Inland Rail North Star to NSW/Qld Border

State Significant Infrastructure Assessment SSI 9371

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Cover image: Bruxner Way, disused rail alignment and Whalan Creek looking south, Australian Rail Track Corporation

Glossary

Abbreviation	Definition
AEP	Annual Exceedance Probability: the probability of a rainfall or flood event occurring in any given year
AHD	Australian Height Datum
ARR 2019	*Australian Rainfall and Runoff: A Guide to Flood Estimation 2019* (Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors) Commonwealth of Australia)
BC Act	*Biodiversity Conservation Act 2016*
BCS	Biodiversity, Conservation and Science Directorate, Department of Planning and Environment
BRVFMP	Border Rivers Valley Floodplain Management Plan
CIV	Capital Investment Value
CPP	Community Participation Plan
Council	Gwydir Shire, Moree Plains Shire and Goondiwindi Regional Council (Qld)
Crown Lands	Crown Lands, DPE
DAWE	Commonwealth Department of Agriculture, Water and the Environment (formerly DoEE)
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
Department	Department of Planning and Environment
DPI	Department of Primary Industries, DPE
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
Heritage	Heritage NSW

LoS	Level of Service
Minister	Minister for Planning
Planning Secretary	Secretary of the Department of Planning and Environment
PMST	Commonwealth's Protected Matters Search Tool
SEARs	Planning Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SRD SEPP	State Environmental Planning Policy (State and Regional Development) 2011
SSI	State Significant Infrastructure
TfNSW	Transport for NSW

Executive Summary

The Australian Rail Track Corporation (ARTC) (the Proponent) is constructing the Inland Rail project, a 1,700-kilometre freight rail line between Melbourne and Brisbane. The North Star to NSW/Qld Border project is one of seven Inland Rail projects in NSW. This stage proposes to install 25 kilometres of new track within the existing non-operational Boggabilla rail corridor, and 5 kilometres of new track within a greenfield corridor.

Inland Rail will provide economic benefits to NSW and Australia. Inland Rail's business case indicates it will increase gross domestic product by $16 billion over the 10-year construction period and 50 years of operation. The North Star to NSW/Qld Border project is expected to create an average of 700 additional jobs per annum during the four year construction period.

The North Star to NSW/Qld Border project will provide economic growth in northern NSW and development opportunities in the region through the improved reliability, efficiency and capacity of rail freight transport provided by this section of the Inland Rail project.

The project complies with the objects of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and is consistent with the Government's key priorities and transport planning framework including *NSW Freight and Ports Plan 2018-2038, 2020 Infrastructure Priority List, NSW State Infrastructure Strategy 2022-2042, Future Transport Strategy 2056*, and *Regional NSW Service* and *Infrastructure Plan*. This project is State significant infrastructure (SSI) and was declared critical State significant infrastructure (CSSI) under section 5.13 of the EP&A Act. The Minister for Planning is the approval authority.

The environmental impacts of construction and operation are considered acceptable, subject to implementation of appropriate mitigation and management measures and compliance with the Department's recommended conditions of approval.

The then Commonwealth Department of the Environment and Energy (now Commonwealth Department of Climate Change, Energy, the Environment and Water) determined the project to be a 'controlled action' under sections 18 and 18A *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), as it was considered likely that the project could have a significant impact on listed threatened species and communities. Following this notification, the Department confirmed that the project would be assessed under the NSW Assessment Bilateral Agreement.

Engagement with the community

The Environmental Impact Statement (EIS) was publicly exhibited from Wednesday 26 August 2020 until Tuesday 6 October 2020 (42 days) on the Department's website. 15 submissions were received and 13 pieces of government agency advice were received during the exhibition period. Three submissions were received from local councils and 12 from the community, including 10 from individuals and two from special interest groups. Seven of the community submissions were objections Key issues raised in the submissions included hydrology and flooding, noise and vibration, traffic and access, social impacts including visual amenity, and the project need and context.

The Proponent responded to the submissions and Department's concerns regarding hydrology and flooding impacts. These were provided in their Response to Submissions (RtS) and Preferred

Infrastructure Report (PIR) on 9 June 2021, with a revised Biodiversity Development Assessment Report (BDAR) on 20 October 2021. Further responses to the Department's requests for information on flood modelling and velocity were made publicly available on 16 December 2021 and 22 March 2022.

Key assessment issues

Flooding and hydrology

The project is located within the Border Rivers Catchment Management Area with key waterways including the Macintyre River, Whalan Creek, Mobbindry Creek, Back Creek and Forest Creek. The area already experiences flooding and the project will result in landscape changes through the introduction of embankments, bridges, culverts, a viaduct, and an upgrade to the existing non-operational rail line through an area with predominantly highly erosive soils. The project has the potential to change flooding characteristics including depth, velocity and duration. The Department engaged an independent hydrologist to review the flooding and hydrology assessment and created a Hydrology Working Group, comprised of government and Proponent representatives, for ongoing review of the Proponent's revised hydrology assessment and proposed mitigation measures.

The Proponent prepared revised hydraulic and hydrological modelling and considered the 1976 flood event in response to recommendations of the independent hydrologist and the Hydrology Working Group. The revised modelling is considered an improvement on what was presented in the EIS, however flood management objectives proposed by the Proponent were not supported.

The Department has recommended Quantitative Design Limits (QDLs) for managing the project's flooding and hydrological impacts during design development and is satisfied that the project can meet these limits in most locations, subject to further mitigation measures and pre-construction verification. Conditions are recommended requiring consultation, mitigation and agreement with the landowner and roads authority where the design results in exceedances of the QDLs. Other recommended conditions require review and monitoring of compliance with the QDLs and to manage any risks from erosion and emergency management plans.

Biodiversity

Much of the project area has been heavily modified by agricultural land uses and past and ongoing disturbances associated with the existing rail corridor. The dominant land cover includes exotic pasture and irrigated and dryland crops. Large areas of remnant vegetation is rare, with remaining native vegetation being largely fragmented small patches, often in a degraded state and offering limited connectivity for fauna. Some connectivity is provided by riparian vegetation along drainage lines.

The project would directly impact 323.3 ha of native vegetation, six threatened ecological communities and 22 threatened fauna species listed under the *Biodiversity Conservation Act 2016* (BC Act) and/or the EPBC Act occur in the project area. The project would also intersect several fish habitat areas and habitat suitable for the Murray Cod.

The Proponent has avoided or minimised impacts by using the existing disused rail corridor where feasible, locating temporary infrastructure within managed land or highly disturbed vegetation, and has committed to securing biodiversity credits under the BC Act to offset impacts to native vegetation and threatened fauna. During construction, the Proponent has committed to managing impacts through preclearing surveys and managing works including plant maintenance and refuelling away from watercourses and riparian zones. The Proponent has also committed to rehabilitating and landscaping disturbed areas.

The Proponent has provided a Biodiversity Offset Package that outlines its approach to fulfilling biodiversity offsets. The package includes the request for an additional two years to source credits and implement compensatory measures including collecting semi evergreen vine thicket seeds, establishing a Biodiversity Stewardship Agreement on land containing Queensland Bluegrass +/- Mitchell Grass grassland, and undertaking restoration activities, and installing artificial shelters for the pale-headed snake and monitoring their use. The Department supports the proposed package and has recommended conditions for a financial deed equivalent to payment into the Biodiversity Conservation Trust, should the measures and credits outlined in the package not be completed within two years.

The Department has recommended conditions relating to biodiversity offsets including for impacts to key fish habitats, a Five-clawed Worm Skink Management Plan to manage construction and operation impacts, beneficial Murray Cod habitat and restrictions on carrying out high risk construction activities during the Murray Cod breeding period.

Noise and vibration

Noise and vibration impacts are expected during construction and operation of the project at a number of receivers. The project will require construction works outside of the standard daytime construction hours, particularly for works requiring favourable climatic conditions such as concrete pours, with noise levels exceeding the noise management levels at nearby residents. Three residences would be highly noise affected experiencing noise levels exceeding 75dB(A). Most construction noise exceedances occur during site establishment and construction laydown activities around North Star and will last approximately six months. Respite will be provided in consultation with affected receivers, and alternative mitigation measures implemented for those impacted by works occurring outside of standard construction hours.

Noise impacts from operation of the project would result in five residences experiencing noise exceeding recommended levels in the *Rail Infrastructure Noise Guideline*. These exceedances will be caused by from train engine noise, wheel-rail noise, train horns, and level crossing alarms. One residence, situated 50 metres from the rail line, will experience exceedances of the maximum noise criteria by 15dBA. The Department supports the Proponent's offer to relocate or purchase this residence. Other mitigation measures are also recommended to be implemented to reduce noise impacts from the project during construction and operation including the preparation of an Operational Noise and Vibration Review to confirm mitigation measures to be implemented.

Traffic, transport and access

Regional and interstate operational traffic benefits are expected by moving freight from the road network on to the rail network, reducing the stress on roads for passenger vehicles. The local network experiences seasonal variation with increased heavy vehicle traffic during harvest season from trucks and farm machinery moving between properties.

Construction of the project will bring traffic delays with light vehicles moving construction workers from the accommodation camps to the construction site, and heavy vehicles moving materials for the rail construction with all roads expected to maintain a Level of Service of A. Several level rail crossings, providing both public and private access, will be upgraded, consolidated or closed with access maintained during construction and operation in consultation with the landowners to minimise disruption and to ensure safety when accessing properties.

The Department has recommended conditions requiring a Construction Traffic Plan to minimise traffic impacts during construction and inform road users of changes to traffic conditions, Public and Private Level Crossing Treatment Reports, and to ensure the height of the Bruxner Way rail over road bridge and the road alignment is designed and constructed to ensure safety of road users, including oversized agricultural vehicles, in consultation with the road authority.

Land use and property access

The project would result in property acquisition and changes to land use, agricultural practices, property access and utilities and the Travelling Stock Reserves and informal stock routes. During construction temporary changes to property access would be discussed with the landowner to limit impacts.

The Department has recommended conditions which strengthen the requirement to consult with landowners regarding temporary and permanent access changes, and require the Proponent to prepare individual property management plans to ensure the requirements of different agricultural operations are considered and provide for mediation should a dispute arise.

Aboriginal cultural heritage

The project lies within the land of the Kamilaroi people. Aboriginal cultural heritage has been identified within the project footprint with both direct and indirect impacts expected from construction works. 53 Aboriginal objects or sites identified would be impacted in addition to artefact scatters, culturally modified trees, and traditional plant resources.

The Proponent has committed to ongoing stakeholder consultation with Registered Aboriginal Parties (RAPs) and the Toomelah Local Aboriginal Land Council (TLALC), to minimise and manage impacts to Aboriginal cultural heritage sites, intangible cultural heritage, and develop suitable salvage methodology to mitigate impacts to culturally modified trees.

The Proponent has also committed to providing access to traditional plant resources where it does not present a safety risk for those gathering the plant resources. Conditions have been recommended to require the identification of areas with unrestricted access for traditional plant resources in consultation with RAPs, TLALC and Council.

The project is in the public interest as it would reinstate rail access along the disused rail track, and contribute to the Inland Rail program objectives including improved freight transport outcomes and travel times between Melbourne and Brisbane, providing efficient connection between regional farms and international export markets, and encouraging growth and investment in the surrounding areas. The Department has undertaken a thorough assessment of the project's environmental impacts and considers they can be appropriately mitigated and managed.

Contents

1 Introduction

The North Star to NSW/Qld Border project is one of seven Inland Rail projects within NSW. Inland Rail is a series of freight rail projects that will form a 1,700-kilometre high-capacity freight rail network between Melbourne and Brisbane (**Figure 1**). The Australian Rail Track Corporation (ARTC) (the Proponent) is seeking approval to construct and operate a 30 kilometre rail connection from North Star to the NSW/Qld border as part of the Inland Rail Project (**Figure 2**).

The project is located between North Star and the NSW/Qld border near Toomelah and Boggabilla within the Gwydir and Moree local government areas. Most of the project (approximately 25 km) is located within the existing non-operational Boggabilla rail corridor with the remaining five kilometres on freehold land used for grazing and cropping and Crown land used for a travelling stock reserve and irrigated cropping.

The project requires approval under the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environment Biodiversity and Conservation Act 1999* (Cth) (EPBC Act). The project will be assessed in accordance with the Bilateral Agreement between NSW and the Commonwealth, made under the EPBC Act. This report addresses the requirements of the EP&A Act and the Bilateral Agreement.

Figure 1 | Inland Rail overview (Source: EIS)

2 Project

The North Star to the NSW/Qld Border project (**Figure 2**) comprises the construction and operation of 30 kilometres of new track including:

- a new rail track following the existing non-operational Boggabilla rail corridor for 25 kilometres from approximately 900 metres north of North Star towards Whalan Creek
- five kilometres of new rail track in a greenfield rail corridor to the NSW/Qld border
- one crossing loop for trains up to 1,800 metres long with provisions to accommodate trains up to 3,600 metres long if required in the future
- 11 new bridges including a 1.8 kilometre long viaduct over the Macintyre River and Whalan Creek
- level crossing works
- establishment and use of off-site borrow pits for construction material
- an accommodation camp in North Star
- ancillary infrastructure and associated earthworks, drainage and road works.

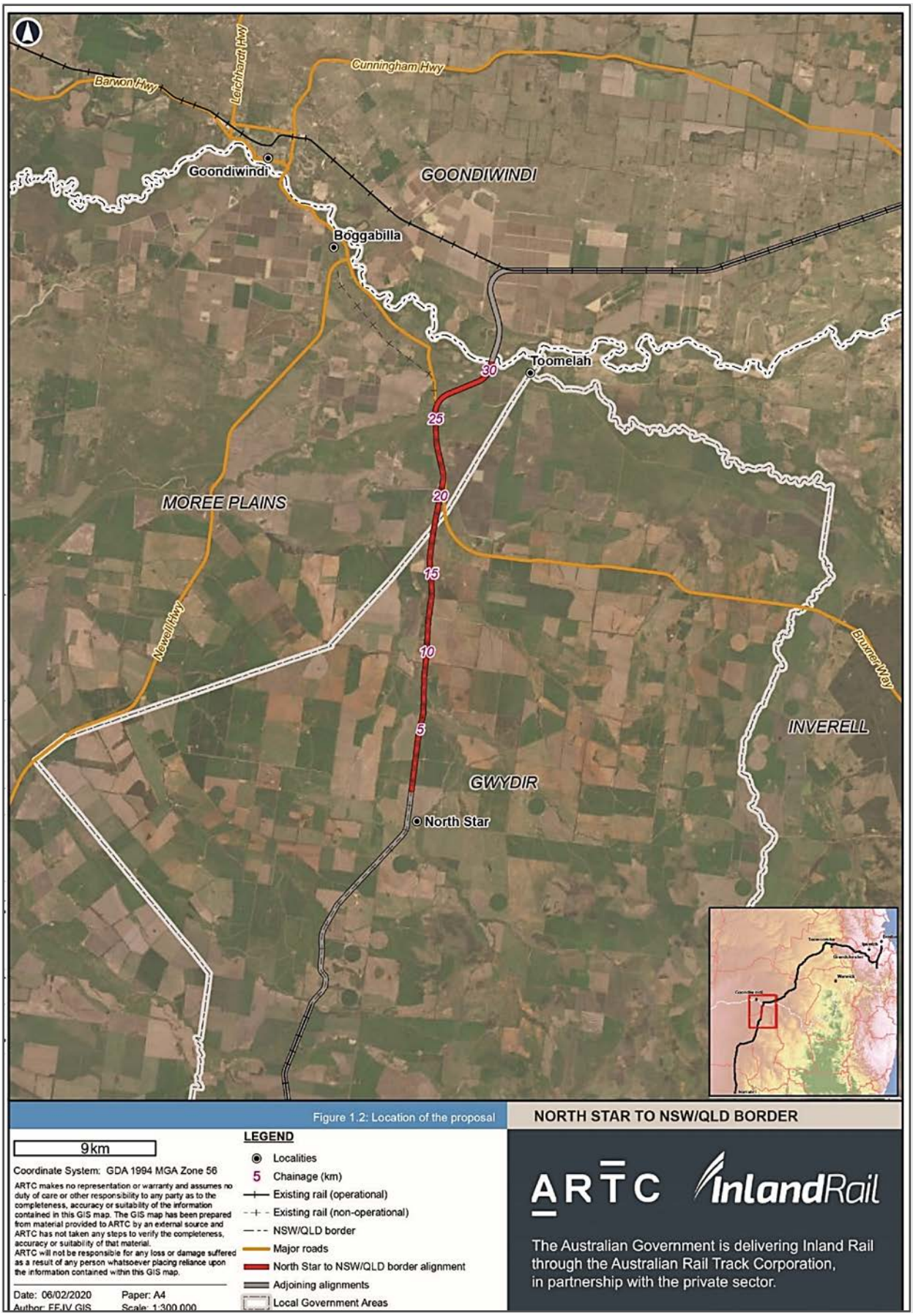

Figure 2 | Project location (Source: EIS)

2.1 Physical layout and design

The physical works proposed for the project are detailed in **Table 1**.

Table 1 | Main Components of the Project

Aspect	Description
New track	Approximately 25 km of new track within the existing non-operational Boggabilla rail corridor. Approximately 5 km of new track within a greenfield rail corridor to the NSW/Qld border.
Crossing loop, maintenance siding and turnouts	One crossing loop designed to accommodate trains up to 1,800 metres long. Turnouts on either end of the crossing loop. A one ended siding (approximately 250 m long) incorporated into the crossing loop for maintenance purposes.
New bridges	11 new bridges including a 1.8 km viaduct between NSW and Qld over the Macintyre River and Whalan Creek watercourses.
Drainage works	Reinforced concrete pipe and concrete box culverts. Scour protection measures. Embankment and catch drains adjacent to the proposed alignment diverting runoff to the nearest bridge or culvert.
Level crossing works	New and existing non-operational level crossings within the existing non-operational Boggabilla rail corridor. Signalling and communications infrastructure.
Road works	Realignment of Bruxner Way near the transition between the existing non-operational Boggabilla rail and the greenfield rail corridor
Earthworks	Approximately 29.6 km of fill embankment for flood immunity typically less than 2 m high. The height increases to approximately 7.5 m in the lead up to the Macintyre River viaduct. Approximately 0.4 km of cuttings with maximum depth of 1.1 m.
Ancillary infrastructure	Signalling and communications infrastructure, signage, fencing and utilities.
Borrow pits	10 pre-existing borrow pits and one newly proposed borrow pit site have been identified as potentially providing fill and capping material for the project. All proposed borrow pit sites are located on rural private properties.

Borrow Pit Site ID	Location	Existing / New
Site 4	Wearne Road	Existing
Site 5	1069 B Bore Road	Existing
Site 7 and 7b	Wearne Road	Existing
Site 8	7409 North Star Road	Existing
Site 9	Lot 12 Bruxner Way	Existing
Site 11	19911 Bruxner Way	Existing
Site 13	31486 Newell Highway	Existing
Site 25	1257 Forest Creek Road	Existing

Site 26	647 Hohns Road	Existing
Site 1	1216 Croppa Creek Road, North Star	Existing
Site 2	1216 Croppa Creek Road, North Star	New

Laydown areas	19 laydown areas including three planned for the storage and handling of diesel, site offices and portable amenities.
Accommodation camp	Located in North Star. Accommodation units include kitchen, dining, ablution and laundry facilities. Supporting and additional associated infrastructure such as electricity and communications infrastructure, sewage treatment and disposal, rainwater harvesting, backup power generators, recreational facilities, offices and car parking.

2.2 Construction timing

Construction of the project is expected to take approximately four years. It is anticipated that works would commence in 2023, with earthworks, bridge and drainage works progressing simultaneously. Track work would progress from south to north.

2.3 Operation

The project would open to rail traffic upon the completion of construction, but train movements would be very low and irregular until the completion of the full Inland Rail project in 2027. Upon Inland Rail's opening, the Proponent anticipates 14 train movements per day on the North Star to Border segment, which would increase to approximately 21 trains per day in 2040.

The project will accommodate double-stacked freight trains up to 1,800 m long with maximum speeds between 80 km/h and 115 km/h. The project is designed to allow for trains up to 3,600 m in length in the future, however, only trains up to 1,800 m long have been assessed.

2.4 Related development

The project connects to two other Inland Rail sections:

- Narrabri to North Star (SSI-7474): Phase 1 approved on 13 August 2020, Phase 2 in EIS development; and
- NSW/Qld Border to Gowrie (Qld): Draft EIS under assessment by the Qld Office of the Coordinator General.

3 Strategic context

Inland Rail is expected to benefit local, state and national economies. The Proponent states the Inland Rail program will increase gross domestic product by $16 billion over the 10 year construction period and 50 years of operation. It is also expected to deliver 16,000 additional jobs at the peak of construction, and an average of 700 additional jobs per annum over the entire construction period.

Inland Rail would provide a rail line between Melbourne and Brisbane that is 200 kilometres shorter than the existing route via Sydney, and with transit times of less than 24 hours. It will also reduce the freight distance between Brisbane and Perth/Adelaide by 500 kilometres. It is expected that freight, including grain and cotton from New England and the Darling Downs regions, would shift from road transit to rail to the Port of Brisbane.

Australia's freight logistics demand is expected to increase alongside forecast growth in the east coast population. The Melbourne to Brisbane freight task is currently dominated by road freight which accommodates approximately 100,000 truck trips per year. The completed Inland Rail Program is predicted to remove approximately 160 trucks for every train between Melbourne and Brisbane, minimising network congestion and improving safety for road users. For freight travelling by rail, bypassing Sydney would not only reduce travel times but also release coastal rail paths through Sydney for both passenger and freight rail services.

The Department is satisfied that construction of Inland Rail will result in economic benefits to rural and regional areas of NSW. Inland Rail will be a catalyst for economic development opportunities in regional NSW. The NSW Government has concurrently announced four Special Activation Precincts (SAPs) along the Inland Rail alignment at Wagga Wagga, Parkes, Narrabri and Moree. These SAPs involve State Government-led infrastructure and land use planning to fast-track industrial and commercial development in these regional centres. Inland Rail provides a key transport connection that underpins these SAPs.

The Inland Rail Project is consistent with the State Government's commitment to creating jobs, economic growth and providing increased regional freight capacity and infrastructure. This has been identified through strategic planning policies and framework, including:

- *State Infrastructure Strategy 2022-2042* (NSW Government, 2022)
- *Future Transport Strategy 2056* (Transport for NSW, 2018)
- *Regional NSW Service and Infrastructure Plan* (Transport for NSW, 2018)
- *NSW Freight and Ports Plan 2018-2032* (NSW Government, 2018)
- *New England North West Regional Plan 2041* (Department of Planning and Environment, 2022).

The key project benefits include:

- contribution to improved freight transport outcomes and travel times between Melbourne and Brisbane by increasing the capacity of the freight network as part of the Inland Rail program;
- providing a new, efficient connection between regional farms in the area and international export markets; and
- encouraging growth and investment in the surrounding area, expanding on regional economic and development opportunities in logistics and agriculture.

The project is in the public interest as it would reinstate rail access along the disused rail track and contribute to the Inland Rail program objectives. The project is expected to create around 350 full time construction jobs during peak construction and 50 operational jobs.

4 Statutory Context

4.1 State significance

The Inland Rail North Star to NSW/Qld Border project has been declared Critical State Significant Infrastructure (CSSI) pursuant to section 5.13 of the EP&A Act. The Minister for Planning is the approval authority.

4.2 Permissibility

The project is for the purpose of rail infrastructure and is characterised as development permitted without consent in accordance with section 2.92 of *State Environmental Planning Policy (Transport and Infrastructure) 2021* (the Transport and Infrastructure SEPP). In accordance with section 5.22(2) of the EP&A Act, the environmental planning instruments that apply to the project are the Transport and Infrastructure SEPP (where it relates to the declaration of development that does not require consent) and *State Environmental Planning Policy (Planning Systems)* 2021 (which declared the infrastructure as CSSI). No other environmental planning instruments apply.

4.3 Other approvals

On 17 July 2018, the Commonwealth Department of the Environment and Energy (now Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) determined the project to be a 'controlled action' under sections 18 and 18A *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), as it was considered likely that the project could have a significant impact on listed threatened species and communities. On 25 June 2020, DCCEEW accepted a variation to the original project to include additional ancillary components being 11 borrow pits, an accommodation camp and two laydown areas. No additional controlling provisions were included.

Following notification from the Commonwealth of the decision that the project was a controlled action, the Department confirmed the project would be assessed under Schedule 1 of the NSW Assessment Bilateral Agreement (February 2015) as amended by Amending Agreement No.1 commencing on 24 March 2020. Under this agreement, the Commonwealth has accredited the NSW assessment process under the EP&A Act for the purposes of the EPBC Act, thus enabling a single assessment of the project. An approval under the EPBC Act is still required from the Commonwealth decision-maker.

4.4 Mandatory Matters for Consideration

The determination must have regard to the objects of the EP&A Act. The Department has considered the objects of the EP&A Act including:

- Economically sustainable development (see Section 3, 4.5 and 6)
- Social and economic welfare (see Section 6)
- Protection of the environment, including in relation to biodiversity, traffic, noise and vibration, air quality, utility management, water hydrology, urban design, amenity and socioeconomic issues (see Section 6)
- Sustainable management of built and cultural heritage, including Aboriginal cultural heritage (see Section 6)

- Good design and amenity of the built environment (see Section 6)
- Principles of ecologically sustainable development (see Section 4.5)
- Promote the sharing of the responsibility for environmental planning and assessment between the different levels of government (see Section 5)
- Community participation in the assessment of the project (see Section 5).

4.5 Ecologically Sustainable Development

The EP&A Act adopts the definition of ESD found in the *Protection of Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental consideration in decision-making processes and that ESD be achieved through the implementation of:

- The precautionary principle
- Inter-generational equity
- Conservation of biological diversity and ecological integrity
- Improved valuation, pricing and incentive mechanisms.

Project objectives which guide the delivery and operation of the project contribute to the sustainability of the project and meeting ESD principles. In addition to the objectives, the Proponent addressed the principles directly in the EIS and has identified a broad range of mitigation measures to manage impacts associated with these issues.

The Department has also recommended conditions of approval requiring the project achieve a minimum “Excellent” ‘Design’ and ‘As built’ rating under the Infrastructure Sustainability Council of Australia infrastructure rating tool.

The precautionary principle is applied throughout the EIS, and the Department considers the assessment and the range of mitigation measures adequately adopt the principle. The Department is also satisfied that the valuation and pricing of the environmental resources associated with the project have been adequately undertaken and internalised through the project design and mitigation measures.

4.6 Biodiversity Development Assessment Report

A Biodiversity Development Assessment Report (BDAR) was prepared in accordance with the biodiversity assessment method and the requirements of the BC Act. The BDAR was updated to address comments made by the Department’s Biodiversity, Conservation and Science Division (BCS) and additional targeted surveys of threatened flora and fauna species. The assessment considered construction and operational impacts on native vegetation, including terrestrial and aquatic threatened species and communities, and Matters of National Environmental Significance (under the EPBC Act). The majority of the site is located on land that comprises an existing non-operational Boggabilla rail corridor (25 kilometres), freehold land used for grazing and cropping, and Crown land used for the travelling stock reserve and irrigated cropping.

The BDAR assessed impacts to the biodiversity values of the project area from clearing of threatened ecological communities (323.43 hectares), directly or indirectly impacting one threatened flora species (Belson’s panic) and five threatened fauna species (Australasian bittern, Painted honeyeater, Murray Cod, Grey-headed flying-fox and Koala). The BDAR identified mitigation measures to further reduce and minimise these unavoidable impacts. These measures include reducing the project footprint, fauna crossings and fauna fencing, biosecurity and management measures.

The Department considers that significant impacts are likely to:

- TEC Brigalow (*Acacia harpophylla*), Natural grasslands on basalt and fine-textured alluvial plains of northern NSW and southern Qld TEC and Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions
- Belsons panic and Bluegrass threatened flora species
- Koala, Five-clawed worm-skink, Painted honeyeater and Corbens long-eared bat.

The BDAR has proposed the provision of ecosystem credits and species credits to offset impacts to TECs and threatened species.

The Proponent has committed to implementing management measures during construction and operation to minimise impacts to vegetation and fauna. These are complemented by conditions of approval requiring the preparation and implementation of a Biodiversity Management Plan to manage construction impacts on biodiversity, retirement of biodiversity credits, implementation of a Five-clawed worm skink Management Plan, the provision of beneficial habitat works for the Murray Cod downstream of the bridge crossing of the McIntyre River, restrictions to bridge works during the Murray Cod breeding period, and fauna connectivity beneath bridge crossings of watercourses.

4.7 Commonwealth matters

On 17 July 2018, the former Commonwealth Department of the Environment and Energy (now the Department of Climate Change, Energy, the Environment and Water (DCCEEW)) declared the proposal to be a controlled action under section 18 and 18A of the EPBC Act as it was considered likely that the proposal could have a significant impact on listed threatened species and communities.

Following notification from the Commonwealth of the decision that the proposal was a controlled action, the Department confirmed that the proposal would be assessed under an Accredited Assessment process. The NSW Bilateral Agreement (Amending Agreement No. 1) has accredited the assessment process under the EP&A Act for the purposes of the EPBC Act, enabling a single assessment of the proposal. This includes endorsement of the Biodiversity Development Assessment Report (BDAR) under the BC Act and the Biodiversity Offset Scheme as the basis for the assessment of biodiversity values under the EPBC Act. Accordingly, NSW has assessed the potential impacts on the relevant Matters of National Environmental Significance (MNES) in accordance with the bilateral agreement (Amending Agreement No.1). The relevant controlling provision of the EPBC Act is threatened species and communities. The assessment of MNES is provided in **Section 6.2** and includes sufficient detail such that the Commonwealth decision-maker may consider those impacts when determining whether to approve the proposal. Additionally, this assessment report makes a recommendation and proposes conditions to the Commonwealth Minister for the Environment and Water in relation to an approval decision.

5 Engagement

Under section 5.28(1)(c) of the EP&A Act, the Planning Secretary is required to make the EIS publicly available. The EIS (**Appendix A**) was made publicly available from Wednesday 26 August 2020 until Tuesday 6 October 2020 (42 days) on the Department's Major Projects website and electronically at NSW Service Centres.

The Department advertised the exhibition in the Sydney Morning Herald, The Daily Telegraph, The Australian, The Land, and the Koori Mail. In addition, the Department notified Commonwealth, State and relevant local government authorities of the exhibition.

5.1 Department's engagement

The Department undertook site inspections of the route alignment and some impacted properties in June and December 2018 (during the scoping and EIS development stages of the project). Additionally, the Department's independent hydrologist undertook a site inspection in March 2021, to obtain an understanding of the surrounding environment and its sensitivities. Representatives from the Department attended four virtual community information sessions held by the Proponent during the exhibition period (September 2020) and attended the Proponent's briefings to agencies, Councils and Toomelah Local Aboriginal Land Council.

During its assessment, the Department met with Moree Plains Shire Council and Goondiwindi Regional Council (Qld) in August 2021 and the Macintyre Floodplain Landholders group in July 2021. The Department contacted Toomelah Local Aboriginal Land Council directly in November 2021 and February 2022.

5.2 Summary of submissions

The exhibition of the EIS resulted in the receipt of advice from 10 NSW government agencies as well as the Qld Department of Natural Resources Mines and Energy, three local government councils (**Table 2**). Submissions were also received from the Toomelah Local Aboriginal Land Council, a group of NSW Macintyre Floodplain Landholders, and 10 individual submissions from the community (**Table 3**).

Table 2 | Summary of State and local government advice and submissions

Submitter	Number	Position
Government Agencies		
Crown Lands	1	Advice
Department of Planning and Environment Biodiversity, Conservation and Science Directorate	1	Advice
Department of Planning and Environment - Water Group Natural Resource Access Regulator	2	Advice
Department of Primary Industries Agriculture	1	Advice

Submitter	Number	Position
Department of Primary Industries Fisheries	1	Advice
Environment Protection Authority	1	Advice
Heritage NSW - Heritage Council of NSW Aboriginal Cultural Heritage	2	Advice
Transport for NSW	2	Advice
WaterNSW	1	Advice
Qld Department of Natural Resources Mines and Energy	1	Comment
Councils		
Goondiwindi Regional Council, Qld	1	Comment
Gwydir Shire Council	1	Comment
Moree Plains Shire Council	1	Comment
Total Agency submissions	**16**	

Table 3 | Summary of community submissions

Submitter	Number	Position
NSW Macintyre Floodplain Landholders	1	Objection
Toomelah Local Aboriginal Land Council	1	Comments
Community Members (by location)		
North Star	3	1 Support 1 Comment 1 Objection
Narromine	2	Objection
Boggabilla	4	3 Objection 1 Comment
Yelarbon (Qld)	1	Comment
Total	**12**	

5.3 Key issues raised – government agencies

Crown Lands commented on the future maintenance of level crossings, impacts to the Travelling Stock Reserves, bridges, the viaduct maintenance access roads, access to borrow pits and laydown areas on Crown Land, fauna passage, fauna fencing and aquatic fauna impact and measures to minimise the spread of weeds.

DPE Biodiversity, Conservation and Science Directorate (BCS) commented on the approach and data used to complete the calculation of biodiversity credits, assessment of Matters of National Environmental Significance and key elements of the modelling completed for flooding and hydrology assessment. BCS's advice included detailed comments and recommendations that informed the Proponent's revised BDAR and hydrology assessments in the RtS and PIR.

DPE Water Group/Natural Resource Access Regulator (Water Group) commented on return flows to waterways, surface water impacts, culvert design, soil properties, the Proponent's ability to secure sufficient construction water and consistency with the Border Rivers Floodplain Management Plan.

Department of Primary Industries – Agriculture (DPI Agriculture) commented on biosecurity risks and made recommendations for the contents of a Biosecurity Risk Management Plan to be applied during construction.

Department of Primary Industries – Fisheries (DPI Fisheries) queried the EIS' methodology for determining aquatic ecology offset requirements and advised of the need for scour protection below bridges and culverts to maintain fish passage.

Environment Protection Authority (EPA) requested clarification about the type and location of sensitive noise receivers and further justification for extended construction hours, queried the use of the Interim Construction Noise Guideline (ICNG) rather than the Noise Policy for Industry (NPfI) for the borrow pits, and the methodology used to assess impacts of the proposed accommodation camp, broader construction activities and operation of the rail line. The EPA requested that standard construction hours are applied unless it is supported by the community.

The EPA also made recommendations for conditions of approval relating to air and water quality.

Heritage NSW – Heritage Council of NSW noted the proposed mitigation measures and commented that the project does not affect any State listed items.

Heritage NSW – Aboriginal Cultural Heritage noted the consultation process and proposed management and avoidance of archaeological sites is reasonable and proportionate.

Qld Department of Natural Resources Mines and Energy commented on the design of the project presented in the EIS relevant to a portion of track that requires assessment and approval under Qld legislation, access to water resources for the project, impacts to Qld's stock route network, state land reserves and vegetation.

Transport for NSW raised concerns about the design height clearance for the proposed Bruxner Way Rail Overpass, changes to the Bruxner Way road alignment that introduces curves on a currently straight stretch of high speed road, flooding impacts to roads, compliance with the NSW *Transport Administration Act 1988* in respect to removing a section of the existing rail line not used for the project, the possible impacts of future trains up to 3.6 kilometres long, and the provision of sufficient road stacking space at level crossings.

WaterNSW wishes to be consulted about possible impacts to WaterNSW infrastructure on land adjacent to the project.

5.4 Key issues raised – councils

Goondiwindi Regional Council (Qld) (GRC) provided separate responses to flooding and hydrology and other issues.

Council's comments on non-flooding and hydrology matters queried the ability to enforce conditions to mitigate project impacts within Qld, such as damage to roads from construction material supply originating in Goondiwindi. Council also commented on impacts from the project to Goondiwindi including biosecurity risks associated with mobilisation of pest plant species, impacts to the Macintyre River and consideration of the Qld *Fisheries Act 1994,* noise impacts, construction and operation traffic and potential damage to local roads, proposed use of a batching plant in Goondiwindi which is currently not operating, waste management, water access and water security for Goondiwindi. Council also raised concern about timing with the proposed Inland Rail Project Border to Gowrie and a current route review and flood review.

Council engaged WRM Water and Environment as a consultant to review the EIS' hydrology assessment. This review raised the following concerns:

- The flood models' representation of inflows and use of a 30m grid size
- The models' calibration against historic flood events and consistent with ARR 2019
- Discrepancies between the flood frequency analysis and TUFLOW model results
- Inconsistences with modelling requirements of ARR 2019
- Accuracy of the models' ability to detail expected impacts of the project.

Gwydir Shire Council (GSC) broadly supports Inland Rail, but requested a change to the project's alignment to remove four level crossings, queried whether traffic data collected in drought conditions in 2018 would accurately reflect traffic during harvest season, requested clarification of the types of vehicles included in the modelling of queue times at level crossings, recommended workshops with local businesses about opportunities to supply the project, requested support in maintaining any infrastructure left from the workers camp, and requested that the project's anticipated flooding impacts on local roads be resolved.

Moree Plains Shire Council (MPSC) strongly supports Inland Rail but raised matters that require further consideration:

Biodiversity

- The offset credit requirements may distort the credit market and increase costs for other projects in the region. Council encourages the Proponent to work with landowners to create additional credits.

Hydrology and flooding

- The project should cause minimal change to existing hydrology
- Flood modelling should consider using ARR 2019
- Flood management objectives should be achieved for the 1976 flood event
- Further information should be provided for flood duration increases
- Consider risk to life from rail formation collapse in the probable maximum flood (PMF) event
- Afflux impacts to roads are of concern
- Note landholder concerns about flood impacts.

Groundwater

- Request a condition requiring compensatory water is provided by the proponent should drawdown occur at private or community bores.

Noise and vibration

- Request to review operational noise and vibration verification work completed for detailed design and noted architectural treatment should consider the use of evaporative cooling.

Traffic and transport

- Council does not support the design of the proposed Bruxner Way rail overpass and requires the clearance to be increased to 6.5 metres to accommodate agricultural machinery and future raising of the road or re-sheeting
- Level crossing design must consider 'short-stacking'
- Raised concerns about impacts of construction traffic damaging roads and requested that roads are returned to at least pre-construction conditions.

Land use and property

- Landowners and Council should be consulted about access disruptions during construction
- Changes to existing formal or informal rail crossings must be subject to consultation with affected landowners to minimise disruptions on farm operations.

5.5 Key issues raised – groups and organisations

Toomelah Local Aboriginal Land Council (TLALC) supports the design of the bridge over the Macintyre River and requests the continuation of open and clear dialogue about the project, employment, training and business or other economic opportunities. It also requested the establishment of a committee during construction to discuss construction and access impacts.

