lachlan River Pump Station | Parkes Shire Council | Water infrastructure | Operational | Parkes | 17 |
| Lake Endeavour Dam Upgrade | Parkes Shire Council | Water infrastructure | Operational | Parkes | 28 |
| Tomingley Gold Mine | Alkane Resources Ltd | Metal mining | Operational with approval to expand | Narromine | 4 |
| **Proposed and approved projects** | | | | | |
| Goonumbla Solar Farm | Smardi Enterprises | Power generation | Approved | Parkes | 2 |
| Parkes Solar Farm | Neon Australia | Electricity generation | Approved | Parkes | 4 |
| Parkes Intermodal Terminal | Asciano Ltd | Rail and related transport | Approved | Parkes | Adjoins |
| Dubbo Hospital Redevelopment Stages 3 and 4 | Health Infrastructure | Hospital | Proposed | Dubbo | 30 |

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Data source: Commonwealth of Australia (Geoscience Australia). 250K Topographic Data Series 3, 2006.

Figure 26.1
Projects in the study area

## Existing projects

### Syerston Mine

The Syerston nickel cobalt mine is located near the township of Trundle, about 40 kilometres west of the proposal site. The initial proposal was approved in 2001, with three subsequent applications submitted to modify the operation of the mine. In 2005, an application was submitted to allow for an increase in the run-of-mine processing rate, limestone quarry extraction rate, and adjustments to ore procession operations. In 2006, another application was submitted to allow for reconfiguration of the water supply bore field. Most recently, an application was submitted to adjust mining and processing operations to initially focus on scandium oxide production. The assessment of the latest application is in progress, awaiting further information from the applicant.

### Northparkes Mine

The Northparkes gold and copper mine has been operating since 1993, with approval granted in 2007 to allow for ongoing operation of the previously approved facilities and extension of the underground block cave mining. In October 2009, two further modifications were granted; one for a mine and mill upgrade to increase production and extend the mine life, the other being for the development of a warehouse.

The site is also subject to three Mining Leases, three Exploration Licences, one Environmental Protection Licence, a Limestone State Forest Occupation Permit and local council approval for road train access on Bogan Road (Umwelt, 2011).

In July 2014, the Minister for Planning granted approval with conditions for development of further mining operations, including depth extensions. This project will also allow for the increase in maximum production and major upgrades to associated mining infrastructure.

### Parkes Hospital

The redevelopment of Parkes Hospital includes site preparation works, bulk earthworks, construction of a new two storey hospital building, and associated site infrastructure works. The works were approved in July 2014, with the new hospital officially opened in January 2016.

### Lachlan River Pump Station

The Lachlan River Pump Station was completed in May 2016. The project, undertaken by Parkes Shire Council, included replacing the river intake pump at the Lachlan River, refurbishing infrastructure and commissioning Bore 8 to increase of water security for the Parkes/Peak Hill area.

### Lake Endeavour Dam Upgrade

The Lake Endeavour Dam Upgrade was undertaken by Parkes Shire Council. The project involved strengthening the Dam to ensure the long term stability and integrity of the structure. The project also involved enhancing the Dam for increased flood security. Lake Endeavour Dam is also available for use for passive recreation activities, with a permit (Parkes Shire Council, 2016).

### Tomingley Gold Mine

The Tomingley Gold Mine project, which was approved in July 2012, included:

- construction, operation and rehabilitation of an open cut and underground gold mine and associated infrastructure
- extraction and process of up to 1.5 million tonnes of gold ore per year for up to 10 years
- transportation the processed ore from the site via road.

Construction of the project commenced in February 2013, mining began in November 2013 and the plant was commissioned in February 2014.

Approval of subsequent modifications to the original consent occurred in November 2013, July 2014 and July 2016. The first modification was to adjust a range of commitments made during the original application which were no longer appropriate. The second was to permit enhancement of the approved and constructed amenity bund, and cut back one of the approved open cut mines. The third, and most recent modification, was for a further cut back, establishment of an additional open cut mine, and underground workings. Decommissioning activities are to occur progressively, with complete rehabilitation proposed by 2021.

### Proposed and approved projects

#### Parkes Solar Farm

The Parkes Solar Farm was approved in July 2016. The proposal comprises the construction, operation, and eventual decommissioning of the Parkes Solar Farm. The proposal provides for construction and operation of about 215,000 solar panels on a 210 hectare site, internal access tracks, staff amenities, and a vegetation buffer. The Parkes Solar Farm would have the capacity to generate 50 megawatts per year.