TLALC emphasised that it must be consulted in matters involving cultural heritage and have requested a fund in lieu of sponsorships and grants from Inland Rail. TLALC also raised concerns about the impact of noise from the 24 hour operation of trains on the community and safety concerns about access to the bridge, particularly by children.

NSW Macintyre Floodplain Landholders an un-constituted group of landholders along the proposed alignment, object to the project. Their objection included specialist reviews of flooding and noise and vibration impacts. Key concerns raised in their objection include:

Project need and context

- lack of proper cost benefit analysis for the project
- concern that methodology used to consider economic costs and benefits is not appropriate.

Flooding and hydrology

- notes the sensitivity of the receiving environment
- queries the appropriateness of designing the project and assessing its impacts against a 1% AEP flood event rather than the 1976 flood event used in the Border Rivers Valley Floodplain Management Plan
- questions the accuracy and credibility of the flood models used by the Proponent to determine the 1% AEP and 1976 floods and the results of those models
- the Proponent's modelling of the 1976 flood event underestimates locally observed peak flow rates of that flood
- anticipated afflux would endanger livestock as the project would block escape routes.

Soils

- notes the agricultural productivity of the black vertisol soils along the alignment and their sensitivity to erosion
- flows concentrated by the project will cause erosion of highly erodible clay soils
- potential for irreversible impacts from erosion at some distance from the rail line
- the existing rail line has caused erosion and should be mitigated.

Cost benefit analysis

- lack of a cost benefit analysis (CBA) for this project in its own right

- questions the methodology used for Inland Rail's CBA and suggests the actual CBA is lower
- suggests changes to the project's alignment that would improve economic benefits through reuse of existing corridor and better serving related businesses
- concern that methodology used to consider economic costs and benefits is not appropriate;
- alignment and location of crossing loop
- design based on an inaccurate 1% AEP flood event
- consultation on key issues including the alignment.

Crown Land

- the project should not be approved with undetermined Aboriginal land claims
- suggests approving project subject to undetermined claims is contrary to NSW Government policy
- results of land claims could affect viability of the project.

Biodiversity

- fails to adequately demonstrate that impacts have been avoided or mitigated
- does not adequately identify impacts to threatened species and ecological communities
- surveys were only completed during drought conditions and not within the optimal survey seasons
- does not consider indirect impacts from changes in hydrology.

Noise and vibration

- does not adequately consider sleep disturbance and recommends World Health Organisation Night Noise Guideline for Europe (with a recommended LAmax criteria of 42db(A)) is applied
- not all sensitive receivers identified
- no commitment to appropriate mitigation treatments including relocation of dwellings highly impacted by noise, including a specific request that the dwelling known as 'Ohmi' is relocated
- concern that typical architectural treatment which relies on windows closed and air conditioning may not be appropriate given current use of evaporative colling units
- concern that appropriate noise mitigation isn't possible to mitigate sleep disturbance.

Visual

- does not adequately assess visual impacts from private residences, noting that no private residences are used as viewpoints
- selected viewpoints are not representative.

Access

- fragmentation of existing land holdings
- movement of stock and vehicles for properties severed by the alignment
- access for properties landlocked as a result of the project
- maintenance of access between farms and paddocks impacted, severed or sterilised by the project
- proponent must consult with landowners about access impact mitigation, including the design and location of rail crossings and must compensate for unresolved impacts
- recommends a condition requiring a mediator for access issues.

Contamination

- need to remediate and rehabilitate existing line not being used for the project.

Compensation

- EIS misunderstands NSW compulsory acquisition legislation and notes that *the Land Acquisition (Just Terms Compensation) Act 1991* only applies to land being acquired. There is no mechanism for landowners not being acquired to seek compensation.

5.6 Key issues raised – community

Public submissions raised the following issues (note that in many cases these overlap with the matters raised by the NSW Macintyre Floodplain Landholders):

Project need and context

- lack of proper cost benefit analysis for the project
- concern that methodology used to consider economic costs and benefits is not appropriate
- preference for western route that uses more of the existing line to Boggabilla
- suggestion that Inland Rail is extended to Gladstone
- accuracy of Proponent's route justification
- alignment and location of crossing loop
- design based on an inaccurate 1% AEP flood event
- dissatisfaction with Proponent's consultation on key issues including the proposed alignment, flooding, noise and farm operations.

Flooding and hydrology

- the 1976 flood should be used as the basis for design and assessment rather than the 1% AEP flood event used in the EIS
- the 1976 flood is understood in the local community as a 1% AEP flood rather than the 0.5% event it is presented as in the EIS
- EIS underestimates peak flows of the 1976 flood
- diversion of floodwaters towards Boggabilla and Goondiwindi
- potential for project to increase flooding to houses and erosion impacts given the highly erodible soils
- increased potential for stock loss in flood events
- request removal of unused alignment to improve flood impacts
- concern that number and type of drainage structures will be insufficient to adequately drain water
- route crosses Macintyre River at location prone to large flood flows.

Agriculture and rural business

- impacts of fencing, including preventing livestock from reaching higher ground during floods, lack of fencing, and ongoing maintenance of fencing
- impacts to the Travelling Stock Routes
- restoration of borrow pits and laydown areas
- removal/replacement of shade trees for stock
- offer of a new potential borrow pit at North Star
- concern about financial impacts to rural businesses from changes in land values, equity availability and insurance costs.

Access and traffic

- movement of stock and vehicles for properties severed by the alignment
- access for properties landlocked as a result of the project
- maintenance of access between farms and paddocks impacted, severed or sterilised by the project
- need to design stock crossings with holding areas and contact details for real time train locations
- access to travelling stock routes and consequences for farming operations
- reinstatement of access should be covered by the EIS even when outside the project boundaries
- project does not eliminate level crossings
- traffic counts were completed during drought conditions and do not reflect true volumes
- suggestion that the project alignment is altered to the east of North Star Road to avoid multiple level crossings
- road alignment and school bus route impacts.

Noise and Vibration

- operational noise impacts to houses near the alignment
- request to relocate the residence called “Ohmi”.

Visual

- does not adequately address visual impacts including from private residences
- lack of appropriate mitigation strategies
- impacts on the setting of rural properties, including impacts on the setting of cattle seedstock businesses.

Heritage

- support for the relocation of heritage items to the Travelling Stock Route.

Contamination

- existing contamination along the entire unused rail line should be rehabilitated not just the portion needed for the project.

Acquisition

- concern that indirect impacts from flooding, ecology, noise and vibration and visual impact cannot be appropriately compensated without the land also being acquired.

Social impacts

- project will benefit a few and impact many
- concerns costs will blow out
- location and legacy of the construction workers camp and need for the Proponent to manage impacts
- lack of commitment for telecommunications upgrades associated with the project to benefit the local community.

Safety

- lack of mobile service and use of proposed mobile app to advise of trains
- ongoing consultation during construction, particularly during harvest times
- risk of blackouts and the need for backup power at level crossings.

5.7 Response to Submissions and Preferred Infrastructure Report

Following the exhibition of the EIS, the Department directed the Proponent to respond to submissions, and to reassess the hydrology and flooding impacts of the project using the larger of the 1976 flood event or the 1% AEP flood event against the Quantitative Design Limits (QDLs) specified in the Narrabri to North Star Infrastructure Approval.

The Proponent provided their Response to Submissions (RtS) and Preferred Infrastructure Report (PIR) on 9 June 2021. The RtS addressed all submissions and included:

- a refined project construction footprint
- an updated BDAR
- an updated construction noise and vibration assessment
- updated operational noise and vibration figures.

Following further advice from BCS, the Proponent submitted a revised BDAR on 20 October 2021.

The PIR included a new flood model that considered:

- the *Australian Rainfall and Runoff guide 2019* (ARR 2019)
- the 1976 flood event as described in the Border Rivers Valley Flood Management Plan and the 1% AEP event in the southern part of the alignment which was not affected by the 1976 flood
- floodplain structures as approved under the Border Rivers Valley Floodplain Management Plan and floodplain structures ground-truthed through LiDAR completed in 2019.

The Department referred the RtS and PIR to government agencies and councils.

BCS advised the BDAR is adequate, the Proponent's revisions to the project's construction footprint have resulted in reductions to impacts to some threatened species and threatened ecological communities, and the offset credit obligation is appropriately identified. BCS also provided its assessment against Matters of National Environmental Significance in accordance with bilateral arrangements.

Heritage NSW advised that the RtS addressed its previous comments relating to Aboriginal cultural heritage and the proposed mitigation measures are appropriate.

Water Group raised the following outstanding matters:

- potential scour, erosion and geomorphological impacts of the project and impacts of return flows to watercourses; and
- lack of clarity about the Proponent's ability to obtain necessary water entitlements for construction.

EPA provided the following comments:

- recommended standard construction hours are applied
- sought clarification about noise management and mitigation measures that inform the Proponent's construction noise assessment and the policy basis for construction noise management
- queried the noise policy and predicted noise levels used to assess impacts of borrow pits
- requested further information about validation of the operational noise model.

Moree Plains Shire Council considers that most matters have been satisfactorily addressed in the RtS and PIR but raised concerns about construction workers' impacts on Moree's rental market, which currently has little spare capacity, to which the current Narrabri to North Star construction has contributed. Council recommended strong measures to manage impacts on housing availability are implemented.

Goondiwindi Regional Council (Qld) provided a review of the PIR conducted by WRM. It noted that the PIR had made progress towards addressing WRM's comments on the EIS but some modelling information require further refinement and impacts require further justification including:

- Model calibration for smaller creeks
- The AEP of the 1976 event
- Documentation of cross-drainage structures
- Disagreement with the proposed more generous impact criteria for the 1976 event compared to the 1% AEP event
- Suggestion for a finer grid model to understand velocity impacts
- Assessment of flow distribution
- Assessment of climate change and extreme event impacts.

5.8 Requests for Information

The Department requested further information on 11 June 2021 about the impact of increased velocity of the project including the proposed drainage structures. The Proponent responded to this request on 16 December 2021 with more detailed modelling of flow velocities at drainage structures to better assess potential erosion impacts and potential mitigation measures to reduce impacts.

A further request for information on flooding and hydrological matters relating to road trafficability, erosion and scour, climate change impacts and cross drainage near the Macintyre River was made publicly available on 22 March 2202.

6 Assessment

The Department, in its assessment of the project, including consideration of submissions and agency advice received, has identified and considered the following key issues: flooding and hydrology, biodiversity, noise and vibration, traffic and transport, land use and property access, Aboriginal cultural heritage, visual impact and social impacts (**Section 6.1** to **6.9** respectively). Other issues considered are discussed in **Section 6.10**.

6.1 Flooding and hydrology modelling and design criteria

The project is located within the Border Rivers catchment on land that is mostly used for agriculture with highly erosive soils. The key waterways include the Macintyre River, Whalan Creek, Mobbindry Creek, Back Creek and Forest Creek. The project area and surrounding catchments currently experience flooding, including two minor floods in 2021. Floodwaters are mostly slow moving due to the flat terrain of the flood plain.

The project will introduce embankments, bridges, culverts and a viaduct, and will rebuild the existing non-operational rail line through an area with highly erosive soils with the potential to change flooding patterns in the area.

The revised modelling prepared for the Preferred Infrastructure Report (PIR) (**Appendix F**) and the responses to requests for information on velocity (**Appendix G**) are considered to be an improvement on the modelling provided in the EIS and are used as the basis of the Department's consideration of flooding and hydrology impacts of the project. The Department disagrees with the Proponent's proposal to use the one percent Annual Exceedance Probability (1% AEP) flood for assessment and mitigation, and their proposal to use Flood Management Objectives (FMOs) instead of Qualitative Design Limits (QDLs).

To assist in the consideration and assessment of flooding and hydrology impacts and obtain independent expert analysis of the hydrology and flooding assessments, the Department engaged Bewsher Consulting Pty Ltd to undertake a specialist review. The review report is in **Appendix H**.

The Department also convened a regular Hydrology Working Group with technical representatives from DPE Water, BCS, the Department's independent reviewer and the Proponent to provide iterative advice and feedback on the Proponent's revisions to its flood modelling and assessment.

The Department considers that flooding and hydrology impacts, assessed against the QDLs set out in **Table 4**, and the 1976 event, and the 1% AEP flood within the southern catchments, can be mitigated with conditions.

The Department has required the Proponent to update the hydraulic and hydrological models to assess flooding impacts from the project as presented in the assessment documentation. Flooding impacts were assessed and presented in various documents (EIS, PIR and response to requests for information). This section clarifies the basis of the Department's assessment and how assumptions or proposals were considered.

Issue

The 1976 event and the revised flood modelling form the basis of the Department's consideration

The modelling completed in the EIS was based on the Proponent's 1% AEP flood instead of the large design flood (1976 event) established in the BRVFMP. To address the concerns raised about this modelling and use of the 1% AEP flood by the Department's independent reviewer, and in

submissions on the EIS, the Department required the Proponent to prepare a Preferred Infrastructure Report (PIR). The PIR was required to present the results from re-modelling of the flooding and hydrological impacts to ensure the 1976 flood was used as the basis for assessment, consistent with the assessment of impacts of other structures within this floodplain.

Revised modelling of flooding and hydraulic impacts provides a greater understanding of likely impacts

The revised hydraulic and hydrological model presented in the PIR and the finer grained modelling completed for assessing velocity impacts is considered an improvement on that presented in the EIS and is the basis for the Department's assessment of the project. This model re-calculated the 1976 flood using the procedures in *Australian Rainfall and Runoff* (ARR) 2019 and a wider spread of available rainfall data.

The revised hydraulic and hydrological model:

- considers the impacts of floods up to and including the 1976 event or the 1% AEP event, where the 1976 level was lower or not recorded
- uses both the levee and topographic data obtained from LIDAR in 2019 (2019 LIDAR) and the BRVFMP approved levee data (BRVFMP levees, includes approved levees with unlimited heights or approved levees that are not built)
- uses a larger area with more data points than the BRVFMP and that presented in the EIS
- considers the *Australian Rainfall and Runoff: A guide to flood estimation* (Commonwealth of Australia (Geoscience Australia), 2019)
- assesses the impacts of increased velocities using a finer grained 3.75 metre model grid size.

The revised model and consideration of additional modelling scenarios provides a greater understanding of the Project's potential impacts on flooding in the area.

Design criteria: proposed Flood Management Objectives

Project specific Flood Management Objectives (FMOs) were proposed and assessed by the Proponent. These FMOs assessed flooding and hydrological impacts differently based on the distance from the project (three kilometres up stream and one kilometre downstream) or scaled based on the AEP (greater or less than the 1% AEP). The Proponent argues that the proposed FMOs address inconsistencies of the Narrabri to North Star QDLs and set targets for localised impacts for rare events like the 1976 event. The Proponent concludes that by considering the FMOs, the project results in minimal changes across the floodplain and addresses localised exceedances through a mitigation framework.

The Proponent also proposed a revised scour/erosion potential QDL for the assessment of velocity impacts in response to a request for further information following the PIR. This included:

- a ten percent increase on velocity where the existing velocity is above 0.5 m per second
- the ability to increase the erosive threshold based on site specific assessments
- where the existing velocities are greater than the erosive threshold, the ability to increase velocities by ten percent, or increase existing velocity of up to 50 %, whichever is the lower.

Despite the proposed FMOs and revised scour/erosion potential QDL the Proponent also considered the 1976 event or the 1% AEP event, where the 1976 level was lower or not recorded, in the PIR and subsequent responses to Requests for Information.

Submissions and agency advice

Government agency advice

BCS raised concerns about key elements of the modelling completed for the flooding and hydrology assessment including further analysis of a one percent design flood compared to the 1976 flood event and justification of proposed flood impact objectives.

DPE Water Group commented on land required to mitigate impacts, soil properties to set thresholds for scour protection, water entitlements and compliance with the impact assessment criteria in the BRVFMP. DPE Water requested to be consulted on construction and operation management measures and requested that post construction water quality monitoring be conducted following rainfall to mitigate geomorphic impacts for a minimum of three years and after large flood events.

DPE Water requested confirmation of water supply for the project, noting there is risk to the project should water supply agreements not be obtained or if additional water supply infrastructure is needed to construct the project.

Council submissions

GRC, Qld commissioned a peer review of the flood modelling undertaken for the Macintyre River Floodplain presented in the EIS and the PIR. The report noted technical short comings and questioned the model's accuracy, reliability and robustness in assessment. It also commented on the current ARR guidelines, flood frequency analysis and the design event modelling.

MPSC commissioned an independent review of the flooding and hydrology assessment which recommended refinements to the current Reference Design flood modelling to address a number of issues including use of Australian Rainfall and Runoff (AR&R) 2016 instead of 2019 and use of 1976 flood event and waste management.

Community, group and organisation submissions

Flooding and hydrology impacts on private property were raised in most submissions received. Comments included concern that:

- the assessment did not consider the 1976 flood event, misrepresented flooding impacts and underestimates locally observed peak flow rates
- the model was not accurate or credible to use to determine impacts
- the assessment did not reflect the sensitivity of the black vertisol soils and the environment.

Consideration

The additional flood modelling presented in the PIR and responses to requests for information provides greater confidence in the likely flooding and hydrology impacts of the project. The regular technical input from DPE Water, BCS, the Department's independent reviewer and the Proponent through the Hydrology Working Group resulted in a greater understanding of flooding impacts that will affect a small number of large land holdings and roads.

While the independent peer reviewer considered the revised model, with improved spatial resolution and accuracy, resulted in a model considered to meet current industry standards and is potentially fit for purpose. He also noted that not all scenarios were considered with these being deferred to detailed design and made recommendations for conditions of approval to ensure these were appropriate addressed and considered prior to detailed design.

The Department considers the use of the 1976 flood is the appropriate flood to use to assess the project's impacts within this floodplain

The Department disagrees with the approach used to attribute an Annual Exceedance Probability (AEP) to the 1976 flood event. The flood is described in the BRVFMP. The EIS contends that the AEP of the 1976 event is much larger than a 1% to 1.3% probability event (approximately 1 in 100 year event) as represented in the BRVFMP but instead closer to a 0.5 % to 0.2 % AEP event (approximately 1 in 200 to 1 in 500 year event). The Proponent also argues that the 1976 event is not appropriate for assessment and mitigation as this event was such a large (and rare) flood event. Instead the Proponent has proposed project specific Flood Management Objectives for the assessment and mitigation of impacts.

Determining the AEP of historical events is challenging with uncertainty of peak flows and accuracy of gauge readings and the locations of gauges changing over time. The Independent peer reviewer notes there is significant uncertainty regarding the AEP of the 1976 event, the estimate AEP presented in the PIR. The Department considers that for this project and location the 1976 event as described in the BRVFMP is the appropriate and accepted event for assessment and mitigation. The Department also notes that the 1976 design event is accepted for the assessment and mitigation of development within this floodplain in NSW and Qld.

The use of a historic flood event rather than the 1% AEP is an approach used in other NSW floodplains such as the Hunter River. In contrast to other states, NSW uses a merit assessment to determine the design flood for development control. While the 1% AEP is adopted in other NSW catchments this has not occurred in the Border Rivers area where the 1976 historical flood has been adopted.

The 1976 flood is the basis for assessment in the recommended Quantitative Design Limits

The Department does not accept that the project specific FMOs proposed for assessment of the project should be different based on the distance from the project (three kilometres up stream and one kilometre downstream) or scaled based on the AEP (greater or less than the 1% AEP). Similarly, the Department does not support the proposed changes to the scour/erosion QDL that would permit increases in velocities where the velocity is already above the erosive threshold without a local erosive threshold survey supporting this increase.

The Independent reviewer notes that while the FMOs had significant differences compared to the QDLs including lower limits for the 1976 flood which were not supported.

The QDLs assist in determining the level of impact to adjoining land from changes to flooding because of the project and are reflective of the specific characteristics of the surrounding area or the general acceptability of an impact. The Department has therefore based its assessment on the revised flood model considering the large design flood or the one percent AEP event, where the 1976 level was lower or not recorded and the QDLs as amended for this project. The Department's consideration of flooding impacts and recommended conditions of approval are based on the QDLs, set out in **Table 4**.

The Department's recommended conditions require consideration of the QDLs against the worst-case of the:

- 2019 LIDAR or topographic levee data obtained by LIDAR, representing an 'as currently is' scenario
- BRVFMP approved levee data (this levee data includes all approved levees with unlimited heights or approved levees that are not built), representing an 'as may be in the future' scenario.

Table 4 Quantitative Design Limits (QDLs)
(These QDLs are only applicable beyond the CSSI corridor, unless otherwise noted, and do not apply to model noise[1])

Parameter	Location or Land Use	Limit
Afflux i.e. increase in flood level resulting from implementation of project.	Habitable floors and sensitive infrastructure [2]	10mm increase [3]
	Non-habitable floors[2]	20mm increase
	Surrounds of residential buildings, other urban, open space recreational land and infrastructure (excluding sensitive infrastructure)	100mm increase
	Agricultural	200mm increase
	Forest and unimproved grazing land	300mm increase
	Classified roads managed by TfNSW[5]	50mm on areas flooded under existing conditions. Otherwise, no increase.[4]
	Highways and sealed roads >80km/hr [5]	No afflux where aquaplaning risk exists and remains unmitigated. Otherwise 50mm increase[4]
	Unsealed roads and sealed roads <80km/hr[5]	100mm increase[4]
Velocity i.e. Increase in flood velocity resulting from the implementation of the CSSI (Both Flow Distribution and the Scour/Erosion velocity QDLs apply)		
Flow Distribution	All areas	20% increase in velocity[6]
Scour/Erosion Potential	Ground surfaces that have been sealed or otherwise protected against erosion. This includes roads and most urban, commercial, industrial, recreational and forested land	Velocities are not to exceed the limiting velocities which would erode the sealing or remove the protection that has been applied to the surface.

[1] Model noise is an artefact of the modelling process and does not provide any useful information and is not the same as model tolerance. Modelling noise is to be ignored when assessing compliance with the QDLs. All modelling noise exclusions are to be reviewed by the independent reviewer required under **Condition E44**.

[2] Habitable floors/rooms are defined consistent with the use of this term in the NSW Floodplain Development Manual. In a residential situation this comprises a living or working area such as a lounge room, dining room, rumpus room, kitchen, bedroom or workroom. In an industrial, commercial or other building, this comprises an area used for an office or to store valuable possessions, goods or equipment susceptible to flood damage in the event of a flood.

[3] 10 mm has been set to provide a margin for modelling uncertainties/tolerances. The intent of this requirement is that existing flood levels above floor level do not increase and there is no new flooding of floors.

[4] Any variation must be negotiated with the roads authority in accordance with **Condition E55**.

[5] Including where located within CSSI corridor.

[6] Local variations in velocity can exceed a 20% change provided that when assessed over a 30m wide flowpath, the velocity change within the flowpath does not exceed 20%.

Parameter	Location or Land Use	Limit
Scour/Erosion Potential *cont'd*	Other areas including watercourses, agricultural land, unimproved grazing land and other unsealed or unprotected areas	An erosion threshold velocity (ETV) is to be adopted through a site specific assessment(s) conducted by an experienced geotechnical or scour/erosion specialist.[7] An ETV of 0.5m/s is to be adopted in the absence of a site specific assessment(s). Where existing velocity exceeds ETV, velocity is limited to a 0.025m/s increase[8]. Where existing velocity is less than ETV, velocity is limited to the lesser of: • ETV • 20% increase or 0.5m/s whichever is greater
Flood Hazard i.e. increase in velocity~depth product (**vd**) and/or flood hazard category resulting from implementation of CSSI. (Does not apply where vd<0.1m^2/s).	Urban, commercial, industrial, highways and sealed roadways[5]	10% increase in vd
	Classified roads managed by TfNSW[5]	10% increase in vd where this does not result in an increase in hazard category. Otherwise, no increase.[4]
	Elsewhere	20% increase in vd
Flood Duration i.e. increase in duration of inundation resulting from implementation of CSSI.	Habitable floors[2]	Where existing above floor flooding is: • less than 1 hour in flood duration, the post-development flood duration shall not exceed 1 hour • greater than 1 hour in duration, up to 5% increased inundation duration Where existing below floor flooding is: • less than 1 hour in flood duration, the post-development flood duration shall not exceed 1 hour • greater than 1 hour in duration, up to 10% increased inundation duration
	Classified roads managed by TfNSW[5]	No increase in duration of flood inundation to sections of road not already inundated[4]. Otherwise 10% increase in inundation duration.
	Highways and sealed roads >80km/hr[5]	10% increase in inundation duration.

[7] The methods used to calculate the erosion threshold velocity must be independently peer reviewed in accordance with **Conditions E47 to E50**. Shear stress assessments may be used as an alternative method from which to describe the erosion threshold in a specific environment (i.e. soil type, depth, velocity). An erosion threshold shear stress (**ETSS**) can be used as an alternative to the ETV to ensure the erosion threshold is not exceeded beyond the limits of this velocity QDL. (If the ETSS is used, compliance with the limiting increases in velocities specified within this QDL are also required).

[8] Where velocity exceeds this QDL, the **Operational Erosion Mitigation and Monitoring Program** required by **Condition E71** must be prepared and implemented.

Parameter	Location or Land Use	Limit
Flood Duration i.e. increase in duration of inundation resulting from implementation of CSSI. *cont'd*	Elsewhere	Where existing inundation is less than 1 hour in flood duration, the post-development flood duration shall not exceed 1 hour. Where existing inundation is greater than 1 hour in flood duration, up to 10% increase in duration of inundation No duration limits apply to newly flooded land no greater than 1000m^2 in area

(These QDLs are only applicable beyond the CSSI corridor, unless otherwise noted)

Quantitative Design Limits are updated from the Narrabri to North Star Phase 1 approval

The Department has recommended changes to the QDLs for this Project compared to the Inland Rail Narrabri to North Star QDLs. The QDLs include limits for afflux, scour/erosion potential, flood hazard and flood duration. The changes clarify the intent of the QDL and are considered appropriate to determine and mitigate the impacts of the Project on the surrounding area and consider the sensitivity of the environment to erosion. The changes that differ from those in the Narrabri to North Star approval are underlined in **Table 4** and discussed below.

Velocity scour/erosion potential: This QDL has been updated to reflect the sensitivity of the local soils to erosion, clarify the default velocity or erosion threshold (0.5m/s) and the requirement for geotechnical or scour/erosion specialists to establish the actual erosion threshold velocity.

The erosion threshold is the point at which active erosion is likely. The Department has adopted a conservative default value of 0.5m/s assumed for highly erosive soils unless a geotechnical or scour/erosion specialist has established the erosion threshold is higher. Increases in velocity up to the erosion threshold are unlikely to result in active erosion.

Where the existing velocity already exceeds the erosion threshold, the QDL has allowed for an increase of 0.025m/s in velocity. This effectively represents a 'no increase' requirement to reflect the sensitivity of the environment and effectively accounts for model noise.

Velocity – Flow distribution: The QDL has been updated to clarify the portion of the velocity QDL that relates to flow distribution changes (i.e. to limit changes to existing flow volumes and direction). The QDL limits velocity changes to no more than 20 percent for all areas.

Afflux: This change was made to clarify the location and or land use it applied included the surrounds of residential buildings, open space recreational land and infrastructure (not including sensitive infrastructure). No change was made to the limit. Changes to the highways and sealed roads QDL address comments by TfNSW and clarify the limit as being no increase in new flooding of TfNSW-controlled roads and no increase in depth of flooding for other high-speed sealed roads where an unmitigated aquaplaning risk exists.

Flood hazard: Flood hazard categories are based on velocity and depth calculations. This change was made to clarify the limit as being a 10% increase in velocity-depth product rather than a change in flood hazard category as the flood hazard category could change based on small increases in velocity-depth product. This change was considered acceptable due to floodwaters being slow moving across flat terrain.

Flood duration: This change clarifies the duration limit for flooding involving habitable floors and ensures that criteria for linked afflux and duration impacts are consistent. Where existing flooding is

above the habitable floor level and greater than one hour a five percent increase is allowed, otherwise no more than one hour. For other areas other than habitable floors and roads, no duration limits apply to land no greater than 1000m^2, including when flooded land is in multiple ownership.

6.2 Flood impacts and mitigation

Issue

The project will change flood behaviour under all scenarios

The project will result in changes to flood characteristics including afflux, duration and velocity. To assist in the review of the Department's consideration the following sections use the following term 'scenario' to mean a model run that considers:

- levee or topographic data obtained from LIDAR in 2019 or the BRVFMP approved levee data
- the model based on the BRVFMP factored flows or the revised model as discussed above.

By considering these scenarios a more complete understanding of the likely impacts of the project is obtained as the:

- 2019 LIDAR data represents a 'real' landscape and the BRVFMP represents the landscape according to regulatory approvals (i.e. it includes floodplain structures approved but not built)
- BRVFMP model with factored flows is the accepted model used for floodplain management and planning in the area and the revised model includes additional historical data not included in the BRVFMP resulting in updated hydrology for the 1976, 1996 and 2011 events.

Increases and decreases in peak water levels predicted

Increases in peak water levels or afflux are likely in areas shown in **Figure 3** and **Figure 4** depending on the scenario and described below.

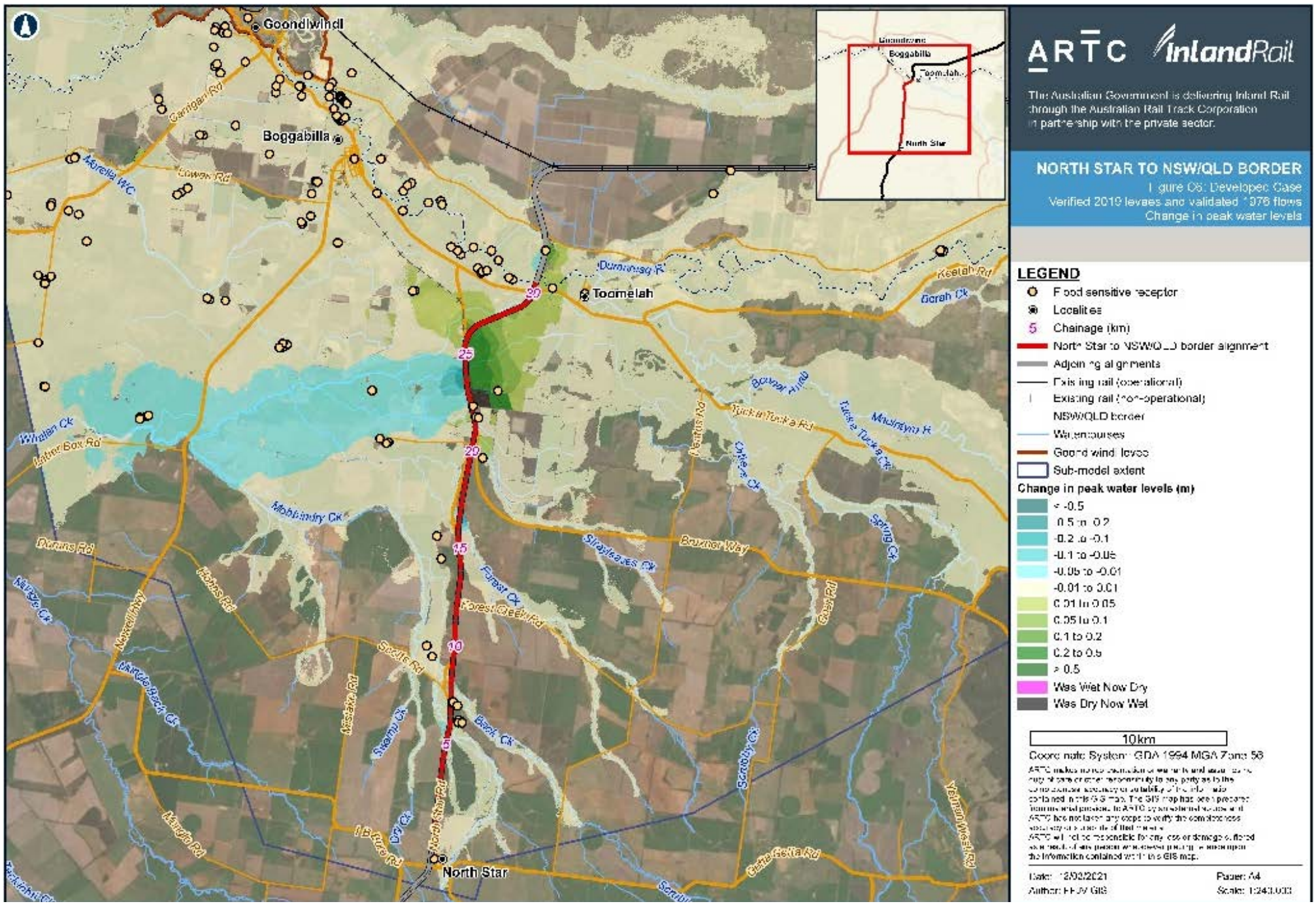

Figure 3 | Change in peak water levels with 2019 Lidar levees and revised model (source: PIR)

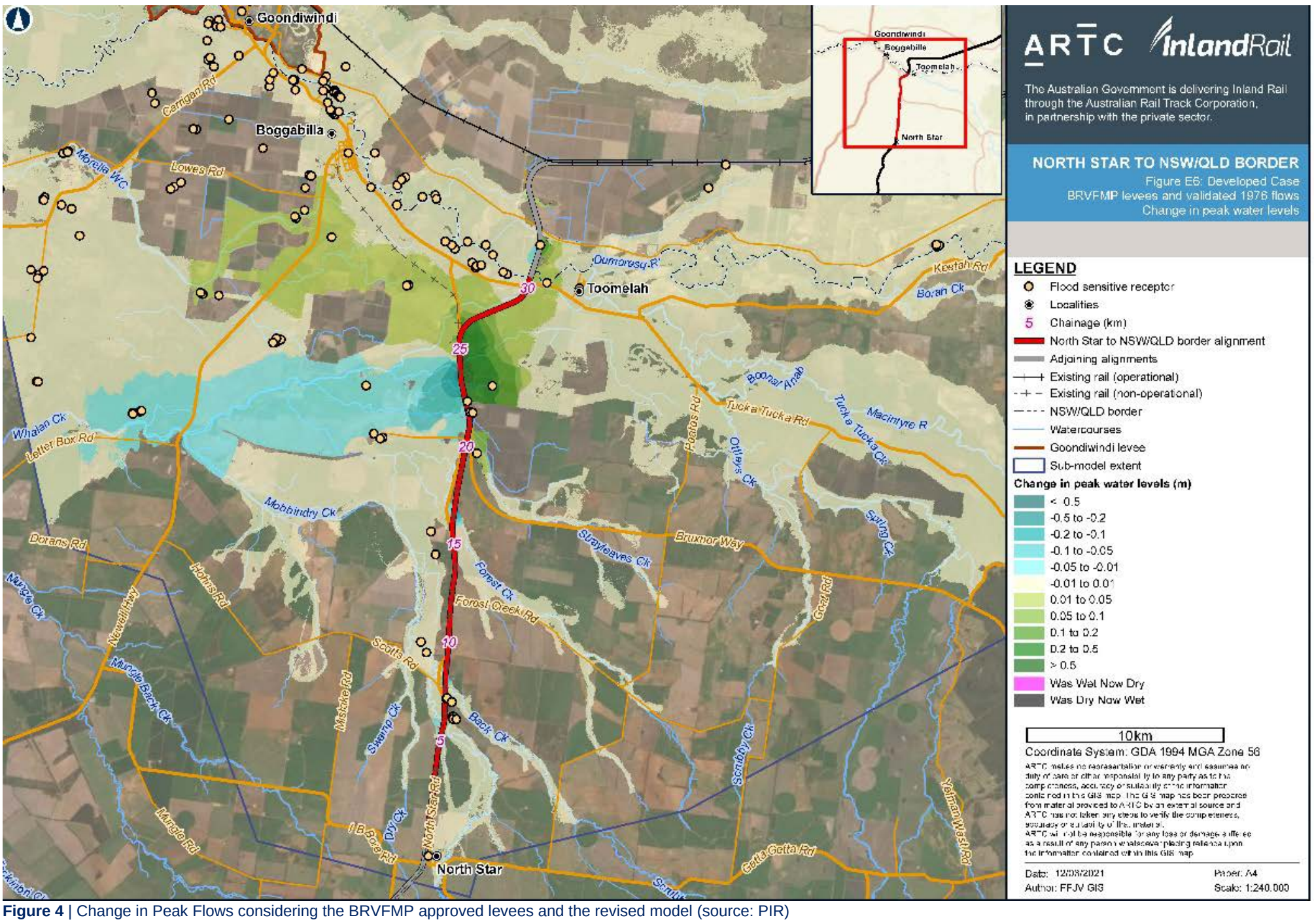

Figure 4 | Change in Peak Flows considering the BRVFMP approved levees and the revised model (source: PIR)

A relatively small number of houses and structures will be subject to increased flood levels

Up to five houses, eight farm structures (sheds and water pumps) and an unsealed landing strip are predicted to have increased flood levels depending on the scenario considered. Increases in flood levels that exceed the relevant QDL in the scenarios presented in **Table 5** include:

- five houses with increases up to 453 mm
- eight pumps/shed with increases up to 1310 mm.

Table 5 | Increase in flood levels that exceed the QDLs

Receptor Number	Description	Increase in flood levels (mm) based on verified 2019 levees and validated 1976 flows	Increase in flood levels (mm) based on BRVFMP levees and validated 1976 flows	Increase in flood levels (mm) based on BRVFMP levees and factored flows
1	Sheds	150	146	157
3	House			13
8	House	11	22	48
9	Sheds		21	48
12	House	68	252	453
32	Pump Shed	818	857	1310
73	House		12	25
74	Shed			26
75	Shed			25
99	Shed			32
100	House		15	31
101	Shed			30
149	Pump			27

Climate change would result in increases in flood impacts

With climate change factored into the model, increasing rainfall intensity by 23 percent across the catchment, the modified 1% AEP event would result in increased afflux at one house (flood sensitive receptor number 12) and three sheds/pumps. One other shed impacted would be removed by the project. The rail line would not be overtopped in this scenario.

The Proponent commits to reviewing the impact to the house and sheds/pumps during detailed design and to mitigation where required and agreed in consultation with landowners.

Increased time of inundation to agricultural land is relatively minor and localised

The project would increase the time that land is inundated in some areas greater than 10 % increase in duration in the QDL. Increases greater than 10 % are localised and close to the rail alignment.

Culverts and bridges can increase velocities in creeks and on agricultural land causing erosion and scour

There is the potential for increased velocities from water being concentrated through culverts resulting in scour of erodible soils impacting waterways, agricultural land and infrastructure. The Proponent's fine-grid modelling assessed culverts in 26 locations and 11 bridges for increased velocities. Of these, six culverts and eight bridges were modelled as exceeding the QDL if unmitigated.