#### Goonumbla Solar Farm

The Goonumbla Solar Farm project is proposed for a site adjacent to the Parkes Solar Farm site. The Goonumbla Solar Farm would include more than 200,000 solar panels, and have capacity to generate up to 150 megawatts of electricity.The project was granted approval in December 2016, subject to conditions.

#### Parkes Intermodal Terminal

The Parkes Intermodal Terminal (also known as the Parkes National Logistics Hub or the Parkes Hub) is located adjacent to the proposal site (for the Parkes north west connection) and the Broken Hill line. Approval was granted in March 2007 for the construction and operation of a facility providing for the large scale transport and storage of freight, and the transfer of freight containers between trucks and trains. The Parkes Intermodal Terminal occupies a 516 hectare site, and is intended to operate 24 hours, seven days per week. Asciano and SCT Logistics own land at the site.

In January 2012, approval was granted to modify the original consent. This approval extended the previously lapsed approval for five years. While the land has been re-zoned, development is yet to commence. The intent is to develop the site to maximise the opportunities resulting from Inland Rail.

#### Dubbo Hospital Redevelopment Stages 3 and 4

In February 2013 consent was granted for Stages 1 and 2 of the Dubbo Hospital redevelopment. These stages comprised of a new building, internal linkages, plant and equipment as well as refurbishment of existing buildings, demolition of old buildings and new landscaping. These works are almost complete.

In June 2016 Health Infrastructure requested SEARs for Stages 3 and 4 of the hospital redevelopment. Stages 3 and 4 consist of:

- construction of a new three store building
- demolition of existing buildings
- construction of a new car park, ambulance driveway and hospital entry.

Timing and details of construction and operation are not yet publicly available.

## 26.2.3 Cumulative impacts

The potential for cumulative impacts between the proposal and the projects listed in section 26.2.2 is considered below, according to the key environmental issues listed by the SEARs.

## Traffic and transport

The greatest potential for cumulative traffic impacts are associated with construction traffic in the vicinity of Parkes. The proposal site adjoins the site for the Parkes Intermodal Terminal. Timing for the construction of the terminal is unknown, as construction has not commenced and the approval expires in February 2017. As such, it is not possible to assess the potential for cumulative impacts between the proposal and the terminal.

Two other projects are located in the vicinity of the Parkes north west connection – the Goonumbla Solar Farm and Parkes Solar Farm. Based on the construction timing proposed in the EISs for these projects, it is unlikely that construction of the proposal would overlap with construction of the Parkes Solar Farm. However, construction of the proposal could overlap with construction of the Goonumbla Solar Farm (between May and September 2018).

Construction traffic for Goonumbla Solar Farm is estimated to be a maximum of about 140 vehicles per day. Vehicle movements during construction of the proposal are estimated to be 400 per day. If construction of these projects overlap, there is sufficient capacity on the Newell Highway to accommodate the combined increase in traffic movements. Construction of the solar farm would use Henry Parkes Way for access, and it is not anticipated that this road would be impacted by construction of the proposal. As such, there is no anticipated significant cumulative traffic impacts.

There are no anticipated operational impacts due to the very low traffic numbers associated with both the proposal and the solar farms.

## Biodiversity

The existing rail corridor and surrounding lands have been subject to a range of historic disturbances from land clearing, agriculture, and rail infrastructure development. The history of disturbance has resulted in an incremental loss of vegetation and fauna habitat across the broader Parkes to Narromine area. This cumulative loss of habitat has placed further pressure on local threatened flora and fauna species and ecological communities.

The proposal would further increase fragmentation in an already fragmented landscape for those vegetation communities and habitats within the proposal site that would be directly impacted by the proposal. However, the proposal would not significantly change the overall connectivity of habitats in the region, as the vast majority of the proposal site is located in an existing rail corridor. Fragmentation and connectivity considerations have been taken into account as part of the biodiversity assessment and the biodiversity offsets calculations.

## Noise and vibration

As noted above, construction of the proposal could overlap with construction of the Goonumbla Solar Farm. There are two sensitive receivers located on Millers Lookout Road that could be impacted from construction noise from both projects. The predicated noise at these receivers from construction of the Goonumbla Solar Farm would be about 27 dB(A), compared with about 43 dB(A) from construction of the proposal. As construction noise from the proposal would be significantly greater than that of the solar farm, there would be no cumulative increase in noise impacts.