The Proponent considered indicative design changes to demonstrate compliance with the QDLs. These included additional and wider spaced culverts and longer bridge spans. **Figure 5** and **Figure 6** show that the plume of non-compliant velocity is reduced and/or contained within the rail corridor. With these indicative design changes, QDL non-compliances were reduced to three culverts and two bridges.

During design development, the Proponent has committed to completing site specific assessments by an experienced geotechnical or scour/erosion specialist in areas where there are increased velocities to inform the erosion threshold, detailed design and further mitigation, including any mitigation that may be required on adjacent properties.

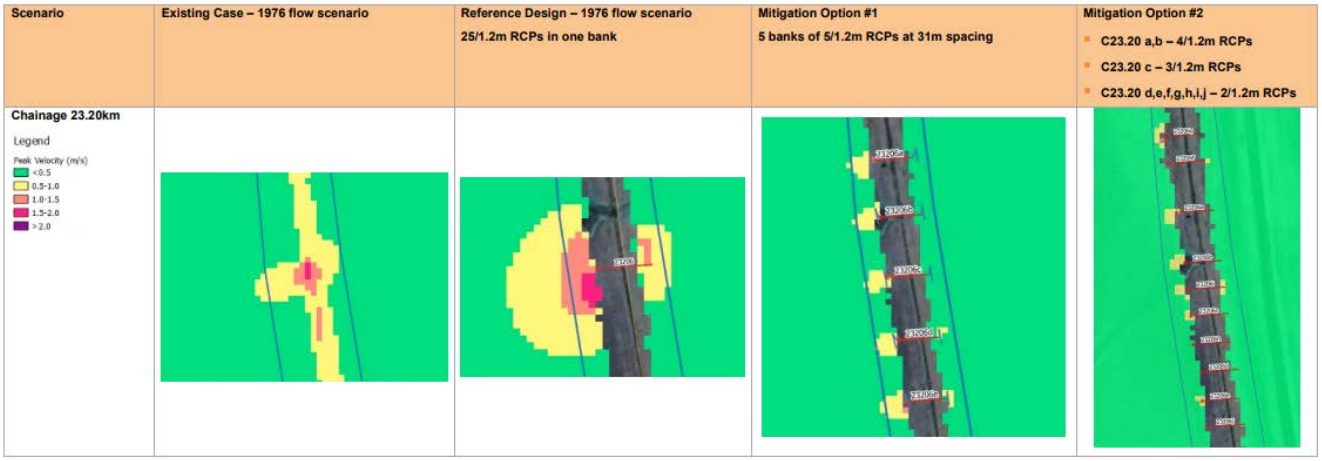

Figure 5 | Example of a culvert design reducing velocity levels on adjoining land (Source: Response to Request for Information Velocity)

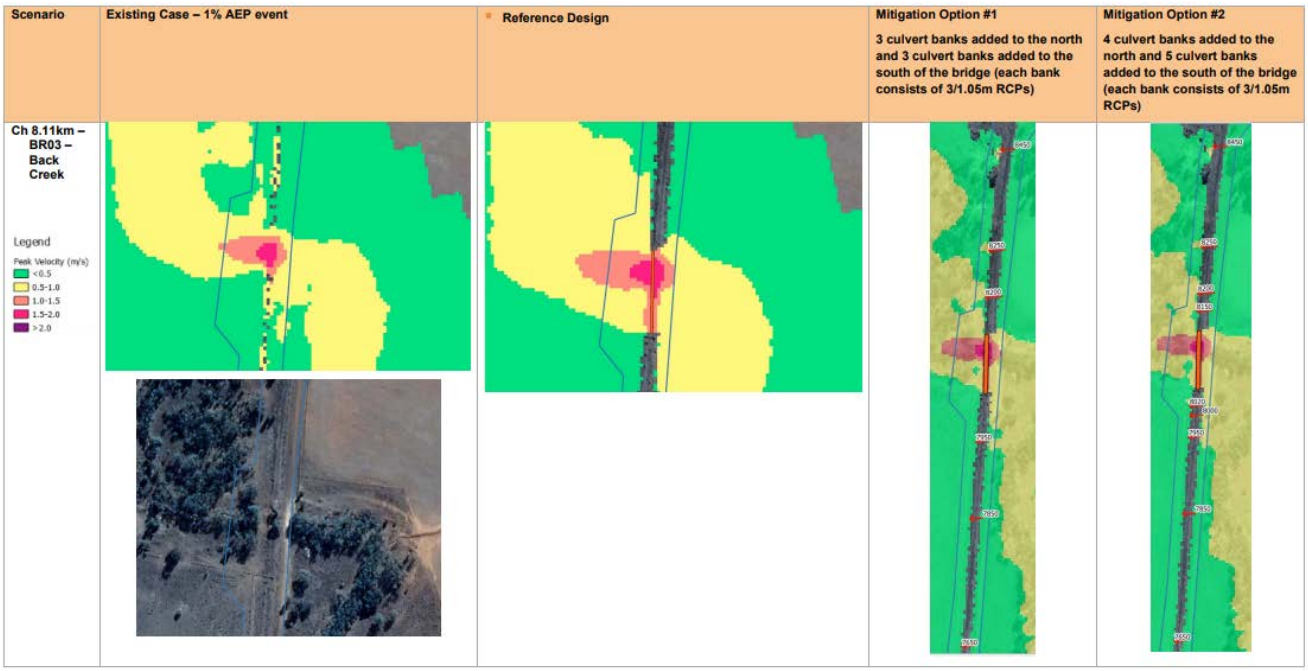

Figure 6 | Example of a bridge design with additional culverts (source: *Response to DPIE RFI regarding further modelling and assessment of velocities through culverts Technical Note, 5 November 2021*)

Roads will have increased flood levels, velocity and time of inundation

Most of the roads on the floodplain have a low level of existing flood immunity with some roads experiencing existing flood levels up to and exceeding one metre. Roads modelled to have increased flood levels due to the project include Bruxner Way, Oakhurst Road, North Star Road and access roads. Depending on the scenario and location, increases of between 10mm to 960mm were modelled.

Bruxner Way currently experiences flooding with the existing maximum duration of inundation being 125 hours. The project's largest duration increases are from 98 hours to 109 hours and 73 hours to 90 hours depending on the scenario and location considered.

Increases to road hazard during floods, resulting from increased velocity and or depth of floodwater, due to the project are modelled for Bruxner Way, Cemetery Road, Gunsynd Way, Kentucky Lane, North Star Road, Newell Highway, Tucka Tucka Road and access roads. Up to 28 road locations would experience an increase in velocity. Increases greater than 20 percent were modelled for the new alignment at one location of the realigned Bruxner Way and one location of the existing Bruxner Way. Velocity exceeding 1m/s is modelled for Bruxner Way 6 existing under the BRVFMP factored flows and approved levee data scenario.

Flooding occurring during construction will be managed to minimise impacts

There is the potential for construction to coincide with flooding within the floodplain. The Proponent has committed to siting temporary construction facilities and laydown areas to avoid flood areas and overland flow paths, where possible, and to constructing drainage structures prior to embankments to mitigate flooding potential during construction. Emergency response procedures would also be prepared to respond to extreme weather events.

The location of the accommodation camp was clarified as being east of North Star on land owned by the North Star Sporting Club. The camp would house approximately 300 personnel during construction. The revised layout of the camp includes an at grade channel between the two parts of the camp to minimise flooding impacts. The sporting club building is predicted to experience increases of up to 200 mm due to its proximity to the accommodation camp. The Proponent commits to further design development during detailed design to minimise flooding impacts.

In a 1% AEP event afflux increases of up to 0.05 metres are modelled on adjoining land. No houses within North Star would be impacted. See **Figure 7**.

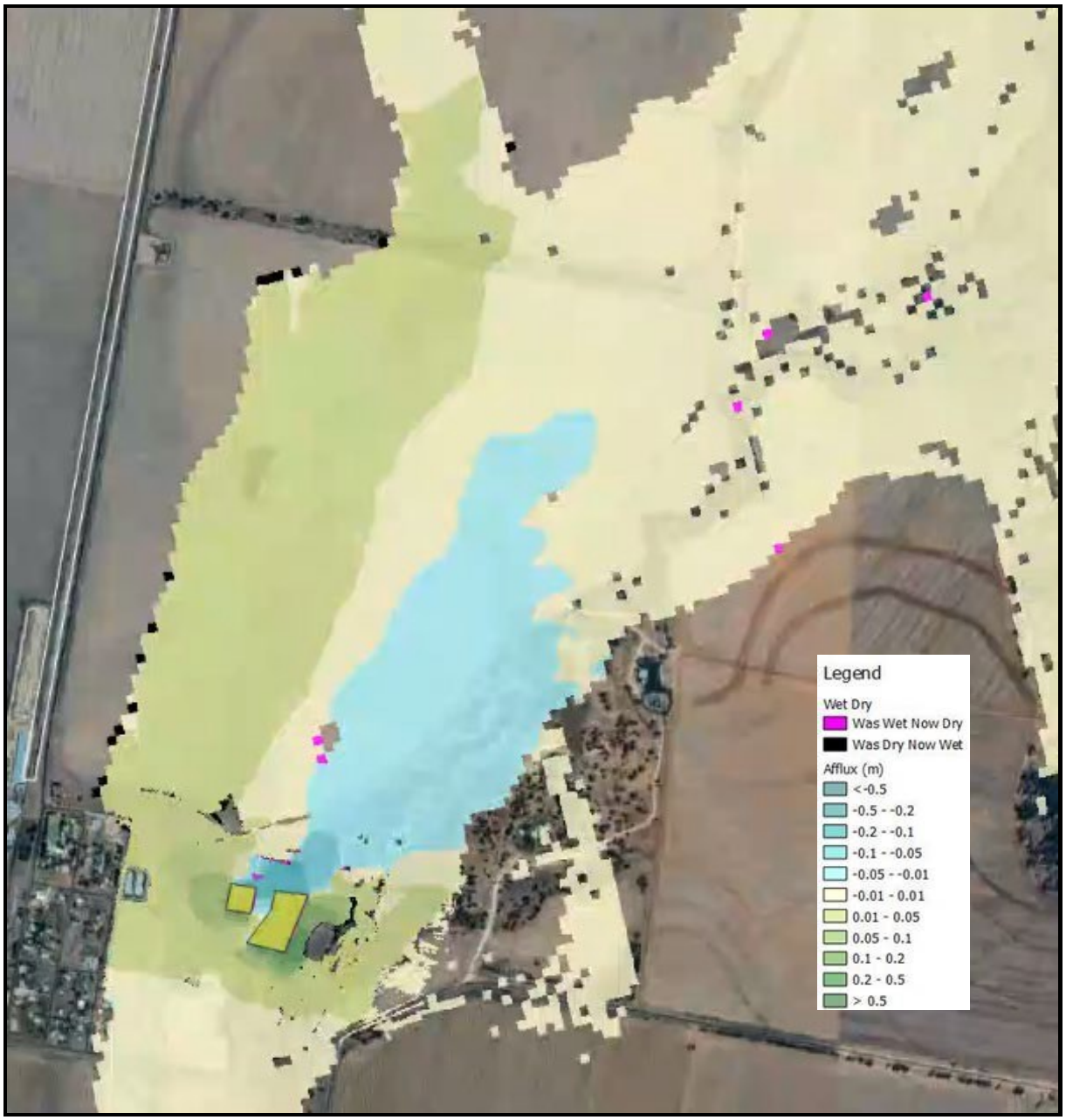

Figure 7 | Change in afflux during a 1% AEP event from the accommodation camp (Source: *Response to DPIE RFI regarding further modelling and assessment of velocities through culverts Technical Note, 10 December 2021*

Submissions

Government agency advice

DPIE Biodiversity, Conservation and Science Directorate raised concerns about impacts generally and to flood dependent ecosystems and measures to mitigate high velocities.

DPIE Water Group/Natural Resource Access Regulator (Water Group) commented on land required to mitigate impacts, soil properties to set thresholds for scour protection and water entitlements. DPIE Water requested to be consulted on construction and operation management measures and requested that post construction water quality monitoring be conducted following rainfall to mitigate geomorphic impacts for a minimum of three years and after large flood events.

Transport for NSW raised concerns about the height of the proposed rail overpass of Bruxner Way and the ability to improve the flood immunity of the road and concerns about increased flooding and aquaplaning risk on roads.

Local council submissions

Gwydir Shire Council (GSC) raised concerns about flooding impacts at Access Road 3.

Moree Plains Shire Council (MPSC) raised concern about the management of construction related flooding impacts.

Community, group, and organisation submissions

Flooding and hydrology impacts on private property were raised in most submissions received. Comments included concern that:

- the project would cause irreversible erosion
- should rectify past scour impacts from the existing non-operational rail line
- predicted afflux would endanger livestock as the project would block escape routes.

Consideration

The Department has considered impacts of the project against the proposed QDLs, outlined in **Table 4** above, and the Proponent's committed management measures. Impacts from flooding and hydrology changes are predicted to impact a small number of large landholdings and compliance with the QDLs is predicted for the townships of North Star, Toomelah, Boggabilla and Goondiwindi.

The Department considers the Proponent's assessment has demonstrated the project can be mitigated to an acceptable level in terms of flooding impacts. Consistency with the recommended QDLs will ensure the surrounding environment is not significantly impacted by flooding, and residual non-compliance with the QDLs can be mitigated with the agreement of landholders.

Quantitative Design Limits set a basis for understanding impacts and potential mitigation

Compliance with a QDL does not ensure there will be no impact. It instead ensures that the impact will be manageable and remain within a level of impact that is considered acceptable having regard to current practice for linear transport projects across NSW. This impact may, in many cases, be imperceptible compared to existing flood impacts without the CSSI, and/or within the margin for modelling tolerances.

In practice, an exceedance of a QDL will act as a trigger point for consideration of design changes or consultation with a landowner to seek agreement to mitigation and management measures outside the rail corridor.

Localised soil surveys and design refinement can mitigate impacts that have the potential to cause scour and erosion

As the project is located on highly erosive soils, there is a potential for concentrated flows to create erosion that could result in ongoing impacts to adjoining private property and infrastructure. The Proponent has demonstrated, using the finer-grained 3.75 m model grid, that design refinement through the inclusion of more and wider spaced culverts and longer bridge spans can mitigate this impact to meet the scour/erosion potential QDL in most locations assessed. For the three of 29 culverts and two of 11 bridges that are currently modelled to exceed the velocity QDL, further consideration of scour and erosion impacts would continue through design refinement of drainage structures prior to construction. The Department supports the completion of detailed localised soil surveys by a qualified and experienced soil scientist to verify the local erosive threshold. The Department has confidence that the localised soil surveys and design refinement can mitigate impacts that have the potential to impact adjoining properties. Where residual impacts persist, these can be resolved through an agreement with the landholder as outlined above and may include mitigation, such as scour protection being applied to adjoining land.

In addition to conditions specifying processes for QDL exceedance / non-conformity, recommended conditions seek to mitigate any erosion attributed to or exacerbated by the project in areas that exceed the velocity QDL or are within an area that is actively eroding by requiring ongoing monitoring against baseline conditions and repair of damage. The Department expects that the requirements of this process will in many cases overlap with mitigation measures agreed with landowners or recommended by the expert panel.

Flooding impacts to roads will be subject to further consultation with the road authority

Roads within the project area have a low level of existing flood immunity. Changes to flooding of roads above the QDLs are unlikely to change trafficability of the road compared to the existing situation consistent with current advice of not driving through flood waters.

Concerns raised about new and increased flooding of roads are addressed through the application of the QDLs and the recommended conditions requiring the Proponent to consult with and obtain the written agreement of the roads authority to any instance where the impacts of the project exceed the QDLs.

The Department supports the refinement of the project to address flooding impacts and that ongoing discussions with the roads authority and TfNSW will be required to ensure impacts to roads and road users are minimised.

Flood mitigation will be an iterative process including affected landowners and approval of the Planning Secretary

The Department acknowledges that flood mitigation will be an iterative process during design development and there is the potential for compliance with one QDL to result in a non-compliance with another or an instance where the resolution of a small non-compliance could not be achieved without significant change to the project. In these cases, the Proponent and a landowner may be able to reach a mutually agreed outcome instead of changing the infrastructure's design to ensure strict

compliance. In seeking any agreement with a landowner in response to a non-compliance with the QDLs, the Department has recommended conditions requiring:

- identification of all non-compliances with the QDLs
- demonstration of how the project can be amended to meet the QDLs or justify why the project cannot be amended to meet the QDLs
- clear demonstration of the range of impacts to the landholder under the specified flooding scenarios that may result in an impact above the QDLs
- consideration of the applicability of the QDL and acceptability of the impact at those locations in consultation with the affected landowner and scientific advice (such as soil science advice to determine the local erosive threshold), where required
- the agreement of the landowner for any residual exceedance of the QDL including any mitigation or management measures to be implemented
- an outline of this process and outcomes in a Flood Design Verification Report for the Planning Secretary's approval.

Where an agreement on a non-compliance can't be reached, the recommended conditions allow for either the Proponent or landowner to refer the disagreement to an independent Flood Impact Assessment Panel for expert advice. This Panel will comprise experts in agronomy, hydrology and engineering and make recommendations about the material impact of any non-compliance with the QDLs and practical design changes or mitigation/management measures to resolve material impacts. Should the Proponent not be able to implement the recommendations an offer to acquire land, or an interest in land that would be required to implement mitigation, must be made.

Further, the Department has recommended a condition requiring the preparation of a Flood Design Verification Report (FDVR) for the Planning Secretary's approval. The FDVR will be the record of the project's performance against the QDLs following the detailed design process. It would document the design, hydrological and hydraulic modelling completed, model assumptions, impacts and non-compliances, mitigation to be implemented and the outcomes of any agreements reached. The recommended conditions require an independent peer review of the modelling and a response to any recommendations the peer reviewer had made to be included with the FDVR.

Flooding impacts during construction can be managed

The Department notes the design of the accommodation camp will be refined to minimise flooding impacts and has recommended conditions requiring the accommodation camp be designed to comply with the QDLs for all flood events up to the 5% AEP event, a more frequent event than that required for the design of the project.

Other construction impacts can be managed by the Proponent's commitments and the recommended conditions requiring a Flood Emergency Management Sub-plan to manage flood risks during construction.

Emergency Management Plans require updating

The Department accepts that in very large floods there is the potential that the infrastructure may be flood affected and or damaged. There will also be impacts to farm operations during large flood events as the current non-operational rail line will be fenced preventing the use of high ground as a refuge by livestock during these events.

The Department acknowledges that the rail line is likely to operate during some flood events and the use of the rail corridor as high ground for livestock is not compatible with an operational rail line. The movement of livestock across the rail line needs to be considered under normal farm operations and flood events. The Department supports the Proponent's commitment to consult with landowners during design development on access arrangements and types of fencing to be used and to mitigate flood impacts to farm operations.

To further mitigate impact beyond the rail corridor, the Department has recommended that the Proponent document flood risk information in consultation with land and landowners, infrastructure owners, SES, BCS and relevant Councils to ensure relevant personnel and agencies can prepare, respond and recover from future flood emergencies.

The Department has also recommended a condition requiring the preparation of a Flood Emergency Response Plan for flood risks within the rail corridor to document how risks to life and property within the rail corridor will be managed.

6.3 Biodiversity[9]

The construction and operation of the project will result in impacts to the biodiversity values within and adjacent to the project's disturbance area. The Proponent has identified direct impacts to threatened ecological communities and threatened flora and fauna species listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

These impacts will be avoided or reduced where possible through the detailed design of the project, including restricting clearing to the existing rail corridor wherever feasible and locating temporary infrastructure in disturbed or non-native vegetation areas. To manage potential risks to ecological receptors, the Proponent has committed to implement mitigation measures, including pre-clearing surveys for fauna, minimising impacts to riparian vegetation and aquatic habitat, delineating no-go areas and implementing biosecurity and weed management measures.

There is potential for some proposed activities to have a cumulative, irreversible, or permanent impact on ecological receptors, even after the implementation of mitigation measures. Accordingly, the Proponent has committed to obtain and retire biodiversity credits in accordance with the BC Act and the EPBC Act and will apply like-for-like or variation rules (the variation rule would not apply to any Matters of National Environment Significance (MNES) under the EPBC Act) by securing offset credits or payment of funds to the Biodiversity Conservation Trust. The Proponent has submitted a Biodiversity Offset Package which sets out the method and timing of retirement of biodiversity credits. The package has been developed to show how biodiversity credits would be delivered under the Deferred Biodiversity Offset Obligation Policy.

[9] References to sections of the EIS, Amendment Report, Amendment Report - Submissions Report and the recommended conditions of approval have been included in this section to satisfy the Commonwealth's assessment requirements.

The Department has recommended conditions which specify the ecosystem and species credits required for the project and the preparation and implementation of a Biodiversity Management Plan to manage impacts on biodiversity values during the construction of the project.

Issue

The project traverses two Interim Biogeographic Regionalisation for Australia (IBRA) bioregions: the Brigalow Belt South IBRA bioregion and the Darling Riverine Plains IBRA bioregion. The subregions within the Brigalow Belt South bioregion are the Northern Basalts and the Northern Outwash. The Castlereagh-Barwon subregion is located in the Darling Riverine Plains bioregion. The IBRA bioregions and subregions in the project area are shown in **Figure 8**.

Much of the project area has been heavily modified by agricultural land uses and past and ongoing disturbances associated with the existing rail corridor. The dominant land cover includes exotic pasture and irrigated and dryland crops. Large areas of remnant vegetation are rare, with remaining native vegetation being largely fragmented small patches, often in a degraded state and offering limited connectivity for fauna. Some connectivity is provided by riparian vegetation along drainage lines.

In accordance with the BC Act, the terrestrial biodiversity values of the project area were assessed in accordance with the requirements of the Biodiversity Assessment Method 2017 (BAM) and reported in the Biodiversity Development Assessment Report (BDAR). The BDAR also assessed impacts to ecological receptors outside the jurisdiction of the BC Act, being threatened ecological communities and threatened species under the EPBC Act, aquatic habitat and threatened aquatic species under the *Fisheries Management Act 1994* (FM Act), and wetlands and groundwater dependent ecosystems. The BDAR was updated following additional survey work completed between September 2020 and March 2021.

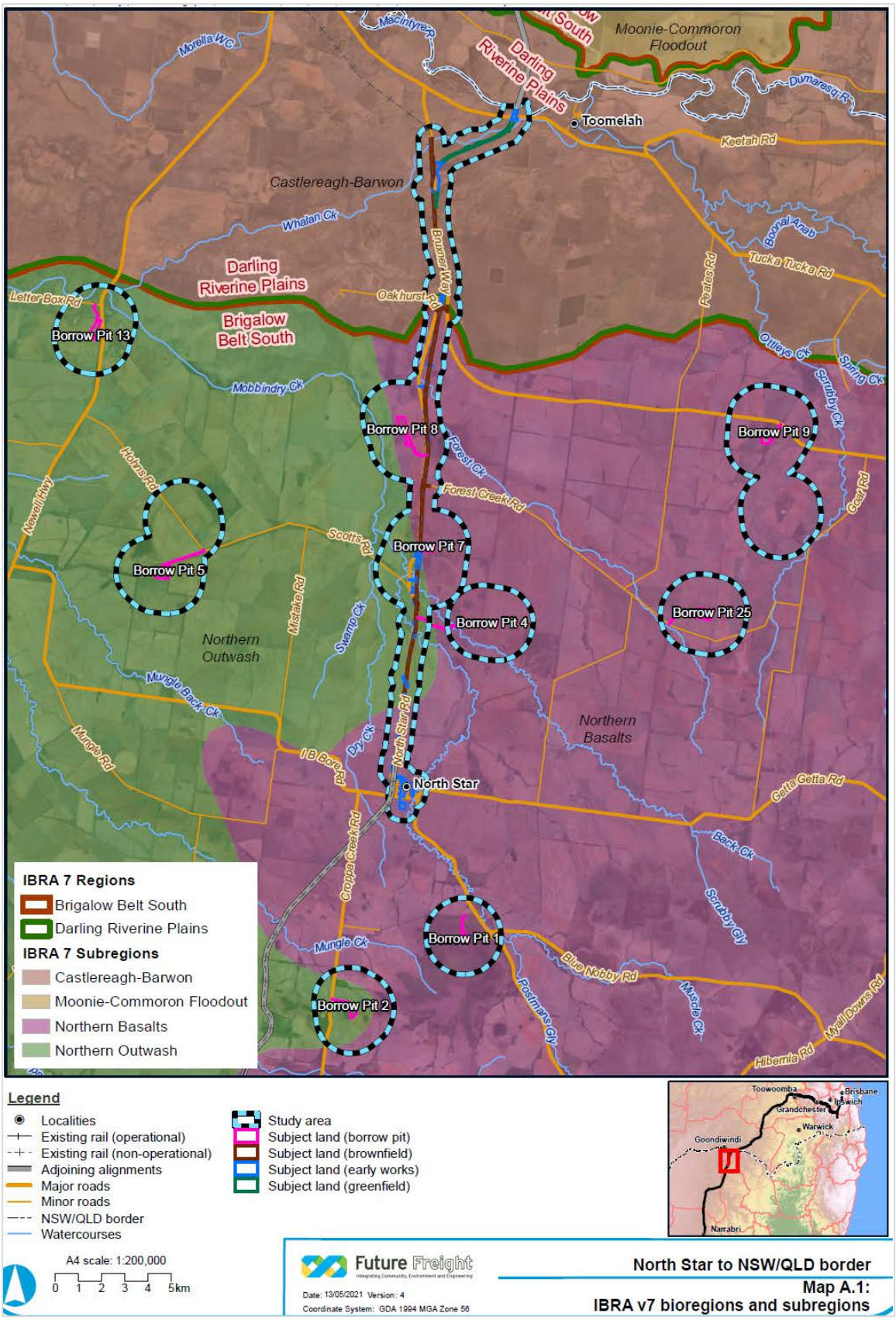

Figure 8 IBRA regions and subregions in the project area (Source*: Terrestrial Biodiversity Technical Report, Revision 10, 20 October 2021*)

Bilateral Agreement and biodiversity development assessment

The Bilateral Agreement (Amending Agreement No.1) between the Commonwealth and NSW Government for the assessment of environmental approvals under the EPBC Act endorsed the BC Act, including the BDAR and Biodiversity Offsets Scheme, for the assessment of impacts to MNES.

The Proponent has addressed the Commonwealth assessment requirements and assessed the impacts of the project on MNES in the BDAR. The sections of the North Star to NSW/Qld Border Environmental Impact Statement (EIS) 2020 relevant to MNES include:

Chapter 3 – Alternatives and proposal options
Chapter 6 – The proposal
Chapter 7 – Construction of the proposal
Chapter 9 – Rehabilitation strategy
Chapter 26 – Cumulative impacts
Appendix B – Terrestrial biodiversity technical report [10]
Appendix S – Aquatic biodiversity technical report.

The sections of the Submissions Report North Star to NSW/Qld Border Environmental Impact Statement 2020 relevant to MNES include:

Chapter 2.2 – Updates to the proposal since EIS exhibition
Chapter 5.2 – Biodiversity development assessment report
Chapter 8.3 – Environmental considerations
Chapter 8.4 – Ecologically sustainable development
Chapter 8.5 – Revised mitigation measures
Appendix G – Revised environmental mitigation measures.

Commonwealth listed species and communities to be impacted

On 17 July 2018, the then Commonwealth Minister for the Environment and Energy decided under section 75 of the EPBC Act the project was a controlled action under the EPBC Act and required an assessment under that Act (EPBC Number - 2018/8222).

The Commonwealth Department of the Environment and Energy (now the Commonwealth Department of Climate Change, Energy, the Environment and Water) concluded in its assessment of the referral documentation that the proposed action is likely to have a significant impact on the following controlling provisions of the EPBC Act:

- Listed threatened species and communities (section 18 and section 18A).

The Commonwealth Department considered that the proposed action has the potential to significantly impact the following:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) – endangered
- Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions – endangered

[10] The Biodiversity Assessment Report in the EIS (Appendix B, Revision 3) was replaced by the Terrestrial Biodiversity Technical Report (Appendix B, Revision 10 dated 20 October 2021).

- Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Qld – critically endangered
- Weeping Myall Woodlands – endangered
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – critically endangered
- Squatter Pigeon (southern) (*Geophaps scripta scripta*) – vulnerable
- Painted Honeyeater (*Grantiella picta*) – vulnerable
- Murray Cod (*Maccullochella peelii*) – vulnerable
- Large-eared Pied Bat, Large Pied Bat (*Chalinolobus dwyeri*) – vulnerable
- Corben's Long-eared Bat, South-eastern Long-eared Bat (*Nyctophilus corbeni*) – vulnerable
- Koala (combined populations of Qld, New South Wales and the Australian Capital Territory) (*Phascolarctos cinereus*) – vulnerable
- Ooline (*Cadellia pentastylis*) – vulnerable
- Bluegrass (*Dichanthium setosum*) – vulnerable
- Belson's Panic (*Homopholis belsonii*) – vulnerable
- Slender tylophora (*Tylophora linearis*) – endangered
- Five-clawed Worm-skink (*Anomalopus mackayi*) – vulnerable
- Adorned Delma (*Delma torquata*) – vulnerable
- Dunmall's Snake (*Furina dunmalli*) – vulnerable.

Clearing of native vegetation will impact threatened ecological communities and habitat for threatened species

The project will directly impact 498 hectares of land along the proposed alignment, which comprises the following segments: greenfield, brownfield, early works and borrow pits. The area of impact for each segment of the project is shown in **Table 6**.

Table 6 | Maximum area of impact (source: Terrestrial biodiversity technical report)

Project segment	Native vegetation impacted (ha)	Managed (cleared) land impacted (ha)	Total area impacted (ha)
Greenfield alignment	38.04	1.64	39.68
Brownfield alignment	165.57	26.47	192.04
Early works alignment	54.89	59.03	113.92
Borrow pits	64.84	87.56	152.40
TOTAL	**323.34**	**174.70**	**498.04**

Note – Managed land means land that is not subject to assessment under the Local Land Services Act 2013 (ie. Category 1 land)

In accordance with the BAM, the Proponent made an assessment against the *Native vegetation regulatory map: method statement* (OEH 2017) to determine whether land within the project area included Category 1 land (referred to as managed land in the BDAR) under the *Local Land Services*

Act 2013. Category 1 land is land that was cleared of native vegetation as of 1 January 1990 or land that was lawfully cleared between 1 January 1990 and 25 August 2017 and has been modified for agricultural cropping (dryland broadacre cropping and irrigated cropping). Land identified as Category 1 land does not require further biodiversity assessment under the BC Act. Approximately 33% of the project area (174.70 hectares) was identified by the BDAR as managed land. The remaining 66% of land directly impacted (323.34 hectares) requires assessment under the BC Act.

The vegetation surveys identified 14 Plant Community Types (PCTs) across three condition types (high, medium and low quality) within the project area. Of these, six are considered to meet the criteria for threatened ecological communities (TECs) listed under the BC Act and/or the EPBC Act. **Table 7** provides a summary of the impacts to native vegetation within the rail alignment and borrow pit sites and the presence or absence of TECs.

An assessment of key diagnostic criteria and condition thresholds was undertaken to determine the presence of TECs in the project area. The BC Act listed TECs identified in the project area are:

- Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions
- Carbeen Open Forest Community in the Darling Riverine Plains and Brigalow Belt South Bioregions
- Myall woodlands in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray Darling Depression, Riverina and NSW South Western Slopes Bioregions
- Semi-evergreen vine thickets of the Brigalow Belt South and Nandewar Bioregions.

Four TECs listed under the EPBC Act occur within the project area:

- Brigalow (*Acacia harpophylla* dominant and co-dominant)
- Natural grasslands on basalt and fine-textured alluvial plains of northern NSW and southern Qld
- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions
- Weeping Myall Woodlands.

Clearing of native vegetation would remove habitat for locally occurring threatened fauna species. This includes the loss of potential breeding, roosting and foraging habitat for threatened fauna species. The project requires the clearing of two paddock trees in the managed land. Paddock trees are important to threatened species as they may provide habitat refuge or be used as stepping-stones during dispersal across managed land.

The Proponent has committed to secure biodiversity credits under the BC Act to offset impacts to native vegetation cleared for the project. Impacts to MNES would be assessed in accordance with the EPBC Act, and variation rules available under the BC Act would not apply to MNES.

Table 7 | Impacts to native vegetation (Source: Biodiversity technical paper (Table 5.1))

Zone and Plant community type (PCT)	TEC under the BC Act	TEC under the EPBC Act	Condition class	Area impacted alignment (ha)	Area impacted borrow pits (BP) (ha)	Total area impacted (ha)
PCT 27 - Weeping Myall open woodlands of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Myall woodlands in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray Darling Depression, Riverina and NSW South Western Slopes bioregions - **present**	Weeping Myall Woodlands - **present**	Medium	0.02	N/A	8.62
			Low	8.6	N/A	
PCT 35 - Brigalow – Belah open forest/woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion	Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions - **present**	Brigalow (*Acacia harpophylla* dominant and co-dominant) - **present**	High	11.17		17.51
			Medium	N/A	0.67 (BP1)	
			Low	4.1	0.9 (BP1) 0.67 (BP2)	
PCT 36 - River Red Gum tall to very tall open forest/woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	Artesan Springs Ecological Community in the Great Artesan basin - **absent**	The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin - **absent**	High	1.17	N/A	5.44
			Medium	4.27	N/A	
PCT 52 - Qld Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion	Not listed	Natural grasslands on basalt and fine-textured alluvial plains of northern NSW and southern Qld - **present**	Medium	33.50	N/A	33.50

Zone and Plant community type (PCT)	TEC under the BC Act	TEC under the EPBC Act	Condition class	Area impacted alignment (ha)	Area impacted borrow pits (BP) (ha)	Total area impacted (ha)
PCT 53 - Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains	Not listed	Not listed	Medium	4.20	N/A	4.20
PCT 55 - Belah woodlands on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions	Coolibah Black Box woodlands in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregion - **absent**	Coolibah Black Box woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions - **absent**	High	0.64	N/A	0.64
	Myall woodlands in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray Darling Depression, Riverina and NSW South Western Slopes bioregions - **absent**	Weeping Myall woodlands - **absent**				
	Semi-evergreen vine thicket in the Brigalow Belt South and Nandewar Bioregions - **absent**	Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions - **absent**				
PCT 56 - Poplar Box Belah woodlands on clay loam soils on alluvial plains of north-central NSW	Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions - **absent**	Brigalow (*Acacia harpophylla* dominant and co-dominant) - **absent**	High	36.37	0.13 (BP7)	
			Medium	9.16	21.1 (BP8)	154.26

Zone and Plant community type (PCT)	TEC under the BC Act	TEC under the EPBC Act	Condition class	Area impacted alignment (ha)	Area impacted borrow pits (BP) (ha)	Total area impacted (ha)
	Carbeen open forest community in the Darling Riverine Plains and Brigalow Belt South Bioregions - **absent**		Low	87.5	N/A	
PCT 98 - Poplar Box – White Cypress Pine – Wilga – Ironwood shrubby woodland on red sandy-loam soils in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not listed	Not listed	High	2.2	0.57 (BP13)	2.77
PCT 147 - Mock Olive Wilga Peach Bush Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Semi-evergreen vine thickets of the Brigalow Belt South and Nandewar Bioregions - **present**	Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions - **present**	High	N/A	1.2 (BP1)	
			Medium	N/A	3.4 (BP1)	4.6
PCT 192 - Silver-leaved Ironbark – Poplar Box +/- Ironwood shrub – grass woodland on rises in the north western plains of NSW	Not listed	Not listed	High	N/A	9.1 (BP5)	
			Medium	4.3	1.4 (BP5)	19.87
			Low	3.10	1.9 (BP5)	
			Medium	7.4	N/A	

Zone and Plant community type (PCT)	TEC under the BC Act	TEC under the EPBC Act	Condition class	Area impacted alignment (ha)	Area impacted borrow pits (BP) (ha)	Total area impacted (ha)
PCT 244 - Poplar Box grassy woodlands on alluvial clay loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt)	Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions - **absent**	Brigalow (*Acacia harpophylla* dominant and co-dominant) - **absent** Poplar Box grassy woodlands on Alluvial Plains - **present**	Low	3.7	N/A	11.1
PCT 247 - Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains bioregion	Not listed	Not listed	Medium	6.2	N/A	
			Low	4.5	N/A	10.7
PCT 418 - White Cypress Pine - Silver-leaved Ironbark - Wilga shrub grass woodland of the Narrabri-Yetman region, Brigalow Belt South Bioregion	Not listed	Not listed	High	N/A	6.1 (BP2) 3.95 (BP9)	
			Medium	N/A	6.8 (BP2) 2.99 (BP9) 1.5 (BP25)	23.91
			Low	N/A	1.05 (BP9) 1.5 (BP25)	
PCT 628 - Carbeen +/- Coolabah grassy woodland on floodplain clay loam soil on north-western NSW floodplains, mainly Darling Riverine Plain Bioregion	Carbeen Open Forest Community in the Darling Riverine Plains and Brigalow Belt South Bioregions - **present**	Not listed	Medium	6.0	N/A	26.4
			Low	20.4		
Total						**323.43**

Threatened flora and fauna species would be impacted by the project

In accordance with the BAM, an assessment of the impact of the project on threatened species was carried out. The assessment identified 50 ecosystem credit species and 47 species credit species that are predicted to occur in the project area. The list of predicted ecosystem credit species was refined based on the known distribution of the species and whether or not critical habitat features were present within the PCT zone. A similar assessment of predicted species credit species was made based on whether or not critical habitat features were present.

This assessment informed the identification of candidate species for targeted surveys. In addition, ecosystem credit species observed within the project area during field investigations were noted (under the BAM there is no requirement for targeted surveys of ecosystem credit species to be undertaken).

The surveys recorded the presence of two threatened flora species

- *Homopholis belsonii* (Belson's panic) endangered BC Act and vulnerable EPBC Act
- *Digitaria porrecta* (Finger panic grass) endangered BC Act.

Both are species credit species under the BAM.

Twenty two threatened fauna species listed under the BC Act and/or the EPBC Act or listed as migratory species under the EPBC Act were recorded or observed in the project area. These species are listed in **Table 8**.