No cumulative noise impacts are likely to be associated with operation of the solar farms and the proposal. There is the potential for cumulative noise impacts with the Parkes Intermodal Terminal, however there is insufficient information currently available to determine to what extent and when.

## Air quality

Air quality impacts from the proposal are predominately associated with construction dust. The assessment found that the predicted particulate levels from construction of the proposal would be unlikely to extend farther than 150 metres from work areas, and would have insignificant cumulative impacts with other projects. Predicted particulate increments from construction would be localised to within a few hundred metres of construction works, and would be unlikely to impact on regional air quality. The Parkes Intermodal Terminal is the only project located close enough to the proposal site to potentially result in cumulative air quality impacts. The construction timing of the terminal is unknown. If construction overlaps, coordination with the terminal proponent may be required.

Operational air quality impacts are not expected at distances greater than 20 metres from the proposal site. There are no identified significant sources of air pollutants, namely nitrogen oxides and particulates, within 20 metres of the proposal site, and cumulative impacts are not expected. The Parkes Intermodal Terminal is the only project located within 20 metres of the proposal. Air emissions from the terminal would be associated with emissions from trains and vehicles, and no cumulative impacts are predicted.

### Soils

The potential for erosion and sedimentation as a result of the proposal is mainly associated with construction. These potential impacts would be readily managed with the implementation of standard erosion and sedimentation control measures. As such, it is not expected that the proposal would have a material impact on erosion and sedimentation at a scale such that cumulative impacts could occur.

The overall risk of encountering or generating land contamination is low, and the proposal would be unlikely to generate impacts at a scale that would interact with other projects.

### Hydrology and flooding

It is predicted that the proposal would result in a small increase in the area and duration of flooding in the immediate vicinity of the proposal site, and that impacts are highly localised. None of the existing or proposed projects will have a significant influence on hydrology and flooding. As such, no cumulative impacts are expected to occur.

### Water quality

Water quality impacts from the proposal would be associated with construction and would be highly localised. There are no anticipated cumulative impacts.

### Aboriginal heritage

A small number of Aboriginal heritage sites may be impacted by the proposal. While some of the existing and proposed projects may also impact Aboriginal heritage items, due to the relatively low density of development in the region there are no anticipated cumulative impacts.

### Non-Aboriginal heritage

No sites/items with a statutory heritage listing, with the potential to be directly or indirectly impacted by the proposal, were identified within or in the immediate vicinity of the proposal site. However, a number of items with potential heritage significance were identified.

While some of the existing and proposed projects may also impact heritage items, they will not impact rail heritage items or items immediately adjacent to the existing rail corridor. As such, no cumulative impacts are expected to occur.

### Landscape and visual impacts

Given the low profile and horizontal form of most of the proposal, the level of visual modification would be confined to a distance relatively close to the area subject to change. The magnitude of the impacts for the proposal are low, as the visibility of the proposal is reduced by the typical flat topography and lack of sensitive receivers.

The combination of the proposal with the other projects proposed near the Parkes north west connection would result in a change in the visual landscape if the other projects proceed.

## Land use and property

As the proposal would be undertaken mainly within the existing rail corridor, land use impacts are generally limited. There would be a relatively small area of additional land required for the Parkes north west connection.

In the vicinity of the Parkes north west connection, with the proposal and other projects, land use will change from rural residential/agricultural to other uses, including an intermodal facility, solar farms, and power generation. These changes are permissible under the current land use zonings.

## Socio-economic

The project has the potential to compete with other projects and industries (including mining related) for employees, due to similar skill requirements – particularly during the peak construction period. Projects that are under construction would generate higher volumes of demand for labour and accommodation facilities than operational projects. These impacts are most likely to occur when construction of the southern end of the proposal is being undertaken, depending on the timing of construction for the other projects.

As noted above, construction of the proposal could overlap with construction of the Goonumbla Solar Farm. It is estimated that construction of this project would require a maximum of 100 staff.

The non-residential workforce has the potential to increase the demand for temporary in Parkes, Narromine, Peak Hill and Dubbo. This may reduce the availability and affordability of housing and accommodation for the duration of construction. There is insufficient information to determine the likelihood and extent of this potential impact, as it would depend on the timing of other projects. A review of accommodation would be undertaken prior to construction, and a workforce housing and accommodation plan would be implemented by ARTC for Inland Rail as a whole.