Table 8 | Threatened and migratory fauna species observed in the project area

Species name	Common name	Credit type	Status under the BC Act	Status under the EPBC Act
Botaurus poiciloptilus	Australasian bittern	Ecosystem	Endangered	Endangered
Circus assimilis	Spotted harrier	Ecosystem	Vulnerable	-
Haliaeetus leucogaster	White-bellied sea-eagle	Ecosystem, Species (Breeding)	Vulnerable	Marine
Gallinago hardwickii	Latham's snipe	Ecosystem	Protected	Migratory
Calyptorhynchus banksii samueli	Red-tailed black-cockatoo (inland subspecies)	Ecosystem, Species (Breeding)	Vulnerable	
Calyptorhynchus lathami	Glossy black-cockatoo	Ecosystem, Species (Breeding)	Vulnerable	
Pomatostomus temporalis	Grey-crowned babbler	Ecosystem	Vulnerable	
Grantiella picta	Painted honeyeater	Ecosystem	Vulnerable	Vulnerable

Species name	Common name	Credit type	Status under the BC Act	Status under the EPBC Act
Daphoenositta chrysoptera	Varied sittella	Ecosystem	Vulnerable	
Petroica boodang	Scarlet robin	Ecosystem	Vulnerable	
Petaurus norfolcensis	Squirrel glider	Species	Vulnerable	
Phascolarctos cinereus	Koala	Species	Vulnerable	Vulnerable
Macropus dorsalis	Black-striped wallaby	Ecosystem	Endangered	
Pteropus poliocephalus	Grey-headed Flying-fox	Ecosystem, Species (Breeding)	Vulnerable	Vulnerable
Saccolaimus flaviventris	Yellow-bellied sheathtail-bat	Ecosystem	Vulnerable	
Ozimops lumsdenae	Northern free-tailed bat	Ecosystem	Vulnerable	
Setirostris eleryi	Bristle-faced free-tailed bat [1]	Species	Vulnerable	
*Miniopterus orianae oceanensis (*previously *Miniopterus schreibersii oceanensis)*	Large bent-winged bat (previously Eastern bentwing-bat)	Ecosystem, Species (Breeding)	Vulnerable	
Nyctophilus corbeni	Corben's long-eared bat[1,2]	Ecosystem	Vulnerable	
Chalinolobus picatus	Little pied bat	Ecosystem	Vulnerable	
Hoplocephalus bitorquatus	Pale-headed Snake	Species	Vulnerable	

Note 1 – potentially recorded via ultrasonic bat call detections
Note 2 – one or more Nyctophilus species were identified through bat call detections, however the genus cannot be identified to species level from their calls. Nyctophilus geoffroyi and *Nyctophilus gouldi were recorded in harp trapping in February 2021, however, Nyctophilus corbeni, which is an ecosystem credit species, was not.*

Three species credit species were recorded in the project area, Squirrel Glider (*Petaurus norfolcensis*), Koala (*Phascolarctos cinereus*) and Pale-headed snake (*Hoplocephalus bitorquatus*). Other species credit species were observed during field surveys:

- White-bellied sea-eagle (*Haliaeetus leucogaster*)
- Red-tailed black-cockatoo (*Calyptorhynchus banksii samueli*)
- Grey-headed Flying-fox (*Pteropus poliocephalus*)
- Large bent-winged bat (*Miniopterus orianae oceanensis).*

Under the BAM, only breeding evidence is considered to represent the above species. Targeted surveys during the breeding season of these species did not record any breeding pairs of the first two

species, nor any breeding camps of the latter two species. These species have been excluded as species credit species but remain as ecosystem credit species.

Two individual Glossy black-cockatoos (*Calyptorhynchus lathami*) were observed in the project area, although not as a breeding pair. Although targeted breeding surveys were not undertaken for the species, breeding presence is assumed in all areas which contain potential breeding habitat (hollow bearing trees) and the Glossy black-cockatoo is a species credit species for the project. Habitat loss and degradation from vegetation clearing is likely to pose the largest risk of adverse impacts to terrestrial species from the project. Impacts will be either direct in the form of vegetation and habitat removal, or indirect such as a reduction in flora and fauna diversity due to shortages in available habitat resources or habitat degradation in areas adjacent to direct impacts.

The project has been amended to avoid serious and irreversible impacts to a threatened ecological community

One PCT and one species credit species were identified as possible candidates for serious and irreversible impacts (SAII), these being:

- PCT 35 – Brigalow – Belah open forest/woodlands
- Pale imperial hairstreak (*Jalmenus eubulus*).

Targeted surveys were undertaken of the Pale imperial hairstreak in January, February, and March 2021. No individuals of the species were found within or adjacent to the project area. Therefore, no further assessment of the species in terms of SAII has been undertaken.

SAII impacts on PCT 35 were expected based on SAII Principles 1 and 2, which are that the community is currently in a rapid rate of decline, and the community has a very small population size, respectively. PCT 35 is analogous with the listed TEC Brigalow community, under both the BC Act and the EPBC Act.

The Proponent undertook a detailed review of impacts to PCT 35 in the borrow pit locations, with those containing PCT 35 exclusively being removed from the project footprint and those with PCT 35 in conjunction with other PCTs having PCT 35 removed from the project and 40 m buffers placed around the remnant vegetation. Residual impacts to PCT 35 total 2.24 ha, being low and moderate condition PCT 35 at Borrow Pit 1 and 0.67 ha of low condition PCT 35 (which does not meet the condition standard requirements for the BC Act and EPBC Act listed Brigalow community TEC) at Borrow Pit 2.

There are several areas within the existing rail corridor where Brigalow has regrown following the decommissioning of the rail line in the 1970s. In some areas the regrowth meets the condition requirement for the EPBC listed Brigalow community. The Proponent states that wherever possible impacts to the community in the rail corridor have been reduced by revising the area of laydown areas or relocating them. The Proponent states the overall impacts to the Brigalow community have been reduced from 101 ha to 17.51 ha, which represents 0.0008% of remaining Brigalow community in NSW.

Impacts to aquatic habitat and threatened aquatic species are minor

A number of watercourses and waterbodies occur within the project area. The aquatic biodiversity assessment noted the project intersected several fish habitat areas and assessed the habitat sensitivity and fish passage classification of the watercourses (**Table 9**).

Table 9 | Habitat status of watercourses in the project area

Watercourse	Classification of watercourse for fish passage[1]	Fish habitat sensitivity[2]	Mapped as key fish habitat / target aquatic species
Macintyre River	Class 1	Type 1	Yes / Darling River snail, Silver perch, Southern purple spotted gudgeon, Murray cod, Eel-tailed catfish and Oliver perchlet
Whalan Creek	Class 2	Type 1	Yes / Southern purple spotted gudgeon
Back Creek	Class 3	Type 1	Yes / Eel-tailed catfish
Mobbindry Creek	Class 3	Type 1	Yes / Eel-tailed catfish
Forest Creek	Class 4	Type 3	No
Unnamed tributary of Mobbindry Creek	Class 4	Type 3	No

Note 1 – Classification for fish passage - Class 1 Major fish habitat, Class 2 Moderate fish habitat, Class 3 Minimal fish habitat, Class 4 Unlikely fish habitat

Note 2 – Habitat sensitivity - Type 1 Highly sensitive key fish habitat, Type 2 Moderately sensitive key fish habitat, Type 3 minimally Sensitive key fish habitat

The Bionet database did not identify any fish records within watercourses intersected by the proposed rail corridor. The only threatened aquatic specifies identified by the Commonwealth's Protected Matters Search Tool (PMST) was the Murray Cod (*Maccullochella peelii*), which is listed as vulnerable under the EPBC Act. The Macintyre River provides suitable habitat for Murray Cod and it was the only threatened aquatic species identified by the aquatic biodiversity assessment. All other watercourses surveyed were considered to be unlikely to support Murray Cod.

Other threatened species and endangered ecological communities that may be found in the broader Border Rivers catchment include:

- Darling river snail (*Notopala sublineate*)
- Southern purple spotted gudgeon (*Mogurnda adspersa*)
- Silver perch (*Bidyanus bidyanus*)
- Olive perchlet (*Ambassis agassizii*) western population
- Aquatic Ecological Community in the Natural Drainage System of the Lowland Catchment of the Darling River' (Darling River EEC).

DPI-Fisheries' fish distribution maps indicate the Eel-tailed catfish (*Tandanus tandanus*) Murray Darling population may be present in the Macintyre River.

The aquatic assessment considered the above threatened species or populations as possibly or likely to occur in the project area, except the silver perch. The project has the following residual aquatic biodiversity impacts:

- Murray cod habitat - 1.15 ha
- habitat of the threatened aquatic species and populations that possibly or are likely to occur in the project area - 1.51 ha
- Darling River EEC - 1.15 ha
- Type 1 and Type 3 fish habitat - 14.6 ha.

The Proponent has committed to undertake further investigations during detailed design to determine the magnitude of these impacts more accurately.

There are no impacts to wetlands

There are no wetlands of International Importance (Ramsar wetlands) within 10 kilometres of the project area. The nearest Ramsar wetlands (Banrock Station wetland complex, Riverland and The Coorong and Lakes Alexandrina and Albert Wetland) are located approximately 1000 to 1300 km from the project. A wetland complex consisting of Morella Lagoon, Pungbougal Lagoon and Boobera Lagoon are part of a remnant channel of the Macintyre River south of Goondiwindi (about 10 km to the west of the Macintyre River viaduct). The wetland complex is listed as a site of national importance in the Directory of Important Wetlands in Australia.

The project has minimal impacts to groundwater dependent ecosystems

The project potentially impacts two of the three types of ecosystems identified by the Groundwater Dependent Ecosystems Atlas. These are:

- aquatic ecosystems – rely on the surface expression of groundwater, such as rivers, wetlands and springs
- terrestrial ecosystems – rely on the subsurface presence of groundwater, includes all vegetation ecosystems.

The project passes through or is in the vicinity of several aquatic and terrestrial groundwater dependent ecosystems (GDEs). The assessment noted that no high potential aquatic GDEs are intersected by the project. Moderate potential GDEs are impacted at Mobbindry Creek (classified ecosystem type river) and the active Macintyre River channel (classified ecosystem type wetland) by cut and fill works, as well as the Macintyre River bridge structures.

Moderate to high potential terrestrial GDEs are impacted by the project. These GDEs are identified as:

- PCT 36 (red river gums and open tall forest) in the floodplains of Mobbindry Creek, Back Creek, Whalan Creek and Macintyre River where cut and fill works, as well as bridge structures at Mobbindry Creek and Macintyre River
- PCT 53 (freshwater wetland sedgeland)
- PCT 247 (lignum shrubland wetland).

The Proponent will offset impacts to terrestrial GDEs by the provision of ecosystem credits.

The Proponent proposes a range of measures to offset biodiversity impacts

The *Biodiversity Offset Package for Inland Rail NS2B Project* (ARTC, 19 December 2022) was prepared to outline the proposed measures to mitigate biodiversity impacts and seek a two year period from project approval to fulfill the biodiversity credit liability. The Proponent has proposed this approach to allow additional time to procure land based offsets including the finalisation of Biodiversity Stewardship Agreements (BSAs) with landholders. BSAs would provide offset credits that the Proponent would use to partially satisfy their offset obligations. Other measures include additional compensatory measures for the Semi-evergreen vine thicket TEC, PCT52 - Qld Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains, Koala and Pale-headed Snake, and payment to the Biodiversity Conservation Trust for any residual credit obligations. The Proponent has committed to provide a financial security to guarantee the proposal's biodiversity offset obligations (not yet retired) will be met.

Submissions and agency advice

Community, group and organisation submissions

Community submissions raised biodiversity concerns regarding:

- adequacy of the ecological assessment, specifically the identification of threatened and endangered ecological communities
- inconsistent with the avoid, minimise and offset hierarchy
- extent of the study area and timing and duration of ecological surveys
- changes to surface hydrology and impacts on ecology.

Government agencies advice and local council submissions

BCS advised it had liaised with the Proponent to address residual issues that were identified in BCS's response to the EIS. BCS noted there are no residual biodiversity matters in the updated BDAR, the BDAR conforms to BAM 2017, and the credit obligations have been appropriately identified. BCS notes that refinements to the project footprint to avoid impacts to biodiversity and targeted threatened species surveys have more clearly identified impacts to biodiversity and has resulted in reductions to the project's credit obligations.

Crown Lands requested consultation on the preparation of the Biodiversity, Biosecurity and Flora and Fauna management sub-plans. Crown Lands also requested details and design for fauna fencing and fauna passage on Crown land and travelling stock routes, detailed design on aquatic fauna and measures to minimise the spread of and introduction of weeds during earth works.

DPI Fisheries is unclear how the 14.60 ha of Type 1 and Type 3 key fish habitat offsets was calculated, given that impacts to key fish habitat require a 2:1 offset. DPI Fisheries recommended that the detailed design of scour protection below bridge and culvert structures ensure fish passage isn't impeded.

DPI Agriculture acknowledged a biosecurity management plan would provide greater detail of measures to manage the biosecurity risks of the project. DPI Agriculture requested that they be consulted in the development of the biosecurity management plan and recommended the plan include pest management for existing and potentially new pests, washdown of machinery, and construction management measures to minimise the spread of pests, diseases and weeds.

MPSC noted the need to retire credits to offset impacts and also recommended the Proponent work directly with key landholders to identify more biodiversity credits.

GRC Qld noted the potential for the spread of pest plant seeds and proliferation of weeds in the local government area. GRC considered the impact on fish passage in the Macintyre River to be uncertain as no assessment has been undertaken under the Qld *Fisheries Act 1994*.

Qld Department of Natural Resources Mines and Energy noted that the clearing of vegetation in Qld for the project will impact Matters of State Environmental Significance (MSES). The Proponent is requested to ensure that all requirements relating to impacts to MSES in the future Border to Gowrie EIS need to be adhered to before clearing of vegetation in Qld commences.

Consideration

The assessment adequately considers Matters of National Environmental Significance (MNES)

The BDAR considered all potential MNES under sections 18 and 18A of the EPBC Act known to or potentially occurring in the project area, as listed in the controlled action documents. In addition, the BDAR assessed impacts to other EPBC listed communities and species identified in the desktop analysis and through site surveys. A summary of MNES assessed as potentially occurring in the study area is shown in **Table 10**.

Table 10 | Summary of MNES potentially occurring in the study area

MNES under the EPBC Act	Number recorded or likely to occur within 10 km of the study area as described in the BDAR	Number requiring detailed assessment as described in the BDAR	Number impacted or potentially impacted
TECs	6 communities	4 communities	4 communities
Threatened flora	8 species	4 species	1 species
Threatened fauna	20 species	14 species	5 species

Six listed TECs were identified from the PMST as potentially occurring in the project area. The further assessment of a seventh TEC, Poplar box grassy woodland on alluvial plains, is not required as the TEC was listed after the project was declared a controlled action. Five of the TECs were identified in the controlled action documents as having the potential to be significantly impacted. An additional TEC, Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions, was identified in the BDAR as having potential to occur in the project area.

Predictive mapping indicated that suitable habitat for two TECs (listed in the controlled action documents), White-box-Yellow box-Blakely's Red Gum grassy woodland and derived native grassland, and Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions, did not occur in the project area. This was confirmed through site assessments and no further assessment of these TECs was undertaken.

Further assessment was undertaken for four listed TECs. The habitat requirements for these TECs and the extent in the project area are summarised in **Table 11**.

The Department notes that the Proponent has reviewed the design of the borrow pits with the aim of reducing impacts to the Brigalow TEC (*Acacia harpophylla* dominant and co-dominant). This has been achieved with high and medium condition PCT 35 analogous to the Brigalow TEC being excluded from the project. There are no changes to impacts to PCT 35 that are in low condition or medium condition that does not meet the Brigalow TEC threshold requirements. Although impacts to the community have been reduced from 101 ha to 17.51 ha, the BDAR considers the project is likely to have a significant impact on the community.

The project directly impacts 33.52 ha of Natural grasslands on basalt and fine-textured alluvial plains of northern NSW and southern Qld TEC. The community is located within the existing disused rail alignment and cannot be avoided. The BDAR considered there is likely to be significant residual impacts.

The Department considers that the removal of 6.4 ha of the TEC Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions at Borrow Pit 1 is likely to have a significant impact, although these impacts are addressed through the provision of ecosystem credits. The BDAR did not undertake an assessment of significance of the impact of the proposal on the TEC.

The BDAR considered the removal of 0.02 ha of Weeping Myall Woodlands TEC is unlikely to have a significant impact on the TEC.

The Proponent has committed to provide ecosystem credits on a like for like basis to offset impacts to the TECs, however, the variation rules available under the BC Act will not be applied to EPBC listed communities.

Table 11 | TECs identified in the project area

TEC name	Habitat requirements for analogous PCTs	Extent impacted within the project area
Brigalow (*Acacia harpophylla* dominant and co-dominant)[1]	The following high or medium quality condition PCTs are considered to be analogous to the TEC. PCT 35 as they meet the condition thresholds in Section 1,7 of the approved conservation advice for the TEC	Rail alignment – 11.17 ha of high quality PCT35 across several patches Borrow pits – high and medium quality PCT35 excluded
Natural grasslands on basalt and fine-textured alluvial plains of northern NSW and southern Qld[1]	The following high or medium quality condition PCTs are considered to be analogous to the TEC. PCT 52 when ⩾ 0.5 ha as described in the Nationally Threatened Ecological	Rail alignment – 33.52 ha of PCT 52

TEC name	Habitat requirements for analogous PCTs	Extent impacted within the project area
	Communities – natural grasslands TEC	
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	The following high or medium quality condition PCTs are considered to be analogous to the TEC PCT 147as described in the national recovery plan for the TEC	Borrow pit – 4.6 ha in Borrow Pit 1
Weeping Myall Woodlands[1]	The following medium quality condition PCTs are considered to be analogous to the TEC. PCT 27 when ≥ 0.5 ha and it meets the condition thresholds in the TEC's policy statement	Rail alignment – 0.02 ha of PCT 27 (medium quality). The patch is part of a larger patch which is not located in the project area. The larger patch will be buffered to ensure it is not impacted by the project.

Note 1 – controlled action documentation

Eight threatened flora species were identified as potentially occurring in the project area, of which five were identified by the PMST and three were listed in the project's controlled action documents. Four species were considered a likely or possible occurrence and subject to targeted surveys. The surveys identified one threatened species, Belson's panic (*Homopholis belsonii*), that would be directly impacted. The threatened flora species Bluegrass (*Dichanthium setosum)* was not found during the targeted surveys, however its presence is assumed within 26.06 ha of potential habitat which were not surveyed.

The BDAR undertook an assessment of significance of the impact of the proposal on Belson's panic (46.44 ha of potential habitat) and Bluegrass (assumed presence on 26.08 ha of potential habitat). The assessment concluded that as the area of impact did not contain an important population, nor did it have critical habitat features, the proposal did not have a significant impact on these species. BCS considered that because of the quantum of impacts to these threatened species, the impact of the proposal could be considered to be significant. The Proponent states such impacts would be offset by the provision of species credit.

The assessment of EPBC listed threatened flora species is summarised in **Table 14**.

Table 12 | Assessment of threatened flora species

Common name	Species name	Likelihood of occurrence
Belson's panic	*Homopholis belsonii* [1]	Known – recorded in targeted surveys
Bluegrass	*Dichanthium setosum* [1]	Possible – targeted surveys did not record the species

Common name	Species name	Likelihood of occurrence
Ooline	*Cadellia pentastylis* [1]	Unlikely – dedicated surveys within habitat did not locate the species
Slender tylophora	*Tylophora linearis* [1]	Unlikely – targeted surveys did not record the species
-	*Androcalva procumbens*	Unlikely – the habitat and species known distribution do not occur in the project area
Slender Darling-pea	*Swainsona murrayana*	Unlikely – targeted surveys did not record the species
Austral toadflax	*Thesium australe*	Unlikely – dedicated flora surveys did not locate the species
	Westringia parvifolia	Unlikely – the habitat and species known distribution do not occur in the project area

Note 1 – Controlled action documentation

Twenty threatened fauna species were identified as potentially occurring in the project area, of which 17 species were identified from the PMST (including nine species listed in the controlled action documents). Fourteen species were considered a likely or possible occurrence, of which twelve are impacted. Several species were subject to targeted surveys and habitat surveys. Five species were recorded during site investigations: including Australasian bittern, Painted honeyeater, Murray Cod, Grey-headed flying-fox and Koala. The consideration of threatened fauna species is summarised in **Table 13**. Although the Glossy black-cockatoo was recorded in the proposal area, an MNES assessment is not required as the species was listed as vulnerable under the EPBC Act on 10 August 2022, after the controlled action declaration was made. Similarly the change in status of the Koala and Greater Glider in 2022 from vulnerable to endangered under the EPBC Act is not required to be assessed.

Table 13 | Threatened fauna species listed under the EPBC Act

Common name	Species name	Likelihood of occurrence
Red goshawk	*Erythrotriorchis radiatus*	Possible – while suitable habitat exists the species was not recorded during targeted raptor survey and the closest record is over 120 km south east of the subject land
White throated needletail	*Hirundapus caudacutus*	Likely – several historical records occur within the search area

Common name	Species name	Likelihood of occurrence
Australasian bittern	*Botaurus poiciloptilus*	Known – individual recorded at farm dam within Borrow Pit 8
Squatter pigeon [1]	*Geophaps scripta scripta*	Unlikely – the species was not recorded during targeted surveys and the project area is outside the current known distribution for the species
Spot-tailed quoll (Southeaster n mainland population)	*Dasyurus maculatus maculatus*	Possible – suitable habitat exists however the species was not recorded during targeted surveys. Closest record is 50 km to the east
Dunmall's snake [1]	*Furina dunmalli*	Unlikely – the species was not recorded during targeted surveys and the project area is outside the modelled distribution for the species
Border thicktailed gecko	*Uvidicolus sphyrurus*	Unlikely – not recorded during targeted surveys
Regent honeyeater	*Anthochaera phrygia*	Unlikely – suitable habitat does not occur in the project area, which are outside the mapped habitat for the species
Painted honeyeater [1]	*Grantiella picta*	Known – individual recorded in Poplar box woodland during October 2019 field survey
Murray cod [1]	*Maccullochella peelii*	Known – recorded in the Macintyre River during targeted surveys for adjacent Inland Rail project (Border to Gowrie)
Greater glider	*Petauroides volans*	Unlikely – suitable habitat does not occur in the project area
Koala [1]	*Phascolarctos cinereus*	Known – an individual was heard calling on a single occasion during a spotlighting survey in River Red Gum forest adjoining the Macintyre River to the east of the alignment.
Red goshawk	*Erythrotriorchis radiatus*	Possible – suitable habitat exists however the species was not recorded during targeted surveys. Closest record is over 120 km south east of the project area
Superb parrot	*Polytelis swainsoni*	Unlikely – the project area is outside the known range of the species
Grey-headed flying-fox	*Pteropus poliocephalus*	Known – individuals recorded in River Red Gum forest and Poplar box woodland during field surveys

Common name	Species name	Likelihood of occurrence
Collared delma [1]	*Delma torquate*	Unlikely – suitable habitat does not occur in the project area, which is outside the known range of the species
Australian painted-snipe	*Rostratula australis*	Possible – the species has been recorded 50 km to the south west but in permanent wetlands
Five-clawed worm-skink [1]	*Anomalopus mackayi*	Possible – habitat exists with a probable find recorded 4 km to the south during pre-clearing surveys in PCT 52 for the Narrabri to North Star (SP1) project in July 2021
Curlew sandpiper	*Calidris ferruginea*	Possible – limited habitat exists, the closest record is 80 km north east
Large-eared pied bat [1]	*Chalinolobus dwyeri*	Unlikely – suitable rocky roost habitat does not occur in the project area, which is outside the known distribution for the species
Corben's long-eared bat [1]	*Nyctophilus corbeni*	Possible – microbat echolocation calls from the genus *Nyctophilus* were recorded during field surveys. Calls within this genus cannot be reliably distinguished between the species. Three species may be present. Only *Nyctophilus gouldii* and *N. geoffroyi* were recorded during harp trapping in February 2021. The species has been recorded in the Dthinna Dthinnawan National Park 20 km to the east.

Note 1 – Controlled action documentation

The project will remove 27.7 ha of potential Koala habitat. The Koala's presence in the project area was recorded as:

- Koala calling in PCT 36 near the Macintyre River
- scats observed in PCT 56 east of the brownfield alignment
- scratches consistent with Koala activity in PCT 628 at the northern end of the brownfield alignment.

The BDAR did not consider the project would have a significant impact on the species as the habitat that would be cleared comprised low quality PCTs with highly scattered individual trees or no trees, which does not provide suitable habitat, and that some PCTs only contain limited preferred forage tree species. BCS noted that 140.88 ha of potential foraging habitat would be removed in addition to 27.7 ha of potential breeding habitat. BCS considered that the removal of Koala use trees in an already fragmented landscape will further fragment the availability of habitat to individuals and would have a significant impact on the species. The BDAR has proposed the provision of species credits to offset impacts to the Koala from the loss of potential breeding habitat. Impacts to potential foraging habitat would be offset by the provision of ecosystem credits for the relevant PCTs.

No Grey-headed Flying-fox camps were recorded in the project area. The nearest camp is located about 10 km to the northwest at Goondiwindi. As the project area does not contain a flying fox roost/camp, the vegetation impacted by the project is considered to be foraging habitat for the species. The BDAR considered the project would not have a significant impact on the species.

Habitat for the Five-clawed worm-skink exists in the project area, although the species was not recorded in site surveys. The nearest records are 50 km to the south east and 80 km to the south west, although a probable find was recorded during preclearing surveys 4 km to the south for the Inland Rail Narrabri to North Star (SP1) project. As Five-clawed worm-skink habitat (268 ha) will be impacted an assessment of significance was undertaken, which considered the project will have a significant impact on important habitat for the species. Ecosystem credits will be obtained to offset impacts to the habitat of this species. In recognition of the important habitat that would be impacted by the project and that the species has been identified in the adjoining Inland Rail project, the Department has recommended the Proponent prepare a threatened species management plan to manage construction and operational impacts on the species. The management plan would identify potential construction impacts, provide details of management and mitigation measures, procedures for the relocation of recovered individuals, goals and performance indicators for mitigation measures and ongoing monitoring.

Bird surveys at 75 sites recorded an individual Painted Honeyeater in Poplar box woodland. The BDAR considered the cumulative impacts of the proposal on the species is low and the proposal is unlikely to have a significant impact on the species. The Department notes that although only one bird was recorded there are numerous records of the Painted Honeyeater in the wider area surrounding the proposal. Low quality PCTs contain no trees and therefore there is little to no habitat for mistletoes to grow on, however, the BDAR did note that medium to high PCTs are considered habitat. The Proponent has committed to provide ecosystem offsets for impacts to the species habitat.

The Corben's Long-eared Bat (*Nyctophilus corbeni*) was identified as a possible species through anabat recording. The BDAR considered the overall cumulative impact on the species to be low and the proposal will not have a significant impact. The proposal impacts approximately 247 ha of the species' potential habitat which could be considered to be significant. The Proponent has committed to provide species credits to offset the potential impacts.

The Department is satisfied with the updated BDAR's assessment of potential impacts to MNES, and recommends the Commonwealth Minister for the Environment and Water:

- notes the Department's assessment of MNES in this report
- considers the Bilateral assessment in **Appendix I**
- considers additional EPBC Act considerations, including the Commonwealth's international obligations and the consideration of relevant approved conservation advices, recovery plans, and threat abatement plans in **Appendix I**
- adopts conditions for a Biodiversity Management plan Condition C8, and Conditions E20 to E35 (inclusive) in the recommended project approval **(Appendix K**).

The removal of native vegetation and resulting loss of habitat is unavoidable

In designing the project the Proponent identified a route alignment that avoided and minimised impacts to the biodiversity values of the project area by using the existing disused rail corridor wherever feasible and locating temporary infrastructure within managed land or highly disturbed vegetation. Areas with MNES and BC listed ecological receptors and their associated habitats were avoided where possible. However, the clearing of native vegetation for the project is unavoidable and will impact terrestrial species through the loss and degradation of foraging and breeding habitat. Indirect impacts may include reductions in the diversity of flora and fauna due to shortages of available habitat resources or degradation in areas adjacent to cleared vegetation. The vegetation directly impacted by the project consists of various condition types (low to high condition) and includes TECs and habitat for threatened species.

The Proponent revised the design footprint to reduce impacts to PCT 35 Brigalow – Belah open forest/woodland. The Department notes that several patches of PCT 35 within the existing disused rail corridor are largely regrowth vegetation and will be removed. The Proponent has committed to offset the removal of PCT 35 by securing biodiversity credits under the BC Act.

Commitments have been made by the Proponent to manage construction impacts on native vegetation and habitats of threatened species. These include the preparation and implementation of a Biodiversity Management Sub-plan to guide threatened plant surveys, pre-clearing fauna surveys, establishment of buffer/no go areas and staging works to avoid animal breeding periods, pre-clearing surveys of remnant and regrowth vegetation by a qualified ecologist, managing works and plant maintenance and refuelling to avoid areas within or adjacent to watercourses and riparian vegetation, and the rehabilitation and landscaping of disturbed areas.

The Department considers that there is limited opportunity to avoid the removal of native vegetation within the disused rail corridor and that direct impacts to vegetation and threatened species habitats will be offset through the provision of ecosystem credits. To manage impacts on vegetation communities and threatened species habitats during construction of the project the Department has recommended that a Biodiversity Management Plan be prepared and implemented following approval from the Planning Secretary. This would ensure that the biodiversity values of land adjoining the construction boundary is protected during construction works.

Impacts to threatened species will be offset

The results of the targeted surveys and an assessment of suitable species habitat factors in the available habitat determined whether species credit species were excluded from further assessment. The BDAR determined that seven flora and five fauna species required species credits to offset the clearing impacts of the project within the rail alignment and/or borrow pits. Details of the species credit species habitat impacted by the project are shown in **Table 14**.

Three fauna species credit species were recorded in the project area. The Squirrel glider and Koala were identified in riparian vegetation of the Macintyre River, and Koala scats and scratches were recorded to the south adjacent to the alignment. The main threats are the loss and degradation of habitat and habitat fragmentation, loss of hollow bearing trees to the Squirrel glider and predation and

vehicle strike to both the Koala and Squirrel glider. The Pale-headed snake was recorded at three locations, two in trees adjacent to Mobbindry Creek and one in a tree in the road reserve adjacent to Tucka Tucka Road. The main threats to the Pale-headed snake are habitat clearing, particularly of old, large and hollow trees, disturbance of riparian vegetation and invasion by the Cane Toad. The clearing of vegetation for the project is unavoidable, particularly within the existing disused rail alignment where remnant vegetation has regrown.

Table 14 | Species credit species requiring offsets and area of habitat impacted

Common name	Species name	Conservation status (BC Act / EPBC Act)	Impact area – rail alignment (ha)	Impact area – borrow pits (ha)
Flora				
Belson's panic	*Homopholis belsonii*	Endangered / Vulnerable	32	14.35
Bluegrass	*Dichanthium setosum*	Vulnerable / Vulnerable	26.1	-
Creeping tick-trefoil	*Desmodium campylocaulon*	Endangered / -	30.18	-
Finger panic grass	*Digitaria porrecta*	Endangered / -	153.15	14.4
Native milkwort	*Polygala linariifolia*	Endangered / -	-	12.4
Slender darling pea	*Swainsona murrayana*	Vulnerable / Vulnerable	29.9	-
Winged peppercress	*Lepidium monoplocoides*	Endangered / Endangered	26.08	-
Fauna				
Glossy black-cockatoo	*Calyptorhynchus lathami*	Vulnerable / -	70.81	52.92
Koala	*Phascolarctos cinereus*	Vulnerable / Vulnerable	27.76	-
Masked owl	*Tyto novaehollandiae*	Vulnerable / -	100.73	32.6
Pale-headed snake	*Hoplocephalus bitorquatus*	Vulnerable / -	12.76	12.4
Squirrel glider	*Petaurus norfolcensis*	Vulnerable / -	47.3	-

The Department notes that impacts to threatened species and their habitats are unavoidable, however biodiversity credits will be provided for the species credit species listed in **Table 14** to offset potential impacts. Further, the implementation of a Biodiversity Management Plan and the Five-

clawed Worm Skink Management Plan will ensure that impacts on these species during construction will be adequately managed. The Department has recommended the inclusion of these plans in the proposed conditions of approval. The Biodiversity Management Plan will require the Proponent to undertake pre-clearing surveys for native fauna and establish protocols for unexpected and incidental finds of threatened species and ecological communities in the construction footprint. The Five-clawed Worm Skink Management Plan requires the Proponent to identify potential habitat, management and mitigation measures to reduce construction and operational impacts to the species, procedures for the relocation of individuals discovered during construction and details of the relocation sites.

Impacts to riparian vegetation and threatened aquatic species can be managed

The Macintyre River is the major waterway in the region and the only permanent waterbody. All other waterways were perennial or ephemeral and have been modified by historic road and rail crossing structures and agricultural infrastructure. Targeted surveys of aquatic fauna identified one threatened species, Murray cod in the Macintyre River.

The aquatic biodiversity assessment assessed residual impacts of 14.6 ha to fish habitat (Type 1 and Type 3). DPI-Fisheries queried whether this residual impact remained after detailed design and if so, an offset of 2:1 under the FM Act would be required. The Proponent advised the 14.60 ha initial impact area was calculated using the Adverse Impact Assessment Methodology and is based on a 100 m buffer of the Macintyre River. The Macintyre River crossing corridor is approximately 30 m wide however the final bridge width is less than 5 m. The actual potential disturbance footprint is relatively small, approximately 0.5 ha, which would be confirmed following detailed design and prior to construction.

The assessment concluded a residual impact of 1.15 ha to Murray cod habitat from bridge works in the Macintyre River. However, the actual disturbance footprint is small (0.5 ha) and an offset under the FM Act is not required. DPI Fisheries advised that it advocates avoidance, minimisation and mitigation measures for bridge construction in lieu of aquatic offsets to compensate the loss of small areas of habitat associated with pier or pile construction.

The Proponent does not consider that additional offsets under the FM Act are required for the small area of Murray cod habitat directly impacted and that impacts on PCT 36 by bridge construction have been addressed by the provision of biodiversity credits under the BC Act. DPI-Fisheries supports this conclusion. DPI-Fisheries noted that there is potential for the Proponent to provide beneficial aquatic habitat for the Murray cod by placing woody debris (snags) in the Macintyre River to provide breeding habitat for the species. Impacts to Murray cod habitat from construction activities could be reduced by restricting high risk construction activities, such as piling, construction and removal of temporary work platforms or waterway crossings, within the waterway during the species breeding period of September to November.

The Department has recommended conditions of approval which:

- require an offset of 2:1 for residual impacts to key fish habitat
- restricts carrying out high risk construction activities in Murray cod habitat during the Murray cod breeding period

- requires provision of beneficial aquatic habitat for the Murray cod within 1 km downstream of the Macintyre River bridge crossing.

The Department is satisfied that impacts to riparian vegetation from the bridge disturbance footprint would be addressed by the provision of ecosystem credits for the PCT under the BC Act and that additional offsets for impacts to key fish habitat and Murray cod habitat is not required, subject to the recommended conditions of approval.

Biodiversity offsets will be required to compensate impacts to threatened communities and species and their habitat

The clearing of native vegetation for the project will require offsetting under the BC Act. The BDAR assessed impacts to native vegetation, threatened ecological communities and threatened species and their habitat and identified the relevant ecosystem credits and species credits. The construction of the project is likely to be delivered in stages, with the required biodiversity credits identified for each segment (brownfield, greenfield, early works and borrow pits) of the project. The required biodiversity offsets are summarised in **Table 15**.

Table 15 | Summary of biodiversity credits by project segment

Project segment	Native vegetation impacted (ha)	PCTs impacted	Ecosystem credits	Species credits	Scattered tree credits
Greenfield alignment	38.04	36, 52,192, 244, 247, 628	1354	7746	1
Brownfield alignment	165.57	27, 35, 36, 52, 53, 55, 56, 98, 244, 247,628	4297	7670	-
Early works alignment	54.89	27, 35, 36, 53, 56, 192, 628	1398	1963	-
Borrow pits (1, 2, 4, 5, 7, 8, 9, 13, 25)	64.93	35, 56, 98, 147, 192, 418	1518	3698	5
Total	**323.43**		**8567**	**21077**	**6**

The BDAR assessed impacts to seven threatened flora species and five threatened fauna species, and the provision of species credits are required for impacts to these species credit species. The Glossy-black cockatoo and the Masked owl are assumed to be present as targeted surveys were not undertaken within the BAM specified months. Belson's panic is the only threatened flora species that was identified within the project area. The assumed presence of six other threatened flora species credit species is assumed based on the presence of suitable habitat.

The Proponent has committed to retire the biodiversity credits in accordance with the BC Act, with options of retiring credits and/or making a payment to the Biodiversity Conservation Fund or providing supplementary measures. The like for like or variation rules under the BC Act would be used to meet

the relevant biodiversity credit requirements for BC Act listed communities, however the rule would not be applied to MNES listed under the EPBC Act.

The Department has recommended conditions of approval which requires the Biodiversity Offset Package to be implemented and regular reporting on the retirement of biodiversity credits and/or payment to the Biodiversity Conservation Fund.

Biodiversity Offset Package and financial security is an acceptable way to meet the biodiversity offset obligation for the project

The impacts to biodiversity require 8,567 ecosystem credits, six scattered tree credits, and 21,077 species credits to be retired. The Proponent has submitted a *Biodiversity Offset Package for Inland Rail NS2B Project* (ARTC 19 December 2022) (the BOP) which demonstrates how the biodiversity offset obligations for the project will be met and requests an additional two year time period to fulfill this obligation. This is consistent with the Department's conditions for deferred biodiversity offset obligations and consistent with other recent large linear infrastructure projects.

The BOP outlines the ecosystem and species credits that have been obtained or are in the process of being obtained, outstanding credits for the brownfields portion of the project which have yet to be sourced and additional compensatory measures. It is noted that delays in obtaining credits, particularly through BSSs before the scheduled commencement of construction in October 2023, will potentially affect the timing of construction.

The Department considers the Proponent has demonstrated reasonable efforts since 2018 to obtain the biodiversity credits, including assisting landowners to obtain BSAs, funding an existing Biobanking site, purchasing species credits, requesting the credits through the credit demand register and acquiring property. The Department also supports the Proponent's preference to obtain land-based offsets before applying the variation rules or payment into the Biodiversity Conservation Fund.

The BOP states that based on BSAs in progress or proposed, the Proponent will be required to acquire 6,135 ecosystem credits out of an obligation of 8,567 (plus 6 scattered tree credits) and 3,001 species credits out of an obligation of 21,077 credits. In December 2022, the outstanding credit liabilities for ecosystem credits is approximately $20.7 million and for species credits approximately $43.5 million. The Proponent states the establishment of new BSA sites for species credits is uncertain and a payment to the Biodiversity Conservation Fund would be made if credits cannot be obtained.

While the BOP notes that some relevant biodiversity credits have been secured the Department acknowledges that no suitable registered ecosystem credits or species credits are available to meet the project's credit obligations in full.

The Department considers the request for an additional two-years to find suitable properties and for the credits to be retired is acceptable and is likely to result in additional land-based credits being obtained. However, there is the likelihood that not all required credits will be obtained within the additional two year period. In this case, payment to the Biodiversity Conservation Fund will ensure the credit liability has been fulfilled for any outstanding credits.

In addition to land-based credits, the BOP includes a number of compensatory measures. The measures are summarised in **Table 16**.

Table 16 | Biodiversity Offset Package compensatory measures

Significant biodiversity value	Compensatory measure	Estimated cost of compensatory measure (≤ 10%)	Timing
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions TEC	• Seed collection at proposed BSA site • Collection of seeds over 4 surveys during September 2023 and April 2024 • Preparation of seed for storage and delivery to Mount Annan botanic garden	$94,298	Within 24 months of the approval of the BOP
Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly the northern-eastern Darling Riverine Plains Bioregion (PCT 52)	Establish a BSA on ARTC owned land at Boggabilla which contains grassland community and restoration works through the use of Assisted Revegetation Management Actions	$1,370,160	BSA application submitted Q4 2023 with expected credit release Q2 2024. Restoration activities to be completed by Q4 2024
Koala	5 days of scent detection dog survey of NS2B proposal area as part of the Inland Rail Koala Genetics Project to fill information gaps on Koalas	$70,000	5 days of scat collection completed and results expected Q2 2023
Pale-headed snake	Installation of artificial shelter devices around trees and/or installed posts on three proposed BSA sites and monitor for 12 months	$183,797	Within 24 months of the approval of the BOP.
		$1,718,255	

The proposed compensatory measures are supported by BCS in principle, and the final BOP would need to be accompanied by specific project plans with actions which are measurable and to confirm the funding is appropriate for the proposed scope of work. The Department has recommended conditions to ensure specific project plans are prepared and included in the BOP.

The Department considers the Proponent's approach is a pragmatic response to addressing a shortfall of available credits and the necessary time to establish land based offsets. The BOP provides enough confidence that additional land-based offsets are possible with the provision of an additional two years and where a residual credit liability remains payment in the Biodiversity Conservation Fund would be required. The Department has recommended conditions that require a financial security agreement (bank guarantee or similar) and Deed of Agreement with the Planning Secretary of the monetary value of the outstanding biodiversity credits, which the Proponent will forfeit

should the measures outlined in the BOP not be implemented within two years of the date of the approval of the project.

These conditions will ensure that the biodiversity values impacted by the proposal are adequately offset by the Proponent in the construction and operation of the proposal.

6.4 Noise and vibration

Noise and vibration impacts are expected during construction and operation at a number of receivers from works during extended construction hours and proximity to the rail alignment. These impacts are generally consistent with other major transport infrastructure projects and can be appropriately managed.

55 sensitive receivers will experience exceedances of the noise management levels (NMLs) during construction daytime works and 105 during out of hours works, with three receivers classified as highly noise affected. Construction noise impacts are expected to be short term and isolated to individual receivers as the linear construction progresses through the rural setting. These impacts will be proactively managed through community engagement.

Five receivers will experience operational noise above the trigger levels with one residential receiver located next to a level crossing, experiencing a maximum noise level of 95 dBA. This resident has requested that their residence be relocated, along with appropriate acoustic mitigation. The Department considers that at receiver operational noise mitigation measures can be implemented at the other affected receivers to reduce noise impacts and supports the Proponent's commitment to relocate the significantly affected residence.

Issue

Extended construction hours and Out of Hours Works (OOHW) are proposed

Extended daytime construction hours (6:30 am to 6:00 pm Monday to Sunday including public holidays) are proposed. Work proposed to occur outside of the standard hours includes:

- bridge and road works
- concreting and piling
- maintenance and repair of public infrastructure
- other works that shorten the duration of the project and have been supported by the affected community.

The majority of out of hours works are proposed for bridge and road works in sparsely populated areas. Utilising extended hours for these works may lead to a reduction in the total number of days that receivers are impacted. Impacts would be minimised through agreements, or alternative mitigation measures and respite developed in consultation with affected receivers. A complaints management system and 24-7 hotline would be provided by the Proponent and work practices and opportunities for mitigation would be reviewed if complaints are received.

Construction works will exceed noise management levels

Construction activities that exceed the project's noise management level (NML) being the background noise level plus 5dB(A) $LAeq_{(15\ min)}$ during daytime construction hours and background plus 10dB(A) during out of hours works will cause noise disturbances to residences and other sensitive receivers.

Construction activities will exceed NMLs at 55 receivers within the five noise catchment areas (NCAs) during construction hours of 7am to 6pm, Monday to Saturday and 105 receivers during out of hours works. Three residences would be highly noise affected with a noise level of 75dB(A), with the worst affected resident experiencing noise of 78dB(A).

Most construction noise exceedances occur during site establishment and construction laydown activities in NCA1 (which includes North Star village) as it affects the largest concentration of residential and commercial receivers. Site establishment and construction laydown is expected to take approximately six months and result in NML exceedances up to 14dB(A) for 28 receivers during standard hours and up to 24dB(A) during out of hours works. Noise level exceedances in NCA2 to NCA5, outside of North Star village will affect between one to four receivers during standard hours and 52 receivers for out of hours works at varying stages of construction due to the linear nature of the project.

A sleep disturbance assessment identified 89 receivers would experience exceedances above the 45 dBA sleep disturbance criterion, and 11 receivers would experience exceedances above the 65 dBA awakening reaction criterion.

Blasting

Blasting is proposed for excavation of material from borrow pits. The closest receivers to blasting would be 100 metres away. Blasting vibration impacts would be re-assessed once specific locations and depths are confirmed. Where blasting impacts are anticipated to exceed the vibration limits, the Proponent would reduce the charge size, ensure adequate blast confinement, avoid secondary blasting and establish a timetable to comply with ANZEC and Australian Standards regarding blasting. Residents within 2 km of the blasting would receive at least three days' notice before blasting.

Operational noise will impact some residential receivers above guideline levels

Operational airborne noise from train engine noise, wheel-rail noise, train horns and level crossing alarms will impact up to five residential receivers and exceed the *Rail Infrastructure Noise Guideline* (RING) (EPA, 2013) by 2040 when an estimated 21 trains per day will use the rail line (See **Table 17**).

The worst affected receiver, "Ohmi" (receiver 254050 see **Figure 9**), is approximately 50m from the rail line and a level crossing. It would experience noise up to 95 dBA exceeding the maximum noise criteria by 15dBA during the day and night. All five residential receivers would experience exceedances of the night-time average criteria by up to 14 dB and three would experience exceedances of the daytime criteria by up to 8dB (**Table 17**).

The Proponent has committed to at property mitigation on a case-by-case basis informed by technical advice and inspections during detailed design.

Table 17 Operational Rail Noise Impacts – Year 2040

Sensitive Receiver ID	Daytime: 7.00am – 10.00pm LAeq (15hour)		Night-time: 10.00pm – 7.00am LAeq (9hour)		Maximum noise event LAmax	
	Criteria	Modelled noise level	Criteria	Modelled noise level	Criteria	Modelled noise level
254027	60	55	55	**56**	80	80
254042	60	55	55	**56**	80	80
254050	60	**68**	55	**69**	80	**95**
254063	60	**60**	55	**61**	80	**85**
254096	60	**62**	55	**63**	80	**87**

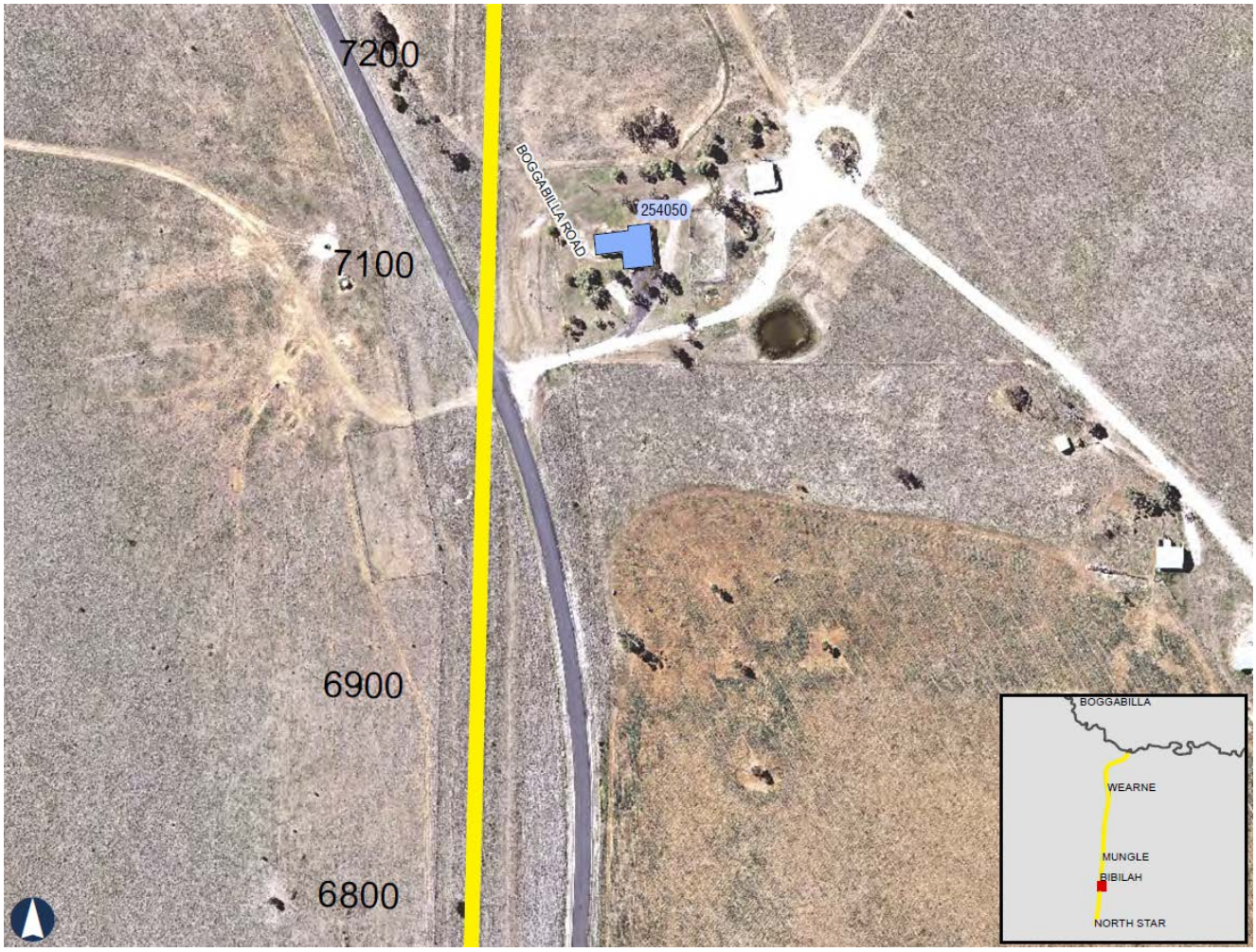

Figure 9 | Sensitive receiver 'Ohmi' (254050) location (Source: EIS)

Minimal impacts from the use of the accommodation camp

The accommodation camp is proposed to the northeast of the North Star Sports Club within NCA1, housing approximately 300 personnel during construction. It would include supporting infrastructure such as generators, air conditioners and pumping stations operating throughout construction of the project (**Figure 10**). During its operation a 1 dBA exceedance of night-time NML is predicted for three receivers. No sleep disturbance criterion is exceeded.

The Proponent has not identified any accommodation camp specific mitigation measures outside of the project's general 24-7 noise hotline and community consultation strategy.

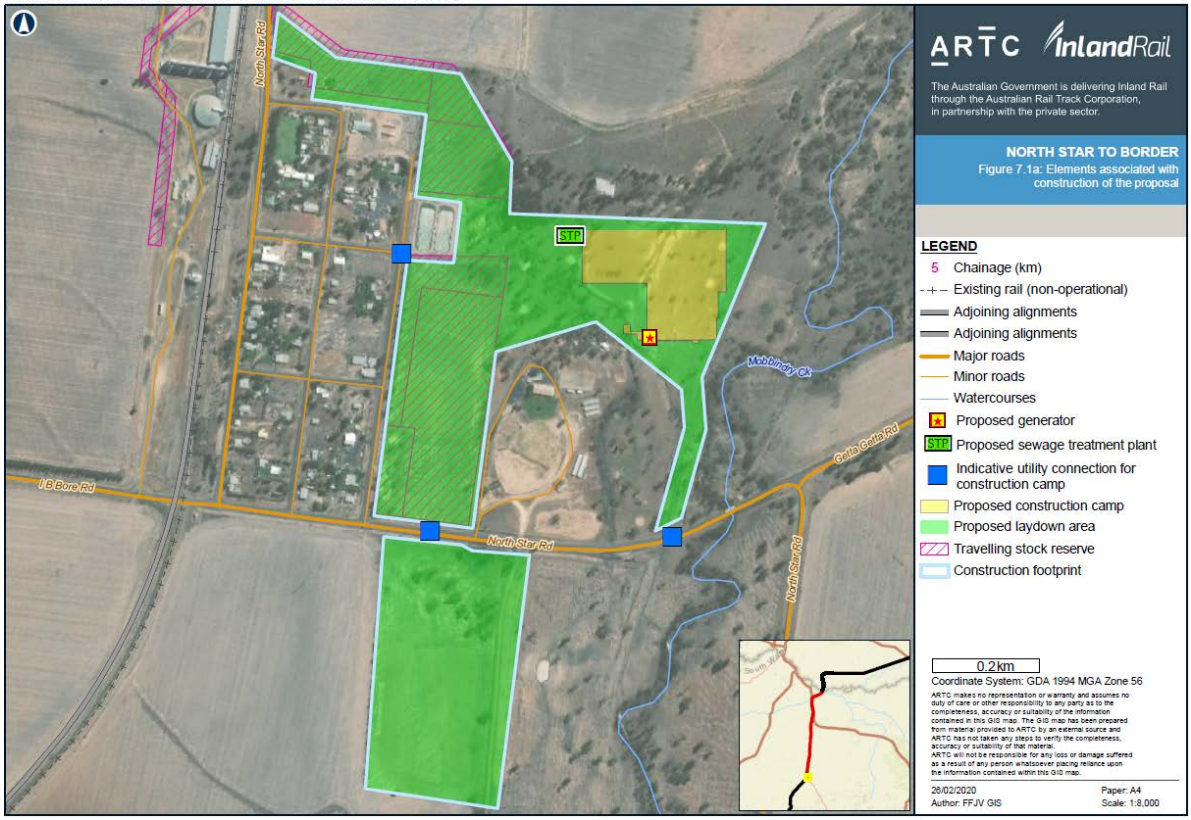

Figure 10 | Accommodation camp near North Star (Source: EIS)

Submissions and agency advice

Community, group and organisation submissions

Toomelah Local Aboriginal Land Council (TLALC) noted that the project would result in a moderate change to the noise environment.

TLALC requested further community engagement and operational noise and vibration testing within the Mission. This should be conducted at both day and night-time to simulate the 24 hour operation of the rail line.

The **Macintyre Floodplain Landowners'** submission raised concern about sleep disturbance. It noted the Proponent's assessment that receivers within 1 km of the alignment would experience noise above World Health Organisation European sleep disturbance guidelines.

Two community submissions raised concerns about noise and vibration impacts including impacts from sleep disturbance during rail operations and the Proponent's assumptions about building attenuation in response to sleep disturbance, ensuring appropriate mitigation measures considering the types of residences and climatic conditions, and that not all sensitive receptors had been identified. Submissions raised concerns specifically with noise and vibration impacts on the "Ohmi" residence given its location to the rail alignment and proposed level crossings to the property.

Community submissions also raised concern that residences constructed of weatherboard and timber and those that use evaporative air conditioning systems, may not be suitable for acoustic at property treatment.

Council submission

MPSC expressed no objection to extended construction hours if specific agreements are reached with the sensitive receivers. Council raised concern about the highly affected sensitive receivers and commented that they would require appropriate mitigation.

Government agency advice

EPA raised a variety of noise and vibration matters regarding sensitive receivers, rating background levels, proposed working hours, and the assessment of borrow pits.

Construction issues raised include vibration measurements, blasting criteria, noise characteristics, camp assessment and noise mitigation. Operational concerns included the rail noise and contours, validation, ground vibration, ground borne noise and mitigation.

Consideration

Construction noise compliance reflects the project's setting and can be appropriately managed

The Department notes that many of construction noise exceedances identified in the assessment reflect low background noise levels. NMLs are 45 dB(A) during the day and 35 dB(A) at night. These levels are conservative and are relatively easy to exceed with typical construction activity.

The Department acknowledges that these noise levels are unlikely to be experienced for the entirety of the construction period as the activities that generate the most noise such as rock-hammering, piling and use of concrete saws will only be used for some of the time. The noise assessment in the EIS represents the worst 15-minute period of construction activity and not ongoing day to day construction noise over an extended period of time. The Department further notes that due to the linear nature of the project, construction noise impacts are expected to be short term and isolated to individual receivers as the project stages progress through the rural setting.

The Proponent has committed to managing construction noise through its Construction Noise and Vibration Management Sub-plan which sets out how the environmental outcomes will be achieved through mitigation and management measures. Some of these measures include the siting of machinery, the use of shielding around noise generating activities, and at-receiver noise treatment for those receivers who are impacted by both operation and construction of the project. The Department is supportive of these measures which will provide the appropriate management of construction noise impacts.

Further, the Department has recommended conditions that require appropriate on-site management and use of the accommodation camp to minimise disturbance and impacts from its use to residents in North Star.

Extended construction hours balance construction efficiency and residential amenity

The proposed seven days a week 6:30 am to 6:00 pm Monday to Sunday construction schedule would accelerate the construction of the project which may potentially reduce the total time construction noise would impact rural residents and the North Star and Toomelah communities. It would also allow for efficient rostering of the construction workforce, many of whom will be drive-in drive-out workers.

The Department has considered the concerns raised by the EPA regarding justification and consultation with the community about extended hours, and notes that most of the alignment is on rural land where agricultural activities do not usually align with standard working hours. The Department notes similar recent project conditions along with the amount, and level, of disturbance to sensitive receivers, in reaching a compromise on constructions hours.

The Department considers it necessary to provide some respite for the proposed extended construction hours, in the interest of balancing construction efficiency with residential amenity. The Department has therefore recommended allowing extended construction hours of 6:30 am to 6:00 pm Monday to Sunday with construction ceasing every second Sunday provided that the community is consulted every three months about the schedule of works and likely mitigation measures to minimise impacts.

These extended hours would not be applicable to works at borrow pits or for the establishment of the accommodation camp as the Department considers the construction efficiencies of allowing extended hours for these activities would be marginal and would be outweighed by the amenity impacts they cause. The Department recommends these activities operate within the hours of 7:00 am to 6:00 pm Monday to Saturday, and at no time on Sundays or public holidays. Importantly, this does not limit the requirement for noise mitigation to reduce impacts at those residents. Further, works that are highly noise intensive are recommended to be restricted to the hours of 8:00 am to 6:00 pm Monday to Friday and 8:00 am to 1:00pm Saturday in continuous blocks not exceeding three hours each with at least one hour of respite between each block of highly noise intensive work resulting in exceedances of the NML at a sensitive receiver.

The Proponent has proposed to carry out some concrete pouring and impact piling works as OOHW. OOHW are often required for large infrastructure projects to perform critical works, oversized deliveries, and utility works, and for this project, the Proponent has justified OOHW due to the need to pour concrete in favourable climatic conditions, which may be at night during summer.

The Department acknowledges the Proponent's justification and the potential for 100 residences to experience some level of sleep disturbance above the sleep disturbance criterion and 11 of those likely to experience levels above the awakening reaction criterion. The Department does not consider it appropriate to allow concrete pouring and piling works without mitigation. Instead, and consistent with conditions for other linear infrastructure projects, the Department's recommended conditions allow for OOHW to be conducted in accordance with an approved EPL, an OOHW Protocol for works not subject to an EPL or through a negotiated agreement with the affected residence. The OOHW Protocol must identify the process for consideration, management, and approval of work which is outside standard hours of construction.

The Department supports relocation as an acceptable mitigation measure

Operational noise exceedances, above the RING trigger levels, are predicted to affect five residential receivers during the full Inland Rail operation in 2040. The project will significantly impact the residential receiver "Ohmi" during operation (receiver 254050). This house is located approximately 50 metres from the rail line and a level crossing (see **Figure 11**) and is also highly noise affected during construction. The estimated maximum noise level at this residence during operation is predicted to be 95 dBA. In 2040, approximately 21 trains per day are predicted to use the level crossing passing anytime of the day or night.

Figure 11 | visual impression of the level crossing near 'Ohmi' residence 254050 (Source EIS)

The Department considers this impact unacceptable and does not consider that typical at-property mitigation measures would achieve acceptable noise level reductions at this resident given the close distance to the level crossing, the requirement for trains to sound their horns at level crossings and the maximum noise level predicted that could occur at any time of the day or night. The resident's request to have their dwelling relocated is supported as the project is located in rural setting amongst large landholdings which make relocation a practical mitigation option. The Department understands that the Proponent has made an offer to relocate or purchase the residence in recognition of the impact. This approach is considered appropriate.

For other sensitive receivers impacted by operational noise above the RING trigger levels, the Department supports proposed at-property acoustic treatments including improvements to boundary fencing, acoustic glazing and façade treatments. However, the Department notes submissions' comments that some residences may be built to differing standards and out of materials that do not suit typical architectural treatment measures to provide adequate noise mitigation, and that many residents rely on evaporative cooling that requires windows to be open. The Department has recommended conditions requiring the Proponent consult with residents to determine and implement appropriate mitigation, as part of the recommended Operational Noise Verification Report, which will confirm expected operational noise based on the project's detailed design and measures to mitigate these impacts.

The project's expected operational noise based on detailed design would be confirmed in the Operational Noise Verification Report, along with mitigation measures. The Department has recommended a condition for this report. The Department also recommends the development of an Operational Noise Compliance Report (ONCR). The ONCR would confirm noise levels once the project is operational and identify if further mitigation measures are required.

6.5 Traffic, transport and access

The project provides significant regional and interstate transport benefits by facilitating greater capacity in the freight rail network. While vehicle numbers on the road network in the vicinity of the project will increase during construction, the capacity and performance of the network will not be significantly affected by the construction or operation of the project. Several level rail crossings providing both public and private access will be affected or closed. The Proponent will maintain access during construction and operation in consultation with landowners and upgrade existing level crossings to be retained to meet current standards.

During operation, there will be some delays at level crossing due to train frequency. These delays will be localised, infrequent and will not adversely affect road network performance or prevent stock movement.

Issue

The local public road network in the project area comprises national, State and local roads. The Newell Highway, Bruxner Way and North Star Road run north-south and parallel to the existing rail corridor in the project study area. The existing road network generally performs at a level of service (LoS) of A.

There will be temporary impacts on the local road network during construction

Construction will generate additional light and heavy vehicle movements on local roads, North Star Road and roads linking to the Newell Highway and Bruxner Way. Light vehicles will move construction workers to and from specific construction areas and heavy vehicles will be move between borrow pits and construction sites delivering fill material and removing spoil. Materials, including ballast, sleepers and concrete for the construction of the project, will also be transported by heavy vehicles.

Construction access to the southern areas would generally be from Croppa Creek and North Star Roads with access to the northern regions from Bruxner Way and Cunningham and Gore Highways in Qld (**Figure 12**).

Construction of the project would result in temporary traffic impacts to the local road network. The project is expected to generate up to 72 construction vehicle movements per day on the Newell Highway during the first year of construction, reducing to 16 construction vehicle movements per day on the Gwydir Highway, New England Highway and Summerland Way in the last two years of construction.

The greatest impact would be from the transport of fill during the first two years of construction, and the movement of workers, which would consistently impact traffic over the entire duration of the project. In the latter two years of construction, quarry transport from the borrow pits would have the greatest impact on traffic volumes.

Potential delays likely during construction and peak harvest season

The network experiences seasonal variation in activity with increased heavy vehicle traffic during harvest season from trucks transporting grain and farming machinery moving between properties. It is likely that increased construction traffic on the network would impact travel times, particularly during harvest season, where there is the potential for delay of vehicles and trucks transporting grain. This impact would be limited to the construction period and is not predicted to change the level of service along any of the proposed construction traffic routes. All roads are expected to maintain a LoS of A with sufficient capacity to accommodate the increased construction traffic and harvest related trucks and machinery even with delays or closures of level crossings. The Proponent has committed to ongoing consultation with relevant

Councils, police, emergency services and affected landowners/occupiers to inform of likely traffic disruptions.

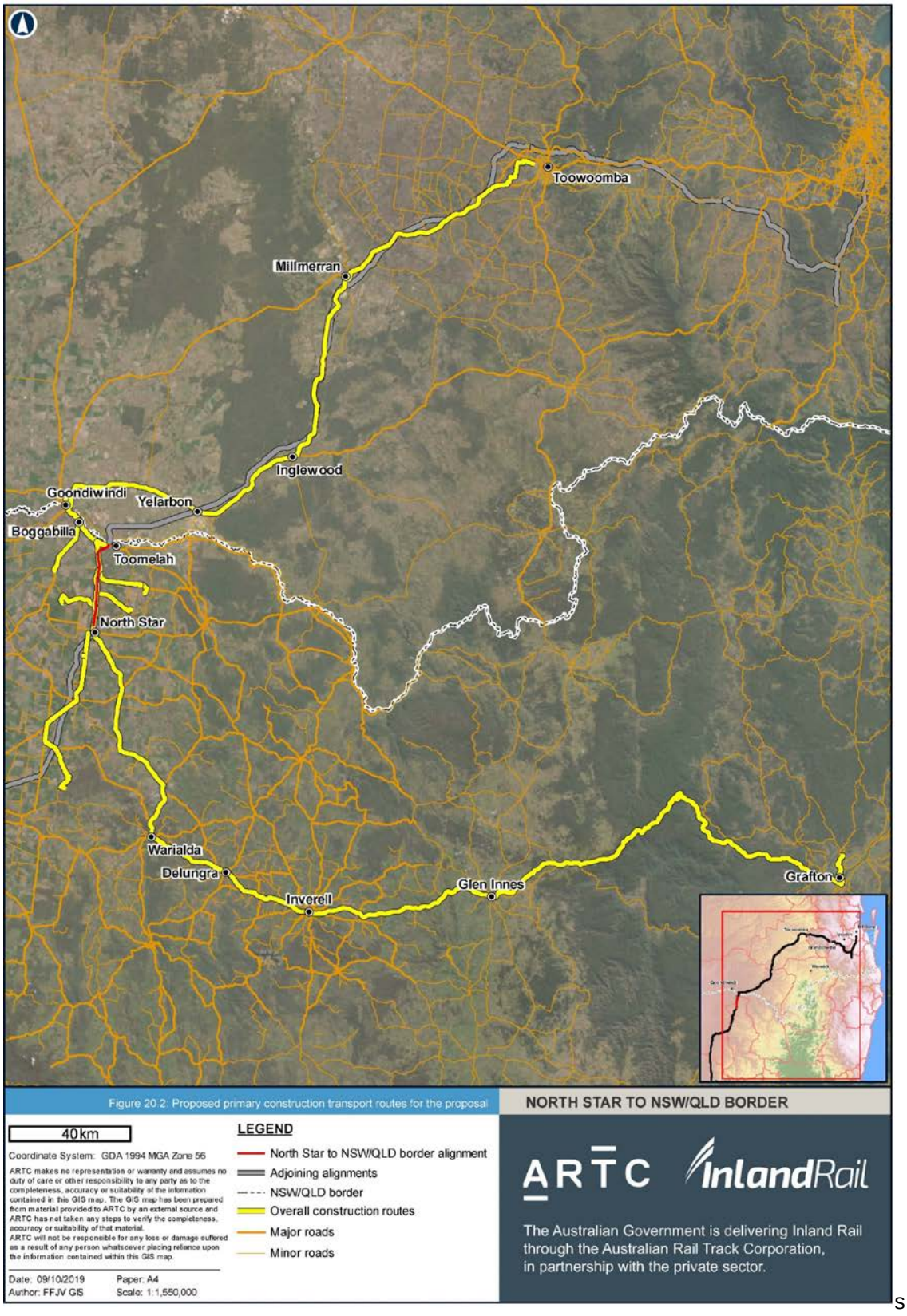

Figure 12 | Proposed construction traffic routes for the project (Source: EIS)

Changes to existing rail crossings

The proposed rail alignment would result in 42 road/rail interface locations, comprising 18 public and 24 private road/rail interfaces. The Proponent has sought to minimise the number of level crossings along the Inland Rail route consistent with the Office of the National Rail Safety Regulator's position to remove level crossings, where possible, and limit the creation of new level crossings unless unavoidable. The Proponent has formulated the preferred treatment for each interface being:

- the upgrade of eight level crossings
- the grade separation (rail over road) of eight interfaces (four of which are bridges over public roads, three are rail bridges over private creeks and one over a private culvert)
- the closure of 26 level crossings due to consolidation, redundancy, or road diversion/realignment.

Of the eight retained level crossings, four are public level crossings and four are private level crossings. The private level crossings will all remain passive. The proposed treatment of the public level crossings is outlined in **Table 18**.

Table 18 | Proposed treatment of public level crossings

Interface ID	Roads authority	Location	Proposed treatment
270-3-P-2	Gwydir Shire Council	North Star Road	Active
270-7-P-3	Moree Plains Shire Council	North Star Road	Active
270-5-P-1	Gwydir Shire Council	Forest Creek Road	Passive
270-4-P-0	State of New South Wales	Unnamed Road (occupational track used as a travelling stock reserve)	Passive

The two public active level crossings at North Star Road would be controlled by boom gates or flashing lights. Two public passive level crossings at the road/rail interface location at Forest Creek Road and an unnamed road used as a travelling stock reserve would be controlled by a 'stop' or 'give way' sign. The Proponent has committed to ensuring the safety of level crossings by implementing warning signage, sufficient stacking, sight distances and lane marking in compliance with relevant national standards. With these mitigation measures, safety risks are anticipated to be unlikely with a medium risk rating. The Proponent has committed to undertaking road safety audits at level crossings in accordance with relevant legislation and guidelines.

In assessing the impact of level crossings on operational traffic delays, the Proponent used 2040 forecasted traffic figures and accounted for increased vehicles during harvest season in their traffic counts. The Proponent's assessment predicted that level crossings would lead to delays of up to 122 seconds, which would occur once or twice per hour assuming two level crossing closures per peak hour. This equates to an average delay across the entire day of approximately 3.3 – 4.7 seconds at level crossings, with roads maintaining an LoS of A in the AM and PM peaks.

Submissions

Community submissions

Key traffic, transport and access issues raised in public submissions include:

- traffic data do not accurately reflect service volumes particularly during harvest periods
- the proposed rail alignment will disrupt property access, business productivity and the management of livestock
- maintenance of access to private property during construction
- retention of private level crossings to ensure ongoing daily operations, particularly farming
- the safety and delay implications of level crossings
- the need for extensive consultation during construction to enable the crossing of public roads and private farm access, particularly during harvest periods.

Government agencies advice and local council submissions

TfNSW provided comments relating to:

- proposed bridge clearance heights and the need to achieve 6.5m clearance of the bridge over Bruxner Way
- adjustment of rail alignment at Bruxner Way to reduce impacts on the road alignment
- confirmation of the crossing loop location
- potential short stacking at level crossings.

MPSC raised issues regarding the safety and stacking distances calculated at level crossings and made the following suggestions:

- increasing bridge clearance at Bruxner Way to 6.5m in line with other projects
- conditioning full dilapidation surveys on local construction routes
- realigning the rail/road corridor where short stacking is likely to occur.

GSC raised the following concerns:

- use of traffic data from a drought period representing lower traffic counts compared to normal seasonal traffic movements
- impact of movement of quarry materials on local roads
- the need to revaluate queue lengths for heavy vehicles
- the potential for realignment of the rail line to remove level crossings due to safety and operational efficiency concerns.

GRC (Qld) raised concerns regarding:

- impacts to traffic on local roads from concrete and material supply to batching plants
- the assessment method for impacts to the local road network
- the need for operational impact assessment to consider future impacts, such as natural disaster recovery works and major replacement works
- cumulative pavement impacts.

Consideration

Construction traffic impacts are temporary and localised

All construction routes would continue to operate within the Level of Service (LoS) A threshold of 250 vehicles per hour, including seasonal variations in truck movements. Despite this, the Department acknowledges that construction will create an increase in vehicle movements on some local roads in NSW and Qld, which are typically lightly trafficked rural roads. Increases would be most significant in the first year of construction where local roads are predicted to experience an average traffic increase of 172 percent. Whilst some local roads would experience a significant percentage increase in traffic, this can be attributed to the very low existing traffic volumes along these routes. Traffic increases will change road conditions for existing users and may affect actual or perceived road safety.

To ensure that road users are aware of changes to road conditions and that the LoS of the local road network retains its predicted levels, the Proponent has committed to preparing a Construction Traffic Management Plan, traffic control plans and undertaking ongoing consultation with Councils and landowners. The Department recommends a condition of approval requiring the Construction Traffic Plan to include measures to minimise impacts on seasonal traffic and inform road users of changes to traffic conditions. As a result, the Department considers that the impacts of the additional construction traffic on road user experience and the level of service of the road network during the peak harvesting periods can be appropriately mitigated.

Submissions from MPSC and GRC (Qld) raised concerns regarding the cumulative impacts of construction vehicle movements on the pavement strength of local roads. Effects on road pavement would be addressed by the Department's recommended conditions of approval to ensure road dilapidation surveys are conducted before and after construction on all construction routes and rectification works occur in the case of damage. Further, the Proponent proposes to maintain roads used for construction to a condition similar to pre-construction.

Reductions in level crossings supported

The Department supports the rationalisation of level crossings in support of Office of the National Rail Safety Regulator's position on level crossings from 42 to eight. The Proponent has committed to reviewing the operation of level crossing treatments once the project has commenced operation to confirm that the level of protection provided continues to be appropriate for the surrounding traffic conditions and safety of users. The Department supports this commitment and strengthens the review process by requiring the Proponent to undertake performance reviews in 2028 and 2038, following the commencement of entire Inland Rail operations. These performance reviews would ensure that level crossing treatments are appropriate and effective and that additional measures are implemented if residual adverse traffic impacts are identified.

Delays at rail crossings would cause minimal local delays

Concerns raised about the short stacking methodology and its consideration of vehicle machinery and stock movements used in its assessment by TfNSW were resolved through consultation with the Proponent and TfNSW. The Department is satisfied that level crossing delays would not impact road network performance and that impacts from delays are likely to be localised and only affect a small number of vehicles. Residents are unlikely to experience a delay at every attempt to cross the rail line, with the assessment considering trains would operate at an average rate of approximately two trains every hour crossing the level crossing during peak hour.

To maintain the safe and efficient operation of the road network, the Department has recommended the Proponent prepare a Public Level Crossing Treatment Report and Private Level Crossing Treatment Report. These reports would outline the location of level crossings, identify crossings to be closed or upgraded, describe the treatments to be implemented, outline details of consultation and include measures to avoid potential short-stacking at public level crossings to avoid obstructing important intersections.

The potential impacts of the crossing loop would be appropriately mitigated

As the exact location of the crossing loop remains to be confirmed, community submissions raised concerns with the uncertainty of its impacts to access. The Proponent is continuing to refine the exact location of the crossing loop as part of a program wide system of optimising crossing loop locations and has advised it will remain within the permanent footprint of the project. To minimise any potential access impacts, the Department has recommended a condition to ensure no part of the crossing loop would cross over any driveway, private road or public road unless agreed to in consultation with landowners.

New bridges and road alignment

The project seeks to implement grade separation (rail over road) at Bruxner Way and Tucka Tucka Road. Several submissions on the EIS raised concerns regarding the proposed 5.4m clearance over Bruxner Way, considered insufficient to allow over-size and over-mass loads including agricultural machinery. This clearance would also place restrictions on the road authority to raise the road to improve flood immunity or basic re-sheeting projects. TfNSW has advised that a height of 5.8 m is considered sufficient to accommodate heavy vehicles and truck heights. Through negotiations with TfNSW, the Proponent has agreed to a clearance height of 5.8 m. The Department has reinforced this commitment through its recommended conditions of approval.

To minimise the number of level crossings, the Proponent has sought to realign Bruxner Way. Several submissions raised concerns about the safety of this realignment for road users given it proposes to introduce three new curves in a currently straight 100km/h speed environment. As a result, the Department has recommended a condition to ensure the realignment of Bruxner Way is designed and constructed to safely accommodate vehicle speeds of 110km/h in consultation with the relevant road authority.

6.6 Land use and property access

Issue

Outside the North Star village, the project is surrounded by large landholdings used for cropping, stock and roads. The project would result in property acquisition and changes to:

- land use including use of agricultural land
- agricultural practices
- property access and utilities
- the Travelling Stock Reserves and informal stock routes.

Construction activities require temporary changes to property access

Construction works along the project rail corridor would result in minor disruptions to property access due to changes to level crossings and temporary closures of individual and shared driveways. Access disruptions during construction would be temporary and would generally be time-limited to when construction is in the affected area and discussed with the landowner to limit impacts.

Operation of the project would change established patterns of access and stock movements

As the project crosses greenfield areas and reuses the non-operational Boggabilla rail corridor, which has been closed for nearly 50 years, its operation would impact established patterns of property access and stock movements. Several landowners own multiple land holdings on different sides of the existing and proposed alignment. The project would impact formal and informal access to these properties from surrounding roads, and across different land holdings. This would particularly affect the movement of livestock and agricultural machinery.

Although informal level crossings provide convenience to private landowners to move stock and machinery, the Proponent has indicated that they will not be retained as part of the project as they are not constructed in accordance with standards that aim to minimise the risk of incidents at rail crossings. Private level crossings will be removed, consolidated with other existing and/or new crossings to maintain access or resolved through road realignment or diversion. The proposed changes to existing private level crossings and property access would impact five private landholders and have the potential to disrupt their farming operations.

The project would also impact travelling stock routes as the previously non-operational brownfield section of the rail alignment can no longer be used for stock travel. There are four travelling stock reserves (TSR) that cross the proposed rail alignment between North Star and Toomelah. Of these, two TSR interfaces would be grade-separated, one would be consolidated into an existing crossing, and one would become a passive level crossing where the stock will have to wait before crossing if a train is passing.