## Waste

The generation of waste as a result of the construction would be minimised by implementing a waste management plan. Only licensed facilities would be used for waste disposal. The following waste management facilities are located in the study area:

- Parkes Waste Depot (Broglan Road, Parkes)
- Parkes Shire rural waste depots – Peak Hill, Alectown, Bogan Gate, Trundle, Tullamore and Gunningbland
- Narromine Waste Management Facility (Gainsborough Road, Narromine)
- Trangie Waste Management Facility (Trangie Tip Road, Trangie)
- Tomingley Waste Transfer Station (Gundong Road, Tomingley).

There are few projects in the vicinity of the proposal site that are likely to generate construction waste in the foreseeable future. Based on current information, construction of the proposal may overlap with the Goonumbla Solar Farm. No significant cumulative impacts as a result of waste generation are anticipated.

The existing mines in the study area have waste management plans in place, and while expansions are being undertaken, significant waste generation requiring off-site disposal is not anticipated.

## Other issues

The potential for cumulative impacts for the other issues listed in the SEARs are considered in Table 26.2.

*Table 26.2 Cumulative impacts – other issues*

| Key Issue | Cumulative impact assessment |
|---|---|
| Protected and sensitive lands | The proposal would not impact protected lands as defined by the SEARs. There would be limited impacts to waterfront land during construction, mainly as a result of the replacement of culverts. Due to the minimal impact as a result of the proposal, the potential for cumulative impacts to protected and sensitive lands is negligible. |
| Biosecurity | Biosecurity risks associated with other projects are relatively low, as the projects are confined to discrete sites. The greatest risks would occur during construction, but even this is considered to be very low. As such, no cumulative impacts to biosecurity are predicted. |
| Sustainability and climate change | Cumulative sustainability and climate change assessments are not relevant to the proposal. The sustainability assessment required by the SEARs is for an assessment of the sustainability of the proposal using the Infrastructure Sustainability Rating Tool and current guidelines and targets. This cannot be applied to a cumulative assessment. In relation to climate change, the SEARs requires an assessment of the impacts of climate change on the proposal, not an assessment of the proposal on climate change. |
| Health and safety | Potential health and safety impacts associated with other approved and proposed projects are not anticipated to increase the risks to public safety when combined with the proposal. |

### 26.2.4 Summary of results

The potential for cumulative impacts between the proposal and other existing or proposed projects is low. Despite the extent of the area included in this cumulative impact assessment, a relatively small number of major projects were identified for inclusion in the assessment. The assessment considered all existing projects as part of the baseline assessment, and proposed changes to these projects were also considered.

The assessment concludes that the impacts from the proposal, combined with other existing and proposed projects in the study area, would not result in significant cumulative impacts.

## 26.3 Residual Impacts

A summary of the potential residual impacts for the proposal is provided in Table 26.3, together with a description of how these potential residual impacts would be managed.

*Table 26.3 Residual impact assessment*

| Potential residual impacts | Comment | Approach to mitigation and management |
|---|---|---|
| **Traffic and transport** | | |
| There is the potential for permanent impacts with the changes to level crossings and changes to roads in the vicinity of the Parkes north west connection. | The extent of impact would be determined during detailed design and through a process of consultation in regards to potential level crossing and road closures. There would be no forced closure of level crossings. | Consultation would be undertaken with relevant stakeholders prior to changes to access or level crossings in accordance with ARTC's processes. The operation of level crossings that have been subject to change would be reviewed after the proposal |