Submissions

Community submissions

Matters raised in community submissions include:

- movement of stock and vehicles for properties severed by the alignment
- access for properties landlocked as a result of the project
- maintenance of access between farms and paddocks impacted, severed or sterilised by the project
- need to design stock crossings with holding areas and contact details for real time train locations
- access to travelling stock routes and consequences for farming operations
- stock and heavy machinery creek crossing at Mobbindry Creek bridge must be reinstated
- reduction of access to one landowner's holdings from 10 points to three
- rail corridor fencing must be suitable for livestock
- request a mediator to determine any disagreements for access arrangements between landowners and the Proponent.

Consideration

Temporary access will be provided during construction in consultation with affected landowners

During construction, the Proponent has committed to maintaining property access with suitable alternative access arrangements provided where required, and for affected landowners to be consulted in advance regarding these alternative access arrangements. The Department has reinforced and strengthened these commitments through recommended conditions that require temporary alternative road and level crossing access be agreed in consultation with the landowner.

The project would affect property access and farm operations

The Proponent is re-establishing rail operations on an existing rail corridor and introducing a new rail line. Access to properties will change with the closure and consolidation of formal and informal crossings, which will affect the movement of vehicles, farm machinery and stock. Community submissions raised concerns with property severance impacts resulting in isolated or sterilised parcels of land, potentially impacting the economic viability of farming operations and restricting internal movements and access to higher ground during flood events. The Department recognises the concerns held by landowners in relation to property access and changes to agricultural management practices and accepts that many of the informal crossings, created when the rail line was not operational, will be closed or consolidated. This is consistent with the NSW Government's *Level Crossing Closures Policy*, which seeks to reduce the number of level crossings.

To minimise impacts on access to and within affected properties and to ensure convenient access appropriate to their needs is retained, the Department has recommended a condition requiring consultation with landowners to identify all level crossings which traverse the project and how the project would impact them and treatments to be implemented for retained and consolidated level crossings. The Department has also recommended a condition requiring the Proponent to develop and maintain a real-time train location service that landowners could use to manage safe stock crossing of the rail line.

The Department is satisfied with the Proponent's proposed treatment of travelling stock reserves, noting that the Proponent has consulted with NSW Local Land Services and NSW Crown Lands about the project's impacts to TSRs and has committed to maintaining their connectivity, where practicable, in consultation with these agencies.

Individual Property Management Plans will document measures to mitigate impacts to farm operations in consultation with impacted landowners

The Proponent has committed to consulting with impacted landowners to ensure farm operations are maintained. The Proponent has also committed to preparing individual property management agreements in consultation with landowners to manage impacts to fencing, access, farm infrastructure and the relocation of impacted structures through the detailed design phase. The Department recognises that each landholder will likely have different access and farm operation requirements and that mitigation measures will vary depending on the nature of their agricultural operations. In recognising landowners need for surety that the project would not significantly impact farm operations, the Department has reinforced and strengthened this commitment through its recommended conditions of approval. The Department has required the Proponent to consult with landowners on mitigation for access and impacts to farm operations and to document the results of this consultation through Individual Property Management Plans.

The Department agrees with public submissions' suggestion of a mediation mechanism and has recommended conditions to require a dispute resolution mechanism. Disputes in relation to property and infrastructure impacts during construction can be resolved through the procedure and mechanism for resolving and mediating disputes or by applying the procedures set out in the *Land Acquisition (Just Terms) Compensation Act 1991*.

6.7 Aboriginal cultural heritage

The project falls within the country of the Kamilaroi/Gamilaraay language group of northern NSW and is within the administrative boundaries of the Toomelah Local Aboriginal Land Council (TLALC). Registered Aboriginal Parties (RAPs) identified Aboriginal cultural heritage as being of high social/cultural value and requested that, where possible, impacts to heritage be avoided.

The project would directly impact 22 artefact scatters, 12 isolated artefacts, nine culturally modified trees, and two intangible sites (watercourses and plant resource areas). The project would indirectly impact seven culturally modified trees and one ring tree (a tree with branches forming a ring created either naturally or culturally and may symbolise a border or point of interest).

The Proponent committed to implementing several measures to manage and minimise the extent of impacts, including avoiding sites, where possible, salvaging Aboriginal stone artefacts and cultural trees where appropriate, archival recording, monitoring for impacts and implementing avoidance protocols, and an excavation and unexpected finds procedure. The proposed mitigation measures will be developed with the RAPs.

Issue

Aboriginal cultural heritage has been identified within the project area

53 identified Aboriginal objects or sites (including stone artefacts, and culturally modified trees) were located within the survey area representing links to the cultural landscape and the local Aboriginal people. The general locations of Aboriginal cultural sites are shown in **Figure 13**.

The scientific value of the archaeological sites has been assessed as low through to moderate and high.

In addition to the archaeological sites identified, the TLALC and RAP field representatives identified intangible heritage in the form of 16 plant resources traditionally used by Aboriginal people as bush foods and medicines. The plant resources were identified within the disturbed railway easement corridor, and in some cases were growing within the disused rail line.

Culturally important landscape features, such as the Macintyre and Dumaresq Rivers, Boobera Lagoon and minor watercourses/lagoons surround and occur within the project area. Five watercourses considered as intangible heritage would be crossed by the rail alignment. These are the Macintyre River, Mobbindry Creek, Back Creek, Forest Creek and Whalan Creek.

Direct and indirect impacts would occur to tangible and intangible cultural heritage with mitigation proposed

Construction would result in the removal or partial removal (direct impacts) of 14 sites, assessed as high scientific value, including multiple artefact scatters and three culturally modified trees, and remove or partially remove four artefact sites with a moderate scientific value.

Indirect impacts, from vibration, dust, and potential changes to water flow, are likely to impact four culturally modified trees, a recently carved tree, and a ring tree assessed as having high scientific value.

The remaining 20 sites consist of artefact scatter or isolated artefacts on land that has been disturbed by vegetation clearance, ploughing or the existing rail corridor, and they have been assessed as low scientific value. These sites will be directly and indirectly impacted.

The project would have no impact on three sites being one artefact scatter, one isolated artefact and one culturally modified tree, and no impact on one carved tree site (with the tree previously removed to a museum in the 20th Century).

The Proponent has committed to avoiding all culturally modified trees as far as practicable. Where avoidance is not achievable and salvage is appropriate, the Proponent would consult with RAPs to develop a suitable salvage methodology and agreement on a keeping place.

The Proponent proposes to manage Aboriginal heritage sites with an Aboriginal Heritage Management Plan (AHMP) framework to be developed in consultation with the RAPs and for salvaging of impacted sites to be in partnership with the RAPs. Indirectly impacted sites would be managed under the AHMP framework, with clear guidance on monitoring for impacts and avoidance protocols.

The Proponent seeks to avoid disturbance of two mature bumble tree specimens (cultural plant resources) near the alignment and would consult with the RAPs and the TLALC about maintaining access to plant resources that are located outside the existing rail corridor and construction footprint, where this does not present a safety risk.

The ACHAR anticipates minimal impacts during construction to the five watercourses, considered intangible heritage, that the rail alignment is to cross. Excluding Whalan Creek and the Macintyre River, all other watercourses have been previously impacted by the existing railway line. The Proponent has committed to managing construction impacts to watercourses which is discussed further in **Section 6.3**.

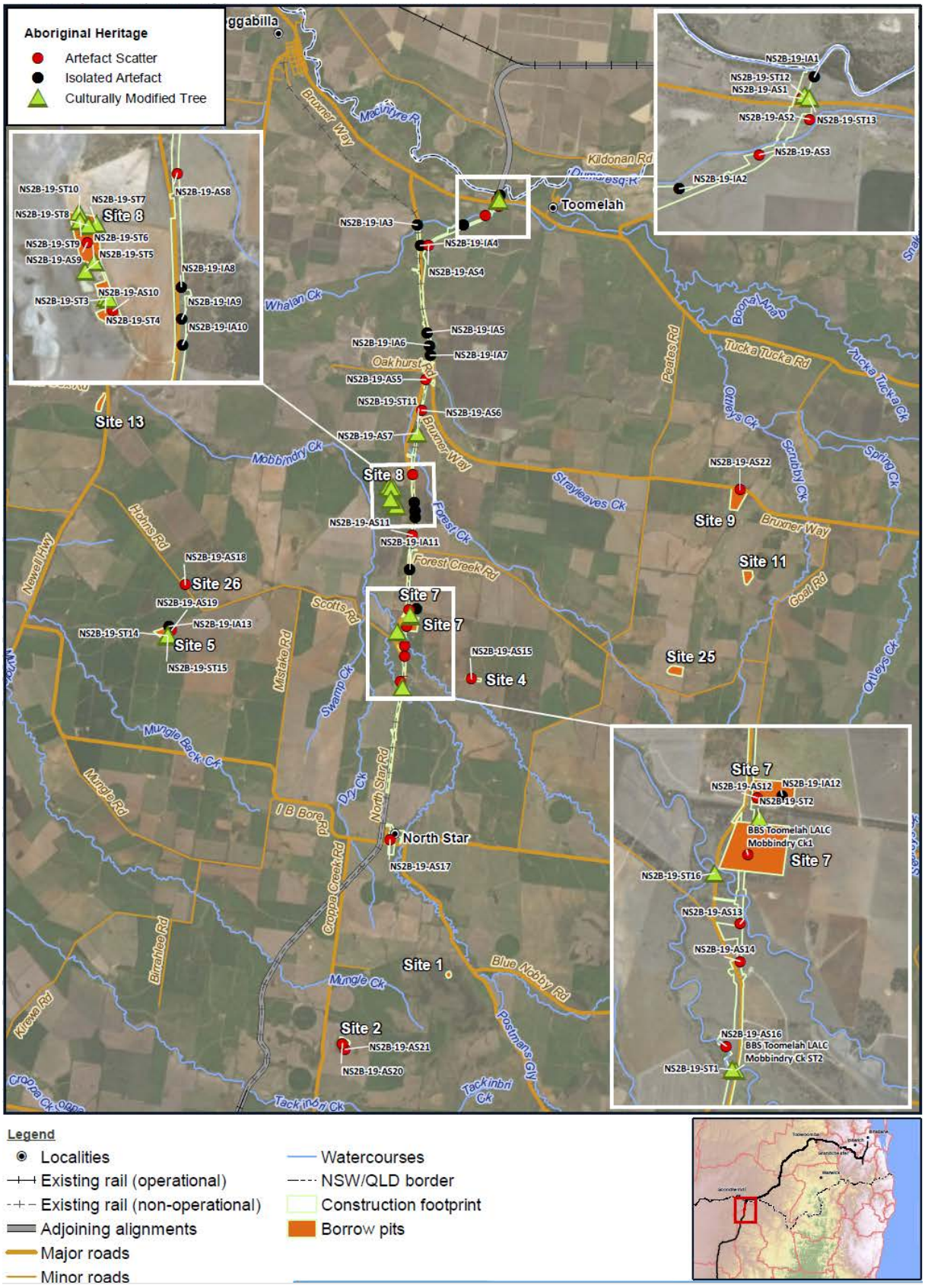

Figure 13 | Aboriginal heritage sites in the vicinity of the project (Source: EIS)

Submissions

Community and group submissions

TLALC supports the ACHAR and requests to have active involvement in all stages of the mitigation of the cultural heritage places that have been identified within the rail corridor. The TLALC requests artefacts be kept on country, either in storage for education purposes or returned to country. Further, they request that the Proponent be open and transparent regarding future clearance work.

A **local landowner** commented on Aboriginal heritage. It was requested that any Aboriginal artefacts found along the Inland Rail corridor be moved to the Aboriginal site known as "Scar Tree" on the Mobinbry TSR Reserve and that no permission is granted for searching of artefacts outside of the corridor, presumably on their land.

Council submissions

MPSC noted that local Aboriginal people should be at the heart of all matters relating to their cultural heritage with direct involvement and engagement above the minimum statutory requirements. Council also noted that the Aboriginal Heritage Management Plan (AHMP) framework, to be developed in consultation with RAPs, would manage impacts to the Aboriginal heritage sites.

Government agency advice

Heritage NSW raised no issues with the proposed impacts and mitigation measures. The proposed Cultural Heritage Management Plan (CHMP) was considered to be reasonable and proportionate to the archaeological finds and impacts and Heritage NSW acknowledged its acceptability to the RAPs.

Heritage NSW also noted that the proposed alignment avoids the significant cultural areas of Boobera and Punbougal Lagoons and the Morella Watercourse connecting both lagoons.

Consideration

Harm to Aboriginal cultural heritage sites and intangible cultural heritage would be minimised and managed in consultation with RAPs

The Department supports the involvement of RAPs and TLALC in ensuring impacts to Aboriginal heritage are minimised and managed appropriately, and notes the RAPs general acceptance of the proposed management approach. This includes the Proponent's commitment to avoid all culturally modified trees, as far as practicable, and involving the RAPs where avoidance is not possible.

The Proponent acknowledges and supports all comments from the RAPs and the TLALC, except for a request for test pitting at the accommodation camp in North Star. The Proponent advises that this area has been significantly disturbed through land clearance and levelling for playing fields and paddocks and the likelihood of finding appreciable tangible heritage at this location is low. The Department notes that Heritage NSW raised no issues with this proposed approach and considers that the proposed unexpected finds procedure including the requirement to notify RAPs and Heritage NSW of a find during construction is appropriate for this location.

The Department has recommended a condition requiring a Construction Heritage Management Plan to further refine mitigation measures in consultation with the RAPs. The Department considers that while harm and disturbance to cultural heritage is unavoidable, the proposed mitigation measures for how harm

to Aboriginal sites would be avoided and/or mitigated in consultation with the RAPs is reasonable and proportionate to the archaeological finds.

Continued access to culturally significant plant resources and watercourses is required

The Department supports continued consultation with the RAPs and TLALC and for the collection of culturally significant plant resources impacted by the project prior to construction.

The TLALC and RAP field representatives identified intangible heritage in the form of 16 plant resources traditionally used by Aboriginal people as bush foods and medicines, including warrigal greens (*Tetragonia tetragonoides*) and winter apple (*Eremophila debilis*). Easy access to these food resources was highlighted as an important aspect of the social significance of the publicly accessible components of the existing railway line. The assessment advises that RAPs identified that when community members would travel to neighbouring towns using the North Star Road, they would collect certain species such as Eurah/Euraba (*Eremophila bignoniiflora*) to give to relatives for their personal use. Likewise, the bumble tree (*Capparis mitchellii*) was singled out as an important women's business plant resource. The Proponent's consultation identified mature specimens of this tree as being of high cultural significance to local Aboriginal women.

The Proponent has committed to maintaining access to plant resources located outside the existing rail corridor and construction footprint, where this does not present a safety risk. Further, the Proponent has committed to collecting local vegetation, seeds and cuttings for propagation and revegetation.

To reinforce the Proponent's commitments, the Department has recommended a condition to ensure that consultation with RAPs and TLALC is undertaken to identify food resources and actions, including the collection, propagation and replanting of traditional plant resources in areas that allow for unrestricted safe access to these resources, prior to the commencement of construction. A further condition would require consideration of the use of traditional plant resources collected before construction in vegetation used in rehabilitation and landscaping. The Department is satisfied that these conditions would adequately minimise long-term impacts to local Aboriginal food resources.

The Department is satisfied that long-term impacts to watercourses and their intangible heritage would be minimal as the project would not impact on long term access to the watercourse or resource for Aboriginal people, nor does the project involve a permanent take of water from these watercourses.

6.8 Visual impacts

The project will be visually prominent in a relatively flat, sparsely populated rural and agricultural area. While most visual impacts are minor, the Macintyre River viaduct, which passes over the Macintyre River and Tucka Tucka Road, will introduce a high level of visual change to the surrounding environment. The Department has recommended conditions of approval to manage and mitigate the visual impacts from large elevated sections of the rail alignment, the rail bridge over the Macintyre River and for the rehabilitation of borrow pits.

Issue

The Macintyre River viaduct will be visible in Toomelah and surrounding residences

High visual impacts would result from the 1.75 kilometre Macintyre River viaduct which passes over the Macintyre River and Tucka Tucka Road. The viaduct will be visible to passing motorists, including

Toomelah residents and local landowners. While the main residential area of Toomelah is situated 2.5 km away from the viaduct, the scale of the viaduct could create a visual barrier between Toomelah and surrounding areas.

Figure 14 | Artist's visualisation, Tucka Tucka Road, rail bridge looking north-eastly direction (access road to Toomelah) (Source EIS)

Other aspects of the project have lower visual impacts

The Proponent has assessed other visual impacts as low to moderate. The Bruxner Way rail bridge (114 m) was assessed as having a moderate visual impact due to the transient nature of the views by passing motorists (see **Figure 15**). The rail infrastructure has also been assessed as having moderate impact looking north west of North Star, given the considerable permanent change to the landscape and proximity to residents of North Star. The proposed alignment in this location follows the existing rail corridor.

Figure 15 | Artists visualisation, Bruxner Way road over rail bridge (Source EIS)

Visual impacts from the upgrade of eight existing bridges were considered to be low as they are located at small creek crossings with no surrounding receivers, are not elevated, and are naturally screened by surrounding vegetation.

Other visual impacts include those from level crossings, 10 river or creek bridges and two rail over road bridges. During construction there will be temporary visual impacts from stockpiling, site offices, fencing and other small construction associated items along the alignment.

Most borrow pit sites are already in use and located in isolated areas

The project will use 11 borrow sites to remove 1.5 million cubic metres of general and structural fill and ballast for the project. Of these, 10 are existing gravel pits on farms and located in rural areas.

Submissions

Community, group and organisation submissions

The **NSW Macintyre Floodplain Landholders** note the limited number of viewpoints considered by the Proponent, none of which are on private property. They claim that the Proponent failed to carry out a proper visual assessment.

Two community submissions raised concerns regarding visual impacts in the greenfield section of the project. One, an owner of a seedstock business, expressed concerns that their impact was understated in the EIS, and that the project would reduce the visual amenity for prospective clients. The other submitter stated that the general aesthetic of having a greenfield track crossing their property will reduce property values.

Council submission

MPSC raised concern that trains with double-stacked containers would be a prominent visual impact. Further concern was raised of high visual impacts from the rail bridges across the Macintyre River and Tucka Tucka Road.

Consideration

There will be visual impacts from the viaduct, bridges and embankments

The project will have varying visual impacts to the project area, with the Macintyre River viaduct and embankment in the Whalan Creek floodplain changing the rural landscape close to the NSW and Qld border. Other areas of the project will be built along the existing Boggabilla rail corridor resulting in a lesser magnitude of change. The Department recognises that the visual impacts assessed in the EIS reflect the relatively flat landscape of the area and understand that some receivers will have a heightened visual impact due to the changing environment.

The Department notes the Macintyre River viaduct will impact the landscape and setting of the river, which has landscape and cultural significance to the Aboriginal population of Toomelah and Boggabilla. The viaduct's crossing of Tucka Tucka Road, the road access into Toomelah, will also cause visual impacts by forming a barrier to the community. The Department acknowledges these impacts and notes that the viaduct also provides an opportunity for collaboration with the TLALC to consider opportunities for interpretation, including the use of Aboriginal designs, patterns and motifs or other appropriate visual interpretations on or adjacent to the project. A condition is recommended that requires consultation with the TLALC and the local community to consider opportunities for visual interpretations that include the use of Aboriginal designs, patterns, or motifs. The Department considers this will contribute to mitigating this impact.

The Department also acknowledges the concerns raised in submissions from the NSW Macintyre Floodplain Landholders and affected landholders about impacts to their properties and the lack of viewpoints across the project, particularly from the point of view of residences. The Department notes that the viewpoints selected in the assessment, although few, are spread out evenly across the project and are reasonably representative of the potential impacts. While the Department considers that

additional viewpoints from private properties would have provided greater clarity about impacts on those properties, the selected vantage points are representative enough to understand the impacts on the broader landscape.

The Proponent's visual impact assessment has categorised most impacts as "negligible" or "low", with impacts to North Star and in the greenfield section (Bruxner Way bridge, embankment through Whalan Creek and Macintyre River viaduct) as "moderate". The Department considers these categorisations underestimate the project's impacts. The rail embankments and bridges are on average up to two metres high and are more than seven metres high through parts of the Whalan Creek floodplain. These structures will be prominent in the flat landscape compared to the existing rail alignment, which is generally at ground level.

This understatement of impacts does not however affect the Department's conclusion that the project's visual and landscape impacts are a necessary function of the project's flood immunity and can be reduced subject to appropriate mitigation. The Department recommends a condition requiring a Visual and Landscape Impact Management Plan, prepared in consultation with landholders and councils, that includes landscaping mitigation for all residences with a view of the project within 100 m of North Star and 500 m elsewhere. While the plan would apply to a broad section of the project alignment, it is consistent with the Landscape and Rehabilitation Plan proposed by the Proponent and proportionate to the impact.

The Department also notes that visual impacts for "Ohmi", the resident identified as being highly impacted by noise would be reduced if the residence is relocated as requested by the owner. The Department supports the offer made by the Proponent, for either the relocation or purchase of the residence.

Borrow pits will have a low visual impact and can be rehabilitated

The impacts from land reforming, vegetation clearing and rehabilitation after use are expected to be minimal as the sites are already in use and in isolated locations on rural properties. All Borrow sites are located on private property and landowners have been consulted throughout the design phase.

Borrow Site 2, a new site, has the potential to provide material for the project and if used will result in localised clearance of vegetation and earthworks. Visual impacts from this site are expected to be minor due to its distance from nearby public roads and screening by topography.

A Rehabilitation Strategy prepared for the sites with the objective of returning borrow pits to self-sustaining, safe and stable landforms, with appropriate native and low maintenance vegetation is acknowledged. The Department has recommended a condition requiring the preparation of a Borrow pit management plan to detail the management and rehabilitation of each borrow pit, including future landform landscaping and revegetation, and measures to manage ongoing environmental impacts.

Section 6.3 biodiversity considers the biodiversity impacts, management and rehabilitation of the Borrow sites.

6.9 Social impact

Issue

The project will have significant impacts upon affected communities and individuals

The construction and operation of the project will have social impacts and benefits for individuals and communities along the alignment. These changes will affect individuals and communities' relationship to cultural values, surroundings, personal and property rights, and employment and economic opportunities. The Proponent's Social Impact Assessment (SIA) categorises many of the project's impacts as "extreme" without mitigation and "high" with mitigation. Social impacts of the project will be experienced by three broad groups:

- Aboriginal people in Toomelah and Boggabilla
- The North Star community
- Agricultural landowners along the brownfield and greenfield sections.

The Department considers that social impacts can be mitigated through the development of a Social Impact Management Plan with the involvement of the affected community and supports the Proponent's commitment to ongoing consultation.

Both negative and potentially positive social impacts are likely for local Aboriginal people

The project is in an area with cultural significance to the Kamilaroi people and will impact Aboriginal people in Toomelah and Boggabilla negatively and potentially positively. Toomelah is an Aboriginal community on the Macintyre River two km from the project with a population of approximately 200-300 people and is a former Aboriginal reserve and mission. Boggabilla is located approximately 10 km from the project. It has a population of approximately 900, of whom 60 % are Aboriginal.

The rail line will be on a viaduct as it passes Toomelah over Tucka Tucka Road and the Macintyre River affecting the visual setting for recreational and cultural uses of the river. Its crossing of Tucka Tucka Road, the main road access to Toomelah, would be visually prominent in a relatively flat landscape and may create a visual and symbolic barrier to Toomelah, which is already geographically and socio-economically isolated. The project's alignment will remove native vegetation and interrupt access to traditional plant resources used by local Aboriginal people for cultural and medicinal purposes. The project's proximity to Toomelah also has the potential to impact residents through noise and air quality impacts.

The project may also have positive social impacts. The construction workforce is expected to be 350 people, which will provide employment and business opportunities for local Aboriginal people. The Proponent proposes a range of measures to promote local and Aboriginal vocational training and employment, to be further developed as part of the Social Impact Management Plan in consultation with the Toomelah LALC and the Toomelah community.

The accommodation camp will temporarily impact the demographics and amenity of North Star

The accommodation camp and construction compound proposed for North Star will impact on the amenity and social composition of North Star. North Star is a quiet village of approximately 50 permanent residents, a primary school, licensed club, café, post office, motel and tourist park. North Star's residential population would increase sevenfold because of the accommodation camp and the camp population is expected to change the demographic profile to that of predominantly working age

and male. The project is likely to affect North Star residents' surroundings, community and culture, business and industry, and health and wellbeing. These impacts would be positive and negative, and would include changes to noise, traffic and air quality (which have been assessed in relevant technical sections of this report), business and employment participation opportunities, changes to the visual and social environment of the village, and potential perceptions about safety.

Agricultural landowners will be impacted by the project

Agricultural landowners will be impacted by severance of agricultural lots, changes to access to and within their properties which may disrupt farming operations, visual and flooding impacts. A range of mitigation measures including information about road network changes and property specific consultation have been proposed to address these impacts. Further consideration of these impacts are addressed in other key issues sections of this report.

A Social Impact Management Plan will detail all measures and processes to manage social impacts and benefits

A Social Impact Management Plan (SIMP) would be prepared to manage and monitor social impacts and benefits during the project's detailed design, pre-construction and construction phases and would be prepared in consultation with the affected community. The SIMP would include management techniques and actions to address the following social impact assessment categories:

- Workforce management
- Housing and accommodation
- Health and community wellbeing
- Local business and industry participation.

Submissions and agency advice

Community, group and organisation submissions

TLALC raised the following social impact matters in its submission:

- the need for the Proponent's ongoing engagement with the TLALC about construction impacts, mitigation and economic and community development opportunities
- need to work with the TLALC to engage local residents about employment and training opportunities
- suggesting a partnership role in administering sponsorship and grant funding to the Toomelah community
- potential noise impacts on residents
- safety concerns about residents (particularly children) accessing the rail line.

Landholders along the project's alignment, individually and collectively, have raised concerns about flooding, noise, access to and within properties and land use and agricultural impacts. While these have also been addressed elsewhere in this report, the Department recognises that these submissions also address the project's social impacts.

Council submissions

MPSC noted that the workforce should be localised and noted potential accommodation and labour market benefits and impacts of the project. Council's comments on worker accommodation noted the need to balance providing opportunities for local accommodation providers with saturating the local

housing market. Council recommended a condition of approval requiring an accommodation strategy. Council also noted the potential impact on local health services and recommended the Proponent be self-sufficient for basic medical care.

Other matters raised by Council included the need to engage Aboriginal people above and beyond statutory requirements, and the need to work with affected landowners on impacts to their properties.

GSC suggested that buildings and infrastructure established for the accommodation camp be retained for community use and noted the importance of assisting local businesses participate in the project though workshops with business owners.

Consideration

The project will have significant social impacts and potential benefits

Many of the social impacts considered and raised in submissions overlap, and have been considered in the assessment of other key issues in this report. The Department recognises that these impacts require further consideration through the lens of how they will be experienced by individuals and communities.

The project will have significant social impacts on individuals and communities with most social impacts being categorised as “high” even after management and mitigation measures are applied. The Department agrees with the Proponent’s assessment that the project will have significant social impacts, along with potential benefits that require appropriate management and mitigation.

Social impacts require management through specific and measurable management measures

The Department acknowledges that the project will have significant social impacts to the affected community and that the proposed SIMP framework is appropriate for managing social impacts and benefits. The Department, however, considers that the SIMP must be further developed, in consultation with the affected community, to provide more tangible actions to manage impacts and provide benefits. The Department therefore recommends conditions of approval requiring the Proponent to prepare a revised SIMP for the Planning Secretary’s approval.

The identification and implementation of effective measures requires partnership with affected communities, for example, measures to encourage Toomelah and Boggabilla residents’ direct and indirect economic participation in the project and to reduce impacts, such as minimising the visual impact of the viaduct and replacing traditional plant resources must involve the Toomelah LALC, community leaders/elders and community members. Similarly, the design of rail crossings to accommodate landholders’ stock and equipment crossing requirements must be carried out in consultation with those landholders, while maintaining rail safety requirements. The Department acknowledges the Proponent’s commitment to consultation and has emphasised it in the recommended SIMP condition.

The recommended SIMP condition requires specific details of measures to secure the project’s potential training, employment and business participation benefits to the community. This includes reporting on local, youth and Aboriginal employment and business participation in the project, as well as providing measures to achieve these outcomes.

The condition also requires identification of measures to address the project’s negative impacts. For many impacts, these measures will be primarily addressed through other environment management plans, including the Construction Noise and Vibration Management Plan, Construction Heritage

Management Plan, and conditions governing the process for locating and designing rail crossings. The SIMP would frame these measures against the social impacts they address, in addition to measures not included in other management plans or conditions such as measures to address housing availability and affordability in towns near the alignment, as raised by Moree Plains Shire and Goondiwindi Regional (Qld) Councils.

Finally, the Department recognises that this SIMP must be appropriately resourced, monitored and adaptively managed for it to be effective and has recommended a condition to ensure it is appropriately resourced, monitored against the indicators of success and includes a process for adaptive management where social outcomes do not meet the success criteria.

An Accommodation Camp Management Plan condition is recommended

The Department acknowledges that the proposed accommodation camp is intended as a measure to minimise demands on housing and community infrastructure. The camp would have sufficient capacity to house the entire non-local workforce and may bring economic benefits to the North Star community through increased business patronage and opportunities to service the camp. As discussed above, the camp may also cause social impacts to North Star.

The Department recommends a condition requiring the Proponent prepare an Accommodation Camp Management Plan to regulate/govern its operations. The plan would include a detailed camp layout, provision of security and medical officers, communication protocols with emergency services, measures to reduce noise amenity impacts, and arrangements for servicing the site with food, water, cleaning, and waste collection. The plan would operate in conjunction with other conditions directly relating to the use of the accommodation camp, the SIMP and other relevant conditions of approval. The Department is satisfied that implementation of these requirements will adequately manage the potential impacts of the camp on the North Star community.

6.10 Other issues

Issue	Findings	Recommendations
Construction water	Water is required for earthworks, concrete, trackwork and the accommodation camp. Construction activities are expected to use approximately 280 megalitres (ML) of water over the construction period, and the accommodation camp would use approximately one ML of potable water per month.	The Department accepts that there is a significant quantity of water potentially available to the project but acknowledges that this may not be available as surplus given licence holders' usage would vary each year.
	While the Proponent has not yet secured their construction water supply, as this is typically deferred to the construction contractor, it has demonstrated there is sufficient potential water supply for construction from 35 potential water sources with allocations between 300 ML and 2,400 ML per year.	Conditions have been recommended requiring construction water needs to be clearly identified and to provide contingencies if this water is unavailable.

	These include: • public surface water storages • permanently flowing watercourses • privately held water storages • existing registered and licensed bores • recycled water • town water. Domestic water needs would be prioritised above construction water supply and existing allocated water entitlements used, where possible. The accommodation camp would be constructed using a rainwater harvesting system, where practical, and the Proponent would investigate using a greywater recycling system to avoid impacts to Council's water, sewage and waste management systems. **DPE Water** noted that the Proponent has not yet demonstrated that it has acquired construction water entitlements and this uncertainty represents a risk to the project. The Department notes that it is the Proponent's responsibility to obtain this water and acknowledges that any uncertainties around this are at the Proponent's risk.	Other conditions have been recommended to ensure the accommodation camp is self-sufficient in terms of water and wastewater to reduce reliance on town water and sewerage infrastructure.
Air quality	**Construction impacts can be minimised** Construction activities would cause localised dust impacts, particularly during blasting at borrow pits, demolition, earthworks, construction and track out activities. Approximately 129 sensitive receivers would be potentially impacted including three receivers within 500 m of blasting at borrow pits. To minimise these impacts, the Proponent has committed to avoid blasting if prevailing wind conditions are likely to transport dust emissions to sensitive receptors; covering vehicles transporting spoil; stabilising exposed surfaces; avoiding long-term stockpiles, where possible; avoiding ground-disturbing activities during windy conditions and implementing dust	The Department has recommended a condition requiring all practicable measures be implemented to minimise dust and other air pollutants during construction. The Department is satisfied that the operational air quality impacts can be appropriately managed to an acceptable level by using existing management frameworks.

	suppression controls prior to the onset of adverse weather. **There are minimal operational air quality impacts** The primary source of air pollution during operation is locomotive engine exhaust produced as a product of diesel combustion. During operation, air quality goals will generally be met except for two locations where the predicted cumulative NO2 maximum one-hour ground level concentration was exceeded. These locations were small and had no nearby sensitive receivers. The Proponent has committed to ensuring all operators develop and implement air quality plans consistent with ARTC's Operational Environmental Management Plan and comply with the relevant conditions and requirements. The Department notes that rail rolling stock operation is a scheduled activity under the *Protection of the Environment (Operations) Act 1997*. This means that trains operating on the line would require an Environment Protection Licence, which may regulate trains' air quality impacts.	
Spoil and waste management	All general and structural fill to construct embankments would be sourced from borrow pits and reused to rehabilitate borrow areas post construction. Surface works involving the excavation of cuttings will produce an excess of approximately 5,000 cubic metres of spoil. The Proponent proposes, where practicable, to reuse spoil through treatment, amelioration or drying with any contaminated spoil being disposed of off-site. GRC (Qld) commented on the waste management of the project, requesting further information regarding the type of waste generated and noted the limited capacity of its waste facilities. The Proponent noted that these details would be further refined during detailed	The Department has recommended conditions for the handling, reuse and disposal of waste. Similarly to the conditions imposed on the Narrabri to North Star Stage 1 project, this will require contractors to provide advance notice to waste facilities to assist them in managing demand. The Department has also recommended conditions regulating the size and location of spoil mounds.

	design and after confirmation of the construction schedule. The Proponent has committed to preparing a Waste Management Strategy as a sub-plan to the CEMP which will follow the waste hierarchy approach of avoidance and reuse before waste disposal and is investigating the use of treated wastewater for irrigation at the accommodation camp and has committed to consulting with the EPA for the environmental criteria and effluent quality requirements. The project may create permanent spoil mounds to manage excess spoil material generated by the project. These are not expected to be widely used as the project will have a cut and fill deficit, requiring the operation of borrow pits. The Department considers the limited use of permanent spoil mounds acceptable subject to limitations on their location and size to avoid sensitive areas and limit their height to that of the rail line. With the implementation of mitigation measures, the impact of waste management activities is expected to be minor and have a minimal risk to the environment or human health. The Department is supportive of the outlined approach to waste management and is satisfied that the standard conditions of approval will be adequate in managing excess waste generated by the project.	
Non-Aboriginal cultural heritage	The project would impact a total of 15 historic sites with potential local heritage significance. The project would directly impact 11 sites including a logger's camp, survey mark, part of the original rail alignment, two railway sidings, two rail bridges and four fettlers (construction) camps. Four sites located adjacent to the project works are unlikely to be impacted by the project, including a shearing shed site, shearer	The Department considers that the Proponent's mitigation commitments are an appropriate and proportionate response to the nature of the items. The Department supports the Proponent commitment to prepare and implement a Construction Heritage Management Plan and has recommended conditions to minimise impacts and undertake

	accommodation, roadside memorial and railway siding sign. The Proponent commits to: • mapping and flagging the extent of clearing • limiting clearance and disturbance to that required to undertake works • a program of archival recording before construction • preparing a Construction Heritage Management Plan to manage impacts, including protocols for the development of a site registry with approved management requirements, heritage clearance protocols, archaeological salvage and an unexpected finds procedure • reinstating the roadside memorial and rail siding sign post-construction, if temporary relocation is required • offering salvaged historic heritage artefacts to a local heritage society/museum. Heritage NSW and MPSC raised no concerns with the proposed impacts and mitigation measures for Non-Aboriginal cultural heritage. The Department considers that the impacts to the 11 items of potential local heritage significance are unavoidable as they are in the works area and it is not practicable or reasonable to divert the rail track to avoid the items. The Department agrees with the Proponent's assessment of residual impacts and is satisfied that they are acceptable subject to mitigation measures and conditions.	Heritage Photographic Archival Recordings of heritage items including the existing rail line.
Climate change and sustainability	The increased frequency and severity of extreme rainfall and flood events, extreme heat and storm events due to climate change, pose a high to very high risk to the project. The Department has considered this in relation to flooding in **Section 6.1**. The climate change risks are proposed to be mitigated by designing drainage structures and embankments to manage high rainfall and flooding events, and track components for high	The Department has recommended the preparation of a Sustainability Strategy to achieve a minimum excellent 'Design' and 'As built' rating under the ISCA rating tool.

heat tolerances to minimise buckling during extreme heat events.

Emergency response procedures will also be developed and updated to respond to extreme weather events. The Department has considered the Proponent's proposed mitigation and adaptation measures and accepts that these would adequately address the risks of climate change.

The Proponent also commits to preparing a Sustainability Strategy to ensure the project meets the Infrastructure Sustainability Council of Australia's (ISCA) Infrastructure Sustainability Rating Tool of 'excellent'.

7 Evaluation

The Department has reviewed the EIS, RtS and PIR, and assessed the key issues arising from the construction and operation of the project. This has been undertaken with advice from relevant government agencies and submissions from councils and the public, and in consideration of key strategic government policies and plans. The Department considered all relevant matters, objects of the EP&A Act and principles of ecological sustainable development. The project is in the public interest by providing development opportunities for regional NSW, improving freight rail capacity and reliability, and encouraging a freight mode shift from road to rail. It provides benefits for rural and regional NSW by providing enabling infrastructure for economic development. The Department considers the project should be approved, subject to conditions.

The project is consistent with 2021 Infrastructure Priority List of Infrastructure Australia, NSW State Infrastructure Strategy 2018-2038, Future Transport Strategy 2056, Regional NSW Service and Infrastructure Plan and NSW Freight and Ports Plan 2018-2023 as it would:

- improve intercity and intracity general and freight transport connections
- improve freight travel times and increased network capacity
- increase access for freight across the rail network, as well as ensure safe, efficient and sustainable freight access to places
- provide economic development opportunity in the region.

Key issues associated with the project are related to:

- flooding and hydrology
- biodiversity
- noise and vibration
- traffic, transport and access
- land use and property access
- Aboriginal cultural heritage
- visual impacts
- social impacts.

The Proponent has identified a range of environmental management measures which it has committed to applying. Residual impacts are acceptable when managed through recommended conditions and the Proponent's commitments, such that there is no long term and irreversible impact. Based on its assessment, the Department recommends conditions aimed at improving the level of environmental management and reducing potential impacts. Subject to conditions, the project would ensure that impacts to native vegetation and threatened species habitat is minimised and offset in accordance with applicable legislation. The project limits changes to existing watercourses, and additional flooding impacts are limited under the Department's stringent conditions. The impact of construction and operational noise would be effectively managed through controls on construction hours and requirements for operational noise treatment.

8 Recommendation

It is recommended that the Minister for Planning:

- **considers** the findings and recommendations of this report;
- **accepts and adopts** the findings and recommendations in this report as the reasons for making the decision to approve the application;
- **considers** any advice provided by the Minister having portfolio responsibility for the project;
- **agrees** with the key reasons for approval listed in the notice of decision;
- **grants approval** for the application in respect of SSI 9371 as amended, subject to the conditions in the attached project approval; and
- **signs** the attached project approval and recommended conditions of approval.

Recommended by:

Belinda Scott
Team Leader
Freight Assessment and Management

Recommended by:

Alexander Scott
Director
Freight Assessment and Management

9 Determination

The recommendation is **Adopted / Not adopted** by:

The Hon. Anthony Roberts MP
Minister for Planning

10 Appendices

Appendix A List of referenced documents

ARR 2019 – Australian Rainfall and Runoff: A guide to flood estimation (Commonwealth of Australia (Geoscience Australia), 2019)

Biodiversity Assessment Method (OEH, 2017)

Floodplain Management for the Border Rivers Valley Plan 2020

Inland Rail – North Star to NSW/Queensland Border Environmental Impact Statement, Volumes 1-7 (ARTC / Future Freight Joint Venture, August 2020)

Inland Rail – North Star to NSW/Queensland Border Response to Submissions (ARTC / Future Freight Joint Venture, received by the Department 9 June 2021)

Inland Rail North Star to NSW/Qld Border Appendix B – Terrestrial Biodiversity Technical Report (Future Freight Joint Venture, Revision 10, 20 October 2021)

Inland Rail – North Star to NSW/Qld Border – Preferred Infrastructure Report (Future Freight Joint Venture, May 2021)

Level Crossing Closures Policy (Transport for NSW)

Native vegetation regulatory map: method statement (Department of Planning and Environment, 2017)

Rail Infrastructure Noise Guideline (Environment Protection Authority, 2013)

Response to DPIE RFI regarding further modelling and assessment of velocities through culverts Technical Note (Future Freight Joint Venture, 5 November 2021)

Response to DPIE RFI regarding further modelling and assessment of velocities through culverts Technical Note (Future Freight Joint Venture, 10 December 2021).

Appendix B Environmental Impact Statement

See NSW Planning Portal website:

https://www.planningportal.nsw.gov.au/major-projects/project/10221

Appendix C Submissions

See NSW Planning Portal website:

https://www.planningportal.nsw.gov.au/major-projects/project/10221

Appendix D Submissions Report

Inland Rail – North Star to NSW/Queensland Border Response to Submissions (ARTC / Future Freight Joint Venture, received by the Department 9 June 2021).

See NSW Planning Portal website:

https://www.planningportal.nsw.gov.au/major-projects/project/10221

Appendix E Terrestrial Biodiversity Technical Report

Inland Rail North Star to NSW/QLD Border Appendix B – Terrestrial Biodiversity Technical Report (Future Freight Joint Venture, Revision 10, 20 October 2021).

See NSW Planning Portal website:

https://www.planningportal.nsw.gov.au/major-projects/project/10221

Appendix F Preferred Infrastructure Report

Inland Rail – North Star to NSW/Qld Border – Preferred Infrastructure Report (Future Freight Joint Venture, May 2021).

See NSW Planning Portal website:

https://www.planningportal.nsw.gov.au/major-projects/project/10221

Appendix G Responses to Major Requests for Information - hydrology

- Response to DPIE RFI regarding further modelling and assessment of velocities through culverts Technical Note (Future Freight Joint Venture, 5 November 2021)
- Response to DPIE RFI regarding further modelling and assessment of velocities through culverts Technical Note (Future Freight Joint Venture, 10 December 2021).

See NSW Planning Portal website:

https://www.planningportal.nsw.gov.au/major-projects/project/10221

Appendix H Independent Peer Reviewer's Report

Inland Rail – North Star to Border (Ns2b) Preferred Infrastructure Report (PIR) Independent Review of Hydrology and Flooding Issues. Final Review Report (Bewsher, 11 November 2022).

https://www.planningportal.nsw.gov.au/major-projects/project/10221

Appendix I Community views

The key issues raised by the community and considered in the Planning Secretary's Report include the project need and context, flooding and hydrology, soils, agriculture and rural business, access and traffic, Crown land, biodiversity, noise and vibration, visual, heritage, contamination, acquisition, social impacts and safety.

Issue	Consideration
Project need and context • Lack of proper cost benefit analysis for the project • Concern that methodology used to consider economic costs and benefits is not appropriate • Alignment and location of crossing loop • Consultation on key issues including the alignment.	*Assessment* • The project is consistent with Commonwealth and State strategic planning and transport documents. • The location of the crossing loop was not confirmed but would be within the approved project footprint. • The Department required remodelling of flooding and hydrology impact and the consideration of the 1976 event. • The Department exhibited the EIS and has met with the NSW Macintyre Floodplain Landholders to discuss concerns raised in their submission. *Recommended Conditions/Response* • No part of the crossing loop can cross over any driveway, private road or public road unless determined in consultation with relevant landowners and adjacent landowners. • A number of conditions require consultation with landowners including conditions related to extended hours of work, flooding and hydrology, traffic and access, visual amenity and land use and property impacts. • The Department does not assess the proposal's business case.
Flooding and hydrology • The modelling is incorrect/inadequate • Accuracy of a 1% AEP that is inconsistent with the Border Rivers Valley Floodplain and that used by Goondiwindi Regional Council (Qld) • The project should be designed for the 1976 flood event • Impacts should be assessed based on the 1976 flood event • Modelling assumptions used may not be appropriate • Impacts will be worse than predicted • Flows will be redirected • Appropriateness of the flood objectives	*Assessment* • The Department required remodelling of flooding and hydrology impacts and the consideration of the 1976 event and is satisfied the revised modelling is appropriate. • The 1976 event and the revised flood modelling form the basis of the Department's consideration of impacts. • The Department did not support the Flood Management Objectives proposed by the Proponent. • The Department has confidence that through design refinement and consideration of Quantitative Design Limits, the potential for impacts on adjoining properties can be mitigated. • Where residual impacts persist, these can be resolved through an agreement with the landholder which may

• Impacts of debris on the operation of culverts/bridges • Damage to and risk the rail infrastructure will fail during flood events.	include mitigation such as scour protection being applied to adjoining land. *Recommended Conditions/Response* • Flood modelling of the final design to consider compliance with specific Quantitative Design Limits (QDLs) in all flood events up to the 1976 flood. • The QDLs are specific limits for flood impacts from the project and include limits for flow redistribution. • Non-compliances with the QDLs require agreement with the landowner or roads authority. • An Independent Flood Impact Assessment Panel will be able to consider non-compliances with the QDLs where agreement cannot be reached • A Flood Design Verification Report must document all compliances and non-compliances with the QDLs including consideration of risk to life due to formation failure.
Soils • Flows concentrated by the project will cause erosion of highly erodible clay soils • Potential for irreversible impacts from erosion at some distance from the rail line • The existing rail line has caused erosion and should be mitigated.	*Assessment* • The project is located on highly erodible clay soils with the potential for concentrated flows to create erosion that could result in ongoing impacts to adjoining private property and infrastructure. • Design changes such as additional and wider spaced culverts and longer bridge spans reduced the number of structures likely to exceed the erosion threshold velocity. *Recommended Conditions/Response* • Recommended conditions require compliance with a scour/erosion potential QDL and a default erosion threshold velocity for highly erodible soils unless site specific assessments determine the erosive threshold velocity is larger. • An Operational Erosion Mitigation and Monitoring Program is required for all areas that exceed the scour/erosion potential QDL or are actively eroding.
Agriculture and rural business • Impacts of fencing, including preventing livestock from reaching higher ground during floods, lack of fencing, and maintenance of fencing • Impacts to the Travelling Stock Routes • Restoration of borrow pits and laydown areas • Removal/replacement of shade trees for stock • Offer of a new potential borrow pit at North Star	*Assessment* • Rail operations would result in changes to access and affect the movement of vehicles, farm machinery and stock. Formal and informal rail crossings would be closed and/or consolidated and the rail corridor fenced. • Types of fencing and impacts to the travelling stock route would be determined in consultation with the landowner or relevant agency. • All borrow pits would be rehabilitated in accordance with the Rehabilitation Strategy. • The borrow pit suggested by a submitter was not included as part of the project. Further assessment and

• Concern about financial impacts to rural businesses from changes in land values, equity availability and insurance costs. • Access to travelling stock routes and consequences for farming operations	approval of this additional borrow pit is required should the Proponent decide to use it for the project. *Recommended Conditions/Response* • The Proponent to consult with all landowners that are either temporarily or permanently impacted by the project. Individual property management plans are required to document the results of consultation and agreed outcomes with each landowner. • A Borrow Pit Management Plan is to be prepared which details management and rehabilitation of each borrow pit. • Connectivity of the travelling stock routes and reserves would be maintained, where possible, in consultation with Crown Lands.
Access and traffic • movement of stock and vehicles for properties severed by the alignment • Access for properties landlocked as a result of the project • How access will be maintained between farms and paddocks impacted, severed or sterilised by the project • Reinstatement of access should be covered by the EIS even when outside the project boundaries • Project does not eliminate level crossings • Traffic counts were completed during drought conditions and do not reflect true volumes • The project alignment requires the rail to be crossed multiple times • Road alignment and school bus route impacts.	*Assessment* • Rail operations will result in changes to access and affect the movement of vehicles, farm machinery and stock. • Formal and informal rail crossings will be closed and/or consolidated and the rail corridor fenced. 26 level crossings would be closed, 8 upgraded and 8 would be grade separated. • Road safety audits will be completed for all level crossings. • Bridges transecting private property will have a sufficient clearance to enable cattle and vehicles to pass underneath. • Design aspects for crossings will be in consultation with affected landowners. • There will be property severance impacts to existing farming operations, rendering some land parcels landlocked. The proponent has committed to consulting with landowners during detailed design phase to ensure appropriate access in provided. • Delays from the level crossings would not impact the road network performance and would result in localised delays affecting a small number of vehicles. • Construction would increase the total vehicle movements but would not impact the road network performance including during peak harvest periods. *Recommended Conditions/Response* • The Proponent to consult with all landowners that are either temporarily or permanently impacted by the project. Individual property management plans are required to document the agreed outcomes with each landowner. • Public and Private Level Crossing Treatment Reports are required to be developed in consultation with landowners or road authority to ensure convenient property access is maintained.

	• A Traffic, Transport and Access Management Sub-plan must be prepared to minimise impacts on seasonal traffic and inform road users and freight operators of changes to traffic conditions during construction. • The realignment of Bruxner Way must be designed to a minimum design speed of 110km/hr and endorsed by the road authority. • Relocation of bus stops during construction must occur in consultation with the relevant council and bus operator. • The Proponent must document procedures and mechanisms for resolving and mediating disputes in relation to property and infrastructure impacts.
Crown Land • The project should not be approved with undetermined Aboriginal Land Claims.	*Assessment* • The Proponent would confirm the status of any land claims when acquisition commences. • If any undetermined land claims remain, the Proponent would work with the Local Aboriginal Land Council and NSW Aboriginal Land Council to reach an agreement to the extent that it affects the claim. *Recommended Conditions/Response* No conditions recommended.
Biodiversity • Does not adequately identify impacts to threatened species and ecological communities • Concerns surveys only completed during drought conditions and not within the optimal survey seasons • Does not consider indirect impacts from changes in hydrology.	*Assessment* • The revised Terrestrial Biodiversity Technical Assessment Report includes additional data obtained between October 2018 and March 2021. • The BDAR considered impacts to threatened ecological communities and threatened flora and fauna species listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). • The Proponent has committed to implementing a Biodiversity Offset Package including additional measures and to obtaining and retiring biodiversity credits in accordance with the BC Act and the EPBC Act, and will apply like-for-like or variation rules (the variation rule would not apply to any Matters of National Environment Significance (MNES) under the EPBC Act) by securing offset credits or payment of funds to the Biodiversity Conservation Trust. *Recommended Conditions/Response* • The requirement to offset impacts to threatened ecological communities and species in accordance with the specified retirement credits before impacts to the biodiversity values. • Restrictions on high-risk construction activities that may impact Murray Cod habitat during the spawning period

	and provision of beneficial aquatic habitat within one kilometre downstream of the bridge. • To provide fauna passages beneath the Mobbindry Creek, Back Creek, Forest Creek, Whalan Creek and Macintyre River rail bridges. • Pre-clearing surveys prior to construction along with other management measures specified in a Biodiversity Management Sub plan. • A Five-clawed Worm Skink Management Plan is required to manage potential impacts during construction and for post-operation monitoring
Noise and vibration • Does not adequately consider sleep disturbance • Not all sensitive receivers identified • No commitment to appropriate mitigation treatments including relocation of dwellings highly impacted by noise • Concern that appropriate noise mitigation isn't possible to mitigate sleep disturbance.	*Assessment* • Sleep disturbance impacts were identified in the noise and vibration assessment. • The number and location of sensitive receivers was updated. • Day and night time construction activities and operational noise would impact sensitive receivers. • A Construction Noise and Vibration Management Sub-Plan would outline measures to mitigate noise impacts during construction and include measures such as machine shielding, and at-receiver noise treatment for those impacted by both construction and operational noise. • The Proponent has made an offer to relocate or purchase a residence that would be highly noise affected. *Recommended Conditions/Response* • Relocation or purchase of a dwelling that would be highly noise affected is supported by the Department. • Extended hours of construction of 6:30am to 7:00pm with construction ceasing every second Sunday would be permitted where consultation about the works and mitigation measures occurs every three months with all affected receivers. • Out of hours work must be approved in accordance with the Out of Hours Work protocol or an Environmental Protection Licence. • An Operational Noise and Vibration Review must be undertaken to monitor effectiveness of mitigation treatments and noise performance and determine whether additional mitigation is required. These treatments will be offered after landowner consultation. • Operational noise mitigation measures, such as architectural treatments will be bought forward and implemented during the early stages of construction to assist in addressing construction noise impacts. • An Operational Noise Compliance Report (ONCR) must be provided to report on operational stages of the

	project to verify noise performance and to detail performance of the proposed mitigation measures.
Visual • Does not adequately address visual impacts including from private residences • Lack of appropriate mitigation strategies.	*Assessment* • The visual impact assessment utilised viewpoints that are spread out evenly across the project. • While additional viewpoints from private residences would have provided greater clarity the viewpoints selected are considered reasonably representative of the impacts on a relatively flat landscape. *Recommended Conditions/Response* • A Visual and Landscape Impact Management Plan to mitigate impacts is required to be prepared in consultation with landowners and residents within 100 m of the project in North Star and within 500 m of the project elsewhere. • Opportunities for Aboriginal interpretation, such as Aboriginal designs, patterns and motifs, on the Macintyre River bridge and Tucka Tucka Road rail bridge must be considered in consultation with the Toomelah LALC and the local community.
Heritage • Support for the relocation of heritage items to the Travelling Stock Route • Toomelah Local Aboriginal Land Council requests active involvement in all stages of mitigation of cultural heritage places	*Assessment* • RAPs and Toomelah LALC would be involved in ensuring impacts to Aboriginal heritage are minimised and managed appropriately. *Recommended Conditions/Response* • Prior to commencement of any work within areas identified as requiring archaeological investigation or salvage an Aboriginal Archaeological Test Excavation Methodology must be prepared in consultation with Heritage NSW and RAPs. • Work must stop should any unidentified Aboriginal objects or Places be discovered.
Contamination • Existing contamination along the entire unused rail line should be rehabilitated not just the portion needed for the project.	*Assessment* • The project would use the existing rail corridor to minimise impacts to land resources and contamination. • A preliminary contamination site investigation was completed with all contaminants being below the adopted soil assessment criteria. *Recommended Conditions/Response* • If soils suspected to be contaminated are unexpectedly found, the Proponent must engage a suitably experienced and qualified contaminated land consultant to undertake further investigations to determine the type and extent of any contamination.

Acquisition • Concern that indirect impacts from flooding, ecology, noise and vibration and visual impact cannot be appropriately compensated without the land also being acquired.	*Assessment* • The project would result in indirect impacts. *Recommended Conditions/Response include*: • The requirement for consultation with landowners and residents with respect to flooding, noise and vibration, property and visual impacts. Acquisition is an option to address impacts including flooding impacts, or when no agreement is reached about non-compliances with QDLs.
Social • Project will benefit a few and impact many • Concerns costs will blow out • Location and legacy of the construction worker's camp.	*Assessment* • There will be significant impacts on individuals and communities, with the majority of impacts categorised as high. • Costs of the project is not within the scope of the environmental impact assessment. • The demographic of North Star is likely to change during construction, with a workers' accommodation camp increasing the temporary population sevenfold. Impacts from this are both positive and negative. *Recommended Conditions/Response* • A revised Social Impact Management Plan is to be prepared for the Planning Secretary's approval • An Accommodation Camp Management Sub-plan is to be prepared to regulate/govern the camps operations.
Safety • Lack of mobile service and use of proposed mobile app to advise of trains • Ongoing consultation during construction, particularly during harvest times • Risk of blackouts and the need for backup power at level crossings • Access to the rail line (particularly children).	*Assessment* • Options to address telecommunications network coverage are being considered by Inland Rail, the Department of Infrastructure and Telstra separate to this project. • The Proponent has committed to ongoing consultation with relevant Councils, police, emergency services and affected landowners/occupiers to inform of likely traffic disruptions during harvest season. • All active level crossings are provided with a backup battery that provides 36-48 hours of backup. Following this alarms are sent to Network Control and trains are warned. In these instances trains would stop before proceeding across the level crossing. *Recommended Conditions/Response* • The requirement for a Traffic, Transport and Access Management Sub-plan to include measures to minimise impacts on seasonal traffic including harvest related vehicles.

Appendix J Bilateral Assessment

Assessment of EPBC Act-listed threatened species and communities for projects under BAM

Suggested information for inclusion in the advice to DP&E

1. Identifying MNES

(a) Confirm whether all the EPBC Act-listed threatened species and communities that occur on the project site, or in the vicinity are identified in the EIS. Note which species and/or communities have not been identified. *The Commonwealth has provided NSW with referral documentation which includes a possible list of MNES recorded on and within the vicinity of the project site generated from the Environmental Reporting Tool (ERT Report). If you do not have the referral documentation contact the PAG assessment officer.*

NOTE: BCS identified substantial issues in the exhibited Environmental Impact Statement (EIS), specifically, Appendix B - Terrestrial Biodiversity Technical Report. The exhibited document did not meet the minimum requirements of the BAM. Through on-going consultation with BCS Appendix B has been updated. All references to the 'BDAR' in this assessment refers to Appendix B – Terrestrial Biodiversity Technical Report Revision 10, dated 20 October 2021 and provided to BCS on 21 October 2021.

The assessment of MNES in the exhibited Biodiversity Development Assessment Report (BDAR) used the Biodiversity Assessment Method (BAM) to an extent but relied heavily on a "Significant Impact Assessment Methodology" (SIAM) which was based on the magnitude of impacts to MNES and the sensitivity of MNES to those impacts. A sensitivity assessment matrix summarised this information. An "Adverse Impact Assessment Methodology" (AIAM) then assessed the potential impacts that may result in a significant residual impact. The methods were complex and difficult to understand, and the outcomes were not consistently described throughout the BDAR. The BDAR did not clearly describe which MNES had a residual significant impact.

Following discussions between BCS and DAWE, and subsequent discussions between BCS and ARTC, much of the AIAMs and SIAM commentary was removed from the updated version of the BDAR presented at the RTS phase. In its place, assessment of MNES was completed using the BAM. Targeted surveys were completed for all MNES. An assessment of significance was completed and described for all relevant MNES.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)-listed threatened species and communities that occur on the project site or in the vicinity as generated from the Protected Matters Search Tool have been identified in the EIS. An assessment of the likelihood of each entity occurring has been undertaken and a decision as to whether an assessment of significance is required has been made (Section 7.1 of the BDAR).

All communities and species listed in the referral documentation that have potential to be significantly impacted have been identified in the BDAR:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) – endangered
- Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions – endangered
- Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland – critically endangered
- Weeping Myall Woodlands – endangered
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – critically endangered
- Squatter Pigeon (southern) (*Geophaps scripta scripta*) – vulnerable
- Painted Honeyeater (*Grantiella picta*) – vulnerable
- Murray Cod (*Maccullochella peeli*) – vulnerable
- Large-eared Pied Bat, Large Pied Bat (*Chalinolobus dwyeri*) – vulnerable
- Corben's Long-eared Bat, South-eastern Long-eared Bat (*Nyctophilus corbeni*) – vulnerable
- Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (*Phascolarctos cinereus*) – vulnerable
- Ooline (*cadellia pentastylis*) – vulnerable
- Bluegrass (*Dichanthium setosum*) – vulnerable
- Belson's Panic (*Homopholis belsonii*) – vulnerable
- Tylophora linearis – endangered
- Five-clawed Worm-skink (*Anomalopus mackayi*) – vulnerable
- Adorned Delma (*Delma torquate*) – vulnerable
- Dunmall's Snake (*Furina dunmalli*) – vulnerable.

An additional MNES threatened ecological community (TEC) and seven MNES fauna species (listed below) are identified in the BDAR as having potential to occur within the project site (Table 7.1 and Table 7.3 BDAR). Credit obligations have been determined for the TEC and four of the fauna species.

- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions – endangered
- Red goshawk (*Erythrotriorchis radiatus*) – vulnerable
- White-throated needletail (*Hirundapus caudacutus*) – vulnerable, migratory
- Australasian bittern (*Botaurus poiciloptilus*) – endangered
- Spot-tailed quoll (Southeastern Mainland population) (*Dasyurus maculatus maculatus*) – endangered
- Grey-headed Flying-fox (*Pteropus poliocephalus*) – vulnerable
- Australian painted-snipe (*Rostratula australis*) – endangered
- Curlew Sandpiper (*Calidris ferruginea*) – critically endangered.

(b) Comment on whether the Biodiversity Assessment Method (BAM) has been applied to all EPBC Act-listed threatened species and communities that occur on the project site or in the vicinity.

The BAM has been fully applied in terms of survey effort and addressing the minimum information requirements for all relevant MNES that are also listed under the BC Act. Three EPBC-listed species which are not listed under the *Biodiversity Conservation Act 2016*; Murray Cod, Adorned Delma and Dunmall's Snake have been assessed in accordance with Commonwealth Survey Guidelines (see section (c) below).

All entities that were identified as requiring an assessment of significance have been assessed. Impacts on two TECs, two flora species and two fauna species (listed below) likely to be significantly impacted were assessed and credit liabilities were determined;

- Brigalow (*Acacia harpophylla* dominant and co-dominant)
- Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland
- Weeping Myall Woodlands
- Corben's Long-eared Bat, South-eastern Long-eared Bat (*Nyctophilus corbeni*) – vulnerable
- Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (*Phascolarctos cinereus*) – vulnerable
- Five-clawed Worm-skink (*Anomalopus mackayi*) – vulnerable
- Painted Honeyeater (*Grantiella picta*) – vulnerable
- Belson's Panic (*Homopholis belsonii*) – vulnerable
- Bluegrass (*Dichanthium setosum*) – vulnerable.

Two TECs and one fauna species are considered to be significantly impacted by the proposed development.

Following discussions with DCCEEW on 22 November 2022, an additional TEC (Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions) is considered likely to be significantly impacted by the proposed development. No assessment of significance was completed by the Proponent.

(c) In the circumstance where there are EPBC Act-listed species that are not addressed by the BAM (i.e. migratory species) comment on whether these species have been assessed in accordance with the SEARs and provide references to where the assessment information is detailed in the EIS.

Three EPBC-listed species which are not listed under the *Biodiversity Conservation Act 2016*; Murray Cod, Adorned Delma and Dunmall's Snake, have been assessed in accordance with Commonwealth Survey Guidelines. Assessment information relating to these species is detailed in the BDAR (Murray Cod - Table 10.12 BDAR; Adorned Delma and Dunmall's Snake - Table 10.10 BDAR).

None of these three species were found during surveys. Murray Cod was considered to be known to occur and an assessment of significance was completed. Adorned Delma and Dunmall's Snake were assessed as unlikely to occur (Table 7.3 BDAR).

(d) Verify that the proponent has expressed a statement about the potential impact i.e. likely significant, low risk of impact, not occurring, for each listed threatened species and community protected by the EPBC Act referred to in 1(a). Note which species and/or communities have not been addressed in this manner.

Entity	Assessment of potential impact as stated by the proponent
Brigalow *(Acacia harpophylla* dominant and co-dominant)	A total of up to 17.51 hectares of this vegetation community will be removed in the alignment and borrow pits. Of this, only 11.84 hectares of medium quality or higher PCT 35 meets the TEC condition assessment as per EPBC guidelines (Table 10.6 BDAR). As there will be clearing of critical habitat for this TEC, there is likely to be a significant impact to the community. The BDAR states that like-for-like offsetting in accordance with the BAM will occur to reduce the risks of significant residual impacts (Section 10.7.2.1 BDAR).
Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	The listed TEC is not present within the study area (Appendix C BDAR). Predictive mapping indicates that suitable habitat for Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions TECs does not occur within the subject land. This was confirmed during site assessments and this TEC was not considered for further assessment (Section 7.1 BDAR).
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	A total of up to 33.5 hectares of this TEC will be removed in the alignment, with associated ecosystem credits (PCT 52) retired to offset impacts (Table 10.10 BDAR). Overall project cumulative impacts are identified as low, although there is likely to be significant residual impacts in accordance with the MNES guidelines.
Weeping Myall Woodlands	A total of up to 0.02 hectares of this community may be impacted (Table 10.6, BDAR). An area of 0.02 hectares of PCT 27 (medium quality) Weeping Myall open woodland occurs in a shallow depression adjacent to Mobbindry Creek. Ecosystem credits will be retired for potential impacts on this TEC. Other areas of PCT 27 (low quality) do not meet the condition requirements for the EPBC Act-listing of the TEC as there are no myall trees present. The proportion of overall cumulative impact is determined as low, and a significant impact on this TEC is not expected (Table 10.10 BDAR).
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Box-Gum woodland TEC is not considered present within the study area (Appendix C BDAR). Predictive mapping indicates that suitable habitat for the White-box-Yellow box-Blakely's Red Gum grassy woodland and derived native grassland TEC does not occur within the subject land. This was

	confirmed during site assessments and this TEC was not considered for further assessment (Section 7.1 BDAR).
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Semi-evergreen vine thicket was observed within the study area and is recorded within the IBRA region. There is 4.6 hectares of Semi-evergreen vine thicket TEC within the subject land of Borrow pit 1 (Appendix C BDAR). A total of up to 4.6 hectares of this vegetation community will be removed as part of the proposal (Table 10.6, BDAR).
Squatter Pigeon (southern) (*Geophaps scripta scripta)*	Unlikely to occur. Targeted bird surveys over multiple years did not record the species. The study area is outside of the current known distribution for the species (Table 7.3 BDAR).
Painted Honeyeater *(Grantiella picta)*	Known. An individual was recorded on a single occasion in Poplar Box woodland during the October 2019 field survey (Table 7.3 BDAR). The Painted Honeyeater is an ecosystem credit species. Bird surveys at 75 sites carried out in October 2018 and 2019 (call playback and spotlighting) recorded a single bird in Poplar Box woodlands. There are numerous records from the wider area surrounding the proposal. The species is a specialist feeder on the fruit of mistletoes which require larger trees to grow on. Low-quality PCTs contain no trees, therefore there is little or no habitat for mistletoes and no suitable habitat for the species. Medium to high PCTs are considered to contain habitat. The overall cumulative project impacts on the species is low and there is not expected to be a significant impact to the species from the project (Table 10.10 BDAR).
Murray Cod *(Maccullochella peeli)*	The Macintyre River provides suitable habitat for Murray Cod. All other waterways surveyed are unlikely to support Murray Cod due to a lack of key fish habitat, including but not limited to semi-permanence of aquatic refuges (Section 4.4.4 BDAR). The proposal is considered unlikely to have a significant impact on Murray Cod (Table 10.13 BDAR).
Large-eared Pied Bat, Large Pied Bat *(Chalinolobus dwyeri)*	This species was removed as a candidate species from the BAM-Calculator. Habitat constraints are listed as cliffs; within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels. None of these habitat elements occur within 2 kilometres of the project. A single patch of vegetation associated with this species is present in study area (PCT 147). Site assessments observed no suitable rocky roost habitat for this species in this patch or elsewhere

	in the study area. The species was excluded from further assessment (Appendix G, Table 38 BDAR). No statement was provided regarding likely impact to the species.
Corben's Long-eared Bat, South-eastern Long-eared Bat *(Nyctophilus corbeni)*	As a species credit species, Corben's Long-eared Bat was only recorded as a possible species from Anabat recording and was not recorded from harp trapping in favourable conditions. In comparison, N. gouldii and N. geoffroyi were recorded. The overall cumulative impact on the species is assessed as low and the project is not expected to have a significant impact on this species (Table 10.10 BDAR).
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) *(Phascolarctos cinereus)*	A total of up to 27.7 hectares of potential habitat will be removed as part of the proposal (Table 10.6 BDAR). The Koala is a species credit species and was subject to extensive targeted surveys, however the species was only recorded as a vocalised observation on the MacIntyre River in PCT 36 in 2019. One set of scats was sent to Barbara Triggs in 2019, which was identified as a possum. Scats and scratches were recorded in February 2021 just outside the subject land as incidental finds during other species surveys. No other signs of this species were detected in the study area across a range of survey types. The species require trees for food and shelter. The low-quality PCTs contain only highly scattered individual trees or no trees, and therefore do not provide suitable habitat for the species. Some PCTs only contain limited preferred forage tree species, based on either observed flora species or benchmark descriptions of the PCT. There is not expected to be a significant impact in accordance with MNES guidelines on this species (Table 10.10 BDAR).
Ooline *(Cadellia pentastylis)*	Unlikely to occur (Table 7.2, BDAR). Detailed survey within potential habitat did not locate the species. There is not expected to be a significant impact to the species from the project (Table 10.10 BDAR).
Bluegrass *(Dichanthium setosum)*	Bluegrass was not found during targeted survey effort within the defined survey period, although its presence is assumed within 26.08 hectares of potential habitat where targeted surveys were not undertaken. An additional assessment of significance is provided in Section 10.7.1.3, identifying that with mitigation and offsetting measures there will not be a significant impact on this species (Table 10.10 BDAR).
Belson's Panic *(Homopholis belsonii)*	A total of up to 46.34 hectares of potential habitat will be removed as part of the proposal (Table 10.6 BDAR).

	This species was recorded in targeted surveys completed in the study area. The overall cumulative impact on this species credit species is identified as low and the overall impact significance is assessed as medium. As such, an additional assessment of significance is provided in Section 10.7.1.2 of the BDAR. With mitigation and offsetting measures there will not be a significant impact on this species (Table 10.10 BDAR). **BCS Comment**: It should be noted that the total impact to Belson's Panic as per the BAM Calculator and spatial data reviewed and accepted by BCS is 46.36 hectares not 46.34 hectares as stated by the proponent in Table 10.6 of the BDAR. The total impact for Belson's Panic is 46.36 hectares.
Tylophora linearis	Unlikely to occur. Targeted surveys carried out within the study area did not locate this species (Table 7.2 BDAR). No statement has been made regarding the likely impact to this species.
Five-clawed Worm-skink *(Anomalopus mackayi)*	The species was not detected during a range of reptile surveys completed under favourable conditions in early 2021 or incidentally during other surveys. Habitat does exist but the closest database record of the species is 50 kilometres south-east or 80 kilometres south-west. However, a probable find was recorded 4 kilometres south of the study area on 5 July 2021 during a pre-clearing survey in PCT 52, as part of the separate Narrabri to North Star segment of the Inland Rail project. It is identified as an ecosystem credit species with low potential cumulative impact. However, areas of predicted important habitat will be impacted and as such an assessment of significance has also been conducted in accordance with MNES guidelines (refer Section 10.7.1.4 of the BDAR). In accordance with MNES guidelines, the proposal is likely to have a significant impact on important habitats of the species (Table 10.10 BDAR).
Adorned Delma *(Delma torquate)*	The species was not detected during a range of reptile surveys which were completed under favourable conditions in early 2021 or incidentally during other surveys. Suitable habitat does not occur within or adjacent to the study area. The proposal is located well outside the known range of the species. There is not expected to be a significant impact on this species (Table 10.10 BDAR).
Dunmall's Snake *(Furina dunmalli)*	Targeted nocturnal or diurnal reptile surveys were completed over several rounds of surveys and the species was not recorded. The subject land is outside of the '*The modelled distribution of Dunmall's snake (Furina dunmalli)´* found in the '*EPBC Act - Draft Referral guidelines for the nationally listed Brigalow Belt reptiles'*. There is not

	expected to be a significant impact on this species (Table 10.10 BDAR).

(e) Identify where further information from the proponent is critical to the assessment of MNES particularly in relation to mapping Table 1 (A), analysis of impacts Table 1 (F) and Table 2 (F), avoidance, mitigation and offsetting, and 6. DP&E would like to be made aware of this as soon as practicably possible – a phone call will do.

No further information is required.

2. Assessment of the relevant impacts

All EPBC Act-listed species and/or communities that the Commonwealth consider would be significantly impacted (as noted in the referral documentation) should be assessed and offset. These are referred to as relevant impacts. If you do not have the Commonwealth's referral brief contact the DP&E assessment officer.

(a) Verify [by ticking the following boxes]:

- ✓ the nature and extent of all the relevant impacts has been described
- ✓ measures to avoid and mitigate have been described
- ✓ an appropriate offset for any residual adverse significant impact has been determined. Note an offset is appropriate if calculated by the BAM and provides an offset specifically for the entity impacted.

The BDAR describes the nature and extent of all relevant direct and indirect impacts to MNES.

The BDAR describes all impact avoidance and mitigation measures applied to the project in Section 8.6, and this section of the BDAR addresses the requirements of the BAM. Refinement of the project footprint since the EIS was exhibited has resulted in the avoidance of impact to 83.59 hectares of Brigalow woodland TEC.

Offset requirements for MNES have been appropriately calculated using the BAM for all impacts associated with the proposed development. The proponent intends to retire the biodiversity credit obligation through one, or a combination of, the options available under the Biodiversity Offsets Scheme. The mechanisms available to the proponent to retire the offset obligation will be included in the project's approval conditions.

(b) Note if information in relation to any of these boxes has not been provided for any relevant EPBC Act-listed species and communities.

No further information is required.

(c) There may be listed threatened species and communities for which the proponent will claim that the impact will be not significant in accordance with the EPBC Act Significant Impact Guidelines. Please provide advice for cases where BCS disagrees with this finding. Note that generally the Commonwealth will not accept that a species determined to be significantly impacted at the referral decision stage is not likely to be significantly impacted unless strong evidence can be provided.

Species/Community	**Proponent's conclusion**	**BCS comments**
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	No assessment of significance has been completed.	Up to 4.6 hectares of Semi-evergreen vine thickets TEC will be removed as part of the proposal. Any removal of this TEC has the potential to reduce the extent of the TEC, fragment or increase fragmentation of the TEC, adversely affect habitat critical to the survival of the TEC, cause a substantial change in the species composition of the occurrence of the TEC and interfere with the recovery of the TEC. The occurrence of this TEC is limited to Borrow Pit 1, so avoidance of impact to this TEC might be possible during detailed design when final resource needs are clearly understood.
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) *(Phascolarctos cinereus)*	Due to the minimal extent of clearing of critical Koala habitat, and the likely low density to which the species utilises the area, there is not expected to be a significant impact on the species. Additionally, all impacted areas of predicted habitat will be offset in accordance with the BAM. As such, there is not expected to be significant residual impacts (Table 10.18 BDAR).	A total of up to 27.7 hectares of potential breeding habitat will be removed as part of the proposal. In addition to this 140.88 hectares of potential foraging habitat will be removed. BCS considers that removal of koala use trees in an already fragmented landscape will further fragment the availability of habitat to individuals.

Bluegrass *(Dichanthium setosum)*	Impacted areas of habitat are not considered to contain important populations and do not contain critical habitat features, and mitigation measures are expected to minimise the effects of native vegetation clearing. Additionally, impacted areas of predicted habitat will be offset in accordance with the BAM. As such, there is not expected to be significant residual impacts (Table 10.15 BDAR).	Bluegrass was not detected during targeted surveys however the proponent has assumed presence for the species for 26.1 hectares of habitat. An impact of this size could be considered significant.
Belson's Panic *(Homopholis belsonii)*	Impacted areas of habitat are not considered to contain important populations or critical habitat features and mitigation measures are also expected to minimise the effects of native vegetation clearing. Additionally, impacted areas of known locations and predicted habitat will be offset in accordance with the BAM. As such, there is not expected to be significant residual impacts (Table 10.14 BDAR).	This species was recorded in targeted surveys completed in the study area. A total of 46.36 hectares of potential habitat is proposed to be removed. An impact of this size could be considered significant.