| Potential residual impacts | Comment | Approach to mitigation and management |
|---|---|---|
| | | commences to ensure appropriate protection is provided, that they are appropriate for the traffic conditions, and whether any additional queuing capacity is required. |
| **Biodiversity** | | |
| The proposal would involve the permanent removal of native vegetation and fauna habitat during construction, including removal of threatened ecological communities and habitats for threatened species. | Construction of the proposal would involve:<br>▸ removal of about 76 hectares of native vegetation<br>▸ removal of about 63 hectares of listed threatened ecological communities under the TSC Act and/or EPBC Act (as part of the total native vegetation clearance).<br>*It is noted that the estimate of potential clearing would continue to be refined as the design of the project progresses, with the aim of reducing the potential clearing required.* | These potential impacts would be mitigated by the proposed mitigation measures, including:<br>▸ implementation of a biodiversity offset strategy to offset permanent removal of native vegetation<br>▸ detailed design and construction planning would minimise direct impacts to vegetation mapped as threatened ecological communities as far as practicable<br>▸ implementation of the flora and fauna management sub-plan (as part of the CEMP), including weed control, fauna habitat management and monitoring |
| | | ▸ pre-clearance surveys would be undertaken, and a tree felling procedure would be implemented to avoid injury and mortality of native fauna during construction<br>▸ native vegetation temporarily disturbed during construction would be rehabilitated. |
| **Noise** | | |
| It is anticipated that, without mitigation, noise levels during operation would exceed relevant criteria at about 28 sensitive receivers. | During detailed design the noise modelling would be updated and further assessment undertaken to identify reasonable and feasible noise mitigation measures to achieve appropriate noise levels. | A range of potential design and mitigation measures would be considered and assessed during the detailed design process, including:<br>▸ rail dampers<br>▸ noise barriers<br>▸ architectural treatment.<br>Post construction noise monitoring would be undertaken |

| Potential residual impacts | Comment | Approach to mitigation and management |
|---|---|---|
| | | at representative locations to verify the effectiveness of the applied mitigation measures with respect to the determined trigger levels. |
| **Hydrology and flooding** | | |
| A reduction in inundation for events up to the two per cent AEP event is anticipated, together with an increase in the extent of inundation for flood events exceeding the two per cent AEP. | The potential impacts are not considered significant, as no houses or other structures would be impacted by the changes in flooding.<br>Impacts are anticipated to be localised. | During detailed design the potential impacts to flooding and hydrology would be further assessed and the design amended as appropriate to minimise impacts.<br>Flood modelling to support detailed design would be ongoing.<br>Consultation would be undertaken with local councils and emergency services to ensure that the flood-related outcomes of the proposal are consistent with local planning and any future floodplain risk management plans. |
| **Aboriginal heritage** | | |
| Construction of the proposal may result in the disturbance/ destruction of identified and unidentified Aboriginal archaeological sites. | Works within the proposal site have the potential to directly or indirectly disturb identified Aboriginal sites and areas of archaeological potential.<br>Two listed sites were identified within the proposal site, and two sites are located adjacent to the proposal site. The proposal may directly or indirectly disturb these sites during construction. These sites have been assessed as having low archaeological significance. | These potential impacts would be mitigated by the proposed mitigation measures, including:<br>▸ detailed design and construction planning would minimise direct impacts to items/sites of Aboriginal heritage significance<br>▸ listed sites would be avoided where practicable<br>▸ implementation of the Aboriginal cultural heritage management plan<br>▸ sites within the proposal site would be avoided where practicable<br>▸ collection of artefacts according to recommended protocols if the sites cannot be avoided. |

| Potential residual impacts | Comment | Approach to mitigation and management |
|---|---|---|
| **Visual amenity** | | |
| Presence of new structures in the landscape for the Parkes north west connection, including a new section of rail line and the Brolgan Road overbridge. | Operational impacts of the proposal would occur as a result of the introduction of new structures in the rural/natural landscape. The significance of these impacts is mitigated by the lack of receivers and relatively flat environment.<br>The visual amenity in the vicinity of the Parkes north west connection is anticipated to change, as adjoining land has been re-zoned as Special Activities (SP1). This zoning allows for uses including freight transport facilities, heavy industrial storage establishments, high technology industries, rural industries, transport depots and truck depots. | Detailed design would involve consideration of building materials and treatments to minimise the potential visibility of the project.<br>Landscaping, vegetation rehabilitation and replanting would be undertaken in accordance with the CEMP. |
| **Land use** | | |
| Some property would be acquired to construct the proposal. Currently it is anticipated that 10 privately owned properties may be impacted. | Property acquisition is required for construction of the Parkes north west connection and potentially in some areas adjacent to the existing corridor (to be determined during detailed design). | All acquisitions/adjustments would be undertaken in consultation with landowners and in accordance with the requirements of the Land Acquisition *(Just Terms Compensation) Act 1991*. |
| **Socio-economic** | | |
| Potential for community amenity and safety impacts as a result of the increase in train movements along the proposal site. | Changes to noise levels, air pollution, and visual changes from the presence of the proposal may impact on the amenity for the surrounding community. These have been discussed above where appropriate. | An operation communication and education plan would be designed and implemented prior to the commencement of operation to provide information about Inland Rail operation and safety, particularly at level crossings. |