(d) Provide references to where specific lists or tables are detailed in the EIS i.e. List of EPBC Act-listed EECs Appendix J Table 4 pg 65

Please note that all these references refer to the BDAR:

- *Commonwealth Matters* – Section 1.1.3
- *Targeted threatened flora surveys during January 2021 surveys* – Table 3.11, Page 76
- *Targeted species survey methodology, location and effort* – Table 3.12, Page 78
- *Plant community types and TEC's, broad condition classes (PCTs) and area of impact* – Table 5.1, Page 117
- *Vegetation profiles* – Section 5.2.1, Page 141
- *Ecosystem – credit species predicted to occur under BAM C within the subject land* – Table 6.1, Page 161

- *Species – credit species predicted to occur by BAM C within the subject land* – Table 6.3, Page 182
- *Threatened and migratory species observed within the study area and adjacent areas* – Table 6.9, Page 203
- *Threatened and migratory species observed within the study area and adjacent areas* – Table 6.10, Page 203
- *Threatened ecological communities (EPBC Act) identified within the Proposal* – Table 7.1, Page 205
- *Threatened flora species listed under the EPBC Act identified from database searches* – Table 7.2, Page 207
- *Threatened fauna species listed under the EPBC Act identified from database searches* – Table 7.3, Page 208
- *Like-for-like offsets within the Biodiversity Assessment Method* – Table 10.6, Page 265
- *EPBC Act listed ecological receptors assessed by the Significant Impact Assessment Methodology* – Table 10.7, Page 267
- *Estimation of potential magnitude of disturbance for each of the ecological receptors identified for the proposal* – Table 10.8, Page 268
- *Initial significance impact assessment of the proposal upon identified MNES* – Table 10.9, Page 270
- *MNES listed in the SEARS and summary recommendation* – Table 10.10, Page 271
- *MNES listed in the PMST (Appendix E) and select other species, and summary recommendation* – Table 10.11, Page 274
- *Assessment against the significant impact criteria: Belson's Panic (Homopholis belsonii)* – Table 10.14, Page 281
- *Assessment against the significant impact criteria: Bluegrass (Dichanthium setosum)* – Table 10.15, Page 283
- *Assessment against the significant impact criteria: Five-clawed worm-skink (Anomalopus mackayi)* – Table 10.16, Page 286
- *Koala assessment tool* – Table 10.17, Page 288
- *Assessment against the significant impact criteria: Koala (Phascolarctos cinereus)* – Table 10.18, Page 289
- *Assessment against the significant impact criteria: Brigalow (Acacia harpophylla dominant and co dominant)* – Table 10.19, Page 292
- *Assessment against the significant impact criteria: Natural grasslands on basalt and fine textured alluvial plains of northern New South Wales and southern Queensland* – Table 10.20, Page 294
- *Magnitude rating and justification of cumulative impacts within the cumulative impact assessment area* – Table 11.1, Page 297
- *Significance assessment of cumulative impacts within the cumulative impact area* – Table 11.2, Page 302
- *Summary of all credits generated within the project segments* – Table 12.1, Page 311
- *All credits generated within the project Greenfield alignment segment* – Table 12.2, Page 312
- All credits generated within the project Brownfields alignment segment – Table 12.3, Page 313

- *All credits generated within the project Early Works alignment segment* – Table 12.4, Page 315
- *All credits generated within the project Borrow pits segment* – Table 12.5, Page 317
- *Appendix C – EPBC and BC – TEC criteria and thresholds*
- *Appendix G – BAM credits – species profiles*
- Table 7 - Belson's Panic (*Homopholis belsonii*)
- Table 8 - Bluegrass (*Dichanthium setosum*)
- Table 37 - Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (*Phascolarctos cinereus*)
- Table 38 - Large-eared Pied Bat, Large Pied Bat (*Chalinolobus dwyeri*)
- Table 48 - Squatter Pigeon (southern) (*Geophaps scripta scripta*).

Table 1 Impact Summary Relevant EPBC Act –listed Ecological Communities

A	B	C	D	E		F	G
EPBC Act -listed EEC	**Y/N**	**PCTs**	**Y/N/comment**	**Ha**	**Credits**	**Comment**	**Relevant page numbers in the EIS**
Brigalow *(Acacia harpophylla* dominant and co-dominant)	Y	PCT 35 - Brigalow – Belah open forest/woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion	Y	17.51	595	A total of up to 17.51 hectares of this PCT will be removed as part of the proposal in the alignment and borrow pits. Of this, only 11.84 hectares of medium quality or higher PCT 35 meet the TEC condition assessment as per EPBC guidelines The anticipated impact to PCT 35 at the time of exhibition was approximately 101.1 hectares. Changes to the footprint since that time has reduced the residual impact to 17.51 hectares.	Table 10.6, Page 265, BDAR
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Y	PCT 52 - Queensland Bluegrass +/- Mitchell Grass grassland on cracking clay floodplains and alluvial plains mainly in the northern-eastern Darling Riverine Plains Bioregion	Y	33.5	1384	A total of up to 33.5 hectares of this TEC will be removed as part of the proposal in the alignment.	Table 10.6, Page 265, BDAR

A	B	C	D	E		F	G
EPBC Act -listed EEC	**Y/N**	**PCTs**	**Y/N/comment**	**Ha**	**Credits**	**Comment**	**Relevant page numbers in the EIS**
Weeping Myall Woodlands	Y	PCT 27 - Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Y	0.02	1	An area of 0.02 hectares of PCT 27 (medium quality) Weeping Myall open woodland occurs adjacent to Mobbindry Creek. Other areas of PCT 27 (low quality) do not meet the condition requirements for the EPBC Act- listing of Weeping Myall as there are no myall trees present.	Table 10.6, Page 265, BDAR
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Y	PCT 147 - Mock Olive - Wilga - Peach Bush - Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion	Y	4.6	127	At total of up to 4.6 hectares of this vegetation community will be removed as part of the proposal.	Table 10.6, Page 265, BDAR

(A) List the relevant EPBC Act listed ecological communities that will be significantly impacted in accordance with the referral documentation.
(B) Verify that there is evidence in the EIS that listed EEC and species habitat has been mapped in accordance with relevant listing guidelines (Yes/No). *Proponents are required by the SEARs to ensure that EPBC-listed communities are mapped in accordance with EPBC Act listing criteria. It is important that any derived native grassland components of an EPBC listed EEC are included in the mapping of native vegetation extent.*
(C) List the Plant Community Types (PCTs) associated with the ecological communities in accordance with the BAM.
(D) Confirm that the identification of PCTs has been correct (Yes/No) and comment if not correct.
(E) Record the area of impact (ha) and credits required.
(F) Comment on the analysis of the impacts in relation to the nature and extent of the impact and whether or not the EIS includes an analysis of the direct and indirect impacts to the EEC. Note whether further information might be required.
(G) Cite relevant page numbers for details provided the EIS and Appendices for each EEC.

Table 2 Impact Summary Relevant EPBC Act –listed Species

A	B	C	D	E		F	G
Threatened species (listed under the EPBC Act)	**Credit Type (SC/EC)**	**Record PCTs associated with ecosystem credits**	**Y/N/ Comment**	**Ha (total species habitat)**	**Credits (total species habitat)**	**Comment**	**Relevant page numbers in the EIS and Appendices**
Painted Honeyeater *(Grantiella picta)*	EC	Medium and high quality PCTs 27, 35, 36, 55, 56, 98, 147, 192, 244, 418, 628 and scattered paddock trees for PCTs 36 and 56. PCT 35 within Borrow Pit 1 and PCT 418 within Borrow Pit 25 were excluded as potential habitat for the species by the BAM accredited assessor as at 15 October 2021 due to the habitat constraint of mistletoes not being present.	Y	139.40	4177	The impact has been calculated in accordance with BAM.	Table 10.6, Page 266, BDAR
Corben's Long-eared Bat, South-eastern Long-eared Bat *(Nyctophilus corbeni)*	EC	PCTs 35, 36, 55, 56, 98, 147, 192, 244, 247, and 418 PCT 418 within Borrow Pit 25 was excluded as potential habitat for the species by the BAM Calculator as at 15 October 2021.	Y	247.62	6188	The impact has been calculated in accordance with BAM.	Table 10.6, Page 266, BDAR
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	SC EC	Medium and high quality PCTs 35, 36, 55, 56, 98, 147, 192, 244, 418, 628 and scattered paddock trees for PCTs 36 and 56 PCT 35 within Borrow Pit 1 was excluded as potential habitat for the species by the BAM accredited assessor as at 15 October 2021 due	Y	SC - 27.7 EC – 140.88	SC – 987 EC – 4073	The impact has been calculated in accordance with BAM.	Table 10.6, Page 267, BDAR Table 12.3, Page 315, BDAR

A	B	C	D	E		F	G
Threatened species (listed under the EPBC Act)	**Credit Type (SC/EC)**	**Record PCTs associated with ecosystem credits**	**Y/N/ Comment**	**Ha (total species habitat)**	**Credits (total species habitat)**	**Comment**	**Relevant page numbers in the EIS and Appendices**
(Phascolarctos cinereus)		to the absence of preferred feed trees at this location.					Table 12.4, Page 317, BDAR
Bluegrass *(Dichanthium setosum)*	SC	N/A	Y	26.1	1076	The impact has been calculated in accordance with BAM. This species was not detected during surveys however has been assumed to be present for 26.1 hectares.	Table 10.6, Page 266, BDAR Table 12.2, Page 313, BDAR Table 12.3, Page 315, BDAR
Belson's Panic *(Homopholis belsonii)*	SC	N/A	Y	46.36	1604	The impact has been calculated in accordance with BAM.	Table 10.6, Page 266, BDAR Table 12.2, Page 311, BDAR Table 12.3, Page 315, BDAR Table 12.5, Page 318, BDAR

A	B	C	D	E		F	G
Threatened species (listed under the EPBC Act)	**Credit Type (SC/EC)**	**Record PCTs associated with ecosystem credits**	**Y/N/ Comment**	**Ha (total species habitat)**	**Credits (total species habitat)**	**Comment**	**Relevant page numbers in the EIS and Appendices**
Five-clawed Worm-skink *(Anomalopus mackayi)*	EC	PCTs 27, 35, 36, 52, 55, 56, 244, 247, 628 and scattered paddock trees for PCTs 36 and 56	Y	268.17	7562	The impact has been calculated in accordance with BAM.	Table 10.6, Page 266, BDAR

(A) List the relevant threatened species that will be significantly impacted in accordance with the referral documentation.
(B) Record whether the relevant threatened species is classified as "species credit species" of ecosystem credit species for the purposes of the BAM.
(C) List the PCTs associated with the ecosystem credit species.
(D) Verify that the habitat polygons for MNES have been mapped appropriately representing the foraging and/or breeding habitat for the species that will be impacted by the development.
(E) Record the area of impact (ha) and credits required. For impacts associated with ecosystem credit species identify the total credit requirements associated with the cleared PCTs identified as habitat for the species.
(F) Comment on the adequacy of the analysis of the impacts in relation to the nature and extent of the impact and whether or not the EIS includes an analysis of the direct and indirect impacts to the species. Note if further information is required.
(G) Cite relevant page numbers for details provided in the EIS and Appendices for each threatened species.

3. Avoid, mitigate and offset

Comment on whether or not the EIS identifies measures to avoid and minimise impacts on the relevant EPBC Act-listed threatened species and communities. Section 8 of the BAM requires that proponents detail these efforts and commitments in the EIS. Identify gaps in the discussion on measures to avoid and minimise impacts on Commonwealth matters. Provide references to sections and page numbers in the EIS.

Section 8.6 of the BDAR discusses measures to avoid and minimise impacts. Key avoidance measures that have been implemented are;

- Optimisation of the proposal footprint was completed post submission of the EIS, this included reduction of areas attributed to borrow pits, laydown areas and early works. EIS disturbance area was has been reduced by 162.84 hectares (Table 8.3, Page 227, BDAR)
- Changes to the design footprint to reduce the potential impact to PCT 35 – Brigalow – Belah open forest/woodland. Six borrow pits were either removed or adjusted to reduce the impacts to PCT 35. The anticipated impact to PCT 35 at the time of exhibition was approximately 101.1 hectares, and following these design changes the residual impact is now 17.51 hectares (Section 8.6.1, Page 226, BDAR).

Comment on the adequacy and feasibility of measures to avoid and minimise impacts. Identify inadequacies where further efforts could be made to avoid and minimise impacts on Commonwealth matters. Provide references to sections and page numbers in the EIS that discuss avoidance and mitigation measures relevant to EPBC Act-listed species and communities.

See discussion above.

Portions of the proposal are located within the existing rail corridor and wherever possible are aligned to be co-located with existing road infrastructure. The ability to avoid further impacts to MNES is constrained by the location of the railway corridor. However, where flexibility exists, impacts will be prioritised in areas of previously disturbed land rather than native vegetation. It is expected that impacts to PCTs can be reduced during the detailed design phase.

BCS is satisfied with the avoidance and mitigation measures proposed.

References:

- Impact Mitigation – Section 8.6 page 226 - 235 – BDAR.

4. Offsetting

(a) Verify [by ticking the following boxes] that the offsets proposed to address impacts to EPBC-listed threatened species and communities are in accordance with the requirements under the EPBC Act.

- ✓ An appropriate offset for any residual adverse significant impact has been determined.
- ✓ Proposed offsets for EECs provide a like for like outcome i.e. proponents have identified PCTs attributed to the specific threatened ecological community being impacted
- ✓ Proposed offsets have been determined using the BAM.

If offsets have not been determined in accordance with the BAM, Planning is required to discuss the proposed approach with the Commonwealth as soon as possible.

Offset requirements for MNES have been appropriately calculated under the BAM. The Proponent commits to the retirement of biodiversity credits in accordance with the Biodiversity Offsets Scheme. The Proponent will apply the like-for-like or variation rules under the BC Act to meet the relevant biodiversity credit obligations. Variations rules would not apply to any MNES (page 319, BDAR).

The Proponent will be required to conform to the relevant like-for-like offset rules for EPBC Act-listed entities.

5. Comment on whether the information and data relied upon for the assessment have been appropriately referenced in the EIS. Comment on the validity of the sources of information and robustness of the evidence.

The information and data used in the assessment has been appropriately referenced, and the sources of information are valid. Information has largely been sourced from the NSW Threatened Biodiversity Data Collection (TBDC) and relevant Commonwealth guidelines.

Table 3 Summary of offset requirements

A	B	C	D	E	F
Threatened species or EEC (listed under the EPBC Act)	**Credits required as calculated by the BAM**	**Credits generated from offsets in remnant vegetation**	**Credits generated from offsets proposed by other means**	**Comment on the proposed offsets**	**Relevant page numbers in the EIS and Appendices**
Brigalow *(Acacia harpophylla* dominant and co-dominant)	595	Not yet identified. Credits will be retired in accordance with the BOS.	Not yet identified. Credits will be retired in accordance with the BOS.	The proponent intends to meet the credit requirements through one, or a combination of the options available under the BOS.	Table 10.6, Page 265, BDAR Section 12, Page 316, BDAR
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	1384				Table 10.6, Page 265, BDAR Section 12, Page 316, BDAR
Weeping Myall Woodlands	1				Table 10.6, Page 265, BDAR Section 12, Page 316, BDAR
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	127				Table 10.6, Page 265, BDAR Section 12, Page 316, BDAR
Belsons Panic	1604				Table 10.6, Page 265, BDAR Section 12, Page 311, BDAR

A	B	C	D	E	F
Threatened species or EEC (listed under the EPBC Act)	**Credits required as calculated by the BAM**	**Credits generated from offsets in remnant vegetation**	**Credits generated from offsets proposed by other means**	**Comment on the proposed offsets**	**Relevant page numbers in the EIS and Appendices**
Bluegrass	1076				Table 10.6, Page 266, BDAR Section 12, Page 311, BDAR
Koala (Breeding)	987				Table 10.6, Page 266, BDAR Section 12, Page 311, BDAR
Koala (Foraging)	4073				Table 10.6, Page 267, BDAR Section 12, Page 311, BDAR
Painted Honeyeater	4177				Table 10.6, Page 266, BDAR Section 12, Page 311, BDAR
Corben's Long-eared Bat	6188				Table 10.6, Page 265, BDAR Section 12, Page 311, BDAR
Five-clawed Worm Skink	7562				Table 10.6, Page 265, BDAR Section 12, Page 311, BDAR

(A) List the relevant threatened species or ecological community included in the proposed offset package (these are the listed species and communities that will be significantly impacted in accordance with the *EPBC Act Significant Impact Guidelines 1.1*.). Identify any relevant species or ecological communities which have not been included in the proposed offset package.

(B) List the total credit requirement identified by the BAM for impacted listed threatened species and ecological community. For EECs and ecosystem credit species this is the sum of the credits generated by PCTs associated.

(C) Identify the total number of required credits which are proposed to be retired through conserving and managing remnant / mature vegetation.

(D) Identify the number of credits proposed to be met through other methods allowable under the BAM, such as rehabilitation of impacted areas or regrowth vegetation.

(E) Comment on the adequacy of the proposed offset in meeting requirements of the BAM and the EPBC Act. In particular is there a reasonable argument for a shortfall in credits required for MNES and/or non-compliance with like-for like? Are the offsets proposed by means other than protection of remnant vegetation adequate?

(F) Reference the relevant page numbers from the EIS and Appendices for each threatened species and community.

Appendix K Matters of National Environmental Significance Assessment

In accordance with the bilateral agreement (Amending Agreement No.1) between the Commonwealth and NSW Governments, the Department provides the following additional information required by the Commonwealth Minister for the Environment and Water (the Minister), in deciding whether or not to approve a controlled activity under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Department considers that all threatened species and ecological communities protected under Part 3 of the EPBC Act have been adequately assessed and documented in the North Star to NSW/Queensland Border Environmental Impact Statement (2020) (EIS) and North Star to NSW/Queensland Border Environmental Impact Statement - Submissions Report (2020). This assessment has been prepared based on the information contained in Chapter 11 (Biodiversity) and Chapter 27 (Environmental Management Plan), and Appendix B (Updated Terrestrial Biodiversity Technical Report, 20/10/2021[11]) and Appendix S (Aquatic Biodiversity Technical Report) of the EIS; Chapter 5.2 (Biodiversity development assessment report) and Chapter 8.5 (Revised mitigation measures) in the Submissions Report; supplementary information provided by the Proponent during the assessment process; and advice provided by the Department's Biodiversity, Conservation and Science Directorate (BCS).

This Appendix is supplementary to and should be read in conjunction with the Department's consideration of impacts to listed threatened species and communities, mitigation and offsetting measures for threatened ecological communities and threatened species, including for matters of national environmental significance (MNES), in **Section 6.2** of the assessment report.

M.1 REQUIREMENTS FOR DECISIONS ABOUT THREATENED SPECIES AND ENDANGERED ECOLOGICAL COMMUNITIES

In accordance with section 136 of the EPBC Act, in deciding whether or not to approve the taking of an action and what conditions to attach to an approval, the Minister must consider matters relevant to any matter protected by a provision of Part 3 that the Minister has decided is a controlling provision for the action. These matters are addressed below and in Table 1 of this report on MNES.

In accordance with section 139 of the EPBC Act, in deciding whether or not to approve, for the purposes of section 18 or section 18A of the EPBC Act, the taking of an action and what conditions to attach to such an approval, the Minister must not act inconsistently with certain international environmental obligations, Recovery Plans or Threat Abatement Plans. The Minister must also have regard to relevant approved Conservation Advice.

Australia's International Obligations

Australia's obligations under the *Convention on Biological Diversity* (Biodiversity Convention) include the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

[11] The Biodiversity Development Assessment Report (Revision 10, 21 October 2021) was updated to the Biodiversity Assessment Method 2020.

The Department considers that the recommendations of the Biodiversity Development Assessment Report (BDAR) (as updated by the BDAR in the Submissions Report dated 2021) and this assessment report are not inconsistent with the Biodiversity Convention, which promotes environmental impact assessment (such as this process) to avoid and minimise adverse impacts on biological diversity. The recommended approval requires avoidance, mitigation and management measures, and offsetting for the listed threatened species and communities. In addition, all information related to the proposed action is required to be publicly available to ensure equitable sharing of information and improved knowledge relating to biodiversity.

Australia's obligations under the *Convention on Conservation of Nature in the South Pacific* (APIA Convention) include encouraging the creation of protected areas which together with existing protected areas will safeguard representative samples of the natural ecosystems occurring therein (particular attention being given to endangered species), as well as superlative scenery, striking geological formations and regions. Additional obligations include using their best endeavours to protect such fauna and flora (special attention being given to migratory species) so as to safeguard them from unwise exploitation and other threats that may lead to their extinction. The APIA Convention was suspended with effect from 13 September 2006. While this Convention has been suspended, Australia's obligations under the Convention have been taken into consideration. The recommendations are not inconsistent with the Convention which has the general aims of conservation of biodiversity.

The *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES) is an international agreement between governments which seeks to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The recommendations are not inconsistent with CITES as the proposed action does not involve international trade in specimens of wild animals and plants.

Recovery Plans and Approved Conservation Advices

There are approved Conservation Advice for the following communities and species:

- Weeping Myall Woodlands
- Brigalow (Acacia harpophylla dominant and co-dominant)
- Natural grasslands on basalt and fine textured alluvial plains of northern NSW and southern Queensland
- Corben's Long-eared Bat, South-eastern Long-eared Bat (*Nyctophilus corbeni*)
- Bluegrass (*Dichanthium setosum*)
- Belson's Panic (*Homopholis belsonii*).

There are approved Conservation Advice and Recovery Plans for the following species:

- Koala (*Phascolarctos cinereus* (combined population of Queensland, New South Wales and the Australian Capital Territory))
- Painted Honeyeater (*Grantiella picta*).

There is no Conservation Advice for the Murray Cod (*Maccullochella peelii*), however there is a Recovery Plan for the species.

There is no Conservation Advice for the **Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions ecological community,** however there is a Recovery Plan for the community**.**

Conservation Advices

Weeping Myall Woodlands – Endangered

The conservation advice was approved on 17 December 2008. This plant community is found in the Riverina, NSW South Western Slopes, Darling Riverine Plains, Brigalow Belt South Brigalow Belt South North, Murray-Darling Depression, Nandewar and Cobar Peneplain IBRA Bioregions. Its main threats are clearing and ongoing degradation as it occurs on highly fertile and arable soils which are sought after for cropping. Other threats include overgrazing, weed invasion and herbivory by caterpillars of the Bag-shelter moth. The proposal will impact up to 0.02 hectares of medium quality condition vegetation. Other areas of the plant community are of low quality which does not meet the EPBC condition requirements. The Department does not consider the proposal would have a significant impact on the ecological community. The Proponent has committed to the retirement of ecosystem credits in accordance with the BAM guidelines to offset impacts to the community.

Brigalow (Acacia harpophylla dominant and co-dominant) – Endangered

The conservation advice was approved on 17 December 2013. Brigalow woodlands are found mostly west of the Great Dividing Range, stretching north almost to Townsville in Qld and south to Narrabri in NSW, and west to Bourke on the Darling River. The most important threats are clearing, fire, weeds, feral animals and inappropriate grazing. Climate change is also emerging as a threat which requires consideration. Impacts to the Brigalow woodland have been reduced from 101.1 hectares to 17.51 hectares in the alignment and borrow pits. Only 11.78 hectares of this plant community comprises medium quality or higher. Although the impact to this ecological community could be considered to be significant, the Department notes that the proposal has been revised to avoid high quality vegetation at a borrow pit and the Proponent has committed to retirement of ecosystem credits to offset this impact.

Natural grasslands on basalt and fine textured alluvial plains of northern NSW and southern Queensland – Critically Endangered

The conservation advice was approved on 15 December 2008. This plant community occurs from the Darling Downs in Queensland to Dubbo in NSW, incorporating the Moree and Liverpool plains. Its main threats are heavy grazing, cropping, mining, weeds and dryland salinity. The location of these grasslands on fertile soils can lead to pressure to repurpose land for cropping. Up to 33.5 hectares of this plant community will be removed for the proposed alignment. The Department notes the Proponent has committed to the retirement of ecosystem credits to offset this impact.

Painted Honeyeater – Vulnerable

The conservation advice was approved on 25 June 2015. This species is sparsely distributed between south-eastern Australia and the Northern Territory, with concentrations between the Grampians, Victoria and Roma, Queensland. Its main threat is habitat loss; other threats include grazing, competition with and predation by other species. The proposal directly impacts 139.4 hectares of the species habitat. Although the BDAR considered the impact would not be significant, the clearing of 139.4 hectares of the community and the presence of medium to high quality

vegetation could be considered to be a significant impact. The Proponent has committed to provide ecosystem credits to offset the impact of the proposal on this species.

Corben's Long-eared Bat, South-eastern Long-eared Bat (*Nyctophilus corbeni*) – Vulnerable

The conservation advice was approved on 1 October 2015. This species is found across the Murray Darling Basin, with concentrations in the Pilliga Forest, Nandewar Range and the Brigalow Belt South bioregion. The main threats are habitat loss, habitat degradation and habitat fragmentation due to agricultural activities and extractive industries. Other threats include fire, reduced hollow availability, exposure to agrichemicals, grazing and potentially predation by feral animals. The proposal impacts 247.62 hectares of the species habitat which would be offset by the securing and retirement of ecosystem credits.

***Phascolarctos cinereus* (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory – Endangered[12]**

The conservation advice was approved on 12 February 2022. The Koala's distribution includes Queensland, New South Wales, the Australian Capital Territory, Victoria and South Australia. The listed population of the Koala has a wide but patchy distribution that spans the coastal and inland areas of Queensland north to the Herberton area and westward to Central Queensland, New South Wales and the Australian Capital Territory. The northern NSW distribution includes the Mulga Lands, Darling Riverine Plains, Brigalow Belt South, Nandewar, New England Tablelands, and South East Queensland (NSW Section) bioregions, within Pilliga forest, low woodland and forested areas. The decline in Koala distribution is associated with habitat loss, temperature increase and drought. The threat of extinction risk is greater in western New South Wales under scenarios of climate and land use change. Koala populations are also impacted by disease and mortality from vehicle strike and dog attacks. The proposal directly impacts 27.7 hectares of breeding habitat and 140.88 hectares of foraging habitat. The Proponent has committed to secure species and ecosystem credits to offset impacts to Koala breeding and foraging habitat, respectively.

***Dichanthium setosums* (bluegrass) – Vulnerable**

The conservation advice was approved on 26 March 2008. Bluegrass occurs chiefly on the northern tablelands and is more rarely found on the north-western slopes, central western slopes and north-western plains of New South Wales extending west to Narrabri. The main threats are stock grazing, clearing for pasture and cropping, fire and invasion by introduced grasses. The species was not detected during surveys however its presence has been assumed on 26.1 hectares of potential habitat. The Department considers that the potential impact could be significant, however, the Proponent has committed to offset the impact by securing species credits.

***Homopholis belsonii* — Belson's Panic – Vulnerable**

The conservation advice was approved on 1 October 2008. The species is known to occur in the southern Brigalow belt (Queensland) and the north-western slopes and plains of New South Wales (between Wee Waa, Goondiwindi and Glen Innes). The main threats are habitat clearing for agriculture and mining, stock overgrazing and weed invasion. The proposal impacts 46.34 hectares of

[12] At the time the proposal was declared a controlled action, the Koala was listed as Vulnerable under the EPBC Act.

habitat, which is considered to be significant. The Proponent has committed to offset the impacts by the provision of species credits.

Recovery Plans

National recovery plan for the "Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions" ecological community

The Recovery Plan for the Semi-evergreen vine thickets TEC came into effect on 12 March 2010. The threats to the TEC are from vegetation clearing, fire, weeds, grazing and vertebrate pests. The aim of the recovery plan is to maintain and conserve the environmental values of the TEC by minimising the loss of remnant and regrowth semi-evergreen vine thicket vegetation and improving their condition and management.

The recovery action of relevance to the proposal is to encourage landowners to enter into conservation agreements over semi-evergreen vine thickets. The proposal directly impacts 4.6 hectares of the community which the Proponent has committed to source 127 ecosystem credits. The provision of the ecosystem credits will result in the conservation and protection of the community, either through the establishment of Biodiversity Stewardship Sites on private or the Proponent's land or sourcing the required offsets through the Register.

The Proponent has included a compensatory action in the Biodiversity Offset Package for the proposal to meet the requirements of the Department's Deferred Biodiversity Offset Obligation Policy (which defers for two-years the requirement to retire biodiversity offsets prior to disturbance to the biodiversity values of the proposal). The proposed compensatory measure involves seed collection and storage at Mount Annan botanic garden. The proposed compensatory measure does not affect the implementation of the Recovery Plan.

The Department is satisfied the Proponent's commitment is consistent with the Recovery Plan for the community.

National Recovery Plan for the Painted Honeyeater (*Grantiella picta*)

The Recovery Plan for the Painted Honeyeater came into effect on 16 June 2022. The Plan notes that threats to the species already fragmented habitat are not abating with habitat continually being cleared for agriculture and industrial development and degraded by over-grazing, as identified in the approved Conservation Advice.

The long term vision of the Recovery Plan is for the population of the Painted Honeyeater to have increased in size to such an extent that the species no longer qualifies for listing as threatened under the EPBC Act. The Recovery Plan objectives are that by 2031 to sustain a positive population trend (compared to 2020 baseline) in the number of mature individuals, and to maintain or improve the extent, condition and connectivity of the habitat. The Recovery Plan identifies six strategies to achieve these objectives, of which one "to protect, manage and restore Painted Honeyeater breeding and foraging habitat" is potentially relevant to the proposal.

The Key Biodiversity Area (KBA) program is an international initiative to identify, map, monitor and conserve critical sites for global biodiversity. The global KBA partnership recognises seven KBAs as important for the Painted Honeyeater. The proposal does not impact any KBA, with the nearest KBA, the Pillaga Forest, located approximately 200 kilometres to the south-west near the towns of Baradine and Narrabri.

The Painted Honeyeater is an ecosystem credit species. The proposal impacts 139.4 hectares of moderate to high condition PCTs which is considered to be habitat for the species. Low quality PCTs contain no trees and there is little or no habitat for mistletoes and therefore no suitable habitat for the Painted Honeyeater. One individual was recorded in Box Gum Woodland during targeted surveys.

The assessment considered the cumulative project impacts on the species to be low and therefore is not considered to have a significant impact, although the Department considers the proposal has a significant impact. It is noted that the Proponent has committed to provide ecosystem credits to offset impacts to the habitat of the species. Overall, the Department considers that the provision of ecosystem credits for the PCTs impacted is consistent with the Recovery Plan's strategic action of protecting, managing and restoring foraging habitat for the species.

National Recovery Plan for the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory)

The Recovery Plan for the combined population of the Koala came into effect on 8 April 2022 and sets out an approach for a national integrated recovery effort. The Recovery Plan notes that land use change (habitat loss, fragmentation and degradation) and climate change present overarching threats to the Koala. Other direct threats include disease, dogs and vehicles.

The Recovery Plan's objectives for 2032 are to stabilise and then increase the area of occupancy and estimated populations and maintain or improve the health of Koalas (genetics and disease) and their ecosystems.

The Proponent has included a compensatory action in the Biodiversity Offset Package for the proposal to meet the requirements of the Department's Deferred Biodiversity Offset Obligation Policy (which defers for two-years the requirement to retire biodiversity offsets prior to disturbance to the biodiversity values of the proposal. The compensatory measure undertook 5-days Koala scat scent detection dog surveys of the proposed alignment, as a component of a wider Inland Rail Koala Genetics Project with the University of South Queensland to fill information gaps on Koalas.

The proposal directly impacts 27.7 hectares of Koala habitat, of which 2.66 hectare is critical Koala habitat. The density of Koala use of the habitat is likely to be low density, regardless the proposal area is not considered to be an important population. The Proponent considers the implementation of the Recovery Plan is not affected by the proposal and has committed to offset impacts to Koala habitat by the provision of species credits and ecosystem credits, and further, the Koala genetics study is consistent with the Recovery Plan action to improve the health of Koalas.

National Recovery plan for the Murray Cod *Maccullochella peelii peelii*

The Recovery Plan for the Murray Cod came into effect on 16 December 2010. Threats to the species' decline include habitat loss and degradation, barriers to fish passage, flow regulation and fishing (legal and illegal).

The goal of the Recovery Plan is to rehabilitate Murray Cod populations in the Murray Darling Basin to 60% (or better) of estimated pre-European settlement levels after 50 years of implementation.

The Recovery Plan identifies the McIntyre River downstream of Texas, Qld as a location with an important population of Murray Cod. The proposal crosses the McIntyre River (single span bridge) within this stretch of the McIntyre River (approximately 100 kms downstream (north-west) of Texas).

The proposal may impact 1.15 hectares of Murray Cod habitat (based on maximum unmitigated disturbance), which would be reconsidered during detailed design of the bridge crossing of the McIntyre River. The aquatic species assessment considered the proposal has minimal impact on Murray Cod habitat and would not impact the implementation of the Recovery Plan. The Department considers the proposal does not significantly impact the Murray Cod and has recommended conditions of approval which:

- restrict high risk construction activities (piling and the installation and removal of work platforms and waterway crossings) during the Murray Cod breeding period
- provides beneficial Murray Cod habitat such as woody debris (snags) downstream of the bridge crossing.

These measures would assist the implementation of the Recovery Plan to rehabilitate habitat for the Murray Cod.

Threat Abatement Plans

The Threat Abatement Plans (TAP) relevant to this action are discussed below and are available at

http://www.environment.gov.au/biodiversity/threatened/threat-abatement-plans/approved.

- **Threat abatement plan for competition and land degradation by rabbits**

The European Rabbit is one of the most widely distributed and abundant mammals in Australia and cause substantial damage to native flora and fauna, vegetation communities and sensitive sites. The direct impacts of the rabbit on vegetation include preventing plant regeneration, overgrazing and damage to plant species, reversing plant succession processes and altering communities and changing the soil structure and nutrient cycling.

The TAP aims to minimise land degradation and impacts to threatened species and ecological communities by strategically managing rabbits at the landscape scale, improving knowledge of the impacts of rabbits, improving the effectiveness of rabbit control programs and increased awareness and engagement by the community of the environmental impacts of rabbits.

The BDAR considered that the proposal would not interfere with these objectives of the TAP.

Land degradation and disturbance has been identified by the approved Conservation Advice for Bluegrass as a key threat to the species. Construction of linear infrastructure through large patches of intact vegetation can result in the establishment of pest species into areas where they are currently absent or in low numbers.

Measures to control pest animals can be addressed through construction and operational management plans.

Therefore, the Department does not consider the approval of the proposal would be inconsistent with the TAP to address land degradation by rabbits.

- **Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads**

The TAP notes that cane toads may have a direct or indirect impact on native species and potentially the ecological communities in which these species occur. There are eight threatened ecological communities listed under the EPBC Act that fall within the current geographic range of the cane toad. Three of these TECs are in the proposal area:

- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions
- Weeping Myall Woodlands
- Brigalow (*Acacia harpophylla* dominant and co-dominant).

Currently none of the listing advices for these TECs indicate that cane toads are a threat to the community, although the Recovery Plan for the Semi-evergreen vine thickets TEC notes threats from cane toads and their possible impact.

The BDAR considered that the proposal would not interfere with TAP which provides a national strategy to guide investment and effort in abating the impacts of cane toads across their known and anticipated range.

Construction of linear infrastructure through large patches of intact vegetation can result in the establishment of pest species into areas where they are currently absent or in low numbers.

Measures to control pest animals can be addressed through construction and operational management plans.

Therefore the Department does not consider the approval of the proposal would be inconsistent with the TAP for biological effects, including lethal toxic ingestion, by cane toads.

- **Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs**

Feral pigs are usually associated with wetlands and river systems. The ecological parameters affected by feral pigs include plant species composition and succession, nutrient and water cycles and water quality. The TAP noted that Impacts can be direct such as digging and destruction of plants and indirectly through long term changes in species composition such as reduced or failed recruitment of new plants, changing the composition of plant communities and aeration of soil structure through digging and rooting, and spread of weed seeds.

Within the proposal area the greatest threat of feral pigs is to the habitat of the threatened flora species Bluegrass.

The feral pigs TAP aims to manage feral pigs within existing policy, legislative and planning frameworks, reduce their spread to new areas, manage feral pigs and build the capacity to address feral pig problems and raise awareness and motivation to act on feral pig problems.

Construction of linear infrastructure through large patches of intact vegetation can result in the establishment of pest species into areas where they are currently absent or in low numbers.

Measures to control pest animals can be addressed through construction and operational management plans.

Therefore, the Department does not consider the approval of the proposal would be inconsistent with the TAP to manage feral pigs.

M.2 REQUIREMENTS FOR DECISIONS ABOUT WORLD HERITAGE PROPERTIES

The Commonwealth determined that the action is not a controlled action for the controlling provision of World Heritage (section 12 and section 15A of the EPBC Act), and therefore further consideration is not required.

M.3 REQUIREMENTS FOR DECISIONS ABOUT NATIONAL HERITAGE PLACES

The Commonwealth determined that the action is not a controlled action for the controlling provision of National Heritage (section 15B and section 15C of the EPBC Act), and therefore further consideration is not required.

M.4 ADDITIONAL EPBC ACT CONSIDERATIONS

Table 1 contains the additional mandatory considerations, factors to be taken into account and factors to have regard under the Act, additional to those already discussed, which the Commonwealth Minister must consider in determining the proposed action.

Table 1: Additional considerations for the Commonwealth Minister under the EPBC Act

EPBC Act section	Considerations	Conclusion
Mandatory considerations		
136(1)(b)	Social and economic matters are discussed in **Section 6.6 and 6.9** of the assessment report.	The Department considers that the project would result in a range of benefits to State and regional economy through improvements in the efficiency of the inter- and intra-state rail freight network.
Factors to be taken into account		
3A, 391(2)	Principles of ecologically sustainable development (ESD), including the precautionary principle, have been taken into account, particularly: • the long-term and short-term economic, environmental, social and equitable considerations that are relevant to this decision • conditions that restrict environmental impacts and impose monitoring and adaptive management reduce any lack of certainty related to the potential impacts of the project • conditions requiring the project to be delivered and operate in a sustainable way to protect the environment for future generations and conserving the relevant matters of national environmental significance • advice provided within this report reflects the importance of conserving biological diversity and ecological integrity in relation to the controlling provisions for the project • mitigation measures to be implemented which minimise potential impacts of the	The Department considers that the project, if undertaken in accordance with the recommended conditions of approval, would be consistent with the principles of ESD. **Section 4.5** of the assessment report addresses the proposal in regards to ESD principles.

	project on biodiversity within the project area.	
136(2)(e)	Other information on the relevant impacts of the proposed action – the Department is not aware of any relevant information not addressed in this assessment report.	The Department considers that all information relevant to the impacts of the proposal have been taken into account in this assessment. The Department's consideration on key issues is presented in **Section 6** of the assessment report.
Factors to have regard to		
176(5)	Bioregional plans	There is no relevant bioregional plan.
Considerations on deciding on conditions		
134(4)	Must consider: • information provided by the person proposing to take the action or by the designated proponent of the action • the desirability of ensuring as far as practicable that the condition(s) is a cost-effective means for the Commonwealth and a person taking the action to achieve the object of the condition.	All project related documentation is available at the Department's website www.majorprojects.planning.nsw.gov.au. The Department considers that the recommended conditions at **Appendix K** are a cost-effective means of achieving their purpose.

M.5 CONCLUSIONS ON CONTROLLING PROVISIONS

Threatened species (sections 18 and 18A of the EPBC Act)

For the reasons set out in **Section 6.2** and this Appendix, the Department recommends that the impacts of the action on threatened species will be acceptable, subject to the implementation of the avoidance and mitigation measures described in the EIS and Submissions Report and the requirements of the recommended conditions.

M.6 OTHER PROTECTED MATTERS

The Commonwealth DCCEEW determined that other matters under the EPBC Act are not controlling provisions with respect to the proposed action. These include listed migratory species, RAMSAR wetlands, Commonwealth marine environment, world heritage properties, national heritage places, nuclear action, Great Barrier Reef Marine Park and a water resource associated with a large coal mining or coal seam development.

Appendix L Recommended Instrument of Approval

See NSW Planning Portal website:

https://www.planningportal.nsw.gov.au/major-projects/project/10221